THE

REPERTORY

OF

PATENT INVENTIONS:

AND OTHER

DISCOVERIES AND IMPROVEMENTS

IN

ARTS, MANUFACTURES,

AND

AGRICULTURE,

BEING A CONTINUATION, ON AN ENLARGED PLAN, OF THE

Repertory of Arts & Manufactures,

A WORK ORIGINALLY UNDERTAKEN IN THE YEAR 1794, AND STILL CARRIED ON, WITH A VIEW
TO COLLECT, RECORD, AND BRING INTO PUBLIC NOTICE,

USEFUL INVENTIONS OF ALL NATIONS.

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THE

REPERTORY

OF

PATENT INVENTIONS, &c.

No. LV. JANUARY, 1830.

Specification of the Patent granted to JOHN DAVIS, *of Leman Street, Goodman's Fields, in the county of Middlesex, Sugar Refiner, for a certain improvement in the condenser used with his apparatus for boiling sugar in vacuo, for which a patent was granted him the 29th day of March, 1828, entitled, "An Improvement in boiling or evaporating "solutions of Sugar and other Liquids."* Communicated by a Foreigner.*—Dated 2nd October, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Davis, do hereby declare the nature of the said invention to consist, in a certain improvement in the condenser used with the said John Davis's former patent apparatus for boiling sugar, whereby the necessary vacuum is not formed by the admission and eduction of water, as therein described; but by the introduction of steam from the boiler or pan into the condenser, thus doing away with the torrecellian column mentioned in the former patent of the said John Davis. And in further compliance with the said proviso, I, the said John Davis, do hereby

* For Specification of which see p. 456 of our last volume.

describe the manner in which my said invention is to be performed by the following description thereof, reference being had to the drawing annexed, and to the letters marked thereon, (that is to say):—

Description of the Drawing.

Fig. 1, (Pl. I,) represents a sugar boiling pan on the former principle, with the said condenser applied thereto, having such portions of the apparatus shown in section, as it was thought would give the clearest explanation of it. A, B, C, D, E, F, are the sugar pan, the feed pipe, proof stick, discharge cock, furnace, ash pit, &c. &c. all of which are too well known to need any further explanation; and G is the pipe which connects the pan with the said condenser, and is in fact, a steam pipe. H is a water tight vat filled with water, for the purpose of keeping the apparatus which is within it always covered with water, and thus air tight. I is a stout cask set into the vat H, with an agitator inside it, which agitator is turned by the handle J working in stuffing boxes to prevent the admission of air. K is a glass tube communicating at each end with the inside of the cask I, through the sides of the vat H, serving as a guage to show the quantity of water in the cask. L is a discharge cock for the vat. M is a feed pipe supposed to lead from an elevated reservoir of cold water. N is a feed cock to fill the vat. O is a feed cock to fill the cask I through the pipe P, and Q is an air cock to let the air escape from the cask as it fills. T is a supply pipe leading from the cask I to the condenser V, for the purpose of supplying cold water to the condenser, and R is a stop cock to regulate the supply.

Now this condenser is a large cask set within another cask, the outer cask being filled with water to keep the inner one air tight. W is a shelf of wood or iron perforated with holes to spread the steam when it first rushes into the condenser. U is a stop cock to cut off the communication between the pan and the condenser. S is a steam pipe, which receives the steam from the pan A through the pipe G. Now this pipe S it will be seen, communicates at its upper end with the cask I, the effect of which is, that when the steam from the pan A is allowed to pass into the pipe G, a portion of the steam passes up the pipe S and acts on the surface of the water in the cask, thus driving a portion of that water through the pipe T into the condenser, while the other portion of steam passes down into the condenser, and is there condensed by the water that is forced in as aforesaid. Y is a waste pipe leading from the condenser to the reservoir or waste place Z.

Having now described the various parts of the said apparatus, I shall proceed to describe the manner of using the same, and the mode of creating and keeping up a vacuum therewith, during the process of sugar boiling.

The first thing to be done is, to fill the outer casing of the condenser with cold water, and also the vat H; then stop the cocks N R and *r*; and open the cocks O and Q, this will admit water from the elevated reservoir of cold water through the pipe M into the cask I and the pipes S and T, while the air that the water displaces will find vent at the air-cock Q; when the cask is completely filled with water, the cocks O U and Q are to be stopped, and the cock *r* opened, this will cause a portion of the water in the cask I and pipe S to fall into the condenser, and when it has dropped eight or ten inches, which will be seen by observing the gauge or glass tube K, the cock *r* must be stopped again and the agitator in the cask I must be turned round by means of the handle J, in order to disengage whatever portion of air may be in the water in the cask, and which will by this means, rise to the upper part of the cask; the cocks O and Q must then be opened again, and more water admitted, which will again fill the cask, and expel the air that has been disengaged, by which means, the water in the cask I, will be as free from any portion of air as possible, and thus fitted for the purpose it is intended to accomplish. The cocks O and Q must now be closed again for the last time during the operation. When in this state, the apparatus is ready for the process of boiling and condensation to commence. The fire must now be lighted in the furnace, the liquor measured into the boiler or pan, and heated in the ordinary way. When the steam in the pan has been got up to a pressure of more than fifteen pounds to the square inch, the water in the condenser must be drawn off by the pipe Y, and the cocks U and X must be opened. The steam from the pan will rush into the condenser and expel what atmospheric air may be in it, and rush out of the waste pipe Y; when this is accomplished, shut the waste cock X, and open the cock R, and partly open the cock *r*; a portion of the steam will instantly rush up the pipe S, into the upper part of the cask I, and thus cause a pressure on the surface of the water in the cask, while another portion will rush downwards into the condenser V, striking upon the perforated plate W, and distributing itself for condensation; the cock *r* being partly opened, the effect produced will be as follows,—the force of the steam which is passing up the pipe S into the cask I, will act with sufficient force of pressure on the surface of the water in the cask, to force out as much as is required for the purposes of condensation through the pipe T and the cock *r* into the condenser V, which quantity may be regulated by the cock *r*; the cold water thus flowing constantly into the condenser will condense the steam there, and the condenser must be of a size to hold all the condensing and condensed water required for one operation, as this operation will continue till the whole of the liquor in the pan is sufficiently evaporated for the purpose of the operator. The general proportions of the apparatus as attached to an ordinary sugar pan, holding about fifty gallons, are here shown, but as a useful general guide to the size of the apparatus, it is only necessary to observe, that the cask I should be large enough to hold sufficient water to condense all the steam that will be generated in one operation of the boiling pan, as it cannot be replenished during the process of boiling, and the condenser of the relative size hereinbefore shewn. When the operation is concluded, it is hardly necessary to observe, that the water is drawn out of the condenser by the waste pipe Y, and the cask I again filled as before, for the next operation. *h* is merely a guage to ascertain the quantity of water in the condenser.

Now whereas, I claim only as the invention, the following improvement, viz.—The substitution of the common waste pipe to the bottom of the condenser, instead of the torrecellian column, and an enlargement of the condenser to about six times the size of that required in the said John Davis's former apparatus, by which said improvement I am enabled to form the required vacuum by the introduction of steam from the boiler or pan into the condenser, as hereinbefore described, which does away with the necessity of the torrecellian column, and the consequent height of the apparatus above the well of waste water, which is often extremely difficult to procure, while it greatly simplifies the operation. And such the invention, being to the best of my knowledge and belief, entirely new, and never before used within that part of His said Majesty's United Kingdom of Great Britain and Ireland, called England, His said dominion of Wales or Town of Berwick upon Tweed, nor in any of His said Majesty's Colonies or Plantations abroad; I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to the said invention.

In witness whereof, &c.

Specification of the Patent granted to Samuel Sevill, *of Brownshill, in the parish of Disley, in the county of Gloucester, Clothier, for certain improvements applicable to raising the pile and dressing woollen, and other cloths.*— Dated 20th May, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.— *Now know ye,* that in compliance with the said proviso, I, the said Samuel Sevill, do hereby describe the manner in which my said invention is to be performed, by the following description thereof, (that is to say):—

My said invention consists, first, in the application of springs to the blades of cloth shearing machines, whether the same be applied to the ledger blades or to the running blades, for the purpose of keeping the blades always in contact with each other, and thus compensating for the wearing of the blades by the continued friction, and keeping a regular and ascertained pressure of one blade against the other. And secondly, in giving additional elasticity to the boards on which wires set in leather are used for raising the pile of cloth. And in further compliance with the said proviso, I, the said Samuel Sevill, do hereby describe the manner in which my said invention is to be performed, by the following description thereof, reference being had to the drawing annexed, and to the figures and letters marked thereon, (that is to say):—

Description of the Drawing,

(which is to a scale of six inches to a foot*). Fig. 2, (Pl. I,)

* Reduced in the Engraving.

is a plan of part of an ordinary shearing machine, and shows one of my said improvements as applied to a ledger blade. A is a cylinder with the spiral running blades. B is the ledger blade fixed to the bar C, which is moveable in the bearings D D. E is a lever upon which the spiral spring F presses, in order to give the ledger blade more or less pressure against the running blades. G is a round bar carrying the spiral spring F; this bar is moveable in the brass bearings D D. H H are screw bolts for fixing these double bearing brasses to the cast-iron back I. K is a ratchet wheel with a paul fixed to the bar G, L is a square end to the bar G, to which a spanner or wrench may be applied for strengthening or relaxing the spring F. M is a loose joint or paul fixed to the back I, for holding the ratchet wheel K. Fig. 3, is an end view of my said improvement as applied to the ledger blade, and the same letters of reference mark the same parts in both this figure and the last. It should here be stated, that two or more of these springs and the necessary apparatus connected therewith, may be used according to the width of the cloth to be sheared. Fig. 4, is an end section of one of my said improvements as applied to running blades: *r r r r*, are the four blades, which it will be seen are set into holders or shafts which pass through the rim of the support wheel X, and are pressed outwards by the spiral springs *e e e e*, which act also against the the central cylinder Y as a point of resistance, and press the blades outwards with a degree of force which must be regulated by experiment, according to the nature of the cloth to be sheared or dressed. Fig. 5 is an end section of a wire board for raising the pile of cloths with wires set in leather, which board I make to turn on a hinge at Z, and supported by the spring W, and thus add a great additional elasticity to the action of the cards in raising the pile of the cloth.

Now whereas, I claim as my invention, the following improvements, (that is to say):—First, the application of springs to the blades of shearing machines used in the process of dressing cloth, and for the purpose aforesaid; whether the same be applied to the ledger blade or running blades, and whether the same be flat springs or spiral springs. And secondly, the giving of additional elasticity to such boards as are used for holding the wire cards for raising the pile of cloth, by hanging such boards on hinges, and applying the springs under such boards, as shown in the drawing.

And such improvements, being to the best of my knowledge and belief, entirely new, and never before used within that part of his said Majesty's United Kingdom of Great Britain and Ireland, called England, his said Dominion of Wales, or Town of Berwick upon Tweed. I do hereby declare this to be my specification of my said invention, and that I do verily believe this my said specification, doth comply in all respects fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

Specification of the Patent granted to THOMAS OTWAY, *of the parish of Walsall, in the county of Stafford, Iron Master, for the invention of an Expedient for stopping Horses, when running away with riders or in carriages.*— Dated 18th April, 1828.

WITH AN ENGRAVING.

TO all to whom these presents shall come, &c. &c.— *Now know ye,* that in compliance with the said proviso, I, the said Thomas Otway, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, is described and ascertained as follows, (that is to say):—

The object of the invention is, to deprive an unruly or run-away horse of the power of restiveness or running away, by impeding him in his breathing. This is accomplished by a pressure upon the nostrils, by drawing a safety rein so as to close them either partially or entirely, and when the object is effected, the pressure is removed by slackening the rein. The invention resembles in appearance a common noseband of leather attached to the head of the bridle, but rather lower than the usual position, as it is fastened by a small chain to the cheek of the bit, instead of the cheek of the bridle. On each side of the noseband opposite the nostrils, a piece of the leather is cut out, leaving an aperture two inches and a half in length, and five-eighths of an inch in breath, or thereabouts; in each of these apertures is fixed a small box or coffer of brass or iron, plated with silver or other metal, which contains a small iron lever padded with leather on the part which is to press the nostril, and attached at one end by a joint to a small rod or piece of iron, which latter passes through a hole at the end of the box, and terminates in a loop outside, to which loop the safety rein is attached. The lever and rod lie parallel to each other in the box, until the safety rein is drawn tight, when by that operation the padded end of the lever is thrown out of the box in the inside of the noseband, and presses the external membrane of the nostrils, and so partially or entirely closes it, as to impede or prevent the animal from breathing, the effect of which will almost instantly be to stop him if running away, and to control him if restive. The box contains a spring of steel, which upon slackening the rein, instantly forces the lever back into its place. It is of course material that the position of the noseband should be exactly opposite to the nostrils, so that the levers shall press them on the right part, and to adjust this properly, the usual ornamental strap which passes down the front of harness bridles, is fastened to the nose-band by a buckle, which secures it in the proper situation. In the drawing hereunto annexed, the apparatus is shewn in several figures. Fig. 6, (Pl. I.) represents a horse's head in profile, with the safety apparatus affixed to the noseband at A, and the safety rein B. Fig. 7 exhibits the noseband upon a larger scale, as seen in front, and fig. 8 the same as seen edgeways, *a a* on the boxes affixed to the noseband or leather strap *b b b*, which boxes contain the levers, springs, and rods above mentioned. The peculiar construction of this apparatus will be best understood by reference to the section of the box containing the lever, spring, and rod, shewn at fig. 9. In this last mentioned figure, *c* is the lever, which turns upon a fulcrum pin *d* passed through it and fixed into the sides of the box; *e* is the tail of the lever, against which the end of a spring *f* acts, for the purpose of shutting the lever down into the box, as shewn in this figure. *g* is the rod sliding through an aperture in the back part of the box. One end of the rod is connected with a joint to the lever towards the tail part, by means of a pin, and the reverse end has a staple or ring *h* attached to it, to which the safety rein is fastened; *i* is a small pad of leather fastened to the lever which presses against the horse's nostrils when the lever is projected outwards. The apparatus being attached to the horse by buckling on the noseband in the manner shewn at fig. 6, when it is required to restrain or to stop the horse, the safety rein B is pulled by the rider with considerable force, which draws out the sliding rods *g g*, and causes the levers with their pads to be projected, as shewn in fig. 10, and also in the section fig. 11. The effect of thus projecting the levers, will be, to pinch the nose, and force the pads *i i* into the cavities in the head, through which the air passes from the nostrils, for the purpose of respiration. As soon as the tension of the safety rein is relaxed, the springs within the boxes acting upon the tails of the levers, force them in again, as at figs. 8 and 9, when the animal experiences no further impediment to breathing. I have exhibited in the drawing which accompanies this my said specification, certain parts of a horse's bridle made upon the ordinary construction, and to which I lay no claim, but the boxes attached to the noseband, containing the levers, rods, and springs, as herein described, for the purpose of stopping a run-away horse, in the manner above explained, being to the best of my knowledge and belief, entirely new and never before used in this kingdom, I claim the exclusive right to make use and vend the same, by virtue of the above recited letters patent.

In witness whereof, &c.

Specification of the patent granted to JAMES GRIFFIN, *of Witty Moor Works, near Dudley, in the county of Warwick, Scythe Manufacturer, for an improvement in the manufacturing of scythe backs, chaff-knife backs, and hay-knife backs.*—Dated 26th April, 1828.

WITH AN ENGRAVING.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said James Griffin, do hereby declare, that my invention is fully described and ascertained by the following description thereof, (that is to say):—

My invention consists, in forming scythe backs, chaff-knife backs, and hay-knife backs with raised studs or pegs, for the purpose of rivetting the cast steel blades thereto, and which studs or pegs form part of and are solid with the said backs. In order that my invention may the better be understood, I will first describe the manner at present in use for making backs, and then proceed to describe my improvement, whereby my invention will be readily understood, and so that a person conversant with the manufacturing of scythe backs, chaff-knife backs, and hay-knife backs, may be able from this my specification, to make and execute my invention. The usual manner for forming the backs for cast steel scythe blades is by welding, or making a piece of iron into the shape required, and then by drilling, or by some other means, forming holes at proper distances; which holes are for the purpose of receiving the studs or pegs by which the blades are rivetted to the backs; now it is evident that the backs thus perforated must be considerably weakened, as in each place where a hole is formed there is nearly a third of the width of the metal removed.

The object of my improvement is to construct the backs with raised studs or pegs which are solid with the backs; consequently backs so formed, will be found much stronger than those which are perforated for passing the studs or pegs through for the purpose of rivetting on the blades. Fig. 12, (Pl. I.) represents a back of a scythe formed according to my improvement; fig. 13, shews a view of it edgeways; *a a a* are the raised studs or pegs by which the blade is to be rivetted to the back; the blade is shewn by dotted lines as fig. 12. The manner I have found to answer best for making backs according to my improvement is, by passing of iron (or other proper metal), heated to a welding or proper heat through a pair of rollers prepared in the following manner:—

I cut a groove around the circumference of one of the rollers to the size and shape required, and sink small holes at proper distances, so that when the heated iron (or other

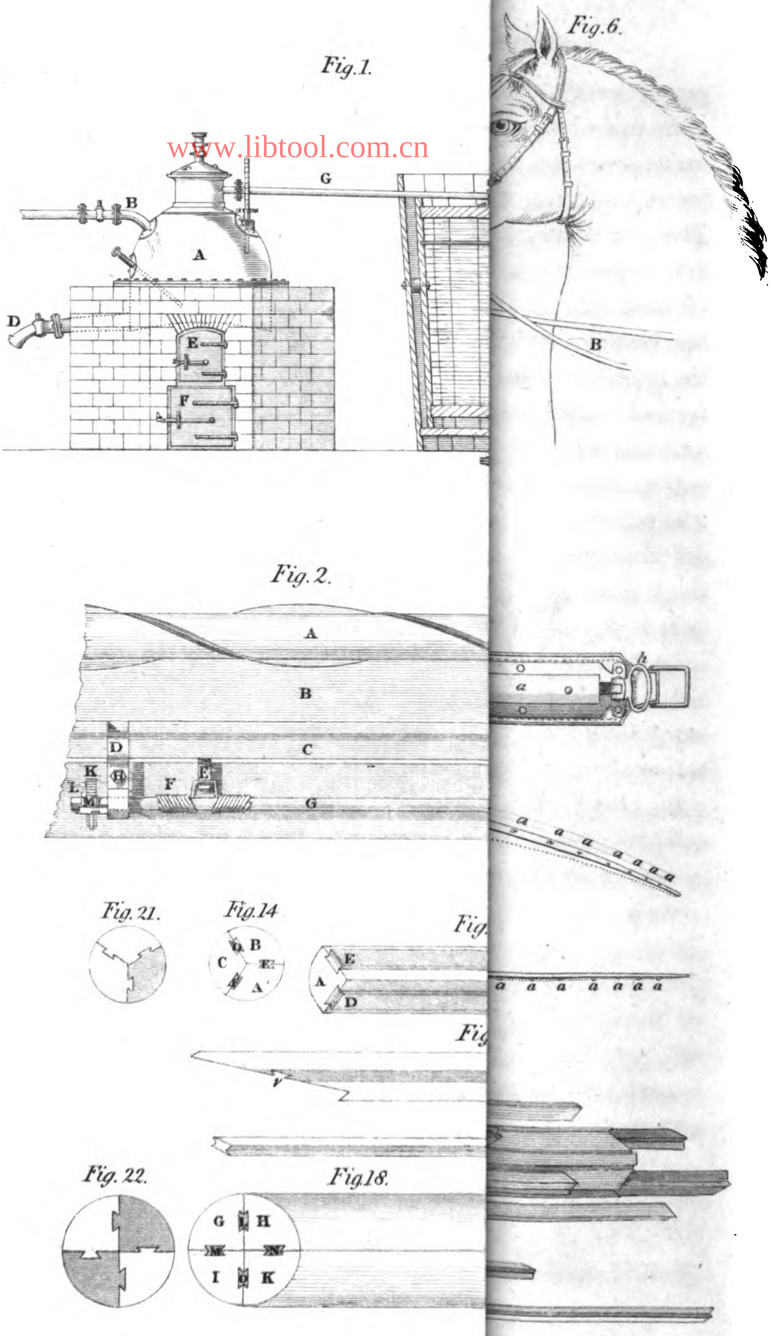
Fig. 6.
Fig. 1.
Fig. 2.
Fig. 21.
Fig. 14
Fig. 22.
Fig. 18.

proper metal), has passed between this grooved roller and a plain roller, it will come out with raised or projecting studs or pegs on one of its surfaces, which studs or pegs are formed by the metal being passed into the sunk holes. The end of the back at *b* is then to be formed by welding and forging it to its proper shape, and the back is to be cleaned by rough filing, and will then be ready for having the blade riveted thereto, which is done by beating down the studs or pegs *a*, and making them spread over the holes formed in the blade. I have here only described, and in the drawing have shown my improvement as applicable to a scythe back, and have to add, that the same description, will apply to chaff-knife backs, and hay-knife backs, they differing only in shape. I have also advised the making of the backs by means of rollers, considering that to be the best and most perfect manner of forming them; but I would have it known, that I do not confine myself to that method, but would have it understood, that I consider my invention to be, and limit my claim to, the forming or manufacturing the backs of scythes, chaff-knives, and hay-knives, with raised studs or pegs, which form part of and are solid with such backs.

In witness whereof, &c.

Specification of the patent granted to THOMAS HILLMAN, *of Mill Wall, Poplar, in the county of Middlesex, Mast Maker, for certain improvements in the construction and fastening of made masts.*—Dated November 1, 1828.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Thomas Hillman, do hereby declare the nature of my said invention to consist, in fastening together pieces of timber, for the purpose of making ships masts and other spars, by means of internal longitudinal dovetailed battens, and in further compliance with the said proviso, I, the said Thomas Hillman, do hereby describe the manner in which my said invention is to be performed, by the following description thereof, reference being had to the drawing annexed, and to the figures and letters marked thereon, (that is to say):—

Description of the Drawing, (Pl. I.)

Fig. 14 is a transverse section of a mast made on my patent plan. A B C are the three main pieces of timber which form the mast, D E F are the three battens, dovetailed on their edges, by which the three main pieces are held together, Fig. 15 is a view of part of the main piece A, showing how the battens D and E fit into the groove cut in it for their reception; it will be observed, that these battens are rather wider at their lower ends *r s*, and in fact, they should be made tapering slightly in width the whole way from the lower to the upper end, but if their sides are parallel, they will answer the purpose, though perhaps not quite so well. Fig. 16 shows a plan for scarfing the main pieces, when it is required to make long masts, or when for economy's sake, it may be useful to use short timber. Q is a transverse dovetailed pin or batten for holding the scarfe together, and which if made tapering also to one end, will have the effect of drawing the joint of the scarfe closely and firmly together. V is the dovetailed groove to receive the batten. Fig. 17 is a separate view of the transverse pin or batten Q. Fig. 18 is a representation of part of a mast made on my patent principle, of four pieces; G, H, I, K, are the main pieces, and L, M, N, O, the longitudinal battens, which are shown as projecting through or beyond the main pieces; this figure must be considered rather as a diagram, than any regular, drawn figure, the rules of perspective having been disregarded, in the hope of thereby giving a clearer idea of the plan. Fig. 19 represents the manner of fastening a mast made of eight main pieces on the patent principle; the masts of this size may either be hollow in the centre, which I should prefer, or they may have a core or main fastening I, in which case, dovetailed battens, such as at P, should be raised or carved on such core or central fastening, and corresponding grooves in the main pieces, as here shewn. Fig. 20 is a view of one of the main pieces of an eight pieced mast, with its two grooved battens and groove for the core. Fig. 21 is a transverse section of a mast made upon my patent principle, shewing how the battens instead of being made in separate pieces, may be raised or carved upon the main pieces out of the wood itself, of which they are composed; in such cases a groove and a batten will be found to each main piece, instead of two grooves, as in the former case. Fig. 22 is a representation of the same manner of uniting the main pieces, where they are four in number, and fig. 23 where there are eight main pieces. It should here be stated, that three main pieces are the number I should recommend for masts from seventeen to twenty-one inches in diameter, four main pieces for masts from twenty-one to thirty inches in diameter, and eight main pieces for masts from thirty to forty-two inches in diameter; but it will be evident that the number of main pieces may vary at the option of the mast maker, as almost any number are capable of being united by the longitudinal dovetailed battens.

In order to construct or put my patent masts together, each main piece, with the grooves neatly cut in them, should be brought to its place, and either lashed or temporally hooped together, with the wide part of the grooves to the heel of the mast, the battens should then be entered into the groove with the small end foremost, and gently and carefully driven up the whole length of the main pieces and cut off if necessary; on account of the length of the mast, the battens may be in two or more lengths, as well as the main pieces; when this is done, the temporary hoop or lashing may be removed, and the mast hooped in the ordinary way.

Now whereas, I claim as my invention, longitudinal dovetailed battens, as aforesaid, and applied to the purpose of fastening together the pieces of timber of which made masts are composed, in manner aforesaid; and such my invention, being to the best of my knowledge and belief entirely new and never before used within that part of His said Majesty's United Kingdom of Great Britain and Ireland, called England, His Dominion of Wales or Town of Berwick upon Tweed, I do hereby declare this to be my specification of the same, and that I do verily believe this my said specification doth comply in all respects fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

Specification of the Patent granted to JOHN LIHOU, *of Guernsey, but now residing at the Naval Club House, Bond Street, a Commander in His Majesty's Royal Navy, for an improved method of contructing Ship's Pintals for hanging the Rudder.*—Dated September 30, 1829.

To all to whom these present shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Lihou, do hereby declare that the nature of my said invention, and the manner in which the same is to be applied, is as follows:—

The above named improved pintals are constructed of the same metal as is used at present for ships pintals, or of any metal or combination of metals proper for the purpose. They are of two kinds, which may be distinguished from each other by the appellations of live or hanging pintals, and dumb or bearing or friction pintals, and they differ from those which have been heretofore used, by being so formed and constructed as to admit of much greater facility of repairs, because each pintal is composed of separate parts, as hereinafter described. In my improved pintals, the pin or pivot of the hanging pintal, and the bearing stud of the bearing or friction pintal, are made separate and detached from the remainder of the pintal, and can be taken out and put in again at pleasure; consequently if the pin or pivot, or bearing stud, should become damaged or broken, it may be taken out and renewed without reconstructing the side brace or strap. The common or ordinary googings are to be used in conjunction with my said improved hanging pintals to keep the rudder to the stern post.

The improved hanging pintal consists of the usual side braces or straps, furnished with bolt holes for fastening or securing it to the rudder, and the head or boss, or mass of metal from whence its pin or pivot projects; but instead of the pin or pivot of the pintal being cast, forged or formed in one piece, with such head, boss or mass of metal, a hole must be made through the boss to receive the pin or pivot, which hole may be cylindrical oval, square, polygonal, or slightly conical or tapered.

Whatever shape it may be formed of, the head or upper part of the pin or pivot must be formed of a corresponding shape, and be made to fit it tightly, and without shake, the intention being that the pin or pivot may be firmly fixed and rendered incapable of turning round in the boss, or of falling through it. To insure this the more effectually the head or upper end of the pin or pivot may be formed with a feather, or with fins upon it, let into or countersunk in the upper part of the boss.

These pins or pivots, when so introduced from above into their places for use, are to be retained there, and prevented from rising, by the boss of the pintal being countersunk or let into the wood of the rudder, which must fit close and bear upon the pin or pivot and boss. The side braces or straps, and the bosses of the hanging pintals, as also the googings or braces, should be made stronger than the pins or pivots of such pintals.

It will be seen from this description, that any or all of these pins or pivots may be removed, and others (which should always be ready prepared and at hand) may be placed in their stead. To effect this it will be unnecessary to do more than to take off the said side braces or straps, or else to remove a sufficient portion of the wood of the rudder that bears upon the heads of the said pins or pivots and bosses.

My improved bearing or friction pintal consists of similar side braces or straps and boss as the hanging pintal, and may be made of the same materials as I have before pointed out, and is to be affixed to the rudder in the same manner; but instead of inserting a cylindrical pin or pivot into the hole of the boss as hereinbefore described, I introduce a bearing stud of any hard metal, or combination of metals, into such hole upwards from below. This bearing stud has a shank and a projecting head or nob on its lower end, which I make hemispherical, parabolical, flat, or in the form of a blunt inverted cone, and the shank that is to pass upwards into the hole of the boss of the pintal, must be so much smaller in diameter than the said protuberance, as to leave a considerable shoulder to bear against the under side of the above-named boss, the shank that passes upwards through that boss, and the hole that receives it, must respectively be square, or of such a corresponding shape as to prevent the bearing stud from turning therein; or for that purpose it must have feathers or fins, as before-mentioned, respecting the head of the pin or pivot of the hanging pintal. The upper end of the said shank must pass through the boss and project a little above it, in order that it may be there fixed by a fore-lock or cross key, or by rivetting, or by a screw nut, or any other sufficient means to retain it in its place, and prevent it dropping out. The pins or pivots of the hanging pintals may be also introduced and secured in their respective bosses, in the same manner. This friction or bearing pintal may work upon the usual googing; but in order to reduce friction, the friction or bearing pintal must work upon a counter or inverted friction pintal. The pin or stud of such inverted pintal is to be separate and secured in its boss, as before described, and formed either with a flat, convex, concave, indented, or hollowed end, or protuberance of hard metal, for the purpose of receiving and supporting the under side of the corresponding protuberance, head, or stud of the friction or bearing pintal on the rudder.

In fixing and applying these bearing or friction pintals, their respective position upon the rudder and stern post should be such that the whole vertical pressure or weight of the rudder may be thrown upon them. Two of these bearing or friction pintals will, I conceive, be found sufficient for the rudder of a ship of one thousand tons, though more may be used. The number of hanging pintals may also be such as may be found necessary to secure the rudder to the stern post. Neither are these improved pintals limited as to the place or position they may be placed in on the stern post and rudder from head to heel inclusive. The friction pintals may be placed on the stern post, and the hanging pintals on the rudder, or the hanging pintals may be attached to the stern post, and the friction pintals to the rudder, and as many may of course be used as may according to the size or quality of the vessel be required.

I mean it to be understood, that my only claim, under my said invention, is for making the pins or pivots of the hanging pintals, and the bearing studs or heads, and the pins to which they are attached, of the bearing or friction pintals, independent and distinct from the remainder of the pintals.

In witness whereof, &c.

Obs.—The principal object of this patent is of great national importance, since the safety of the individual vessels that compose our navy, depends, more than in any other circumstance, on the effective state of their rudders, and Captain Lihou has too well explained, in a paper published on the subject, how frequently ships are rendered inefficient through the impossibility of repairing at sea, the broken rudder-pintals of the common construction to require much on our part to shew the value of an invention by which this disability is so completely removed as by that which is explained in the preceding specification.

The first-mentioned mode of keeping in the moveable pintals, (by projections in the substance of the rudder,) we do not consider sufficiently effectual, but some of those afterwards proposed for the same purpose are not liable to the same objection. This we say in reference to the "hanging" pintals, on which the security of the rudder must depend, beyond comparison, more than on the "bearing" pintals recommended by the Captain to be used with them. Of these latter we do not think so highly as their inventor, for, in the first place, as he has directed them to be placed, they would supply the space where hanging pintals might be fastened, and would so far cause the connection of the rudder to the vessel to be weaker, and secondly, it does not appear that the resistance to the motion of the rudder that arises from the friction caused by its weight, is of any great consequence, since the largest rudder can be made to traverse, by an insignificant force, even before the vessel is launched, when the whole weight is sustained by the googings, and of course, can be moved by one much less, when the vessel is afloat, and so large a proportion of the rudder buoyed up by immersion in the water. It appears to us however, that one, or two at most, of the bearing pintals might certainly be used advantageously, with each rudder, if placed at its upper part, quite above the level of the water, where they would not interfere with the hanging pintals, so much in the importance of situation; they would then prevent the googings from being so much effected by the percussions of the rudder, when the vessel pitches violently, as they are in their present unprotected state. We think it would also be an improvement to have the apertures of the googings made large enough to let the pintals fall down entirely through them, when broken; since the difficulty of refixing rudders at sea, appears from the statement of the patentee, and from other authority, to be very much increased by the broken pieces of the pintals sticking in the googings.

We may add, that such alterations would not interfere with the rights of the patentee, since his patent appears to have for its principal object the forming of the pintals in two separate pieces, which we undoubtedly consider an important advantage over the ordinary method.

As the situation of a ship, after loosing its rudder at sea, is most perilous and distressing, and the lives of all on board are in the most eminent hazard, we refer the reader to our fifth volume, present series, p. 303, for an account of several methods of fitting up temporary rudders which may, in many instances, be found a desirable resource in case of this appalling accident.

ACCOUNT OF NEW PATENTS.

Patent granted to WILLIAM MENCKE, *of Park Place, Peckham, Surrey, Gent., for improvements in preparing certain materials for, and in the making or manufacturing of bricks.* Dated August 11, 1828.

IN the specification of this patent, brick-earth, or clay is directed to be mixed with chalk in certain proportions, (not mentioned,) by means of the horse-mill commonly employed in brick-making, water being added at the same time in sufficient quantity; the whole is then to be run out in shallow ponds, and the water separated by exposure to the air and sun, and other means usually adopted; in this state sulphuric acid is to be added to the mixture, but in what portion or manner is not explained, and all that is said respecting this singular addition is, that "the sulphuric acid helps to dry the materials and makes them unite better together." When the mixture is sufficiently freed from water to bear being taken up in lumps, it is brought under sheds and dried there "until it will rake," after being broken small by any convenient means; it is then taken to a press formed in the following manner, and by it forced into moulds, of the shape required.

The upper part of the press is a common fly-press, such as is used in stamping coin, having long arms to its lever terminated by heavy balls, of about 100 lbs weight each;

the follower, or horizontal moveable platform beneath the screw, has fastened to its under surface a number of blocks, of wood or iron, of the shape of bricks, a small distance apart from each other, fitted so as to enter an equal number of hollow moulds without bottoms, placed horizontally in a frame across the middle of the press, so as to have its level adjusted by wedges, that go through mortices in the pillars or sides of the engine. Beneath this frame a second follower is supported by the piston of an hydraulic press, having its small pump and cistern at one side of the apparatus, and on this follower a wooden plate, or board, of the size of the frame of moulds, is placed, which by the action of the hydraulic press is strongly forced against the bottom of the latter.

The press being thus arranged, the moulds in its centre (which in the example given, are eighteen in number,) are first filled with the materials, prepared as mentioned, to a level with their upper edges, and are then forcibly compressed by the upper screw-press, acting on the blocks beneath its follower, which forms them into so many brick-shaped masses; the follower of the lower press is then allowed to descend a certain space, by unscrewing a conical stopper at the side of its pump, which permits the water to run into its cistern, and then the levers of the screw-press again put in motion, it forces the blocks through the moulds, and by them delivers the compressed masses of the materials down on the board beneath them, on which they are transported to the drying arches described below; another board being placed on the follower of the hydraulic press, prepares the apparatus for a renewal of the operations described.

The drying arch is a long, low, arched building, as represented in the drawing, having a furnace at one end, and a chimney at the other, with two door-ways at each extremity, and numerous small apertures formed in its sides, and arch. In this building, the raw bricks are piled up as in the field for drying; and a fire being made in the furnace, by its effect they are brought to a proper state for being burnt, as it is called, or enduring the intense heat by which they are completed; for this latter purpose they are taken down and re-piled in the same arched building, with layers of fuel interposed between them, in the usual manner, and the apertures in the sides and top of the building, previously closed, are then opened successively, as best suits the state of the combustion of the fuel and the heat required for the operation.

OBS.—The use of the sulphuric acid, directed in the foregoing mixture, seems to us extremely doubtful as to its beneficial effect, while from the large quantity that must be used to produce any sensible effect on such bulky materials, its expense would be enormous: on being added, it would at once attack the chalk, and reduce it more or less to the sulphate of lime, according to the proportion in which it was employed, at the same time expelling its carbonic acid, so as to tend to separate the materials instead of uniting them, and ultimately to render them at least porous. In the burning, or final intense heating, part of the sulphuric acid would be again expelled by the fire, which would tend to disunite the materials still farther, while a dreadfully fœtid vapour would be produced by the action of the expelled acid on the fuel.

We have also to observe, that the hydraulic press appears to be unnecessary to the intended effect, as it is evident that the lower follower, or platform, might be lowered or raised, as required, by a balance beam and levers, or other simple means, without any diminution of perfection in the operation; and the cost of this very expensive engine be thereby saved.

We think, however, that the press, modified as mentioned, would be a very useful apparatus in brick-making, from its accelerating the drying and consolidating the *usual* materials; that the arched building recommended, is also a most desirable addition to the means of completing the bricks; and that (considering the great loss occasioned by imperfect bricks at the outside of the clamps or piles, in which bricks are commonly burned, most of which would be prevented by the use of the arched building), its adoption would produce a considerable saving, that would pay a large interest for the sum expended in its construction.

Patent granted to RICHARD WILLIAMS, *(late of Tabernacle Walk, Middlesex, but now of Canterbury Buildings, Lambeth, Engineer), for improvements in the application of elastic and dense fluids to the propelling of machinery.* Dated December 15, 1828.

THE dense fluid employed by the patentee is oil, and the elastic one steam; and the means by which these are made to propel machinery, are by causing the steam to expel the oil from vessels, which being placed in a tank or baque filled with this substance, are thus rendered lighter than the surrounding medium, and rise upwards with a force proportionate to the degree in which this is effected.

To bring this idea into operation, a steam boiler, heated, supplied with water, and regulated in any of the approved methods, is placed immediately beneath a large cistern closed at the top, and nearly filled with oil; in this latter, three vessels steam tight at their sides and top, but open at bottom, of about half the depth of the cistern, and as large in other respects as is consistent with their intended motions, are placed at equal intervals asunder: from the centre of the tops of these vessels, polished iron bars like the piston rods of steam engines, pass upwards through stuffing boxes in the cover of the oil cistern, and at a sufficient height are, by coupling bars properly jointed, united to cranks in an axle, that is supported horizontally in the plane of the three ascending rods by pillars, or other sufficient means, at each of its extremities: which axle, being made to revolve by the ascent and descent of the three vessels, aided by a momentum wheel, may be applied to give any motion required to machinery in any of the usual methods employed by mechanicians.

To cause this alternately reversed vertical motion in the three vessels, under each on the bottom of the oil cistern, is placed an upright cylinder, that may be considered as a steam-meter, into which steam is admitted before it passes into the moving vessels, by a valve box, from whence a tube descends to the boiler underneath: the top of this cylinder is conical, and at its summit is placed a conical valve that opens downwards, through the cavity in which the steam ascends to the moving vessel. The valves are so arranged that when the vessel is at the lower part of its course, the charge of steam from the cylindrical steam-meter will pass into it, drive out the oil that before occupied its space, and thus give it that buoyancy from whence its motion upwards originates, in the course of which it closes the upper valve of the steam-meter, and opens the lower one, to again replenish the latter with a fresh charge of steam from the boiler; while at the same time a third valve that is fixed in the top of the moving vessel, is opened by a small bar that rises from it, which strikes against the under surface of the cover of the oil cistern, when the vessel ascends sufficiently high, whereby the steam rushes out from the moving vessel into the upper part of the oil cistern, from whence by a pipe it is conveyed to a condenser, while the oil entering the vessel from below, as the steam leaves it from above, restores the original gravity of its contents, and thus removing any resistance it might cause to the ascent of the other two vessels, admits of their acting in their respective cranks, with the full power of their buoyancy; and the three cranks being disposed so that their planes form angles of 120 degrees with each other respectively; one of the three moving vessels (each of which is furnished with steam-meters, and other parts similar to those described), will be always acting by its buoyancy in pushing up the crank connected with it, and thereby cause the axle to revolve.

The oil cistern is of an oblong form about twice the length of its height; but its shape, as well as that of the moving vessels, and of the steam meters, may be varied in several ways; as may also the materials of which those different parts are constructed, and the fluid in which the moving vessels operate, without diminishing the power of the engine.

Obs.—Mr. Bryan Donkin, in August, 1803, obtained a patent for a method of producing rotary motion (founded on the same principles as that just described), by which a chain of buckets passing round two rollers vertically opposite, and immersed in a cistern of water, oil, or other fluid, were put in motion by steam being admitted beneath the lowest of the buckets, at the side of the chain where their mouths pointed downwards. Another engine was contrived several years ago by M. Latour, that will come within the limits of the title of this patent, as in it air (an elastic fluid) was forced beneath cold water by a reversely moved Archimedian pump, and passing from thence into boiling water, in which a water wheel was placed, made this revolve by ascending in its buckets.

The machine now before us, and that of Mr. Donkin, must be considered as steam engines, in order to ascertain their relative value; and as neither of them can come in competition with the Boulton & Watt's common steam engine in point of efficacy for the steam expended, they must depend solely for their utility on the greater cheapness of their construction, and subsequent maintenance in working condition. And in this point of view, though Mr. Donkin's engine may, particularly where coals are plentiful, on some occasions be preferable, that of the present patentee, it appears to us can in no respect have this advantage; as from the great quantity of apparatus that it requires in its formation, its first cost would probably be much greater than any steam engine of equal power. The quantity of oil necessary for it, would also be expensive, more especially as it is extremely likely that this would be much wasted by the steam passing through it, as well as deteriorated by its chemical action.

It also appears to us, that the steam meters in this engine are not sufficiently guarded against the entrance of the oil; since they must be covered with it, according to the account given by the patentee of the mode of operation, at the time when the upper valves of these concomitant parts are opened.

Patent granted to William Storey, *of Morley, in the Parish of Batley, in the county of York, Plumber and Glazier, and* Samuel Hirst, *of the same place, Clothier, for certain materials, which when combined, are suited to be employed in scouring, milling or fulling, cleansing and washing of Cloths and other Fabrics, and by the employment of which material considerable improvement in those purposes are effected.*—Dated March 10, 1829.

These materials consist of a saponaceous mixture, compounded of alkaline matters, with a small quantity of fat, and the following method of preparing it, is nearly a verbatim copy of the specification.

A large cistern being procured and filled with human urine, the latter is allowed to stand in it for about six weeks, in order to produce fermentation; when this has thoroughly taken place, about four hundred gallons of the fermented urine is to be transferred to an iron still, with a block-tin worm passing through a refrigerator, of the usual construction; to this is to be added one pound of tallow, prepared from beef suet, for the purpose of preventing the froth that would otherwise arise in ebullition. This mixture is to be distilled, and whilst in operation about six gallons of the aqua ammonia thus produced, are to be drawn off into a cask, adding six pounds of the best mottled soap, previously dissolved. This will give it an opaque appearance and produces, as the patentee asserts, an excellent saponaceous material for cleansing and dressing woollens. The casks should be bunged up to exclude the air.

Patent granted to THOMAS ROBINSON WILLIAMS, *of Norfolk-street, Strand, in the county of Middlesex, Esq. for improvements in the making or manufacturing of Felt, or a substance in the nature thereof; applicable to the covering the bottoms of vessels, and other purposes.*—Dated 21 May, 1829.

THESE improvements consist in passing the hair, wool, cotton, hemp, or other material intended to be manufactured, between two endless webs of woven wire, immersed in tar or pitch, in such manner that only a proper quantity of the latter shall be imbibed; and also by the use of glue or size, instead of tar, &c. in forming a material which may be used for mill-board, paste-board, and floor-cloth.

The machine the patentee uses for these purposes, consists of a vessel for containing the pitch or tar, which is placed on a frame, and is heated either by coils of steam-pipes placed within, or by a fire immediately below it. Near one end, and immersed in the liquid contained in the vessel, is a roller, under which a web of woven wire passes, for conducting the felt through it, and towards two pressing rollers placed near the other extremity, but above the liquid; another web of wire passes under the upper one of these, and the two webs having rotatory motion imparted to them, convey the felt through the pressing rollers, in order to squeeze out all the superfluous tar, which drops again into the vessel, while the felt is conveyed off to a table, where it is then ready to be cut into sheets, or whatever form may be required. A series of conducting rollers are used for facilitating the admission of the felt. The patentee does not confine himself to any particular machine for spreading the material, but states, that either a carding engine, blowing machine, or devil, may be used for that purpose.

Patent granted to George William Lee, *of Bagnio Court, Newgate Street, in the City of London, Merchant, for certain improvements in machinery for Spinning Cotton and other fibrous substances. Communicated by a Foreigner.* —Dated May 2, 1829.

The object of this patent is a substitute for the ordinary flyer used in spinning machinery. The patentee directs to be formed a cast iron frame, pierced with holes for a spindle and bobbin to work in; a circular rim or hoop rises above the surface of the frame, having a groove formed in its circumference, in which a ring works with facility. A small hook, for conducting the yarn to the bobbin, projects from this latter, and is placed in the relative situation of the lower extremity of the arm of ordinary flyers. There are two modifications of this apparatus mentioned in the specification, one of which consists of a groove formed in the upper edge of the rim in which the segment of a ring works, having also a hook attached to it; the segment in this instance should be sufficiently large to cause a proper degree of friction, so as to regulate the tension of the yarn. In the other mode, the rim itself, having an indentation formed in its edge to serve as the hook in the former instances, is made to revolve on friction pulleys, working in grooves cut in its circumference. The patentee observes, that in all the above methods the spindles must be made to vibrate as in ordinary machines, to procure the equal distribution of the thread, and that the bobbins may be made half as long again and even more, with advantage, provided the vibration be regulated accordingly. He asserts that, by the above-described apparatus, he is enabled to obtain a greater velocity than the flyer and the ordinary movements of the bobbin will admit of, and that he is thereby enabled to spin a greater quantity of yarn without shifting, whilst this has also, from the friction of the ring, a more even degree of tension, and that the trembling motion, arising from the wear of the spindle, is not of so much importance when fitted according to his method.

Observations on Mr. Hillman's *Patent-Method of Constructing Made-Masts. Communicated in a Letter to the Editor.*

Sir,—I find that in the last October No. (Vol. VIII. p. 595,) of your very useful work, you have inserted a notice of my patent "For the improved Construction and fastening of Made Masts," and feel assured, that the opinions there expressed, on a perusal of my specification, will not be found just on further examination and inquiry. Had those observations appeared on the first publication of my plans, (viz. in June 1828,) however harsh or speculative, I should have conceived your undoubted right and privilege, as the conductor of a scientific periodical, entitled your columns to an unbounded scope of criticism; but after the lapse of so many months since the introduction of my plans, during which period I have been practically demonstrating their efficacy, by the manufacture of numerous masts, I think it was incumbent on the author of such article, not to have pronounced his judgment on a superficial view of my *theories* alone, but to have satisfied himself, whether they were or were not practicable, before he hazarded so severe a censure. I feel convinced, Sir, had he favoured my manufactory with an inspection, and witnessed the completion of masts, 100 feet in length and 34 inches diameter, (made from 23 or 24 pieces,) perfect in point of combination, without the aid of a single bolt or crossfastening, the result had been widely different, and no such passage as the following have found insertion. Referring to one part of my operations, he states, "the matter, indeed, may be attempted, and perhaps got over, by driving several short battens in succession into the same grooves after each other, but this will only exhibit a bungling unworkmanlike succedaneum, unconformable to the original directions:" but not having availed himself of such opportunity, I must beg permission to insert a few remarks, in further explanation and proof, of the practicability of my system.

In respect to workmanship, which is doubtless an important point, and one on which he anticipates my chief failure, I trust a few words will not only convince him, that no recourse is made to a *pitiful make-shift,* but that the combination of mechanical means employed, ensure a successful accomplishment of the work, without risking its failure by the inability of the operative, leaving nothing to perplex individual discretion. All the internal surfaces are straight lines and planes, presenting no intricacy whatever; requiring, after the saw, nothing more than the unerring joiner's plane. The inner line of the groove is always parallel with the internal surface of the timber, which insures the solidity of the mast; the outer line strengthens or increases transversely one-eighth of an inch, to a given number of feet longitudinally; regulated, of course, by the length of mast. This taper in the batten I am aware is inconsiderable, otherwise its properties as a wedge, might have the effect of pressing too forcibly on the sides of the grooves; whereas my object is to cause the dovetails to draw and bind closely, and when driven, to operate purely as contracting wedges on the joints longitudinally, and form in effect a cross-fastening. Planes of my own invention, similar to a plough, sink the groove to the exact bevil and depth; the intermediate wood is then removed with much facility and accuracy, (the depth and width being so exactly guaged,) and bevil-sided planes, (the one cutting under, the other laterally), are applied, which clear it perfectly for the reception of the batten: a dovetail plane, corresponding with the thickness of the batten, is worked on the edges alternately, and produces the dovetails with the greatest ease and precision. As regards the length of batten, much misconception appears to exist; and also, in the mode of bringing the work together; no cords or "lashings" being used or found necessary, the main pieces requiring but to be placed horizontally on each other, and the batten driven up; the largest mast I have constructed, having its component parts combined, in eight working hours. The length of batten is determined by the position of the respective scarfes in the main pieces, which it is intended to strengthen or *fish;* a butt or joint not occurring excepting at a secure distance from such scarfe: they are worked on the average 34 feet in length, though some have been driven as long as procurable, even to the extent of 60 feet. No instance of splitting by driving has yet occurred, notwithstanding the percussive force applied, the instrument used being, instead of a "mall," what may be termed a "battering ram," weighing five or six cwt. and the greatest possible impetus given to it. The operation of the batten in drawing the main pieces into close contact ought to be witnessed to be credited, and is decidedly superior to any "sett" or cross-fastening I am acquainted with. In many instances, when combined, no other traces of joints have been apparent than the different colours of the respective main pieces.

The late Mr. Thomas Tredgold, acknowledged as the first authority on a question of mechanics, gave me his opinion, in a letter, dated July 18th, 1828, of which the following is an extract: "The well-known difficulty and excessive expense of procuring timber for large masts, as well as the uncertainty as to soundness, and freedom from defects, renders every method proposed for building masts out of small, but perfect trees, worthy of serious attention. The method you propose is certainly the most effective one I have seen for joining the parts in complete contact with one another; the only doubt I have respecting it, is, that the dovetailed slips will not press the longitudinal joints with so much force as to cause all the pieces to act together in one mass." On which opinion, I may safely assert, his "doubts" were removed; the dovetails, on trial, having operated, to the fullest extent, in the manner desired.

I trust, Sir, these explanations will satisfactorily remove the objections stated in prejudice to my plans.

As to my mast made by means of carved battens from the solid piece, I was never sanguine of its applicability, and scarcely contemplated its adoption; having specified it merely as a continuation of the same principle, to prevent, if possible, infringement; presuming, without fear of contradiction, *longitudinal fastenings* in ships' masts, to be perfectly new and original, though evidently its first principle. I have, at this moment, masts on long voyages, made from numerous pieces, without a single bolt in them, though a fastening, I can avail myself of (having specified it,) if circumstances occur to render it desirable.

In a subsequent number of your work, an account is given of the particular service of a mast, presumed to owe its superior stability to a partial application or improvement, without claiming the merit of its being built under an entire new system; the patent being for such local application alone. A circumstance occurred so similar, proving not only the strength of mine, but also the facility it affords for repair, that I hope you will favour me by briefly inserting the particulars.

A ship of 500 tons burthen, having two of my patent masts, was accidentally upset in the dry dock, having the topmasts up, and the lower and topsail yards across at the time, with the rigging but very insecurely set up. It was found necessary to cut away the lower masts at length, which, after repeated blows with the axe, was effected. The four severed parts were afterwards taken to pieces in my manufactory, some new pieces added, and otherwise shifted, and the masts were again replaced in the ship, at the cost only of one new mast.

I am unwilling to trespass farther on your indulgence, or I could add many other testimonials of their service.

I remain, Sir, your very obedient humble Servant,

THOMAS HILLMAN.

Mill-Wall, Poplar, Dec. 11, 1829.

We insert the above letter, which has been addressed to us by Mr. Hillman, in order that he may himself explain the grounds on which he considers he has been harshly treated in the observations we gave on his patent in a preceeding number, and to which he refers; but it may be as well here to remark, in justice to ourselves, that Mr. Tredgold, the very authority which he quotes, expressed (as it appears by Mr. Hillman's extract from his letter) the same objection to the invention which we have alluded to; throughout our observations, viz. the insufficiency of the dovetailed slips in pressing the longitudinal joints with so much force as to cause all the pieces to act together in one mass. We by no means lay this down as a dogma, but time and experience alone can prove how far it is, or is *not* the case.

Account of & Remarks on the Patent Cause, LEWIS *v*. MARLING.

Communicated in a Letter to the Editor.

SIR,—The following statement of, and observations upon the recent case, Lewis v. Marling, tried in the Court of King's Bench, 5th November, may possibly be interesting to some of your numerous readers, involving as the decision of this important case does, some new features in the administration of justice, and the construction of the law relative to patents.—Counsel for the plaintiffs, Sir James Scarlett, Mr. Brougham, Mr. Campbell, and Mr. Rotch; Counsel for the defendants, Messrs. Pollock, C. F. Williams, Alderson and Godson, Verdict for the plaintiffs, £200. damages.

The plaintiffs, Messrs. Lewis, are highly respectable clothiers in the county of Gloucester, and sole proprietors of the patent obtained by themselves and Mr. William Davis, engineer, (now of Leeds) the defendant; Mr. Marling is also a clothier in an extensive way of business at Stroud, in the same county, and a purchaser of the improved shearing machine, manufactured under the patent of Gardner & Herbert, obtained in the year 1825; and the plaintiffs have successfully contended that the machine manufactured under this patent are in imitation and infringement of their patent. Your readers will at once perceive that this is another edition of the case Lewis *v* Davis reported in your Journal for February 1829, (Vol. VIII. p. 105), and the plaintiffs have, in each case, obtained a verdict under the direction of the court, thereby confirming their patent for the exclusive right to use, make, or vend the rotatory shearing machine, operating from list to list of the cloth. That success should have been so marked and decided, must have been surprising to every one acquainted with the subject, including even the patentees themselves, and the decision of these cases will form a memorable era in the history of patents, and evince the progress of that liberal feeling so characteristic of the present times. The history of the cases are as follows, In the year 1818, the plaintiffs obtained a patent* for improvements in shearing machines, in the specification of which patent, they set up four claims. The first is for a triangular wire wound on a cylinder operating against a ledger blade. The second is for a spring bed. The third for a spiral brush, or proper substance to raise the pile of the cloth, and the fourth claim is, for their described method of shearing cloth from list to list, by a rotatory cutter, which shearing across, is said to have been first performed by the plaintiffs, and the case thus stated, was proved in evidence by the plaintiff's witnesses,as also the extensive sale, great value, and importance of the invention.

* The specifications of the various patents obtained by Messrs. Lewis, for preparing and dressing cloths, will be found in vol. 36, p. 257, vol. 37, ps. 69, 144, and 327, and vol. 38, p. 79. of our second series.

The defence to this action was, that the plaintiffs were not the inventors of the machine to shear from list to list, and that they had no real claim to either the whole or to any part of the machine for which they had obtained the patent. And a witness of the name of Jones (from Leeds) was called, who stated that he had been in business for himself as a cloth dresser and cropper, several years previous to the year 1816, that he had a manufactory in Bermondsey, was in a considerable way of business, and employed a number of workmen; that about the year 1816, he purchased of an engineer then resident in Bermondsey, named George Coxon, a machine to shear from list to list by a rotatory cutter, which he put to work openly in his manufactory; and as well as employing his own workmen with the machine, he left it open to his customers, who doubtless saw the machine and became acquainted with the peculiarities of its construction. This same witness saw this, or a similar machine, subsequently put to work at a clothing manufactory near Bristol. Mr. Coxon the maker of this machine, failed in business, and afterwards went to America, where it is probable he manufactured many of them; for subsequently to this period, several importations on this principle came over from our translantic brethren; for instance, the specification of Barnes produced at this trial, the specification of James Mallroy, the model of which the witness Mr. Smith, of the house of Pawson and Smith, of Leeds, and of King Street, Cheapside, brought from America in 1816; which model was made from a machine Mr. Smith had seen at work at Utica, near New York; a communication of a similar kind was made to parties in Leeds, and in Scotland; a machine on the same principle was also constructed at Gallashields, and the trade generally were acquainted with the spiral shear, introduced by some American into this country long previous to the date of the plaintiff's patent; in addition, it was admitted, that the first three special claims of the plaintiffs, viz.—the triangular wire, the spring bed, and spiral brush, were not used by the defendant, consequently, could not be infringed; and all invention in the fourth and general claim to shear by a rotatory cutter, from list to list, was decidedly negatived by the evidence previously stated. Yet the learned judge directed the jury to find for the plaintiffs, and on a motion for a new trial the Court gave it as their opinion, that they did not consider novelty in an invention as essentially necessary to form the ground of exclusive claims under the statute.

In reviewing the peculiarities of this interesting case, and in adverting to the grounds upon which the Court and Jury have twice decided in favour of the plaintiffs, it may be observed, that the general appearance and character of both the machines are very nearly the same. Their object is to shear woollen cloth from list to list, by a rotatory cutter, operating against a fixed or ledger blade; and this double verdict must, unquestionably, have been held to be agreeable to the justice of the case, had the Lewis machine been an original invention; but that is the hinge upon which the whole case turns, which together with a fair investigation of the particulars constituting the similarities in both machines, involve the real merits of the case.

The defendants have contended that the general question ought not to be the question at issue, for the Lewis machine is made up of the parts of other machines previously known.

The frame, the carriage mounted on friction rollers, and the operating machinery are all taken from, or are mere modifications of Harmer's old machine. That the rotatory cutter was well known, and had previously been applied both to shear from end to end, and from list to list of the cloth. The cloth rollers are taken from Dyer's patent, and all the essential parts of the "described method," had been in use and were well known as the inventions and improvements of other parties; these observations apply to both the machines in question, they are mere things of "shreds and patches," and in their general character have not the least title to original inventions; and the merits of each machine must be concluded from the usefulness and value of the improvements they specially claim as their several inventions.—The Lewis specification of 1818, has four of these especial claims as before stated. The spring bed is clearly the same in principle as that adopted by W. H. Hart, in his specification of March, 1812.—(See Vol. XXI, p. 193, second series.) The spiral brush was adopted by Collier, in his patent of 1816, but was utterly useless. The described method of shearing, if understood to mean the operating machinery, is entirely old, and the common property of the public. If understood to mean the mode of shearing by a rotatory cutter in conjunction with the previous stated special claims, then do not the defendants infringe, for their method is different and performed by different machinery? and if the described method mean simply the act of shearing across the cloth from list to list, by a rotatory cutter, without reference to machinery, that claim must be negatived, by the fact of William Davis, the joint patentee with Messrs. Lewis, having worked with George Coxon as a workman, and obtained from him, or from his fellow workman, a knowledge of the machines put to work by Jones, in his factory at Bermondsey. The triangular wire appears however, to be a novel invention, but it wants the further test of usefulness; it did not answer, and was succeeded by the bayonet shape wire, and that again by a triangular edge, which is now more generally adopted; upon the whole, there appears but little of either invention or utility in the special claims of the plaintiffs, and the court it appears has decided these cases on the most general grounds; for in the case Lewis *v.* Davis, the mere fact of being the first to apply the rotatory cutter to shear from list to list, without the invention of any machinery, was held sufficient to establish a right so to shear under any modification of construction. But in the case Lewis *v.* Marling, originality of invention appears to have been entirely passed over, and a general claim made to rest upon the mere act of publication, or making known to the public a valuable machine; for though a machine might not be new either in its principle or construction, yet the patent might be good, as novelty was not held to be an essential element in the composition of a patent. A further developement of this important case will occur in the proceedings by writ of Scire Facias, when the questions will be raised in another form. How such a combination of facts and circumstances as herein stated can be resisted, confirmed and enlarged as they will probably be, by other testimony, is difficult to conceive, but the result will depend on contingencies which cannot be anticipated. The question must however be put at rest, for the numerous interests involved cannot permit it to remain unsettled, and the opinions of the Court of King's Bench will be further illustrated in the application of the general principles of law.

I am, Sir,

Your obedient Servant,

JOSEPH RAYNER.

King's Square, Goswell Road,
December 18th. 1829.

LAW OF PATENTS.

IN our last volume (page 675) we inserted the evidence of Mr. Taylor and Mr. Davies Gilbert given before the

Select Committee of the House of Commons appointed to examine the state of the Patent Laws, and we now continue with such extracts as we think likely to prove interesting to our readers.

Mr. W. H. WYATT, the Editor and Proprietor of this work, gave evidence to the following effect:

Have you any observations to offer upon the subject of the patent laws?—The subject of patents is one which I have been intimately considering for many years; and my opinion is, that great inconvenience arises from the present mode of granting patents.

In what way have you been led to turn your attention to the subject of patents?—I am the editor and proprietor of the Repertory, a work which has been published for the last thirty years, iu which *verbatim* copies of the specifications inrolled, are published. We obtain them in two ways, either by paying for copies at the office, or by the loan or communication of the originals from the patentees themselves. That work contains many hundred copies of specifications the same as in the office; and also contains a list of every patent that has been obtained since the year 1795; and I have in my possession a private volume containing a list of every patent that has ever been obtained since the time of James II., in the order in which they have been obtained according to the dates, with an index to their names. The Repertory forms now a very voluminous publication, and is to be met with in a great many public libraries, and is consequently very easy of access to inventors; but inventors seldom are readers. In the year 1794, when the Repertory was first published, the number of patents in a year was about fifty odd; and it has subsequently increased to two or three hundred for England alone.

How many patents were obtained in the time of King

James ?—I believe one or two; there are very few patents till the year 1796. Public attention was then drawn to them from the publication of the Repertory, which then originated.

Has the number of patents increased of late years ?—They increased during that period when many speculations were afloat, but at the present moment they have decreased very much; there are from five to a dozen in the course of a month only. On the first day of every month I publish a list of every patent that has been obtained during the preceding month.

Do you conceive that the granting of patents has tended to stimulate inventions much ?—I conceive that it has not only done that, but that the system of patents has been a greater spur to the improvement of the arts and manufactures in this country, than any other system that could be adopted, for no sum of money will gratify an inventor; if it is indefinite, his expectations are very great.

Do you know whether it is a general complaint that the law of patents is very uncertain ?—I believe universally; there are great inconveniences from the present system. The first and most prominent is the system of caveats, which tends to mislead all uninformed inventors, I mean persons whose attention has not been directed to the law of patents. The first impression, and it is almost universal, is, that entering a caveat is obtaining a sort of little patent, and that they have all the benefits of a patent for the expense of entering a caveat, which is twenty shillings during the year, and persons, under the fancied protection of that caveat, commit acts that render the patents afterwards of no effect.

Does not that arise from their not taking sufficient pains to inform themselves as to what the law is ?—Certainly; but it is so universal, that I have never been able to see a cure for it.

In point of fact is a caveat of any great value?—A caveat is of value under certain circumstances and limitations; for instance, if a person contemplate taking out a patent for an invention which he has not perfected, it prevents another person from anticipating him, and thereby excluding him, because he has notice of the application; and if his invention be the same, he has an opportunity of participating in it by an arrangement between the parties. I have known where parties have claimed a patent, and been opposed by a caveat, that a compromise has taken place between the two applicants, so that both parties have participated in the patent jointly obtained.

In those cases do you conceive that both parties were fairly entitled to a patent?—In some instances; but I have known instances where parties have fished out the information by means of their caveat, and have participated. I have known mischief arise from the different periods for inrolling specifications. A person who has a patent for an improvement on the steam engine or any other invention, will have perhaps six months to enrol his specification, and another person who takes out a patent immediately afterwards, may have only two months. Then the person who is compelled to enrol his specification in two months, has no protection against the man who has six months incorporating the invention which he has inrolled in his specification. By that course the person who took out the prior patent, may totally defeat the other.

As the patent takes effect from the date of the sealing, how can that happen?—Supposing a person takes out a patent on the first day of July for certain improvements, with a power to inrol his specification within six months, and another person obtains a patent on the second of July for the same object, as is very frequently the case, in the precise words with a power to inrol within two months, when his specification is inrolled, there is nothing to prevent the man who has six months, incorporating the one that has been inrolled within two months, if he be dishonest enough to do it.

Will not incorporating the substance of the other patent vitiate his own?—If you can prove that he has not invented it; but that is a negative which you cannot easily prove.

On that account it is presumed most parties take the longest period granted by law for inrolling their specification?—They do, for that and other reasons, and in doing that, no great expense is incurred, nor any perjury; because in preparing affidavits to obtain time, the words I have introduced are, "that the petitioner hath directed petitions to be presented to His Majesty, praying letters patent," but he does not go on to say that it is his intention to take out the letters patent. The affidavit used formerly to go on to say that it is the intention of the party to complete them.

Are there any means of ascertaining the nature of the caveats that take place in respect of patents?—With reference to the Attorney and Solicitor General, whose clerks keep lists.

What do you think of the policy of preventing a person taking out a patent for an invention discovered by a British subject, and permitting him to take out a patent for an invention communicated to him by a foreigner residing abroad?—I think the policy of permitting patents to be taken out for inventions communicated from abroad is very good, because the great object is to improve the manufactures of the country, and whether it be done by invention here or invention abroad, I think the object is desirable; we are indebted to the Americans for a great many important inventions which come under that denomination. I think that so far as the law prevents a patent from being taken out for an invention communicated by a British subject abroad, it should be altered.

Have you any other observations to make upon the patent laws?—There has been much complaint as to the expense of patents; I am of opinion with the last witness, that if you decrease the expense much (and unless you did, it would be no benefit), it would so increase the number of patents, that they would become a public nuisance; for notwithstanding the great expense of obtaining patents, there are patents continually obtained for the most trivial, absurd, and old things.

Does not the expense of patents operate very unequally upon different inventions?—I am not aware that the cost of a patent upon any article of importance has ever been an object after the first year.

Are there not many inventions, the success of which must necessarily be limited to the first or second year, and afterwards the thing from its very nature will be forgotten, such as the kaleidescope?—That is an instance I had in my mind the moment the subject was alluded to; but that invention, though it was only popular for a very short time, was so popular, that I apprehend the expense incurred in obtaining the patent was no object; and I do not recollect any other instance.

May there not be many articles of fashion which last only for a season?—There are articles, such as straw hats, and things of that sort; but still the sale has been very great, if they have been at all encouraged.

Would it not be fair for such ephemeral inventions, to allow a person to take out a patent for a shorter period than fourteen years?—I should apprehend more inconvenience than advantage would result from such a course.

Would it not be a better check to patents being granted for frivolous inventions, if the parties who were to judge of the propriety of granting patents were more narrowly to sift them in the first instance?—It would certainly be a check, but I do not perceive any advantage in that check, but a great deal of discontent would frequently arise; parties would complain of being prevented.

Have you any other suggestions to offer to the Committee with regard to the patent laws?—I conceive that all the defects, or at least a great portion of them, might be remedied by a very different mode of obtaining patents. The present mode, which is dependent upon the King's leisure for signing patents, which he is called upon twice to do in every patent, is a very great inconvenience to the subject; because I have known patents to be delayed several months waiting for His Majesty's signature, during which period the invention has been discovered by others, and the patent rendered of no effect.

Would your idea be to dispense with the sign manual? —My notion is, that if the Crown would allow the prerogative to be interfered with, an Act, authorizing the patent to issue from an office, would be an improvement; and I think that if a specification were made, the first course to be adopted, instead of the last, that would be an improvement; I think if the specification took the place of the caveat, and were entered for twelve months, or some definite period, with power to substitute at a certain period a more perfect one, it would be an improvement; that is, that the patent should take date from the lodgement of the specification, and that the party should be at liberty to consult all the world in preparing his specification.

Would you have that temporary specification detail the invention in some degree?—I would have it so perfect, as that the parties could make it subject to revision from the experiments and inquiry of others.

And of course, the thing described in the subsequent specification must be fairly deducible from the thing laid down in the first specification?—Certainly, it must not travel out of that.

Would you have the first specification go into considerable detail?—I would have it as perfect as the parties could make it from their own mind, or their own confidential friends assisting them.

Would it not be an evil to allow a very general specification to be made?—Certainly; I would make that first specification, if possible, a perfect one, subject to all the rules by which specifications are now drawn: I think it would also be an improvement if all specifications were inrolled in one office; or rather not literally inrolled, but copied into a book; I think it would be very advantageous if all the specifications were collected from the several offices, and properly indexed and properly made out, so that they should be of easy access.

Are they of easy access at present?—I think not.

Are you aware of any classed list that is made out?—No perfect one. The best book of reference upon such subjects, as far as it goes, is Dr. Young's Lectures; but in the office there is no list, but a list of the names.

So that a person wishing to learn at the public office what patents had been taken out, would have to make a very long search?—A very long search at the Inrolment Offices; they could give no information but such as he particularly inquired after.

The following ACCOUNT *of the Number of* PATENTS *granted from the year 1675 to 1829, and the List of Patents in Force, was delivered to the Committee by* Mr. WYATT.

CHARLES II.	
Year.	No.
1675	4
1676	2
1677	3
1678	5
1679	2
1680	—
1681	5
1682	7
1683	7
1684	12
JAMES II.	
1685	5
1686	3
1687	6
1688	4
WILLIAM & MARY.	
1689	1
1690	3
1691	20
1692	24
1693	19
1694	9
1695	8
1696	3
1697	3
1698	8
1699	4
1700	2
1701	1
ANNE.	
1702	—
1703	1
1704	4
1705	1
1706	4
1707	3
1708	2
1709	3
1710	—
1711	3
1712	3
1713	2

GEORGE I.	
Year.	No.
1714	4
1715	3
1716	8
1717	6
1718	6
1719	2
1720	7
1721	7
1722	13
1723	7
1724	14
1725	9
1726	5
GEORGE II.	
1727	7
1728	12
1729	8
1730	11
1731	9
1732	3
1733	6
1734	8
1735	6
1736	—
1737	3
1738	6
1739	3
1740	4
1741	8
1742	6
1743	7
1744	17
1745	4
1746	4
1747	8
1748	11
1749	13
1750	7
1751	8
1752	6
1753	11
1754	9

GEO. II. *continued.*	
Year.	No.
1755	12
1756	3
1757	9
1758	14
1759	10
GEORGE III.	
1760	8
1761	14
1762	9
1763	20
1764	14
1765	14
1766	30
1767	23
1768	23
1769	36
1770	30
1771	22
1772	30
1773	29
1774	36
1775	20
1776	29
1777	33
1778	30
1779	38
1780	32
1781	34
1782	39
1783	64
1784	46
1785	60
1786	59
1787	54
1788	43
1789	44
1790	68
1791	57
1792	84
1793	43
1794	55
1795	50

Geo. III. *continued.*		Geo. III. *continued.*		Geo. IV. *continued.*	
Year.	No.	Year.	No.	Year.	No.
1796	73	1809	102	1821	108
1797	54	1810	95	1822	113
1798 ..	77	1811	115	1823	138
1799	82	1812	119	1824	181
1800	96	1813	143	1825	249
1801	104	1814	94	1826	131
1802	105	1815	99	1827	148
1803	74	1816	118	1828	152
1804	60	1817	98	1829 (May)	37
1805	95	1818	130		
1806	99	1819	101	Total..	5,539
1807	96	George IV.			
1808	95	1820	98		

LIST OF PATENTS IN FORCE.

June to Dec.	1815	53	Jan. to Dec.	1824	181
Jan. to Dec.	1816	118	......	1825	249
......	1817	98	......	1826	131
......	1818	130	......	1827	148
......	1819	101	......	1828	152
......	1820	98	January to May,	1829	37
......	1821	108			
......	1822	113	Total......		1,855
......	1823	138			

Mr. Farey, an Engineer, stated that many patents are solicited by attornies; it is usual for most persons who have made an invention, to apply to an attorney to obtain a patent; there are also patent agents, who make it their business. Those patents which are solicited by attornies, are divided amongst all that profession; but as the patent agents are continually soliciting patents, and make it their express business, each of them passed a greater number than any individual attorney. He considered it more beneficial for a party applying for a patent, to make an application to an agent than to carry it through himself; the trouble would be excessive in that case; and the preference of an agent to an attorney is, that the agent, by doing a greater number at once, has greater facility; the process is very complicated, and it is necessary to take the papers from one office to another, because, when they are lodged at one office, they are not forwarded from that office to the next, but they must be taken by the applicant or his agent, and often they are not ready for delivery the first time he applies for them. Mr. Farey recollected, that when he solicited a patent, by way of experiment, it occupied a large portion of the whole of his time, and interrupted all his professional studies. He believed that when it is desired to extend a patent to those colonies that have a colonial legislature, it requires an express act from them to enable disputes on the patent right to be tried in a colonial court of justice, otherwise they would be judged here, which would increase the expense of law proceedings beyond all bounds. He is not aware of any instance in which a colonial legislature has refused to sanction a patent, nor of any instances in which it had been applied for; the objection to having a patent for England and the colonies, without an act of the colonial legislature, is, that all law proceedings being necessarily in this country, the expense of bringing over witnesses would be enormous for an invention which was exclusively practised in the colonies. Those inventions are not very numerous, and hence it is not common to apply for such acts. In cases of inventions which are expected to be chiefly employed in this country, and only occasionally in the colonies, the inventor might not think it worth while to apply for an act of the colonial legislature. The only instance which has come to his knowledge, is a recent patent to Mr. Hague, for expelling the molasses from sugar; he (Mr. H.) explained to him, that if law proceedings on such a patent right were limited to suing infringers, in our courts in this country, it would amount to a prohibition altogether; hence he applied for an act of the colonial legislature, at the same time with his patent for this country. It may be stated on that ground, that an invention which is entirely for the service of the colonies, will require an act of colonial legislature, in addition to the patent, to make it available, but they are very few; he supposed, with the exception of that invention, and half a dozen others that have never come into use, there will be no such cases found; there being but few manufactures that are exclusively practised in the colonies. He supposed they would require a separate act for each colony which has a legislative assembly.

He stated that the time it generally takes to obtain a patent is said to be six weeks; but whether they have ever been obtained in six weeks or not, he could not say; they are certainly now two months upon the average, and that is frequently extended to a much longer period.

During the time between making the application and sealing the patent, the applicant has no security for his invention; there was even an increased necessity for secrecy beyond that which existed before his application, because his application has called attention to his procedure, and declared what is the object of his pursuit. A man who has proceeded with some freedom in his experiments, and in private trials of machinery, before he applies for his patent, is always obliged to shut up his models, and desist altogether, until he obtains a patent; for by his application, he calls the attention of all rivals to his proceedings, and any disclosure of his invention made before his patent is sealed, (however treacherously obtained,) would be fatal to his patent. It is a common practice of manufacturers, if they begin an invention solely for their own use, without any thought of a patent, when they have obtained such a prospect of advantageous result as to see that a patent would be desirable, they destroy all the models, and every vestige of them, and even send away the workmen who made them, on some distant embassy, to avoid any chance of the secret being called forth by the competition that exists among rival traders as soon as one makes an application for a patent. That is a very great inconvenience, and valuable time is lost to the public as well as to the inventors.

He knew of no legal precautions that a man can take against that chance of losing his patent right; and it frequently happens that patents are delayed very long in their progress through the offices, so as to occasion a very great grievance. He had an instance of that recently; he prepared the title for an application for a patent on the 23d of June last, and he was certain that the first proceeding for a patent was taken by the attorney within a day or two of that date; but the patent was not obtained till the 31st of January 1829; what made this peculiarly inconvenient was, that the inventor had made a trial of his invention before he thought of taking out a patent at all, and before he applied to him, Mr. F. advised him to keep it a profound secret the instant that he made the application for a patent; and he told him, that it would be from six weeks to two months, that he would be obliged to remain in secrecy and consequent inaction; but it proved to be more than seven months. In the mean time, another person conceived the same idea, and opposed the grant of that patent before the Attorney General, when the progress of the patent was far advanced; that opposition was not made till the 8th of December; and he believes that the invention, upon which the opposition was founded, did not exist at the time when the patent ought to have been granted, if there had been no delay.

He was not aware that this extraordinary delay arose out of any peculiar circumstances affecting that patent; but there were no unusual circumstances attending the invention; it was probable that the King's health might have affected it, as in all cases he knew that when the King is indisposed, the patents are delayed at the stage when His signature is required. In this case, the opposition grew up in the meantime, and the applicant was obliged to answer it at considerable expense, and at the risk of his patent being refused, and further delay was occasioned.

The longer the delay between his application and the patent being granted the greater is the risk of opposition and of discovery; he alluded to the inventor, Mr. Parker, who was a lieutenant in the navy, and at that time had no occupation whatever, but he was waiting in total inaction till he could bring this invention forward. It was a self-acting drag, to be applied to travelling carriages, and he had so well digested his plan, that he was ready the very day after the patent was sealed, to begin to work with great vigour, and the thing was applied to a carriage, and tried in a short time after his patent was sealed; but if he had done so, in the time between applying for and obtaining it, he would have been subject to the loss of his patent, for the plan could not be concealed when it was taken out to try it on the public roads.

The object of keeping an invention secret after it is determined to take a patent, arises out of these considerations; first, lest the invention should be pirated; and, secondly, lest there should be such an act of publication as to vitiate the patent; and also the risk of calling up an opposition to the grant of the patent; because the instant that any man, by any means, announces to his competitors in trade that he is engaged upon a new invention, they are all upon the watch to find out what it is, and if they know only the object of it, or what part of his processes it relates to, they can examine into the circumstances of their own processes to find out something for the like purpose, if not the same. Therefore it always happens, that when a patent is applied for, on any new subject, that there are several other applications for patents upon the same subject, following each other very quickly.

The title is often worded obscurely, in order to avoid directing public attention to the subject; but there is a danger in being too obscure, because then a court of justice may afterwards hold that it is an invalid patent, for want of coincidence between its title and the specification. It was one of the most metaphysical problems that he (Mr. F.) knew, to prepare a title to a patent; it generally took him two or three days to make up his mind about the wording of a title; not to be so clear as to call the attention of rivals, and enable them to discover the subject, and not so obscure as to incur the danger that a court of justice might afterwards rule, that it was an imperfect definition or title of the invention described in the specification.

It has never been declared by law, or decided with precision, what constitutes a publication during the interval between the application for the patent, and the sealing, as to vitiate the patent, but his advice to inventors is, to keep their secrets as close as possible. It is supposed that an invention communicated by the patentee to any person whose assistance is necessary to carrying on the invention towards perfecting it, would not be considered as a publication. When an inventor brings his invention to him, and communicates it to him for professional advice, that is no publication; and if he communicates the same to a workman, or to only so many as are fairly necessary, in order to make a machine or a model; but it has never been decided, whether if those persons were to communicate it at second hand, that would be a publication or not; he apprehended it would, though it was probable that the inventor would have a remedy against those persons by action for damages. In the absence of any decision of the Judges, he supposed from the concurrent opinions of counsel of eminence, that such breaches of trust would be considered as publications. It has never come before a court except once, and then he believed the matter was settled in such a way as not to give the positive opinions of the court on the subject. Whenever an invention, or a new article produced by an invention, has passed from one person to another by sale, before the date of a patent, the patent cannot be maintained. There is a decision on this point. The inventor of a new mode of making verdigris, manufactured and sold the article before the date of his patent, which was afterwards set aside in consequence. In this case the invention being the mode of making the article, that invention did not become known by such sale, and therefore the substantial claim to a patent remained; viz. the power of the inventor to withhold his invention from the public.

If a person having made an invention of the same nature as that for which a patent is sought, and has carried it on secretly, it is decided that such secret exercise of an invention would not vitiate the patent; but then it is assumed that the person so carrying it on secretly, would inevitably reveal the secret the moment that he knew that a patent was applied for, and a disclosure of the secret by him, in the interim between the date of the application, and the date of the patent, would vitiate the patent; that is the only reason he had for leaving the patent open to destruction by a publication of the invention, between the date of application and the date of the patent; viz. that those persons who have been previously secretly practising the same invention, may have an opportunity of publishing it, so as to destroy the patent. But such publications from the fear of an expected patent, rarely take place, because, when a person applies for a patent, he does not declare himself so clearly by the title, that the person secretly practising the same invention could be certain that it is identical with the previous secret practice.

To be continued.

Court of Chancery, Dec. 22, 1829.

BEESTON *v.* FORD.

THIS case arose upon an application for an injunction, which had been dissolved by the Lord Chancellor, on a former occasion, on cause being shown against it by the plaintiff. The merits of the case are as follows:—

In 1802, the plaintiff was the assignee of a patent for improvement in ships' cabooses, and it appeared that the patentee and his assignees had enjoyed the exclusive use of the invention for about seven years. It was shown that an alteration was then made, by which, instead of the fire-place being open, and capable of being closed by an iron plate with hinges, a fixed iron plate was substituted, and the fire-place was fed by means of a furnace. In other respects the machines correspond. His Lordship thought, that notwithstanding these alterations, the plaintiff ought to be considered as having enjoyed the patent up to the present time. The rule of law in these cases had been laid down by Lord Eldon to be, that where a patentee had for a number of years enjoyed the exclusive possession of a patent, the Court would not allow that possession to be disturbed, and would grant an injunction until the trial at law, whatever doubt there might be as to the validity of the patent. On the other hand, if such possession could not be proved, the Court would not grant its protection, but would send the parties to a court of law to decide the question. In "Hill v. Thomson," and in other cases which had been cited at the bar, Lord Eldon had repeated this rule, and had acted upon it. The question, as his Lordship observed in one of these cases, was not merely between the parties on the record, for unless the injunction were granted, any person might violate the patent; and the consequences would be, that the patentee must be ruined by litigation. For this reason, although there was great doubt, in the case of Bolton and Watt, the injunction was granted until the right of possession could be tried, and directions were given to have the question tried speedily. The present case, therefore, relating to an invention which had actually been enjoyed seven years, it appeared to his Lordship, upon the authority he had referred to, that the possession ought not to be disturbed. After reading the specification,* he could not but entertain great doubt whether it could be supported. It included a new and an old machine, and he thought that the improvement ought to have been much more minutely and accurately pointed out. He doubted, too, whether that part of the invention which was claimed as a novelty, as to constructing the covers to the boilers, was a new invention. Its application to ships' cabooses might be novel; but it was very questionable whether that alone entitled it to protection. The infringement being, as his lordship thought, well established, supposing the patent could be supported, the machine appeared to be accurately enough described. It was not, however, his province to decide the validity of the patent on the ground he had alluded to, and he must therefore order the injunction to be revived. Some

* We purpose inserting this specification in a future number.

arrangement should be made for the speedy trial at law of the patent-right, and he therefore ordered the declaration to be delivered before the essoign-day of the next Term, and that the trial should be in the Court of Common Pleas.

FRENCH PATENT.

Patent granted to JEAN NICOLET, *of Fribourg, Switzerland, for the Composition of a Powder for promoting the Vegetation of Grains, and for preserving them from rotting.*— Dated June 4, 1813.

THE first precaution to be taken for the preservation of grain, and even flour, is to protect them from the voracity of birds, rats, and insects; but in covering the grain with a composition which would render it insupportable to animals, it is necessary at the same time that such composition should have no tendency to injure the grain.

The following mixture will be found to accomplish the one without the other:—

Rock alum	-	-	-	1 pound
Blue vitriol	-	-	-	1 —
Green vitriol	-	-	-	1 —
Purified nitre	-	-	-	1 —

These four substances are to be melted, and one pound of sulphur, with an equal quantity of white arsenic, are then to be added. The whole being well mixed together, it is left to cool, to reduce it to a fine powder, which is made into packages of one pound each.

In making use of this powder, the contents of one of the packages are boiled for about five minutes in urine, taking care to put but a small quantity of the powder at a time into the vessel, in order that the effervescence be not too great. It should here be observed, that the proportion of urine to be employed with this powder is six pints to the pound, which is sufficient to preserve two sacks or four hundred pounds of any grain. The powder thus prepared, penetrates the interior of the grain, imbibes its feculency, and without altering its vegetative properties, communicates to it such a degree of bitterness, that it is rendered completely loathsome to animals as well from its smell as its taste, both being equally offensive. Experiments have proved that this mixture produces an augmentation of one-eighth in a crop of grain.—*Brevets d'Invention.*

On the propagation of Sound. By Dr. Chladni.

This celebrated natural philosopher, whom science has recently been deprived of, applying the theory of liquid waves to the theory of aerial, caused sonorous rods to vibrate in water, on which he had spread a very slight stratum of the powder of lycopodium, for the purpose of better observing the undulatory motion. When a sonorous rod of metal or glass is plunged into a liquid surface, round this four currents are observed, two of which are in the direction of the vibratory motion, and the others at right angles to the direction of the first.

The currents, which are in the same direction as the vibrations, are receding or eccentric. The two other currents, which are opposed to that direction, are approaching or concentric. In all the receding currents, the lateral parts are curved outwards, and afterwards converge with the returning or approaching current, so that between every concentric and eccentric current a circular motion is formed which represents an oval, the most acute extremity of which is turned inwards. When one part of the eccentric current is thus returned with the opposite current, it becomes divergent quite near to the sonorous rod, and unites anew with the eccentric current, and so on. Hence it results that the centre of the oval observed between two currents is nearer to the sonorous body, and turns on itself.

The eccentric currents are generally a little longer and narrower than the approaching or re-entering currents. When a tuning fork is used, or any other instrument with a double vibrating stem, the same phenomenon is seen for each stem or arm. Since, from this phenomenon, we may conclude what passes in aerial waves, it will be easy to explain the interruption of sound in certain directions where the undulations take a transversal progression, namely, where they pass from a centrifugal to a centripital motion.—*(Kastner's Archiv. VIII.)*

Plurane, a new metal discovered in the Platina of the Oural Mountains. By Mr. Osann.

The platina, decomposed by aqua regia and remaining insoluble in that acid, is treated by potash, and then dissolved in water. By repeating this operation three times, a residue is obtained no longer exibiting a metallic appearance. Precipitated by nitric acid, and reduced to one half by distillation, it gives long prismatic crystals, of a white colour, inclining a little to red, and remarkable for their great brilliancy. Exposed on charcoal to the flame of the blow-pipe, they are speedily decomposed: one part sublimes whilst the other is reduced into a metallic globule. By adding a little muriatic acid to the aqueous solution and plunging in a bar of zinc, the latter is soon covered with a dark grey pellicle of reduced metal. Heated in a glass tube closed at one end, these crystals sublime in small brilliant needles, without leaving any residue.

These crystals form the new metal to which the author has given the name of *plurane*.—*(Annalin der Phys.)*

NOTICE OF EXPIRED PATENTS.

GEORGE YOUNG, of Paul's Wharf, Thames Street, London, Gentleman; for a method of making a peculiar species of canvas, which may be used more advantageously for military and other purposes than the canvas now in use. Dated December 5, 1815.

MARQUIS DE CHABANNES, of Russell Place, Fitzroy Square, Middlesex; for a method or methods for conducting the air, and regulating the temperature, in houses and other buildings, and warming and cooling either air or liquids in a much more expeditious, and consequently less expensive, manner than hath hitherto been done within this kingdom, which is applicable to various useful purposes, and will be of great public advantage.—Dated December 5, 1815.—(*For copy of Specification, see Repertory, Vol. XXVIII, p.* 321.)

JAMES LEE, of Old Ford, Middlesex, Gentleman; for certain improvements in the methods before invented by him, of preparing hemp and flax; and by which also other vegetable substances may be rendered applicable to many of the purposes for which hemp and flax are used.—Dated December 5, 1815.

CHRISTOPH DIHL, of Frith Street, Soho, Middlesex, Esq. for certain improvements in the method or apparatus of distillation.—Dated December 5, 1815.

JOHN MALZL, of Poland Street, Middlesex, Machinist; for an instrument or instruments, machine or machines, for the improvement of musical performance, which he denominates a *Metronome*, or musical time-keeper.—Dated December 5, 1815.—*(For copy of Specification, see Repertory, Vol. XXXIII, p.* 7.)

DAVIS REDMUND, of Johnson's Court, Fleet Street, London, Machinist; for a machine for the manufacture of cocks and bungs.—Dated December 9, 1815.

SAMUEL CLEGG, of the Gas Works, Peter Street, Westminster, Middlesex, Engineer; for an improved gas apparatus.—Dated December 9, 1815.—(*For copy of Specification, see Repertory, Vol. XXX, p.* 1.)

ROBERT KINDER, of Hill Street, Liverpool, Lancashire, Gentleman; for a method or means of propelling ships, boats, and other vessels.—Dated December 16, 1815.—(*For copy of Specification, see Repertory, Vol. XXVIII, p.* 261.)

ROBERT DICKINSON, of Great Queen Street, Lincoln's-Inn-Fields, Middlesex, Esq. for an improvement or improvements in the hoops or hooping of barrels.—Dated December 17, 1815.—(*For copy of Specification, see Repertory, Vol. XXIX, p.* 157.)

WILLIAM PLENTY, of Newbury, Berks, Iron-founder; for a plough or agricultural instrument, made on an improved principle, answering a two-fold purpose, so that land may be both pared and ploughed.—Dated December 22. 1815.—(*For copy of Specification, see Repertory, Vol. XXIX, p.* 193.)

WILLIAM ADAMSON, of St. George's Hanover Square, Middlesex, Gentleman; for a principle by which an horizontal wheel may be so moved about its axis by water, as to give it a power considerably greater than can be obtained by the application of water to a wheel in any other position Dated December 22, 1815.

LIST OF NEW PATENTS.

Francis Westby, of Leicester, in the county of Leicester, Cutler, for certain impoved apparatus to be used for the purpose of whetting or sharpening the edges of the blades of razors, penknives, or other cutting instruments. —Dated November 26, 1829.—(*Two months to enrol Specification.*)

John Marshall, of Southampton Street, Strand, in the county of Middlesex, Tea Dealer, for a method of preparing or making an extract from cocoa, which he denominates "Marshall's Extract of Cocoa."—Dated December 10, 1829.—(*Two months.*)

Benjamin Goulson, of Pendleton, near Manchester, in the county of Lancaster, Surgeon, for certain improvements in the manufacturing of farina and sugar, from vegetable productions.—Dated December 14, 1829.—(*Six month.*)

Charles Derosne, of Leicester Square, in the county of Middlesex, Gentleman, for certain improvements in extracting sugar, or syrups, from cane juice, and other substances containing sugar, and in refining sugar and syrups. Communicated by a Foreigner.—Dated December 14, 1829. (*Two months.*)

Persons desirous of obtaining Patents for inventions, may have them procured with little trouble to themselves, and generally without their personal attendance in London, on application to the Editors *of the* Repertory *(addressed to the care of Messrs. T. & G.* Underwood, *32, Fleet Street,) who, from long practice and experience, presume they may be enabled to afford important assistance to Patentees in drawing up and adjusting their Specifications, on the accuracy and perspicuity of which, in a great measure, depends the security of the Patent.*

THE REPERTORY OF PATENT INVENTIONS,

No. LVI. FEBRUARY, 1830.

Specification of the patent granted to John Nicholls, *of Pershall, in the county of Stafford, Gentleman, for certain improvements in the Lever, and the application of its power.*—Dated July 25, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I the said John Nicholls, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed, are described and contained as follows, (that is to say):—

My said invention of improvements in the "lever, and the application of its power," consists, in applying weights to the opposite sides or ends of a lever suspended at the the centre, (the centre of gravity being below the point of suspension), so as when acted upon, to produce a vibratory or oscillating motion, which may be applied like any other force or power, to the moving of machinery, or other useful purposes. Where force is required, the construction is represented in figs. 1 and 2. This lever may be made of cast-iron or any other suitable material, and may be of any given form or dimensions, as to its length, breadth, or thickness; at certain given points near each end, I attach weights as represented in the drawing; or, I so form the arms of the lever, as to act themselves as weights. These weights are placed in such a position as to balance each other; and at a given distance below the line of the axis of motion, and by the alternate elevation and depression of each end in succession, I obtain a vibratory action, by which an accession of power is obtained. I find by experiment, that when the lever is $5\frac{1}{2}$ inches from the axis of suspension to the centre of the weights, that the line of the centres of the said weights should be about $1\frac{5}{8}$ or $1\frac{3}{4}$ of an inch below the centre of the axis of suspension, making an angle with the centre, of about sixteen degrees. I also find, that it is beneficial for the improved lever to have an elevation above the axis, of about $2\frac{3}{4}$ inches, and of about $4\frac{1}{2}$ inches above the line of the centres of the weights, making an angle with the centre of about twenty-five degrees. The suspended weights which I have applied in these applications, are about 2lbs each, and the vibratory action of the lever, about 36 vibrations or double strokes per minute.

These lines of construction, and given dimensions, and the statement of weight as applied in practice, I lay down, and recommend as general data for the proportional construction of all apparatus on a larger scale, and which I consider as best adapted to obtain the most effective power from the application of my said improved lever; but I do not confine myself to any particular form of construction, or to these proportions; for if a greater speedis required, I use larger or heavier weights, and if a slower speed is wanted, I use lighter weights, and adapt the construction of the improved lever and its machinery, to the objeet to which it is intended to be applied.

I now proceed more particularly to describe the nature of my said invention, and improvements: figs. 1 and 2 are geometrical elevations, and side views of the two sides of the improved lever, shewing the application of its power to move machinery, and other useful objects to which the said improvements may be found applicable. *a a* in each figure, represent one side of the improved lever, which may be made of wood, or of cast iron, or of any other suitable material; *b b* are weights attached to each end of the lever, which should be equal or nearly so; *c* is the axis on which the lever *a a* is suspended. *d d* are columns of cast-iron, or other suitable material, which support the improved lever. *e* is a crank or lever fixed firmly in the axis *c*, and moves with the lever. *f* is a connecting rod which joins or connects the crank *e* with the crank *g* on the axis *h*. *i i* is a wheel fixed on the axis *h*, which operates upon and moves the pinion K K, which is firmly fixed on the axle *l*. *m m* is a fly wheel also fixed to the axle *l*. *n* is an iron pin, to which a rope *u* is attached, for the purpose of putting in motion the improved lever and suspended weights. *o o o o* are stays or braces which connect each side of the suspended lever firmly together. *p p p* are frames of cast iron or other material made to support the wheel *i i*, and the pinion K K, and their axis *l* and *h*.

Fig. 3, represents a sectional view of the suspended lever. *a a a a* represents the wood or cast iron sides; *b b* the lead or iron weights; *e*, the crank on the axis; *c c c* the axis of the improved lever; *o o o o* the stays or braces by which the sides of the lever are firmly held together.

Fig. 4, represents a sectional view of the frame *p p p p*, on which the fly wheel *m m*, on the axis *l*, and the pinion K K rest and are supported, also the wheel *i i* on the axis *h*, on which the crank *g* is fixed. The improved lever and machinery therewith connected, and which have been herein described, may be put in motion by any power acting upon it in such a manner as to produce a vibratory action on the end of the lever *a a*, &c.; for instance, a pulley and ratchet wheel, which may be attached to the frame *p p*, which being caused to act with sufficient force on the end of the lever at *n*, through the medium of a rope, or any other connecting means, a depression at one end of a lever will occur, and the gravity of the weights will instantly produce an effort to regain an equilibrum, and the effect will be a vibratory action or motion of the improved lever; which operation being repeated, a rotary movement of the machinery may be produced, and the power thus obtained applied to useful purposes. Thus motion may be communicated by the force of a man acting directly upon the rope *u* by a pull downwards, or in any other convenient mode by which the vibratory action will be communicated to the improved lever *a a*, and suspended weights *b b*, which will operate by the axle *c* upon the crank *e*, communicating motion by the connecting rod *f*; to the crank *g*, and the axle *h*, to the wheel *i i*, which operates upon and moves the pinion *k k*, fixed on the axle *l*; and the fly wheel *m m*, being thus put in rapid motion, will enable the crank *g* to pass the line of centres or neutral points, and the motion and power thus originated by the action of the improved lever and weights, may be communicated to a corn mill, or any other machine or machinery requiring rotary motion. The power originated by the vibratory action of the improved lever and weights, may also be advantageously applied to working pumps, and many other useful purposes which will be obvious to every practical machinist. Having thus described my improvement generally and particularly, and having given an example of the mode of constructing my said invention of the improved lever, and the particular details of the application and manner of operation, by which the power of its vibratory action may be communicated to machinery, and by which description, and drawings, any competent machinist may construct or manufacture, and apply the same to useful purposes, I proceed to state my special claims to the invention of the improvements herein described, and the application of their power.

First, I claim as my invention, the application of the vibratory motion of suspended weights acting on opposite sides or ends of a lever, having a common axis to the production or application of force, as a moving power as herein described.

Second, I claim as my invention, the described application of the improved lever, and of the mechanical power originating from the vibratory motion of suspended weights acting as aforesaid, under any other similar form of construction by which the same can be manufactured, produced, and applied; but, I do not claim the wheels, cranks, or axis, or any other mechanical apparatus in common use, as any part of my invention, except in connection with the construction of the "improved lever, and the application of its power."

In witness whereof, &c.

Specification of the Patent granted to William Godfrey Kneller, *of Pearl Street, Spitalfields, in the county of Middlesex, Chemist, for certain Improvements in evaporating Sugar, which improvements are also applicable to other purposes.*—Dated May 27, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said William Godfrey Kneller, do hereby declare that my invention consists in a method or process and certain apparatus as hereinafter described, by which I am enabled to evaporate liquids and solutions at a low temperature, and thereby to avoid the injury to which certain substances which require a nice and delicate application of heat, such as sugar, for instance, are liable to, by being exposed to too high a temperature. And I do further declare that my said invention and improvements consist in forcing, by means of bellows, or any other blowing apparatus, atmospheric or any other air, either in a hot or cold state, through the liquid or solution subjected to evaporation, and this I do by means of pipes, whose extremities reach nearly (or within such distance as may be found most suitable under peculiar circumstances,) to the upper or interior area of the bottom of the pan or boiler containing such liquid or solution, the other extremities of such pipes being connected with larger pipes which communicate with the bellows or other blowing apparatus, which forces the air into them. The pan or boiler may be of any shape or dimensions, but I prefer it with a flat level bottom, and I introduce the liquid or solution to the depth of from about four to six inches. The heat may be applied to the lower or exterior area of the bottom of such pan or boiler by naked fire, steam, or hot air, in the usual manner, and by means well understood; the air then forced into the heated liquid or solution keeps it in a constant agitation, abstracts its heat, and carries off the steam or vapour which is to be expelled. By raising the degree of heat under the pan or boiler, and increasing the quantity and velocity of the air injected into the liquid or solution, or on the contrary, by lowering the heat and moderating the injection of air, the evaporation is accelerated or retarded at the pleasure of the operator, according to the nature of the substances or the effect desired.

And I do further declare that in applying this my said invention and improvements to the evaporation of cane juice or syrup for making refined sugar, I can bring it to the proof or crystallizing point by keeping the temperature of such syrup or cane juice between one hundred and forty and one hundred and seventy degrees of Fahrenheit's thermometer, although I prefer to keep it between one hundred and sixty and one hundred and seventy degrees. By this simple and cheap apparatus I obtain a great quantity of large and shining crystals, which hitherto were attainable only by evaporating *in vacuo*, a very troublesome and expensive process, while other methods by exposing the sugar to a high temperature impair the quantity, size, and brilliancy of the crystals, and form a great quantity of molasses or treacle.

And I further declare that this my invention and improvements can be applied to the evaporation of other liquids and solutions, as well as syrups and cane juice or sugar, by varying the apparatus and the degree of temperature according to their nature and the will of the operator.

And I further declare that this my invention and improvements can also be applied to distilling or rectifying spirits, provided that a vent be given to the air arising with the spirit after the latter shall be condensed.

And I further declare, that in order more quickly to remove the steam or vapour from the surface of the liquid or solution, and thereby to favour the evaporation, I sometimes, and particularly when I use hot air for heating the pan or boiler, conduct the hot air after it has given out part of the heat to the bottom of the boiler, to the surface of the liquor or solution, but I do not consider this contrivance necessary in any, nor advisable in all cases. It is hardly necessary to observe, that the evaporating power is augmented by increasing the diameter of the pipes, and the quantity of air propelled by the blowing apparatus through the liquid.

And I do further declare, that as it is desirable that the liquid to be evaporated should be of equal depth in every part of the evaporator, the bottom of which is recommended to be perfectly level; it will be found that the liquid when sufficiently evaporated and concentrated, does not readily flow out through the spout opened for the purpose; to remedy this inconvenience, I place a vertical sliding plate four and a half to five inches in height and somewhat less in length than the breadth of the evaporator or pan, such plate being kept in its upright position by projections at right angles with its lower edge, which must slide as nearly as possible in contact with the bottom of the same pan. This plate is in the first instance put at that end of the pan, or evaporator, which is opposite to where the spout is situated. When the evaporation is effected to a sufficient degree, I damp the fire, or shut off the steam or hot air, and open the spout to draw off the liquid, a great part of which will immediately flow out; I then by means of a winch, or lever, raise the pipes about six inches, and gently draw the said vertical plate by a thin wire or chain towards the spout, and thus quickly clean the bottom of the pan. It is necessary to raise the pipes in order that the before-mentioned plate may pass under them, and at the same time not interrupt the blast of air through the small pipes, which might be obstructed if any of the evaporated liquid should congeal or crystalize in them by cooling. For effecting these objects the main pipe arising from the bellows or blowing apparatus, is inserted into the main pipe in the evaporator, in an air tight manner, but with a joint or flexible tube sufficiently long to allow the system of blowing pipes to slide upwards for about six inches. The form and construction of the apparatus which I use to produce the above effect, may be varied according to circumstances, and the form and position of the pan or evaporating vessel to which it is to be applied. But two things are essential in its construction, the first of which is, that however numerous the blowing pipes may be, that their lower orifices should be distributed as evenly and equally over the whole surface of the bottom of the pan as possible, and secondly, that a stream of air should issue from the lower end of every one of them at the same time. To insure this latter object it is immaterial whether the bottom of the pan or boiler be perfectly level, but it is quite necessary that all the lower ends of the blowing tubes should be on a level and parallel to the surface of the fluid to be evaporated, in order that there may not be a higher column of fluid in one tube than in another. The mode of construction necessary to produce these objects may be various, but in order the more distinctly to explain my meaning and my mode of operating, I hereunto subjoin a drawing, (Pl. II.) of the apparatus which I have used, and find to answer the purpose, and in which A A A A, fig. 5, is a plan or bird's-eye view of an oblong pan or boiler, B B B the tinned copper or other large air pipes, which are closed at their end C C C, but open into each other, and likewise into the still larger perpendicular pipe D, from which the air is supplied by communicating as aforesaid, to bellows or other blowing machinery; *e e e e*, &c. are the small lateral pipes which communicate with the large air pipes and proceed downwards through the fluid to be evaporated to very near the bottom of the pan. The lower ends *e e*, &c. of these pipes are all very nearly equi-distant from each other, to produce the equal distribution of air before mentioned. Fig. 6 is a transverse section of the pan A A A A, fig. 5, showing the great air pipe D, the cross pipe and its continuations B B B in section, and the small descending pipes *e e e e*, &c. as shewn in the last figure, likewise the pipes *f f f f* which likewise descend from the pipes B B, but in a more nearly vertical direction, which prevents their being seen in the view fig. 5, but by means of which, the distances of the lower ends of these blowing tubes are brought to the same distance as under the pipes B B, as in other parts of the pan. *g g g* are legs to support the above described system of pipes, by standing on the bottom of the pan, and are of such length as will just prevent the lower ends of the said blowing pipes from touching it. The whole of this system of pipes is to be raised at once as before mentioned by any adequate machinery, in order to permit the scraping or cleaning plate *h h* to pass under the ends of the before-mentioned small blowing pipes. Fig. 7 is a longitudinal section of fig. 5, of which a particular description will be unnecessary, as the same letters of reference denote the same parts in this and the other figures, the insertions of the small blowing pipes into the pipes B B being shown by black dots. In all these, fig. 5 shows the situation near which the discharging valve or orifice should be placed, and K K is the line near which the surface of the fluid should stand when first introduced to be evaporated. As before mentioned, the form of this apparatus may be varied, provided its essential properties of the air blowing through all the descending tubes, and this being so disposed as to produce greatly divided and equally distributed currents of air over the whole bottom of the vessel at once, are maintained, because my invention consists in producing rapid evaporation at lower temperatures than usual, by the means hereinbefore described. In witness whereof, &c.

OBS.—It is well known that a current of air promotes evaporation, and is in many instances employed for that purpose by being made to pass over the surface of liquids; the principle on which the foregoing patent is founded, consists in forcing air *through* liquids, and we are inclined to think it will prove more efficient, inasmuch as the air is not only brought into intimate contact with many and constantly changing surfaces of the liquid, but also strongly and incessantly agitates it; the effect of such agitation is an increase of evaporation and decrease of temperature, which points are to be considered as advantages of importance in all cases where liquids are to be converted into vapour at a lower degree of heat than their boiling point, under the common pressure of the atmosphere.

It has been stated to us, that by Mr. Kneller's process the evaporation of water is more rapid at 180° of Fahrenheit, than by boiling at 212,° and is consequently attended with a considerable saving of fuel.

The same object has been attained *in vacuo*, but the present apparatus, we readily admit, appears to have the advantage over that method, both in simplicity and cheapness, from its requiring fewer and less expensive vessels; in other respects the results must be similar, as the high temperature is avoided which injures the products by acting on the substances exposed to it, and favouring new combinations.

The refined sugar made by evaporating on this plan, has been represented to us as being equal, and in some respects superior to that evaporated *in vacuo*, as having the property of not being effected by a damp atmosphere; the former circumstance is so far in accordance with the theory, that a high temperature prevents the formation of large and shining crystals and converts sugar into treacle or molasses; the permanency of the sugar in the open air may be accounted for by the crystallization taking place under an abundant supply of air, and not in the seclusion from the atmosphere.

The patentee in a communication he has made to us observes, that "the same invention if applied to distilling ardent spirits, raises them in a *clean* state, and the injection of air accelerates their passage through the condensing worm; the low temperature prevents in a great degree the production of empyreuma; the air forced down upon the bottom of the still keeps it cool, and the agitation supersedes the necessity of *rousing*; and as the wash is not suffered to be heated to the boiling point, it can never rise into the *head* and cause the spirit to *run foul*. The sugar-house of Messrs. Widder & Co. Gravel Lane, Houndsditch, is fitted up and worked with this apparatus."

Specification of the patent granted to JOSEPH GARDNER, *Smith, and* JOHN HERBERT, *Carpenter, both of Stanley St. Leonard's, in the county of Gloucester, for certain improvements on machines for shearing or cropping woollen cloths.**—Dated December 18, 1824.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c—*Now know ye*, that in compliance with the said proviso, We the said Joseph Gardner, and John Herbert, do hereby declare, that the nature of our said invention, and the manner in which the same is to be performed, is particularly described and ascertained, in and by the drawings hereunto annexed, and the following description thereof, (that is to say):—

* This patent is the subject of one of the actions which Messrs. Lewis, of Brimscomb, have lately brought with success against several individuals, on the ground of its interfering with their rights. The trials will be found in p. 105, of our last, and p. 36, of our present vol.; and the specifications of Messrs. Lewis's patents, are given in vol. 36, p. 257, vol. 37, pp. 69,144, and 327, and vol. 38, p. 79, of our second series.

In the first place, we declare, that our said improvements apply only to such machines for shearing cloth, as are constructed with a fixed ledger blade, and an upper revolving cutter, whatever may be the construction of the same; or whether the same be used for shearing or cropping the said cloth from end to end, or from list to list. And secondly, we declare, that our said improvements so applicable as aforesaid, consist of three distinct points of invention or contrivances by which our said improvements are brought about; and these are first, a new lateral or horizontal motion, which we give in succession to each blade of the revolving cutter at the same time that it is revolving, thus causing it to slide or pass along the fixed ledger blade, by which its cutting power is very materially improved. Secondly, in a new and effectual means which we adopt and use for supporting the middle part of the cushion or bed over which the cloth passes, and by means of which, it is evenly and equally held up and supported against the cutters, without the possibility of the central part of the bed drooping or giving way, and thus producing an even and regular face upon the whole width of the cloth. And thirdly, in a new arrangement of line and contrivance for carrying the cloth forwards under the cutters with the greatest regularity and precision. The means by which these several points of improvement are brought about and carried into effect, will be clearly understood, by referring to the drawing hereunto annexed, and the following description thereof; as we before observed, the first part of our improvement applies to all revolving or vibrating cutters at present in use, whatever may be their particular construction, and, consequently, to them we make no claim; but we alter the axles upon which they revolve, by prolonging the same, and giving them a lateral play of about half an inch between the bearings which support them; and to one end of such axle, as at fig. 8, (Pl. II.) we attach by means of a ball and socket joint, (or any other contrivance which will permit the cutting cylinder to revolve), a connecting link or eye, fitted up with brasses and a tightening adjustment, for the purpose of embracing and working upon the crank *b* formed in the small upright spindle C C, consequently, as that spindle revolves, the crank will give any requisite degree of alternating motion, to be regulated by the throw or extent of such crank to the cutting cylinder in the direction of its axis: and we find, that from half an inch to three quarters of an inch of such motion, is amply sufficient to produce the beneficial effect sought by our invention. The cutting cylinder is made to revolve as usual by a gut or band working over the rigger or pulley *d d* formed on the side of the small bevil wheel *e e*, the axis of which projects fr omone side only, and works in a proper bearing on the frame of the machine, which bearing is common to such wheel *e e*, and the axis of the cutting cylinder. The projecting axis of the wheel *e e* is made hollow, so as to permit the axis of the cutting cylinder to pass and move through it longitudinally; but that axis must be square in the part where it slides through the hollow axis, or if round, must be fitted up with a projecting cock or feather to slide in a corresponding groove in the hollow axis, to the intent, that whenever the wheel *e e* is moved round, it may compel the cutting cylinder to move at the same time. F is a small bevil wheel fixed upon the upright spindle C C, and working by its teeth into the larger wheel *e e* for the purpose of causing that spindle and its crank to revolve; whereby the lateral sliding motion is given to the cutting cylinder: and *g g* is an iron projecting cock or arm screwed or fixed against the side frame of the machine for carrying the spindle crank and wheel *e e*, and F, which revolve upon the two pointed centre screws *h h*, or in any other convenient manner. The relative proportional diameters, and consequent number of teeth of the two bevil wheels *e e* and F, must be regulated by the number of cutting blades used or employed upon the cutting cylinder; because it is necessary to give a lateral sliding motion to each blade in succession; therefore if four blades are employed, as in the drawing, the larger wheel *e e* must be four times the diameter of the smaller wheel F, in order that such smaller wheel and the crank upon its spindle, may go four times round while the cutting cylinder goes once round. If three blades had been employed, then the small wheel F must make three revolutions to one of the larger wheels *e e*, and their size and number of teeth must be apportioned accordingly, unless the blades are made to move backwards and forward alternately, when the small wheel F may be made twice as large in proportion to *e e*, as above specified. In putting the machine together, it will likewise be necessary to observe, that the crank with its appurtenances must be so placed, as to bring the cutting cylinder into the nearest possible position to the axis of the wheel *e e*, when any one of the cutting blades of that cylinder is just about to come into contact with the fixed ledger blade, and is about to commence its cut; to the intent, that during the whole progress of its cut, it may be protruded or pushed longitudinally over the ledger blade, and if so adjusted for any one blade, it will be found right for all the others, provided the two wheels *e e* and F, have been properly proportioned to each other, and that the cutting blades are placed in a proper spiral direction upon the cylinder to which they are affixed. The end of a strong spring is shown at *i*, which is for the purpose of bearing down the axis of the cutting cylinder to the ledger blade at that end which is next the wheels; but this will not be necessary if the workmanship is good and perfect, and need only be resorted to in case of wear, or the fitting not being very perfect, as its only use is to prevent that shake which might arise to the cutting cylinder from the teeth of the wheels. The adjustment of the cutting cylinder as to its distance from the ledger blade, is made by screws in the usual way, but forms no part of our improvements, and therefore need not be described.

We believe the above described machinery to be the best adapted for carrying this part of our invention into effect with steadiness and certainty, but as it consists in giving a steady sliding lateral motion to each blade of the cutting cylinder while it is in the act of revolving, and this same effect may be produced, though less perfectly, by using cams or eccentrics, or rose work, or other contrivances upon the upright spindle C C in lieu of the crank, and by causing the axis of the cutting cylinder to re-act by springs, weights, or other mechanical contrivances, so we claim the exclusive privilege of using these; as the principle upon which this first part of our invention consists, is, that of giving lateral motion to the cutting blades at the same time that they are revolving.

The second point of our invention and improvement which relates to the bearing up or supporting the middle part of the bed, is drawn in its proper place under the last described figure; *k k* representing the bed, which consists of a truly turned cylinder of metal or hard wood, turning on gudgeons or pivots at the two ends in proper bearings, and covered very smoothly with woollen cloth, plush, or other fit material over which the cloth is to pass; but such a bed has been used before, and is not therefore claimed as any part of our invention, but is mentioned only to shew the use and application of what we do claim, which consists of a shorter roller *l l* or rollers (though we deem one sufficient) fixed in proper bearings under the centre of the longer bed roller *k k*, and likewise made to revolve on pivots; this roller *l l* should likewise be truly formed, and may be covered with cloth or other soft and elastic material to prevent its making a bed or indentation in the upper bed roller. If a single roller is used it may be of from one fourth to one-third of the length of such bed roller, and the bearings which supports its axis are made adjustable by screws, for the purpose of adjusting it very accurately to the bed roller, so as to produce a proper pressure and likewise to provide against the unequal wear of the axes of either of the said rollers in their bearing. Its use and application is so obvious that it will be needless to enter into any further description of it or the mode of fixing it, as this will be apparent to every competent workman.

The third, and last point of our invention consists in an improved modification of the machinery for moving the cloth forwards under the cutters while in the act of shearing, and the better to explain this, we have introduced a view of an entire shearing frame or machine, with all our aforesaid improvements attached to it in their proper situations; at fig. 9, though we do not claim any part of such frame and machine as our invention, except only as regards the particulars herein described, as constituting the three points or objects of our aforesaid improvements. *m m m m* is the ordinary frame of a machine, over the central part of which the cutting apparatus, consisting of the revolving cutter, ledger blade, bed, and their appurtenances, extends from side to side; and it must be observed, that this apparatus together with the several riggers or pullies *n o* and *p*, hold one fixed situation in the central part of the frame, and do not move from end to end upon it; consequently the cloth must move under the fixed cutters, and for this purpose the cloth rollers *q q* (only one can be seen in the figure) are fixed in proper bearings under the square frame *r r*; this frame has a long roller *s s* fixed on each side for the piece or end of cloth to pass over, and our aforesaid third point of improvement consists in the manner of giving equable and steady motion to this frame and its rollers, which altogether slides upon the two fixed rollers *t t*, and a third one in the centre of the top rail of the frame which is hidden by the rigger *o*; three such friction rollers are of course placed on each top side of the frame, and motion is communicated to the machine by applying the moving power to the axis of the large rigger *n* which by a line or band passing over a small rigger *u*, the axis of *p*, gives increased velocity of motion to the larger rigger *p*; and this, by another line or band passing round the rigger *d*, (fig. 8,) of the cutting cylinder, over the stretching pulley *w*, fig. 9, gives rapid motion to such cutting cylinder. A small rigger is fixed on the axle of *n* and this small rigger communicates a slow and equable motion to the larger rigger *o* for moving the frame *r*. Upon the axis of the rigger *o* we hang a cylindrical roller, which is free to move round on such axis, but by means of a cluck box or other contrivance on the end next the rigger *o*, it can be engaged or disengaged from that rigger by the lever and handle *x* in the manner of a fast and moving wheel, and thus it may be made to partake of the revolving motion of the rigger *o*; or be stopped at pleasure; to such roller we firmly attach the two ends of a gut strap or line which is wound a sufficient number of times around the cylinder, and in opposite directions in the nature of a mangle motion; the two opposite ends of such gut, strap, or line, are fixed to the two ends of the frame at *y* and *z*, one of the ends as at *z* having a tightening screw, by which the gut or line can at any time be brought to a proper state of tension. It follows therefore, that when the cylindrical roller is in gear or connected with the rigger *o*, it will carry the frame *r r* together with the cloth and cloth rollers and apurtenances, forwards against the cutters; but by moving the handle x the cylindrical roller is thrown out of gear, and may be instantly stopped at the list of the cloth, or in any part of its progress when out of gear; the whole frame is likewise to be drawn backwards by hand for the purpose of repeating a cut or taking a new one, in which case the cloth will require to be shifted by turning the cloth rollers q q in the usual way. The above form of machine, as shewn by fig. 9, applies to the process of shearing from list to list, but any competent workman will immediately see how its form must be varied to shear from end to end; this however constitutes no part of our invention, as our improved mode of moving the revolving cutter, bearing up the bed and moving the cloth, apply equally to either mode of shearing.

In witness whereof, &c.

Specification of the patent granted to THOMAS WALLER, *of Luton, in the county of Bedford, Straw Hat Manufacturer, for certain improvements in the manufacturing of straw plait, for the purpose of making bonnets, hats, or other articles.*—Dated February, 18, 1826.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I the said Thomas Waller, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed, are particularly described and ascertained, in, and by the following description thereof, (that is to say): My invention of improvements in the manufacturing of straw plait, for the purpose of making hats, bonnets, &c. consists, in the employment of the ordinary wheat straw grown in Tuscany, and other parts of Italy, which I plait, twist, or weave, in the same manner as English straw, except, that I use the upper part nearest the ear of the straw, instead of the lower part, or that which is contained in the hull, in order to produce similar kinds of straw fabric to those made of English straw, and commonly called or known by the names of "whole Dunstable plait, double seven split straw plait, Luton twist plait, broad Luton twist plait, double eleven split straw plait, whole Dunstable, nine, eleven, thirteen, and fifteen straw plait." The mode of preparing the said straw in Italy, forms no part of my invention. I import the straw into England in the same state of preparation, as when used for weaving or plaiting that peculiar straw fabric called Leghorn; and I twist or weave the said Italian straw, whether whole or split, in the manner commonly practised by the people in Bedfordshire, and its neighbourhood, in making the said "whole Dunstable plait, double seven split straw plait, Luton twist plait, broad Luton twist plait, double eleven split straw plait, whole Dunstable, nine, eleven, thirteen, and fifteen straw plait;" the method of making which, are so well understood by straw plaiters, as to render any further explanation of the process unnecessary.

The advantages of my invention, are, that the Italian straw when so plaited, is much stronger from the mode in which it is prepared, than the English straw, when plaited and sewed together in the forms of hats, bonnets, and other articles; and may be readily unsewed without injury, and made up again into forms suitable to the prevailing fashion, or fancy of the wearer; whereas the breadths of Leghorn plait commonly made from the same materials, being knitted together at their edges, are not capable of being disunited and made up again into other forms, without materially injuring the fabric; and again are combined with the above advantages, the beauty, richness of color, and durability of Leghorn.

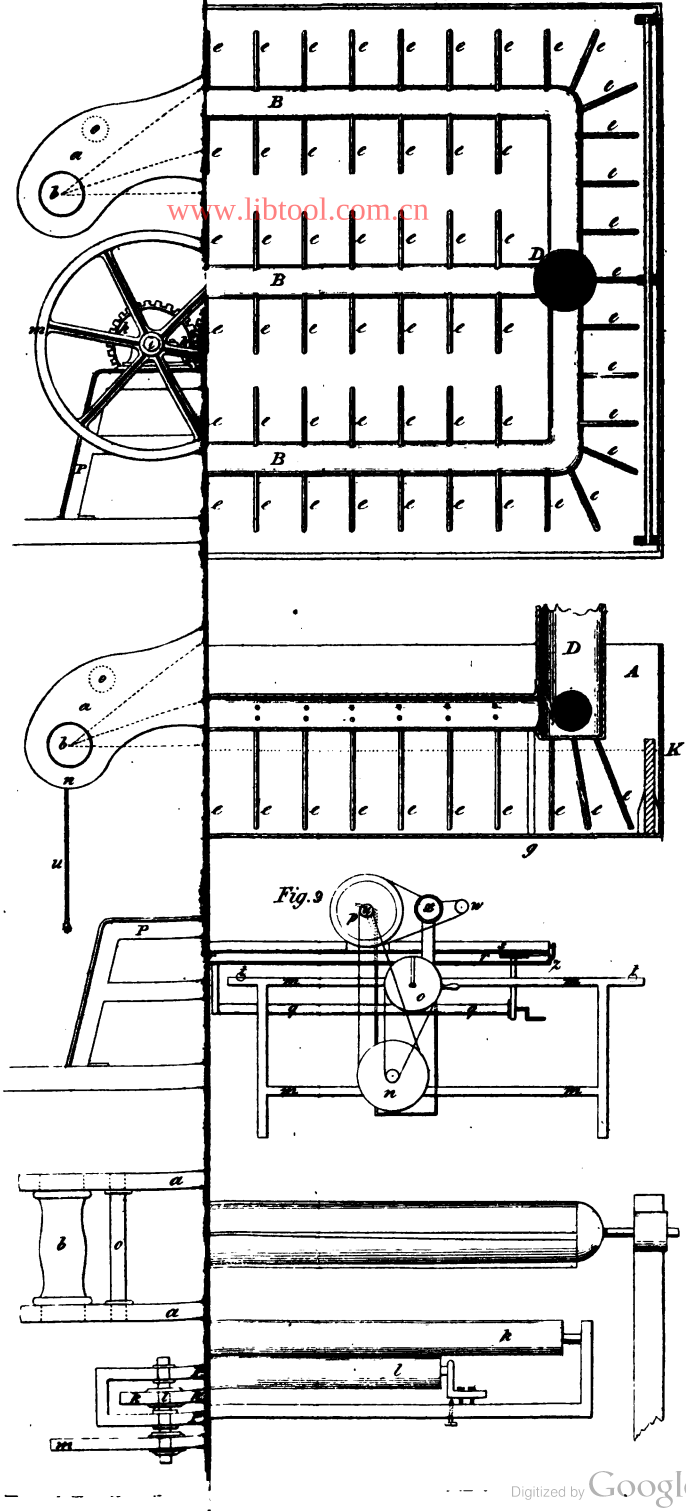
Fig. 3

Having thus stated my improvements, I wish to observe, that, I do not profess to be the inventor of any of the several kinds of plait above mentioned, but I rest my claim of invention, solely on the employment of Italian straw for the plaiting, twisting, or weaving of similar kinds of fabric to those heretofore made of English straw, whether whole or split, excepting the English imitation of Leghorn plait, none of the various plaits proposed to be made under this patent, having that sort of selvage which is capable of being knitted together, but are all of them so to be plaited, that their edges must be united by sewing, as the English straw plait always has been.

In witness whereof, &c.

Specification of the Patent granted to CHARLES TURNER STURTEVANT, *of Hackney, in the County of Middlesex, Soap-boiler, for certain Improvements in the Process of manufacturing Soap.*—Dated May 26, 1829.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Charles Turner Sturtevant, do hereby declare the nature of my said invention to consist in a process whereby I am enabled to make pure alkaline lees unite with animal or vegetable matter in the soap copper, which therefore enables me to use caustic alkalies instead of the crude alkalies, such as barilla, kelp, and the like, now in use for that purpose; thereby avoiding the residuum which is used in the process of black ash making, and which causes much waste of animal matter; and in further compliance with the said proviso, I, the said Charles Turner Sturtevant, do hereby describe the manner in which my said invention is to be performed, as follows: that is to say, I put into the copper, in the first instance, a small portion of soap and water, and mix them well together, so as to form a saponaceous compound, to which I add a small quantity of tallow or fat, or oil, as the case may be, mixing it with compound, and adding thereto as much caustic soda lees as will be taken up by these materials without separating. In this manner I continue adding animal or vegetable matter as aforesaid, and caustic soda lees till the copper is full, gradually increasing the fresh doses of animal or vegetable matter and alkali in proportion as the quantity of matter in the copper accumulates, keeping the mixture well roused or stirred during the whole of the process; when this is accomplished, it is moulded in frames in the ordinary way. The best strength for the caustic soda lees I believe to be about one thousand two hundred and sixty specific gravity, and the temperatures used in the boiling may be the same as heretofore adopted; but I recommend the use of smaller coppers, and of an oblong shape, capable of containing from two to four tons, and I prefer their being heated by steam.

Now whereas I claim as my invention the following improvements, that is to say; first, using pure caustic alkaline lees in the soap copper instead of the lees now in use, thereby doing away with the residuum aforesaid; and, secondly, commencing the operation of boiling with the saponaceous compound aforesaid, and adding animal or vegetable matter and caustic alkali thereto in manner hereinbefore described till the copper is filled; and such my improvements being to the best of my knowledge and belief new, and never before used within that part of his said Majesty's United Kingdom of Great Britain and Ireland called England, his said dominion of Wales, or town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the same; and that I do verily believe this my said specification doth comply in all respects fully, and without reserve or disguise, with the proviso in the hereinbefore in part recited letters patent contained, wherefore, I do further claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

Observations by the Patentee.—In order to give the general reader a correct idea of the nature of the improvements, for which the above patent has been obtained, it will perhaps be convenient to say a few words upon the ordinary method of soap making. The composition of soap is well known to consist of animal or vegetable fat, soda and water in certain definite proportions. Although this fact has been well known, yet soap has never been made by uniting its constituent principles in a direct manner; but, in order to accomplish the combination, the crude alkaline lees obtained from barilla, kelp, &c., previously rendered caustic by an addition of quick-lime, are boiled together with the fat in large cauldrons or coppers. As the lees contain considerable quantities of neutral salts and carbonate of soda, a very large quantity are requisite to saturate the fat, which renders it necessary to perform the process of several operations or boilings. The lees, after having imparted their free caustic alkali to the fat, are drawn from the copper, and are then termed spent lees; they, of course, consist of the neutral salts and carbonate of soda, with a portion of the animal fat held in solution. In order to recover their alkaline parts, the spent lees undergo a process termed black-ash making, but which it is here unnecessary to describe; it is, however, an expensive process, and exceedingly offensive. On this account it is dispensed with in several manufactories; the spent lees are sold for a very trifling consideration, and in other cases even thrown away. Although the neutral salts form no part of the composition of soap, yet, according to the present method of making it, their presence in the lee is absolutely necessary; and in some cases where alkalies are employed, which either do not contain them at all, or in too small quantities, common salt is employed to supply the deficiency.

By referring to the preceding specification, it will be seen that, instead of requiring the presence of neutral salt in the lees, they are divested of that and all other extraneous matter, pure soda only being used, thereby rendering it totally unnecessary to put into the copper any thing that does not enter into the composition of the soap.

The advantages of this method will be easily perceived by those engaged in the manufacturing of soap; for, as there are no spent lees to withdraw from the copper, there can be no waste either of alkali or tallow, nor can there be any black-ash making; besides which, the principal causes that render soap-works so generally obnoxious are removed; and the process considerably shortened.

It is affirmed that this method of soap making is applicable to all the various sorts at present in use, and that the soap so made will suffer in no respect by comparison with those manufactured in the ordinary way.

The inventor flatters himself that as a pure soda can be most economically procured from the British alkali obtained from the decomposition of salt, a great extension of this article of domestic manufacture will prove a result of his improvements.

ACCOUNT OF NEW PATENTS.

Patent granted to ISAAC DICKSON, *of Chester Street, Grosvernor Place, Middlesex, Esq. for an Improved Projectile; partly communicated by a Foreigner.*—Dated December 8, 1828.

THE object of this patent described in its specification, instead of being a projectile, turns out to be an instrument for shooting forth projectiles, and so formed as to assume the appearance of a walking stick; but differing from others before made, in having a joint in the upper part of its stock, (which permits that part to be bent with the degree of inclination, similar to that of the butt of a fowling piece, most convenient for resting its end against the shoulder, preparatory to the discharge,) and having also some peculiarities in the construction and position of its lock.

This shooting instrument, or gun, consists of three consecutive tubes; the first of which constitutes the barrel, the second the receptacle of the lock, and the third the butt, or shoulder piece; the first and third being of the usual length of similar parts in other guns, while the second is about as long as the third. The lock is of the percussion species, formed by a helical spring wound round a stalk that proceeds from a solid bit of steel, which is the instrument of the percussion, and strikes when in action, against a percussion cap placed on a nipple, extending from the centre of the back of the breech of the barrel, and containing the touch-hole in the longitudinal direction of the latter, instead of its entering at right angles to it, as is usual. The farther end of the stalk of the percussor has a notch, that hooks on to a corresponding part on the trigger, when the helical spring is drawn up, and is retained there by the action of a flat spring that presses the two notches together, until the tail of the trigger is pulled to make the discharge; which tail is jointed to the body so as either to lie flat beneath it, or to rise out from it at a right angle; the former being its position, when the gun is made to assume the appearance of a walking stick, and the latter, when it is prepared for shooting; at which time a tubular case, that slides on it like part of a telescope, is pushed back over the butt, and uncovers the tail of the trigger that then starts out into its rectangular position, by the impulse of a spring placed above it on the body of the trigger; and is retained thus by another spring on the upper part of the body, formed like that at the back of a pocket knife.

The same retraction of the tubular case, that releases the trigger, also uncovers the joint of the butt, and permits it to be bent down to its proper angle, where it is retained by a spring catch of a peculiar construction, which is easily withdrawn when the gun is to appear like a cane, but is not of sufficient importance to merit minute description. There are two appertures made quite through the tube in which the helical spring is confined; by one of which the percussion-cap is placed on the nipple previous to the discharge, and drops out at the other side, after this takes place; and by the other the blade of a turn-screw, or a similar piece of metal, passes into a slot in the stalk of the percussor near its notch, in order to pull it back over that of the trigger, when the lock is to be cocked. These apertures are completely covered by the sliding tubular case, when it is drawn down from the butt, over the lock piece.

The ram-rod is formed with a joint in its middle, so as to permit it to be bent double; in which state it is thrust into the barrel, when the gun is in its cane form; and is kept there by a ferrule, that either screws over the muzzle or is fastened by other sufficient means. We believe the barrel itself may also be made with sliding joints like a telescope, but this, if intended, is not expressed so decidedly, as to escape doubt.

OBS.—Hybrid instruments, to serve two purposes like this cane-gun, seldom perform either of them perfectly; and while this must be awkwardly heavy and long when used as a staff, it will be inconvenient likewise as a fowling piece, from the time it requires for its preparation for this purpose, and on account of the small surface of the part of its extremity intended to rest against the shoulder, which from this circumstance must receive a painful blow from the recoil on each discharge. Neither do we perceive any particular advantage that can arise to a gentleman from making his fowling piece look like a walking cane, that can in the least compensate for its inconvenience and additional expense, and to such we think it must be an object much more of curiosity than utility.

We however have to object to this implement on much more serious grounds, as from its facility of concealment and of escaping observation, it would much favour the depredations of the poacher, and the plots of the assassin; for which reason we have the less scruple in pointing out to notice, the circumstance, before mentioned, of the incongruity of the specification with the title, in the patent being granted for a projectile; the instrument described being a gun, which certainly cannot be considered a projectile; a defect, which if it did not invalidate the patent, must leave such a latitude to patentees in general on other occasions from its example, as must be very injurious to the rights of the public.

The only advantage this gun seems to us to possess, is that its lock is peculiarly well guarded against the weather by the sliding case with which it is enveloped; but at the same time, we have no doubt, that locks on fowling pieces of the usual construction, might be equally well protected by several means as readily executed. The part that contains the lock however, though it has the above superiority, is evidently most inconveniently and unnecessarily long, according as it is represented in the drawing belonging to the specification.

Patent granted to ANDREW GOTTLIEB, *of Jubilee Place, Mile End Road, in the county of Middlesex, Locksmith, for certain improvements and additions to locks and keys.*—Dated June 1, 1829.

MR. Gottlieb's intention, is the detecting of any attempt to pick or unlock with a false key, and his method for attaining this object, is by means of a piece of paper fixed on four pointed projections formed in a plate of metal which is placed at the back of the lock, and immediately over the plate covering the works. By this means a false key introduced would perforate the paper and lead to immediate detection of any attempt to open it. The way in which the real key is made to unlock it without destroying the paper, is by forming a projection about half way up the shank of the key, which by moving a washer, causes a spring to act on the plate on which the paper is affixed and forces it up without fracture. For still further security, the patentee directs a cheque book to be employed, from which designs can be cut, bearing a corresponding one in the margin, in order to prevent the substitution or removal of the paper placed in the lock.

Patent granted to WILLIAM MANN, *of Effra Road, Brixton, in the county of Surry, Gentleman, for the application of compressed air to communicate power and motion to fixed machinery, and to carriages and other locomotive machines, and to ships, vessels, and other floating bodies.*—Dated June 1, 1829.

THE specification of this patent occupies nearly eight skins of parchment, and consists almost entirely of calculations of the various effects which would be produced by different arrangements of the apparatus of the patentee for condensing the air into vessels prepared for its reception; and he inserts a clause in the body of the specification, by which he disclaims any right to the adaptation of power so packed to the propelling of machinery, although the title of his patent, as will be seen above, is directly for its *application*, and not for the mode of packing it. The method adopted by Mr. Mann, is the making use of an indefinite number of condensing pumps in lieu of one only, as has been heretofore employed, to be regulated as circumstances may require, but decreasing the size of each pump successively in the ratio of the pressure intended to be obtained. Thus, for example, if it be required to obtain the power of thirty-two atmospheres, the patentee directs to be employed a series of four pumps, on the piston of the first of which, is to be exerted a power sufficient to compress the air forced into its cylinder to the density of four atmospheres; the second, which communicates by a reservoir with the first, is to be constructed one half the size of the latter, so that it will contain the same quantity of air as the preceding one, when compressed to twice its former density; the third pump is then made one half the size of the second, and the fourth, in the same proportion to the third; all of these are attached to communicating reservoirs furnished with valves, so that when the air arrives at the fourth reservoir it is compressed to thirty-two atmospheres; or, for better explanation, as the density of the air is increased in the ratio of the dimunition of the vessels into which it is forced, it will follow in the above example, that 4 atmospheres $\times$ 2 $\times$ 2 $\times$ 2 = 32 atmospheres; these relative proportions can however be varied if thought proper with the same effect, provided the product of the areas of the pumps employed be equal; for example, if three pumps be used, instead of the four above described, diminishing in the proportion of four and two, the result would be the same, viz. 4 atmospheres $\times$ 4 $\times$ 2 = 32 atmospheres.

The patentee in thus describing his compressing apparatus, states, that a great saving of power will be obtained by using a series of pumps instead of the ordinary method, (in speaking of which he refers particularly to that adopted by the Portable Gas Company), though he admits that the same power must be exerted for working it; it is therefore a mystery to us, in what way he economises his power; for this is by no means satisfactorily explained in his specification. He asserts, that the reaction of the pistons in ordinary compressing pumps causes a considerable loss of power; how then, we may ask, will this be obviated by using more pumps then one, since each pump is furnished with a piston, which must cause an increase of reaction, compared with usual machines, in proportion to the increased number of pumps employed.

In applying power thus packed to the propelling of fixed machinery, Mr. Mann directs to be used, an engine of a similar construction as a high pressure expansion steam engine; namely, with two cylinders differing in size and furnished with proper valves, in the first of which, the air is to act as steam when at high pressure, and being cut off at half the stroke of the piston, (if the difference of the cylinders be as two to one), it is allowed to act by expansion in the smaller one. He then proceeds to enumerate the uses to which it may be applied, and amongst others, to the working of cranes "in the way proposed by Mr. Hague, to the St. Katherine's Docks Company." He also proposes to convey a supply through pipes, as at present practised with gas, and along the batteries of garrison towns, to be used in lieu of powder, for shooting forth projectiles from cannon.

Although we have always been inclined to think well of the application of this power to convey merchandise to distant places, and in the working of cranes, (as expressed in our remarks on Mr. Hague's patent for the latter object, contained in our seventh volume, page 274, and also on Mr. Wright's, in page 269 of the same volume), yet we cannot see on what grounds the present patentee asserts his right to such application, (as he decidedly does in his title), since the scheme has been agitated years ago by many persons. and amongst others by Mr. Medhurst and Mr. Vallance. We beg to refer our readers to the remarks on Mr. Hague's patent, above alluded to, for our general opinion on the use of compressed air.

Patent granted to CHARLES BROOK, *of Mielham Mills, near Huddersfield, in the county of York, Cotton Spinner, for certain improvements in machinery for spinning cotton and other fibrous substances.*—Dated June 4, 1829.

AFTER describing certain portions of ordinary spinning machines, to elucidate more clearly his invention, the patentee proceeds to describe those parts to which he lays claim. After the thread or yarn has passed through a series of three or more delivering rollers, as is usually the case, Mr. Brook causes each thread to pass over the surface of a roller revolving in a contrary direction, and partly immersed in water, and from thence it proceeds to the flyer or bobbin; this arrangement he asserts, will cause the small fibres which would otherwise project, to be incorporated in the body of the thread, and consequently produce a much more even and solid fabric than is formed without the assistance of the wet roller. He also recommends a cylinder covered with cloth, to be placed between the delivering and wet rollers, in order that it may catch up any threads that may break, without causing any derangement of the remaining yarns. He however does not lay claim to the latter part of the apparatus, but merely observes, that he has found it to be a useful addition.

Patent granted to John Smith, *of Bradford, in the county of York, Corn Miller, for certain improvements in machinery for dressing flour.*—Dated June 4, 1829.

This patentee states his improvements to consist, first, in using iron ribs for forming the frame of the dressing cylinder; secondly, in a method of fixing the wire-work thereto; and lastly, in using an external brush to cleanse it. He forms the ribs, of two semicircular pieces of iron joined together by screws and nuts, and kept firm by two bars at opposite sides passing through transverse perforations made in each rib: through the latter, in a contrary direction, are also formed numerous other perforations for the admission of screws which pass through the wire-work and the holes prepared for them, and are then screwed firmly by finger nuts, whilst the heads of the screws fit into a groove or channel formed along the inner circumference. The patentee then directs a brush to be placed above the cylinder, and both are caused to revolve, though with different degrees of swiftness, by means of gear properly arranged for this purpose: the axis of the former turns in a two armed lever, which latter is caused to move easily on a pivot at certain intervals, being acted upon by a second lever attached to part of the gear, in order to raise it when the connecting bars, in passing, would otherwise come in contact with it, and prevent its working. An internal brush is also used, as in the usual machines.

Patent granted to ROBERT PORTER *of Carlisle, in the county of Cumberland, Iron Manufacturer, for a certain improvement or improvements in the manufacture of heels and tips for boots and shoes.*—Dated June 13, 1829.

THIS patent is for the peculiar formation of the rollers employed in the manufacture of boot heels and tips, in such way, that they shall be made thick in places where they require strengthening, and thin where there is the least wear, so as to combine strength with lightness. The rollers instead of being perfectly circular, are made with projections in those parts where it is calculated the tips require to be thin and with indentations where they should be strong. Small steel studs are also screwed into various parts of the rollers, to form perforations for the reception of the nails by which they are fastened to the boots. The piece of metal intended for the heel or tip, when drawn through the rollers, is of course perfectly straight, but is formed by hand into the shape required.

In the drawings attached to the specification are given several modifications of the rollers, to be altered according to the shape or fashion of the boot to which the tips are intended to be fixed.

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*On Mr. Bernhard's Patent for raising Water.—Communicated by the Author, in a Letter to the Editor.**

Sir,—In your last volume, page 607, is given (in connection with a description of my patent for raising water or other fluids,) certain observations on my invention which I might justly complain of as being harsh and uncourteous. I have to request from your justice, the insertion in a future number, of my specification at large, and the following remarks.

The author of the observations I allude to, is of opinion, that the principles of hydraulics and hydrostatics are so well understood at the present day by boys and working artisans, that he is astonished how professed improvers (myself for example) can err so grossly against the first principles of the art. It is possible that he may be deeply learned in this branch of the sciences; be that as it may, I conceive the study of the properties of solid and fluid bodies under the various influences of heat, vacuum, atmospheric pressure, &c. to belong to the province of the naturalist and the philosopher, and it must be left to the world, and the evidence of facts, to decide between us, how far I may require his instruction.

He appears to have given the descending pipe a very different appropriation to what it has in the specification of my patent. He believes the descending thirty feet column of water to be balanced by a similar one in the ascending pipe, and concludes that if the ascending pipe were shortened thirty feet, the descending tube entirely removed, and the improvement, (for he considers it an improvement) of not exhausting the upper part of the ascending pipe,

* As Mr. Bernhard considers himself to have been so harshly treated by us, (as will be perceived on perusal of his letter) we have complied with his wishes by inserting his remarks, although not couched in the most flattering style towards us. We leave our readers themselves to judge on the merits of the case he complains of.

but to allow the action of the air freely upon it, the apparatus would shew the same result.

This is certainly a new principle, and I must admit his projected improvement to be infinitely superior to my discovery, and will readily yield to him the palm of perfection, if he can instruct us in what manner to perform his pretty trick of raising a column of water fifty feet out of a boiling cauldron, communicating (as mine does) by means of a tube from its bottom, with an open reservoir of water, and causing it to flow, although exposed to the pressure of the atmosphere with no other power acting upon it than the same atmospheric pressure, and that equally upon the upper part of the ascending pipe, and upon its opposite extremity.

The calculation of the cubic contents of the boiler, viz.—211,200 wine gallons, required to enable water to flow for an hour up a tube of two inches in diameter, to the height of fifty feet, is evidently upon a par with his new discovered apparatus for raising water, without a descending pipe, exhauster, or cooler; and although I may have every respect for the hydraulic and hydrostatic talents of this gentleman, I certainly have my doubts whether the water, either hot or cold, according to his principles, would not rather escape from the bottom of his apparatus, than rise the height of fifty feet; with such an impression therefore, I dare not venture upon the investigation.

I can, however, state as facts, that by my first and very imperfect apparatus for raising water, in the Kent Road, near the Surry Canal, (formed strictly according to the principles laid down in my specification, the ascending pipe being of the diameter of nine inches, the boiler formed of thirty-six tubes, each four feet long, and four inches in diameter, which upon the whole may contain about twelve cubic feet of water,) at least fifty cubic feet of water is raised within the space of two minutes, notwithstanding the learned authorities of Messrs. Dalton and Rumford, quoted for shewing the impossibility of this result; and I live in the hope, that the author of your remarks, when he shall have satisfied himself of the correctness of this statement, will give us a treatise, *à posteriori*, of the existence of things of which, *à priori*, he denied the possibility, and admit that the law on the properties of fluid and solid bodies, as laid down by Dalton, Biot, Gay Lussac, and other learned men, are not adapted to all cases and circumstances, and that, consequently, the discoverer of any system, which he successfully applies, ought not to be hunted down because his discovery is not confined within the narrow bounds of old theories.

You will at least be able to deduce from this fact, that the expansion of water rather exceeds the .0466 part of its volume, but the volume of water has in truth very little influence in this operation; for in my apparatus every thing depends upon the perfection of the vacuum, the heating and the cooling apparatus, and particularly that their dimensions bear a relative and due proportion the one to the other, so that you cannot sever either the head or the foot from my apparatus without robbing it at once both of life and effect.

Under the new circumstances in which my apparatus places fluids, water, by a certain degree of heat, and a perfect vacuum regulated according to the just laws of proportions, may be made to rise in any required quantity, not only 50 or 100 feet, but if necessary, 500, 1000, or 5000 feet, &c. being expanded and approaching the nature of steam more or less in proportion to its elevation, as a column of steam of atmospheric density, and of 1700 feet $\times$ 32 = 54400 feet, then only balances with its weight the atmospheric pressure.

In conclusion, I must observe, that the writer of these observations, had probably his own headless apparatus without a descending pipe and vacuum, in view, when he asserted; that a more expensive system of raising water had never yet been discovered.

I cannot contradict him in this particular, as I am not sufficiently learned to perceive that a single drop of water would ascend in an apparatus so constructed, unless he closes the aperture in the bottom of the boiler, and thereby robs himself of the influence of the elevating power of the atmosphere.

I am, Sir,

Your very obedient Servant,

ANTON BERNHARD.

8, Finsbury Circus,
Jan. 12, 1830.

LAW OF PATENTS.

Examination of the Witnesses before the Select Committee of the House of Commons.

Continued from p. 57.

MR. FAREY in continuation, proceeded to detail the forms he proposed should be adopted by persons applying for letters patent. He recommended that on applying for their patents, they should lodge a statement of the principles, to be afterwards developed in the specification, and that when the time arrived for the enrolment of the specification, and consequently granting the patent, they should give the details, to be transcribed into the patent itself. He observed, that the knowledge of those details does not always exist at the time most proper for applying for the patent, and therefore it is impossible that they should be described, nor will they come into existence, until the thing has been put into practice; as it is now, the two months which elapse between the time of applying for the patent, and the time when the patent is granted, are lost, as to any such creation of the means of putting the invention into practice, and thereforc the patentee has in fact only the remaining two, four, or six months, and in that time he must prepare his specification as best he can. He would require a greater precision in the meaning of the first application, for the benefit of all inventors that are occupied at the same time, on the same subject; it is an intolerable nuisance to persons who are engaged in speculations, that they are perpetually in danger of having their inventions or improvements stolen from them, and put into the specifications of some existing patents, not yet specified, but which have titles that will cover their inventions Such undefined patents are like legalized receiving houses for stolen goods. The inventors whose ideas have been so appropriated by previous patentees, are called upon to prove the negative that the patentee did not invent what he specifies. They must prove that the invention was in use before the date of the patent; or that it was communicated surreptitiously from them to the patentee after the date of the patent; their proving that they invented it or put it into use themselves after the date of the patent is not sufficient, because the invention became the property of the inventor from the patent, although he is not called upon to declare what it was for a long time after.

He was scarcely prepared to make up his opinion, whether it would be advantageous to the public, that patents might be taken out for a shorter time than fourteen years, supposing that there was a correspondent diminution of expense; it would tend to multiply the number of patents for trivial inventions, which he thought not desirable, because they occasion so much litigation, and that evil would remain, if patents were rendered more secure by better law. Shorter terms, at less cost, would be utterly unavailable to patent rights for inventions of importance, which so much require amendment at present; because there the evil is, that fourteen years is too short. In his opinion, fourteen years of profitable exercise of an invention is always sufficient, if it has not been preceded by loss that is to be repaid. The question is, whether a part or the whole of that term may not pass away before the profitable exercise begins. An invention which has no such term of unprofitable exercise, might be very well repaid by five years, as in France; but if it is an invention of any importance, there is always a period of positive loss and outlay, and then another period of unproductive exercise before gain begins. The difference of cost between a five years, and a fourteen years patent, would be of no consequence to patentees of important inventions, where a great outlay of capital is always contemplated. He did not see how the public are ever to get any benefit from it. Patents for profitable objects would always be taken for the longest term, and unprofitable ones become extinct of themselves. It would be only enabling the patentee to save a small sum of money, and inducing a poor man, for the sake of doing that, to forego a part of the advantage he might derive from his invention. His observation supposed the length of the term to be left to the option of the patentee; if the term could be adapted to the nature of the invention, by a discretionary power, very great benefit might arise, if that discretion were wisely applied; but as there is every chance that it would be misapplied, and would then do excessive injustice and injury, he would by no means recommend any such discretion.

It is a very common case for the same invention to require two, three, and four successive patents; and it is a very great hardship, it operates prejudicially to the public as well as to the inventor. He knew a case where an inventor obtained a patent, and not more than a week after lodging the specification, he made a material improvement upon what was specified; the improvement is so great, that it would supersede his present article, which is a good one, and sells well; and yet if he practised the last and best edition, his former patent might be brought in question, and therefore he keeps it a secret, and does not practise it at all; some time or other he may apply for a new patent, when his old one is expiring, or by his death it may be lost.

There is no remedy for a defective specification at present. When a patentee is compelled to specify his invention within six months, which is the longest period that can be obtained in ordinary cases, if he is not then prepared to specify his invention, with all its details of execution, in a perfect manner, his patent right must take the chance of his imperfect specification; and although he may come to know how to make it perfect the next day, he has no remedy whatever; he has no means of putting upon the roll that additional perfection which he attained in the means of execution, even the next day after specification was enrolled; and if he practises the invention in a better manner than that which he specified, instead of its being held that he is deserving of public approbation, for having pursued his course of invention further than at first, the courts of law assume that he has committed a fraud, by concealing something which he ought to have put into the specification.

Supposing he makes an improvement in the course of two or three years after taking out his patent, the effect is the danger of overturning his patent, if he practises the improvement, or departs from his specification in his practice. In such a case, the ground upon which the patent was overturned would be upon the supposition, that at the time of his making the specification, he concealed something with which he was acquainted: and he can only refute that imputation by proving in evidence, that the specification described does contain sufficient instructions to enable the public to exercise the invention with full advantage. It is impossible for him to prove the negative, that he did not know the improvement at the time of specifying. When a man invents, and takes out a patent for a steam engine, steam coach, or a lace machine, or a mule to be worked by power, six months is the utmost he can get for preparing his specification; he uses his utmost exertion to get his engine made, and put to work, before the time when the specification is due, in order to make a trial of it, and regulate his specification by that trial; perhaps just before the time when he is expecting to get it to work, some part fails, or requires to be re-made, which prevents his making any trial, and the time being come, he is not able to try his engine before he must put in his specification, which he therefore makes as well as he and his adviser can guess, without any trial, though he has gone through nearly all the trouble and expense of a trial; then a few days after, having enrolled, he finds out, upon experiment, some most important improvement in the means of carrying his invention into effect, which either had not occurred to him before, or if he had thought of it, he could not have safely put it into the specification, because it was a mere speculative idea. If he had put in that speculative idea, and it had turned out on subsequent trial to be wrong, it would be said in a court of law, this was a blind, this is nonsense, to mislead the public from the real invention, which he reserved for his own private practice.

In that case, the inconvenience arises from want of time; and the expense of those hurried proceedings, to get a sufficient trial of new machines to enable us to specify properly is excessive, being frequently obliged to keep people working night and day. Even when a successful trial has been accomplished, there remains so little time afterwards, that the specification must be composed in such haste as to run the greatest risk of some inaccuracy or error. Supposing a specification to be so accurately drawn as to be sufficient to inform the public how to use the invention at the time that the invention is enrolled, and that subsequently to that, the inventor discovered some improvement in his invention, his patent is not forfeited by his using that improvement; but he must prove that his original invention would answer the purpose proposed, and be a useful and beneficial practice, and the fact of his departing from it, is presumptive against him; therefore in such a case, when the right comes to be tried in a court of law, the inquiry does not turn upon the real patent machinery that is in actual use, doing business and public good, but it is necessary often to make old-fashioned and obsolete machines that have been described in the specification, but have been superseded by better ones, and are of no use whatever except to satisfy a court of law, that what was specified will really do; and if by such evidence the court can be persuaded that they will do, then, however inferior they may be to the more recent editions of the inventions, (which they never examine), the patent escapes from being set aside for want of sufficient description. If the opposite parties can persuade the court that the machines described will not answer, then the patent is set aside, without any inquiry into the real merits of the invention in its modern form, and that which is in daily use, and is the subject of the action. Mr. F. thought it quite fair that the patentee should be bound to give such a specification; but when an inventor's patent is set aside because he has not fully described his invention, it ought to be on the ground that the secret has been withheld, so that the public are really not in possession of it, and have consequently not derived the benefit of such possession. Instead of making ridiculous inquiries whether an obsolete specification be so defective as to destroy the patent, it should be amended by a new one, corresponding with the improved state of the practice. On the other hand, if the public are really in possession of the invention, and deriving benefit from its exercise, whether they became possessed by means of the old specification or not, the patent ought not to be set aside. It is law, that if a patent invention is insufficiently described, the patent cannot be maintained; that is, where the specification does not contain such information, that persons conversant with that art can practise the new invention with real advantage, and quite as much advantage as the patentee practised it at the time of recording the specification. That remedy for a bad specification is merely penal, and the public has no advantage from it whatever; they do not get any more complete specification by annulling the patent. If the patentee were to be compelled to bring a better specification, there would be a real advantage; and if he refused to do so, then the present penalty of forfeiture would be very properly applied.

It would be very easy to have specifications examined and verified either by a competent commission, or by suitable referees. The courts of justice now trust to the examination and opinion of others, but they do it in an improper manner, because it is by parties, brought by interested individuals, and when it is too late to amend any defects.

Mr. F. considered that a specification ought not to be inrolled at all, till it is made sufficient; and that there should be no further inquiry about the sufficiency of the description, except by way of appeal against the examiners; one-tenth of the trouble and expense that is now incurred, to find out whether it is sufficient or not, when it is too late to make any remedy, would have made it sure at first. A commission well constituted would determine that and many other points very well; but it would be very objectionable that any previous examination should take place, as to the merit of inventions; because it is impossible to foresee which will, by future cultivation, grow up to maturity, and which will not be worth such cultivation; hence every one should be allowed a fair chance.

A *scire facias* may be brought against a patentee, calling him into court to show why his patent should not be repealed, upon any ground of objection; but it is a very expensive mode of proceeding, and it puts the parties opposed to the patent in the situation of plaintiffs, which is not often the best for them, and therefore they rarely resort to it. In the other case, several different defendants may attack him in concert, by infringing the patent in every quarter, and making a common purse to carry on the war; that is a much better course for them, because if the patentee succeeds in one action, he must then try another and another, till his money is all gone, and he can scarcely ever keep his patent right alive to overcome them all. The few patents that have been supported, have been commonly sustained by collusion with the infringers themselves, after one trial has decided that the patent is not absolutely bad, they combine with the patentee to allow them free use of the patent on moderate terms, and then, by making a common purse, they prosecute and suppress all new infringements: to effect that, they must keep up the appearance of law proceedings, but defend themselves so as to let the patentee get a verdict, which is only sham; but added to the common purse, it serves to terrify new infringers, who are not allowed to have licenses or practice at all, whereby the patent right becomes a close monopoly, instead of a general practice paying a small rent to the patentee. If patent rights were made more secure in law, and by less expensive proceedings, it would not suit the interests of patentees to enter into such combinations, but, on the contrary, to promote the most extensive and open use of their inventions, under licenses, at a moderate tax.

The expense for the patents of the three kingdoms Mr. F. thought decidedly too high, but he did not think that the expense of a patent for one kingdom is too high; he meant, that in the absence of any other check to an unlimited multiplication of patents, they should not be granted too cheaply. At present, while patents are to be had merely for paying the fees, there must be some limitation applied by means of the expense, and he considered the present expense for England a limitation which is sufficient; but when to the expense of a patent for England, the expense of one for Scotland, and another for Ireland, is added, and also an additional variable expense depending upon the difficulty of the subject, the sum total is, in his opinion, too much for mere limitation, and becomes a tax upon particular inventors, who are commonly the most deserving of encouragement. It might be desirable to make little or no expense in the first instance, but to apply an annual and increasing tax upon the continuance of the patent right. To make the annual tax scarcely any thing at first, but to make it afterwards such a progressive tax from year to year, as would at last induce inventors to abandon the right before the end of the term, which in that case should be longer than at present (say 21 years). If the inventions were not very good ones, the patents for them would be cut off by this course, sooner or later. On such a plan, government might always ease a deserving inventor, by remitting his tax, when he had not been properly rewarded.

The remainder of the evidence of this witness was nearly similar to that already detailed, and he handed in for the inspection of the Committee, a number of documents, consisting of the forms which he proposed for the specification of patents, and extracts from foreign laws on the subject generally.

Mr. BRUNEL *was examined to the following effect:*

You are an engineer?—I am.

Will you have the goodness to state any views you may have with respect to patents, or the patent laws?—I know very little of the patent laws; I have had several patents myself; I think that patents are like lottery offices, where people run with great expectations, and enter any thing almost; and if they were very cheap, there would be still more obstacles in the way of good ones. I think the expense of patents should be pretty high in this country, or else if it is low you will have hundreds of patents more yearly, and you would obstruct very much the valuable pursuits.

Do you conceive that 500*l.* is not too much?—That is too dear; I think that the expense of three patents is too dear; there are very few that take them from that circumstance; they imagine that it is enough to have a patent for England, and they think it is of very little use to have a patent for Ireland.

Could you suggest any means by which this too great facility of granting patents might be remedied otherwise than by the expense?—It is very difficult; it would be a very desirable thing to give more time to improve the invention, and then to come with a complete specification.

Do any means occur to you of protecting the applicant for a patent during the interval after he has applied for a patent, and before the patent is sealed?—What is called a caveat is one of the means of doing that, and it has some effect, because then notice is given if another person comes to solicit a patent, if it can be detected in the head of that patent, that it has a similar object with that for which another person has taken a patent who has already entered a caveat. The caveat might be a little more extensive than it is, because, if you change the name of the thing, it escapes the observation of the officers, and the two patents both go on; but if they are alike, there is a stop directly of the second. They are called before the Attorney General, who hears both sides, and he says to the second, you are like the other, and therefore first come first served.

Have you considered whether it would be advantageous to have a commission of persons to examine the specifications?—I think it would be a very good thing; I should imagine that it would be an object for that commission to receive a rough outline of the invention, and to give the inventor a year or two to improve his machine, and then he may come again to the commission, and deliver a specification, with all the improvements he has made during that time: that, I think, would be desirable.

What do you think of the present rule of law, that the patents cannot be given for an abstract principle?—I think that is wise, and that ought to remain as it is; it would be dangerous to grant a patent merely upon a principle.

Supposing a person to have discovered a valuable principle, should he not be entitled to some remuneration from those that carry it into effect?—Of course.

Supposing any person should discover a means of making that principle useful to the public, would it not be right that the person who discovered the principle should have some compensation?—Certainly.

But you think that the person is not entitled to any patent right for the discovery of a principle, unless he has discovered some mode of carrying it into effect?—No, as as a principle it is of no use whatever; it may remain ages, as steam has remained ages unused.

Are you aware of any valuable inventions for which patents have been granted, that have been lost upon some technical point?—I cannot specify any one in particular; but it is generally known that there are such cases, and a great hardship it is, when, for a trifling flaw, a patent is set aside; I have had to support my own right in one instance; I took out a patent for an improvement, and I specified the thing altogether; I could not maintain my action, because I was told I ought to have specified and defined what preceded, and what was my improvement; now every body could know what existed before, and they might have used it; but it was very hard for me to lose the patent, because that was not exactly specified according to the law.

Have you considered any remedy for that inconvenience?—There would be no inconvenience whatever in allowing the patent to stand good, because any one might take the preceding part, without infringing the patent.

You are aware, that if a person specifies any thing old in patents, he loses his patent; do you see any objection to that?—There is a great hardship in that; if it is a thing which does in fact set his patent aside, then of course it ought to fall; but if it is a trifling thing, he ought to have the benefit of the remainder. It is a thing which nobody can guard against, because no inventor can know the thousands of patents that have preceded.

When a patent has been infringed, what remedy has the patentee?—An injunction against the supposed infringer; but if he closes his doors, you have great difficulty to get a knowledge of what he has done; the person says, my invention is not like your's, and I will not show it, because there are important things in it.

Upon the whole, do you think the patent laws are beneficial to the public?—Very much so.

What is your opinion as to the period of fourteen years?—It is a great deal for some, and not enough for some others; I shall lose probably six years before I come to make any thing of my present patent.*

Are you aware of the practice in France, with respect to the period of time that is granted?—Yes; that is better.

Can you suggest any better plan than that?—Perhaps there might be better plans for this country.

Do you think it would be desirable to allow a longer time for maturing the invention, before putting in the specification?—I think it would; if a longer time was allowed for an invention to be matured, the fee might be increased without any bad consequence.

Would you increase the time beyond fourteen years?—I think that might be done in some cases.

In whom would you leave the discretion of giving a longer period?—That is a difficulty which I am not capable of removing.

Should the longer period be given by way of extension of the old period, or as an original period?—I think it ought to be an extension of the patent.

Would you think it desirable that a man might take out a patent for a shorter period than fourteen years?—Yes.

In that case do you think he ought to pay a smaller fee?—Yes.

The establishment of a commission has been mentioned as one of the propositions for the regulation of patents; do not you conceive that there would be much objection to a commission of that description, arising from the jealousies

* This, we presume, to be in allusion to his gas-engine; the specification of which is inserted in our second Volume, present Series, p. 157.

that would subsist?—Very great; if the invention could be laid before them, without knowing from whom it comes, it would be very desirable.

Do you think that in most cases parties could be brought to agree in the appointment of referees?—It would then be partial; because each party would of course name as many of his friends as he could.

What is your opinion as to the present mode of trying the validity of a patent by a jury?—I have frequently said, that I might as well toss for the fate of a patent; it is an intricate question for a jury, and in many cases it is quite unintelligible to them.

In such cases would not the appointment of a tribunal composed of scientific men be very desirable?—Certainly it would be a very good thing; for example, one might say that the Royal Society would be a proper tribunal.

Do you conceive that the chance of having a patent fairly tried is greater with a special jury than with a common jury?—I think it is better; but if it is to be decided by a jury, it would be much better that it should be by some persons in the profession; at any rate it should be by competent persons.

Is not the number of such competent persons so limited, that the choosing them would almost amount to appointing a commission?—Certainly, that might be so.

Do you conceive that many persons are deterred from taking out patents by the insecurity of the present law?—I think it is a great discouragement.

Do you think that more people will depend upon secrecy than upon patents?—Probably so.

And in that case many good inventions are probably lost to the public?—Yes.

What are the prices of patents in France?—I think it is 1,500 francs for fourteen years.

Do you consider that too low a price?—For France it is very well, but for this country it would be too low.

What would be your opinion of giving a power to the Secretary of State, or some other authority, to direct the specification to be concealed in certain cases?—I do not know what is the motive for concealing it; if it is on behalf of the inventor, that is some reason, but if it is to prevent its going abroad it is of no use, because if it is good it will soon make its way, and if it is not, it is of no consequence.

Is not that the mode adopted in France?—It is; but it is not that liberal principle which exists in this country.

Is any inconvenience found to result from it in France? —I am not aware.

May it not operate with great injustice upon individuals who not knowing of the patent on account of its secrecy, may be expending sums of money in accomplishing the same thing?—That is a great inconvenience.

Could you communicate it sufficiently to the public to enable them to avoid pirating the invention, without at the same time enabling them to make it?—Certainly not; because if a man gets two or three things, he will find out the remainder.

What do you think of the policy of allowing a patent to be taken out for an invention communicated by a foreigner, and excluding a person from taking out a patent for an invention communicated to him by a British subject?—I think it would be better if it were the same in both cases.

Is there any inconvenience in the present law which limits the number of persons interested in a patent to the number of five?—That is a commercial question on which I cannot give any opinion; I think it would be mischievous to extend it without a limitation.

To be continued.

Notices *of Communications to the Horticultural Society, of which separate Accounts have not been published in the Transactions. Extracted from the Minute Books and Papers of the Society.*

From the Transactions of the Horticultural Society.

Method of Grafting on the large branches of old Trees.

Mr. Malone, Gardener of G. S. Foljambe, Esq. of Osberton House, Nottinghamshire, described in a communication to the Secretary, a plan he had adopted for grafting on the large branches of old trees, which he denominates dove-tail grafting. The scion is selected, so as to have two or three buds above where the knife is to be inserted: To prepare it for the operation, a slip is cut off the end of the scion, sloping towards the bottom, and as long as it is decided to insert it into the stock. On each side of the cut, as far as it extends, a part of the outer bark is taken off, leaving the under part of the cut portion of the scion broader than the upper part. The branch to be worked is thus prepared, being first cut off smooth and straight; two parallel slits, distant from each other nearly the width of the prepared scion, and the length of its cut part, are then made in the bark of the branch, observing particularly to slope the knife, so that the under edge of the wood may be wider than the outer edge. The piece of bark between the slits must then be taken out, separating it at the bottom by a horizontal cut. The scion will slide into the dovetail-groove thus formed, and if the work is well performed, will fit neatly and tightly. Two or three longitudinal slits should be made round the branch, to prevent the place into which the scion is fitted from opening as the bark dries. A small quantity of the grafting clay should then be carefully applied, securing it on with a flannel or list bandage, the ends of which may be fastened with small nails. The top of the stock should be covered with clay, to secure it from wet, sloping it well up to the grafts. The length of the part of the scion to be inserted into the stock, should be about an inch and a quarter, and when preparing this part, there should be a bud left on the outside: by this the union of the scion and stock is accelerated, and rendered more complete. When very large branches or trees are to be grafted, three or four scions should be inserted, placing them at equal distances round the stock. By this arrangement the sap will ascend equally on all sides, and every part of the stock will be preserved from decay.

Treatment of Orange and Lemon Trees.

Mr. Thomas Shea, Gardener to Lord Burghersh, at Florence, communicated the following particulars of the treatment of orange and lemon trees in that part of Italy. He has observed, that throughout the winter, instead of being placed in green-houses, as in England, by which means they are kept in a state of growth, they are put into sheds, the windows and apertures of which are only closed during frosty weather. At other times the external air is freely admitted, the plants are watered only once or twice a month, and then sparingly. In the end of April they are taken from sheds and set in the open air. These plants are kept dwarf, and in large earthenware pots. In June they are manured with two handfuls of kiln-dried lupines, mixed with double the quantity of goats-dung, and this is covered with stable manure. Throughout the summer the plants are very much watered; to a large plant, as much as five or six buckets every other day is given, and in very hot weather they are watered daily. Fvery fourth or fifth year, the plants are lifted out of the pots, and the balls reduced, the external roots being taken off.

Description of Slate Troughs for Green-houses.

MR. JOHN WALMSLEY, Slate Merchant, of Belvidere Road, Waterloo Bridge, exhibited a trough, made with slates, contrived by WILLIAM ATKINSON, Esq. who has used such at different places, where they have been found to answer better than any other material for troughs for green-houses; or they may be made water-tight for aquatic plants. They may be made of any length not exceeding five feet. The most convenient size for green-house plants or creepers, is about three feet long, twelve or fifteen inches wide, and twelve or fifteen inches deep. The slate is about three-eighths of an inch thick, rubbed to a smooth surface. The bottom is grooved, into the sides and ends, and where joined at the angles, is secured by iron screws to a triangular piece of slate inside the trough. Slate boxes have been adopted by Mr. Atkinson, in consequence of wood soon rotting, and of the great inconvenience of renewing the boxes without injuring the roots of the plants. The slate troughs are very durable, and may be painted any colour outside, and ornamented if required.

Description of a temporary Glass-house for forcing Trees.

A MODEL of a block and portion of a rafter were exhibited from the garden of GREGORY GREGORY, Esq. at Rempstone, in Nottinghamshire. They were sent to illustrate a simple and effectual method of constructing temporary glass-houses, for forcing any particular trees trained on the open wall. The blocks are built permanently into the wall under the coping, at such exact distances, that lights will fit in between any two of them upon the movable rafters which pin into the end of the blocks. The lights employed are the same as are used for hot-beds or other purposes in the garden, and are applied in two lengths, forming any angle to the wall which the gardener may choose. Along the front of the border a temporary dwarf wall is built opposite to the trees, intended to be forced, in which upright glass, if required, is fixed, or the lights are brought down, so as to rest on the wall, if no upright glass is used. The flued walls generally used in the northern counties, of course materially assist this method of forwarding a crop. In the insertion of the blocks into the walls, a provision must be made in the coping, such as will let the lights pass freely under it. The walls at Rempstone are so planned, that sixty feet of wall is allotted to three trees, and the flues are confined in their returns to that extent; this produces a uniformity in the application of the moveable houses. The temporary dwarf walls are constructed on arches so as not to interrupt the roots of the trees.

FRENCH PATENT.

French patent for ten years, granted to M. LORRAINE of Paris, for the manufacturing of Perfumed Imitative Wax Candles.

CANDLES made of tallow only, are unctuous, opaque, greasy, little sonorous, especially in summer, liable to run or gutter, and readily acquiring a rancid smell. These inconveniences are avoided, by putting fat, which has been melted and run into cakes, to ferment in a stove where the heat is moderate: this fat distils, and throws off an oily liquor, which is removed with a piece of linen or a sponge.

To free the grease from the fleshy and fibrous parts by which it is accompanied, it is first chopped, and after being washed in several waters, it is boiled with a given quantity of Roman alum. The alum soon separates, and destroys the heterogeneous parts, and we obtain a pure clear fat, which will last a very long time. The fat chopped and melted is run into buckets full of water distilled from aromatic simples, such as lavender, thyme, rosemary, &c. The fat and water are beaten together with a spatula, to effect a union. After forty-eight hours, the fat is separated from the water by means of a water bath. The water alone is disengaged, and the aromatic and odoriferous parts remain incorporated with the fat. To complete the purification, the fat is liquified and scummed, till no foreign substance nor water remains. This will be known by the limpid state of the fat, which then yields only a pure white scum. Still greater purity is obtained by a second quantity of alum incorporated with the tallow.

Before casting or running the candles, a composition is made, of half wax and half spermaceti, which serves to prepare the wicks. This composition, harder and more cohesive than the tallow, makes the candles less subject to gutter, makes them firmer, dure longer, and require less snuffing. At the moment of removing the pure liquified tallow from the fire to cast the candles, a certain quantity of gum-arabic dissolved in water, and united with a small quantity of wax and alum, is incorporated with it. The whole are beaten together, and when the tallow has settled well, and cooled to a certain temperature, it is poured into the moulds. By this preparation, in proportion as the cooling takes place, the foreign substances proceed to, and fix at the surface of the candles, forming a kind of covering, pleasant to the touch, like wax candles. This covering also hinders the candles from guttering, and enables a person to handle, and even rub them, without greasing the fingers, and without their communicating any other smell than that of the aromatics entering into the composition.

The last operation for preventing the guttering of the candles when burning, and giving more solidity to them, is to prepare some glovers' size, very weak, and boiled with another quantity of gum and alum, and to pass a hair pencil, dipped in this size, all over the candles, and the next day after they may be used.

Candles prepared in this way are clear, transparent, sonorous, and last longer than others. They feel like bougies, and have the colour of pure wax.—*Description des Brevets.*

Experiments on Elasticity. By M. Savart.

The author has had in view to shew that, by means of sonorous vibrations, we may determine the elastic state of various opaque or transparent solid substances; in the same manner as by light we can study the interior structure of diaphanous bodies. M. Savart builds upon this proposition,—that a circular homogeneous plate, equally thick in every part, would yield but one sound for one and the same acoustic figure, and that this figure would be placed in all possible directions, if the place where motion is communicated, were to pass successively through all points in the circumference of the disk. Consequently, every substance not fulfilling these conditions must be considered as not possessing the same properties in all directions. Metal plates, cast, rolled, or made thin by hammering, having been submitted to this kind of trial, M. Savart found that they all yielded two rectangular sounds, according to which the elasticity was not the same. This he verified on silver, tin, copper, iron, lead, zinc, bismuth, antimony, steel, cast-iron, brass, bell-metal, and several other alloys. It may be conceived that it must be the same for all fibrous substances. But what was more difficult to foresee, sulphur, plaster of Paris, cast in thin plates, resins, and various saline substances which crystallize confusedly, present an exactly similar result. M. Savart denotes, by the expression *axes of elasticity*, the two rectangular directions of the greatest and the least elasticity; and he shews, by different experiments, that the existence of these axes is the result of a molocular phenomenon, similar to crystallization, with which it is intimately connected. For, according to his observations, every thing seems to take place in the various solid bodies, as though they were formed of a system of parallel fibres.

M. Savart has extended his researches to bodies regularly crystallized, as well as to metals cast in large masses, and has discovered that the motion of rotation depends on the structure of the bodies, and on the inequality of their elasticity in different directions.—*Annales des trav. de l'Academie des Sciences.*

On the tempering of Steel.

To harden steel, sometimes it is rubbed with soap before heating it, sometimes it is put with raspings of horn, charcoal dust, common salt, and charcoal, and pulverized earth, into an earthen vessel well closed and luted, which is submitted to a suitable temperature. The vessel is broken above the tempering liquid, the mass falls into it, and the cooling is rapid. If the temper is to be less hard, the vessel is thrown into the liquid; and as the liquid cannot penetrate into its interior, the cooling of the steel does not take place until after that of its cover.

When it is intended to temper wrought articles of steel, they are covered with a coating of clay half an inch thick, which likewise prevents the water from cooling them too suddenly and making them brittle. The clay may be previously worked up with urine, and mixed with common salt.

The point and edge of steel instruments are often tempered in oil, but a mixture of soap, urine, tallow, and olive-oil, is preferable.—*(Mag. zur. Befoerd. der Indust.)*

Magnetism which can be excited in all metals when they have been divided into very small particles.—By Mr. Seebeck.

A magnetic needle which, at an elevation of four lines nearly, made 116 oscillations from 45° to 10°, made, first, 36 oscillations over a stratum of iron-filings, half a line in thickness; secondly, 35 oscillations over a stratum of iron filings of a line in thickness; thirdly, 29 oscillations over a stratum nine lines in thickness; fourthly, the same magnetic needle, held at a similar height, made 97 oscillations over a stratum of filings nine lines thick, of an alloy of one hundred parts of copper and three parts of iron; fifthly, it performed 87 oscillations over a stratum of brass-filings, the brass containing six per cent of iron, and the stratum being nine lines in thickness; sixthly, over a stratum of pure copper-filings, the needle made 116 oscillations, consequently, the copper exerted no influence; but, seventhly, when the needle was brought to the distance of a line and a half from that stratum of copper-filings, the oscillations no longer exceeded 107 or 108.

Hence, it is evident, that the metals acquire a great part of their magnetic power by the division of their particles, and that the opinion of those who attribute the magnetism of bodies to the presence of iron alone is not maintainable. If there be some alloys, in which the magnetic property is found weakened, there are others in which that property is found augmented, even by the effect of the mixture. In this case are the alloys of copper and iron, platina and nickel, nickel and gold, platina and iron, platina and copper, &c.

Mr. Seebeck has also found, that the number of oscillations of a magnetic needle, suspended horizontally, but to which the motion of a pendulum is given, diminish likewise, if these motions are performed over a metallic plate. In the same way, if a copper pendulum is made to move above a magnet, or between its poles, the oscillations of this pendulum diminish in number and extent, sooner than if that magnetic influence were absent. Among the metals, mercury is that which, oscillating in a pendulum, is the least sensible to magnetic action. A wooden pendulum, with a bob of marble or pure glass, is not in the least influenced by magnets, nor by terrestial magnetism. *(Ann. der Physik.)*

Researches respecting Normal Vibrations. By M. Savart.

If a thin plate be made to vibrate, and if it be covered with a thin stratum of sand, mixed with a much finer powder, the sand will acquire a figure indicating the principal mode of division, and the fine powder will trace another figure, more complicated, connected with the first: these *secondary modes* of division are what the author has studied.

In the case wherein the plate offers only circular and concentric nodous lines indicated by the sand, the fine powder traces other circular lines in the same number, comprised between the first, and collects besides at the centre of the plate. The plate or blade presenting afterward diametral nodous lines indicated by the sand, the fine powder traces as many diametral lines which coincide with the first, and besides a circular line which appears, most frequently, only in detached portions in the intervals between the principal lines. It may be also admitted, that in the case of the diametral lines, every one of these coincides with a similar line of the secondary mode.

The number of secondary lines being always $2n+1$, when the number of the lines of the same kind is n, the vibrating parts of the secondary figure are smaller than those of the principal figure, and the secondary sounds more acute than the principal sounds.

When a square plate offers only nodous lines parallel to two of its edges, secondary lines are produced at the same time parallel to the first, and in number $2n+1$, if the number of the principal lines is n. When there are two rectangular principal lines cutting the sides of the plate equally in two, the fine powder goes to the four angles; but the circular heaps of this powder are but the rudiments of four secondary lines parallel to the four sides of the plate; joined to the two secondary lines which co-exist with the principal lines, we have really six secondary lines parallel three to three. In general, if the number of principal lines which cross one another at right angles be n, that of the secondary lines will be $4n \times 2$. The result will be similar when the lines are in the diagonal direction.

Rectangular plates having their short sides longer than half the greater sides, offer the same divisions as square plates. The consequence which the author draws from all these results is, that the sound produced by the secondary motion, by uniting with that of the principal motion, is one of the principal causes of the peculiarity (timbre) of tone in different sonorous bodies. *(Ann. de Chimie.)*

On the alloy of Zinc and Tin. By M. Koeschlin.

This alloy is nearly equal to brass in tenacity, and resists friction as well. It is cheaper, since the mean price of the metals composing it is only eighty per cent. and the pieces may be used as delivered from the moulds.

It is essential that the zinc employed be very pure; for on the purity depends the tenacity and fusibility of its alloy, which, if made with impure zinc, would readily break, would wear away rapidly, and would not run well in casting. The following are the different alloys proposed by the author:—

1 part of tin 3 parts of zinc	fusible from	260° to 300°	(=500° to 572° F.)
2 ditto tin 4 ditto zinc	ditto	300° to 350°	(=572° to 662° F.)
3 ditto tin 2 ditto zinc	ditto	320° to 360°	(=608° to 680° F.)
Equal parts of tin and impure zinc.	ditto	250° to 350°	(=482° to 662° F.)
Ditto of tin and impure zinc.	ditto	450° to 500°	(=842° to 932° F.)

(Buln. de la Soc. Industr. de Mulhausen.)

On the Silicate of Iron, of Bodenmaiz. By *Professor* Kobell, *of Munich.*

This mineral, reduced to very fine powder, is attacked by hydro-chloric (muriatic) acid. 20 parts gave the following results:

Silica - - -	6.12	
Protoxide of iron -	10.32	
Sulphur - - -	0.18	
Water - - -	3.74	= 20.36
	20.36	

As the mineral is found with pyrites, the sulphur doubtless proceeds from a small mixture of these substances. Subtracting the sulphur, and attending to the increase of weight, we have

Silica - -	31.28	of which oxigen is	16.25
Protoxide of iron	50.86	—	15.59
Water - -	19.12	—	16.99
	101.26		

This mineral may consequently be considered a hydrated silicate of iron. (*Annalen der Physik.* 1828.)

NOTICE OF EXPIRED PATENTS.

JOSEPH REYNOLDS, of Kitley, in the parish of Wilting, Salop, Esq. for certain improvements in the construction of wheel carriages and of ploughs, and other implements used in husbandry, to be moved by steam, heated air, or vapours.—Dated January 9, 1816.

EDWARD COOPER, of Newington Butts, Ironmonger and Machinist; for a method of printing paper for paper hanging.—Dated January 10, 1816.

THOMAS DEAKIN, of Ludgate Hill, in the city of London, Furnishing Ironmonger, and JOHN RICHARD HAYNES, of St. John's Street, Middlesex, Ironmonger; for an improved stove, grate, or fire-place.—Dated January 15, 1816.

JAMES BARRON, of Wells Street, Oxford Street, Middlesex, Brassfounder; for an improvement or improvements on castors.—Dated January 23, 1816.

LIST OF NEW PATENTS.

WILLIAM HALE, of Colchester, in the county of Essex, Machinist, for a machine or method of raising or forcing water for propelling vessels.—Dated January 12. 1830.—(*Six months to enrol Specification.*)

JAMES CARPENTER, of Willenhall, in the parish of Wolverhampton, in the county of Stafford, and JOHN YOUNG, of Wolverhampton, aforesaid, Locksmiths, for certain improvements on locks and other securities, applicable to doors and other purposes.—Dated January 18, 1830.—(*Six months.*)

WILLIAM PARR, of Union Place, City Road, in the county of Middlesex, Gentleman, for a new method of producing or reciprocating action, by means of rotatory motion, to be applied to the working of all kinds of pumps, mangles, and all other machinery in or to which reciprocating action is required, or may be applied.—Dated January 18, 1830.—(*Four months.*)

EDWARD DAKEYNE, and JAMES DAKEYNE, both of Darley Dale, in the county of Derby, Merchants, for a machine or hydraulic engine for applying the power or pressure of water, steam, and other elastic fluids, to the purpose of working machinery and other uses requiring power; and applicable to that of raising or forcing of fluids.—Dated January 21, 1830.—(*Six months.*)

Persons desirous of obtaining Patents for inventions, may have them procured with little trouble to themselves, and generally without their personal attendance in London, on application to the EDITORS of the REPERTORY (addressed to the care of Messrs. T. & G. UNDERWOOD, 32, Fleet Street,) who, from long practice and experience, presume they may be enabled to afford important assistance to Patentees in drawing up and adjusting their Specifications, on the accuracy and perspicuity of which, in a great measure, depends the security of the Patent.

THE

REPERTORY

OF

PATENT INVENTIONS,

No. LVII. MARCH, 1830.

Specification of the Patent granted to George Haden, *of Trowbridge, in the county of Wilts, Engineer, for certain Improvements in Machinery for dressing Cloths.*—Dated March 2, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said George Haden, do hereby declare, that the nature of my said invention, and in what manner the same is to be performed, are particularly described and ascertained in and by the drawings hereto annexed, and the following description thereof, (that is to say):—

My improvements in machinery for dressing cloths, have for their objects the performance of two distinct operations in the finishing of woollen cloths, both of which are carried on in one machine simultaneously. These operations are, laying the pile or nap on the face of the cloth, by means of a series of brushes, or cards and brushes, or any other suitable material, moved by a comparatively slow motion, and at the same time polishing and fixing the nap, so laid, by the rapid rotation of heated calendering cylinders; the effect of which conjoined operations is, to give the cloth a smooth face and a permament lustre.

The improved machine exhibited in the accompanying drawings bears some resemblance to a gig mill. It is therefore to be understood, that I do not intend to claim all the parts of the said machinery as of my invention, but shall particularize those features of novelty which I do claim, after I have described the construction and arrangement of the whole.

Fig. 1 is a front view of the machine complete. Fig. 2 is the right hand end of the same. Fig. 3 is the left hand end, and fig. 4 is the appearance of the back of the machine. Fig. 5 is a vertical section taken transversely through the machine at the red dotted line A B, in figs. 1 and 4, similar letters referring to corresponding parts in all the figures.

Rotatory motion is communicated to the machine from a steam engine, or any other first mover, by means of a band and rigger, or toothed gear, attached to the main axle *a*, which axle carries the operating parts of the machine. *b b* are two drums or open cylinders, formed of rails of wood, and mounted on axles supported in plummer boxes attached to the frame of the machine; on one of these drums *b*, the piece of cloth intended to be dressed is first wound; its end is then carried over the tension rollers *c c*, and made fast by canvas sewn on to the forel of the other drum; near the end of the shaft of each of these drums a toothed wheel *d d* is mounted, and which slide round loosely upon the shaft as their axles. Both of these wheels *d* take into the intermediate wheel *e*, which is mounted loosely upon a stud fixed to the side of the frame, and is driven by a smaller toothed wheel *f* on the main axle *a*. The moveable parts of the coupling boxes *g g* having ratchet teeth, slide on square parts of the shaft of the drums, and by a movement of the perpendicular standard rod *h*, with its tappets *i i* taking into grooves in the said coupling boxes, those parts of the boxes are slidden to and fro, which cause the shafts with the drums to be alternately thrown in and out of gear with their respective wheels *d*; the other parts of such boxes being fixed to such wheels *d*.

This is effected by shifting the lever or handle *k* to the right hand or left, which produces a lateral movement of the horizontal rod *l*, connected to the standard *h*, and causes the tappets to slide the respective coupling boxes in or out of gear. Let it now be supposed, that the piece of cloth has been wound upon the lower drum, and its end conducted over the tension rollers *c c* and made fast to the upper drum as before described: the upper shaft must now be thrown into gear, for the purpose of drawing the cloth progressively from the lower drum, the axle of which, being out of gear, will run round freely as the cloth is drawn off, the tension of the cloth being maintained by the friction of weighted levers *m* bearing upon the periphery of the friction wheels *n*, as shewn particularly in fig. 3. The manner of conducting the cloth through the machine being shewn, I now proceed to describe the operative parts by which the improvement in the dressing and finishing of the cloth is to be effected.

On the main axle *a* I mount the carrier wheels *o o*, the arms of which support the brushes or cards, or other suitable material at *p p* and which are attached thereto by screw bolts, or by any other convenient means, and extend across the machine. Between the brushes or cards or other suitable material, the calenderers *q q q* are placed, which are hollow cylinders of copper or any other metal, revolving on axles or pivots supported in plummer boxes, on the peripheries of the the carrier wheels *o o*. These cylinders are intended to be heated by steam introduced from a boiler through the pipe *r* and axle *a* into the steam box *s*, a part of the axle *a* being made hollow for that purpose. From the box *s* the steam passes through small pipes *t t t*, with stop cocks; the ends of which pipes are inserted into the hollow axles of the respective calendering cylinders *q*, and the steam thus conducted is allowed to flow through small apertures in the hollow axles, so as to fill the cylinders and heat their surfaces, the condensed steam being allowed to discharge itself through any convenient opening at the end or elsewhere. At one end of the axle of each cylinder a pinion *u u u* is fixed, which pinions take into a stationary toothed wheel *v*, firmly fixed to the frame of the machine by screw bolts, as shewn in fig. 3.

It will now be perceived, that rotary motion being given to the main axle *a* by a rigger or otherwise, as before described, the carrier wheels *o o*, which may be considered as a gig barrel, will revolve, and the brushes or cards, or other suitable material at *p p*, will by that means be made to act against the face of the cloth distended between the tension rollers *c c*, and, consequently, to brush and smoothen the pile; at the same time the calendering cylinders *q*, also carried round by the gig barrel, will in consequence of their pinions *u* taking into the teeth of the fixed wheel *v*, be made to revolve rapidly on their axles, and by the friction of their heated surfaces upon the face of the cloth, the pile which has been smoothly laid, will become polished and acquire a permanent lustre.

I recommend, that the brushes, cards, or other suitable material, upon the arms of the carrier wheel *o*, should be placed in a curve, the radius of which is about equal to the whole diameter of the gig barrel, as by that means, the points of the brushes, or wires, or other suitable material, will come progressively into contact with the face of the cloth at an acute angle, and thereby act more delicately upon the pile or nap, than if they formed radii equal to the semi-diameter of the gig barrel. The breasting of the cloth upon the polishing surface *q* may be increased or diminished by shifting the situation of the lower tension roller *c*, this may be done by turning the pinions *w w*, by means of the winch and endless screw *x*, the pinions taking into racks *y y*, which slide in segment grooves and carry the pivots of the lower tension roller *c*, as shewn in fig. 3.

When the whole length of the cloth has been drawn off the lower drum on to the upper one, by the means above described, the handle *z* of the friction lever is to be raised, so as to release the lower drum and bring the friction-break against the wheel of the upper one; the handle *k* is then to be shifted so as to throw off the upper coupling box *g*, and lock the lower one to the wheel *a*, by which means, the rotation of the wheel will cause the cloth to be drawn back and wound upon the lower drum, the friction of the upper break retarding the rotation of the upper drum, and causing the cloth to be drawn tightly while winding for repetition of the dressing process.

I perform the above described operation while the cloth is in a wet state, and find the effect improved by occasionally introducing a jet of cold water, which may be conveniently done by the employment of a pipe *j j* extending across the machine, having many small perforations, and a stop cock, to be opened or closed as occasion may require.

Having described the particular construction of my improved machinery for dressing cloth, I now wish it to be understood, that I do not confine myself to the precise arrangement of the parts as exhibited in the drawings, knowing that many variations might be made without materially altering the general plan of the machine or its effects when put into operation; neither do I intend to limit the number of brushers or of calendering cylinders to be combined in a machine for dressing cloth; but I do claim as my invention, the adaptation of heated calendering cylinders which revolve upon their axles and work upon the main cylinder to a gig mill or brushing machine, or to any similar apparatus for dressing woollen cloths, and such calendering cylinders are also carried round with, and constitute a part of the surface of the main cylinder, as shewn in the drawing hereunto annexed.

In witness whereof, &c.

Specification of the Patent granted to CHARLES BROOK, *of Meltham Mills, near Huddersfield, in the county of York, Cotton Spinner, for certain Improvements in Machinery for spinning Cotton and other fibrous Substances.*—Dated June 4, 1829.

WITH AN ENGRAVING.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I the said Charles Brook, do hereby declare that the nature of my said invention of certain improvements in machinery for spinning cotton and other fibrous substances, and the manner in which the same is to be performed and carried into effect are described and clearly shewn in the drawings hereto annexed, and the following description:—In the annexed drawings the same letters in the different views and sections represent the same parts throughout, and the scale to which the several views and sections are drawn is written at the bottom of the sheet. Fig. 6, (Plate III.) represents a front view of part of an ordinary spinning frame called a throstle, with my improvement applied to it. In this view only part of the machine is shewn, the remainder being similar, and the part shewn sufficient to explain the action and nature of my invention. Fig. 7 is a transverse section of the same machine, and fig. 8 a plan of the part shewn in fig. 1. In these figures A represents fast and loose pullies, which are driven by a strap in the ordinary manner. B, C, D, and E, are successive wheels for conveying the motion to the wheel F, which is placed on the front roller shaft, from which the other rollers receive the differential motion, for the purpose of drawing the roving. In fig. 7 these wheels, A, B, C, D, and F, are shewn at their pitch lines only; and my reason for describing them here, or inserting them in the drawings, is to shew more clearly the exact position or part of the machine at which I apply my approvement. Before I proceed to describe the way in which my improvement is effected, I shall state the object and nature of the improvement, which consists in producing a much smoother thread or yarn than is produced by the ordinary process. This I effect by passing each thread or yarn over a revolving cylinder during its passage or transit from the front or delivering roller to the flyer of the bobbin. These revolving cylinders, over which the respective ends of thread or yarn are passed, are marked G in the drawings, and will be seen most clearly at fig. 8. These cylinders marked G are supported on an horizontal shaft, which receives motion from the front roller shaft by means of the spur-wheels H and I, which gear into each other, and carry the shaft on which the cylinders G are supported in an opposite direction to the revolution of the front roller, as shewn by the arrow in fig. 7. Beneath the cylinder G is placed a trough K, which contains water into which the cylinders are partly inserted, so that by their continuous revolution the upper part of their surface over which the thread or yarn passes in its passage or transit from the front roller to the flyer of the bobbin is kept constantly wet, the consequence of which is that the motion of the yarn or thread from the front or delivering roller to the bobbin being opposite to the duction of revolution of the cylinders marked G, loose fibres, which otherwise would stand off, are incorporated into the thread or yarn, and the twisting proceeding at the same time unites them into its substance instead of allowing them to stand off. On referring to fig. 7, it will be seen that the cylinder G, over which the thread or yarn passes in its passage from the front or delivering roller to the flyer of the bobbin, presses the thread or yarn, which is tinted red,* a little out of the straight line, which is required to produce the effect of incorporating the loose fibres into the thread or yarn as already described. This pressure is regulated by set screws seen at M in the drawing, which, being connected with the steps or supports in which the shaft carrying the G cylinders revolves, enables the operator to adjust the position of the cylinders G as required. At the back of the cylinders marked G, and immediately beneath the front roller is placed a revolving shaft marked L, which also receives motion from the front roller by means of spur-wheels as seen in the drawings. This shaft L extends the whole length of the drawing rollers, and is covered with woollen cloth, for the purpose of taking up any end of yarn which may break. Thus, supposing any one of the ends of yarn or thread to break between the front roller and the bobbin, the roving which would continue to be delivered from the front roller would necessarily fall on the covered shaft L, and adhering to the woollen surface be wound or taken up by its revolution, and thereby be prevented from interfering with any other part of the machine. This shaft L, and its property of taking up any broken ends that may occur, I name as a useful application, but do not in any way claim it as part of my invention.

* The colouring is necessarily omitted in the engraving.

Having described my certain improvement in machinery for spinning cotton and other fibrous substances, I declare that I do not claim any of the well-known portions or parts of the machine hereinbefore described, such parts having been named to make the description and nature of my invention more clear; but I do claim that arrangement of parts described at the letters G, H, I, K, and M, which consists of a revolving cylinder or cylinders introduced between the front or delivering rollers, and the cop or bobbin of a spinning machine, for the purpose of pressing against the thread or yarn, which, in conjunction with the water received on to its surface from the trough K below, produces the effect already described. And If urther declare, that my improvements may be modified and varied by driving the cylinders G in an opposite direction, or from other parts of the machine than that from which I have driven them, as well as by the application of bands and pullies instead of wheels, for the purpose of revolving the cylinders, all which well-known modifications and variations, together with the proportions of the different parts, as well as the material to be used in constructing those parts, may be attained with facility by any person of competent skill, and fit to be intrusted with the direction and construction of machinery of this and a like description.

In witness whereof, &c.

Specification of the Patent granted to HENRY ROBINSON PALMER, *of the London Docks, in the county of Middlesex, Civil Engineer, for a certain improvement or improvements in the construction of Warehouses, Sheds, and other buildings, intended for the protection of property.* Dated April 28, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Henry Robinson Palmer, do hereby declare that the nature of my said invention is fully described and ascertained in and by the drawings hereunto annexed, and the following description thereof, (that is to say):—

My improvement or improvements in the construction of the roofs and other parts of warehouses, sheds, and other buildings, intended for the protection of property, consists in the application of metallic plates or sheets, in a fluted, indented, or corrugated form, to the purposes in relation to buildings, for which metallic plates with even or plain surfaces, have been already applied. The advantage to be derived from the form or forms proposed consists in the additional strength obtained in the metal itself, so that less aid is required from frame work supporting or attached thereto, to preserve the plates in their proper form and position.

Various forms of the flutings, indentations, or corrugations, may be adopted, but I prefer the fluted or that which is composed of curved or waving lines, as represented in the section at fig. 9, (Pl. III.)

The fluted sheets or plates of metal, may be applied to roofs of buildings, to the sides of them, to the doors, the shutters, and to the partitions in the buildings, whether moveable or stationary.

The form of the flutings, and the manner of applying the fluted sheets or plates, may vary according to circumstances, and to the taste of those who require their use; I therefore shall confine my explanation of the manner of applying them to such examples only as are necessary for the illustration of the purposes intended by me.

Fig. 10 represents four plates or sheets rivetted together.

Fig. 11 represents the section of a roof, the two sides of which *a a*, are composed of fluted plates or sheets. These plates are rivetted at their upper ends to a crown plate made in an angular form, and represented at *b*.

The lower extremities of the fluted plates or sheets are rivetted, or otherwise connected with a gutter composed of metal, and formed as represented at *c c*. The gutters rest on bearers commonly known by the name of gutter plates, which may bear on pillars or any other usual supports most convenient. The horizontal thrust or pressure of the roof thus formed, may be resisted by any known means most conveniently applicable.

The application of the fluted, indented, or corrugated plates or sheets to the sides of buildings, or to partitions, or to doors or shutters, is best performed by rivetting or otherwise connecting the said sheets or plates to a frame made of wood, or any other substance that may be preferred, though a frame of the same metal as the plate is best adapted for the purpose.

Fig. 12 represents a fluted sheet or plate inserted in a metallic frame, the section of which is angular, and represented by fig. 13. In this case, the sheet or plate of metal is inserted within the recess of the frame, and rivetted to the flanch all round. The figs. 12 and 13 referred to, may be considered to represent the general mode of applying my improvement or improvements to the sides of buildings, to partitions, to doors, and to shutters.

I do not claim as my invention any particular mode of forming the plates or sheets as herein described, the means of producing such forms being well known; neither do I claim as my improvement or improvements any particular mode of connecting the fluted, indented, or corrugated sheets or plates of metal together, or the mode of attaching them to buildings, so as to form a part or parts of such buildings; but I claim as my improvement or improvements the use or application of fluted, indented, or corrugated metallic sheets or plates, to the roofs and other parts of buildings, as hereinbefore described.

In witness whereof, &c.

Specification of the Patent granted to Donald Currie, *of Regent Street, St. James's, in the county of Middlesex, Esq. for a Method of preserving grain and other vegetable and animal Substances and Liquids. Communicated by a Foreigner.*—Dated January 31, 1828.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Donald Currie, do hereby declare that the nature of my said invention and the manner in which the same is to be performed, is particularly described and ascertained as follows, (that is to say):—

My said method of preserving grain and other vegetable and animal substances is, by inclosing them in air tight vessels, vaults, or other proper receptacles, from which I extract the atmospheric air as much as possible, and replace it with carbonic acid gas, procured by any of the well known methods; as for instance, by the combustion of charcoal, or by fermentation; and thus I prevent the tendency of the grain to vegetate, and greatly hinder the decomposition of the other vegetable and animal matters which is ordinarily so greatly promoted by the action of the oxygen contained in atmospheric air.

Fi

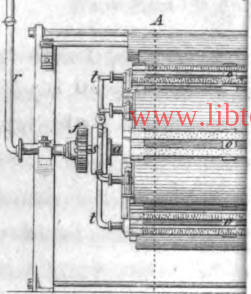


Fig. 7

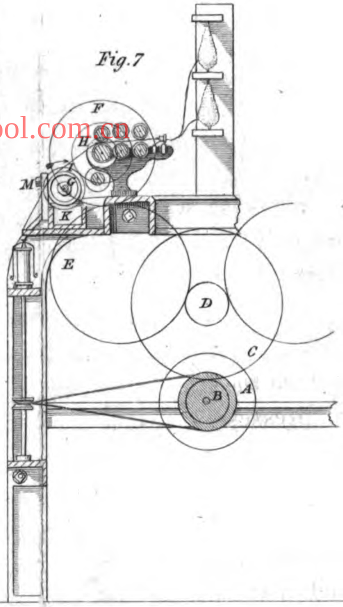


Fig. 5.

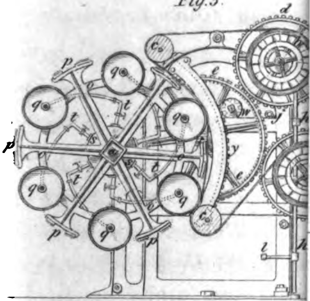


Fig. 3

Fig. 9

Fig. 13

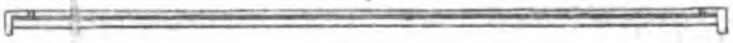


Fig. 12

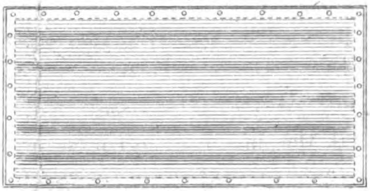


Fig. 1

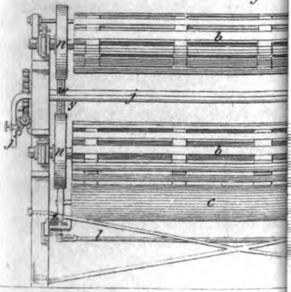
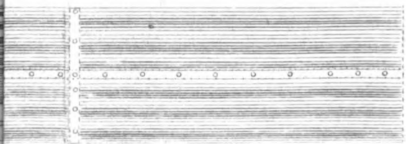


Fig. 10



The liquids must be put into tightly corked or otherwise closed bottles, or other fit and proper vessels, and be then inclosed in a similar manner in air tight vessels, vaults, or other proper receptacles, filled with carbonic acid gas, which will hinder the usual destruction of the corks or other closures, and consequently, preserve the said liquids in a more complete manner than has hitherto been effected.

In witness whereof, &c.

Specification of the Patent granted to John Mac Leod, *Esq. of Westminster, Surgeon on the Madras Establishment, for certain Improvements in preparing or manufacturing certain substances so as to produce Barilla, or substitute for Barilla.*—Dated August 11, 1829.

To all to whom these presents shall come, &c. &c.—*Now know ye,* the mode of preparing the patent barilla, or substitute for barilla.—Travelling along the coast of Coromandel, at certain seasons of the year, the ground in many places is observed to be covered with a white efflorescence. On examination, it will be found to consist chiefly of muriate and sesqui-carbonate of soda. These substances are collected by the natives and used by them for a variety of purposes. The ground on which this efflorescence appears, is never covered with verdure. The soil is a deep sand with a mixture of clay, carbonate of lime, &c. The clay contains as it generally does, some oxide of iron. Whole fields on the west side of the great Pulicate Lake, forty or fifty miles north of Madras, are of this description; carbonate (sesqui-carb.) of soda is met with only on the surface, and it is found in greatest abundance a few weeks after the periodical rains have ceased. The natives begin collecting it in March, and continue to do so during the hot weather that succeeds. The saline crust is scraped from the surface, mixed with sand and clay, washed in water so as to separate some of the insoluble matter, and the watery solution is evaporated to dryness. The residuum thus obtained, is the *Karum* of the bazaars, and is the only preparation hitherto made or used in India of these materials. This karum contains from four to six or eight per cent of soda, and the rest consists of carbonic acid, sand, clay, muriate of soda, decomposed vegetable matter, and occasionally other impurities. Various attempts have been made to introduce this substance into our manufactories, and with this view, consignments of it have at different times been sent from Madras, but the nature and quantity of its impurities effectually excluded it. Some years ago, it occurred to me, that if it were divested of some of its insoluble matter and submitted to the action of fire so as to free it from a portion of carbonic acid, decomposed vegetable matter, water, sulphur, and other volatilizable impurities, it might become an article of considerable importance. I conceived that if the karum were treated in this manner, and fused in a reverberatory or other furnace, it might be converted into a substance resembling barilla, which would be found a perfect substitute for that article. This idea I soon after put in practice, but my first attempts were unsuccessful. The materials above mentioned being fused in a reverberatory furnace, became a mass of green glass, in consequence of their containing a quantity of silecious matter, of which they had not been sufficiently divested. It therefore became necessary to get rid of this admixture by more careful solution and evaporation to dryness, as already mentioned. These operations being performed with sufficient care, the residuum underwent the action of fire without any sensible portion being converted into glass, and the fused mass being withdrawn and cooled, resembled very fine barilla in its most essential properties, and in fact, passes current in the London and Antwerp Markets as barilla of a superior quality.

In witness whereof, &c.

ACCOUNT OF NEW PATENTS.

Patent granted to THOMAS STIRLING, *of the Commercial Road, Lambeth, Surrey, Slater, for Improvements on filtering Apparatus.*—Dated August 16, 1828.

MR. STIRLING'S filtering apparatus consists of a vessel of considerable depth in proportion to its other dimensions (as represented in the drawing) divided into five compartments horizontally, (of from six to twelve inches or more in height, according to the size of the vessel,) by four diaphragms, or transverse partitions, the lower one of which is perforated for a space of about six inches square in its middle, with several holes, small below and enlarged conically upwards; over these holes a piece of wire gauze is to be placed, and above that another diaphragm or plate, having an opening six inches square in its middle, is to be cemented to the former. The second transverse partition differs only from the first, in having the conical holes bored near its sides, instead of in its middle; but the third is again formed like the first in this respect; while the fourth or upper one, is perforated in all parts indiscriminately.

The lower compartment is occupied solely by the water to be filtered, which is conveyed into it by a pipe screwed into its side, which turns up outside, at a height proportioned to the force with which it is desired that the water shall pass upwards through the filter. The second compartment is filled with fine river sand: the third with the same material mixed with carbonaceous matter, or with a species of sand procured from the River Carron in Scotland; and the fourth with bits of "*scoriæ*," from the Carron founderies, broken so as to be from one eighth to one quarter of an inch in diameter; while the fifth, or upper compartment, is occupied by the pure filtered water that has passed through those different beds of materials.

The vertical pipe is furnished with a cock, where it enters the lower compartment; another cock is also placed in the bottom of the latter, to discharge the impurities left there by the ascending water, and a screw plug is inserted in the side of the same, to close an aperture, through which a brush on a wire handle, such as is used for cleaning bottles, may be introduced to detach sediment from the internal surfaces of the compartment, when required to be purified; at which time water may be let to run in from the pipe to assist the operation. A third cock, placed in the side of the upper compartment to deliver the pure water when required, completes the apparatus.

The patentee recommends the use of slabs of slate for the formation of vessels for filtering, when of a moderate size, of which two pieces are to be grooved at the edges to receive those of two other pieces to form the sides; all of these are grooved near their lower edges to receive a horizontal piece that forms the bottom, which with the rest constitutes the vessel. The transverse partitions are supported by upright pieces placed close to the sides of the vessel, and are cemented at their edges to them by mastic or other cement, to prevent the passage of water in any place but through the conical perforations; the edges of the bottom piece, and of the two plane sides, are also cemented to the grooves in which they are fitted; and the whole is kept together by horizontal screw bolts, furnished with nuts, that pass through parts of the side pieces, which project beyond their grooves.

When the filtering apparatus is to be of a very large size, the vessel or cistern may be formed of iron plates or of bricks or stones, united by water-proof cement.

The use of having the conical holes placed at the edges of the second transverse partition, is, to cause the water to traverse a larger portion of the filtering materials in passing to them from those in the middle of the lower one, and from them to those in the middle of that next above them in position.

Obs.—We consider the general arrangement of this filtering apparatus to be commendable, particularly as regards the filtration by ascent, the provisions for cleansing the lower compartment, where the water enters, and the use of slate slabs for its cistern, when not of too large a size, as we consider this material to be as little liable as earthenware to defile the water. Stone slabs however have for several years been used in France for filtering vessels, which perhaps might have suggested to the patentee the employment of slate for this purpose.

We are not however quite so well satisfied of the advantages of the sand and broken scoriæ from Carron, recommended for filling the filtering compartments. If by scoriæ is meant, as we suppose, the dross that is removed from the surface of the pig iron when in fusion, it appears to us that the water would be liable to contract some flavour from the iron, which remains unvitrified in its composition, and that the sand would incur a similar objection; but should this be the case, the defect is easily remedied by substituting pure silecious sand and gravel for these materials.

It also appears to us, that the apparatus would be improved by having its transverse partitions so contrived as to be occasionally removed, in order to cleanse all the compartments and renew the filtering materials, that evidently must become foul after any considerably protracted employment. This alteration we think might be easily effected, and seems to us much preferable to cementing the edges of these partitions, as directed by the patentee, and which must of course preclude this displacement.

Accounts of other filtering apparatus may be found in our first volume, p. 567; third, p. 376; and eighth, pp. 11, and 190, present series.

Patent granted to JOSHUA BATES, *of Bishopsgate Street Within, in the City of London, Merchant, for a new process or method of whitening Sugars.*—Dated August 1, 1829.

IN describing the benefits to be derived from this invention, the patentee, to render them more clear, describes that part of the preparation of loaf sugars termed "claying," in which he states that the raw sugar after having undergone the operations of clarifying, boiling down, and graining, is poured whilst yet warm and in a liquid state into unglazed earthenware pots, of the form of an inverted cone, having an aperture at the taper end; this, however, is stopped up whilst the sugar remains liquid, and the latter is stirred up with a stick several times whilst being poured into the pots, in order to prevent its sticking to the sides, and consequently, to facilitate its expulsion when required. The sugar when cool is no longer fluid, but an aggregate of chrystallized grains, the spaces between them being filled up with a brown syrup, which, owing to the porosity and consequent capillary attraction of the former, would never drip out unless by the action of water. To expel this syrup, therefore, the process of claying is resorted to, which is effected by mixing up a quantity of pipe-clay to the consistency of batter, and placing it on the surface of the sugar about one inch in thickness; the consequence of this is, that the water, extricating itself by degrees from the clay, filters gradually through the sugar, and finally through the aperture in the pot, carrying away the syrup which mixes with it on its passage. This operation is again repeated, and sometimes a third time, the clay being removed and a fresh mixture applied on each occasion; the sides of the pot being gently tapped the loaf comes out, and is found whitened, with the exception of the point, which frequently retains a rather inferior colour.

To this, which is the ordinary mode of operation, there are several objections, which the patentee states his invention will obviate. The quality of the sugar is impaired by the irregularity with which the water passes through it, as the liquid must necessarily percolate more quickly when the batter is first placed on, than towards the end of the different operations, when the clay becomes nearly dry. This latter after its first use is again mixed up for future occasions, and, as appears by the patentee's statement, it imbibes a portion of the sugar, from its continual contact with it, and when exposed to the heat of a sugar house, frequently becomes sour and imparts a bad flavor to the sugar to which it is next applied.

To remedy these defects, he constructs a small circular vessel or saucer of unglazed earthenware, of that description of which wine coolers are generally manufactured, which is made so as to fit into the larger end of the sugar pots, with an interval of about half an inch round its sides. This being placed on the sugar, in the same situation where the clay batter is usually employed, is filled with water, which, percolating through it gradually and in a minute state of division, may be caused to continue filtering through the sugar with unvaried regularity, until the whole loaf, including also the point, be entirely divested of syrup. Mr. Bates does not confine himself to the substance mentioned for forming the filters, but states, that they may be constructed either of hair sieves, in which a quantity of sand has been placed, of filtering stones, or of any material through which liquids will pass gradually and minutely divided.

The above is the nature of the improvements as relating to the whitening of loaf sugars; the patentee in continuation observes, that in the whitening of raw or muscovado sugars by the process of claying, it is found impossible from the partial adhesion of the grains to each other, to cause by pressure an equal distribution of the water. To remedy this defect and the consequences arising from it, he employs a large circular pan, the bottom of which is fitted with an indefinite number of pots, of the same form as those employed for the loaves, and like them furnished with an aperture; into these the raw sugars are pressed, and a vessel similar to the first described filter, only varying in size, is placed over the pan and filled with water. This plan he observes, has been found to whiten sugars more effectually than the ordinary method: and, as he claims as his invention, the employing a series of moulds, or inverted cones for the raw sugar, he states, that the process of claying may be also used in conjunction with them, in lieu of his filter, as described.

Patent granted to WILLIAM SHAND, *of the Burn, in Kinkardineshire, North Britain, Esq. for a certain improvement or improvements in distillation.*—Dated August 10, 1829.

THE apparatus which constitutes these improvements is represented in the drawings of the specification, as consisting of three wooden vessels or vats, made of wood, or other slow conductor of heat, through the side of the first of which, near the top, is introduced a pipe that communicates with, and is attached to the beak of the still. This pipe widens at its lower end, and is placed like an inverted funnel over a small cavity formed at the bottom of the vat. A similar pipe passes from the first to the second vessel, and from that again to the third, and so on in succession, if more vats than three be employed; to the last however is attached a worm, which is immersed in a vessel of water, as in ordinary cases.

The bottoms of the vats are formed of wood, and have the cavity before noticed, cut in the centre somewhat larger than the funnel suspended over it; a plate of copper or other metal is fixed under them, furnished with cocks and pipes for conveying off the water with which the cavities are filled; the use of which latter will be presently explained. The tops of the vats are made of copper or other quick conductor of heat, and have domes formed in their centres; funnels furnished with cocks are placed near these for filling with water the cavities at the bottom of the vessels. Small pipes communicate with the lower part of each vessel in order to convey to the still the condensed vapours that have accumulated there; and in order to facilitate their passage, the bottoms of the vessels rise in gradations.

The patentee states, that in causing the vapour to pass through the water contained in the cavity, it will be divested of a portion of its empyreuma, and consequently, a much more pure spirit will be obtained. In case however the strength of the spirit be a greater object than its purity, he directs the inverted funnels at the extremity of the pipes to be drawn above the liquid contained in the cavity. The tops of the vessels being formed of metal, the action of the atmosphere on the outside will be generally found sufficient to condense the aqueous vapour, while the alcoholic part passes on to the worm: should this fail to produce the desired effect, water is directed to be admitted on the top of the vats, the quantity and continuation of which is regulated according to circumstances.

A modification of this arrangement is described, in which the several vats are formed by an equal number of partitions placed perpendicularly in a square vessel, with the pipes arranged as in the former instance; but instead of placing water over the vessels for condensing the aqueous vapour, the wash intended for distillation is appropriated to that purpose, and is surrounded by a covering with a pipe leading to the still to prevent any vapour from escaping which might be formed by the heat of the copper domes.

Mr. Shand concludes the description of his invention, by stating it to be "applicable to the distillation of any fluid obtained by the evaporating of a gas or vapour, composed of gasses or vapours, condensible at different temperatures."

Patent granted to THOMAS SALMON, *of Stokeferry, in the county of Norfolk, Malster, for an improved Malt-kiln.* Dated July 8, 1829.

THE object of this patent is to cause a portion of the heated air employed in the preparation of malt, to operate on the surface of the wet grain or green malt.

In the drawing accompanying the specification, the floor of an ordinary kiln is represented, formed of flat tiles with numerous perforations, and at equal distances from each other are placed three inverted funnels, which may be made either of tin, iron, bricks, or other materials that will bear heat; the lower extremities of these funnels (which the patentee terms "*rarifiers*") are square, and each fits into a space formed by the removal of one of the perforated tiles: a slide passes through the upper part of the rarifier to regulate the admission of heat, and is directed to be so placed, that it shall be above the greatest quantity of grain that is prepared at one operation. When the wet grain is spread on the floor of the kiln the slides of the rarifiers are withdrawn, and a portion of heated air passes upwards through the funnels and spreads itself throughout the chamber. The patentee states, that this method causes the malt to dry quicker, and that less steam is condensed on the roof. He concludes by recommending the aperture at the top of the kiln to be contracted to three feet, if the area of the floor be twenty-seven feet square, and in like proportion for other sizes.

Patent granted to MOSES POOLE, *of Lincoln's Inn, in the county of Middlesex, Gentleman, for certain improvements in the apparatus for raising and generating Steam and currents of air, and for the application thereof to locomotive Engines and other purposes. Communicated by a Foreigner.* —Dated July 8, 1829.

THE first part of these improvements consists, in the formation of the boiler of a steam engine; this is constructed of a series of tubes placed so as to form a sort of square cage work, surrounded by a casing of iron into which the fuel is placed, and having an opening at the top for the chimney. The tubes are placed in a horizontal position, and each is screwed into an iron casting, being made steam tight by bringing over a nut at the opposite side, with a packing of asbestos or fire-lute interposed. The size of these tubes are to be regulated according to the power required; but those represented in the drawing of the specification are on a scale of three feet in length, with a bore of one inch: they are shewn as attached to a locomotive carriage, to which the patentee states them to be eminently adapted.

The pipes communicate with one another throughout the whole series, and to the extremities of the first and last, or, for better explanation, to the two ends of the coil of pipes, are affixed two vessels or receptacles of steam, which Mr. Poole terms the "*separators*;" where any water which may be forced into them along with the steam, will separate itself by its own gravity, and will be then re-circulated through the tubes by the force pump above mentioned. When it is required to clean them, this can be done by a rod furnished with a barb, similar to that employed in cleaning guns, being introduced into the pipes by withdrawing the nut; water is then forced through them by the pump, and all sediment being loosened is carried off.

The next improvement is the causing the steam to enter below the piston at the bottom of the cylinder, (which is placed horizontally) by which means, the patentee states, any water that may accidentally flow into it will be forced out; this he asserts would *not* be the case if caused to enter above the piston, as in ordinary engines. In adapting this engine to a locomotive carriage, rotary motion is imparted to the hinder wheels by means of cranks, and the parallel motion of the pistons is regulated by a wheel running on iron rods.

To generate the currents of air as expressed in the title, a tube is affixed to the waste pipe, from the former of which branch out three or more very small tubes; these are carried to the chimney, where it is stated they will be found of peculiar advantage, particularly in carriages where the flues are necessarily short; the effect they will produce being a continued draft through the fuel, arising from the steam in passing through the minute apertures of the small tubes, causing by its velocity a partial vacuum in the chimney, which can only be filled up by air passing through the fuel, every other aperture being closed. There is also described, a method of stopping the carriage, or retarding its progress by means of a lever attached to the perch between the hinder wheels. This lever works like a hinge in an iron sledge or drag, which is attached to a chain that extends under the whole length of the carriage and passes round a small windlass, that is worked by a handle passing upwards to the seat of the driver. When it is required to stop the coach the chain is wound round the windlass, and in thus pulling forward the drag and lever, the latter, being made somewhat longer than the radii of the wheels, lifts the hinder ones from the ground, which continue their rotatory motion without propelling the carriage; the engine consequently continuing to work, the circulation of water through the boiler is not prevented.

Numerous patents have been granted for tubular or cage-like boilers, among others we shall enumerate that of Mr. Cox Stevens, the specification of which is contained in our 7th vol. second series; that of Mr. T. Paul, contained in our 1st vol. present series, p. 190, and of Mr. I. A. Teisser, in our 2nd vol. same series, to the remarks on which we beg to refer our readers, as being alike applicable to the present patent.

Patent granted to JOHN MC. CURDY, *of Great James Street, Bedford Row, in the county of Middlesex, Gentleman, for certain improvements in the method of constructing Mills and Mill Stones for Grinding.—Communicated to him by a Foreigner.*—Dated November 2, 1829.

IN the interior of this improved mill the boulter is placed below the grinding stones, and is worked by means of two pins, called a *tic-tac*, which project from a beam that forms the axis of the stones, and strike alternately against a rod by which one end of the boulter is suspended; the main shaft, therefore, which gives motion to the stones works also the boulter, and this constitutes one of Mr. Mc. Curdy's claims.

He next describes a method of regulating the fineness of the flour during the operation of grinding by causing the upper stone to work in a socket; to the latter is affixed a lever, having an adjusting screw and clamp at its extremity, by turning which, the stone is raised or lowered at pleasure. To reduce the friction and to improve the surface of the stones, the patentee proposes to cut a series of grooves thereon, several plans for doing which are represented in the drawings. For repairing and also for forming entire mill stones, he directs the following cement to be employed; viz.—To one part of French burr stone broken into small pieces, are added five parts of the same material pulverized, and being boiled with an equal quantity of alum, the mixture is poured with a ladle into the crevices or such parts of the stones that may require repairs, or if intended for entire stones, into appropriate moulds. Mr. Mc. Curdy also lays claim to the placing stones vertically in mills, though no description or comment upon any peculiar arrangement of this nature is given in his specification.

On a Method of rendering Platina malleable. *By* William Hyde Wollaston, M.D. F.R.S. *&c.*

From the Philosophical Transactions, 1829.

As, from long experience, I probably am better acquainted with the treatment of platina, so as to render it perfectly malleable, than any other member of this Society, I will endeavour to describe, as briefly as is consistent with perspicuity, the processes which I put in practice for this purpose, during a series of years, without seeing any occasion to wish for further improvement.

The usual means of giving chemical purity to this metal, by solution in aqua regia and precipitation with sal ammoniac, are known to every chemist; but I doubt whether sufficient care is usually taken to avoid dissolving the iridium contained in the ore, by due dilution of the solvent. In an account which I gave in the Philosophical Transactions for 1804, of a new metal, rhodium, contained in crude platina, I have mentioned this precaution, but omitted to state to what degree the acids should be diluted. I now therefore recommend, that to every measure of the strongest muriatic acid employed, there be added an equal measure of water; and, moreover, that the nitric acid used be what is called "single aquafortis," as well for the sake of obtaining a purer result, as of economy in the purchase of nitric acid.

With regard to the proportions in which the acids are to be used, I may say, in round numbers, that muriatic acid, equivalent to 150 marble, together with nitric acid equivalent to 40 marble, will take 100 of crude platina; but in order to avoid waste of acid, and also to render the solution purer, there should be in the menstruum a redundance of twenty per cent. at least of the ore. The acids should be allowed to digest three or four days, with a heat which ought gradually to be raised. The solution, being then poured off, should be suffered to stand until a quantity of fine pulverulent ore of iridium, suspended in the liquid, has completely subsided; and should then be mixed with 41 parts of sal ammoniac, dissolved in about five times their weight of water. The first precipitate, which will thus be obtained, will weigh about 165 parts, and will yield about 66 parts of pure platina.

As the mother-liquor will still contain about 11 parts of platina, these, with some of the other metals yet held in solution, are to be recovered, by precipitation from the liquor with clean bars of iron, and the precipitate is to be redissolved in a proportionate quantity of aqua regia, similar in its composition to that above directed to be used; but in this case, before adding sal ammoniac, about 1 part by measure of strong muriatic acid should be mixed with 32 parts by measure of the nitro-muriatic solution, to prevent any precipitation of palladium or lead along with the ammonio-muriate of platina.

The yellow precipitate must be well washed, in order to free it from the various impurities which are known to be contained in the complicated ore in question, and must ultimately be well pressed in order to remove the last remnant of the washings. It is next to be heated, with the utmost caution, in a black-lead pot, with so low a heat as just to expel the whole of the sal ammoniac, and to occasion the particles of platina to cohere as little as possible, for on this depends the ultimate ductility of the product.

The grey product of platina, when turned out of the crucible, if prepared with due caution, will be found lightly coherent, and must then be rubbed between the hands of the operator, in order to procure by the gentlest means, as much as can possibly be so obtained, of metallic powder, so fine as to pass through a fine lawn sieve. The coarser parts are then to be ground in a wooden bowl with a wooden pestle, but on no account with any harder material capable of burnishing the particles of platina,* since

* The following experiment will prove the necessity of attending to this precaution:—If a wire of platina be divided with a sharp tool in a slanting direction, and, being then heated to redness, be struck upon an anvil with a hammer, so as to force into contact the two newly-divided surfaces, they will become firmly welded together; but if the surfaces have previously been burnished with any hard substance, the welding will be effected, if at all, with very great difficulty.

When the powder of platina has been overheated in decomposing the ammonio-muriate, or has been burnished in the grinding, I have in vain endeavoured to give it a welding surface, by steeping it in a solution of sal ammoniac in nitric acid.

every degree of burnishing will prevent the particles from cohering in the further stages of the process. Since the whole will require to be well washed in clean water, the operator, in the later stages of grinding, will find his work much facilitated by the addition of water, in order to remove the finer portions, as soon as they are sufficiently reduced to be suspended in it.

Those who would view this subject scientifically should here consider, that as platina cannot be fused by the utmost heat of our furnaces, and consequently cannot be freed like other metals, from its impurities, during igneous fusion, by fluxes, nor be rendered homogeneous by liquefaction, the mechanical diffusion through water should here be made to answer, as far as may be, the purposes of melting; in allowing earthy matters to come to the surface by their superior lightness, and in making the solvent powers of water effect, as far as possible, the purifying powers of borax and other fluxes in removing soluble oxides.

By repeated washing, shaking, and decanting, the finer parts of the grey powder of platina may be obtained as pure * as other metals are rendered by the various processes of ordinary metallurgy; and if now poured over, and allowed to subside in a clean bason, a uniform mud or pulp will be obtained ready for the further process of casting.

The mould which I have used for casting, is a brass barrel, 6¼ inches long, turned rather taper within, with a view to facilitate the extraction of the ingot to be formed, being 1.12 inches in diameter at top, and 1.23 inches at a quarter of an inch from the bottom, and plugged at its larger extremity with a stopper of steel, that enters the barrel to the depth of a quarter of an inch. The inside of the mould being now well greased with a little lard, and

* Sulphuric acid, digested upon the gray powder of platina, thus purified, extracted less than 1-1000dth part of iron.

the stopper being fitted tight into the barrel by surrounding it with blotting-paper, (for the paper facilitates the extraction of the stopper, and allows the escape of water during compression,) the barrel is to be set upright in a jug of water, and is itself to be filled with that fluid. It is next to be filled quite full with the mud of platina, which, subsiding to the bottom of the water, is sure to fill the barrel without cavities, and with uniformity,—a uniformity to be rendered perfect by subsequent pressure. In order, however, to guard effectually against cavities, the barrel may be weighed after filling it, and the actual weight of its contents being thus ascertained, may be compared with that weight of platina and water which it is known by estimate that the barrel ought to contain.* A circular piece of soft paper first, and then of woollen cloth, being laid upon the surface, allow the water to pass, during partial compression by the force of the hand with a wooden plug. A circular plate of copper is then placed upon the top, and thus sufficient consistency is given to the contents to allow of the barrel being laid horizontally in a forcible press.

After compression, which is to be carried to the utmost limit possible, the stopper at the extremity being taken out, the cake of platina will easily be removed, owing to the conical form of the barrel; and being now so hard and firm that it may be handled without danger of breaking, it is to be placed upon a charcoal fire, and there heated to

* From the mean weight of the ingots obtained in previous operations, it is known that the barrel described in the text ought to contain 16 ounces troy of dry platina powder. The weight of the contents of the barrel $= 16 \text{ ounces} \times \frac{\text{sp. grav. of platina} - 1}{\text{sp. grav. of platina}} +$ the weight of a cubic inch of water $\times$ capacity of the barrel in cubic inches $= 16 \text{ ounces} \times \frac{20.25}{21.25} + .526$ ounces $\times 7{\cdot}05 = 18{\cdot}9575$ ounces troy. Should the contents of the barrel weigh materially less than this estimated weight, there must be a want of uniformity in the disposition of the powder within the barrel.

redness, in order to drive off moisture, burn off grease, and give to it a firmer degree of cohesion.

The cake is next to be heated in a wind-furnace; and for this purpose is to be raised upon an earthen stand about 2½ inches above the grate of the furnace, the stand being strown over with a layer of clean quartzose sand, on which the cake is to be placed, standing upright on one of its ends. It is then to be covered with an inverted cylindrical pot, of the most refractory crucible ware, resting at its open end upon the layer of sand, and care is to be taken that the sides of the pot do not touch the cake.

To prevent the blistering of the platina by heat, which is the usual defect of this metal in its manufactured state, it is essential to expose the cake to the most intense heat that a wind-furnace can be made to receive, more intense than the platina can well be required to bear under any subsequent treatment; so that all impurities may be totally driven off, which any lower temperature might otherwise render volatile. The furnace is to be fed with Staffordshire coke, and the action of the fire is to be continued for about twenty minutes from the time of lighting it, a breathing heat being maintained during the last four or five minutes.

The cake is now to be removed from the furnace, and being placed upright upon an anvil, is to be struck, while hot, on the top, with a heavy hammer, so as at one heating effectually to close the metal. If in this process of forging the cylinder should become bent, it should on no account be hammered on the side, by which treatment it would be cracked irremediably; but must be straightened by blows upon the extremities, dexterously directed, so as to reduce to a straight line the parts which project.

The work of the operator is now so far complete, that the ingot of platina may be reduced, by the processes of heating and forging, like that of any other metal, to any form that may be required. After forging, the ingot is to cleaned from the ferruginous scales which its surface is apt to contract in the fire, by smearing over its surface with a moistened mixture of equal parts by measure of crystallized borax and common salt of tartar, which, when in fusion, is a ready solvent of such impurities,* and then exposing it, upon a platina tray, under an inverted pot, to the heat of a wind-furnace. The ingot, on being taken out of the furnace, is immediately to be plunged into dilute sulphuric acid, which in the course of a few hours will entirely dissolve the flux adhering to the surface. The ingot may then be flattened into leaf, drawn into wire, or submitted to any of the processes of which the most ductile metals are capable.

The perfection of the methods above described, for giving to platina complete malleability, will best be estimated by comparing the metal thus obtained, in respect of its specific gravity, with platina which has undergone complete fusion; and by comparing it, in respect of its tenacity, with other metals possessing that quality in the greatest perfection.

The specific gravity of platina, drawn into fine wire, from a button which had been completely fused by the late Dr. E. D. Clarke with an oxy-hydrogen blowpipe, I found to be 21·16. The aggregate specific gravity of the cake of

* The chemist will find this flux very serviceable for removing from his crucible or other vessels of platina those ferruginous scales with which, after long use, and particularly after being strongly heated in a coal or coke fire, they become incrusted. In the analysis of earthy minerals, I have been in the habit of using a similar flux, composed of two parts by weight of crystallized carbonate of soda, and one of crystallized borax, well ground together. It has the advantage of not acting, like caustic alkali, upon the platina crucible, and is a powerful solvent of jargon and many other minerals, which yield with difficulty to other fluxes. If the mineral to be operated on requires oxidation, in order to decompose it, a little nitre or nitrate of soda may be added.

metallic mud, when first introduced into the barrel, exclusively of moisture, is about 4·3; when taken from the press, is about 10. That of the cake fully contracted, on being taken out of the wind-furnace before forging, is from 17 to 17·7. The mean specific gravity of the platina, after forging, is about 21·25, although that of some rods, after being drawn, is 21·4; but that of fine platina wire, determined by comparing the weight of a given length of it with the weight of an equal length of gold wire drawn through the same hole, I find to be 21.5, which is the maximum specific gravity that we can well expect to be given to platina.

The mean tenacity, determined by the weights required to break them, of two fine platina wires, the one of $\frac{1}{3000}$, the other of $\frac{1}{5550}$ of an inch in diameter, reduced to the standard of a wire $\frac{1}{10}$th of an inch in diameter, I found to be 409 pounds; and the mean tenacity of eleven wires, beginning with $\frac{1}{4500}$ and ending with $\frac{1}{33500}$ of an inch, reduced to the former standard, I found to be 589 pounds; the maximum of these eleven cases being 645 pounds, and the minimum 480 pounds. The coarsest and finest wire which I tried, present exceptions, since a wire of $\frac{1}{1500}$ of an inch gave 290 pounds, and a wire of $\frac{1}{30500}$ of an inch, 190 pounds. If we take 590 pounds, as determined by the eleven consecutive trials, to be the measure of the tenacity of the platina prepared by the processes above described, and consider that the tenacity of gold wire, reduced to the same standard, is about 500, and that of iron-wire, 600, we shall have full reason to be satisfied with the processes, detailed in the present paper, by which platina has been rendered malleable.

To this paper I beg to subjoin an account of some processes relating to two of the metals which are found in the ore of platina.

To obtain malleable palladium, the residuum obtained from burning the prussiate of that metal is to be combined with sulphur, and each cake of the sulphuret, after being fused, is to be finally purified by cupellation, in an open crucible, with borax and a little nitre. The sulphuret is then to be roasted, at a low red heat, on a flat brick, and pressed, when reduced to a pasty consistence, into a square or oblong and perfectly flat cake. It is again to be roasted very patiently, at a low red heat, until it becomes spongy on the surface. During this process, sulphur flies off in the state of sulphurous acid, especially at those moments when the heat is allowed occasionally to subside. The ingot is then to be cooled; and when quite cold, is to be tapped with a light hammer, in order to condense and beat down the spongy excrescences on its surface. The alternate roastings and tappings (or gentle hammerings) require the utmost patience and perseverance, before the cake can be brought to bear hard blows; but it may, by these means, at length be made so flat and square, as to bear being passed through the flatting-mill, and so laminated to any required degree of thinness.

Thus prepared, it is always brittle, while hot; possibly from its still containing a small remnant of sulphur. I have also fused some palladium *per se*, without using sulphur; but I have always found it, when treated in this way, so hard and difficult to manage, that I greatly prefer the former process.

To obtain the oxide of osmium in a pure, solid, and crystallized state, I grind together, and introduce, when ground, into a cold crucible, three parts by weight of the pulverulent ore of iridium, and one part of nitre. The crucible is to be heated to a good red in an open fire, until the ingredients are reduced to a pasty state, when osmic fumes will be found to arise from it. The soluble parts of the mixture are then to be dissolved in the smallest quantity of water necessary for the purpose, and the liquor, thus obtained, is to be mixed in a retort, with so much sulphuric acid, diluted with its weight of water, as is equivalent to the potash contained in the nitre employed; but no inconvenience will result from using an excess of sulphuric acid. By distilling rapidly into a clean receiver, for so long a time as the osmic fumes continue to come over, the oxide will be collected in the form of a white crust on the sides of the receiver; and there melting, it will run down in drops beneath the watery solution, forming a fluid flattened globule at the bottom. When the receiver has become quite cold, the oxide will become solid and crystallize. One such operation has yielded thirty grains of the crystallized oxide, besides a strong aqueous solution of it.

Method of manufacturing Melting-pots for Iron and Steel. By Mr. C. S. Smith.

From the Transactions of the Society of Arts.

The failure of a pot is a serious inconvenience, both on account of the loss of time and of metal, as well as of the interruption which it creates. Great variations are observable in the duration of pots from different makers, and even in those by the same maker; arising not so much from difference in the materials employed, as from a difference of skill or care in mixing the ingredients, and in the other parts of the manipulation. Whenever a bubble of air is left in the clay after being tempered, a pin-hole in the pot made of such clay will be the common result, for the pressure of the melted metal will probably force a way through this weak part.

In order to submit the pots made by Mr. Smith to a very severe trial, one was kept constantly in work for two days and the intervening night; during which time it received twenty-three charges, of 70 lbs. each, of cast-iron. Another pot was worked for three successive days, being raked at night in order to prevent it from cooling; under this management it received eighteen charges of cast-iron, of the same weight as the former.

Neither of the pots had cracked or leaked in the least, but were now become unserviceable from the lip having been worn down into the side, in consequence of the necessity of knocking away the scoriæ after each fusion, which could not be done without breaking down a little of the lip.

The pots made by Mr. Smith are composed of the three following ingredients:—Stourbridge clay, coke, and plumbago, or black lead, as it is usually called.

Stourbridge clay comes to market either ground or in lump; the price charged for each is the same, and therefore the latter is to be preferred, as less mixed with impurities. A convenient quantity of this clay is to be put on a sieve 1-4th of an inch in the mesh, and is to be carefully hand-picked, all pebbles and other impurities being thrown aside; it is then sifted on a board and put into a bin. Those pieces which will not pass through are transferred to a mortar with a spring pestle, in which they are pounded till they are fine enough to pass through the fine sieve, the meshes of which are 1-8th of an inch wide. This fine clay is put in a barrel by itself.

The coke is thus prepared:—The masses, in the state they come out of the oven (for gas coke is of inferior quality), have their tops and bottoms knocked off; the middle part only, which is of a uniform firm texture, being reserved for use. The coke is now to be pounded, taking care so to manage, by moderating the blow of the pestle, that as little dust as possible may be made. When duly pounded, it is to be thrown on the fine sieve, and all that passes through is to be rejected; it is then to be transferred to the coarse sieve, and what comes through is now of a proper size.

The plumbago is Mexican, and is to be reduced to a very fine powder.

The board called the *walking* board, on which the mixing and tempering the ingredients is performed, is six feet square, having cross pieces on the underside to raise it about an inch from the ground. The process commences by mixing on the coarse sieve eight quarts of clay and five quarts of coke, and sifting them together on the walking board; here they are to be still farther mixed by hand, till the mass appearing uniform, it is to be collected in a heap: *clean* water is then to be added and stirred in, so as to make the mixture of the consistence of mortar. One treader, or, for expedition sake, two, is then to get on the board, and is to tread the mass well with his naked feet, working it chiefly with the heels: when trodden, it is to be turned over or thrown with a spade, and is again to be trodden, alternating these two processes for about twenty minutes.

Then mix on the fine sieve four quarts of finely-pounded clay and 2 lbs. of the pounded plumbago, and sift a little of it over the mixture on the board; tread and throw it as already described, then sift on more of the fine clay and plumbago; and proceed in this manner till the ingredients are thoroughly incorporated, and the air has been all trodden out. The mixture should remain a night in lump, and the manufacture of melting-pots from it may begin the next morning.

The apparatus consists of a four-legged board, called a horse, for the workmen to sit on, having near its fore end two uprights supporting a cross board, through which a round hole is made, capable of receiving the stem of the plug or core. Perpendicular to this hole is a socket for the reception of a pin that terminates the stem of the core, and tends to keep it upright and steady; the core, fixed on the top of the stem, and therefore an inch or two above the cross board, is a cone as large as the cavity of the melting pot, with a border below to regulate the thickness of the pot. The best dimensions for the horse are 3 feet 6 inches in length, 9 inches in width, and 3½ inches in thickness: it should be raised sufficiently high to allow the workman to sit on it with his feet resting on the ground, and the part where the thighs press should be rounded off and curved in a little. The cross board, which receives the stem of the core, should be raised 6 inches above the horse; and upon it is erected the square or gage, 18 inches high, and 10 inches in the blade. The cap of the core should be of basil or thin sheepskin.

Every thing being ready, the core is first to be rubbed well with plumbago, to prevent the cap from sticking to it; the cap is then to be put on the core, and a piece of the mixed materials, or *walk*, as it is technically called, large enough for the melting pot, is to be cut off from the mass. A pot capable of holding 70 lb. of cast-iron requires 16½ lbs.; one of 35 lbs. of brass requires 10 lbs. The piece is to be worked and beaten up well on the walk-board, and is to be carefully made into a lump, which, a hole being then made in it, is to be fixed on the top of the core. The workman then takes a flat piece of board 4 inches square with a handle, called a *flatter*, and strikes it, beginning at the top and bringing down the clay gradually till it has got as low as the rim at the bottom of the core. During this, the stem of the core being grasped by one hand and turned gently round, the core itself, with the clay on it, is brought successively under the action of the flatter. Great care is to be taken during this operation that no air gets into it, or, if any bubble should appear in the clay, it is to be cut out with a knife. The bottom of the pot is now to be beaten quite flat, making it of the proper thickness by the gage, and observing that the core is not made to rise from its socket by any clay getting under the bottom of the core; for the consequence of this would be, that the bottom of the pot though regulated by the gage, would be too thin by all the rising of the core. The workman now dips one hand in water, and presses the pot, rubbing it from top to bottom, while the other hand is turning round the core. The effect of this is, that the pot becomes of a uniform thickness, not varying in any part so much as one sixteenth of an inch. Finally, the pot is to be smoothed all round as well as the bottom, and the process is completed. The first pot of each day's work should be cut up with a knife to ascertain that there are no air-holes, and that the tempering has been properly performed.

A soft, new-made pot might get out of shape by being handled; the core, with the pot on it, is, therefore, taken off the horse and carried to a quiet sheltered place, and the pot being then set on its bottom, the core is raised out, leaving the cap within, which itself parts from the pot with a little management. The lip is then made by pressing the handle of the trowel from within against the edge of the pot, having placed the fore-finger and thumb, one on each side of the edge, to limit the action of the pressure.

It is by no means an unnecessary precaution to put the new-made pot in a quiet place, for if subject to any considerable jarring before it gets dry and hard, the pot will sink and not carry its rated charge of metal.

From twenty to thirty-six melting pots, of excellent quality, may thus be made in a day.

Method of preventing the Dry Rot in Ships' Timbers.—By MR. E. CAREY, R. N.

From the Transactions of the Society of Arts.

EVERY one knows that deciduous trees are full of sap during the period which begins in early spring, and terminates with the complete expansion of the leaves. If at this time a branch be cut off, or if a hole be bored into the trunk, an exsudation of the sap, in greater or less abundance, will follow. The bark at this time may be stripped off from the wood wiih ease, and in large flakes; and every part of the tree is, so to speak, bathed in moisture. A chemical analysis of sap shews it to be a watery liquor containing some sugar, mucilage, and extractive matter. In several trees, as the birch and sycamore, the sap is sufficiently copious aud saccharine to furnish a fermentable liquor, from which a weak, though perfect, wine may be made; and the sugar-maple of North America produces a sap, from which sugar is annually made in considerable quantity, by boiling it down to a proper consistence. At the fall of the leaf the wood of a living tree is considerable dryer than it was in spring, and contains a less quantity of sugar and of other easily decomposable vegetable principles.

The old method of preparing oak timber for naval use appears to have been, to cut down the tree in the winter, and after lopping the ends of the branches, to let it remain where it fell till the next summer, without stripping the bark from it. During the spring the buds in the bark, and in those sprays which had not been removed, began to vegetate and grow; and in so doing absorbed, consumed, and removed a part, probably nearly the whole, of the sap which was contained in the trunk at the time of its being felled.

The imperfect condition of the roads rendered it impossible to convey heavy timber along them, except in the height of summer, so that a tree grown in the weald of Sussex, or even in the remote parts of the New Forest, often did not reach Portsmouth yard till the second year after it had been felled. Here it was stripped of its bark, and stacked either in the open air or under cover, till by continued exposure to a free draught of air, it was seasoned, that is, dried.

During this method of management fungous rot appears to have scarcely existed in our shipping, whether naval or mercantile.

Of late, within the last fifty years, a great increase has taken place in the navy, without a corresponding supply of oak timber of home growth; and, at the same time, the price of oak bark, for the use of the tanner, has been continually augmenting. These circumstances have led to the practice of felling timber in spring, when, from the abundance of sap, the bark is easiest stripped. But, with the removal of the bark, that vegetation which used to take place during the summer after felling, and which probably was so advantageous in seasoning the wood, is prevented. The naked wood, full of moisture, is exposed to the drying winds of spring and the heat of summer; in consequence of which it becomes shaken and injured by numerous wide clefts, occasioned by partial drying, which admit the rain, and probably also the microscopic seeds of fungi to the heart of the tree. The immense demand of our dock-yards during the last half century of almost incessant war, necessarily occasioned a diminution of the time requisite for seasoning. Hence the timber employed in the construction of shipping has probably of late years been defective, not only from insufficient drying, but also from containing sugar, mucilage, &c. the elements of sap, which when not acted upon by the living power of vegetation, are susceptible of vinous and acetous fermentation, and, finally, are resolvable into a matter in which the seeds of fungi will grow with great vigour.

To the duration of timber so circumstanced, its situation in the hull of the ship is singularly unfavourable. The external surface, both without and within the ship, is covered with pitch, turpentine, or paint, by which the further escape of moisture (or the process of seasoning) is entirely prevented. The other surfaces of the timber are exposed, in darkness, to the action of a warm, moist, stagnant air; that is, are in a situation the most favourable for spontaneous decomposition, the rapidity of which is probably hastened tenfold by the growth of fungi, the slender roots of which penetrating into the pores of the wood occasion the destruction of its substance to proceed even more rapidly than that of its surface.

It is well known that a saturated solution of common salt is destructive of vegetable life even in those plants which flourish only in sea water, and a still weaker solution is fatal to all except the maritime plants. Hence it might be argued that ship timber would be secured from rot (as far as this is occasioned by the growth of fungi) by injecting its sap vessels with a solution of salt; and this treatment has been found efficacious in practice. Merchant vessels that convey salt in bulk are not liable to fungi. A frigate infested with fungous rot, was accidentally sunk in the Mediterranean, and when weighed again, after remaining under water for some months, was found to be free from fungi, and so continued. In the United States of America, many vessels are built of timber quite green; and in these it is by no means uncommon to fill up the spaces between the timbers with salt; and vessels so salted, it is understood, bear a higher price in the market on account of their greater durability.

Again, it might be argued, that oil would be efficacious, by penetrating into the sap vessels of timber, and thus preventing the access of moisture: in confirmation of which, it may be observed that Greenland ships and other whalers are not liable to fungi. Agreeable to this theory is the practice which prevailed at Boston more than forty-five years ago, to hollow the heads of the timbers and to fill them with oil during the building of the ship.

The efficacy of oil combined with salt, may be argued from the known fact, that vessels engaged in the Newfoundland fishery, in which the salted fish are stowed in bulk, are not at all liable to fungous rot, and that the bottom of the hull of such vessels will last as long as two or three successive tops.

From these and similar facts, Mr. Carey was convinced that a mixture of oil and salt, applied to the timbers of ships, would be very efficacious in preventing rot. He also thought that it would be found useful to add to this composition a quantity of powdered charcoal, in order to increase its bulk at small expense, without introducing any noxious ingredient; and which should have the farther advantage of being so light as in the least possible degree to effect the buoyancy of the vessel.

In the year 1785, he built two schooners of eighty tons each, in the island of Cape Breton, for a Mr. Simmonds, and filled up all the spaces between the timbers and elsewhere with a composition made of the before-mentioned ingredients.

The next year he removed to the Gut of Canso, and there built, of green wood, fresh from the forest, a brig of 200 tons for a Mr. Williams, an American refugee. In this vessel, before he put on the plank sheers, he bored a hole in the centre of each timber-head, fore and aft, on each side, as deep as he could without injuring the treenails;

keeping clear of the bolts and nails. These holes he filled up with a mixture of cod or seal oil, salt, and fine charcoal, brought to as thick a consistence as would run. The spaces between the timbers and elsewhere he filled with a similar composition, but of the consistence of mortar. The way in which it was applied was this:—The space being filled with the composition, a block of wood smaller than the space was then laid on the surface and driven in: the compression forced the mixture into the smallest adjacent crevices, and the block was allowed to remain. Stops of wood were also inserted where required, in order to keep the whole in its place and prevent it from slipping down.

The brig, filled in as described, was launched, and was employed in the trade between the United States and the West Indies.

In the year 1816, Mr. Carey, on his return from the West Indies, by way of the United States, proceeded to New York, where he accidentally met with Mr. Williams, the owner of the brig. This gentleman informed Mr. Carey that the vessel which he had built for him thirty years before was then at New York; that he had occasion to open her a short time before, and found her as sound as on the day she was launched. He invited Mr. Carey to come on board, and allowed him to bore with a half-inch auger into any parts which he suspected decomposition might have taken place. Mr. C. accordingly did so, and found every core brought out by the auger to be perfectly sound.

As Mr. Carey had no intention at that time of making public the result of his experiment, he did not request of Mr. Williams any certificate of the facts above stated: but when, in 1827, he communicated these particulars to the Society, it was conceived by the Committee, to whom the investigation of the subject was committed, that, although they had no reason whatever to question the correctness of Mr. Carey's statement, the public would be better satisfied to have the particulars of this very interesting and important experiment substantiated by the attestation of Mr. Williams. But Mr. W. was not a resident at New York; and although Mr. Carey inserted an advertisement in the New York newspapers, as also did J. A. Yates, Esq. of Liverpool, on the part of the Society, in the newspapers both of New York and Boston, nothing could be heard of Mr. Williams, till Mr. Carey learnt, some time after, that Mr. W. had died in the West Indies three years before.*

LAW OF PATENTS.

Examination of the Witnesses before the Select Committee of the House of Commons.

Continued from p. 115.

Mr. Abbott in answer to questions proposed by some of the Committee, detailed the expenses and forms attending the obtaining of patents, and his examination continued as follows:—

Is it possible so to word the title of a patent as to escape the caveat?—There have been instances, and one arose in my own practice, where patents have been framed with what they call "blind titles," for the purpose of escaping the caveats; originally, I should observe, caveats were not permitted to be inspected; and I must say, I think it is exposing patents to great danger to permit them to be inspected, as they are at the present day; originally they

* It is understood that the Navy Board at present have the spaces between the timbers in men-of-war filled with a mixture of chalk, oil, and Stockholm tar, injected into the bottom of the frame by means of a forcing pump.

were not permitted to be inspected; now since they have been inspected, it was a very common thing for a man, possessed of a little ingenuity, to frame his title so as to steer clear of some particular caveat, or of all of them if he could. An instance of that kind came to my knowledge; I was concerned in it, where this *blind title* escaped a caveat, and I afterwards got information of it, and stopped it at the Great Seal; and from that time there was a fresh rule laid down.

Do you remember what the title was?—I am not sure I remember right what it was; but it was a very common thing then to frame titles as obscurely as possible, for the purpose of evading caveats: the Attorney and Solicitor General's clerks are not men of science generally, and have no mechanical knowledge; the title was worded so obscurely that he could not tell which of the caveats was affected by it, and many caveats have not had the proper notice they would otherwise have had if there had been a specific title referrable to the object for which the patent was to be granted. I think the one referred to was an application for some improvement in the process of refining sugars, and a blind or obscure term was made use of; "Process for improving the quality of certain vegetable substances;" now it was so obscure, that my caveat that was entered to stop any process in the clarifying sugar was not noticed; it did not occur to the Attorney General's clerk that sugar was a vegetable substance; I afterwards got notice of it, and stopped it at the Great Seal; on that occasion, some directions were given by the Lord Chancellor that something specific—some definite object should be stated in intelligible terms in the title for which the patent was applied for; in the title of the invention something specific and definite, not in those general, vague, and ambiguous terms as the one I am speaking of was couched in.

Does an obscure title vitiate a patent?—I believe not; I am not aware that it has ever been raised; if the specification is obscure that is said to be a ground for voiding the patent.

Or if the specification does not agree with the title of the patent?—Certainly, that is quite clear; there is no doubt about that.

Do you conceive patentees are commonly ready with their specifications within the time allowed for making the specifications?—No, I have generally found them coming at a few days before the time expired for specifying; I have generally found them unprepared until nearly the time was expired, and they are generally got up in great haste at the end of the time.

To what is that owing do you imagine?—In many cases where a man has got it in his mind, and he has not got the practical part when he applies for his patent, and he is afraid to try it, unless he should disclose his process; he has got something in his mind which he has not matured, and when he has got his patent he finds his practice differs a little from his theory, and he has got to reconcile difficulties to mature his object before he can venture to specify. That very often happens.

Then would it be any convenience that you should give him more time than is usually given for specification?—I think six months is quite sufficient if they would set about it directly they have got their patents. I think six months is abundantly sufficient, except as referrable to Ireland; you cannot always depend on getting a patent within six months there; and it is open to the inconvenience I before adverted to, that if the Irish patent has not been got through when the person is obliged to specify here, any body could get a sight of it and could communicate information there, which is descriptive of the patent there.

You have mentioned sometimes three months occur between applying for a patent, and obtaining the Great Seal to it?—Yes.

During the whole of that time the inventor is liable to lose his patent, supposing any body, by becoming acquainted with the invention, makes it public?—Certainly; and he is exposed to more danger, because upon the notice being given from the Attorney General's office, to all persons who have got caveats on the subject, it is known he is applying that process.

Would it not be very desirable, if any means could be devised by which the applicant for a patent should be protected from the moment he makes his application?—I think it would; highly desirable; pending the progress of the patent, if I understood the question right, if it were not known before any disclosure that took place, then not by his own act; but if any body surreptitiously gets possession of it, that shall not be destructive of his patent right, unless it was by some means where it had been used before the application, but not pending it; for it frequently does happen that inquiries are made, and, from some instances where an applicant has been stopped, where I have been concerned, I am afraid information has been obtained during the progress of the patent as soon as notice has been sent upon the caveat.

Do people generally begin to sue out their patents in Ireland, and in England, or do they wait?—They should do it.

What is the practice?—Some do begin directly, but generally speaking they do not begin directly; a man says I want to get my English patent, that I may try my experiment without the danger of disclosure.

Do you propose to secure to a man property in his invention from the time he applies for his patent?—I think it is proper it should be so, provided he ultimately gets the patent, and does not rest on that security, for the great difficulty would be if it was not guarded against in some way, a man would keep his application pending six, nine, or twelve months, to an unnecessary period.

You mean there should be some further advantage in obtaining the patent, otherwise many would have no object than in obtaining, merely obtaining it?—I am afraid I have not made myself understood. There are many men, who would make the application for a patent, would extend it to an inconvenient length of time, while he was protected, and perhaps afterwards not even go on with his patent. He must not delay it; I should think it would be very inconvenient if he were not to prosecute with what is called due diligence; to go on without losing any time but what is unavoidable.

You have been explaining considerable inconvenience, and very often injury occurs from the insecurity of an invention after an application is made?—Yes; and I think it would be proper to protect him pending the application, provided he did not unnecessarily protract it in its progress.

In order to effect that object, it would be necessary to give the inventor a property in his invention to a certain extent?—Yes, it would.

How would you accomplish that object without making it necessary that he should specify at the time of his application?—There would be some difficulty, certainly, in doing that. I do not know how it could be restrained if he disclosed it; but, perhaps, the only way that he could be protected would be, that any disclosure of it, pending the application should not void his patent, although his patent was dated after the disclosure. The law at this day is, if the thing has been publicly used before the date of the patent, although after the petition first presented, that destroys the patent.

As to the practice, how would you secure to a man that which he does not strictly define?—I should say, just in the same way as you do now under a patent; you secure a man to-day by a patent that which he does not define for six months time to come; but when he does define it, it goes back to the time of the date of his patent, as if he had then defined it. The King grants a patent to-day; the patentee has six months to specify in; he is protected in that intervening space of time, when, at the expiration of six months he puts in his specification, he is in the same situation as if he put in his specification at the time it is sealed.

Might not the man under those circumstances make an application without specifying, and in the interval between his application and the issuing of his patent, in which the specification was to be contained, might he not hear of some extension or improvement upon it by some one else, for which that other person had applied, and that he might include in his specification? — I can only answer that by saying, the law has been laid down, that if a man discovers any improvement in the intervening space of time between the granting the patent and the specifying, there is a modern decision on the subject, that he is at liberty to include that, for it is the result of his experiments to mature his invention.

It is not an improvement by the inventor himself, but an improvement by some one else who had brought a better invention?—Then the law would be as it is now. I, who take my patent for one thing, I am secured in it; any other person who has found out something being an improvement on it, he is entitled to an exclusive right of that improvement if he could use it without my invention; but not to incorporate and to amalgamate mine with his without my permission; that is the law as it stands at this time.

In cases, then, where a property is given in an invention before specification, would it not be likely to occur that a person obtaining that property, would have it in his power to include in his specification that more efficient invention, with the same object which might be produced by another person during the interval?—He might do it, but it would be at his own risk of destroying his patent if the thing was discovered.

For the sake of guarding against that inconvenience, would you think it desirable that a person applying for a patent, should at the same time give in a sealed description of it, to which reference might be made hereafter?—I should think that that would be a very desirable way, if it were practicable; but then it would come round to this, that many men would say, "my invention is of that large and that extensive nature, that I cannot make such a specification by anticipation as it were, until I have had the opportunity of trying it, as would disclose all its properties; and if I am to be bound by that, perhaps it may only be half the object that I am entitled to, it may embrace but half the object I am entitled to."

Would not that amount to the same thing as compelling the applicant to enrol his specification at the time of his application?—I have thought a great deal about it, but I could not arrive at a conclusion that it would be beneficial, on the whole, to make the man enrol his specification immediately he applied for his patent, or immediately he got it.

Do you think that it would be possible for the applicant to put in, as proposed, a description of his invention, although it might not be possible to draw out a legal specification at the time?—If it is to be of any utility, it ought to be a specification; if a man is left to enlarge it, or contract it, it is open to all the mischief you are attempting to guard against; it ought to be perfect, or it is of no utility.

Might not a person describe some principle or other from which his invention afterwards might be fairly inferred to have arisen?—To give some outline of it, but not embracing the means, the Committee mean.

Yes?—I do not see why he should not be called on to state it more specifically in his title, if he is not to disclose his process, but then the title would be very long in many instances; in France, they are obliged to deliver a specification at the date of the patent. I do not see how the deposit of the principle of his invention, or the outlines of it, affords him any protection; it is rather, I should submit, a protection to others that he shall not embrace any thing under his patent that he had not really invented.

To be continued.

Apparatus for proving the strength of Glass Bottles.—By M. Colardeau.

This apparatus is composed of a forcing pump mounted on a frame; it is furnished with leather and a lantern valve. The water is conveyed through a pipe terminated by a cover or hat, which, by means of the leather, is pressed on the orifice of the bottle. At the same time a jointed claw-lever seizes the bottle below the rim of the neck, and presses it so much the more as the pressure of the water is more considerable. This useful arrangement places the bottle in the most favourable circumstances for accurate proof. In fact, the glass is here free and isolated in all parts, so that the force of the water to break it is not paralyzed by any cause foreign to the vessel itself.

All the bottles proved by M. Colardeau with this apparatus bore a pressure of 15 atmospheres.—*(Industriel.)*

Method of purifying Seed-Oil.—By M. Dubrunfaut.

From Archives des Decouvertes, &c., 1829, p. 384. Paris, 8vo.

This method consists in treating the oil by one or two parts per cent. of concentrated sulphuric acid, beating it forcibly, and washing with water.

Formerly, the filtration of the washed oil was effected by passing it through various substances. This filtration, always tedious and troublesome, had for object to separate from the oil a light substance held in suspension, and which obstructs the transparency. In the new process the washed oil is deposited in a wine-pipe, having one end taken out, and standing on the other; it may contain seven hectolitres (= 24·72 cubic feet English.) Six hectolitres of acidified oil are put into it, and beaten up with 50 kilogrammes (= 11 lbs. avoirdupois) of cakes of colza,* dry and well pulverized. This beating is continued half an hour; the oil is then left to settle for nine days, after which time four *tonnes* (pipes) of clear oil may be decanted, and a like quantity of unpurified oil be put in its place. This is also beaten up, and three days after is drawn off, continuing to operate in this manner till the 50 kilogrammes of cakes shall have exhausted the clarifying power, which will happen after drawing of 200 *tonnes* of clarified oil.—*(Industriel.)*

* *Colza*, *colzat*, or *colsa*, a kind of cabbage, the seeds of which give an oil fit for burning.—Tr.

Report on fulminating Powders capable of being used as priming for Fire-arms.—By Messrs. AUBERT, PELISSIER, and GAY-LUSSAC.

From Annales de Chimie, xlii, 5 September, 1829,

A GREAT number of powders which fulminate by a blow are known; but, with respect to their application to fire-arms, those of chlorate of potash and fulminating mercury alone deserve particular attention, the others presenting too many inconveniences or dangers in their preparation and employment.

Powder with Chlorate of Potash.

This powder is an intimate mixture of sulphur, charcoal, and chlorate of potash. The sulphur or the charcoal may be suppressed on substituting other inflammable substances; but the powder then loses more or less of its power. At the suggestion of Berthollet, the discoverer of chlorate of potash, the manufacture of this powder was begun, 1786, at Essonne; but an explosion, followed by the most serious accidents, soon occasioned it to be given up. This powder is stronger than the best powder made with saltpetre, It speedily renders the trial-mortar unserviceable, by enlarging the chamber and producing deep cracks in it. Employed by M. Welter at Meudon, to fill bombs which he caused to explode buried in the earth, it constantly broke them into uniform pieces of the size of a chesnut, whilst the pieces of other bombs, filled with common powder and placed in the same circumstances, were much less numerous. This powder might consequently be employed with more advantage than common powder, for filling bombs, forcing gates, blowing up bridges, &c.

The property which it possesses of being inflamed by a blow or stroke determined its application, as priming, to percussion guns; but it soon gave place to fulminating mercury, on account of several inconveniences attending it, the principal of which are to cause great foulness, and to have a corrosive action on iron. As this last property might depend on the sulphurous acid produced during its decomposition, we endeavoured to neutralize the effects of the acid, by mixing with the powder suitable quantities of dried carbonate of soda. The experiment had the desired success; but the powder lost, by this mixture, much of its inflammability, and besides we soon discovered that the chloride of potassium, resulting from the decomposition of the chlorate of potash during inflammation, speedily corrodes iron in a damp air. This is a great inconvenience inherent in powder made with chlorate of potash, and it does not appear to us to admit of an easy remedy.

We think it useless to insist any longer on the qualities of this powder, the use of which is discontinued, and shall confine ourselves to say that, if it were determined to employ it in the artillery for some particular purposes, the manufacture and carriage of it might, with suitable precautions, be effected without danger.

Howard's powder, or fulminate of mercury.

This powder is at present generally employed for the guns of sportsmen, on account of its easy inflammation and its inaction upon iron. It is a salt formed of oxide of mercury and a peculiar acid composed of one atom of azote, one of oxigen, and two atoms of carbon. Since the composition of this powder has been known, it has been named *fulminate of mercury*. When it detonates by a blow or by heat, the mercury is set at liberty in the state of vapour, as well as the azote; and, from the carbonaceous deposit observed on the surfaces on which it has been made to detonate, it is very probable, that half the carbon which it contains, forms, with the oxygen, carbonic acid, and that the other half is deposited or dispersed. In this supposition, 1 gramme of fulminate of mercury would give 0·155 litre of gases permanent at the temperature of melting ice, and under the pressure of 0.76 metre; but this volume, at the moment of explosion, is much more considerable, because it is dilated by heat and mixed with mercurial vapour. A gramme of common powder yields nearly a double volume of elastic fluids.

The revivification of the mercury in a state of vapour would be a very serious inconvenience, if the fulminating powder used for priming were in greater quantity than that now employed; because the mercurial vapour is disagreeable to the smell and injurious to health. Sportsmen, it is true, have not yet made any complaint of this inconvenience, but exists nevertheless; and before adopting into the military service fulminating priming powders, it would be prudent to examine them with respect to the influence they might exert upon the soldier in consequence of the inconveniences just mentioned.

Detonation of fulminate of mercury by a blow.

We shall examine this property, the fulminate being perfectly dry, and very damp.

The fulminate when dry detonates very readily by a *blow* of iron upon iron, a little less readily by a blow with iron upon bronze, still a little less by that of marble on glass, marble on marble, or glass on glass: it inflames however with sufficient facility in these different circumstances, for us to be almost sure of causing the explosion at every blow. The blow of iron upon lead inflames it but with great difficulty, and that of iron upon wood is quite ineffectual.

The fulminate always inflames easily by *friction*, especially by that of wood against wood. It detonates less readily by that of marble on marble, than of iron upon iron, and, lastly, of iron upon wood or marble. The fulminate which has been pulverised detonates with more difficulty, particularly by friction, than that which is in crystals.

Moistened with five per cent of water, the fulminate loses a great deal of its inflammability. It detonates however with the blow of iron on iron, but the portion struck burns alone and without flame, without communicating the inflammation to that which is not struck. The friction of wood upon wood produces a similar effect. But inflammation was not produced in the experiments by the blow of marble on marble, nor by the friction of marble on marble or on wood. The fulminate, inflamed by a heated body, melts with the same slowness as common gunpowder moistened with fifteen per cent of water.

If the fulminate be mixed with ten per cent of water, it will be still more difficult to inflame it. It disappears however by a blow of iron upon iron, but without flame and noise. The part struck burns alone and projects the other. Moistened with thirty per cent of water, it still detonates sometimes under the muller, (wood on marble) during the manipulations; but the detonation is partial, and is not communicated to the rest of the mass: the muller is merely raised under the hand of the workman, and no accident ever results from it. These experiments afford the certainty that by operating on the fulminate mixed with water, explosions will be little to be dreaded.*

* According to the new arrangements adopted in the manufactory of priming powders, situated in the plain of Jory, near Paris, since the explosion which entirely destroyed it, more than two hundred millions of caps have been manufactured in that establishment, without any other accident than a piece of marble broken under the muller, as abovementioned.

Effect of the explosion of the fulminate of mercury.

The character of the powders eminently inflammable is to detonate at the moment of their inflammation, even when only very small quantities are employed, and to act on surrounding bodies as a moving power actuated by a great velocity. The best made common powder is extremely far from having such a rapid inflammability as fulminate of mercury, and especially as fulminate of silver; and no fire-arms loaded with either of these fulminates, with the same charge as common powder, can resist their action, although the volume of elastic fluids produced in the first case is smaller than in the second.*

Thirty grammes of fulminate of mercury inflamed in a small box of card, on the head of a barrel ill-fixed, made a hole through it without breaking it, as a ball would have done from a four pounder. The noise of the explosion seemed much louder than the report of a musket.

The same quantity of powder, inflammed in similar circumstances, made scarcely any report, did not break the bottom of the cask, nor did it even shake it.

Twenty-five grammes of fulminate of mercury put on a board placed upon the ground in the open air, broke it to pieces, and besides made a hole in the ground under the board. The same quantity of fulminate, placed on a barrel with the head out, of the capacity of a hectolitre nearly (=3½ cubic feet,) broke it to pieces by the detonation.

A small steel chamber three cubic millimetres in capa-

* Whatever charge of the fulminate of mercury may be put into a forearm made with the known metals, it will speedily be destroyed; for, during the charging of the primings or matches with the fulminate weakened with common powder, the punches of tempered cast steel, with which that powder is pressed to the bottom of the capsules, are speedily furrowed by the explosions which occur every moment, although the gases produced have a free passage by the sides of the punches.

city, the sides of which were three millimetres in thickness, was often broken to pieces by the explosion of the fulminate of mercury which it contained.

Twenty-five grammes of fulminate of mercury, inflamed in the open air, communicated the inflammation to another portion of fulminate placed five centimetres (= 1.97 inch) off; but inflammation did not take place in another portion of fulminate at the distance of twelve centimetres (= 4.72 inches.)

If we place a train of it against another train of gunpowder on paper, and even one upon the other, and set fire to the fulminate, the gunpowder will be dispersed without leaving a trace of its combustion on the paper, and it may be found again almost entirely. If, on the contrary, we set fire to the gunpowder, as soon as the inflammation reaches the fulminate, the latter so instantaneous in its detonation, will still have time to disperse the rest of the powder before the inflammation can reach it, and no traces of the combustion of the dispersed part will be perceived. An intimate mixture of fulminate and of bruised gunpowder will, on the contrary, burn totally.

This result on the propagation of the inflammation by the fulminate, to such small distances, in open air, appear so much the more extraordinary, because, in the primings of fire-arms, this propagation, relatively to the quantity of fulminate, is incomparably greater, since it extends to more than a centimetre (= 0.39 inch,) and Lieutenant-Colonel Châteaubrun has carried the inflammation to the powder, in a twenty-four pounder, through the thickness of the metal, by a chimney of ten points with ten centigrammes (= 1½ grain) of fulminate. But the results above stated are incontestible, and it will soon be seen that the anomaly which they present is not real.

(To be continued.)

Stilpnomelan, a new mineral, found in Silesia.—By MR. GLOCKER.

THIS mineral was found in isolated pieces in the neighbourhood of an ancient mine, at Obergrund, near Zuckmantel, in the midst of thonschiefer, (clay slate). It is in crystalline masses of a lamellar structure, passing into the acicular and fibrous structure. It possesses the hardness of calcareous spar, is easily cut, and weighs from 3·25 to 3·40. Its black colour passes to blackish green. Its powder is of a greenish grey. It has a lively lustre, intermediate between the fat and pearly lustre. It is opaque. With the blowpipie it melts immediately into a bluish black scoria. It is usually accompanied with calcareous spar and quartz, and often contains hepatic and ferruginous pyrites, disseminated in very small veins. Its scaly variety has some resemblance to chlorite, but differs from it in several particulars.—*Bull. des Sciences Nat.*

NOTICE OF EXPIRED PATENTS.

JOHN GEORGE DRUKE, of Chapman Street, Pentonville, Middlesex, Chemist, for a method of expelling the molasses of syrup out of refined sugars in a shorter period than is at present practised with pipeclay.—Dated February 3, 1816.—(*For copy of Specification, see Repertory Vol. XXIX. p.* 321

JOHN MILLINGTON, of Duke Street, Manchester Square, St. Mary Le Bone, Middlesex, Engineer, for certain machinery to be moved by wind, steam, manual labour, or any of the processes now employed for moving machinery; by means of which, boats, barges, and other floating vessels, may be propelled or moved in the water.—Dated February 1, 1816.

JOHN BUDGEON, of Dartford Kent, Paper Maker, for a process for reducing rags or articles composed of silk, linen, or cotton, after they have been used, and bringing them into their original state, and rendering the material of which they are composed fit to be remanufactured, and again applied to beneficial and useful purposes.—Dated February 3, 1816.—*(For copy of Specification, see Repertory, Vol. XXX. p.* 21.

JOHN THOMAS DAWES, of West Bromwich, Stafford, Iron Master, for certain improvements in steam engines, some of which improvements are applicable to other purposes.—Dated February 6, 1816.

JOSEPH BARKER, of Cottage Green, Camberwell, Surrey, Artist, for means of continuing the motion of machinery.—Dated February 6, 1816.—*For copy of Specification, see Repertory, Vol. XXXVII. p.* 6

WILLIAM MILTON, of Heckfield, Hants, Clerk, for certain improvments upon the wheels and perches of carriages.—Dated February, 10, 1829.—*For copy of Specification, see Repertory, Vol. XXIX. p.* 236.

HENRY DE SARUL, of Leicester Street, Leicester Square, Middlesex, Artificial Florist, for an improved cylindrical gold and silver swap and washing machine. Communicated to him by a certain foreigner residing abroad.—Dated February 20, 1816.

WIILLIAM BAYNHAM, of London Road, Surrey, Chemist, for a composition for making leather and other articles water-proof,—Dated February 20, 1816.—*For copy of Specification, see Repertory, Vol. XXXIX. p.* 336.

JOSEPH MANTON, of Davies Street, Berkley Square, Middlesex, Gun Maker, for improvements in the construction and use of certain parts of fire-arms, and also of the shoeing of horses.—Dated February 29, 1816.

LIST OF NEW PATENTS.

GEORGE VANGHAM, of Cleveland Street, Mile End Road, in the parish of Mile End Old Town, in the county of Middlesex, Engineer, for a machine or pump for raising water or other fluids.—Dated January 23, 1830.—(*Two months to enrol Specification.*)

JOHN YATES, of Hyde, in the county of Chester, Calico Printer, for a method or process of giving a metallic surface to cotton, silk, linen, and other fabrics.—Dated January 26, 1830.—(*Six months.*)

GEORGE STOCKER and ALEXANDER STOCKER, both of the parish of Yeovil, in the county of Somerset, Gunsmiths, for a cock for drawing liquor from casks, which produces a stop superior to that which is effected by common cocks, and will continue in use for a longer period of time.—Dated January 26, 1830.—(*Two months.*)

JOHN ARNOLD, of Sheffield, in the county of York, Powder-Flask Maker, for an improved spring latch or fastening for doors.—Dated January 26, 1830.—(*Two months.*)

GEORGE FREDERICK JOHNSON, of Canterbury, in the county of Kent, Tunbridge Ware Manufacturer, for a machine or apparatus, which is intended as a substitute for drags for carriage wheels, and other purposes.—Dated January 26, 1830.—(*Six months.*)

THOMAS BULKELEY, of Richmond, in the county of Surry, Doctor of Physic, for a method of making or manufacturing candles.—Dated January 26, 1830.—(*Six months.*)

JAMES COBBING, of Bury St. Edmund's, Cordwainer, for certain improvements on skaits.—Dated January 26, 1830.—(*Six months.*)

Samuel Wright, of Shelton, in the Staffordshire Potteries, for a manufacture of ornamental tiles, bricks, and quarries, for floors, pavements, and other purposes.—Dated January 26, 1830.—(*Six months.*)

Robert Busk, of Leeds, in the county of York, Gentleman, for certain improvements in apparatus used for distilling and rectifying. Communicated by a foreigner.—Dated January 26, 1830.—(*Six months.*)

John Revere, of New York, in the United States of America, now residing in the parish of St. James, Westminster, M.D., for a new alloy or compound metal applicable to the sheathing of ships, and various other useful purposes.—Dated January 28, 1830.—(*Six months.*)

Josias Lambert, of Liverpool Street, in the city of London, Esq., for an improvement in the process of making iron applicable at the smelting of the ore, and at various subsequent stages of the process up to the completion of the rods or bars, and a new process for the improving of the quality of inferior iron.—Dated February 4, 1830.—(*Two months.*)

George Pocock, of Bristol, Gentleman, for improvements in making or constructing globes for astronomical, geographical, and other purposes.—Dated February 4, 1830.—(*Two months.*)

John Gray, of Beaumorris, in the county of Anglesea, Gentleman, for a new and improved method of preparing and putting on copper sheathing for shipping.—Dated February 4, 1830.—(*Two months.*)

Charles Taverner Miller, of Piccadilly, in the county of Middlesex, Wax Chandler, for certain improvements in making or manufacturing of candles.—Dated February 4, 1830.—(*Six months.*)

Joseph Clisild Daniell, of Limphey Stoke, in the parish of Bradford, in the county of Wilts. Clothier, for certain improvements in the machinery applicable to the manufacturing of woollen cloths.—Dated February 6, 1830. —(*Six months.*)

MELVIL WILSON, of Warnford Court, Throgmorton Street, in the city of London, Merchant, for an improved method of preparing and cleansing paddy or rough rice.—Communicated by a Foreigner.—Dated February 6, 1830.

THOMAS ROBINSON WILLIAMS, of Nelson Square, Blackfriars Road, in the county of Surrey, Esq. for improvements in power looms, applicable to the weaving of wire and other materials.—Dated Febuary 6, 1830.—(*Six months.*)

EDWARD COWPER, of Streatham Place, in the county of Surrey, Gentleman, for certain improvements in the manufacture of gas.—Communicated by a Foreigner.—Dated February 12, 1820.—(*Six months.*)

JOHN FREDERIC SMITH, of Dunstan Hall, Chesterfield, in the county of Derby, Esq, for certain improvements in preparing or finishing piece goods, made from wool, silk, or other fibrous materials.—Dated February 12, 1830.—(*Six months.*)

JOSEPH MARIE URSULE LA RIGANDELLE DU BUISSON, of Fenchurch Street, in the city of London, Merchant, for a new method of extracting for the purpose of dying, the colour from dye woods, and other substances used by dyers.—Communicated by a Foreigner.—Dated February 12, 1830.— (*Two months.*)

THE

REPERTORY

OF

PATENT INVENTIONS,

No. LVIII. APRIL, 1830.

Specification of the Patent granted to Isaac Brown, *of Gloucester Street, in the county of Middlesex, Watch Maker, for certain improvements applicable to Watches and other Horological Machines.*—Dated 23d September, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Isaac Brown, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed, is particularly described and ascertained, in and by the following description, reference being had to the drawings hereunto annexed, (that is to say):—

My improvements consist in the first place, of a new mechanical arrangement applicable to winding up watches and other horological machines, and the manner in which the same is to be produced, applied, and carried into effect, is as follows: when the watch to be wound is what is termed a going barrel, my contrivances applicable thereto will be best understood by referring to fig. 1, Pl. IV. which represents a watch with a going barrel to which my invention is applied; the dial being removed that the new works may be seen. *a* is the barrel ratchet which keeps up the maintaining power, it is larger than is generally made use of in order to gain power. *b* is the click that takes into the ratchet and prevents its return, and *c* is the click spring. *d d* is the winder, consisting of a circular rim with an internal circular ratchet corresponding with the teeth of the ratchet *a*. The winder is generally made of steel, about half the thickness of the space between the pillar plate and dial; (but it may be made of brass or any other hard metal that will stand). The winder is let in the bezil of the case, and when the bezil is properly attached to the watch case the winder should be just free of the pillar plate, and is fastened to the bezil by means of screws or pins, or it may be cemented as most convenient. The squares at *e e e* are small studs to support the dial at its proper distance from the pillar plate; the small circles close to the squares, represent the holes to receive the dial feet, which may be pinned in the ordinary way, or it may be secured by a screw through the face of the dial; the connection of the bezil and the fashion of the case, will be better seen at fig. 29, where I have given a section of the case, in order that it may be better understood. In this figure *a a* is the bezil, having a projecting rim underneath at *o o*, the outside edge of which is turned with a slant in the form of a dovetail, and fits into a groove in the case at *i i*. In this figure the bezil is represented as raised out of the groove that it may be the better seen. The way in which the bezil is prevented from rising out of its bed when the watch is together, is by means of three or more screws, as represented at *p*; passing through the edge of the case at equal distances, the points of which come against the slanting edge or dovetail of the underneath projecting rim of the bezil and prevent its rising out, and at the same time allow the bezil to be moved round; but I sometimes use three steel studs, as represented at *g g g*, fig. 1, which are screwed to the plate and project over the winder so as to let the winder move easily. *b*, fig. 29, is the barrel ratchet; *c c* the winder; *d* the movement plate; *e* the bottom of the case, and *g* the glass. Now by examining fig. 1, it will be evident, that when the bezil of the case *h h* (to which the winder *d d* is affixed) is moved round in a circular direction from right to left, the teeth of the winder taking into the teeth of the ratchet *a* (which is fixed on the square of the barrel arbor), it will cause the barrel arbor to turn and the main spring of the watch to be wound up. But, when my contrivances are to be applied to the winding up of a fuzee watch, it makes a material alteration, as will be clearly understood by reference to the drawing fig. 2. In this instance, *a a* is the winder with internal wheel teeth; *b* is the winding wheel, which revolves on a small hollow cylinder rising from a steel plate let into the pillar plate of the watch and secured by three screws, so that the cylinder does not project higher than the plate more than the thickness of the bottom of the winding wheel. Fig. 3, is a perspective view of the said plate with its cylinder. Fig. 4, is a detached view of the winding wheel with its click and spring; and fig. 5 is a section of the same. Now it will be seen by reference to fig. 2, that the square of the fuzee comes through the cylinder on which the winding wheel revolves, and rises so much above it as to receive the winding ratchet *c*, which is fixed upon the square, and secured by means of a pin through the end. I would here observe, that the winding ratchet is perfectly free of the winding wheel, so that when the winding wheel click is removed or lifted out of the teeth of the ratchet *c*, it will allow the fuzee to move in any direction. Now it will be evident, that, when the bezil of the watch (to which the winder is attached) is moved round from left to right, the teeth of the winder acting in the winding wheel will cause it to revolve on the cylinder, and the click of the winding wheel falling into the winding ratchet will carry the ratchet round also, which being fixed upon the fuzee square will wind up the main spring of the watch. When the watch is thus wound up, unless the click of the winding wheel *b* is lifted out of the winding ratchet *c* the watch cannot go; I therefore raise the click in the following manner: *d d* are two steel studs, a side view of one of which is given at fig. 6; they are screwed to the plate and project over the winding wheel in an oblique direction, as shewn in fig. 2, the points of these studs being free of the winding wheel click. The nibs at the points bear lightly on the bottom of the winding wheel and prevent it rising off the cylinder. There is also projecting from the point of the click a fine circular spring, the extremity of which stands further from the centre than the click or click spring (as shewn in fig. 4), consequently, during the operation of winding the spring is bent inward as it passes either of the studs; but if the bezil be turned in an opposite direction, or from right to left, the nib of either stud takes inside the said spring, and lifts the click out of the winding ratchet, and when the point of the stud comes in contact with the point or end of the click it will go no further in that direction. I also put a pin in the winding wheel at a little distance from the click to prevent its being lifted too high. By reference to fig 4 it will be seen, that the small spring projecting from the click is a little enlarged near the point of the click, so that when the nib of the stud has passed over the enlargement it may not so easily move back again, which is to prevent the winder from returning, by the wearing of the watch in the pocket. But I prefer a stop work such as is generally used to most stop watches, which may be introduced at any convenient part. In fig. 2, *g* represents the stop work, the point of the arm taking into the teeth of the winder, which prevents the bezil from moving during the wearing of the watch. I do not always make the winder to move in one direction during the operation of winding; but, I sometimes adopt the following plan, which is more simple and cheaper than the one just described: *a a* fig. 7 is the winding rack frame, which moves on a screw pivot or fulcrum at *g*; near the outer edge of this frame at *h* are two pins, and there is a short projecting arm from the bezil at *n* which comes between the two pins, so that by moving the bezil the said frame is made to move backward and forward on its fulcrum; the distance of which movement is regulated according to the length of the winding rack *b*, which may be done by having another projecting arm from the bezil as at *i*, and two stops or pins, as at *p q* let into the plate: the winding rack when in the position, as represented in the drawing, with its back end resting against the frame, as at *s*, is a perfect segment from the pivot or fulcrum at *g*, and is connected with the frame by means of two arms *u u*, one end of each of which is fastened to the rack, and the other end to the frame by means of screw pivots on which they move easily, the arms standing in rather oblique directions to the fulcrum of the frame at *g*. Now it will be evident, that when the bezil of the case is moved from left to right it will carry the winding rack with its frame in the same direction, and the rack teeth taking into the teeth of the winding ratchet *c* (which is fixed on the fuzee square), will move the ratchet round as many teeth as there are teeth of the rack brought into action; but when the frame is turned back again, the inclined side of the rack teeth coming against the inclined side of the ratchet teeth, the rack will be forced up and will pass back again without moving the ratchet. There is a fine spring at *x* screwed to the rack frame, the point of which presses against the end of one of the arms that projects a little beyond the screw pivot; this spring is intended to bring back the rack to its bearing at *s* after it is past the ratchet. Thus by a reciprocating motion of the bezil backward and forward the watch may be wound up; after which, the bezil must be moved back till the arm *i* comes close to the stop *p*, at which time the rack will be quite free of the ratchet and allow the watch to go. In order to make the rack rise better out of the ratchet when the bezil is thus brought back to its stop *p*, I put a pin in the end of the rack at *o*, which projects into a segment groove in the plate at *d*, considerably wider than the pin, and of such length, that the pin in the rack shall stop against the end a little before the arm *i* of the bezil reaches the stop *p*. Thus the rack will be thrown out of the ratchet teeth, and will fall in when the watch is wound; but there must also be a stop work used of the same description as that represented at *g*, fig. 2, to prevent the bezil from moving in wearing the watch in the pocket.

I also adopt the following plan of winding up a fuzee watch, which is perhaps more simple than either of the foregoing, it will be understood by reference to fig. 30. *a a* is the winder fixed to the bezil, as in fig. 2. *b* is the winding wheel fixed on the fuzee arbor. *c* is an intermediate wheel turning on a pivot screwed into the arm or lever *d d*, which has its fulcrum at *e*. The end of this arm may project a little outside of the case, or be connected to a slider on the edge of the case, so that by moving the end of the lever or slider, the intermediate wheel may be thrown in and out of gear with the winding wheel; but from the position of the fulcrum of the lever it will always be in action with the winder *a a*. When the watch is to be wound, the wheel *c* is to be moved into gear with the winding wheel *b*, and, by turning the bezil the watch will be wound up: after which, the intermediate wheel must be thrown out of gear by moving the slider the reverse way, when it may be held by a stop spring placed on the underside of the pillar plate. Of course it will be understood, that the bezils of these three last winders, are secured in their respective grooves or beds on the same plan as that described above. I would also observe, I have introduced the motion wheels into the drawing fig. 1, 2, and 7, merely to show the situation of the wheels, as I do not purpose any alteration either in size or number to what is generally used; but to make the watch as flat as possible with a going fuzee, I remove the perpetual ratchet and going spring from betwixt the great wheel and fuzee brass or spiral barrel (where they are invariably placed), to the under side of the great wheel. The plan I have adopted is as follows, and will be understood by reference to the drawing: fig. 8 is the underside of the great wheel: *e e* is the sink or circular recess to receive the perpetual ratchet, which is sufficiently deep to prevent the ratchet teeth from rising above the surface of the wheel, as will be seen by the section of this wheel, fig. 12. The ratchet revolves upon a pipe turned out of the wheel in the ordinary way. Within this sink there is a groove *b* to receive the going spring fig. 9, one end of which is pinned into the great wheel, and the other end into the perpetual ratchet. Fig. 10 is the perpetual ratchet with its clicks and springs, the teeth of which rise on the underside and not on the edge as in the usual way. Fig. 13 is a section of the same. Fig. 11 is the fuzee ratchet. Fig. 14 is a section of the same. The fuzee is put together in the following manner: first, the great wheel is put on the fuzee, next, the perpetual spring is put into its groove *b*, the perpetual ratchet is next put on, and last of all, the fuzee ratchet, which is pinned on to the fuzee arbor, so as not to hold the perpetual ratchet too tightly. Now the way in which the spring detant acts upon the perpetual ratchet, (a side view of which detant is seen at fig. 15), will be understood by reference to fig. 16, which shows that side of the plate next to the dial. The fuzee is seen through the third wheel sink; *a* is the great wheel; *b* the perpetual ratchet with its click and spring, and *c* the fuzee ratchet.

The spring detant is let into a groove in the plate at *d*, so as the hook of the spring shall bear lightly on the teeth of the perpetual ratchet; hence it must be evident, that the spring detant will allow the perpetual ratchet to pass in one direction, but not in the other, as the hook will take hold of the teeth and prevent its return. By this arrangement, I gain as much height in the fuzee as the thickness of the perpetual ratchet. I will here explain the way in which my keyless winding watches are put together and taken to pieces, which is as follows:—

After the movements of the watch are put together in the ordinary way, I fasten them into the case by means of screws or otherwise, after which (if it be a fuzee watch), I screw on the small steel plate with its cylinder through which the fuzee square comes; next, I put the winding wheel on the cylinder, and secure it in its place by its two studs; I then pin the winding ratchet on the fuzee arbor; after which, I put on the bezil with its winder, which is secured from rising out of its groove as before explained. The dial is next put on, and then the hands, after which the glass is snapped into the bezil. When the watch is to be taken to pieces again, I first take out the glass by introducing a small wire up a hole that is made through the bezil against the edge of the glass, as represented at fig. 29, which will throw out the glass. I then take off the hands, then the dial, &c.

To make the watch case look uniform and neat, there being no joint to the sliding bezil, I do away with the outside joint of the bottom of the case, by introducing what I shall call a spring knuckle, which is not seen from the outside. This contrivance is shewn at fig. 17. *a* is the bottom of the case that contains the spring knuckle. *b b* is the spring which is made in a half circle to suit the size of the case; it is rather thick towards the ends, where it is fastened to the bottom of the case either by screws or otherwise; the other part of the spring is rather thin till it comes near the knuckle, so that it gives way with very little pressure. The knuckle stands higher than the spring, and is made of such height as to accommodate the thickness of the case, and is made out of solid steel spring tempered. Fig. 18 is a perspective view of the spring knuckle. *c* is the stud that is screwed to the bottom of the case and projects a little over the spring, and is to prevent the case being opened too wide so as to strain the spring. Fig. 19 is a side view of this stud. *d d* is the joint or knuckle of the case.

My invention further consists of a new mechanical arrangement and combination of works applicable to all purposes, where the locking or unlocking of an alarum is required, and also to the setting off the striking part of a clock to strike the hours and quarters if required. Fig. 20 represents what is usually called the dial work of the watch to which my invention is applied; and first, as respects the alarum part, *a* is the alarum snail, the back arbor of which goes through both of the movements or watch plates, the front arbor comes through the centre of the alarum dial *a*, fig. 27, and carries the alarum hand. On the end of the back arbor is fixed a milled head or nut, which coming close to the plate prevents the snail from rising out of its place, and serves also to set the alarum hand, as it will be evident that the alarum hands may be moved to any part of the dial by the milled head, a detached view of which with the snail is seen at fig. 21.

The use of the notch on the edge of the snail with one side perpendicular to the centre, and the other in a slanting direction, will be explained hereafter; *b* is the alarum wheel, which is of the same size and number of teeth as the hour wheel *h*, the teeth of which take into the hour wheel teeth, and, consequently, perform a revolution in the same time, which is twelve hours. It is here represented as pierced, to show the action of the unlocking lever upon the alarum snail; it goes upon the front arbor of the alarum snail and is prevented from moving too easily on the arbor by means of a circular spring, which presses against the arbor, as shown in the detached alarum wheel at fig. 22. *c c* is the unlocking lever, the curved point of which rests on the edge of the alarum snail, and the tail lays close to the neck of the pendant. It is kept in this position by means of a spring *d*, which presses against a small projecting arm of the said lever. Now it must be evident, that as the alarum wheel is fixed pretty tight on the arbor of the snail it will carry the snail along with it, so that by the going of the watch, the notch in the edge of the alarum snail will be brought round to the curved point of the unlocking lever every twelve hours, and as soon as the perpendicular side of the notch passes the curved point of the unlocking lever, it is forced into the notch by means of the spring *d*, and the tail of the lever is thrown out from the pendant, but the sloping side of the notch raises the lever again to its former position. In the next place, the arrangement for setting off the striking part of a clock is as follows:—*e*, fig. 20, is a pinion of the same number as the cannon pinion, the arbor of which goes through both plates, and has a milled head on the end of the arbor, exactly the same as the arbor of the alarum snail; this pinion is connected with the minute wheel g_1 by means of an intermediate wheel *f*, which may be cut in any number of teeth that may be required, as it is only designed to change the direction of the pinion *e*. It must be evident, that the pinion *e* will perform a revolution in the same time as the cannon pinion, which is an hour. To the pinion *e* is attached an arm, with a pin near the point that takes under the lower arm of the clock discharger *h*, and lifts it every time it comes round, (it is represented in the drawing as partly lifted); but when the lower arm of the clock discharger falls off the pin in the arm of the pinion *e*, the upper arm of the discharger is brought back to the neck of the pendant by means of a spring *k*, which presses against a short projecting arm of the discharger. By means of the milled head on the end of the arbor of the pinion *e*, motion may be communicated to the cannon pinion, and by that means the watch may be set to time; but to prevent any accident by moving the minute hand back past the hour, I make the lower arm of the clock discharger, as represented at fig. 23, which is on the same principle as the passing spring of a chronometer, and will let the pin in the arm of the pinion *e* pass backward without moving the discharger. The alarum dial is a small dial the same size as that of the second circle, and is fixed to the alarum wheel by means of a small pipe that projects from the centre of the alarum wheel and fits tightly into the dial. The dial is painted like a small watch dial, with the hours as represented at fig. 27, and there is a circular opening in the watch dial through which the alarum dial is seen, as at *a*, fig. 27. The alarum hand must be put on in that position that it will point exactly to the centre of the pendant at the time the unlocking lever falls or is thrown out from the pendant, and when the twelve marked on the alarum dial stands in the centre of the pendant the hour and minute hand should be put on so as to point in the same direction, which will be twelve o'clock. Now it must be seen, that when the minute hand has made one revolution, and again points to the pendant, the hour hand will point to one o'clock, and the one on the alarum dial will point to the pendant, and so on with all the other hours, so that by fixing a point in the watch dial opposite the centre of the pendant, it will point to the hour of the day on the alarum dial, and as the alarum hand and dial move together, and the unlocking lever is thrown out whenever the alarum hand points to the pendant, it must be evident, that, whatever time the alarum hand is set to on the alarum dial, the unlocking lever will be thrown out from the pendant exactly at the same time. I also put a slider on the edge of the case, on the same side of the pendant as the unlocking lever, so that when the alarum is not wanted it may be pushed close up to the tail of the lever, and take the pressure of the curved point off the edge of the alarum snail, that it may be no hindrance to the going of the watch.

I shall now proceed to describe the manner in which the alarum and clock movement is operated upon, by means of the unlocking lever and clock discharger, before which, I would observe, that I have given a section or side view of the alarum and clock movement in its detached state, together with the index plate at fig. 24; the frame *a a* that contains the train of wheels is made smaller than the index plate *b*, in order that the bell *c c* may cover the works. The bell is screwed to a stud *d*, that is fixed in the centre of the upper plate, there are two holes made through the bell opposite the barrel arbors, that the maintaining power may be wound up either by a detached key or by milled heads screwed upon the arbors, as represented at *e e*. The alarum consists of a going barrel with a steel wheel at one end, which is cut in ratchet teeth for the purpose of working the hammer, and at the other end is the great wheel that drives the train. The train generally consists of three wheels and four pinions, but I sometimes make the alarum movement with a contrete wheel on the end of the going barrel, which drives a pinion with a balance or crown wheel; this, acting in a verge, works the hammer fixed on the arbor of the verge. The clock has also a going barrel, with the same number of wheels and pinions, together with the striking hammer and its spring, which are arranged in the same manner as most modern striking clocks. The two wire tails *g g*, that project through the index plate *b*, are connected one with the alarum locker, and the other with the hour-regulating lever, which will be better seen at fig. 25, where *a* is the hour-regulating lever, which acts on a pivot screwed into the plate; *b* its wire tail, *x* is the regulating spring, which is made very thin close to where it is screwed to the lever, and at the other end is a hook, which takes hold of the star wheel *e* and moves it one division every time the lever is lifted by the clock discharger; (a side view of this spring is shewn at fig. 26); from the shape of its hook it will be evident, that when the regulating lever is brought back by means of its spring *c*, after the clock has struck the sloping part of the hook, coming in contact with the tooth of the star wheel, (which is bevilled on that side,) it acts as an inclined plane, and raises the spring so that the hook will pass over without moving the wheel, and be ready to move round the star wheel another division whenever the lever is again lifted. The jumper *d* with its spring, is to prevent the star wheel from moving more than one division at a time; the star wheel *e* is cut in twelve teeth, and is fixed on a hollow cylinder, together with the clock snail *g*, at a little distance from each other, and revolves on a pivot that is screwed into the centre of the plate, the cylinder is of such length as to project a little through the index plate, and carries the hand shown at *a*, fig. 28. The rack hook *k* has a curved tail, that comes in contact with a short arm of the regulating lever, by which means, whenever the lever is lifted by the clock discharger, the hook *d* is raised out of the rack *i*, and the rack is forced back by means of its spring *k*, and its arm falling against the snail regulates its striking. *n* is the gathering pallet, that winds up the rack as the clock strikes. There is a pin at *p* in the regulating lever that projects through an opening in the plate and comes in contact with a pin in one of the wheels whenever the lever is lifted, and prevents the clock from striking until the levers fall back. *r* is the alarum hammer, and *s* its spring. Now if it is required to make the clock to chime the quarters, nothing more is necessary than to cut the star wheel in forty-eight, and make the clock snail in the same way as the snail of most of the modern clock watches that chime the quarters, and also make the pinion *e* in the watch, shown at fig. 20, with four arms instead of one, and it will strike the quarters as it goes. It may also be made to repeat the hours by forming a connection from the rack hook to a stud or knob at any convenient part of the stand, as at *b*, fig. 27, which may be depressed by the finger, or any other means, and disengage the rack hook. The alarum locker is made with an elbow, as shewn by dotted lines at *t*, fig. 25; it is fixed on an arbor which is pivoted, and acts inside the movement plates *a*, a little of the edge of the plate being filed away to allow the wire tail *u* to pass through the index plate; at the other end of the locker is a pin that rests against the edge of the fly-wheel *o*, which has also a pin in its edge, and is likewise represented by dotted lines; it is kept in this position by means of a fine spring *w* that presses against the lower arm of the locker, so that the alarum cannot go off until the pin of the locker is removed from the edge of the wheel, which is done every time the unlocking lever falls out from the pendant as it comes in contact with the wire tail *u* of the alarum locker, and lifts it from the fly-wheel *o*.

The way in which the watch is attached to the alarum and clock movement is as follows:—Fig. 28 is a stand made of wood or metal, about an inch thick, (but they may be made in any other form); the alarum and clock movement is let into the back of the stand about half way through, with the index plate to shew in front, as at fig. 28, *a* being a small dial marked in the middle of the plate, and the hours painted on it as represented.

The opening in front is made to suit the size of the watch case, when lined with leather or velvet; the bottom of the watch case is kept at a little distance from the index plate by a ring of leather *b*, so that it shall not come foul of the index hand. The two wire tails of the alarum locker and regulating lever project into the opening through the index plate over the twelve, and come a little past the pendant, and at such distances from each other as to allow the neck of the pendant to go between them; there is also a sink cut for the nob of the pendant, so that the watch shall always go in, in the same position. Now to attach the watch so that it shall strike the hours right, the index hand must be moved in the direction of 1, 2, 3, &c. to the hour it struck last; suppose, for example, the time by the watch is half past twelve, the hand is right as represented at *a*, fig. 28; but if the time by the watch is past three, the hand must be put to three, and when the watch is attached, as represented at fig. 27, the clock will strike the hour as the watch goes.

When the alarum is to be used, nothing more is necessary but to set the alarum hand to the time at which it is to go off on the alarum dial, place it in the stand, and wind up the alarum movement.

The points upon which I ground my exclusive right and privilege to the foregoing invention are,—first, the new combination of mechanism by which the winding is effected:

Secondly, the alarum snail and wheel in connection with the unlocking lever and its spring. Thirdly, the arrangement of mechanism for discharging the clock, as shewn in fig. 20, in connection with the hour regulating lever shewn at *a*, fig. 25. Fourthly, the arrangement of mechanism connected with the going fuzee and its spring detant *d*, fig. 16. And lastly, the method of opening the bottom of the case by the introduction of a spring knuckle, whereby the outside joint of the case is dispensed with.

In witness whereof, &c.

Specification of the Patent granted to John Morfitt, *of Cookridge, near Leeds, in the county of York, Bleacher, for a certain improvement in Retorts used by Bleachers and Makers of Oxymuriatic Acid or Oxymuriate of Lime.*— Dated February 10, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.— *Now know ye,* that in compliance with the said proviso, I, the said John Morfitt, do hereby declare that the nature of my improvement is described and ascertained in manner following, (that is to say):—

The retorts used by bleachers and makers of oxymuriatic acid or oxymuriate of lime, are usually made of lead, and it is found that the upright sides of such leaden retorts are rapidly corroded by the liquid and other matters which are heated within such retorts, for the purpose of distilling or expelling oxymuriatic acid gas therefrom; my improvement consists in applying a lining of glazed earthenware withinside of the lead retort, so as to extend all round the interior upright sides thereof, and reaching from the bottom of the retort to a greater height than the level at which the surface of the liquid and other matters within the retort are intended to stand. The said lining of glazed earthenware being so applied withinside the lead retort as to prevent the liquid and other matters contained in the retort from coming in direct contact with the lead whereof the upright sides of the retort is composed; therefore, by means of my improvement those upright sides will be protected from being corroded by the liquid and other matters contained within the retort. I apply my lining of glazed earthenware in segments or lining pieces, of such size as can be conveniently formed in glazed earthenware in the manner of tiles; the surfaces of such segments or lining pieces being moulded to suitable forms to correspond with and fit against the upright sides of the retort, when they are placed around the inside thereof, so as to stand edgeways upwards upon the bottom, and applying as close as they can against the lead. The adjoining edges of such segments are formed to interlock or fit into each other at all their junctions, so as to keep each other firmly in their places, and all the interstices or cracks between the different segments as well as between the segments and the lead, are filled up with dust obtained from pounding fragments of the same kind of glazed earthenware as the segments or pieces are made of. When any one of the said segments or pieces becomes cracked or broken it can be removed and replaced by a new one, without disturbing the other segments or pieces. The said segments or lining pieces may be made of any kind of glazed earthenware which is not of a porous quality; the linings that I have used in my retorts are made of a sort of clay that is used for making fire bricks, and are afterwards glazed according to the common practice of potters.

For the further explanation of the manner of performing my improvement, I have added three figures in the margin exhibiting a retort, such as is commonly used by bleachers and makers of oxymuriatic acid or oxymuriate of lime, with my improvement applied to it, fig. 31, (Pl. IV.) is a vertical section. Fig. 32 a horizontal section, and fig. 33 a perspective view of two of the segments of glazed earthenware.

The retort is a circular leaden vessel A A, of about four feet and a half diameter, one foot and a half deep at the sides, and two feet deep at the middle, with the manhole in the top at B, to admit a workman to clear out the inside of the retort; C is the cover of the manhole, the lower edge of its rim being immersed in a luting of clay and water that is contained in a circular channel around the border of the manhole. D D is a projecting rim around the dome top D, E, E, D, of the retort; beneath which rim suitable brick work is built all around the retort, so as to enclose it and form a channel or flue around the sides and under the bottom of the same, to receive steam or heated air, whereby the liquid and other matters in the retort are heated, in order to produce oxymuriatic acid gas therefrom. 1, 1, is the lining of glazed earthenware which constitutes my improvement; the lining rises up higher above the bottom of the retort than the liquid mixture is intended to stand therein, as before mentioned, and the segments are jointed and interlocked together at the adjoining edges, as is shewn by fig. 32, and also in fig. 33, which represents two of the segments of glazed earthenware detached, as they appear before they are fixed in their places within the retort. For a retort of the above dimensions, whereof the lead of the sides will be about 1 inch thick, and the flat leaden bottom 1¼ inches thick, I make my glazed earthenware lining for protecting the leaden sides from corrosion about 1¾ inches thick, that lining being made in about eight or ten segments to complete the circle of that size; but for smaller or larger retorts the dimensions must be varied accordingly, as will be obvious to any competent workman.

Fig.1.

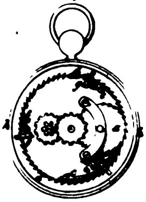


Fig.2.

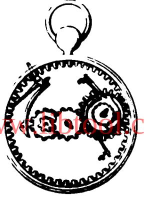


Fig.3.

Fig.4.

Fig.5.

Fig.6.

Fig.7.

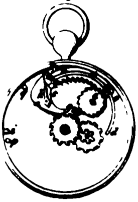


Fig.16.

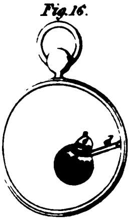


Fig.8.

Fig.12.

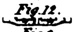


Fig.9.

Fig.14.

Fig.15.

Fig.13.

Fig.11.

Fig.30.

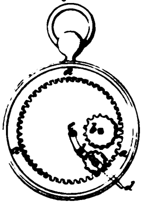


Fig.26.

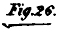


Fig.17.

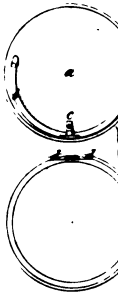


Fig.24.

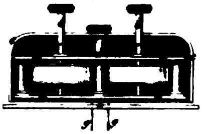


Fig.10.

Fig.20.

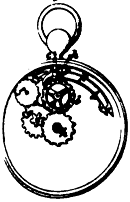


Fig.29.

Fig.19.

Fig.18.

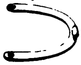


Fig.21.

Fig.23.

Fig.27.

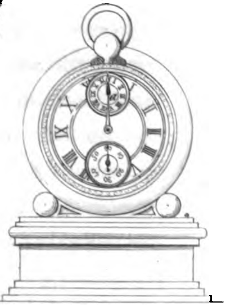


Fig.28.

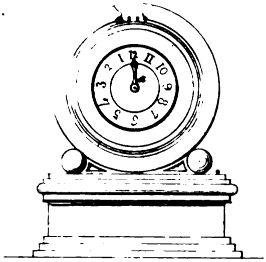


Fig.22.

Fig.25.

Fig.31

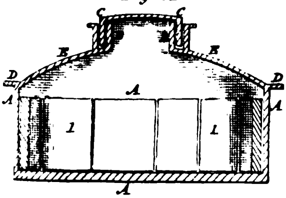


Fig.33.

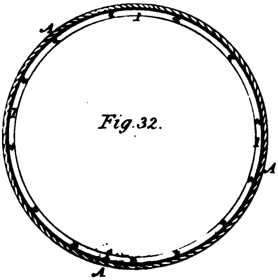


Fig.32.

Having now ascertained and described the nature of my invention and the manner of performing the same, I do hereby declare, that I claim as my invention, the application of linings of glazed earthenware, within the upright sides of leaden retorts used by bleachers and makers of oxymuriatic acid or oxymuriate of lime.*

In witness whereof, &c.

Specification of the Patent granted to FRANCIS WESTBY, *of Leicester, in the county of Leicester, Cutler, for a certain improved Apparatus to be used for the purpose of whetting or sharpening the edges of the blades of razors, penknives, or other cutting instruments.*—Dated 26, Jan. 1830.

WITH AN ENGRAVING.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Francis Westby, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed, is fully described and ascertained in manner following, (that is to say):—

My improved apparatus is intended to be used for whetting or sharpening the blades of razors, penknives, or other cutting instruments, which are usually whetted or sharpened by rubbing them upon the flat surface of stones called hones or oil-stones. By my apparatus the said blades are guided (in the manner hereinafter to be described), so that the cutting edge thereof must apply to the surface of the stone at such an angle or inclination thereto as is proper to whet or sharpen the said edge and produce such a cutting edge as is required; and the apparatus ensures, that when the blade is rubbed backwards and forwards upon the surface of the stone it shall not deviate from that angle. Figs. 1 and 2, (Pl. V.) on the annexed sheet of drawings,

* We refer our readers to p. 745 of our last vol. for our observations on this patent.

represent one form in which my improved apparatus may be constructed; fig. 1 a section, and fig. 2 a horizontal plan of the same. *Note.*—All the figures except the perspective view are drawn to the full size.* A, figs. 1 and 2, is an oblong block of wood, in which the hone and the parts for guiding the cutting instrument are mounted. The wood is cut away at the middle part of the block A, with a long deep notch of about two thirds of its depth, as is shewn by the section fig. 1; and also a small cavity or chamber is cut out in each end of the notch in the block A, shewn in the section, and by dotted lines in the plan, fig. 2. The notch or space so excavated in the block A receives the hone B, fig. 1, which is bedded with cement upon the bottom part of the notch. C is a moveable plate of metal placed above the hone to apply to the back of the razor or other cutting instrument, in order to guide the blade and determine the angle at which its edge shall be applied upon the surface of the hone, when it is rubbed thereon in order to be sharpened. The guide plate C is of the same breadth as the hone B, but rather longer, and the two ends of the plate C, which extend over beyond the two ends of the hone B, are supported by two upright screws *b b*, which are fitted through holes in the bottom of the block of wood A, their heads *f* being countersunk within holes at the under surface of the bottom; and the screws are screwed through holes in each end of the guide plate C, and there are two coiled spiral springs of wire *e*, which surround the screws *b b*, and act between the underside of the guide plate C and the bottom of the cavity formed at each end of the notch in the block A, see fig. 1. The elasticity of the springs *e e*, tends to force the plate C off from the surface of the hone B, as far as the screws *b b* will permit; but by turning the head *f f* of the screws *b b*, which are countersunk into the underside of the block A, the guide plate C may be drawn down towards

* Necessarily reduced in the engraving.

the hone, in opposition to the elasticity of the springs *e e*; or by turning the heads of the screws *b b* the other way round, the guide plate C will be removed further from the surface of the hone; hence by the screws *b b*, the distance between the hone and the guide plate C can be regulated at pleasure. The guide plate C confines the back of the blade of the razor or other cutting instrument, from rising up too high above the surface of the hone, and thereby prevents the possibility of rolling the edge upon the surface of the hone when it is rubbed backwards and forwards thereon, or forming the edge to a more blunt or obtuse angle than is intended to be given to it. The blade is inserted into the space left between the guide plate C and the hone B, in the manner shewn in the section, fig. 1; and the distance between the plate C and the hone, is adjusted by means of the regulating screws *b b*, according to the thickness of the back of the razor or other cutting instrument, so that the back will nearly fill up the space left between the guide plate and the hone.

The sharpening is performed by holding the handle between the fingers and thumb, with a sort of twisting action, which will tend to raise the back of the blade upwards against the underside of the guide plate C, and at the same time press the cutting edge downwards upon the surface of the hone; the force of that pressure being determined by the said twisting action given to the handle of the blade, and tending as it were to turn the blade and handle round about its length as an axis. The blade being thus held with a suitable degree of twisting force and pressure of the edge upon the hone, may be moved backwards and forwards over the length of the hone, and at the same time endways of the blade, so as to produce that sort of horizontal circular motion, which is usually given to blades during the operation of whetting on an oil-stone, (that is to say): every part of the blade is made to describe a horizontal circle or oval curve; but this kind of motion for whetting is no way peculiar to my apparatus, for it may be used with any other kind of rubbing motion which is suitable for whetting the edges of blades. Also, in case the blades of razors or other cutting instruments, are made with the back sufficiently thick to give the edge the proper angle when the back is made to bear upon the stone as well as the edge; then the space left between the guide plate C and the surface of the hone, must be only as much as will receive the thickness of the back and allow it to move freely backwards and forwards: in such case, also the blade may be held exactly in the usual manner to produce the requisite pressure of its back and its edge upon the stone, without bearing the back upwards beneath the guide plate C by the twisting action above described; the guide plate being in such case only a security that the thick back of the blade shall not by accident or inadvertence, be raised up from contact with the stone. It is for blades with thin backs, which require those backs to be raised up from the surface of the stone, that the handle is to be held in the above described manner with a twisting action, which will raise the back upwards in contact with the underside of the guide plate C. Care must be taken to set the guide plate C exactly parallel to the hone before commencing to use the apparatus.

I have shewn my improved apparatus figs. 1 and 2, fitted with an elastic strop D D, which is formed of an endless band of leather encompassing two small stretchers *h* and *i*, which extend across the breadth of the strop within the loops formed at its two ends. The strop D D is supported by two small studs *l* and *m*, which turn up from the ends of two plates of metal L and M, which are screwed on each end of the block of wood A. A pin *g*, which projects out from the stretcher *h*, and passes through the leather of the strop at one end, is lodged in a hole in the stud *l*. Two rods or strong wires are fastened to the stretcher *h*, and extend parallel to each other, all the length of the strop withinside of it. The other ends of those wires pass through holds in the other stretcher *i*, and in the leather of the strop; and the extremities of the same wires are fixed into a small bar *n*, which applies against the stud *m*, fig. 1. A screw *o*, is inserted through the cross bar *n*, and screws into the stretcher *i*, which is within the end loop of the strop; the shoulder of the screw *o*, bearing against the outside of the cross bar *n*. By turning the screw *o*, the strop D may be strained to such a tension as to render it a sufficiently firm surface for strapping the blade of a razor. The shoulder or round shank of the screw *o*, is received in a notch formed in the stud *m*, and left open on one side in order that the screw may be displaced sideways out of that socket, and then the pin *g*, at the opposite end of the strop may be drawn out of the stud *l*, and the strop D D entirely removed; it may be replaced with the other side upwards, or it may be used in the detached state.—*Note*. Such strops having been heretofore made, form no part of my invention, and are only represented and described here, to show how they are applied in concert with the apparatus which is my invention.

Figs. 3 and 4, represent another form in which my improved apparatus may be constructed: fig. 3 is a section of the apparatus; and fig. 4 is a plan of the block A. In this construction, the object is the same as the preceding, viz. to guide the blade of the instrument which is to be sharpened, and to prevent the back from being raised too high off the surface of the hone. But instead of the hone B being fixed, and the guide plate C being caused to approach to or recede from the hone by the regugulating screws in the manner hereinbefore described, the guide plate C, figs. 3 and 4, is fixed fast by screws to the top of the block A, so as to cover over the notch therein; and the stone B is cemented and held fast by screws to a bed plate I, which is supported by the upright screws *b b*. The heads of those screws are countersunk into holes in the bottom of the block A, and are screwed into the bed plate I. The hone B, and its bed plate I, are forced up towards the guide plate C by a long bent spring *e*, which is screwed by the middle of its length to the bottom of the notch in the block A, and lies interposed between that bottom, and the underside of the bed plate I, the two ends of the spring *e*, bearing the same upwards by the elasticity of the spring in opposition to the screws *b b*. The space between the hone B and guide plate C, can be regulated by turning the adjusting screws *b b*, and causing the guide plate C to rise or fall until it is set at the required distance from the hone, and exactly parallel thereto. The spring *e*, must be made strong enough to prevent the hone yielding at all to the pressure requisite for sharpening the edge of the instrument properly. This apparatus is also furnished with a strop D, (see fig. 3), which is strained and supported by screws mounted in studs formed at the ends of the guide plate C, which turn up for that purpose; and the strop can be tightened or slackened, or entirely removed by means of those screws, as is sufficiently obvious by the drawing; and it is unnecessary to describe that part more minutely, because, as before mentioned, it is no part of my invention.

Note.—Instead of adjusting the guide plate by means of two regulating screws, as shewn in fig. 1, it may be placed, as shewn in fig. 5, being guided at each end by a pin on which it can slide up and down loosely: two springs *e e*, fig. 5, are interposed between the guide plate C, and a fixed plate I, screwed on the top of the wood block A, over the notch therein. The place of the guide plate is adjusted by a screw *b*, which is riveted into the plate C, and passes up through a hole in the fixed plate I, and a nut *i* is applied upon the screw *b*, where it comes up through the plate I. By turning the nut *i*, the guide plate C may be drawn up from the hone, or by turning the nut *i* the other way, the guide plate will be caused to approach the hone.

The construction of my apparatus may be varied, by using two hones with their surfaces placed opposite to each other, the second hone being fastened to the guide plate C, so that the back of the blade may apply thereto, instead of to the guide plate as above described: in this way the edge may be turned upwards in order to sharpen it against the upper hone, the lower hone then serving as a guide to the back of the blade, to ensure that the edge shall be applied at a proper angle to the surface of the upper hone, in the same manner as the upper hone serves as a guide for the back when the lower hone is used. And when two hones are so disposed opposite to each other in my apparatus, they may be chosen of different qualities, one being a coarse hone or oil-stone to sharpen a thick edge, and the other, a finer hone to finish a fine edge. And further, if the guide plate C is made of soft yellow brass, it will in some cases be found to give a finish to a cutting edge after it has been finished on the hone to turn it upwards and rub it against the surface of such brass guide plate, in the same manner as it was before rubbed upon the hone, the edge being well supplied with the black oil which gathers upon the hone whilst it is rubbed up the brass plate. And note, although I have described my apparatus with regulating screws to adjust the space to be left between the surface of the hone and the surface of the guide plate, it is to be observed, that such regulation is only necessary in order to adapt my apparatus to whet or sharpen blades of different breadths and thicknesses at the back, and therefore, when my apparatus is to be made for sharpening only one particular blade, or one particular size of blades, the guide plate may be immediately fixed at a suitable distance from the hone, whereby my apparatus will be simpler in its construction, but the same in effect for sharpening the particular blades for which it is made.

Figs. 6, 7, and 8, represent another form in which my improved apparatus may be constructed: fig. 6, a perspective view; fig. 7, a section; and fig. 8, a horizontal plan thereof. Two hones B B, are received in an upright box A, which is mounted upon the larger box D for a base; the hones descend through the box A, and also through the top of the box D, which has two oblong holes or slits cut out in it to receive the hones; the narrow piece of metal which is left on the top of the box D, between those oblong holes, divides the hones B B, and a double spring *e* in the form of the letter U, is inserted between the two hones. The two prongs of the double spring bear against the adjacent sides of the holes, and by their elasticity tend to force the hones away from each other. The hones B B stand upon a bearing plate E, which is supported by a screw *b*, the head whereof is countersunk within a hole in the bottom of the box D, and the screw is screwed into the plate E, and the upper end enters into *m*, a hole in the top of the box D, whereby the screw is guided and kept perpendicular; a washer is fastened upon the screw *b* just above the bottom of the box D, so that the screw *b* cannot itself rise or fall within the box; but by turning it round it will raise up or depress the plate E and the hones B B, which rest upon that plate, so as to bring a new part of the length of the hones into action when that which has been used has become worn. The hones can be caused to approach each other in opposition to the elasticity of the double spring *e*, by means of adjusting screws *g*, which pass through the metal of the box A, and bear against the backs of the hones. A grooved trough

R, is mounted upon a standard F, on the top of the box D, by means of a round plug which is formed on the underside of the trough R, and inserted into a cylindrical hole in the standard F; so that the trough R can be directed towards any part of the space between the two hones B, by turning the plug round horizontally in its socket, and it can then be fixed in the standard F by the screw *h*. The end of the trough R nearest the hones may be adjusted by the regulating screws *i i*, which are screwed through the ears of the small bracket *m* which is fixed to the outside of the box A, whereby the trough R can be placed in the required position with respect to the space between the stones B, and retained between the points of the screws from any considerable deviation from that position; but it is desirable to leave the trough R with a little liberty to play about its plug. The razor or other blade which is to be sharpened, is fixed in a small clamp *n* between the two screws *b b*; a stud which projects from the lower part of that clamp, is fixed upon a cylindrical rod *m*, which lies in the bottom of the trough F, and is adapted to be slided endways backwards and forwards therein; the clamp *n* is formed so that when it is quite vertical, its lower edges do not touch either of the edges of the trough F, and then if a blade is fixed in the clamp it will pass clear between the hones B without touching either of them; but if the rod *m* is turned to one side or the other, the clamp *n* will be tilted over, so that one of its bottom edges will bear upon the corresponding edge of the trough F, and then the blade which is fixed in the clamp *n* will also be tilted over to one side, and its cutting edge will be brought in contact with one of the hones B. Care must be taken to adjust the position of the trough R, so that when the clamp *n* is tilted over to one side or the other, the cutting edge of the blade shall be brought exactly in contact with the corresponding hone B at the proper angle, with the surface thereof for sharpening, and no more. And that adjustment may be attained with great accuracy, by means of the several regulating screws hereinbefore mentioned, viz.—Those which act upon the stones, those which regulate the trough F, and also those which hold the blade in the clamp *n*. When the apparatus is adjusted the edge is sharpened by drawing the blade backwards and forwards in the direction of its length, with its edge in contact with one or other of the hones, the angle and direction of the blade being guided during such motion by the bearing of one of the bottom edges of the clamp *n* upon the corresponding edge of the trough R; the clamp being tilted alternately to one side or the other in order to bring the blade into contact with each hone B in turn.

Note.—The clamp *n* is intended to hold razors and large blades; but for penknives or blades of a small size, a smaller clamp *r* is fixed into the clamp *n*, and that small clamp is provided with its own screws to fasten the blade into it.

Having now described my apparatus, I do hereby declare, that what I claim as my invention under the said letters patent, is the improvement of applying and fixing a guide plate as hereinbefore described, over or opposite to the surface of such a hone or oil-stone as is or may be used for whetting or sharpening the blades of razors, penknives, or other cutting instruments; leaving only such a space or interval between the adjacent surfaces of the stone and of the said guide plate as will confine the back of the blade from being raised up any higher from the surface of the stone than is proper to give the edge the desired angle. Also, in applying two stones with their surfaces opposite to each other, and at a suitable distance apart, in order to whet or sharpen the cutting edge, first, on one side by one stone,

Fig. 1.

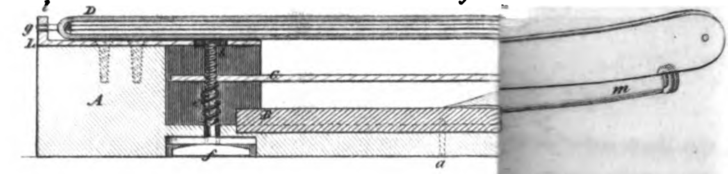


Fig. 2.

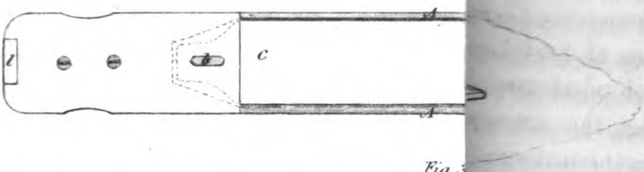


Fig. 3.

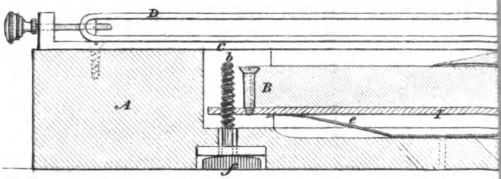


Fig. 4.

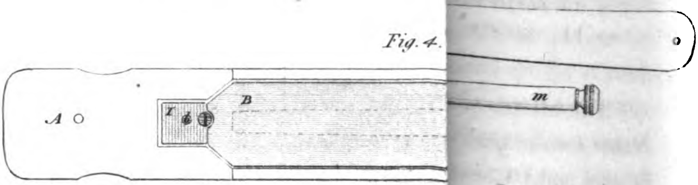
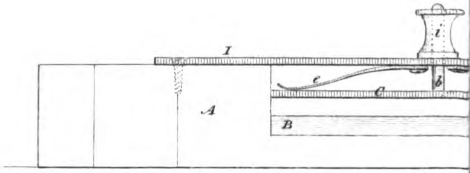


Fig. 5.



g. 11.

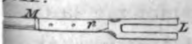
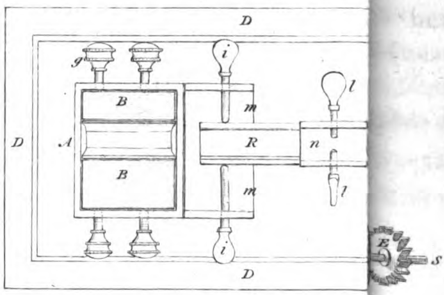


Fig. 8.



and then on the other side by the other stone. And as to the particular modes hereinbefore described, of adjusting the distance or space between the stone and the guide plate, or between the surfaces of the two stones; and also the means of holding and guiding the blade during the motion which must be given to it, during such whetting or sharpening, the same may be greatly varied without departing from the nature of my invention as here set forth.

In witness whereof, &c.

Specification of the Patent granted to GEORGE STRAKER, *of South Shields, in the county of Durham, Ship Builder, for an Improvement in Ship's Windlasses.*—Dated September 11, 1829.

WITH AN ENGRAVING.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said George Straker, do hereby declare the nature of my said invention to consist in certain machinery applied to, or connected with, the windlasses of ships or other vessels, in such manner as enables me to apply the power of a handspike (peculiarly formed for that purpose) with more effect, and with less loss of time than heretofore. And in further compliance with the said proviso, I, the said George Straker, do hereby describe the manner in which my said invention is to be performed, by the following description thereof, reference being had to the drawing annexed, and to the figures and letters marked thereon, (that is to say):—

Description of the Drawing, (Pl. V.)

Fig. 9 is a perspective view of a ship's windlass, fitted with my said improvement on the starboard or sheet anchor side, but it may be as well here to observe, that it may if required be equally well fitted to the larboard side, or to both if thought necessary. A is the paul bit, B is the bit head, C C is the windlass barrel, D is a cogged band or rack round the windlass barrel, and E is a pinion working into the said rack; F is the axle on which the said pinion is fixed, and is supported at one end by the bit head, and at the other end by the paul bit. G G G G are four circular metal plates with rackets or teeth cast on or rivetted to one side of each of them, as at H H H H, fig. 10, and fixed firmly in pairs on the axle F, about four or five inches asunder; the teeth or rackets H on each plate, must be set exactly to correspond, and it is then by means of a peculiarly shaped handspike, hereinafter described, that I act upon these teeth or rackets, forcing round the pinion E, and thus acting with great power upon the rack D, which of course turns the windlass barrel round.

Fig. 10 is an enlarged view of one of the racket plates.

Fig 11 is a representation of the said peculiarly formed handspike: the lower part from the point marked M, is made of iron, and is forked at L, and is furnished with two shoulders, one on each side, as at *r;* now if one of this sort of handspikes be introduced between each of the two racket plates G G, which form a pair, the fork L being allowed to bestride the axle F, the shoulders will rest upon and act against the rackets H on both sides, and if these handspikes be only worked up and down, like a pump brake, they will force the axle F round, and thus turn the barrel of the windlass, while the loss of time occasioned by removing the handspike of the old form when hove down, and hitting the hole on the upper square again at every fetch will be avoided; and it is evident that this improvement of the racket plates and forked handspikes is equally applicable to the main axle of the windlass barrel, and to the axle of the pinion E; and it may be proper to observe, that the racket plate or wheel may be made single and worked by a handspike placed astride of it.

Fig. 12 is a view of the racket plates G G G G, the axle F, and pinion E, drawn to a large scale the better to shew their construction; S S are the two points that rest on the bearings, one on the paul bit, and the other on the bit head.

Now whereas, my said improvement, when applied as here shewn to the axle of a pinion, (which I consider the most efficacious mode of applying it) may be made to ship or unship in the bearings of the axle, or to slip in or out of gear with the pinion at pleasure. And whereas the racket plates may be made of cast-iron, or of wood strapt with iron, or otherwise. But whereas, I claim as my invention, the racket plates marked G and H, whether applied to the axle of the pinion as here shewn, or to the main axle of the windlass barrel, as before mentioned; and also the forked handspike to be used therewith, which two articles together, used for the purpose of giving additional power to a ship's windlass, constitute my said improvement and invention, and such my invention, being to the best of my knowledge and belief, entirely new and never before practised in that said part of his said Majesty's United Kingdom of Great Britain and Ireland called England, his Dominion of Wales or Town of Berwick upon Tweed. I do hereby declare this to be my specification of my said invention, and that I do verily believe, this my said specification doth comply fully in all respects, and without reserve or disguise with the proviso, in the said hereinbefore in part recited letters patent contained, wherefore I do hereby claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

Specification of the Patent granted to BARON CHARLES WETTERSTEDT, *of Commercial Place, Commercial Road, in the county of Middlesex, for a Liquid or Composition for water-proofing and strengthening Leather.**—Dated July 1, 1828.

TO all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Baron Charles Wetterstedt, do hereby describe the manner in which my said invention is to be performed by the following description thereof, (that is to say):—

Take of rosin sixteen pounds and of tallow five pounds, which being boiled together, add one gallon of boiled linseed oil, which being well mixed together, add one pound and a half of turpentine, in which is dissolved one ounce and a half of India rubber. This mixture is to be rubbed into the sole, or leather intended for the under part of the shoes.

The following mixture is suitable for harness and the upper parts of shoes, as blacking may be rubbed on after the composition.

Take of neats' foot oil one gallon, of tallow six pounds, of hog's lard one pound, of bees wax half a pound, which are to be boiled till the whole is well mixed and dissolved, to which, when nearly cold, add of spirits of turpentine three pounds, in which is dissolved three ounces of India rubber; these being well mixed and cold, will be ready to be applied to the leather either by a brush or other means.

Although I have here given the exact proportions, they may be slightly varied without departing from the invention.

In witness whereof, &c.

* The patent granted for this invention was transferred by Baron Wetterstedt to Mr. Henry Hunt, and the above specification is therefore a description of the ingredients of what is popularly known by the appellation of "Hunt's Waterproof Composition."

Patent granted to THOMAS FOWLER, *of Great Torrington, Devonshire, Stationer, for improvements in, or for, raising and circulating hot water, hot oils, and other hot fluids, for domestic and other purposes.*—Dated Oct. 2, 1828.

To explain the principle on which the object of this patent is effected, Mr. Fowler supposes two vessels to be placed on the same level, at some distance asunder, which are connected both by a syphon that passes from the upper part of one to that of the other, and by a straight pipe that runs horizontally between their lower extremities. Beneath one of the vessels a furnace being constructed, for bringing the liquor put into it to the boiling heat, the end of the syphon within it is to be bent upwards a little, to prevent any air from entering it, that might be extricated from the boiling liquor; a cock is to be fixed near each end of the syphon, and another in the neck of a funnel, fixed to the middle of its most elevated part; all which are used when it is to receive its charge of liquor: and a fourth cock placed in the middle of the straight pipe completes the whole.

The two vessels being then filled with water, or other liquor, and the cock closed in the straight pipe, a fire is to be kindled in the furnace, and when the liquor above it (which we will suppose to be water) boils, the two lower cocks of the syphon are to be closed, and that in its funnel is to be opened; water is then to be poured into it by the latter until it is filled and the air at the same time expelled from it by the same passage; when this is done in closing the funnel cock, and opening all the others, the patentee states, that the water will flow through the syphon from the vessel over the furnace, to the other one, and from thence back again into the former through the straight pipe; on account of the water in the leg of the syphon next the furnace being hotter, and of course lighter, than that in the more remote and cooler leg.

The principle being thus established, the patentee next states, that a similar effect will be produced, if the extremity of the same syphon farthest from the furnace be united to the end next to it of the straight pipe, and the vessel be removed, in which these ends were before contained; implying however the proviso, that the legs of the syphon be far enough asunder, to permit the water in that, which is most remote from the furnace, to be sufficiently cooled in passing through it, to have its specific gravity thereby sensibly increased.

The patentee after this, describes two or three more complicated apparatus for producing a similar effect, in each of which several boilers and connecting tubes are used; these boilers in some cases being arranged so as to be all placed over one furnace; and in one instance formed by dividing a single large boiler into several compartments by transverse vertical partitions; but as a sufficient explanation is not given of the superior utility of these more complicated combinations, we do not think in necessary to describe them more minutely.

The applications of this contrivance mentioned in the specification, are to the warming of hot houses, and the heating of baths; of which latter a figure is given, where the bath is supposed to be in an upper appartment, and the boiler on the ground floor: the patentee properly observing on this occasion, that the legs of the syphon should never exceed thirty feet in vertical elevation, on account of the pressure of the atmosphere (which is the operating cause of the action of all syphons), not being able to counterbalance a column of water of any greater height; and adding, that in general he prefers that its elevation should not be more than twenty feet.

The idea on which this patent is founded is certainly ingenious; and we feel therefore sorry that the patentee has but a small chance of making his speculation profitable; since so many excellent contrivances for heating hot houses, and baths, are in existence, with several of which his could by no means compete in effect, economy, or convenience. Of baths, we shall only instance the portable one sold by Mr. Dean, of Regent Street, (for which he states that a patent has been granted to Surgeon Hicks, of Conduit Street), that contains a fire-place in itself in most respects very cleverly contrived; and of the capital inventions for heating hot houses, that lately published in the Transactions of the Edinburgh Horticultural Society, by Colonel Patterson, in which the action of steam for only an hour and a half in the evening, is made to produce an *equable* heat for the whole of the night and next day, by merely filling the chamber into which the steam is admitted beneath the beds, with small round stones, instead of leaving it void in the usual manner.

We have farther to observe, that great difficulty has hitherto been found in making syphons operate for any considerable time; which is increased proportionably by the size of the syphon, and more particularly, by the height of its legs; an objection that would be unfavourable to the present contrivance: but as this difficulty depends on the accumulation of air, extricated from the water, in the upper part of the syphon, it is not improbable that a remedy for it may be found, by some ingenious application of the principle of the lateral communication of motion of fluids, so ably explained in 1798, by Venturi, in his publication on this subject.

Patent granted to James Soames, Jun. *of Wheeler Street, Spitalfields, in the county of Middlesex, Soap Maker, for a new preparation or manufacture of a certain material produced from a vegetable substance, and the application thereof to the purposes of affording light and other uses.*— Dated September 9, 1829.

This preparation is stated to consist in subjecting the common cocoa-nut oil to hydraulic or other fit pressure; by which means the stearine or thick part is separated from the eläine or fluid part; thereby forming two distinct materials, the one of which is applicable to the manufacturing of candles, and the other to be burnt in lamps, and for other uses.

The cocoa-nut oil being taken in the state in which it is imported into this country is to be put into packages of linen of a close texture, with an outside covering of thick sail-cloth; the sizes being regulated to about two feet long, three to four inches broad, and one to one and a half inches thick. These packages are to be placed in single rows between the plates of a powerful press, (that employed by the patentee being of ten inches ram,) care being taken to leave small intervals between each for the passage of the eläine, during the pressure. The oil should be exposed to a temperature of 50° to 55° for several hours before, and also during the operation, and when as much of the eläine has been separated as can then be expressed, (which is ascertained by its flowing only in drops and at long intervals) it is to be subjected to an increase of temperature, but by no means exceeding 65° as the purity of the eläine is regulated proportionably. The latter is then to be clarified by mixing with it from one to two per cent. by weight of the sulphuric acid of commerce of 1·8 specific gravity, diluted with six times that quantity by weight of water. The whole being violently agitated in a barrel churn, or by other mechanical means, it will assume a whitish colour, and the scum being carefully taken off, it should be allowed to subside, when the heavier impurities will sink to the bottom, and the remainder can be drawn off at pleasure. Should it after this process be deemed not sufficiently clear, it is to be passed through filters of flannel lined with blotting paper. The material thus obtained it is stated will be fit to burn in lamps of the usual construction, and may be employed for oiling locks, sharpening instruments, and various other uses. The stearine when separated from the eläine is to be melted down and poured into moulds for forming candles, in the same manner as is usually done with tallow.

Patent granted to THOMAS MORGAN, *of the parish of Tipton, in the county of Stafford, Manufacturer of Tin-plate, for a new method of manufacturing or preparing Iron Plates or Block Plates for Tinning.*—Dated September 9, 1829.

THE object of this patent is stated to be the substitution of a clearing process in the place of that termed "scaling," as usually resorted to in the preparation of iron or block plates for tinning.

The bar from which the plates are to be formed is directed to be rolled in the usual manner, when it is to be plunged in cold water, as quickly, and with as little loss of heat as possible, in order to divest it of scale; it is then to be cut in lengths and rolled into plates, which are to be cleaned or pickled in sulphuric acid and water, in the same manner as now adopted in the scouring room, in the last process prior to tinning. The proportion of the ingredients of the pickle is from three quarters to one pound of the former, with one gallon of the latter; but this may be varied according to the strength of the acid or quality of the plates. When the plates are by this means sufficiently cleared, they are to be washed and placed on their edges separately to dry; to facilitate which operation the patentee recommends hot water to be used in which a little quick lime is immersed, in order to free them more effectually from the acid. They are then to be cold rolled and afterwards annealed in either of the usual ways, viz.—either by steeping in diluted muriatic acid, and heating in an open furnace, or by enclosing them in an iron case, in which they are annealed without the assistance of the muriatic acid. When the latter process is adopted, the plates should be pressed tightly together to exclude air, and the sort of box the patentee states he has found most convenient for the purpose has been formed a few inches larger than the plates, having two pins on each side, at a short distance from the ends of the box, which are rivetted through the bottom; the lid of the box is provided with corresponding holes for the pins to pass through, and a slit being made in the protruding part, a wedge is driven in, which forces down the lid of the box to any degree of tightness.

After the annealing of the plates they are directed to be again pickled and scoured in the usual way, previous to tinning.

Patent granted to JOHN MARSHALL, *of Southampton Street, Middlesex, Tea Dealer, for a method of preparing an extract from Cocoa, which he denominates Marshall's Extract of Cocoa.*—Dated December 10, 1829.

THE following is nearly a verbatim description of the process for preparing this patent extract, as given in the specification.

To one pound or thereabouts of ground cocoa, whether of Caraccas, Trinidad, or of other nuts, put about one gallon of water; boil them for about an hour, and carefully skim off the whole of the oil; after passing it through a seive, or any thing that will answer the purpose of a seive, the liquid is to be placed in a chemical water-bath, and to be evaporated until it arrives to about the consistency of treacle, taking care to keep it constantly in motion by stirring; when sufficiently evaporated it may be put into bottles or other vessels, which should be well corked and sealed to exclude the air. The extract thus prepared will be fit for use on the next, or any succeeding day.

Patent granted to JOSEPH ANGE FONZI, *of Upper Mary-le-bone Street, in the county of Middlesex, Gentleman, for certain improvements in or additions to Fire-places.*—Dated September 9, 1829.

THE apparatus described under this patent, to which the inventor has given the appellation of a "Fonzienne," is stated by him to consist of an arrangement whereby he applies the known principle of supplying the air which is to support the combustion of the fuel to the surface of the latter instead of from below; and by causing it to pass downwards, to prevent any smoke, dust, or disagreeable vapour, which would otherwise arise. He directs a square box of cast-iron, without lid or bottom, to be constructed and placed on a hearth of stone or iron plates; within this is to be placed a grating in an inclined position, so that a much larger space shall be left at the back than at the front of the box; below the bars a perforation is made in the former situation for the passage of the smoke, which proceeds through a vertical pipe to a chimney or to the open air; at different distances from the box or stove, are placed two square boxes or cases, through which the pipe is made to pass, the one to serve for a boiler, and the other for an oven, and which are heated by the hot air passing through the flue. This constitutes the principle of the invention, although various modifications are described by the patentee; and he recommends, in conclusion, that in all new houses where it may be wished to make use of this "Fonzienne," a niche should be constructed in lieu of a chimney, through which a funnel of metal should be made to extend through all the apartments, and states that by this means, a fire made in the lower room would heat the others sufficiently without a separate fire in each.

Patent granted to ROBERT TORRENS, *of Croydon, Surrey, a Lieutenant Colonel in the Royal Marines, for certain Apparatus for the purpose of communicating Power and Motion.*—Dated Sept. 9, 1829.

THE power employed for working this patent apparatus is stated to be produced by the alternate dilations of liquids into vapour, and the contractions of vapour into liquids; and which vapour is generated by a fluid that boils at a lower temperature than water.

In the drawings annexed to the specification are represented two cylindrical vessels, with hemispherical tops, placed vertically and parallel to one another, and communicating by a large pipe placed horizontally at their bases. In the interior of these vessels, which are termed the compressers (for reasons that will presently be explained), are placed two smaller cylinders with flat tops, in which the gas or vapour for working the engine is generated. The space between the compresser and the smaller cylinder is filled with water, or other incompressible fluid, which, before the engine commences working, is forcibly pumped in by hand until it raises a safety valve attached to the condenser; which latter is also formed of two vessels in a similar manner, and has a cock attached to it, through which the air contained in the vessels is expelled, on their filling with the fluid forced into them. The inner vessel or generator, inclosed in the compresser, is to be about half filled with the fluid intended to be used, and a small fire being lighted under one of the compressers, the gas produced in the inner vessel, before the boiling of the fluid contained in the outer one is allowed to accumulate until it raises a loaded valve communicating with the compresser; the engine is then charged, and is set in motion by the admission of the gas to a working cylinder, supplied with a piston, as in ordinary steam engines.

Colonel Torrens states that the hydrostatic pressure of the liquid contained in the outer vessel exerted on the inner one, counteracts that of the fluid in the latter, as far as regards any tendency to escape through crevices, or to burst the vessel; for this reason, therefore, he gives the outer cylinder the denomination of a compresser, and recommends that it should be made of cast iron or other strong metal, to enable it to sustain considerable pressure; while the inner one can be constructed of a thin material, and lined with any substance that will withstand the corrosive or other injurious effect of the fluid employed in it.

By an arrangement of pipes, (which pass through the larger one at the base of the compressors, and are consequently continually surrounded with a heated liquid), the gas is conveyed from the generators alternately to the upper and lower part of the working cylinder, being regulated by a sliding valve; from thence it flies off to the inner vessel of the condenser, which is kept constantly cold by means of water pumped at each stroke of the piston into the outer casing; where the fluid employed for generating the gas in its original state collects after condensation.

The patentee in his specification represents the piston rod proceeding downwards, and the beam consequently placed below the cylinder: a crank and fly wheel are attached to the beam, and the strokes of the piston are regulated by a throttle-valve.

As the preventing any escape of vapour is stated to be a principal point gained by this invention, it is proposed for farther attaining this end, to form the piston with double packings, and an intermediate space to be filled with oil or other fluid, which will more effectually preclude the passage of the gas than the single packing usually employed: for this purpose the rod is directed to be made hollow; and at the end attached to the beam is to be affixed a globular vessel, into which and through the whole length of the rod the oil is to be forcibly pumped by hand; so that when withdrawn from the pump and attached to the beam, the hydrostatic pressure of the fluid acting against the sides of the cylinder will prevent any passage of gas. A modification of the generators is also described in the specification, to be used when the *rays of the sun* are intended as the heating medium, and when a fluid is employed that boils at a much lower temperature than water.

Account of the CHEVALIER ALDINI'S *Apparatus for the preservation of persons exposed to flames.*

THE Chevalier Aldini, of Bologna, has been earnestly occupied in the construction of an apparatus, or rather clothing, intended to preserve persons from injury who are exposed to flames, which has become the subject of some of the *Conversazioni* at the Royal Institution. The following description of its composition and effects, in the words of Professor Farraday, will convey a just idea of its properties as well as of its application :—

A union of the powers possessed by a metallic tissue to intercept flame, with the incombustible and badly conducting properties of amianthus, or other substances, has been made in the apparatus ; and the latter consists of two distinct systems of clothing, the one near the body composed of the badly conducting incombustible matter, and the other, or external envelope, of a metallic tissue.

The pieces of clothing for the body, arms, and legs, are made of strong cloth which has been soaked in a solution of alum; those for the head, the hands, and the feet, of cloth of asbestos. That for the head is a large cap, which entirely covers the whole of the neck, and has apertures in it for the eyes, nose, and mouth, these being guarded by a very fine copper-wire gauze. The stockings and cap are single, but the gloves are double, for the purpose of giving power of handling inflamed or incandescent bodies.

M. Aldini has, by perseverance, been able to spin and weave asbestos without previously mixing it with other fibrous substances; the action of steam is essential in the bending and twisting of it, otherwise the fibres break. The cloths prepared with it were not of close texture, but loose: the threads were about one-fiftieth of an inch in diameter, and of considerable strength: cords of any size or strength may be prepared from them. M. Aldini hopes to be able so to prepare other fibrous matters, as to be able to dispense altogether with this rare and costly material.

The metallic defence consists of five principal pieces; a casque, or cap complete, with a mask: this is of such size as to allow of sufficient space between it and the asbestos cap, and is guarded before the face by a visor, so that the protection is doubled in that part; a cuirass, with its brassets; a piece of armour for the waist and thighs; pair of boots of double wire gauze; and an oval shield, five feet long, and two and a half wide, formed by extending gauze over a thin frame of iron. The metallic gauze is of iron, and the intervals between the threads about one twenty-fifth of an inch each.

When at Geneva, M. Aldini instructed the firemen in the defensive power of his arrangements, and then practised them before he made the public experiments. He shewed them that a finger enveloped first in asbestos, and then in a double case of wire gauze, might be held in the flame of a spirit-lamp or candle for a long time, before inconvenient heat was felt; and then clothing them, gradually accustomed them to the fiercest flames.

The following are some of the public trials made. A fireman having his hand inclosed in a double asbestos glove, and guarded in the palm by a piece of asbestos cloth, laid hold of a large piece of red hot iron, carried it slowly to the distance of 150 feet, then set straw on fire by it, and immediately brought it back to the furnace. The hand was not at all injured in the experiment.

The second experiment related to the defence of the head, the eyes, and the lungs. The firemen put on only the asbestos and wire gauze cap, and the cuirass, and held the shield before his breast. A fire of shavings was then lighted, and sustained in a very large raised chaffing dish, and the fireman approaching it, plunged his head into the middle of the flames, with his face towards the fuel, and in that way went several times round the chaffing-dish, and for a period above a minute in duration. The experiment was made several times, and those who made it said they suffered no oppression or inconvenience in the act of respiration.

The third experiment was with the complete apparatus.

Two rows of faggots, mingled with straw, were arranged vertically against bars of iron, so as to form a passage between thirty feet long, and six feet wide. Four such arrangements were made, differing in the proportion of wood and straw, and one was with straw alone. Fire was then applied to one of these double piles, and a fireman, invested in the defensive clothing, and guarded by the shield, entered between the double edge of flames, and traversed the alley several times. The flames rose ten feet in height, and joined over his head. Each passage was made slowly, and occupied from twelve to fifteen seconds; they were repeated six or eight times, and even oftener, in succession, and the firemen were exposed to the almost constant action of the flames for the period of a minute and a half, or two minutes, and even more.

When the course was made between the double range of faggots without straw, the fireman carried a kind of pannier on his back, prepared in such a way as to be fire-proof, in which was placed a child, with its head covered by an asbestos bonnet, and additionally protected by the wire-gauze shield.

Four firemen made these experiments, and they agreed in saying, that they felt no difficulty in respiring. A very abundant perspiration came on in consequence of the high temperance to which they had been exposed, but no lesion of the skin took place except in one instance, where the man had neglected to secure his neck by fastening the asbestos mask to the body dress.

No one present could resist the striking evidence of defence afforded when they saw the armed man traversing the undulating flames, frequently hidden altogether from view by them as they gathered around him.

The fact that in M. Aldini's apparatus a man may respire in the middle of the flames is very remarkable. It has often been proved, by anatomical examination, that in cases of fire many persons have died altogether from lesions of the organs of respiration. It would appear that the triple metallic tissue takes so much of the caloric from the air as it passes to the lungs, as to render its temperature supportable; and it is known, by experiments in furnaces, that a man can respire air at 120 or 130° C. (= 246 or 267 F.), and even higher. Perhaps also the lesions referred to may have been due to aqueous vapour, which is often produced in great abundance in fires where endeavours are made to extinguish them by water, for such vapour would transfer far more heat to the lungs than mere air. Hence in every case, and however guarded, firemen should enter houses in flames with great prudence, because the circumstances are not the same as in the experiments just described.

It is remarked that several suits of this defensive clothing should be provided, not to clothe many persons at once, but that, in endeavouring to save persons or valuable things in cases of fire, the fireman should not approach again and again in heated clothing, but have a change at hand. The Grand Duke of Tuscany has ordered six suits for the city of Florence.

M. Aldini shewed several experiments relative to the extinguishing power of his preparations before the Société de Physique de Genève. One consisted in placing an asbestos cloth of loose texture over a flame either of wax or alcohol; the flame was intercepted as well as it could have been by a piece of wire gauze. This experiment is supposed to favour the objections made to Sir H. Davy's explication of the theory of the wire gauze safety-lamp; but there seems to be a mistake in the idea which has been taken of that theory. Sir H. Davy never explained the effect of his lamp by absorption of heat from flame dependant upon the good conducting power of the tissue alone, but by the joint action of absorption and radiation. There is no doubt that cloth of asbestos is an admirable radiator, and that this power, with its conduction, is probably sufficient to explain the effects upon Sir H. Davy's theory.*

Observation on Writing Ink.—By J. Bostock, M.D., F.R.S. *&c., Chairman of the Committee of Chemistry.*

From the Transactions of the Society of Arts.

When the sulphate of iron and the infusion of galls are added together, for the purpose of forming ink, we may presume that the metallic salt or oxide enters into combination with at least four proximate vegetable principles:—gallic acid, tan, mucilage, and extractive matter; all of which appear to enter into the composition of the soluble part of the gall-nut. It has been generally supposed, that two of these, the gallic acid and the tan, are more especially necessary to the constitution of ink; and hence it is considered, by our best systematic writers, to be essentially a tanno-gallate of iron. It has also been supposed, that the peroxide of iron alone possesses the property of forming the black compound which constitutes ink, and that the substance of ink is rather mechanically suspended in the fluid than dissolved in it.

Ink, as it is usually prepared, is disposed to undergo certain changes, which considerably impair its value; of these the three following are the most important: its tendency to moulding; the liability of the black matter to separate from the fluid, the ink then becoming what is termed ropy; and its loss of colour, the black first changing to brown, and at length almost entirely disappearing.

* It has been reported in some of the public journals, that it is in contemplation to supply the New Police of the metropolis with this Fire-proof Clothing.

Besides these, there are objects of minor importance to be attended to in the formation of ink. Its consistence should be such as to enable it to flow easily from the pen, without, on the one hand, its being so liquid as to blur the paper, or, on the other, so adhesive as to clog the pen, and to be long in drying. The shade of colour is not to be disregarded; a black, approaching to blue, is more agreeable to the eye than a browner ink; and a degree of lustre or glossiness, if compatible with the due consistence of the fluid, tends to render the characters more legible and beautiful.

With respect to the chemical constitution of ink, I may remark, that although, as usually prepared, it is a combination of the metallic salt or oxide with all the four vegetable principles mentioned above, yet I am induced to believe, that the last three of them, so far from being essential, are the principal cause of the difficulty which we meet with in the formation of a perfect and durable ink. I endeavoured to prove this point by a series of experiments, of which the following is a brief abstract: having prepared a cold infusion of galls, I allowed a portion of it to remain exposed to the atmosphere, in a shallow capsule, until it was covered with a thick stratum of mould; the mould was removed by filtration, and the proper proportion of sulphate of iron being added to the clear fluid, a compound was formed of a deep black colour, which shewed no farther tendency to mould, and which remained for a long time without experiencing any further alteration.

Another portion of the same infusion of galls had a solution of isinglass added to it, until it no longer produced a precipitate; by employing the sulphate of iron, a black compound was produced, which, although paler than that formed from the entire fluid, appeared to be a perfect and durable ink. Lastly, a portion of the infusion of galls was kept for some time at the boiling temperature, by which means a part of its contents became insoluble; this was removed by filtration, when, by the addition of the sulphate of iron, a very perfect and durable ink was produced. In the above three processes, I conceive that a considerable part of the mucilage, the tan, and the extract, were respectively removed from the infusion, while the greatest part of the gallic acid would be left in solution.

The three causes of deterioration in ink, the moulding, the precipitation of the black matter, and the loss of colour, as they are distinct operations, so we may presume that they depend on the operation of different proximate principles. It is probable that the moulding more particularly depends on the mucilage, and the precipitation on the extract, from the property which extractive matter possesses of forming insoluble compounds with metallic oxides. As to the operation of the tan, from its affinity for metallic salts, we may conjecture, that, in the first instance, it forms a triple compound with the gallic acid and the iron, and that, in consequence of the decomposition of the tan, this compound is afterwards destroyed. Owing to the difficulty, if not impossibility, of entirely depriving the infusion of galls of any one of its ingredients, without, in some degree, effecting the others, I was not able to obtain any results which can be regarded as decisive; but the general result of my experiments favours the above opinion, and leads me to conclude, that, in proportion as ink consists merely of the gallate of iron, it is less liable to decomposition, or to experience any kind of change.

The experiments to which I have alluded above, consisted in forming a standard infusion, by macerating the powder of galls in five times its weight of water, and comparing this with other infusions which had either been suffered to mould, from which the tan had been abstracted by jelly, or which had been kept for some time at the boiling temperature, and by adding to each of these respectively both the recent solution of the sulphate of iron, and a solution which had been exposed for some time to the atmosphere. The nature of the black compound produced was examined by putting portions of it into cylindrical jars, and observing the changes which they experienced, with respect either to the formation of mould, the deposition of their contents, or any change of colour. The fluids were also compared by dropping portions of them upon white tissue-paper, in which way both their colour and their consistence might be minutely ascertained. A third method was, to add together the respective infusions and the solutions of the sulphate of iron in a very diluted state, by which I was enabled to form a more correct comparison of the quantity and of the shade of the colouring matter, and of the degree of its solubility.

The practical conclusions that I think myself warranted in drawing from these experiments are as follow:—In order to procure an ink which may be little disposed either to mould or to deposit its contents, and which, at the same time, may possess a deep black colour not liable to fade, the galls should be macerated for some hours in hot water, and the fluid filtered; it should be then exposed for about fourteen days to a warm atmosphere, when any mould which may have been produced must be removed. A solution of sulphate of iron is to be employed which has been exposed for some time to the atmosphere, and which consequently contains a certain quantity of the red oxide of iron diffused through it. I should recommend the infusion of galls to be made of considerably greater strength than is generally directed, and I believe that an ink formed in this manner will not necessarily require the addition of mucilaginous substance to render it of a proper consistence.

I have only to add further, that one of the best substances for diluting ink, if it be, in the first instance, too thick for use, or afterwards become so by evaporation, is a strong decoction of coffee, which appears in no respect to promote the decomposition of the ink, while it improves its colour, and gives it an additional lustre.

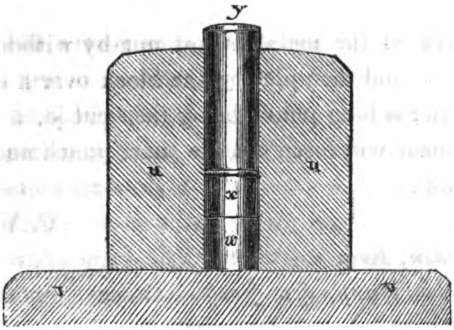
Method of condensing Brass.—By MR. CORNELIUS VARLEY.

From the Transactions of the Society of Arts.

SIR,—About thirty-five years ago, a very costly chronometer was put into the hands of my late uncle, Mr. Samuel Varley. It was apparently without fault, but had baffled the efforts of some of the best workmen in the trade to make it keep time. My uncle discovered the cause of this imperfection to arise from the balance being magnetic; he accordingly replaced it with one of well-hammered gold; and the watch was soon made to keep good time. He was ever afterwards accustomed to employ gold or brass as the material for the balance of all important watches, making the brass himself in order to secure its purity, and hammering both it and the gold in the tool about to be described. He also made escapement-wheels of brass thus hammered, and was frequently applied to by others in the trade for brass of his making and preparing, it being found that such would bear cutting finer and sharper than any other, without failing; for (to use the somewhat quaint but expressive phrase of the workmen), his brass exhibited in the lathe a certain sweetness and pleasantness, evidently the result of superior homogenity.

If a piece of malleable metal be successively struck on two opposite sides by a hammer the face of which is larger than the metal, this latter soon spreads out and cracks at the edge. If, on the contrary, the face of the metal is larger than that of the hammer, and the blows be given as nearly as may be, on the centre of the plate, the part struck, being surrounded by a hoop of metal, as it were, can scarcely spread laterally, and is soon hardened by condensation: but the neighbouring parts, in proportion as they approach the margin of the plate, not being sufficiently restrained from spreading under the hammer, cannot be hardened in the same degree with the middle portion: besides, every blow, while hardening the part immediately under it, is, in consequence of the inequality of resistance, producing a contrary action on the adjacent parts, by violently straining and stretching them. If the metal be in the form of a block, and be hammered on all sides, a tolerably uniform mass may be obtained; but this uniformity is only a balance of opposite states all through the mass, it being impossible to condense the block by hammering in one part, without forcibly straining the neighbouring parts. Such hammering, therefore, is limited; for although a certain quantity hardens the metal, every blow beyond this increases its unsoundness, till at last the block is good for nothing, and can only be cured by melting or welding it afresh.

The tool (shewn in the annexed cut), obviates all these inconveniences. *u u* is the section of a block of hard steel, made perfectly flat at bottom, where it rests on the face of the anvil *v v*; a hole, about one fourth of the diameter of the block, is bored through its axis truly vertical; *w* is a short cylinder of hard steel dropped into the hole in the block, which accurately fits, and resting on the anvil; *x* is the piece of brass or other metal to be hardened: it must be turned quite clean and smooth, so as to fit the hole with perfect accuracy, and must be made quite flat both at bottom and at top; *y* is a punch of hard steel, with a somewhat convex top. The pieces being put together, the top of the punch *y* is to be struck with a moderately heavy hammer, gently at first, and increasing gradually to the utmost effect; this must then be changed for the largest hammer that the block and punches can safely bear. The momentum of the blows will be communicated to the disk *x*; and as both this and the punches are made accurately to fit the hole in the block, it is evident that the only effect of the blows can be the condensation of the disk *x*.



At the commencement of the hammering, a remarkable difference, both in the sound and in the feel of the hammer in the hand, will be perceived between striking on the punch and on the anvil: as the work proceeds, this difference becomes less; and when the difference has ceased, that is, when the hammer rebounds from the top of the punch as much as it would do from the anvil, the metal has acquired its greatest degree of hardening by compression. A large hammer, with moderate speed, appears to communicate its effect deeper into a block of metal than a lighter one moving as much quicker as it is lighter; for the metal springs to a quick blow, for want of time to allow the particles permanently to recede; a heavy blow, on the contrary, being slower than the vibrations of the metal, overrules them, and sends the effect deeper into its substance. The shorter the punch, the more efficiently does it communicate the impulse of the hammer: the length, therefore, of the hole in the block above the metal should not be more than sufficient to form a secure guide to the punch, and the upper unsupported part of the punch should be as short as it can conveniently be made. The block, as well as the upper and the lower punch, should be hardened and then tempered to a straw colour, to enable them to bear the long-continued action of the hammer.

The disk of the metal is got out by withdrawing the upper punch, and then placing the block over a hole larger than its own; a long punch being then put in, a few blows of the hammer will force out the short punch and the condensed metal.

C. Varley.

A. Aikin, Esq.
Secretary, &c. &c.

FRENCH PATENTS.

French Patent granted to M. Derepas, *of Paris, for a peculiar composition of Phosphorus Matchlights.*

Into a large flask heated in a sand-bath, put eight parts of pure phosphorus, which you are to half melt, without allowing it to oxidize. After it is dissolved, add four equal parts of magnesia: mix the whole for an hour at the heat of 90 degrees of Réaumur (=234·5 F.) and moderate the fire in proportion as the operation is terminated. When cooled to from 30° to 33° (= 99°.5 to 106·25), this composition forms a sort of fat powder, which is put into bottles, and, when cold, carefully stopped. This substance forms an opaque body, fit for inflaming a common match.—*(Descript. des Brevets).*

French Patent granted to MESSRS. MICHAUD LABONTE & DEPUIS, *of Paris, for the invention of a method of plating copper (cuivre) with platina.*

TAKE 123 grammes (= 1899·6 grains) of fine silver, which you are to prepare for solution by the addition of 490 grammes (= 7567·6 E. grains) of nitric acid at 48° (= 1·50 specific gravity, at 55° F.): introduce them into a matrass and expose it on a sand-bath over a continued fire, till the silver is perfectly dissolved.

Afterward prepare, in a porcelain capsule, 490 grammes of white tartar and the same quantity of marine salt. When these substances have been pulverized together, pour the solution into the capsule and stir the whole with a wooden spatula, till a perfect mixture is obtained. This composition is used for preparing the copper intended to be plated: for this purpose, the copper is first cleaned, and this composition is afterwards applied to it to whiten it. This application being made, with the assistance of a flat and very clean piece of cork, upon the metal, the latter is afterwards enveloped by a leaf of virgin silver, and exposed to the action of a well-closed air-furnace. Let it heat to a degree above cherry red. Apply, by means of a burnisher, and rub on the plate without taking it out of the furnace, and this will apply the substance on the copper plate. When the whole forms only one body, pass it between laminating rollers, to give it the consistency of a solid body. This first operation terminated, the leaf of platina is prepared of the proper size for the copper plate intended to be covered, so as to envelope it, and both are cleaned with sand, to remove any grease they may have on them, and dried with clean linen, that there may be no moisture remaining. The copper is then enveloped by the platina foil, in the same manner as it was before enveloped by the leaf of virgin silver, and submitted to the action of the same furnace as before, rubbing also in the same way with the burnisher, which applies the platina.—*(Desc. des Brevets)*.

New Blow-pipe, intended as a Substitute for the Enameller's Lamp.—By M. Danger.

The body of this instrument is formed of a small square piece of wood, having a groove made laterally in the middle of its length, which fits to the edge of a table, and is furnished underneath with a locking screw serving to fix it. The piece of wood has a perpendicular hole bored through it, which receives at bottom a little glass tube, to which a bladder or leathern bag is tied forming a reservoir of air, and at top a glass nozzle or blow-pipe, which fits in tight by means of a cork. A lateral hole, communicating with the first, receives the bent tube, by means of which the reservoir is supplied with air. This tube is formed of two pieces fitting into each other, so that it can be lengthened at pleasure. The upper part where the mouth is applied is furnished with an ivory mouth-piece, and the bent part presents, near its base, a contraction or choke, into which a cone of cork enters. This cone, acting as a valve, is furnished with a brass wire sliding freely in a small guide fitted to the end of the tube. On blowing into the tube, the valve presses against the little guide, and thus yields a passage to the air; but as soon as the air endeavours to return, the valve returns, lodging in the contracted part of the tube, and closes the passage.

The workman sitting before the table, blows now and then to supply the reservoir, which he presses between his knees. In this way, he has it in his power to modify the jet of flame at his pleasure.

The lamp placed before the instrument is of simple construction. A small *capuchon* covers the flame, which takes an inclined direction.—(*Bull. de la Soc. d' Encouragement.*)

On the treatment of Siliceous Minerals by the Alkaline Carbonates.

The ready fusion which M. Berthier has observed in a great number of salts mixed in atomic proportions, may be applied to the treatment of siliceous minerals by the carbonates of soda or potash over a spirit lamp. If we make a mixture of five parts of carbonate of potash and four of carbonate of soda, this mixture will melt so easily, that we can bring 15 grammes (= 231·6 grains) into perfect fusion over a spirit lamp, with a double current of air. If sand be added to the mixture, as lively an effervescence is produced as when an acid is poured on the alkaline carbonates. This effervescence occasions a spirting out of the materials; and, by a too great addition of the siliceous mineral, the mass becomes moreover too difficult to melt when the mineral has not been reduced into very fine powder and intimately mixed. For this reason, it is necessary to commence by mixing it with the two carbonates. In this way, several grammes of felspar (feld-spath) may be very readily decomposed over the spirit lamp.—(*Annalen der Physik.*)

NOTICE OF EXPIRED PATENTS.

FRANCIS TURREL, of Long Acre, Middlesex, Coach-maker, for a wheel-guard.—Dated March 2, 1816.

JOHN WOOD the Younger, of Bradford, Worsted Spinner, and JOSHUA WORDSWORTH, of Leeds, Machine Maker, both in the county of York, for improvements in machines applicable to every description of spinning. Dated March 2, 1816.

BRYAN DONKIN, of Grange Road, Bermondsey, Surrey, Engineer, for a mean or method of effecting certain purposes or processes in which a temperature above that of boiling water is requisite or desirable, by applying the temperature requisite or desirable in the said certain process for effecting the said certain purposes in a manner not hitherto employed therein.—Dated March 2, 1816.—(*For copy of Specification, see Repertory, Vol. XXX, p. 23.*)

GEORGE FREDERICK MUNTZ, of Birmingham, Warwickshire, Roller of Metals, for a method of abating, or nearly destroying, smoke, and of obtaining a valuable product therefrom. Dated March 2, 1816.

JOHN LEIGH BRADBURY, of Gloucester, Gentleman, for improvements in the machinery for spinning of cotton, flax, wool, tow, worsted, or any other fibrous substance. —Dated March 9, 1816.

PIERRE FRANCOIS MONTGOLFIER, of Leicester Square, Middlesex, Engineer, for improvements on the machine denominated *Bellier Hydraulique, or Hydraulic Ram.* —Dated March 14, 1816.—(*For copy of Specification, see Repertory, Vol. XXX, p.* 11.)

JOHN STEAD, of Wicker, Brightside Bierlow, near Sheffield, Yorkshire, Coach Maker, for an improvement of a stage-coach, or other coach or carriage, for the carrying of passengers; lighter and more commodious than usual, that is to say, for the carrying of four or more inside passengers, and six, eight, ten, or more outside passengers, with greater safety than those now in use carrying the same number of passengers.—Dated March 14, 1816.

MARC ISAMBARD BRUNEL, Chelsea, Middlesex, Gentleman, for a knitting machine.—Dated March 14, 1816.

WILLIAM WEST and DANIEL WEST, both of Bombay, in the East Indies, for certain methods of producing and applying power and motion to presses, and other mechanical apparatus.—Dated March 14, 1816.

P. F. MONTGOLFIER, of Leicester Square, Middlesex, Engineer, and H. D. DAYME, of the same place, Gentleman, for improvements in a machine, which acts by the expansion or contraction of air heated by fire, and which machine is applicable to the raising of water, or giving motion to mills or other machines.—Dated March 14, 1816. (*For copy of Specification, see Repertory, Vol. XXXII, p.* 257.)

JAMES DAWSON, of the Strand, Middlesex, Esq. for new or improved means of producing or communicating motion in or unto bodies, either wholly or in part surrounded by water or air, or any or either of them, by the re-action of suitable apparatus upon the said water or air, or upon both of them.—Dated March 14, 1816.

JOHN FITKIN, of Old Street Road, in the parish of Shoreditch, Middlesex, Truss Maker, WILLIAM FITKIN, of the same place, Truss Maker, and JOSEPH BARTON, of Lombard Street, London, Gentleman, for a new truss.—Dated March 14, 1816.

PIERRE PELETAN, of Manchester, in the county of

Lancaster, Chemist, for a new method or methods of making sulphuric acid, commonly called oil of vitriol.—Dated March 14, 1816.

Samuel Jean Pauly, of Knightsbridge, Middlesex, Engineer, for an article or substance for making without seams, coats, great coats, waistcoats, habits, cloaks, pantaloons, mantles, stockings, socks, and any other kind of clothing, covers for umbrellas and hats, and mattresses, seats, and cushions filled with atmospheric air.—Dated March 23, 1816.

Enoch Tonkin, of the City Road, Middlesex, for a globe reflecting stove for light and heat.—Dated March 20, 1816.

Emerson Dowson, of Wellbeck Street, Middlesex, Ironmonger, and John Isaac Hawkins, of Titchfield Street, in the same county, Engineer, for improvements or additions to grates and stoves, and an instrument, machine, or apparatus for supplying grates and stoves with fuel.—Dated March 23, 1816.—(*For copy of Specification, see Repertory, Vol. XXIX, p.* 76.)

Robert Cameron, Junr. of Edinburgh, Paper Maker, for a machine for manufacturing paper on a principle entirely new.—Dated March 23, 1816.

Joseph Bowles, of Bennett Street, Blackfriars Road, Surrey, Millwright, for improvements in or on oil mills.—Dated March 23, 1816.

Samuel Brown, of Westgate, Norfolk, Ironfounder, for improvements upon the swing and wheeled plough-carriages and plough-shares.—Dated March 23, 1816.

Henry Osborne, of Bordesly, near Birmingham, Warwickshire, for a method or principle of producing cylinders of various descriptions.—Dated March 23, 1816.

John Merryweather, of the Castle of Lincoln, Gentleman, for a means of propelling boats and vessels through the water. Dated March 23, 1816.

ABRAHAM ROGERS, of Sheft, Halifax, Yorkshire, Coal Merchant, for a method of effecting a saving in the consumption of coal or fuel, by an improvement in the mode of setting or heating boilers of steam-engines, and other bodies of different descriptions; also for heating and warming stoves, drying houses, manufactories, and other buildings, and for burning different descriptions of glasses. —Dated March 23, 1816.

LEBRECHT STEINHAUSER, of Old Bond Street, Middlesex, Mechanist, for a new or improved castor or roller for tables, sofas, bedsteads, and other articles.—Dated March 23, 1816.

JAMES YOUNIE, of Theobald's Road, Red Lion Square, Middlesex, Ironmonger, for an invention for the prevention or cure of smoky chimnies.—Dated March 23, 1816.— *(For copy of Specification, see Repertory, Vol. XXX, p.* 337.)

JOHN SORBY, the Younger, of Sheffield, Yorkshire, Edge-tool Maker, for a method of making an auger, for the use of shipwrights, millwrights, carpenters, and other artificers, upon a new and improved construction.—Dated March 23, 1816.

WILLIAM MACNAMARA, of East Smithfield, Middlesex, Plate Glass Manufacturer, for a method or methods of manufacturing glass.—Dated March 23, 1816.

URIAH HADOCK, of Holloway, Middlesex, Chemist, for a new species of paint, colour, and cement, for painting and colouring, and preserving, the interior and exterior of houses, ships, and other things.—Dated March 23, 1816.

LIST OF NEW PATENTS.

JOHN BRAITHWAITE, and JOHN ERICSSON, of the New Road, in the county of Middlesex, Engineers, for an improved method of manufacturing salt.—Dated February 27, 1830.—(*Two months.*)

ENOCH WILLIAM RUDDER, and ROBERT MARTINEAU, of Birmingham, in the county of Warwick, Cock Founders, for certain improvements in cocks for draining off liquids. —Dated February 27, 1830.—(*Six months.*)

CHARLES RANDOM, BARON DE BERENGER, of Target Cottage, Kentish Town, in the parish of Saint Pancras, in the county of Middlesex, for improvements in fire-arms and in certain other weapons of defence.—Dated February 27, 1830.—(*Six months.*)

WILLIAM GRISENTHWAITE, of Nottingham, Esq. for an improved method of facilitating the draft or propulsion, or both of wheeled carriages.—Dated February 27, 1830. —(*Six months.*)

HENRY HIRST, of Leeds, in the county of York, Clothier, for certain improvements in manufacturing woollen cloth.—Dated February 27, 1830.—(*Six months.*)

MOSES POOLE, of Lincoln's Inn, Gentleman, for a certain combination of, or improvement in, springs applicable to carriages and other purposes. Communicated by a foreigner.—Dated February 27, 1830.—(*Two months.*)

JOSEPH CHESSEBOROUGH DYER, of Manchester, in the county of Lancaster, Patent Card Manufacturer, for certain improvements on, and additions to, machines or machinery to be used and applied for conducting to, and winding upon spools, bobbins or barcels, rovings of cotton, flax, wool, or other fibrous substances of the like nature.—Partly communicated by a foreigner.—Dated February 27, 1830.—*(Six months.)*

WILLIAM GRISENTHWAITE, of Nottingham, Esq. for certain improvements in steam engines.—Dated February 27, 1830.—*(Six months.)*

ROBERT WILLIAM SIEVIER, of Southampton Row, Russell Square, in the parish of St. George's Bloomsbury, in the county of Middlesex, Sculptor, for certain improvements in the construction of rudders in navigating vessels. Dated February 27, 1830.—*(Six months.)*

SIMON THOMPSON, of Great Yarmouth, in the county of Norfolk, Mariner's Compass Maker, for certain improvements in piano fortes.—Dated February 27, 1830.—*(Six months.)*

WILLIAM HOWARD, of Rotherhithe, in the county of Surrey, Iron Manufacturer, one of the people called Quakers, for certain improvements in the construction of wheels for carriages.—Dated February, 27, 1830.—*(Six months.)*

PHILIP CHILWELL DE LA GARDE, of the city of Exeter, Gentleman, for certain improvements in apparatus for fidding and unfidding masts, and in masting and rigging of vessels.—Dated February 27, 1830.—*(Six months.)*

THOMAS PROSSER, of the city of Worcester, Architect, for certain improvements in the construction of window sashes and in the mode of hanging the same.—Dated March 6, 1830.—*(Six months.)*

THOMAS RICHARD GUPPY, of the city of Bristol, Sugar Refiner, for a new apparatus for granulating sugar.—Dated March 6, 1830.—*(Six months.)*

RALPH STEVENSON, of Colridge, Stafford, Potter, for improvements in machinery for making from clay, or other suitable materials quarries, bricks, tiles, and other articles. —Dated March 6, 1830.—(*Six months.*)

JAMES RAMSAY and ANDREW RAMSAY, both of Greenwich, in North Britain, Cordage and Sail Cloth Manufacturers, and MATTHEW ORR, of Greenoch aforesaid, Sail Maker, for an improvement in the manufacture of canvas and sail cloth for the making of sails.—Dated March 20, 1830.—(*Six months.*)

GEORGE SCOTT, of Water Lane, in the city of London, Engineer, for certain improvements on, or additions to, windlasses and relative machinery applicable to naval purposes.—Dated March 20, 1830.—(*Six months*).

JOHN ALEXANDER FULTON, of Lawrence Poultney Lane, Cannon Street, in the city of London, Merchant, for an improvement in the preparation of pepper.—Dated March 20, 1830.—(*Six months.*)

WILLIAM ERSKINE COCHRANE, Esq. of Regent Street, in the county or Middlesex, for an improvement or improvements on his patent cooking apparatus.—Dated March 20, 1830.—(*Six months.*)

BENJAMIN ROTCH, of Furnival's Inn, in the county of Middlesex, Barrister at Law, for improved guards or protections for horses legs and feet under certain circumstances. —Dated March 20, 1830.(—*Twelve months.*)

Persons desirous of obtaining Patents for inventions, may have them procured with little trouble to themselves, and generally without their personal attendance in London, on application to the EDITORS *of the* REPERTORY *(addressed to the care of Messrs. T. & G.* UNDERWOOD, *32, Fleet Street,) who, from long practice and experience, presume they may be enabled to afford important assistance to Patentees in drawing up and adjusting their Specifications, on the accuracy and perspicuity of which, in a great measure, depends the security of the Patent.*

ducing to powder, a portion of the coke attendant


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Fig 2
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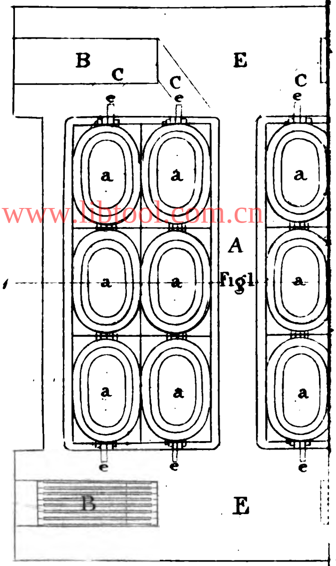
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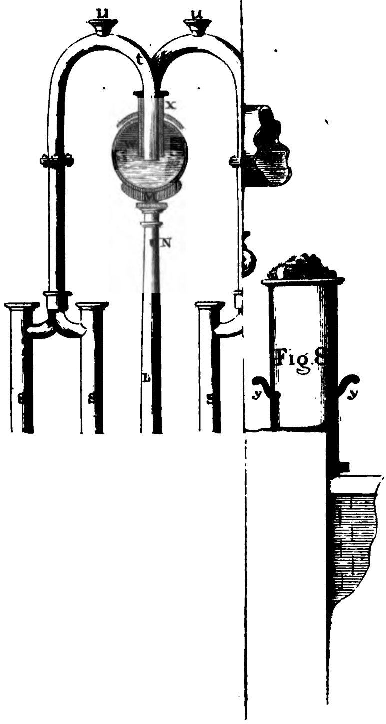
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THE

REPERTORY

OF

PATENT INVENTIONS,

No. LIX. MAY, 1830.

Specification of the Patent granted to JOHN BRUNTON, *of West Bromwich, in the county of Stafford, Engineer, for improvements in the apparatus for manufacturing Coal Gas and Coke, and also improvements in the method of arranging such apparatus.*—Dated October 2, 1828.

WITH A PLATE.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Brunton, do hereby declare, that the nature of my said invention, and the manner in which it is performed, are particularly described and set forth in the following description thereof, and in the drawings hereunto annexed, (that is to say):—

My improvements consist, first, of retorts made of cast iron, and not cased or lined with fire clay, of a conical shape, for the purpose of facilitating the discharge of the coke at the larger end, when the retorts are fixed in a vertical position with that end downward, thereby saving much labour and inconvenience in the discharge thereof, and also preventing the injury which is occasioned by the breaking and and reducing to powder, a portion of the coke attendant upon the ordinary method of discharging retorts. Secondly, in the adaption of a perforated pipe, of a conical or other convenient shape to the retorts, for the purpose of enabling the gas to escape freely through the mass of coal when it is of such a nature as to make it desirable to facilitate the escape of the gas by some such means. Thirdly, in an improved furnace or fire-place, door or mouth. Fourthly, in a contrivance for preventing the breaking or disturbance of flanches or joints by the expansion and contraction of the hydraulic main, or the pipes leading thereto. Fifthly, in improvement in the arrangement of various parts of gas apparatus; which arrangements, and also the improvements in the various apparatus, are set forth in the annexed drawings and the explanations thereof. Any convenient number of my retorts may be connected together or placed in beds; but I have in my drawings, confined myself to a set or bed of twelve retorts, considering that that number will be generally useful and advantageous.

The same letters or characters refer to the same parts in each of the drawings, and thus illustrate each other: Fig. 1, (Pl. VI.) a ground plan of a bed or set of twelve retorts. Fig. 2 shows the mode of connecting the mouth pieces of the retorts. Fig. 3 a cross section. Fig. 4 a sectional plan of the upper end of fig. 3. Fig. 5 a general elevation, shewing the thoroughfare under the beds of the retorts for the purpose of discharging, &c. Fig. 6 exhibits the bottom cover or stopper of a retort. Fig. 7 exhibits the perch or support of the coal within the retort. Fig. 8 exhibits a measure that may be used in charging the retorts.

Fig. 1 a ground plan of a double bed of retorts containing six in each, and which are marked *a*. A is a wall of fire-bricks passing between the two beds, and is supported by a sleeper K, as shown in fig. 3. B B are two furnaces heating the two beds of retorts through the flues

C C C C, which passing along the outside of the retorts unite and return between them into the main flue leading to the chimney, as is shown more distinctly in fig. 4.

Fig. 2 shows the manner in which the mouth pieces are connected together, viz. by means of bolts and screws passing through the flanches *d d d d*. *e e* two flanch pieces (shewn also in fig. 1), extending beyond those of the retorts, and resting on the piers E E, fig. 1, for their support. The outer part of these flanches marked *q*, form supports for the bottom of the flues. Fig. 3 a cross section by the line 1, 2, in fig. 1, shewing its elevation, with stand and H pipes, hydraulic main, &c. A is the wall dividing the two beds of retorts. D D are the two outside walls or arches connecting the two piers E E, (see fig. 5). Under these arches are two walls F F, supported upon sleepers G G, and containing four stoppers T T T T, fig. 5, for the convenience of withdrawing in order to clear out the flues. *a a a a* are the four conical retorts, the lower ends of which are shewn with their covers in various positions. *j* the lower cover or stopper of a retort, (shown more distinctly in fig. 6). The mode of attaching it to the mouthpiece is shewn in the drawing, but I do not claim any particular mode of doing it. *f* a perch or support for the coals within the retort, and is attached to a rod *g*, which passes through the cover *j*, and is secured at the proper height by the screwed cap *h*. The perch is shewn more distinctly in fig. 7. *n* an upper cover, which when placed on the top of the retort and luted in the usual manner, is kept down by the pressure of the lever and weight *o* upon the centre of it; but which in case of a stoppage in the pipes allows it to act as a safety valve and thereby prevent mischief. The end of the lever opposite to the one carrying the weight is attached to the support *p*. *b* a perforated pipe inserted into the retort for the purpose of facilitating the escape of gas when generating from small coal: it is kept in its place at the bottom by the perch *f*, and at the upper end by the cross bar *m*. H H H H figs. 3 and 5, represent the furnace doors; the entrance to each furnace consists of a frame and two doors meeting in the middle and there forming an angle, as shewn in the drawings, the one door opening upwards and the other downwards. The lower door is opened when the fire-place wants cleaning; the upper door is opened for the purpose of introducing fuel, a portion of which lies against the door, preserving them in a great degree from the action of the fire, and at the same time preventing the escape of a portion of heat. W the ash pit, in which is placed the water trough X. I I I I are cover tiles resting on the upper flanches C C, &c. and upon the walls A and D. To prevent any expansion of the hydraulic main, or the pipes leading thereto breaking or disturbing the flanches or joints connected therewith, instead of supporting the hydraulic main in the usual manner by means of an inflexible column or standard, I interpose or place between the hydraulic main and the upper part of the column or standard, a crutch or bearer, the lower part of which is allowed to press upon one end of a compensating lever, to the other end whereof a weight is attached. These levers and weight are so proportioned to the weight of the hydraulic main as to allow the crutch upon the upper part of which the hydraulic main rests, to move up and down with it, and thereby prevent the inconvenience which might otherwise arise. As a further means of preventing injury from the expansion of the pipe, I fix to the hydraulic main a requisite number of dip pipes, each of which descends about three inches into the liquid contained in the main; and through these dip pipes to about the same depth in the liquid, the H pipes are passed so loosely as to allow the liquid to form an hydraulic joint between them, and therefore render a stiff and inflexible joint of the hydraulic main and the pipes leading into it unnecessary, and allow them to expand and contract by a change of temperature without occasioning any inconvenience. In the drawing, figs. 3 and 5, *r*, an aperture in the upper end of the retort through which the gas passes into the stand pipes; *s* a stand pipe; *t* the pipe usually called H pipe, leading from the stand pipe *s* to the hydraulic main. *a*, a branch and bonnet in the middle of the pipe *t*, for the convenience of cleaning it; *w* the hydraulic main; *x* a dip pipe fixed to the main, and through which, the end of the pipe *t* passes so freely as to allow the liquid to form an hydraulic joint between them. The particular parts I have now described and the advantages of my arrangement of them, will be evident, from the examination by any person of ordinary attainments, of the figures 3 and 5. The thoroughfare under the beds of retorts for the purpose of discharging them with considerably less labour (and with less injury to the coke), than by any other means: together with the furnace mouths H, the ash pit W, and water trough X, are distinctly shown in fig. 5. The retorts with their covers and the mode of securing the upper cover so as also to make them serviceable as safety valves, is distinctly shewn in fig. 3. The hydraulic joint connecting the hydraulic main and pipe leading into it, and also the crutch and compensating lever, are fully illustrated by the figures 3 and 5. Fig. 8 represents a vessel which I use for charging the retort; it is made of proper capacity for containing the charge of one retort, and when placed over it, by withdrawing a sliding bottom, which is fitted to it for the purpose, the contents are emptied into the retort.

In witness whereof, &c.

The following letter explanatory of the advantages of the invention described in the preceding specification, has been addressed to us by Mr. Brunton the patentee:

To the Editor of the Repertory of Patent Inventions.

SIR,—I have the honour to lay before you some account of the benefits accruing from the adoption of my patent retorts, as now erected in the works of the Birmingham and Staffordshire Gas Company. In reports to the proprietors they have been noticed in terms of praise highly gratifying to me as their engineer. I should be happy to give the fullest information on the subject, but the limits of this letter and the space I presume you can afford, allow me only to point out some of the most prominent advantages of them as compared with the well-known eliptical retorts, which have hitherto chiefly been used in these works.—1st. The space occupied by my retorts is less than half as much as usual; half the expense of the retort house in a new concern may therefore be saved.—2nd. The expense of brickwork and setting is only half.—3rd. The saving in wages is one half.—4th. The coke is a fourth more in quantity, being all large without breeze.—5th. The saving of fuel is twenty per cent., and the retorts are heated with more uniformity.—6th. Each retort can be separately removed and replaced without disturbing the rest.—7th. The coal may be measured without additional trouble.—8th. The retort can be charged and discharged in two minutes, without loss of gas or least annoyance to the men, whereas an eliptical retort requires about seven minutes; during which time there is a constant escape, with many other inconveniences.—9th. The entire expense of stoker's tools is saved.—10th. The cost of the retort is less, and the duration may be expected on many accounts to be much greater than usual. Important as these advantages appear, they are not by any means the whole of the actual benefit resulting practically from the use of my retorts; because each of them contains double the usual charge of coal, and consequently produces twice the quantity of gas with one fourth of the usual number of men. I have besides experienced many conveniences in the use of my furnace door and other improvements. I beg leave only to add, that these observations are not hypothetical; but are the practical results of experience, which will be obligingly confirmed by the Visiting Committee of Directors of the Birmingham and Staffordshire Gas Light Company; who allow me to say, that it is their intention to adopt them throughout their extensive works as fast as their present eliptical retorts wear out. Retorts of the kind above described, have been worked since January 1829 with the most decided success; and I hope you will consider my specification worthy of your early attention.

I have the honour to be, Sir,

Your most obedient Servant,

JOHN BRUNTON.

Gas Works, West Bromwich,
near Birmingham.
April 3, 1830.

Specification of the Patent granted to THOMAS MORGAN, *of the parish of Tipton, in the county of Stafford, Manufacturer of Tin Plate, for a new method of manufacturing or preparing Iron Plates or Black Plates for Tinning.*—Dated October 9, 1829.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Thomas Morgan, do hereby declare, that the nature of my said invention doth consist in doing away with the process of scaling altogether in the preparation of iron or black plates for tinning, and using a process of clearing in lieu thereof, thereby causing this latter process to be performed twice in the course of preparing the plates for the purpose aforesaid. And in further compliance with the said proviso, I, the said Thomas Morgan, do hereby declare the manner in which my said invention is to be performed, by the following description thereof, (that is to say):—

The bar from which the iron plates or black plates are to be made is to be rolled in the usual manner, but care should be taken to have the bar finished with a clear surface, for which purpose the bar rolls should be kept in good order, and the finishing grooves smooth, and the bar when rolled should be plunged as quickly and with as little loss of heat as possible, into cold water, to clear off the scale. The bar is then to be cut into lengths and rolled into plates in the usual way; but care should be taken not to overheat the bar in the thick iron furnace, and to have a clear blue frame kept up in the finishing furnace, that the plates may be as free from scale, and as mellow or soft as possible. In cutting the edges of such plates as are intended to be annealed together in a box or case, as hereinafter is mentioned, care should be taken to make them square or true, and of equal size, so that they may be placed evenly in the box and none of their edges projecting beyond the rest, by which means they can be better annealed than otherwise they could. When the black-plates have been thus prepared, they must be cleared or pickled in sulphuric acid, or oil of vitriol and water, in the same manner as is now adopted in the scouring room in the last process prior to tinning. Muriatic acid or spirits of salts, and perhaps some other acids might be used in this process, but I believe sulphuric acid to be the best. The object of thus clearing or pickling the plates, is to remove all oxydized and other rough and hard particles from their surfaces; but they do not require to be so perfectly cleared as in the last process prior to tinning; and scouring is unnecessary in this process, it being sufficient to remove all particles from the surface of the plates which would mark or injure them in cold rolling. The pickle should be heated, and bran and saw-dust may be used therein in this process, as in the usual method of clearing or pickling the plates in the scouring room prior to tinning; and the plates must be kept well separated from each other, and not worked too tight, and occasionally agitated and kept in motion during the process so that the pickle may pass freely between them. The plates will be found more difficult to clear in this process than in that prior to tinning, and will require to be kept longer in the pickle for that purpose; but the length of time cannot be specified as they must remain till they are tolerably clear. About half a box of black plates may be cleared at once in a hole or cistern of ordinary size, (that is to say), about twenty-three inches in length by fourteen inches in breadth; and if the plates have been cold rolled, a greater number may be cleared at once in a hole of the above size. To make the pickle of proper strength about three quarters of a pound, or from that quantity to a pound of sulphuric acid, will generally be found sufficient to a gallon of water; and when a hole of plates has been cleared, about two quarts, or from that quantity, to a gallon of the pickle should be taken out of the hole and replaced by fresh pickle of similar strength for each following hole of plates. The strength of the pickle however, and the quantity necessary to be changed with each hole of plates cannot be accurately stated, as they will vary with the quality of the plates, the heat of the pickle, and the strength of the sulphuric acid. Instead of throwing away such pickle, as is above directed to be taken out of each hole after the plates have been cleared, it will be well to put it into another hole or cistern; and any plates which are difficult to clear, may be pickled twice by putting them fresh into such last-mentioned hole or cistern, (which may be kept up by occasionally adding a little fresh pickle if necessary), there to remain till they are removed into the hole or cistern in which they are to be cleared as above mentioned. As the outside plates are often difficult to clear it would be better to have them pickled separately from the others, being first cold rolled if necessary. When the plates have been thus cleared they should be washed (scouring is unnecessary), and placed on their edges apart from each other to dry. The drying should be effected as quickly as convenient; and for that purpose, the plates should either be dried on a stove, or dipped in hot water previous to placing them on their edges to dry; and if it be intended to anneal them in a box or case, as hereinafter mentioned, it will be better to use the hot water, and add to it a little quick lime, the more effectually to remove any acid adhering to the plates. When the above process (which will prevent the necessity of scaling the plates) is completed, the plates should be cold rolled in the usual way, and afterwards annealed by either of the methods now in use, (that is to say), either by steeping the plates in dilute muriatic acid and heating them in an open furnace, or by inclosing them in an iron box or case in which they are annealed without the use of dilute muriatic acid. In case of annealing the plates in a box they should be pressed tightly together, so as to admit as little air as possible between them, and the box must be allowed to cool before it is opened.

Boxes of various constructions have been used for annealing the plates; but those which I have found most convenient have been about an inch and a half longer and broader in the clear than the plates they were intended to anneal, and from four to five inches deep in the clear, with two upright pins on each side of the box, placed about three or four inches from each end, and fastened against the sides, or rivetted through the bottom of the box: the pins may be either round or square, and about half an inch in diameter, and they should stand as far above the top of the box as to reach about an inch and a half above the lid when it is fitted down on the box. The lid should be provided with corresponding holes to let the pins through. Through each pin should be an opening the long way of the box about the eighth of an inch in width and an inch in length, and commencing half an inch from the top of the pin, to let in a wedge, which, when driven in, will force down the lid and keep the plates tight together; for which purpose, as many plates must be put in each box as it can possibly hold consistently with the shutting down of the lid. The lid, sides, and bottom of the box may be about half an inch in thickness, and the sides should be rabbeted for about half an inch from the top, and the lid made to fit the rabbet so as to be level with the sides of the box when it is on.

The plates having been annealed are to be pickled or cleared, and scoured in the usual way prior to their being tinned, and it would be well to take out of every hole about a gallon of the pickle after the clearing of such box and plates, and to supply the place with fresh pickle. The pickle so removed, may be used in clearing or pickling the black plates the first time, in the manner hereinbefore directed to be adopted, instead of scaling. When the plates have been annealed in a box, it sometimes happens that they do not clear in the scouring room prior to tinning so readily as those which have been annealed in an open furnace. In this case, it may be well to take them out of the pickle when about half cleared, scour them in the usual way, and then return them into the pickle and complete the process of clearing. They will not afterwards require to be again scoured prior to tinning, washing being in this case sufficient.

Now whereas, I have detailed the ordinary processes for preparing the plates for tinning, not with a view of claiming them as my invention, but because many manufacturers omit some of the particulars hereinbefore described, whereas, it is important that they should all be attended to, in order to obtain the best result from my method of manufacturing; and whereas, I claim as my invention the adoption of a process as hereinbefore described, of clearing instead of scaling iron or black plates, in the course of preparing them for tinning, and previous to their being cold rolled and annealed, whereby the iron lost in the scaling is saved, and a better article produced at a cheaper rate; and such my invention, being to the best of my knowledge and belief entirely new, and never before practised in that said part of his said Majesty's United Kingdom of Great Britain and Ireland called England, his said Dominion of Wales or Town of Berwick upon Tweed. I do hereby declare this to be my specification of the same, and that I do verily believe, that this my said specification doth comply in all respects fully, and without reserve or disguise, with the proviso, in the said hereinbefore in part recited letters patent contained, wherefore I do hereby claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

Specification of the Patent granted to JOSEPH RAYNER, *of King's Square, in the parish of Saint Luke, Old Street, in the county of Middlesex, Civil Engineer, for certain improvements in apparatus and machinery for conducting heat, and applying the same in the operations of washing, scouring, cleansing, fulling, dressing, dying, and finishing Woollen Cloths; and in calendering, straining, glossing, polishing, and finishing Silks, Cottons, Linens, Woollens, and all other goods to which the same may be applicable.*—Dated August 5, 1829.

WITH AN ENGRAVING.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Joseph Rayner, do hereby declare, that the nature of my said invention and the manner in which the same is to be performed, is fully described and ascertained as follows, (that is to say):—

My improvements consist in the invention of the application of an apparatus for generating and conducting heat, by the circulation of heated fluids, to the process of manufacturing of woollen and other cloths, and of polishing and finishing the same, by which certain improvements are effected in the said process. Also, in the invention of the application of apparatus and machinery to such other useful purposes as are hereinafter described, and exhibited in the accompanying drawings.

Fig. 1 represents a section of a generator or boiler, which may be constructed of cast or wrought iron, or any suitable material, secured by a safety valve, and placed on its end, suspended by parts projecting into the brick work, as shewn in the figure. The fire is placed under the end, and the flues are constructed to circulate spirally or otherwise around the generator, which, by passing over a large portion of the surface of the generator, will effect considerable saving in the comsumption of fuel. To the generator may also be adapted and connected a pneumatic apparatus, which will effect a more complete combustion of the fuel, and a consequent saving of expense. This pneumatic apparatus may be a pair of bellows, of the usual construction, or a cylindric, or tubular blowing apparatus, as circumstances may render convenient. The generator is charged quite full of fluid, (water being preferable in ordinary cases on account of its cheapness) and heated to the required temperature. Should any loss of the fluid arise from leakage at the joints or otherwise, it is supplied by the cistern *a*. To the projecting flanches or nozzles *b c*, pipes are connected for conveying the heated fluid. *d d d* represent a safety valve, lever, and weight. *e e* a tube or indicator, by which the degree of heat the fluid has obtained may be known; it will also serve as an air tube when the generator is charged with fluid, and will also indicate the quantity of water in the generator. *f f* represent the furnace or grate bars. *g g* the hoppers by which the fire is supplied with fuel. To the generator thus described, a pipe is attached at the nozzle *b*, which may be conveyed in any direction, and made to communicate with cylinders, the exterior casing of wood-vats, or other contrivances, and is connected with a return pipe entering at the nozzle *c*, and which will raise the entire circulation of the heated fluid, which may thus be applied to furnace dying, heating stocks of fulling mills, or any similar purpose which admit of an exterior and interior case being so placed as to permit the hot fluid to act freely upon the object to be heated, and the degree of heat required will be obtained by regulating the degree of heat to which the fluid in the generator (fig. 1) is carried. I proceed to describe the method of applying the circulation of heat by fluids to such purposes.

Fig. 2 represents an horizontal view of an apparatus for transmitting heat by fluids or liquids for the purpose of heating a drying stove for cloths of any description, or for any other useful purpose where a soft and mild heat is desirable, and in particular where great security from fire is required, for as the heat may be conducted to almost any reasonable distance, and the generator being placed in a situation of security at a distance from the drying stove, the risk from fire is reduced to a minimum, or the least possible, under any construction of heating apparatus. *h* represents the top of the generator, (as seen at fig. 1.) and the heated fluid passes along the pipes *i i i i*, &c. *j* is the counter generator, by which the more rapid circulation of the heated particles is secured. The bent pipes present an extended surface, from whence the particles of heat are passing by radiation in rapid succession. The generators in this case are placed as much lower than the stove as circumstances will admit, and the pipes or tubes are laid on a wall, or any other solid foundation by which they may be firmly supported and kept in the situation in which they are placed. The same apparatus will apply with advantage to heating buildings or manufactories under various modifications of construction adapted to the circumstance of each particular case; but the application to buildings or manufactories I do not claim as any part of my invention.

Fig. 3 represents an application of the apparatus to the purpose of indigo or vat dying, by which any number of vats may be heated at one time. The heat is conveyed by the fluid along the pipes and round a casing or interior tube placed in the vat, and the heat may be increased or diminished by turning the stop cock. *k k* represents the generator and counter generator. *l l l l*, &c. represent the vats in section. *n n* the circular tube or casing, within which the hot fluid circulates. *m m* the stop cocks through which the fluid passes into the casing of the vats. *o o o o* are the pipes through which the fluid circulates.

Figs. 4 and 5 represent applications of the apparatus to drying calicoes, prints, and other manufactured articles. *p p p p* are rollers on which pieces of calico are alternately rolled, it then passes over the hot cylinders *q q q q* to the roller *p p* at the other end, on which it is rolled by the motion of the shaft *r*, through the medium of a strap or band, and when the piece to be dried is drawn out to the end the motion of the shaft *r* is reversed by any of the usual modes of changing the motion, and the cloth is rolled back on the rollers *p p* at the other end; and this operation is repeated until the piece is sufficiently dry.

The cylinders are heated by a generator and the heat passes through each cylinder in succession, and the fluid or liquid returns by circulation for fresh supplies of heat to the generator. *s s* represents the pipes through which the hot fluid or liquid passes to each cylinder in succession, &c. These apparatus may be made under various arrangements of construction, and fig. 5 is given as another application of the principle for drying piece goods, *t t* represents a case charged with heated fluid or liquid, and of sufficient width to dry the extended breadth of the piece. *u u* are nozzles or flanches by which the heat is charged and returns to the generator. *v v v* are rollers on which the cloth may be wrapt alternately. *w w w w* are carrier rollers placed across the heated case to allow the cloth to pass freely over the surface, and may or may not be used, as the strength or delicacy of the fabric may require.

Fig. 6 represents a section of the generator and its application to heating a cylinder, or other form of vessel to be applied to manufacturing purposes, to be hereafter described.

The generator A is assumed to be in all cases kept entirely full of the fluid or liquid to be heated, and which is intended to be the medium of transmitting heat to the various purposes to which it is applied. That fluid will in most cases be water, or it may be oil or other liquids whose boiling points range much higher on the scale of Fahrenheit. The generator A being full of the fluid or liquid to be heated, also the pipes B and the cylinder C, as the process of heating proceeds the heated fluid or liquid will pass from the top of the generator A along the pipes, in the direction of B to C, and slightly cooling in its progress; the colder particles will pass from and along the pipe D, and will return to the bottom of the generator A at *c*, by which means a constant circulation of heat through the heated fluid or liquid will be kept up. This is a plain and obvious application and illustration of the principle of conducting heat by fluids or liquids. The pipes B and D may be made of any shape or form that circumstances may require, and the cylinder C may be either stationary as in fig. 4, or made to move by wheels and pinions, (or other means) as hereafter described in the figs. 7, 8, 9, and 10. A steam tight and packed joint is described at E E, in fig. 6, by which it is obvious that the cylinder C may be put in motion, while the pipes B and D remain stationary. The construction of these packed joints are so distinctly represented by the drawing at E E, that any competent machinist may construct the same without further description. This application of the principle of conducting heat by fluids, will apply to the calender with beneficial effect, and any required degree of heat may be had on the surface of the calender roller with convenience. The apparatus described in fig. 6 will apply with little modification to calendering, and may be advantageously adapted to any of the machine calenders in common use, which will greatly assist in straining, polishing, glazing, and finishing cottons, silks, linens, woollen or other piece goods requiring this process. By an apparatus similar to fig. 6, and an adaptation of the needful pipes, heat may be applied in the woollen manufactories to the process of washing and scouring, and cylinders or vessels of wood or iron, may be heated to the required temperature. The stewing process may be performed by an adaptation of the apparatus in fig. 6, and by the same apparatus adapted to the object, heat may be applied to the fulling mill, using a case or lining instead of a cylinder; and the heating of furnaces for dying may be effected in the same way. The same apparatus (fig. 6) will also apply to the generating of heat for the vats and furnaces of manufacturing chemists and bleachers, the peculiar arrangement required for such objects will arise out of the circumstances of each particular case of application, preserving and adhering to the principle of entire circulation of the heated fluid or liquid, as illustrated in fig. 6. A drying stove upon the plan suggested in fig. 3, and heated by the generator, as described in fig. 1, will apply to gunpowder, and all other manufactures where security and risk from accident by fire is the primary consideration.

Figs. 7 and 8, represents the two sides of a machine for brushing, pressing, and finishing woollen cloths. 1, 1, 1, 1, is the cast iron frame on which the machine is mounted; and 2 is a shaft placed across the entire machine, and to which is fixed a fast and idle pulley, or any other apparatus by which the machine may be put in motion. 3 is a pinion on the shaft 2, working into and moving the wheel 4 on the end of the heated cylinder C. 5 5 are wheels on the end of the roller shafts 6 6; and which are put in motion by the wheel 4 on the axis of the heated cylinder C: the rollers 6, move the rollers 7, 7, 7, 7, by friction or pressure. F represents an iron roller smoothly turned, to press upon the surface of the heated cylinder C. The cylinder C may be made of cast-iron or other suitable material; and the roller 7, 7, &c. &c., may be made of wood or iron constructed in the usual way. 8 is a wheel on the central shaft 2, which works into and moves the wheels 9 9 on the ends of the brushes H H with considerable velocity. 10, 10, are levers, from which is suspended a weight to press the rollers 7, 7, on 6, by which the cloth is firmly held during the operation of brushing, &c. &c. 11, 11, are screws to press the roller F on the cylinder, and by which the operation of pressing is performed at the same time with that of brushing. 12, 12, represents three smooth iron rollers, by which the cloth is strained and held tight in passing to the friction rollers 7, 7, and 6. 13, 13, represents a circular lining or case of wood to be placed so as to receive the cloth as it descends from the friction rollers 7, 7, and 6; and it is made smooth on the inside so that the cloth may receive no injury as it passes during the operation. The operative parts of this machine being thus described, it may be very needful to state, that the cloth to be acted upon is placed in the circular lining or case 13, 13, and passes over and under the rollers 12, 12, in the direction shewn in the drawing over the friction rollers 7, 7, to the brush H then to the heated cylinder C, over which it passes under the roller F, then descends in the same way over the other brush H to the friction rollers and the wood case 13; the operation is carried on successively until completed. Heat is applied to the cylinder C by the apparatus described in fig. 6; and the surface of the heated cylinder may be raised to the desired temperature, and being uniformly pressed by the roller F through its entire length, the process of hot-pressing, brushing, and polishing, or finishing, is thus performed at the same time, and by one operation. Steam or hot water may be applied during the operation to the surface of the cloth, by which the cloth is polished, and a superior lustre is raised on the surface. The heated cylinder may be moved with more or less velocity at the option of the user, or as experience shall suggest, and the same remark will apply to the brushing cylinder; the above proportions are such as may be applied to advantage.

Figs. 9 and 10 represent the two side views of a machine, being another application of the heating apparatus to dressing and cleansing, or moizing woollen and other cloths. 15, 15, 15, represents the cast-iron or wood frame on which the machinery is mounted. 16 is a pinion on the axis L, extending across the centre of the machine, and having placed or fixed on the end of the same, internal or external friction wheels, or a fast and idle pully, by which motion is communicated to the entire machine; the pinion 16 takes into and moves the wheel 17 fixed on the heated cylinder M. N is a roller of wrought or cast-iron of the same length as the heated cylinder, and both are smoothly turned on the surface; the axis of the heated cylinder is fitted with flanches which are adapted to join the pipes at the steam packed joints, as shewn at E E, fig. 6, by which means the cylinder is heated to the required temperature. 18 is also a wheel on the axis O acted upon and moved by the pinion 16. 19, 19, are wheels acted upon and moved by the wheel 18, which give motion to the cloth rollers 20, 20, on which axis they are placed so as to move freely and independently when out of gear. On the axis of the cloth rollers 20, 20, ratchet coupling wheels are placed, which by teeth take into corresponding teeth on the side of the axis of the wheels 20, 20. These ratchet wheels are moved in and out of gear alternately, as the cloth passes during the operation from one to the other roll, the change being effected when the cloth has reached the extremity of its length. 21 is a lever moving on a centre 22, by which the wheels are thrown in and out of gear, or remain neuter, at the option of the operator, and as circumstances may require. 23, 23, are brushes of wire, or of bristles, or any other suitable material, or one or both may be formed after the usual construction of the gig mill cylinder, with boards to receive the teazles or wires of any peculiar make or adaptation to the purposes of dressing cloth, and these may be moved with the required velocity by changing the wheel 28. 24, 24, are friction wheels fixed on the ends of the axis of the cloth rollers 20, 20. 25, 25, are levers to which a weight is attached, and by which the friction wheel is retarded in its motion, and held steady when the wheel 19 is out of gear. The levers 25, 25 are joined to the large lever 26 by chains at each end, and as the ends of the lever 26 rise and fall, the levers 25, 25 will alternately act upon the friction wheels 24, 24, and at the same time the depression or elevation of the lever 26 will operate upon the lever 21, and throw it in or out of gear as the case may require, and this is effected by alternate cams fixed on an upright bar. 28 is a wheel on the end of axis L, and operates upon and moves the wheels at the ends of the axis P P, on which the brushes of wire, or bristles of the gig mill cylinder is firmly attached and fixed, and which is moved with the requisite velocity. 30, 30 are friction rollers to give greater or less action of the teazles or wires upon the cloth. 31, 31 are screws to give pressure to the roller N if required; another arrangement of machinery may here be described, and heat be applied to the cloth during the operation of dressing or raising the pile, by which the action of the teazles, brushes, or wire in the gig mill will be greatly assisted, and a double gig will be formed. In moizing or cleansing woollen cloth the successive charges of water will be assisted by the application of heat, which may be raised to any required temperature. 32, 32, fig. 9, represents the exterior ring of a gig mill. 33, 33 are the the boards of the gig mill on which the teazles or wires rest, and are supported; between these boards a roller 34, 34, of copper, or any other suitable material, may be inserted, of about three or four inches diameter, more or less, which being suspended on their own axes will move by the pressure of the cloth on the gig mill; or in the space between the boards may be inserted a convex tube or case of copper fixed to and on the ring of the gig mill, as seen at 35, 35, fig 9. These rollers or tubes may be heated as follows, viz.—at the axes of the gig cylinders P through a steam packed joint connecting with a case of copper or cast-iron, this case has a hollow space of about 2 inches, and is of sufficient diameter to extend to and support the copper rollers by their axes, which are inserted in the side of the case through a stuffing box or other packing, to prevent leakage. The hot fluid being charged at the axis P through a steam packed joint from a generator, as described at fig. 6; the hollow case on the axis will communicate the heated fluid to the copper rollers or tubes, which will pass through the hollow axis of the rollers or tubes along the entire width of the gig mill, and descend by a similar case at the other end of the axis, and will pass through a steam packed joint and return to the generator, as shewn at fig. 6. Thus heat may be applied to the gig mill in common use, and two, four, or more heated rollers may be applied during the operation of dressing cloth, at the same time the teazles or wires are performing their operation. The operation is, by folding or winding the cloth on the cloth roller 20, passing it in the direction shewn in the drawing *g*, over the gig mill cylinder or brush, or the heated cylinder, then forward to the other brush or gig mill to the cloth roller 20, and when the cloth has run through its entire length it returns back to the other cloth roller, as heretofore described, and the operation is repeated until complete.

In the apparatus and machinery before described, I claim solely as the subject of my invention the application of heat conducted by a circulating fluid or liquid through an apparatus of any construction to the several useful purposes hereinbefore stated, whatever may be the fluid or liquid used, or the particular form or combination of machinery employed for effecting such purposes; but I do not claim any of the parts of such apparatus or machinery. Fluids or liquids form a more convenient medium for conducting heat than any other means, I therefore claim as my invention, solely the application of heat conducted by a circulating fluid or liquid to the manufacture of woollen and other cloth, and also the other objects contemplated under any modification of construction calculated for the general application of the principle of circulation, as stated at fig. 6. This form of construction will admit of considerable variation, but the principle on which the invention is founded, as above said, is, that of causing the heated fluid to circulate freely, and as it cools in its progress to return to the generator for fresh supplies of heat, which operation would continue until the whole fluid is of equal temperature, but which can never be the case so long as the heat is passing by radiating from the surfaces intended to communicate heat to the useful objects and purposes hereinbefore stated.

In witness whereof, &c.

Specification of the Patent granted to GEORGE WILLIAM LEE, *of Bagnio Court, Newgate Street, in the city of London, Merchant, for a certain improvement in machinery for s pinning cotton and other fibrous substances.*—Dated May 2, 1829.

WITH AN ENGRAVING.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said George William Lee, do hereby declare the nature of the said invention to consist, in substituting for the ordinary flyer used in spinning machines, a hook, which I cause to revolve round or with a circular rim or hoop, whereby I am enabled to obtain a greater speed than the arms of the flyer and common operations of the bobbin will allow of, and to increase the length of the bobbins, so that a greater quantity of yarn can be spun before they require shifting, and to produce a more constant and even tension of the yarn than is produced in the common mode of spinning, while the trembling of the spindle occasioned by wear is less injurious when fitted in my manner.

And in further compliance with the said proviso, I, the said George William Lee, do hereby describe the manner in which the said invention is to be performed by the following description thereof, reference being had to the drawing annexed and to the figures and letters marked thereon, (that is to say):—

Description of the Drawing, (Pl. VI.)

Fig. 11 represents the improvements of the hook revolving round a circular rim, and which may be effected in two ways, both of which are shown by this figure. C is a rail or thin plate of cast-iron pierced with holes for the

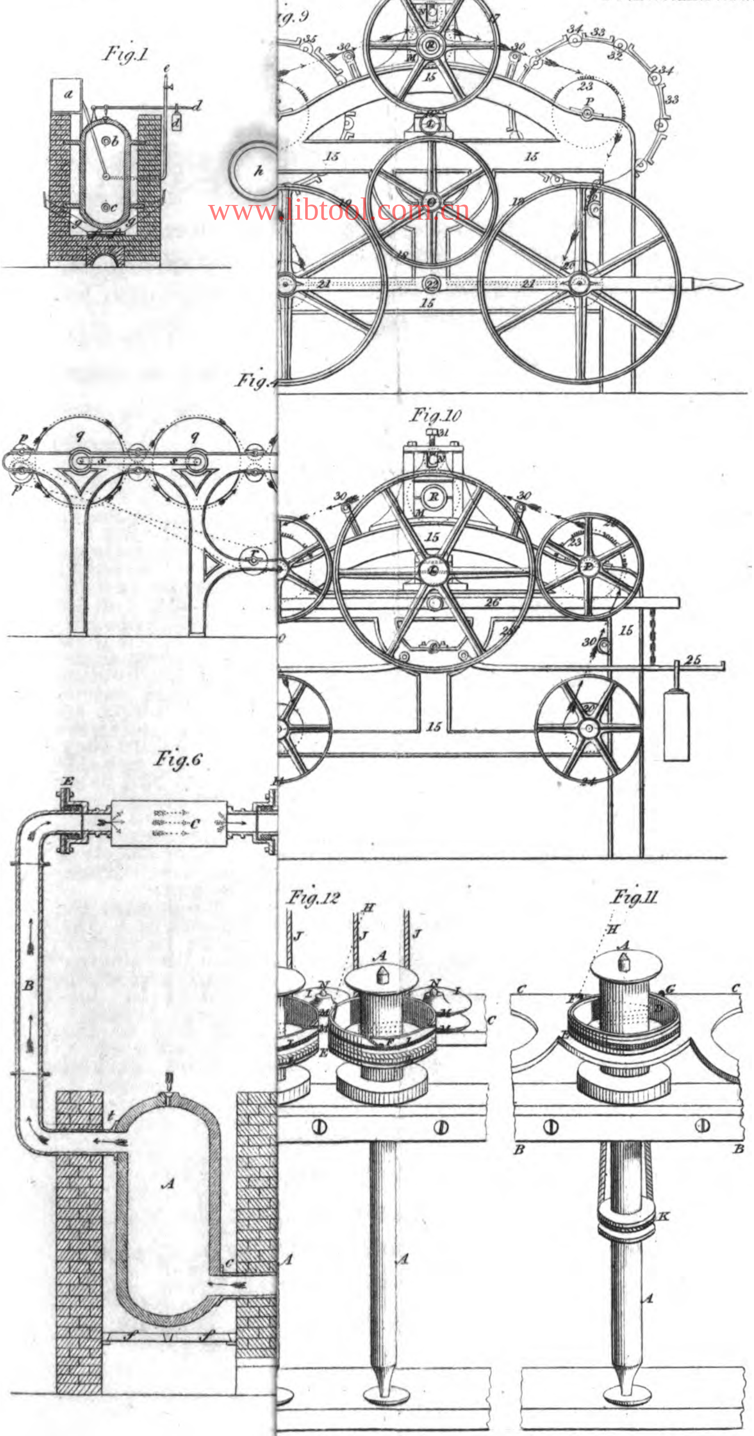


Fig. 1
Fig. 9
Fig. 10
Fig. 6
Fig. 12
Fig. 11

bobbins and spindles to work in. D is a circular rim fixed into one of the holes and standing up above the surface of the rail, on the outside of this rim is cut a groove in which the ring E is loosely placed, so as to revolve easily round it, and F is a hook fastened to the said ring, and answers to the eye or hook on the common flyer; in this figure the bobbin is supposed to turn with the spindle, which has two studs or pins extending upwards from a collar formed on it with holes or mortices in the base of the bobbin for that purpose. H is the yarn, which being placed in the hook F drags it round as the spindle turns, while the friction of the ring E in its groove gives the required tension to the yarn. G is another manner of effecting the same object, G is a hook fastened to a segment, which travels in a groove cut in the top of the rim D, such segment being long enough to hold and steady the hook. A A are the spindle and bobbin. B B B B the spindle rail and step rail.

Fig. 12 represents the improvement of a hook revolving with a circular hoop, the hook being in fact cut in the hoop itself. A A are the spindle and bobbin, which in this figure is supposed to turn on the spindle. I I I are friction pullies furnished with projecting rims marked M, which work into corresponding grooves, creases, or channels L L, cut in the circular hoop E, which hoop is held against the friction pullies by the bands coloured blue and marked J, these bands are supposed to lead to a cylinder or drum, by means of which the circular hoop is driven. F is a hook formed in the upper edge of the hoop E, and into which the yarn H is passed, and which drags the bobbins like the arms of a common flyer. The spindles and bobbins in both figures must be made to vibrate in the usual manner, in order to distribute the yarn over the whole length of the bobbins. It should here be observed, that the hook shewn in these figures should be placed where the lower extremity of the flyer in common spinning frames moves, and the body of the bobbin should be half as large again as those of the common kind, and may be greatly increased in length without inconvenience, provided the vibrating movement be made to correspond.

Now whereas, I claim as my invention the following improvements, (that is to say):—

First, a hook revolving round a circular rim in manner aforesaid, and for the purpose aforesaid; and secondly, a hook revolving with a circular hoop in manner aforesaid, and for the purpose aforesaid. And such the said invention, being to the best of my knowledge and belief, entirely new and never before used within that part of his said Majesty's United Kingdom of Great Britain and Ireland called England, his said Dominion of Wales or Town of Berwick upon Tweed; I do hereby declare this to be my specification of the same, and that I do verily believe, this my said specification, doth comply in all respects, fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to the said invention.

In witness whereof, &c.

Specification of the Patent granted to Josias Lambert, *of Liverpool Street, in the city of London, Esq., for an improvement in the process of making Iron applicable at the smelting of the Ore and at various subsequent stages of the process up to the completion of the rods or bars, and a new process for the improving of the quality of inferior Iron.*— Dated Feb. 4, 1830.

To all to whom these presents shall come, &c. &c.—

Now know ye, that in compliance with the said proviso, I, the said Josias Lambert, do hereby declare, that the nature of my said invention and the manner in which the same is to be performed, is described and ascertained as follows, (that is to say):—

The improvement in the process of making iron applicable at the smelting of the ore and at various subsequent stages of the process up to the completion of the rods or bars, consists, in the application of salt, potash, and lime, mixed or combined together to the iron ore or iron in the blast furnace, the refinery furnace, the puddling furnace, the balling or reheating furnace, or in any other process to which the iron in its manufacture is subjected when considerable heat is applied; and it likewise consists, in the application of salt, saltpetre, and lime, mixed or combined together to the iron in the puddling furnace, whether the same iron shall have been subjected to the application of salt, potash, and lime, in any of the previous operations of the manufacture or not.

The proportions in which I recommend the mixture or combination of salt, potash, and lime, to be formed, are two parts of salt, one part of potash, and two parts of lime; but should the proportions in some degree differ from those best adapted to the purpose the useless portions will be dissipated in the process of the manufacture. The mixture or combination employed during the process in the blast furnace should be applied at the time of smelting the materials, which are to produce the iron at the rate of about twenty-five pounds to the ton of iron, and may be introduced in proportionate quantities at the tunnel head of the blast furnace, either at intervals, or with every charge of the materials which are to produce the iron. If not used in the process of smelting it may be applied at intervals to the metal during the operation in every charge of the refinery furnace, or in the puddling furnace, or in any other process to which the iron in its manufacture may be subjected when considerable heat is applied. A proper proportion to be used in the refinery furnace may be at the rate of twenty pounds to the ton of iron, and in the puddling furnace about eighteen pounds to the ton of iron; but in the balling or reheating furnace and other processes, the quantity to be applied must depend upon the quality, form, and substance of the iron, taking care that it be sprinkled over and amongst or brought in contact with the iron; the quantity to be employed will vary from about eighteen to thirty pounds per ton of iron.

The proportions in which I recommend the salt, saltpetre, and lime, to be mixed or combined, are two parts of salt, one and a half parts of saltpetre, and two parts of lime; should these proportions differ in some degree from those best adapted to the purpose, the useless portions will be dissipated during the process of the manufacture.

This mixture or combination of salt, saltpetre, and lime, should be applied to the iron in the puddling furnace whilst the metal or pig iron is in a state of fusion, and may be mixed with it at intervals at the rate of about twenty pounds to the ton of iron.

The quantities to be applied of either of the above mixtures will differ in some degree according to the quality of the materials or the iron; but the proportions above mentioned are those proper on the average.

The process for the improving of the quality of inferior iron, consists in the application of either of the same mixtures in similar proportions to such iron when subjected to considerable heat: for this purpose they may be applied to the iron and the iron melted in combination with them, or they may be applied to the iron in the puddling furnace in such quantities as may be best adapted to improving the quality of the iron according to its properties more or less exhibited, of being what is termed red-short or cold-short, (that is to say), the application of the mixture of salt, potash, and lime, is best adapted to the iron which is termed red-short, and the mixture of salt, saltpetre, and lime, is best adapted to the iron termed cold-short; the quantity of the mixtures to be employed in either case, will vary from about eighteen to thirty pounds per ton of iron, according to the degree of inferiority of the iron; or the mixtures may be applied to the iron in any reheating or other furnace, and the metal subjected to a red heat for a time proportioned to the quality, form, and substance of the iron, care being taken that the mixtures be applied in contact with the heated metal; and for this purpose, if the iron be in the form of tubes, such as gun barrels, the mixtures may be introduced into the tubes.

In witness thereof, &c.

Observations by the Patentee.—The effect of this application in the blast furnace is, to create a more perfect fusion of the earthy materials, and their separation from the iron in a more powerful degree than can be effected by any of the ordinary methods of burthening a furnace; the pig produced under this operation is considerably more pure than any obtained in the common smelting prosess. A similar effect is produced in the refinery furnace, the iron runs hotter, the cinders contain less of the metal, and their proportions of earthy materials are increased, whilst a saving in yield accrues to an important amount. In the puddling furnace the application of the mixture of salt, saltpetre and lime, is of the most powerful efficacy in causing the decomposition of the carbon and the acid combinations that have resisted the operation of the refinery. Nearly all the bar iron produced from coke-made pigs contains more or less of earthy bases; certain proportions of these influence the quality materially by contributing to the red and cold-short properties; the earths are brought into a fusible state and completely nitrified by the alkali and the lime, and being separated from the iron leave it pure and free from defect. It remains only to be added, that the practice coincides with the theory of this process, and the fact has been proved by an infinity of experiments upon the worst description of iron, which has corresponded with the anticipated effect, both in its mechanical and chemical properties. The patent is in operation at the works of Messrs. Thompson & Co.

ACCOUNT OF NEW PATENTS.

Patent granted to JOSEPH MARIE URSULE LA RIGAUDELLE DU BUISSON, *of Fenchurch Street, in the city of London, Merchant, for a new method of extracting, for the purpose of dying the colour from dye woods and other substances used by dyers.*—Dated February 12, 1830.

THIS process is performed by means of steam caused to pass through the substance to be operated upon, which condenses in its passage and extracts the colour; it is then evaporated to any consistency at the pleasure of the operator.

The apparatus employed by the patentee is composed of a steam box lined with lead, and covered by a shallow metal pan; a pipe proceeding from a boiler, communicates at one end of the box and filling it with steam, heats the pan and its contents in the course of the process; from the opposite end of the box a second pipe proceeds upwards through the bottom of a wooden chamber, (that is lined with glass or glazed earthenware) to the distance of about one foot from the top, the lid of this chamber is constructed so as to open, and when closed, to remain steam tight; a quantity of chips or saw dust of the dye wood being put in at the top, it falls on a false bottom of perforated tin, and the steam being admitted into the steam box, will find its way through the pipe and fill the space that is left in the chamber; in passing downwards through the dye wood it condenses, and dripping on the real bottom of the chamber, which is placed on an inclined plane, is conveyed from thence by a small pipe to the shallow pan described; in this situation it is observed, the liquid thus produced may be evaporated by means of the steam that is below it,—even to powder if it be necessary. When the liquid flowing from the chamber becomes colourless, the whole of the dying properties of the wood has been extracted; the chips, which will be found bleached, may then be removed and a fresh portion operated upon.

In a clause at the conclusion of the specification, the patentee observes that, if the substance employed be of a resinous nature, the vapour of spirits of wine must be used instead of the steam of water.

Patent granted to GEORGE POCOCK, *of the city of Bristol, Gentleman, for improvements in making and constructing Globes for astronomical, geographical, or other purposes.* —Dated February 4, 1830.

MR. POCOCK commences his specification, by detailing the disadvantages arising from the importability of globes of the usual construction, and in continuation states, that to obviate such inconveniences is a principle point of his invention. He therefore proposes to form them of paper, well pasted together at the edges and with an aperture at the south pole, by which they can be inflated at pleasure:

another method he adopts, is to construct a globular frame of thin cane, in the same way as applied to umbrellas; in both instances however, he directs a wire or other support to be inserted through the orifice at the south pole, which, by means of a button at its upper end is attached in a corresponding eyelet hole in the interior of the globe at the north pole; to the latter part on the outside, are affixed three pieces of tape, of about a foot in length, with an ivory knob, to serve as a handle, attached to their centres; these tapes strengthen the globe, and a cane hoop for a similar purpose is attached to the orifice before mentioned, by means of a strip of linen pasted firmly over it and the edges of the globe.

A great portion of the specification is taken up by the description of a sort of air pump for inflating the globe; which operation, the patentee however states, may be performed by holding the cane hoop at the orifice firmly in the hand, and drawing it suddenly through the air; it is then to be placed on the carpet or floor of a room, and being raised about a foot from the ground and lowered alternately, it will be thoroughly distended.

He next describes a flexible scale for working problems, which he forms of tape half the circumference of the globe in length; it is divided into two equal parts, and ninety degrees north and south from the equator are marked on the left hand side; this serves for the brazen meridian of ordinary globes. On the right hand side are marked one hundred and eighty degrees continuously, and under each, the corresponding number of miles; this is intended as a substitute for the quadrant of altitude, and much dispatch, it is stated, will be gained by it in working problems. On the opposite side of the tape is an analemma done in the same way as the scale.

A modification of these globes is also described, formed with a vane at its upper extremity; a lamp being placed in the interior, will, on the globes being suspended by the rarifying of the air, cause it to revolve, and present an amusing and instructive object for young persons. The paper recommended by the patentee for the construction of these globes is that made of new Irish linen; its strength being an important object.

Patent granted to EDMOND GIBSON ATHERLEY, *of York Place, Portman Square, Middlesex, Esq., for an apparatus for a method of generating Power, applicable to various purposes*—Dated June 12, 1828.

THIS apparatus is composed of two balance levers, suspended in a frame of proper height, the first at one fifth of its length, and the other at its middle, the longest arm of the former being equal in length to either of the equal arms of the latter; the points of suspension are separated from each other, so as to permit the extremity of the last mentioned arm of the first lever to be a small distance from that of one of the arms of the other; by these extremities they are connected by a short piece, jointed to each in such manner, as to permit both levers to be moved up and down a considerable space from their primary horizontal position.

The short arm of the first lever is to be applied to work the pump, or other labour for which it is required, and therefore to its end is to be appended the pump rod "*brank,*" or connecting bar that forms the means of communication; and to the opposite end of its long arm a weight is to be attached, equal to that of the pump rod, or connecting bar, and another similar weight is then to be fastened to the extremity of the remote arm of the second lever. The whole is to be put in motion by a third lever, that descends vertically from the point of suspension of the second lever, and is equal in length to the sum of both its arms, and to the bottom of which is fixed a third weight equal to either of the others, or somewhat more ponderous; and this latter vertical lever is to be fastened to the horizontal arms of the second lever by oblique stays, or by curved pieces, which, according to the drawing, form a semicircle, of which the two arms of the second lever constitute the diameter. If the long arm of the first lever be four feet in length, for example, its short arm will be one foot long; and each of the arms of the second lever will be four feet in length, while the length of the third or acting lever will be eight feet; and by a motion given to its weight back and forwards, like the bob of a pendulum, the patentee supposes that considerably more power will be gained, than if it were placed as a pump handle, or other common lever is, that is used for similar purposes; and states somewhat relative to the resemblance between part of his apparatus and the beam of a pair of scales, by way of supporting his opinion; but as he has not explained how this resemblance can have the efficacy that he asserts, we may be excused for neither perceiving or believing in its existence.

Using the geometrical axiom, that "if from equals you take equals, the remainder will be equal," we may soon reduce this apparatus to its really efficient elements; which are the vertical or pendulous lever with the weight at its lower end, and the short arm of the first lever; since one of the arms of the second lever only serves to neutralize the long arm of the first, and its other arm to support a weight which balances that on the end of the latter; therefore equal arms and equal weights acting in opposition to each other being removed, no more of the apparatus will remain than what we have above stated: and this reduction will bring the performance of the apparatus to depend on the mechanical effect of a long heavily weighted pendulous lever, in working pumps, or causing other similar motions; and as this demonstrably can only be to equalize irregular forces applied to give motion to the lever, where this is no object of consequence, the weight must rather diminish than increase the effect of the lever, since some force must be required to keep it in motion, even if it were entirely detached.

From these considerations we think we are warranted in consigning this patent apparatus to the lumber room.

Patent granted to George Stocker *and* Alexander Stocker, *of Yeovil, in the county of Somerset, Gunsmiths, for a Cock for drawing liquor from casks, which produces a stop superior to that which is effected by common cocks, and will continue in use for a longer period of time.*—Dated Jan. 26, 1830.

In this patent cock, a conical plug attached to a shank, is made so as to fit into a socket or cylinder, and is caused to rise and fall by means of a key and two arms projecting from the shank which work in corresponding screw-worms in the upper part of the cylinder. The plug is directed to be formed of yew-wood, leather, or other material that is softer than the socket; and the advantage anticipated by such an arrangement is, that the instrument will not be destroyed by wearing, but that this will only cause the plug to sink lower in the socket, without any disarrangement of parts. On the upper part is placed a washer, as in ordinary cases, to prevent the liquor from flowing into the key-chamber; no farther novelty is described in the specification.

Patent granted to John Gray, *of Beaumorris, in the county of Anglesea, Gentleman, for a new and improved method of preparing and putting on Copper-sheathing for shipping.*—Dated Feb. 4, 1830.

The object the present patentee has had in view, is the preventing any projection or indentation in the sheathing of ships when fixed on them; and he causes a perfectly regular and smooth surface to be obtained, by forcibly forming indentation in the sheets, which will present corresponding projections on the opposite side, the heads of the nails being countersunken in the former, whilst the latter are admitted into the wood; this, it is stated, will also give additional security to the means of fastening the sheets.

The tool employed for forming these countersunken perforations, consists of a screw working in a socket formed in the centre of a metal frame or bridge, that is firmly screwed to a bench or table. The lower extremity of the screw is a conical punch, which, when screwed down, fits into a corresponding piece of metal having a small perforation formed through it, for the passage of the particles of copper that are punched out of the sheet. This latter after having being laminated and dressed, is placed below the punch, and the screw being turned by a lever passing through its top, the conical form of the punch will create a countersunken projection in the sheet of copper, into which the heads of the nails are to be made to fit, so as to present an even surface. The legs of the bridge above mentioned, are directed to be made far enough apart to admit of the passage of the sheets below it, and they thus serve as a guide for making the perforations in a right line. In affixing the sheets to the bottoms of vessels, they are to be caused to extend half way over each other alternately, in the usual manner.

A modification of this instrument is described in the specification, which the workman can employ in his hands without the necessity of its being attached to a bench; in this case, the screw socket and the indented metal for the reception of the punch are formed in one piece, from which also projects a handle: two small plugs that are raised and lowered by placing the thumb on a spring near the handle, and are fixed at proper distances from the screw, serve as guides, by falling into the perforation made in a sheet, and thus retaining it in its proper position when drawn along to repeat the stroke of the punch.

Patent granted to Moses Poole, *of Lincoln's Inn, in the county of Middlesex, Gentleman, for a certain combination of, or an improvement in, Springs applicable to carriages and other purposes. Communicated by a Foreigner.* Dated Feb. 27, 1830.

To construct and adapt these springs to a vehicle, (that exemplified in the specification being a stanhope), two single steel plates, somewhat longer than the ordinary springs, are directed to be firmly affixed to the axle of the wheels, by means of clamps, at an elevation of about forty-five degrees with reference to the shafts. These springs or plates are to be turned in a spiral direction, proceeding in contrary ways from the centre, which is the fixed point; and to each end is fitted a cylindrical piece of metal that works as an axle in a corresponding bearing projecting from the shafts at proper distances. Two smaller springs placed at right angles with the larger ones, and of precisely similar construction in other respects as those described, are fixed at their centres to the bottom of the body of the vehicle, as are also the bearings in which they work; the four plates are linked together at their extremities by eight curved arms or levers, furnished with hooks or rings which interlock, and consequently suspend the body of the carriage. It is stated that the reaction, or tendency of these spiral plates to untwist, when acted upon by the weight of the carriage and its contents, is such under this arrangement as to cause the necessary elasticity for carriages in general.

Patent granted to John Arnold, *of Sheffield, in the county of York, Powder Flask Maker, for an improved Spring Latch or fastening for doors.*—Dated January 26, 1830.

Mr. Arnold forms his spring latch by placing one metal cylinder within another, the latter serving as a sort of box or socket for the bolt to act in, and the former as the bolt itself. One end of the outer cylindrical case is open for the passage of the inner one, while the other is closed and has a spiral spring placed in the interior to press out the bolt or latch; a groove is formed in the outer case through which the spindle of the handle passes, and admits of its moving in a horizontal direction; when required to lock or unlock the exterior end of the bolt is sloped off to form an inclined plane, and this part, as well as that through which the handle passes, is made solid for the sake of strength. When it is required to fit this lock to a door, a circular hold is to be made in the edge, and a corresponding one in the door post, a small plate being placed on the latter, through which the bolt passes. The only advantage that it is attempted to show will arise from the use of this patent latch, is, that it is more easily adapted, and does not injure the door by cutting away. Various plans are shewn for forming the locks, and the remainder of the specification is chiefly taken up by a description of their separate parts, to which of course no claim is made.

Proof of the impracticability of employing MR. BROWN'S *Gas Engine to any useful purposes.—Communicated in a letter to the Editor.*

SIR,—I presume, that in common with myself and many others, you have been a witness to the pretensions of Mr. Brown, in asserting the superiority possessed by his gas engine over any other mechanical power, and of the frequent endeavours he has made to delude the public with the assumed advantages he declares it to possess.

The late Mr. Tredgold, in a work published by him a few years since, particularly alludes to this engine, and by simple calculation, founded on the experiments of able and acknowledged authorities (the correctness of which cannot be contested), he completely proves the impracticability of adapting Mr. Brown's engine to any useful purpose, whilst it has to compete with so powerful an antagonist as the steam engine. As the paragraph to which I allude may not have come under the observation of all your readers who may be interested in this subject, I beg leave to suggest to you to insert it in your useful work, when you have a corner to spare; for even if I am mistaken in my latter surmise, yet I believe I may safely say, that no one will be a loser by a second perusal of it; and it will, I am persuaded, open the eyes of many, who (as in various other instances) have been led to admit the superior efficacy of this engine from mere dynamometrical experiments, without judging from actual practice, when the false economy of many new inventions is soon and dearly ascertained.

In speaking of the gas engine Mr. Tredgold says:—

"The power of this new engine is gained by burning gas in a cylinder so as to rarify its contents in a very considerable degree; it is then cooled, and the difference between the pressure of the atmosphere and the elasticity of the air in the cylinder constitutes the moving power. It has been attempted to shew, that the power results from the products of the combustion being condensed into less bulk than the combustibles occupied before; but this solution is inadequate to explain the effect produced.

"The principle of its action may be easily illustrated by a simple experiment: let a piece of paper which inflames readily, be burnt under an inverted glass so as to fill its capacity with flame, and then immediately immerse the mouth of the glass in water. The consequence is, that the hot air or flame is condensed by the water, and shrinks into a space of about one-third of the capacity of the glass, while the water rises and fills it, till the contained air be of the same elasticity as the atmosphere.

"Mr. Brown, the inventor of the gas machine, produces a similar effect by burning gas in a metallic cylinder, and by means of the flame of gas, and an apparatus which is very ingenious, renders this well-known phenomenon a means of obtaining a considerable quantity of mechanical power. Whether this power be likely to be useful for locomotive carriages or not, we will now proceed to examine.

"To ascertain the degree of rarefaction (or of vacuum) in the cylinder, let x = the temperature of the flame, the original temperature of the air in the cylinder being 50 degrees. Then $\frac{450+x}{500}$ = the bulk of the expanded air;* and when the pressure of the atmosphere is 30 inches of mercury, we have $1 : \frac{500}{450+x} :: 30 : 30\left(\frac{500}{450+x}\right)$ = the force of the air left in the cylinder when cooled to 50°; consequently, $30\left(1-\frac{500}{450+x}\right) = \frac{30(x-50)}{450+x}$ = the force on the piston in inches of mercury, without reduction for friction or other causes of loss of effect. If the temperature of the flame be 1050 degrees, which is a temperature we think it would be easy to give it, then $\frac{30(1050-50)}{450+1050} = 20$ inches of mercury for the force of the piston without reduction for friction, &c.

"Our next inquiry is the expense of gas required to pro-

* Tredgold on Warming Buildings, &c. Art. 220, 2d edition.

duce a given quantity of mechanical power. Let b express the cubic feet of gas that will heat a cubic foot of air one degree; then $b\,x$ is the volume of gas that will heat a cubic foot of air x degrees; and $b\,x : 1 :: 1000 : \frac{1000}{b\,x}$ = the volume of air that would be heated by 1000 feet of gas, consequently $\frac{1000 \times 30\,(x-50)}{b\,x\,(450+x)}$ = the mechanical power of 1000 feet of gas when not reduced for friction.

" But this equation has a maximum, and making x variable, and its fluxion equal to zero, we have $x = 208$ degrees; hence the greatest degree of mechanical power will be obtained when the temperature of the rarefied air is 208 degrees; and calculating to this maximum power, we have very nearly $\frac{35}{b}$ = the mechanical power of 1000 feet of gas, not reduced for friction, in inches of mercury.

" The weight of an inch of mercury one foot square being 70·7lbs., the lbs. raised one foot high, supposing there was no friction, would be $\frac{2474}{b}$ by 1000 cubic feet of gas. The maximum temperature will be different when the proper reduction is made for friction, and the effect less; but it will be sufficient for our purpose to estimate the gross power.

" If pure olefiant gas be used, we should have from Mr. Dalton's experiments * $b = \frac{1}{41040}$; which gives about 102 millions of pounds raised one foot for the mechanical power of 1000 cubic feet of gas, not reduced for friction; and therefore 1000 cubic feet of oil gas would not do more than the work of six horses in an engine, even if the gas worked by an engine entirely devoid of friction, and consequently it must be much too expensive for any rail-road conveyance. If coal gas be employed, its effect must be less than that of pure carburetted hydrogen, and for pure carburetted hydrogen $b = \frac{1}{22800}$†, from which we find its mechanical power 56

* Dr. Thomson's System of Chemistry. vol. i. p. 148.
† Ibid.

millions of pounds raised one foot high by 1000 cubic feet of gas working in an engine without friction; and this not being more than the useful effect of 3½ horses, it is pretty evident that the gas engine must be much too expensive for any case where the work can be done with horses. In a machine of this kind we cannot allow less for the loss by friction and waste of heat, &c. than one-third, which makes the power of 1000 feet of oil gas equivalent only to that of four horses, and 1000 feet of coal gas not quite equivalent to 2½ horses. The engines are more complex than high pressure steam engines, and in the event of using them for locomotive engines, the gas must be compressed into a space of about 1-30th of its natural bulk, and consequently be liable to accident from explosion."

After quoting the above, it is unnecessary and would be presumptuous in me to add any further remark respecting this, I had almost termed it, chimerical invention. Should you, however, deem fit to publish the above extract, I have only to state in conclusion, that I am not actuated by any personal hostility to Mr. Brown, or by any private interest in bringing this subject under your consideration, my sole object being that of general justice; and I leave an unbiassed public to decide which are the most correct, the assumptions of Mr. Brown, or of,

Sir,

Your obedient humble Servant, X.

April 3, 1830.

To the Editor of the Repertory, &c.

LAW OF PATENTS.

Examination of the Witnesses before the Select Committee of the House of Commons.

Continued from p. 187.

Do you conceive any improvement might be made with respect to the caveat at present? Suppose, when a caveat is entered, that the invention was referred to a commission of scientific men, instead of being referred to the Attorney or Solicitor General to determine between the two applicants, would that be a more satisfactory mode?—I should hesitate much in considering that it would.

Why?—I think it would be attended with great danger to patentees; I think it would be productive of favouritism.

The Attorney and Solicitor Generals not being usually scientific men, does not great difficulty arise, at times of caveats being opposed, in informing them of the real nature of the invention?—Sometimes those difficulties do arise, and I have known them call for scientific information for their own guidance; I remember Sir Thomas Plumer did that, and some others; I remember Sir Thomas Plumer in particular, he called for some information from a scientific man conversant with the subject, and I think it has been done in other cases; he would call in an indifferent person. In short, the subject of patents is so pregnant with difficulties, that you are choosing among difficulties.

Might not the information given by the Attorney General to any persons called in upon the opposing of the caveat be construed to be a publication of the patent?—I think not; and the Attorney General would have no difficulty in framing his question so that the person to whom he was addressing it, should not get the precise information of the object to which it was referrible.

Have you any doubt it would be desirable that the Attorney General should have assessors composed of scientific men to assist him in judging?—He has the means of doing that now; if he is at loss on any subject, he can get information.

What means has he of paying for that?—I do not know whether he pays them at all.

But if you gave him authority to do it, and power to pay such persons for their trouble, would not that be a more satisfactory mode ?—I certainly should prefer that to a standing board, as far as my humble opinion goes.

What do you think of the propriety of appointing assessors to judge, or commissioners to judge of the sufficiency of the description contained in the specification?—I am not quite prepared, and I should not like to speculate on a thing with which I am not sufficiently acquainted; I should have some doubts about it.

Would it not add to the security of patents, as it would prevent their being set aside on the ground of insufficient descriptions?—And their opinion to be final and conclusive on that subject?

That is the view contained in the question?—I should have great hesitation in saying that that would be quite advisable; there is so much difference of opinion on abtruse subjects until it is put to a public test, that I am not quite prepared to say any three men would always draw a right conclusion.

Do you think the public at any time during the whole continuance of a patent ought to have a right to question it on any ground?—It is a hardship on the patentee I know, but I do not see how to remedy that difficulty without letting in a greater; it has been talked of; I have had many inquiries made of me about permitting a man to enrol his specification; the answer I have generally given on that is, if you were to do that he would embrace fifty things when he was only entitled to one, if he was afterwards at liberty to put in a new specification, and then he would only claim that one.

Is it not a very common practice, for the purpose of misleading the public from the real nature of the invention, to multiply the number of modes of effecting that object, without particularly specifying that one upon which the inventor really depends?—That many specifications have been framed very obscurely, and my own opinion has been with that view certainly, but that is only a matter of opinion; I cannot state it.

Would not the referring the specification to a commission, to judge of the description being or not being sufficient, be of advantage to the public, inasmuch as it would prevent that practice just alluded to?—If the Committee would allow me, perhaps I should sooner get at an answer to that question if the Committee would allow me to ask, whether it is to be before or after the specification, is the patentee to go to these three scientific men with his specification before he has put it in, because there would be considerable difficulty in the patentee being restricted; they perhaps might say he has only two or three modes that we think good, you shall not take the other seven; the patentee might say, I consider that I am entitled to ten modes, and I should not like to be restricted to three, or I am entitled to three; I can do it three ways, and I should not like to be restricted to one: before I answer the question I must understand whether the Committee meant it to be previously or subsequently to the enrolment of the specification.

The question contemplated, that sufficient time should be allowed to the party as at present between the application for the patent and the enrolment of the specification; but before the specification is final, and before the patent is sealed, that a commission should examine whether the invention is adequately described in the specification, would not such an examination before a commission insure to the public a complete description of the nature of the invention?—I should think it would be so; but I am not sufficiently in possession of scientific knowledge to form a correct opinion on that point; there are many other persons more conversant with such matters, who are better able to answer that question; I own I feel a difficulty about it.

In a chemical invention, for instance, if the commission was to superintend the process, to see that the chemical preparation can really be prepared by the mode described, would not the appointment of a commission for that purpose have a beneficial effect for the public?—It is probable that it would; but I am not quite competent to form a satisfactory opinion on it.

Is it not advantageous to the public to know really what the nature of the invention is?—Certainly.

Then, instead of leaving it to the honour of the patentee to describe clearly what the real nature of the invention is, would it not tend to make that matter more clear to the public if a commission was really to investigate the nature of the invention described in the specification?—Very considerable difficulty might arise upon it; a patentee might not be satisfied with these gentlemen's decision, and then it would follow perhaps as a consequence, that he is not to have his patent after he has gone to the expense of it; I have seen very great difference of opinion among scientific men.

Have you seen much difference among scientific men on the point, whether the invention is or is not adequately described?—Certainly I have; certainly I have very great.

In making these discoveries, you have frequently found, have you not, that the practice differs in a great way from the anticipated effect derived from small experiments?—I am satisfied that when a patentee can, without fear of the danger of disclosure, make his experiments upon a much more extended scale than he has thought himself safe in doing while his patent is in progress, I have no question he has frequently improved his object very materially.

But is it not also found, that results which have been anticipated in study, when they come to be put together, are not produced by the machine when put together?—Yes.

Constantly?—Yes.

Then the patentee himself can hardly predicate with certainty what will be the result of his own machinery in nice operations?—I am quite sure that is very often the case.

In chemistry, does not a great deal depend upon manipulations and small details, which, if they were described, it would be utterly impossible for men of science to know if they would produce the result promised; as for instance, in making a dye, might not the boiling for five minutes, or ten minutes, most materially alter the result of the colour? —I should think that very probable.

If it was prescribed in the patent the dye should be boiled ten minutes, no man of science could say with certainty the colour promised should be so produced, should you not expect that?—I am not competent to answer that question.

If it could be shown that, from insufficiently describing the time, or any part of the manipulations, the preparation could not actually be prepared in consequence of such insufficient description, would not the patent be liable to be set aside?—Certainly.

Is not a patent always as obscurely drawn at present, as the specifier thinks consistent with prudence for the legality of the patent?—I believe that is done so sometimes; I have no doubt it is done; frequently it is an object to say as little of the real merits of the invention as is possible?—I have no doubt of it.

Is not the principle upon which the granting of patents is founded, the giving a person monopoly for a limited time, for the purpose of making known to the public the nature of a beneficial invention?—That is the object certainly.

Then would not any contrivance which should make known to the public what the real nature of the invention is, be more consistent with the object of the patent than the present practice is?—It might be, if that object was attainable; but I am not quite prepared to say that there would not be considerable difficulty in it: they are to exercise, I assume, a discretion; and a patentee might be told that this Board differed from him; and, unless he put it in some shape they approved, that he should not have his patent. I am not quite clear that that might not be a very great hardship on a patentee in some cases and upon many subjects; there certainly is difference of opinion upon many new principles, or the modes of reducing them into practice.

But it would not be, in this case, a question, how they should be reduced to practice, but whether the method which the patentee asserts will be adequate to reduce them to practice, is or is not adequately described?—It might I dare say be, in some cases, beneficial; but I am not prepared to say it would in all.

Supposing the Attorney General was directed to appoint an assessor, subject to challenge from both parties disputing the patent, would you suppose that they might be brought to agree on the appointment of a scientific man?—The applicant and opponent might be brought to agree on him.

That is the question?—Perhaps, in many cases, they might.

In cases where there were double applications for a disputed invention, it is now submitted to the Atorney General. Supposing the Attorney General had the power of appointing an assessor, whose appointment was subject to challenge from either of the parties, would they be likely finally to agree upon some scientific person who he might appoint in most cases?—I should think they would oftener disagree than agree on one who should be the assessor, if the Attorney General had not the power to call in such a person as he thought proper or approved. If they differed as to him, the Attorney General to call in a third.

Supposing the Attorney General appointed a scientific man, and he was objected to, the party would state his reason, and the Attorney General would then appoint some one else, if the reason was good; do you imagine, in such a case as that they would not be brought to agree to the appointment of a person?—If the Attorney General has the power of the appointment, if it is to be decided by means of an assessor, I should say it would be better the Attorney General should call in any persons he chose.

Are there not very minute details, that occur in many cases, the necessity and full effect of which can only be appreciated in the particular trade to which they relate?—Generally speaking, it is so.

Must not any commission that should be appointed, be formed of persons of that particular trade?—I should think they ought.

Would that be advisable?—I must say I should doubt the propriety of that, certainly.

Do you conceive, in that instance that has just been mentioned, the decision is likely to be more satisfactorily made by an Attorney General who can know nothing about these trades, or by scientific men who might be selected for their peculiar knowledge of them?—I should say, it does not often happen that there is any difficulty that the Attorney General cannot decide; it is not of very frequent occurrence that he is not capable of arriving at a proper conclusion in deciding it.

Now, take a chemical invention; for a chemical discovery how is an Attorney General, who is not acquainted with chemistry, to ascertain whether the mode proposed is capable of producing the effect stated?—I should say that is one of the exceptions to the rule.

Are not very many patents granted for chemical inventions?—Certainly.

In all those cases the Attorney General is not a competent judge?—If there was an opposition before him he might, and it is more than probable he would find some difficulty; but when he hears what each party has to say; first hearing the applicant, not in the presence of the opponent, then hearing the opponent, not in the presence of the applicant, seeing where the interference, if there is any arises, he can generally put questions to one and to the other; question upon question, till he can arrive pretty nearly at a correct conclusion.

Do you conceive he ever can come to a satisfactory conclusion, as to whether the mode of producing a chemical result is properly set forth by questions without experiments?—I do not know; I am not speaking of the specification.

The Committee are?—I understood the question to be referrible to an applicant and an opponent in the previous stages of granting a patent, and where the Attorney General was to decide between the parties, between one and the other; the Attorney General has nothing to do with the specifications, it is only to decide upon interference or no interference at the commencement.

The question you have been asked by the Committee went to the propriety of appointing a commission to examine the specification, in order to ascertain whether the thing was properly described or not?—I must say, I doubt the practicability of it; the vast matter that must come before them that they cannot be competent, any three men, to decide on every thing that must come before them.

Is not your answer founded on the supposition that it should be a permanent and unchangeable commission; if the commission was only appointed *pro re nata*, then would the objection you have last stated be removed?—I can only answer as matter of opinion that I doubt the practicability of it.

Supposing each party was to appoint scientific persons, and that those two persons so appointed were to select a third, and to proceed to an examination in case of a disputed application, what do you conceive would be the effect of that?—As referrible to whether it should be decided by the Attorney General or in this way?

Yes, the is the meaning of the question?—It is a difficult thing to answer in all its bearings, as it might perhaps in some few instances be beneficial, but as a general rule, I do not think it would.

Do you not think that scheme would produce fraudulent caveats and fraudulent attempts to attack the patent, for the purpose of establishing it afterwards; might not two parties come to an understanding, one with the other, that they should make an objection and be heard upon it before the Attorney General, for the purpose of establishing a patent which might otherwise be bad, and by that means introduce fraud into the system?—The Attorney General's merely reporting in favour of a patent does not conclude the question.

Report on fulminating Powders capable of being used as priming for Fire-arms.—By Messrs. AUBERT, PELISSIER, and GAY-LUSSAC.

Continued from p. 187.

THE strength of fulminate of mercury is much greater than that of the best gunpowder, but it would be difficult to say how much.* To estimate it, various quantities of fulminate of mercury and gunpowder have been exploded under a hollow mass of copper, placed so that its ascent might be measured. It has been found, in this circumstance,

* The French marine has adopted a priming made with the same powder, which is placed on the touch-hole of the cannon, and which not only carries the fire to the charge, through the whole thickness of the metal, but also cracks the cartridge, however strong may be the parchment or material of which it is made.

that the fulminate raised the mass of copper to a height from fifteen to twenty times greater than the powder.

The great rapidity of the explosion of mercurial fulminating powder, from which effects result similar to those produced by a missile thrown from a fire arm, might render its employment useful in some circumstances, for instance, for breaking gates under the form of petards.

Mixture of fulminate of mercury with powder for making priming.

The quantity of fulminate of mercury necessary for a priming (*une amorce*) is so small, that it is in a manner unmanageable. One has been naturally led to mix it with common powder, to increase the bulk of the priming; but this is not the chief advantage of the mixture. Indeed, pure fulminate of mercury communicates inflammation to powder but with difficulty, and at much smaller distances than when it is mixed with bruised or very fine powder: this is a consequence of the instantaneousness of its inflammation. If it is alone, the elastic fluids have lost the greater part of their caloric before reaching the powder, and can no longer inflame it; but, if it is mixed with very fine powder, the latter is carried to the powder while in a state of ignition and sets fire to it.

In the trials of mixtures of the fulminate with various substances, made rather with a view to preserve the priming from humidity than to change the composition of the powder, it was found that many were unfavourable to the explosion of the fulminate, although mixed with it only in very small proportions; such are oil, tallow, and resin.

The most advantageous proportions for caps is ten parts by weight of fulminate and six parts of bruised powder. They are rendered a little less quick with ten of fulminate and seven of fine powder.

In waxed primings, the bruised powder should be in less proportion. It amounts to five parts in those of commerce, and is 3·3 in the priming proposed by M. Vergnaud for muskets.

The quantity of fulminate of mercury sufficient for a fowling piece is 0·0166 grains = $\frac{1}{4}$ gr. Eng., or 57600 primings may be made with one kilogramme (= 2·2 lbs. avoirdupois) of the fulminate; but, for muskets, the priming should be a little augmented. In the waxed primings the quantity of fulminate is 3 centigrammes (= 0·46 grain E.) or nearly double that of the priming caps.

The force necessary for producing inflammation of the fulminate of mercury increases as the proportion of bruised powder becomes greater, and the layer of the fulminate thicker. Consequently primings may be made more or less explosive, which should inflame, for example, by the blow of the hammer falling from the whole cock, and not when falling from the the half cock. A ram falling from different heights has been used with advantage for measuring this force; but the necessity has been discovered of seeking at the same time the extent of the propagation of the inflamed jet in the passage leading to the powder; for, as it has been remarked, it is not the pure fulminate which carries inflammation the farthest. Besides, the most explosive primings may be employed, without fear of inflaming them by the fall of the hammer from the half cock, on leaving between it and the passage, or touch-hole, but a very small distance.

Examination of fulminating primings with regard to foulness, and to their action upon iron.

Fulminating mercury, as already remarked, leaves a carbonaceous residue on the bodies on which it has been detonised. This residue is very considerable relatively to the weight of the fulminate; but it is followed by no inconvenience by reason of the extreme smallness of the fulminating primings. Besides, it never acquires coherency, and cannot accumulate much without being dispersed by the effect of the detonation. It exerts moreover no corrosive action on iron.

Fulminating primings, such as are used, and which are a mixture of fulminating mercury and bruised gunpowder, act in a different manner. If the foulness which they leave be judged of by the number of times of missing fire, a very accurate way of appreciating the inconveniences, we should regard it as null; for, by experiments which will be stated hereafter, in a hundred successive shots, there was not one instance of a miss fire, neither in the touch-hole nor the barrel, whilst with common powder and our old locks the times of missing fire are commonly reckoned as one in seven shots.

To appreciate the corrosive action of the fulminating priming, nearly equal quantities of pure fulminate of mercury mixed with bruised powder for priming, and of chlorate of potash mixed with common powder, were detonised in a well-polished gun-barrel. A portion of the barrel was also moistened with a solution of marine salt, and the barrel was laid in a damp place on the ground-floor. Twenty-four hours afterward, the effect produced on the iron was examined. The pure fulminate had left a carbonaceous residue which appeared more bulky than that of common powder, but underneath it the iron was unaltered. Common powder gave less residue, and had less rusted the iron than the fulminating powder for priming: after this it was the salt water, and lastly, the chlorate powder, which produced the most rust.

Examination of the advantages of percussion guns, with respect to the economy of powder.

In the common gun, there is a loss of elastic fluids by the touch-hole, which does not occur with percussion guns, and it has appeared interesting to measure the extent of this loss.

Two similar guns were taken of the pattern of 1816, for the infantry, which we shall designate as No. 1 and No. 2, and they were tried in succession by the pendulum, with a charge of 10 grammes (=154·34 grains, E.) of musket powder and a ball of 19 to the pound, placed between two smooth pieces of card as wadding. The recoil being found to be the same for both guns, a percusssion lock was fitted to No. 2, and the quantity of powder which was required as a charge was sought for to obtain the same recoil as with the other gun loaded with 10 grammes of powder and a ball. It was found that 9·14 gr. (=141·1 grains) were sufficient, and, consequently, the charge might be diminished nearly one-tenth, by substituting the percussion for the common gun, without lessening the distance to which it would carry. The ratio just stated, remains exactly the same, on employing charges a little exceeding 10 grammes, and applies exactly to the charge of 12·25 gram. (=189·1 grains) of military fusils, whereof about 11 grammes only enter the barrel.*

To the economy of powder of about one-tenth of the charge produced by the adoption of the percussion gun, must be added that of the priming in the common gun, the weight of which when the pan is filled is, at a mean, about 1·1 gramme (=17 grains nearly), and last that due to missing fire, or flash in the pan only, commonly estimated at one in seven shots. By uniting these different quantities, we find 2·276 (=35 grains) of saving for every shot of 12·25 grammes (=189 grains), or 2·276 kilogrammes

* The difference between the effects of percussion guns and those with flints is perhaps also due in part to the greater rapidity of the inflammation of the charge occasioned by the priming of fulminating powder.

(=5lbs. avoird.) in 1000 shots, or lastly, 6·26 francs, at 2·75 francs per kilogramme of powder. Indeed, this advantage is partly compensated by the price of the fulminating priming, which may be estimated, for caps, at 3·50 francs the thousand; but, on subtracting this last number from 6·26 francs, we still obtain a saving of 2·76 francs in 1000 discharges. Furthermore we insist on this calculation only to shew that the adoption of fulminating primings would be, with regard to economy, more advantageous than onerous.

Missing fire in percussion guns.

In order the better to appreciate the effect of fulminating primings, we have endeavoured to place ourselves in circumstances similar to those which occur in war, by employing for the experiments, a musket powder a little altered and badly dusted (epoussétée). The gun was fired with ball, with the accustomed charge, and with fulminating caps.

With a chimney of which the diameter was 1·1 millimetre (=0·04 inch), the barrel began to miss fire at the 53rd shot, and from the 53rd to the 60th, six primings were used without clearing the touch-hole before it went off.

By substituting a chimney of 1·85 millmetre (=0·073 inch) in place of the former, there was no miss fire in 100 shots, in several series of experiments. After the last series, the gun was not cleaned, and the next morning the shooting was recommenced. Missing fire occurred at the following shots: 1, 2, 3, 4, 5, 6, 7, 16, 42; but afterwards the series of shots up to 100 was terminated without missing fire. It was evidently the foulness of the chimney formed the preceding evening, expanded by the damp which it had absorbed, which occasioned the missing fire. It is remarkable that, in all these experiments, the primings did not once fail to explode.

The same trials were recommended with the waxed primings proposed by M. Vergnaud, using the same gun, its lock having been suitably modified. The temperature of the atmosphere being very high, led to the discovery of several inconveniences of the waxed primings; they became soft, stuck together by a slight pressure, and lost their form. While the temperature was high, the number of times of missing fire, with the chimney of 1·1 millimetre, was greater than with caps: the failures often began with the 20th shot, but did not become continuous, as with caps, till towards the 60th. With a touch-hole 1·85 *m.* (=0·073 inch) in diameter, there was not one failure in 100 shots; but the foulness then became so considerable it was necessary to use a shade for the sight (couvre-vue). The priming sometimes failed to explode, which might depend as much on its peculiar nature as on the form of the gun-lock.

This is not the place for comparing the lock for waxed primings to that for caps: we shall confine ourselves to remarking, that the lock for caps requires less precision in its execution than the other; that its hammer will more certainly strike the chimney in a perpendicular direction, and will require less force for inflaming the priming; and, lastly, the foulness will be considerably less.

The advantage of having no miss-fire is not confined to an economy of powder of one priming in seven: it must be considered that the quantity of powder employed by the soldier, whether involuntarily, or designedly, as he often does to diminish the recoil of his piece is much more considerable than that which has been supposed. But, independently of that saving which may appear insignificant, the absence of every failure to discharge the piece has the immeasurable advantage of augmenting the assurance of the soldier, by giving him the certainty that his piece will not fail him in face of the enemy at the moment of danger.

It might be thought that we could not succeed in preventing the missing fire but by giving the chimney of the touch-hole too great a diameter, and consequently by diminishing the distance to which the piece would carry; but experiment has taught us, that the recoil of the pendulum fusil is exactly the same with a chimney 1·85 mill. in diameter, as with a chimney 1·10 mill. in diameter. This result will not surprise, if it be considered that the chimney remains closed up by the hammer after the percussion. It would be even possible to enlarge the diameter still more, on giving the hammer a force sufficient to resist the effort of the elastic fluids which tend to escape through the touch-hole.

Further, we have convinced ourselves that, even in a common gun, the variation of the diameter of the touch-hole, within the limits from one to two millimetres, occasions no perceptible diminution of the distance to which it will carry. The following is a table of the results which we have obtained:

Diameter of the touch-hole.	Charge of powder, corresponding to each diameter, for obtaining the same recoil by the pendulum-fusil.
0·90 millim. = 0·035 in.	10.00 grammes = 154·34 grs. Eng.
1·66 ...... = 0·065	10·00 ...... = 154·34
2·76 ...... = 0·108	10·39 ...... = 160·36
3·48 ...... = 0·137	10·72 ...... = 165·45

Manufacture of the fulminate of mercury.

This powder is prepared with mercury, nitric acid at 38 or 40° of Baumé (=1·36 to 1·36 s. g.) and alcohol at 85 or 88 centesimal degrees. Varied experiments on small quantities have taught us that the best proportions are those found by Howard: 1 mercury, 12 nitric acid, and 11 alcohol. One kilogramme of mercury (=2·2 lbs. avoird.)

produces 1¼ kilogramme of pure fulminate, a quantity with which at least 40,000 primings in caps may be made for the military fusil.

The fulminate of mercury, as it is prepared, being in small crystals, are to be first ground on a marble table with a wooden muller, after having wetted it with 30 per cent. of water. Afterward, add six parts of common powder to ten parts of fulminate, and continue the grinding. A firm paste is obtained, which dried to the proper degree by exposure to the air, is made into grains, each of which is to form one priming.

If the fulminate of mercury offers no danger as long as it is moist, it is no longer the case when it is dry, and should not then be handled without great caution. Nevertheless we may avoid employing it in that state; and as the manufacture of fulminating priming will be always very small, and as it may be very much divided, and very perfect methods of proceeding applied to it, we do not hesitate to declare that it might be made without any difficulty and without more danger than that of common powder in the Government establishments. An explosion would have even less injurious consequences, as well to the workmen as the buildings, on account of the very small quantity of matter under manipulation.

Different sorts of priming hitherto employed.

There have been used, 1st. the fulminating powder in grains; 2nd. the powder in pastilles covered with lead or paper; 3rd. the powder in grains varnished; 4th. the waxed primings; 5th. the caps or capsules; and 6th. tube primings.

The powder in grains is very dangerous, for the explosion of a single grain determines that of the whole mass. It is almost entirely disused. The other primings have not the same inconvenience; but as they have it in common to have a covering, and as those called waxed, and with caps, are almost the only ones in use, we shall occupy ourselves with the latter only.

The waxed primings were in use with sportsmen, when proposed by M. Vergnaud for the infantry. Every one contains three centigrammes (nearly half a grain Eng.) of fulminate of mercury and one centigramme of bruised gunpowder, and are enveloped with a coating of wax applied by hand, which defends them very well from the action of moisture, and prevents them from exploding simultaneously. They fix also very readily to the pan, and may be easily carried, and without danger, by always taking care to protect them from the heat of the sun, and that of other bodies which might determine their agglomeration.

They have the inconvenience of causing great foulness, and giving a little more smoke and smell than cap primings. Their present price in commerce is from 6·75 to 7 francs per thousand.

The cap primings are most in use at present, and form at least 99 per cent. of the consumption: those for the guns of sportsmen contain in each priming 0·017 grammes of fulminate of mercury, mixed with six-tenths of its weight of bruised gunpowder *(pulverin)*. These primings very well resist the action of humidity, and take fire after several hours immersion in water. Their very regular and solid form allows of their being fixed on the chimney of the touch-hole by mechanical means, which will be very advantageous for military fusils. In the explosion, the copper cap is torn, and rarely divided and projected; but, by hollowing the head of the percussion hammer, the copper is no longer projected excepting towards the ground.

The copper caps are made by means of a fly press with great rapidity. The primings sometimes take fire during their manufacture; but the inflammation communicates but very rarely to the small number of those under manipulation. They are easily carried and without danger. Their present price in commerce is $3\frac{1}{2}$ francs per thousand. At this moment, we cannot say which sort of priming, the waxed or the cap-priming, would be preferable for military service. Experiments will be necessary to resolve the question.

Conclusion.

The experience acquired respecting fulminating primings, and their almost general use for the guns of sportsmen, render their advantage in war incontestable. Their adoption would save powder, render the discharge certain, and give the soldier more confidence.

The chlorate of potash powder having the inconvenience of rusting and making the arms very foul, and of occasioning in consequence the piece to miss fire, the primings with fulminate of mercury should be preferred, having none of those inconveniences.

The manufacture of fulminate of mercury, although not without danger, offers no real difficulties, and the administration of powders would speedily be prepared to undertake it, and to supply all the wants of Government.

The primings proposed by M. Vergnaud, are composed of fulminate of mercury, like those already in use; but they are characterised by their covering of wax. Those in caps, judging from the almost general use of them for fowling pieces, appear to be preferable, but the wants of the military service may require other conditions which it does not belong to us to examine, and experience alone should determine the preference.

In terminating this report, we think it right to anticipate an objection which might be raised against the application of fulminating primings to fire-arms used in war, namely, that the mercury forming the essential basis of these powders comes to us from foreign countries, and in case of war we might be deprived of it, so as seriously to compromise the military service.

But to reduce this objection to its just value, it is sufficient to remark, that at least 40,000 primings can be made with one kilogramme of mercury, and that with 100 kilogrammes four millions of primings might be made, a sufficient quantity for 100,000 men. It would therefore be easy to provide at a favourable time a sufficiency of mercury for the military service; besides, we know by experience, that even during the last continental blockade, France was never in want of mercury. Lastly, we might, in case of need, substitute for a short time the chlorate of potash for fulminate of mercury, without making any change in the locks of the fire-arms, or might employ even fulminate of silver.

NOTICE OF EXPIRED PATENTS.

William Lewis, of Brimscomb, Gloucestershire, Dyer, for a machine for fulling woollen or other cloths, that require such process.—Dated April 5, 1816.—(*For copy of Specification, see Repertory, Vol. XXXVII. p.* 69.)

Joseph Turner, of Layton, Yorkshire, Mechanic, for an improved rotary engine, and application thereof, with or without other machinery, to useful purposes.—Dated April 8, 1816.—(*For copy of Specification, see Repertory, Vol. XXXVII, p.* 259.)

John Woodhouse, of Bromsgrove, Worcestershire, Civil Engineer, for a method of forming the ground for roads and pavements, and also for paving and repairing old pavements and roads.—Dated April 9, 1816. (*For copy of Specification, see Repertory, Vol. XXX, p.* 79.)

William Atkinson, of Bentinck Street, Mary-le-bone, Middlesex, Architect, for a method or methods of forming blocks with bricks and cement in the form of ashlar stone, for building, so as to have the appearance of stone. —Dated April 9, 1816.—*For copy of Specification, see Repertory, Vol. XXX, p.* 75.)

William Stenson, of Coleford, Gloucestershire, Engineer, for an improved engine to be worked by steam, or any other power.—Dated April 9, 1816.

William Lassalle, of Bristol, Apothecary, for a method or contrivance for an improvement in the construction of a gig, and of cards, so called in the clothing and other manufactories, or other machines or instruments used and employed in such manufactories for the same or similar purposes, a contrivance never before put in practice.—Dated April 23, 1816.

George Bodley, of the city of Exeter, Ironfounder, for an improved metallic engine to work either by steam or water, which he denominates Bodley's improved metallic Engine.—Dated April, 27, 1816.

LIST OF NEW PATENTS.

John Rawe, Jun. of Albany Street, Regent's Park, in the county of Middlesex, being one of the people called Quakers, and John Boase, of the same place, Gentleman, for certain improvements in steam boilers, and a mode of quickening the draft for furnaces connected with the same. —Dated March 30, 1830.—(*Six months.*)

William Aitkin, of Carron Vale, in that part of the United Kingdom called Scotland, Esq. for certain improvements in the means of keeping or preserving beer, ale, and other fermented liquors.—Dated March 30, 1830. —(*Six months*.).

Daniel Towers Shears, of Bankside, in the borough of Southwark, in the county or Surrey, Coppersmith, for certain additions to and improvements in the apparatus used in distilling, and also in the process of distilling and rectifying.—Dated March 31, 1830.—(*Two months*.)

James Collier, of Newman Street, Oxford Street, in the parish of St. Mary-le-bone, in the county of Middlesex, Civil Engineer, and **Henry Pinkus**, of Thayer Street, Manchester Square, Esq. in the same parish, Gentleman, for an improved method and apparatus for generating gas for illumination.—Dated April 5, 1830.—(*Six months*).

William Alltoft Summers, of Saint George's Place, Saint George's in the East, in the county of Middlesex, Engineer, and **Nathaniel Ogle**, of Millbrook, in the county of Hants, Esq. for certain improvements in the construction of steam engine and other boilers, or generators, applicable to propelling vessels, loco-motive carriages, and other purposes.—Dated April 13, 1830.—(*Six months*.)

Persons desirous of obtaining Patents for inventions, may have them procured with little trouble to themselves, and generally without their personal attendance in London, on application to the Editors *of the* Repertory *(addressed to the care of Messrs. T. & G.* Underwood, *32, Fleet Street,) who, from long practice and experience, presume they may be enabled to afford important assistance to Patentees in drawing up and adjusting their Specifications, on the accuracy and perspicuity of which, in a great measure, depends the security of the Patent.*

THE

REPERTORY

OF

PATENT INVENTIONS,

No. LX. JUNE, 1830.

Specification of the Patent granted to William Rodger, *of Norfolk Street, Strand, in the county of Middlesex, Lieut. in the Royal Navy, for "Certain Improvements on Anchors,"* Dated 13th March, 1828.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said William Rodger, do hereby declare that the nature of my said invention and the manner in which the same is to be performed, are particularly described and ascertained in and by the drawing hereunto annexed, and the following description thereof, (that is to say):

My said invention of certain improvements on anchors consists, in part, in a new method or methods of constructing them, by particular combinations of wood and iron, some of which are shewn in the different figures of the drawing, which, as aforesaid, is annexed to this specification, and in which fig. 1 is a side view of one of my improved anchors; fig. 2 a top view or plan thereof; fig. 3 a front view of the anchor stock; and fig. 4 a back view of the crown and fluke of the anchor, in all of which figures, as well as in the others, the same letters of reference indicate the similar parts. A A is the top plate of iron, and B B the bottom one, which is made stronger than the bar A A, and which constitute a chief part of the shank of the anchor. These plates A and B are thickened at their front ends, and united by welding them together, as shewn at C, in figures 1 and 5; their back ends are then connected or welded to the sides D D of the arm or fluke E; there are also corresponding holes F F &c. made through both of the plates A and B, to receive bolts or pins, by which they are connected together, in the manner to be described hereafter. Holes G G are made through the sides of the arm or fluke, as shewn in figs. 6 and 7, for a bolt H to pass through, as shewn in figs. 1, 2, and 4. The plates A and B are thickened or strengthened towards the throat or crown of the anchor, in order that the sides of the arm or fluke may be welded to them more firmly; and they are further secured by the bolt H. The palm I, which forms the extremity of the fluke, is welded to the sides D D of the arm, as shewn in figs. 4 and 7. A hole J is made through the front end of the shank, which is thickened on its upper side for that purpose, and as shewn in figs. 1, 2, 5 and 8, through which hole is passed the bolt of a shackle K, as shewn in figs. 1 and 2. In the sides of the plates A and B, gaps or notches are made, as shewn in fig. 8, which receive into them the sides of a staple L, shewn in fig. 9, and which is secured in its place by means of a pin passed through holes made in the sides of the staple, as shewn in figs. 1, 5 and 9; the use of this staple is to perform the office of the nut, commonly formed upon the shanks of anchors, for securing the stock in its place thereon. Between the plates A and B of the shank of the anchor, I introduce a centre piece M M, formed of any fit and proper kind of wood, such for instance as

African or English oak, saul or teak, as shewn in figs. 1, 4, 5, 10 and 11; and through which centre piece I make holes, corresponding with the holes F F, &c. formed in the plates A and B before described, for pins or bolts to pass through, and which said pins or bolts are to be firmly rivetted on one end of each, into countersunk holes, formed in one of the plates to receive them, the opposite ends of the bolts having projecting heads made upon them; or they may be connected together in any other fit and proper manner; I can also surround the said pins or bolts with iron bushes, tubes, or sockets, such as shewn at N N in fig. 12, and which will prevent the plates A and B from approaching each other, in case of the wood becoming decayed or injured by worms or other causes; and in order to prevent as much as may be the said injury, I can also coat the sides of the said wood with sheets of iron, or protect them with filling nails, as is frequently done in the case of piles, or other wood-work under water: I can also introduce iron pins or dowels O O, figs. 1 and 13, at intervals between the said pins or sockets, as a substitute for the above bushes. The anchor stock P P, figs. 1, 2, 3, 14 and 15, instead of being formed of two pieces of wood as usual, consists of one main piece of wood Q Q, figs. 1, 2, 3, 14 and 15, and of a broad flat iron plate R R, shewn in figs. 1, 2, 3, 14 and 16, united to the main piece of wood Q Q, by the iron bolts S S, &c. and the iron bands or hoops T T T T, the latter of which are shewn in fig. 2, and the former in figs. 2 and 3. The bolts S S, &c. have countersunk heads corresponding with the countersunk holes formed in the iron plate R R, as shewn in fig. 3; and their other ends are secured either by being rivetted into holes formed in iron collects, clinch-rings, or washers; or by being screwed and having screwed nuts bound upon them. There is also required another piece of wood U U, shewn in figs. 1, 14 and 16, and which I term a filling piece, to occupy the angular gap left between the edge of the iron plate R R, and the back edge of the main piece Q Q of the stock, as shewn in the sections of the stock in figs. 1 and 14. Besides the staple L affixed upon the shank of the anchor, in the manner before described, in order to secure the stock in its place, I likewise form a shoulder or stop V, shewn in figs. 1 and 5, upon the under side of the iron plate B, for the still better security of the stock, and against which stop, the iron plate of the stock R R is lodged. The front of the anchor-stock and the iron plate is bevelled or sloped, in such a manner as to give the stock a tendency to bury itself deeper in soft ground, than it otherwise would do, were it formed in the usual manner. This bevel is shewn in the sections of the stock, figs. 14 and 15, at W W, and which said sections are taken at the parts of the stock indicated by the dotted lines X X, in fig. 2. The middle part of the stock is however left square, as shewn by the section of it in fig. 1, for the sake of giving more strength to that part: I likewise, for the same reason, weld a thin iron plate Y, shewn in plan, in fig. 17, and edgeways in fig. 18, upon each side of the front end of the shank of the anchor, as shewn by dotted lines at Y, in figs. 1 and 5, and which have between them a recess, into which the front end of the centre piece of wood M M is received. In case of a hempen cable being used with this anchor, I have provided a ring Z, figs. 1 and 2, to receive it, and which, with two or more links, is to be joined to the shackle K by another shackle of suitable dimensions, as shewn in figs. 1 and 2. A chain cable may be attached to the shackle K in the usual manner, as it is made large enough for that purpose, and also to receive the cat-head stopper. An eye-bolt *a*, figs. 1, 2 and 4, is passed through the iron plate A A, and the wooden centre piece M M; near to the crown, and secured in a proper manner, to which the chain of the buoy rope is attached by means of a shackle. There is also provided a shackle *b*, figs. 4 and 7, affixed to the heel of the palm of the anchor, to which may be attached a chain for fishing the anchor, and which chain may be designated a fish-pendant; this chain passes over either of the projecting heads of the bolt H, and along the shank, over the stock, and is fastened around the shank at the front end thereof. Near to the extremity of this chain there is a ring affixed, to which the fish-tackle is to be hooked in fishing the anchor, at which time another smaller chain, which is also affixed to the said ring, and which had been wound, tied, or fastened around the front end of the shank, is to be unloosed or cast off, when the fish-pendant takes another direction and will bring up the fluke of the anchor as usual. The bolt H, which passes through the crown of the anchor, has affixed upon each end of it a perforated circular piece of wood, hooped around, and upon the extreme rounded ends of which an iron cupped washer is placed, and one end of the bolt having a countersunk head formed upon it, which fits into the countersunk hole of one of the washers; the other end is to be rivetted into a countersunk hole made in the other washer to receive it. The intent of cupping these washers is, to prevent the outer ends of the two circular pieces of wood from splitting. Fig. 19 is a side view, and fig. 20 a plan of another method of forming an anchor, similar to that already described, with this difference however, that the plates A A and B B, instead of being placed upon the top and bottom of the shank, are laid upon the sides of it, and are both of an equal thickness. I however prefer the former method of constructing the anchor, as possessing more strength than this latter one. Fig. 21 is a side view, and fig. 22 a plan of an anchor, formed nearly in the shape of a common anchor with 2 flukes, but combined in the manner already described, excepting in those variations which are necessary to adapt them to the double fluked anchor. Fig. 21 shews that the plates A A &c. previously to being welded together at the ring end of the shank of the anchor, are bent into the shape shewn in that figure; in order to form the arms or flukes, and they are strengthened or supported by the curved piece of iron *c c*, shewn separately in fig. 23, which is welded to them at the extremities of the arms or flukes, and as far upwards as possible; and the middle parts are connected together by iron pins, which are passed through holes made in them and rivetted, as is shewn in fig. 21. The palms of the flukes are welded at their heels and points to the plates A A, &c. as shewn in fig. 24, before the plates are bent and connected together ready for welding. The wooden part M M of the shank of this anchor is introduced between the plates A A, &c. and secured by means of iron pins rivetted through the whole in the manner already described; and further secured by means of an iron strap *d d d*, shewn in figs. 21, 22 and 25, which is lodged in a gap *e*, made at the crown of the anchor, shewn in fig. 23, and is afterwards secured by iron pins rivetted through it and the wood on the shank, and which said pins, as well as those securing the side plates A A, &c. to the beam of wood or centre piece M M, may be surrounded with iron bushes, tubes or sockets, in the manner before described. Two wooden filling pieces *f f* are also lodged and secured within the angular gaps left on each side of the main piece of the wood M M, at the throat of the anchor, to fill up those gaps, as shewn in fig. 21. The form of the curved piece of iron *c c* at the dotted line in fig. 23, is shewn in the cross section thereof, which is annexed to that said figure. Instead of the staple L, fig. 9, which forms a substitute for the nut, usually welded to the square of the shank of the common anchor, to secure the stock in its place, as before described, I here employ the hoop *g*, shewn in figs. 21 and 22, and separately in fig. 26, and which is also firmly secured by means of a pin or bolt passed through it and the wood, and rivetted. This double fluked anchor may be stocked as usual. I do not mean or intend hereby to claim as my invention, the forming of anchors with one fluke only, such having been already in use, although differently formed from mine, as herein shewn: but I do hereby claim as my invention, and the object of this my said patent, the combining of iron and wood in the formation of anchor shanks in general, and the particular modification of form, necessary to ensure the fluke of this single or one fluked anchor always falling in the proper position to take hold; namely, that it should be always downwards. This is effected by raising the point of suspension to which the shackle K is affixed, so as to place the line of traction as much as possible above the centre of the gravity. I also claim the elongation of the shank of the anchor beyond the point of junction of the arm, commonly termed the crown of the anchor, and which causes the fluke of the anchor to turn in the direction that the ship is drifting, at the time that the anchor reaches the ground or bottom. I also claim the combination of wood and iron to form the stocks of one fluked anchors, and the particular shape or form given to the front side of the stock, which is bevelled or sloped so as to cause it to penetrate as deep as possible into the ground, and which tendency is further encreased by the angular shape given to the front end of the shank, and by the line of traction being so much more elevated than in the common anchors. I also claim the method of forming the shank, and those parts of the arms of double fluked anchors to which the palms are connected by welding, of one entire piece of iron, as shewn in fig. 21;

and also the method of strengthening the crown and throat thereof by means of the iron strap *d d d*, as shewn in figs. 21 and 22. I also hereby claim the application of one or more iron hoops or bands, to be placed and secured upon such parts of the shanks of both single fluked and double fluked anchors, made upon either of the several methods herein described, as may most conduce to the further strengthening thereof; and particularly by placing them near to the throat and trend of the anchors.

In witness whereof, &c.

Specification of the Patent granted to John Lane Higgins, *of Oxford Street, in the county of Middlesex, Gentleman, for "Certain Improvements in Wheel Carriages,"*—Dated 11th August, 1828.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said John Lane Higgins, do hereby describe and ascertain the nature of my said invention of certain improvements on wheel carriages, and in what manner the same is to be performed, by the plans and drawings hereunto annexed, and the following descriptions thereof, (that is to say):

Fig. 31 represents an elevation of a three wheeled carriage, constructed according to my improvements; (the body or seats are supposed to be removed, in order to explain the nature of the invention). A represents the fore wheels. B the hind wheel. C C C C the fore carriage for the body to rest on. D D D D the springs or stays fixed on the axletree. E the sway bar connected with the fore carriage and working under the perch. F F the double

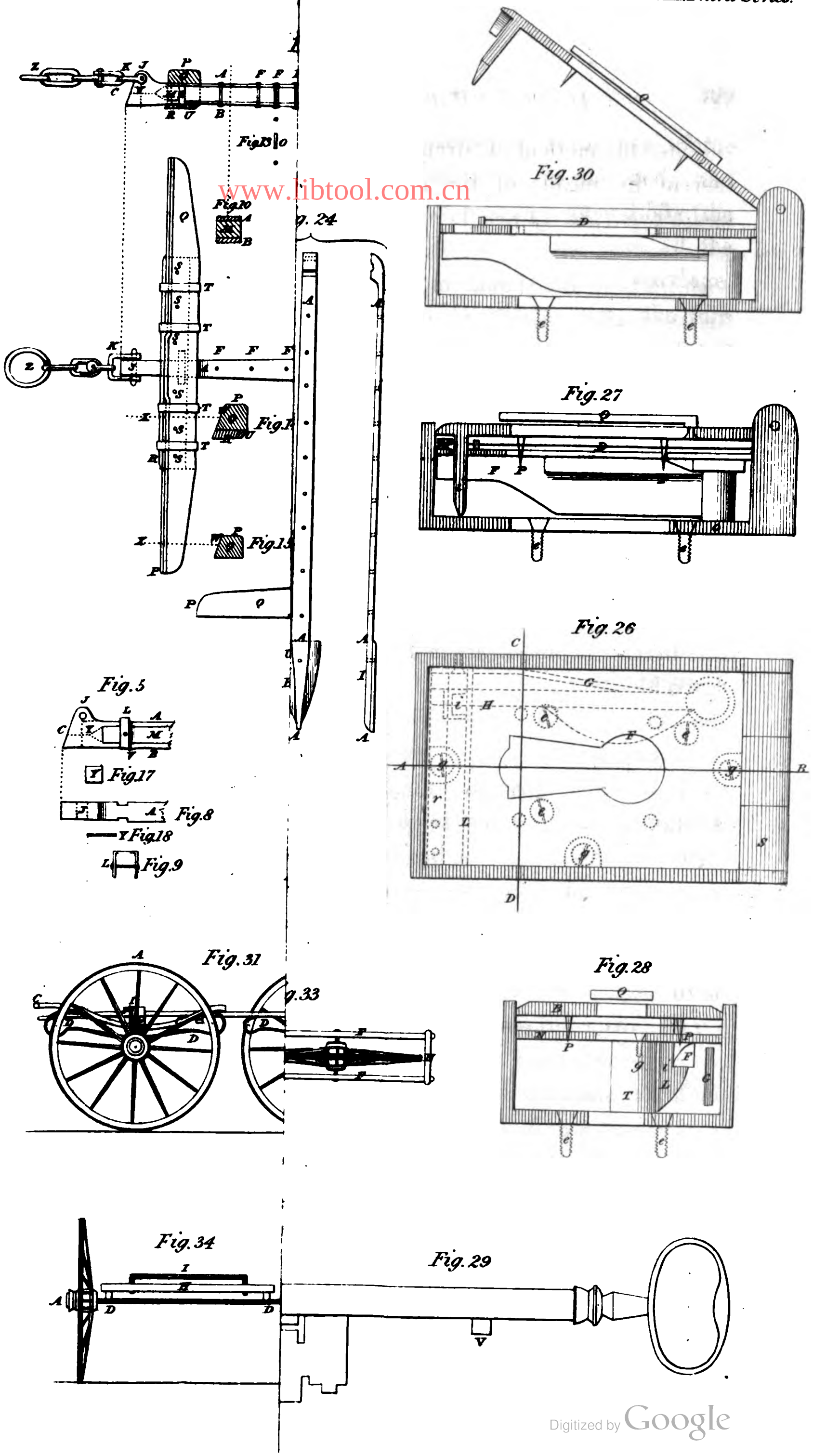


Fig. 30
Fig. 10
Fig. 13
Fig. 24
Fig. 14
Fig. 15
Fig. 27
Fig. 26
Fig. 5
Fig. 17
Fig. 8
Fig. 18
Fig. 9
Fig. 31
Fig. 33
Fig. 28
Fig. 34
Fig. 29

perch framed through the transome G. H the bed of the fore carriage. I an iron staple fixed in the bed, and forming the double centre, as shewn in figs. 32 and 33; (the same letters refer to the corresponding parts in all the figures). Fig. 32 is an horizontal plan of the carriage. A A the fore wheels. B the hind wheel. C C C C the fore carriage and the fore futchells. E the sway bar. F F F F the double perch framed, through the transome G; the fore part of the perch rests on the bed H, and the hind part on the springs or axletree of the hind wheel. I I the iron staple or two bolts fixed in the bed H, as shewn in fig. 34. K K are two curved pieces framed into the transome G, they are circular arches described with the length of the staple I I, as radii from the two ends of the staple as centres. L is a bolt fixed in the piece N, against which the bar M works when the carriage is on the lock, as shewn in fig. 33. N N N N are pieces framed into the double perch to strengthen it. The perch is drawn forward by the ends of the staple I bearing against the curved pieces K K. Fig. 33 represents the carriage on the lock. The bed of the fore carriage is confined by one end of the staple I, against the transome G X; at the other end of the staple works round the curved piece K; thus the wheel A advances by an arch, described from G X; and the wheel A X recedes by the smaller arch from G X; the staple I I passes over the perch to prevent its getting out of gear. Fig. 34 is a transome section of the fore carriage. A A the fore wheel. D D the spring stays or blocks on the axletree and supporting the bed H. I the staple fixed in the bed. Fig. 35 is an horizontal plan of the perch. Fig. 36 is a transome section of the transome G, shewing the double perch F F and the curved pieces K K, framed through it. A body being placed on the fore carriage, and turning with it between the wheels in the same manner as a two wheel carriage, the driving is rendered much safer and easier than an ordinary four wheel carriage: a great advantage is also gained by this construction of carriage when backing or going down hill, the two ends of the staple or bolts I I bearing against the transome G. The hind wheel is kept parallel with the fore wheels, except when the driver wishes to alter his course; another body seat, or boot may be placed over the hind wheel, with a recess for that wheel to work in. The carriage represented in the drawing, may be made of any customary materials, and the form or proportion may be varied according to the kind of body or seats for which it is intended.

Having now described my improvements, I do hereby declare, that my invention does not consist in any specific form or construction of the wheels, axletrees, springs, or other parts represented in the drawings hereunto annexed in a detached state; but my improvements consist in combining and arranging those parts in such a manner as to form three-wheeled carriages with double centered perches. The drawings hereto annexed, together with the foregoing description, explain how the said parts are to be combined, to form a carriage of the above description; but the arrangement, forms, dimensions, and proportions of the parts may be greatly varied, to render carriages of the above description suitable for various purposes of pleasure or utility; such variations will be obvious to any competent workman who may construct carriages according to my improvement, and need not be further explained.

In witness whereof &c.

Specification of the Patent granted to ANDREW GOTTLIEB, *of Jubilee Place, Mile End Road, in the county of Middlesex, Locksmith, for "Certain Improvements on, or Additions to, Locks and Keys."*—Dated 1st June, 1829.

WITH AN ENGRAVING.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Andrew Gottlieb, do hereby declare the nature of my said invention to consist in the application of, and securing a piece of paper, or other the like fragile suitable material, as a label over the key-hole of locks, in such manner as to prevent the possibility of a key, or any instrument, being introduced through the key-hole into the interior of the lock, for the purpose of unlocking it, without detection. And in further compliance with the said proviso, I, the said Andrew Gottlieb, do hereby describe the manner in which my said invention is to be performed, by the following description thereof, reference being had to the drawing annexed, and to the figures and letters marked thereon, (that is to say):

Description of the Drawing:

Fig. 37 is a front view of my said invention, and represents a shallow, oblong, square box, or metal chamber, with two key-holes, corresponding with that of the lock to which it is to be applied; cut, one in the front plate or cover, and the other in the back of the box; *e e e,* are three screws, in the back of the box, to screw it fast over the key-hole of the lock: these screws, in some cases, will screw directly into the lock; as, for instance, when it is applied to a padlock; and in others into the wood, outside of the lock, as in the case of a door-lock, where my metal chamber or box will be screwed through the wood of the door into the lock. Exactly over the key-hole H is a tumbler, acted upon by the spring G, turning on the pivot J, and provided with a boss F, which is acted upon by a stub on the shank of the key hereinafter explained. The tumbler H takes into a spring catch *i i*, which holds the cover of the box down, until, by turning the key, the stub on its shank acting against the boss F, pushes the tumbler out of the catch, and the spring *r* throws up the cover, which turns on a hinge at S, and to which of course the spring *r* and catch *i i* are attached. The parts F G H J may be considered as the internal works of the box, and are covered over by a thin plate, having also a key hole cut in it, which thin plate is screwed down by the screws *g g g*, upon three pieces of metal, rising from the back of the box to support it. On this thin plate I place a piece of paper, cut to the width of the plate, and extending in length as far as the dotted lines L, which represent a small ledge for preventing the paper from slipping down and interfering with the free action of the spring catch: now when this piece of paper is laid over the thin plate, the cover shut down upon it, and the box screwed over the key hole of any lock, it is evident that no key or other instrument could be introduced into the lock for the purpose of unlocking it, without perforating the paper, which would cause the attempt at once to be detected: and it should be observed, that these papers may be cut from a cheque book, made to a proper size for the purpose, with counterparts, and be left in the book, and may be written upon in any way to give additional security, according to the service which the locks are destined to perform. Fig. 38 is a section of the box, from A to B; in fig. 37, the pieces which support the thin plate being omitted to avoid confusing the drawing: this figure represents the lid shut down upon the piece of paper, which I call the label, denoted by the red line M.

i is the catch of the lid, which secures it down by means of the tumbler F, which takes into it, and which is acted upon by the spring at its back; the flexure of which spring causes the tumbler to move back when the catch *i* is pressed against it, and to return on the hold of the catch when pressed beyond it. P P are two out of four small pins or points, rivetted into the cover of the box, and shutting into small sockets cut to receive them in the thin plate on which the paper lies; and their object is, by piercing the paper at those points, to hold it firmly, and prevent the possibility of pushing it on one side or removing it, for the purpose of opening the lock without detection. Fig. 39 is a transverse section of the box from C to D, in fig. 37. B is the lid shut down. *i* is the catch of lid B, secured under the tumbler F. G the steel spring at the back of tumbler L, is the hold of the catch. P P are the four pins to prevent the removal of the label D. N is the thin plate which covers the works. T is one of the pieces of metal on which the plate N is secured. Q is a brass dropper over the key hole of lid B. Fig. 40 shews one of my improved keys, with the addition of a stub or piece of metal at V, placed on the shank of the key, so as to act between the back of the box O, and the thin plate N, when the key is in the lock The stub V is made of sufficient length, when the key is turned round, to touch the tumbler F, and to force it off the hold of the catch L, thereby releasing the lid B, which the spring M, fig. 38, immediately causes to fly up. Fig. 41 is a view of the box, with the lid open, and a paper in it. Now whereas many variations may be made in the mechanical means by which I hold the piece of paper over the key hole of the lock, for the purpose aforesaid, and combining the principles hereinbefore described: but I claim as my invention the application (by such and the like mechanical means as are hereinbefore described), of a piece of paper, or other the like fragile material, over the key hole of a lock, in such manner that it cannot be removed; nor can a key or other instrument be introduced into the lock through the key hole, for the purpose of opening it, without detection; while at the same time it does not prevent the lock being opened with its proper key, when required. And such my invention being, to the best of my knowledge and belief, entirely new, and never before used within that part of His said Majesty's United Kingdom of Great Britain and Ireland, called England; His said Dominion of Wales, or Town of Berwick upon Tweed; I do hereby declare this to be my specification of the same, and that I do verily believe, that this my said specification doth comply in all respects fully and without reserve or disguise with the proviso in the said hereinbefore in part recited letters patent contained; wherefore I do hereby claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

ACCOUNT OF NEW PATENTS.

Patent granted to WILLIAM GOOCH, *of Mount Street, Berkeley Square, in the County of Middlesex, Plumber, for certain Improvements in Baths of different Descriptions, which Improvements are applicable to other purposes.*—Dated, Nov. 7th, 1829.

THIS is stated to consist in applying apparatus either to a common shower bath, so as to form or combine a shower bath with a vapour bath, or to a plunge bath, to combine a plunge bath with a shower and vapour bath, all of which can be used singly or otherwise at pleasure.

For the former a cloak or covering, of a thick cotton texture, with an aperture, which draws round the throat of the patient, is fastened by hooks or otherwise at the upper part, to the frame of a common shower bath, while the lower part hangs loosely on the floor of the frame: a perforated plate is placed in the centre of the latter, to which a pipe is affixed, that is furnished with a long handled cock, and conveys the necessary vapour from a boiler on the outside of the bath. The boiler recommended to be used by the patentee, but to which he lays no claim, consists of a vessel large enough to contain two gallons of water, with its top formed like a dome. When medicated vapour is intended to be employed, the herbs or other ingredient are suggested to be placed between two perforated plates in the boiler, through which the steam will pass before entering the bath.

In adapting the cloak to the plunge bath, a metal tube, supported by two legs of similar material, are nailed to the floor of the apartment, and affixed to the head of the bath; the cloak is supported by two arms that project from the tube, which arms, being balanced by a weight at the extremity of a cord passing through the latter, can be elevated or lowered at pleasure; the perforated metal plate for distributing the vapour, is placed at the bottom of the bath, as in the former instance, and is supplied with a pipe and boiler in like manner. The shower-bath is added to this last described bath by means of a lever, which being curved at one extremity, raises a shower-bath (of course without the ordinary framing) to the requisite height, and the cloak employed for the vapour-bath being raised to the top of the lever, and caused to surround the shower-bath, it can be thus used as required.

It is finally stated in the specification, that by fitting pockets to the cloak, it can be adapted to the purpose of a shampooing bath.

Patent granted to James Viney, of Picadilly, in the City of Westminster, a Colonel in the Royal Artillery, for certain Improvements in Steam-Boilers, and the Apparatus connected therewith.—Dated Nov. 2, 1829.

THE principle of this patent is the adapting of the heat produced from inflamed oil, or gas, to the generating of steam, with equal or more advantage than other fuel; and the improved boiler is constructed of a combination of generators, of a peculiar construction, that shall be presently described; the number of which, are to be varied according to the shape, or size of the apparatus with which they are connected. The improvements in the latter, as alluded to in the title, bear reference to steam carriages; and the benefit contemplated, is the superseding the tank, separator, and blowing box, by making use of the generators before mentioned, and which we shall now proceed to describe.—

A number of conical cylinders, decreasing gradually in diameter, but all of equal length, are placed one within the other, leaving a space round each cylinder, and constituting a number of conical chambers, which contain, alternately, the water and the flame; the tops of these chambers, it is obvious, must be closed, though the last, or external one, has a numerously perforated covering, for the passage of the waste steam; and the object in using this, is stated to be the preventing the noise usually attendant on its escape. This generator is furnished with a safety valve, and a pipe passing through all the cylinders at the upper part, and another at the lower, cause by the former a communication to the steam, and by the latter to the water in each cylinder. Below these conical vessels, a vessel similar to a lamp is represented in the drawings, but all explanation as to its construction, or dimensions, is omitted. Small apertures are directed to be made in the upper circumference of the flame chambers, or flues for the passage of any smoke that may be produced; and the outside of the apparatus is to be cased with wood, which is hooped on like a cask; the wood preferred by the patentee being poplar. The object of this casing is not stated, but we presume it is for the purpose of preventing the escape of the caloric, on the principle of its being a slow conductor of heat.

When more than one of these generators are employed, a pipe is to communicate to each alternately, for the conveyance of the steam to the apparatus in connection with them.

Patent granted to Daniel Macdougall, *of Edinburgh, Horticulturist, for certain Improvements in, or Additions to, Syringes, applicable to Garden and other purposes.*—Dated Nov. 10, 1829.

The improved syringe described in this specification differs from those of usual construction only, in its having a valve placed in the centre of the rose-head, the intention of which is to counteract the re-action of the atmosphere in withdrawing the piston for filling the syringe, to which there is necessarily a tendency in those in common use, arising from the partial vacuum produced between the piston and the water, by the comparatively slow passage of the latter through the minute pores of the rose-head. To lessen the exertion required for filling the instrument, Mr. Macdougall makes use of a hinged valve of leather, which admits of the entrance of the water through a large aperture, without allowing its return. A piece of wire gauze is directed to be placed over the valve, in the interior of the barrel, to prevent the admission of dirt or leaves when filling.

Patent granted to John William Dodgson, *of Lower Shadwell, in the County of Middlesex, Pump and Engine Maker, for certain Improvements in Ship's Scuppers, and which may be applied to other purposes.*—Dated Nov. 17th, 1829.

This patent, like the last one we have described, is merely for the application of a valve to the instrument so improved; but it is in this instance so placed as to allow the water to pass out of the tube without allowing any to return. It is scarcely necessary to give any farther description of this improved scupper, as its formation can so easily be conceived without it; we need only say, that a cover is screwed on to the barrel that passes through the side of the ship, and to it a leather valve is attached vertically. When the scupper is to be placed in a perpendicular position, the valve is kept closed by a weighted lever attached to the end of the valve, with its fulcrum proceeding downwards from the cover.

Patent granted to Thomas Osler, *of Birmingham, in the County of Warwick, Chandelier-Furniture Manufacturer, for certain Improvements in the construction of Glass and Metal Chandeliers, and other Articles of Ornamental Lighting.*—Dated November 10th, 1829.

In the drawings attached to the specification of this patent, are represented combinations of flint glass, in various forms, which, it is stated, will produce unusual lustre and brilliancy. The shapes of the detached pieces, that are directed to be united, as shall presently be described, Mr. Osler prefers should be either of a prismatic, or pyramidal form, as being best calculated to produce the refractive effects of light. The pieces of flint glass are in all the examples, placed in intimate contact with each other, at their edges, and being fixed in a circular position, a substitute for a lamp or chandelier, may be thus produced, which, it is stated, will be exceedingly pleasing to the eye, and may be converted into a species of blind, for concealing any thing unsightly, the shapes being, in this instance, of course regulated by circumstances.

In order to fasten the glass in the form required, (supposing it to be conical for example) two annular pieces of metal, of different sizes, are to be employed, in which are formed grooves, for the admission of the pieces of glass; these latter have a notch cut in them at either end, which fit nicely in the groove before mentioned, and a small quantity of plaster of Paris, or other cement, being previously placed in the grooves, the pieces of glass will, in a short time, be found firmly fixed in their respective situations. For the farther strength of this newly contrived lamp, or ornament, some pieces of metal are placed in the interior, which are arranged according to the uses to which it is intended to be applied; and the patentee recommends the metal rings or grooves to be covered with a thick piece of glass, to prevent any unsightly appearance.

The greater part of the specification, is taken up with the description of various forms and modes of uniting the materials, which we do not deem necessary to detail; but we may here observe, that some injudicious sentences are inserted, that lead us to imagine it has not been submitted, previous to its enrolment, to the consideration of a person conversant with the subject of patents.

On Mr. Bernhard's *Patent for raising Water.*

Communicated by the Author in a Letter to the Editor.

Sir,—From your having had the kindness to insert in your work on a former occasion, some remarks that were elicited from me in answer to your observations on my patent apparatus for raising water, I take the liberty of again trespassing on your goodness, by requesting you to insert the present communication in your next number. You will, on perusal, find it is the answer to some correspondence relative to my invention, that has been published in the "London Journal of Arts and Sciences;" and to which I have been by the Editor of that work most unjustifiably denied an opportunity of replying. I hope therefore you will enable me to defend myself by inserting my statement, which I doubt not was only refused admission to his book, from its refuting so completely the arguments of his correspondent.

So far then as I understand one of his correspondents, who styles himself Æolus, he denies entirely that the water in my apparatus in the Kent Road has been raised by ordinary atmospheric pressure and expansion, or diminution of its specific gravity by heat; and he affects to show, that the column of water had been raised only through the powerful acting upon the bottom of my torricellian column of expanded vapors, gases, airs, or other unknown elastic fluids, which, by the application of heat of a degree from 600° to 800° Fahrenheit, he supposes to be chemically united in the unexpandible and incompressible water, &c.

Æolus hereby shows himself a sort of absolutist or papist, in swearing to the infallibility, *under all circumstances*, of the published doctrines on the properties of fluids; I will now examine some of his dogmas and conclusions, which appear to me very far from being correct and true.

Æolus's first decision, directly touching my invention, is declared in the following terms. "The raising of water "in the apparatus in the Kent Road, is not effected by "expansion of the water in consequence of the application "of heat, nor is the discharge in any considerable degree "affected by the condensers, which for any practical purpose, upon a large scale, may, considering their expense, "be dispensed with." He states further: "But it is not a "heat of 140° or 212° applied evenly to the *entire* column of "water; *but a heat of* 600° *to* 800° *Fahrenheit*, applied "*exclusively* to the boiler or retort, which acts powerfully "upon the water therein, and upon the lower strata only of "the torricellian column." In continuation, he says, "That "the rapid revolution of gases, and the formation of elastic "vapors, &c. are the sufficient causes of the effects pro-"duced; namely, of the raising and discharge of a stream of "water, at the height of 70 or 700 feet." He decides further, "*After the first junction of the ascending column* with "the torricellian column in the descending tube, the boiling "point, during the remainder of the operation, is 212° "Fahrenheit;" and he concludes from that supposed fact, that afterwards there is an end of the interior vacuum or torricellian column, and that the formation of the second torricellian column in the descending pipe, and all the expence of that part of the machine may be saved, as well as the condensing or cooling apparatus.

He then endeavors to shew by reasonings and conclusions from his preceding statements, "That the discharge of the "water by the exit valve, is not the consequence of its "expansion;" "that is impossible," says he, and decides that the specific gravity of the water at the top of the ascending pipe, in my apparatus in the Kent Road, as the degree of heat when at that height is 140° only, would be nearly the same as water at 40° or 50°.

Æolus limits further in page 13 the properties of fluids, or the natural laws thereof, in consequence of the unvarying accordance of all experiments hitherto made.

But Æolus must pardon me if I state that I only find him correct when he expresses the opinions of others, and that it appears to me, not a single conclusion or application made by himself, from undeniable rules, or natural laws, such as hitherto experienced by fluids is correct, *with relation to my apparatus.*

I think it will be the shortest way, to state the impossibility of raising water by his principles and advised improvements of my apparatus, in order to shew the possibility and correctness of my own opinion, regarding the known result of my apparatus.

Æolus would have me make the following economical arrangements.—Take away the condenser at the top of the ascending pipe, and likewise the then superfluous discharging pipe, to which I would add, as superfluous also, the air pump, as the vacuum, according to the statement of Æolus, is at an end after the first discharging of the water.

Now indeed we have a wonderfully simple apparatus; viz. only the water reservoir below, for supplies of water to the boiler by an admission valve, and upon the top of the boiler the ascending pipe 70 feet high, directly connected by its upper end with an exit valve in an open water reservoir.

For raising the first torricellian column of 32 feet, I will still permit to exhaust the ascending pipe, and afterwards make a terrible fire under the boiler, that the water therein may be heated to 600° or 800° Fahrenheit, and elastic gases, airs, &c. (steam if he please), rapidly created and heated to such an expansive power, that it would be powerful enough to raise a column of water, not only to 70 feet, but to 700 feet, applied in the right manner.

Your correspondent admits, that the expansion of the elastic gases and vapors, would press equally on all the internal sides of the boiler, consequently upon the valve, and therefore no more water would enter from the cistern into the boiler, whilst his elastic vapors, and the non-diminished gravity of his non-expandible water-column in the ascending pipe, would resist the raising of the admission valve, only by the minor atmospheric pressure.

Farther he states his elastic vapors would act upon the bottom of the (I beg you will keep in mind) *incumbent* water column of 32 feet in the ascending pipe, (which is, as may be seen in my drawings, connected with the top of the boiler), and would raise and discharge it powerfully through the exit valve, and afterwards a partial vacuum would be obtained in the boiler and ascending tube, (I cannot understand by what wonder that partial vacuum in a boiler of 600° or 800° degree of heat, without condensation, could be created,) and new supplies of water would be filled up by the atmospheric pressure out of the cistern, and would be raised by the same way, as presently explained, if a sufficient degree of heat should be applied for creating the elastic vapors in sufficient expansion.

I think if Æolus would consider his described apparatus, he would find that it is exactly the one with which all the experiments on expansion of water have been hitherto tried, and that indeed it is *impossible* to raise water by such a process.

Perhaps Æolus has, by his abstract studying on the invariable natural laws of expansion of water, forgot to bring into calculation the, I think equally old and invariable, natural laws of specific gravity, and all the experiments made thereon. Surely every man knows that if you throw a stone into the water it falls to the bottom, and if you throw water into an open glass the air will run out, and if you boil water in an open vessel you produce steam: this steam, or even Æolus's elastic vapors, will neither remain under the bottom of the water column in the ascending pipe, having free access to it through a large opening in the top of the boiler, nor raise like a piston the incumbent column, but would pass through it with the rapidity of lightning to the top of the column, &c.

I need not observe, as it is a long established and well known fact, that if you make an opening in the top of a water boiler, and you heat with ever so intense a fire your boiler, the water in such open boiler will not rise to a higher degree than 212° Fahrenheit.

I hope your readers will perceive that the statements, or explanations, given by Æolus, of the principles by which the water in my apparatus is raised, or raises itself, are quite erroneous. The editor of the London Journal, after witnessing the fact in the Kent Road himself, acknowledged in his July number, that such great columns of water as were discharged from time to time from my apparatus, could not have been raised by formation and condensation of steam, to the top of the ascending pipe.

Now if water is not raised in form of steam, as he and every one can see in my apparatus, by means of the glass tube; and if it is *impossible* to raise an *incumbent* water column, by the expansive power of steam under this column; and no other mechanical power is applied; by what means, I ask, is the *water* in the Kent Road raised, if expansion or diminution of its specific gravity is impossible?

I have no other power than atmospheric pressure and heat, at the foot of my column, and I am convinced that Æolus, and those practical engineers who have written, declared, and maintained, "that water, "or other fluids, governed by the same natural laws, "cannot expand, separate its particles, or diminish its "specific gravity *under any circumstances*, by heat, to a "greater extent than, perhaps, 5 per cent. of its volume;" are all in error? I have, by continued study through a great number of years, convinced myself by calculations, that water, *under such circumstances as I have shewn in the description of my apparatus*, will become expanded, or diminished in its specific gravity, to every useful extent, and can consequently be raised by that apparatus, to every useful height, and in every desired quantity.

If my invention was not calculated to be of the greatest benefit to mankind, I should consider it superfluous to publish this following explanation, which I have given in particular to all persons who visited my work in the Kent Road; viz.

By working the air pump, or some other exhauster, a vacuum, as perfect as possible, is created in the whole interior of my apparatus, which is jointed together perfectly air tight. Now the water from the cistern, or as in Kent Road, from the Grand Surry Canal, enters through a pipe or box, by atmospheric pressure into the boiler, (or system of pipes, &c.) and raises itself up in the ascending pipe, to a height corresponding to the perfection of the vacuum.

In the Kent Road, as my vacuum varied between 22 and 26 inches, the torricellian column could not be at any time higher in the ascending pipe than 28 feet above the superficies of the water in the canal. I beg it may be well understood, that my boiler, or heating vessels, are so constructed, that one opening into, or near the bottom of the vessel, communicates below with the outside water in the cistern or canal; and the other, opening at the top of the boiler, tubes, &c. communicates upwards with the *incumbent* water in the ascending pipe. The ascending pipe in Kent Road, was of 9 inches diameter. Now when the fire is made under the boiler, the heat, or caloric, will enter in the heating apparatus, and from it communicate to the incumbent water column in the ascending pipe, with a rapidity known to be the nature of heat. As the top of the ascending pipe is connected with a cooling apparatus, the small quantity of vapors which will be derived from the slightly heated water, are condensed the moment it enters into the cooling apparatus, and as the air, or gases, which are in the water, are continually exhausted by the continual working of the air pump, the vacuum is *continually* preserved; and that is the soul of my invention.

If you will consider the *simultaneous* acting of two very powerful forces; viz. atmospheric pressure and heat, at the bottom of and throughout my water column, together with the condensation by cooling, and the exhauster preserving a continual vacuum, so that all, or nearly all, pressure on the top of the raising water column is taken away, how can anybody doubt but that the water, by the fundamental laws of nature and society, that is, if I may so speak, by the right of the most powerful, will ascend to any given height?

To prove my principle further:—If the balance between any certain vacuum and the atmospheric pressure will be, as for instance, in my apparatus in Kent Road, 28 feet, when the water is cold, and you now create a column of 46 feet of caloric, and that shall be mixed in the water, I hope it will be allowed, that the water column through that accession of caloric will be expanded, or the particles of water separated in such a way, that the water and caloric column of 74 feet, will not have more weight than the cold water column of 28 feet. I hope, at least, it will not be denied that heat or caloric is without any weight, and inclined to ascend; and if so, I submit we can draw the conclusion, that a certain ascending power exists in heat, which, in my case, would favor the ascending of the water column.

If the water, as water, rises to the top of the column by expansion, or by diminishing its specific gravity, and flows over into the cooling apparatus, in the same moment the balance would be restored between the weight of the water column in the ascending pipe, and the atmospheric pressure of the exterior water in the cistern, or canal, which is propagated by direct communication at the bottom of the water column, in such a manner, that a portion of cold water would enter into the heating apparatus, and press out an equal portion in the ascending tube.

If the heating, cooling, and exhausting apparatus are in good proportion one to the other, and likewise to the diameter of the ascending pipe, one *continual* stream of water would be raised; and if any person, on witnessing my apparatus in the Kent Road, shall have drawn the conclusion, that it is a necessary consequence of my principles that the water is only raised *at intervals,* they will be clearly in error, that circumstance being chargeable solely to the imperfections of my apparatus there; imperfections, as I have before observed, inseparable from first experiments.

Having thus, as I hope, clearly stated the impossibility of raising water in the way Æolus has explained the phenomenon, and given, as clearly as I could, my own opinion on the natural laws and principles by which the water is effectually raised in my apparatus, I hope yourself and your readers will not mistrust the correctness of my invention, which I can prove was not made or conceived by accident, but by very long and painful study and mathematical calculation, before any trial was made, and will not further oppose me. By shewing the incorrectness of generally received rules, when applied to my apparatus, I have proved what all philosophers are agreed upon, viz. that in this world we cannot find a general rule applicable to all circumstances.

My first apparatus, in Kent Road, was sufficiently perfect to shew the truth and correctness of my principle; and I hope Mr. Rayner, who is so very sanguine as to the great fortune which my invention ought to produce me, will now be contented also with my explanation; but still I have experienced such hard-hearted and cruel opposition for a great number of years, on the continent, and even in this promised land of encouragement to arts, sciences, and useful inventions, that I do not expect to find, even in England, any protection or assistance, till I have no more need, that is to say, till the worth of my invention can be demonstrated by measuring the fuel used and the water raised; that expences have been saved, and that my apparatus is superior, in its childhood and youth, to the full fifty years old, and a thousand times improved invention of steam power.

I know very well, that in thus expressing myself, I am like the child David, challenging the giant Goliah of steam power; but I speak the truth, and I trust in the omnipotent power of truth; and, notwithstanding I am very much disregarded by one great water company in London, (who would rather prefer to expend £80,000, for conducting water from a great distance to London, than permit me only to shew, on their own ground, but at my own expence, that I am able to raise a sufficient supply for their use, and that it would, though obtained from their present impure sources, by my process, be rendered sweet and wholesome), still I feel very happy to be in the possession of such an invention, which will be so highly beneficial, the purification of water being regarded as a matter of great importance by Parliament and the Home Secretary, Sir Robert Peel; and I offer my services with all my heart, to provide from the river Thames itself, water, entirely free from all foul and insalubrious particles for the inhabitants of London, at very considerably less expence than by any method now adopted.

I beg leave to recapitulate here the advantages of my apparatus over steam engines, viz. its very simple construction; the whole being only jointed pipes, it will last ten times as long as a steam engine; in consequence of the absence of all friction, it is nearly free from all repairs, and injury by explosion is impossible, as the internal expansion is at all times inferior to the external compression by the atmosphere, and the first expence of erection is much less than the steam engine; to which you ought to add, the saving of all oil or other fat now needful for lessening friction, and nearly all expences and loss of time for adjustment and repairs. It is applicable for making sugar, brewing, and distilling; producing power for all kinds of locomotive engines, and propelling all kinds of vessels or carriages; but, certainly, its greatest superiority is shewn, in its application to the raising of water for supplying towns, and draining mines, lakes, bogs, &c. for in those instances, unlike the steam engine, which is only the means of working water-pumps, my apparatus raises the water directly and at once.

Being so firmly persuaded of the great importance of my invention, I feel it my duty to do all in my power for bringing it, as quick as possible, into use; for which end I take the liberty to offer, to any particular company or practical engineer, desirous of making the first trial work in any branch, the license for that first work without any payment.

If I should be blamed for praising my own works too much, and it be said, that a modest man would not intrude himself as the first inventor and engineer in the world, but would patiently and submissively expect to be called for and praised by others, if his works merit it, I answer, there is a time for every thing; I have patiently and in silence suffered myself to be calumniated and offended by all names which can be given to visionary or swindling men; I feel and know the signs of the times; I am now obliged, it is my duty to the public, to my friends, and to my own honor, to disregard all the trifling rules of a false modesty, and to make every effort to counteract the false representations and mistaken opinion formed of my invention.

I remain, Sir,

Your very obedient Servant,

ANTON BERNHARD.

8, *Finsbury Circus*, 16*th May*, 1830.

ACCOUNT OF FRENCH PATENTS.

Patent for ten Years, granted to J. C. MARTIN, *of Paris, for Methods of printing with Plates or Blocks, in various permanent Colours, on Goat's Hair Velvet, called Utrecht Velvet.*

THESE methods are the same as those employed by all good printers on woollen goods.—First, the article is immersed in a bath of salt of tin or alum; afterward the colours are applied, one after another, when they are dry, and then the velvet is subjected to steam, in order to fix the colours.

The goods, enclosed in a frame well closed, are put into a chest, in order not to let the steam escape: they are left in this state for two or three hours, over boiling water, and are afterward washed.

Names of the substances from which the colouring parts are extracted.

For blue, solution of indigo.
For yellow, decoction of weld or of quercitron-bark.
For green, a mixture of blue and yellow.
For red, decoction of Pernambuco wood, or of cochineal.
For black, decoction of logwood and nutgalls.

The application of the colours on the stuff is made by means of gum arabic, gum tragacanth, starch, and generally of any material capable of thickening a liquid.—*Description des Brevets.*

Patent for 15 *Years, granted to* Messrs. RAVINA, MEHIER, *and* DAGUILLON, *Silk Manufacturers, of Lyons; and Jacquard machinist, of the same city, department of the Rhone, for the manufacture of a Stuff for Furniture, like those of the Gobelins, on a machine to which the* jacquarde *is applied.*

THE wooden frame of this machine, to which the machinery called *la jacquarde* is applied, has the same form as those on which plain textures are made; its length is two metres and three centimetres, (= 6½ feet nearly).

A single roller is placed behind to receive the chain, which is wound upon it. This chain is simple and of thread.

The front roller carries needles, and rolls up, at pleasure, the stuff as it is made. This stuff unrolls of itself, when it has passed over three-fourths of the circumference of this roller.

The chain is extended horizontally, and every thread is passed through a loop, to which a leaden needle is suspended. The reed or slay *(peigne ou ros),* through which the chain passes, is of steel, and fixed to a beater.

The pattern is drawn upon reducing paper, of eight in twenty, which forms forty throws of weft per tenth: it is read on cards, pierced every where required by the pattern or design.

The preceding description is that of a machine for a stuff in two colours. The following is an improvement made in that method.

In the new arrangement the chain is double, and the double threads are divided in half: each part of these double threads is passed through a loop or eye, and all the loops are placed in two rows or bodies, disposed so that the first body, in which the two threads work together, is only for weaving the shades and grounds, whilst the second body of loops works only a single thread per tooth of the reed, which it raises for passing the lost throw *(coup perdu),* formed of silk, and making an interior canvass or texture, which ties the stuff across, prevents *relais,* and dispenses with seams.

In this kind of manufacture, a single workman is employed at each machine, to move all the threads by means of a single pedal.

The stuff is made of thread, silk, wool, gilt thread, &c. —*Description des Brevets.*

Patent for fifteen years, for methods of manufacturing Wire for Piano-fortes and other musical instruments, granted to IGNACE PLEYEL, *of Paris.*

THE white wires are made from soft and very ductile iron wire. The French iron wires best suited for this purpose, are the kinds known under the name of *fer de roche.* We employ in this manufacture, only iron which has already been reduced into wire, at least to the dimension of two-thirds of a line in diameter. These wires owe their quality to the manner of tempering or annealing the iron wire, and of passing it through the draw-plates.

To anneal the wire, a fire-place is built of bricks and mortar, of a cylindrical form, having its exterior and interior edges furnished with an iron hoop, beneath a large chimney. The dimensions of this fire-place or furnace are proportioned to the quantity of iron wire intended to be annealed at one time, which is placed in it, upon an iron grate. This grate is placed so high, as not to allow the fire to touch the wire. The furnace is covered with a sheet-iron cover, in which there is a hole, for allowing the smoke to escape. The iron wire is placed in coils upon the grate, till it reaches to about four inches of the top, the cover is put on, and a fire lighted with white wood only. The heat is kept up till the wire has acquired a pale red colour, and not more. That the fire may be distributed equally throughout, the cover should be frequently turned, because the hole in it would attract the heat, and, without that precaution, one side would be heated more than another. This method of annealing suits only iron wire of the size of one-third of a line in diamer: to draw it finer, the following process should be employed.

In the furnace already mentioned, at a certain height above the grate, are supports, on which another similar grate is placed. A strong plate of sheet iron is laid on each of these grates; the dimensions of the plates, allowing an inch all round for the passage of the ascending smoke, to allow the cinders to fall from the top, and to promote an equal communication of heat. The iron wire ought to be wound into a narrower space than the width of the plates of sheet iron, and placed on the lower plate in such quantity, as to reach the upper one. The lower fire-place is filled with fuel, and the same combustible is placed on the upper plate, both fires are then lighted, the cover is put on, and frequently turned during the process.

In a furnace capable of holding fifty pounds of iron wire, the fire is kept up for four or five hours, the length of time depending, however, on the situation of the furnace and consumption of fuel.

The first process of annealing is commonly done twice on the same iron wire: the second is done after that wire has been drawn three or four times through the draw-plate, for reducing its diameter. The second process is employed but once.

Tools used in this manufacture.

These tools consist of:—1st. A wooden work-bench four or five feet long and three wide. 2nd. A plank, three feet long, one foot wide, and three inches thick, which is fixed to one of the edges of the bench by two pins. Above this plank two little barrels of wood are raised, ten inches in length and six in diameter, each having its axis placed in the direction of the width of the plank, and received in two brass supports, fixed firmly against the lateral sides of the said plank. The axis of each roller is furnished with a handle, for moving it. At the middle of the plank there is raised, to the height of the centre of the axis of the barrels, a piece of wood of the whole width of the plank, in which is a groove, four or five lines deep. At each extremity of this piece of wood two wooden uprights are framed, supporting a cross piece, in which is a second groove, corresponding to the first. A draw-plate is adjusted, so as to slide easily between these two grooves. At each end of the same plank, and by the side of the draw-plate, a small piece of hard wood is placed, on which the ends of the iron wire are filed, before passing them through the plates.

A sort of reel, nearly like those used for thread, excepting that it is conical, serves to receive the rings of iron wire intended to be drawn. The bench, serving as a foot for this reel, is raised to the height of the barrels.

On a small wooden upright, placed in a mortice made in the plank, between the barrel and the draw-plate, a little box is fixed, containing grease, composed of lard and tallow. There is a hole through this box, to allow the iron wire to pass through it, and become smeared with the grease.

To beat up the draw-plate when the holes are too much worn, and to pierce it, we employ a block of wood, similar to those commonly intended for receiving small anvils, and on which a mortice is made sufficiently deep.

A small file is used to reduce the end of the wire, when beginning to draw it; a pair of flat pincers for drawing it, when introduced into the holes of the draw-plate; a common hammer, and an iron guage for measuring the sizes of wire; lastly, a draw-plate is the most essential tool that we must have for this work. The material of which this tool is composed, and the way in which it is pierced, contribute very much to the quality of the wires.

A draw-plate, to be a good one, must be made of a substance, neither too hard, nor too soft: all those which are steeled are good for nothing; and pure iron is equally unsuitable. The best material for making them, is a mixture of the best bar-iron, and cast iron. These plates should be pierced, so that every hole goes on diminishing, in diameter, underneath: these holes are commenced with conical steel punches, which are struck; the draw-plate is then put to heat in a fire of only wood, and the operation of piercing it, is afterwards completed, when cold, with steel punches. It is necessary to have punches corresponding to all the diameters of wires required to be drawn.

Manner of working.

When all the tools are ready, as above mentioned, and the iron wire is also prepared, it is put upon the reel which is placed at the end of the bench. The end of the wire is then filed, pushed through the grease-box, and into the hole of the draw-plate corresponding to its size, and is drawn by hand with the pincers till it can be attached to the barrel, where it is fastened by points which are fixed for that purpose on the barrel: the barrel is then turned gently by means of its handle.

For the first course, it is necessary that the barrel which does not act should be removed, because it would be in the way of the wire coming off the reel to enter the draw-plate. When the whole wire has passed through one hole, the other barrel is put into its place, the wire is sharpened anew, the draw-plate is turned, the wire passed through the next following hole in size, drawn with the pincers, and fixed to the second barrel, which is turned by its handle, so that the wire unwinds from the first barrel, passes through the draw-plate, and winds on the second. It is necessary to take care that the wire be always passed through the grease-box before entering the hole in the draw-plate.

One thing essential to be observed is, that the wire passes through holes corresponding to its size, so as to require but little power to pull it through, consequently, the diameter of the wire is reduced but a very small quantity each time it passes through a hole in the plate.

To draw the wire of two-thirds of a line in diameter, it is necessary to anneal it twice before reducing it to one-third of a line: brought to this size, it is annealed by the method before described, and afterwards it will not require annealing to be reduced to the greatest degree of fineness. In order that the iron wire may possess the proper degree of ductility and tenacity to form a sonorous string, it must pass five or six times through the draw-plate after the last annealing. When the iron wire is reduced to the desired size, nothing more is requisite than to give it the necessary polish and white colour, that it may render clear and distinct sounds.

Polishing and whitening of the Wires.

When the wire is drawn down to the proper size, the draw-plate and grease-box are removed, the wire is fastened to the vacant barrel, and wound upon it, making it glide at the same time through a piece of leather previously rubbed on rotten stone. It is frequently necessary to repeat this operation to obtain a fine polish. The method of winding the wire on bobbins it is needless to describe. The size of the bobbins depends on the number desired to the pound weight.

Yellow Wires.

The implements necessary for making these are the same as for the white wires, and they are used in the same manner: the only difference is in the polishing and annealing.

To obtain good yellow wires, we must employ only brass, composed of four-tenths of copper, three-tenths of old brass *(mitraille jaune)*, and three-tenths of calamine. This brass should be of a pure yellow colour; it may be procured at the manufactories in rods of a line in diameter. It is to be annealed once, by heating it in the furnace, placing it on the grate, putting white wood above and below it to obtain a clear and gentle fire. It is to be heated for an hour or two so as to be only red hot. On taking it out, it should be dipped for a moment into a boiler of hot tallow. It is afterwards allowed to cool completely, and is then passed through the draw-plate in the way already described for white wires.

The brass wire is polished by the process before mentioned, excepting that instead of rotten stone we employ red tripoli.

Strings or wires made by these methods will stand in tune a tone and a half higher than the wires of Nuremberg.*—*Description des Brevets.*

Patent for Five Years, granted to J. G. M. Drexel, *of St. Quentin, Depart. de l'Aisne, for an elastic Seat for Carriages, with or without Springs, and which is also adapted for the removal of Patients, &c.*

This seat is constructed inside of from five to seven double springs of steel, each pair of the flat springs being joined together at their extremities by two hinges, the

* It reflects but little credit on English wire-drawers, that a large portion of the iron wire used by our numerous and eminent pianoforte-makers is Berlin wire. It appears, however, that some manufacturers of Birmingham have been able to furnish a small supply of steel wire, said to be of superior quality in regard to tone and tenacity. During the last twenty years pianoforte-makers have gradually increased the diameters of their wires to obtain a fuller tone, and it is to be regretted that they have no fixed guage of sizes generally understood. Brass wire is now commonly whitened by tinning.—Tr.

springs being curved, and having their concavities turned towards each other. They are fixed to the sides of the seat by two or three screws through each spring, and are so arranged as to allow a spring of five or six inches.

The top and bottom of the seat are composed of boards or plates, and the distance between them depends on the elevation of the springs.

Blocks placed inside these boards prevent the springs from being forced in case of an over-load, and four short pieces of webbing connecting the top and bottom maintain an equilibrium, and prevent the side opposite the weight from rising.

The four pieces of webbing and the springs are covered with leather or cloth all round at pleasure; but, if with leather, it is necessary to make some holes through the sides and the back only for the air to escape when compressed by the load. If holes are not made through the front, it is because the air shall not blow against the legs of the person sitting on the seat.

A closed aperture, made in each side of the bellows, may be opened at pleasure by taking out a few screws, which will allow oil to be applied to the hinges or joints of the springs when necessary, and permit the removal of whatever may be injurious to the play of the springs.

This seat, having the form of a cushion, may be fitted in coaches or other places by means of screw-pins properly placed. By adding a back to it, we may form an elastic arm-chair.—*Déscrip. des Brevets.*

Patent for Five Years, granted to J. G. A. Chevallier, *Optician, Paris, for Spectacles or* Besicles, *whether concave or convex, round or oval, named* Isocentric, *the circles of which are made to approach each other at pleasure, by means of a peculiar mechanism.*

Mountings of Spectacles.

A screw is adapted to the mounting or frame, which allows the two circles or ovals containing the glasses to be brought nearer together or the contrary, and thus to bring every visual point to its true centre, whatever be the size of the wearer's head.

New Method of manufacturing the Glasses.

With a diamond cut, two pieces of glass out of the same plate, round them, and afterwards cement them on the same tool, after which they are to be ground.

By this means we are sure that the material is the same; that the glasses are also equally refrangible; that they will be equally polished; and, lastly, that there will be an exact parity between them in their fabrication after this system. —*Description des Brevets.*

On the Colours which different substances communicate to the flame of the Blowpipe. By Mr. Buzengeiger.

I make use of a lamp, made exactly to the pattern pointed out by Berzelius, in his Treatise on the Blowpipe. It is very important to be able to see in a distinct manner, the conical blue flame, and the transparent vapor by which it is enveloped and terminated. I produce this circumstance by cutting the wick obliquely, the highest part being straight, and by opening the wick longitudinally, in order to introduce the point of the blowpipe. I employ the oil commonly used in argand lamps: for experiments with the blowpipe, the oil purified by sulphuric acid, should be rejected, because it always contains a little of the acid, and it then deteriorates the wick, and alters the colour of the exterior vapour. This oil is soon discovered, by its requiring the wick to be frequently snuffed, being in a short time converted into a muddy substance, presenting the reaction of sulphur. The wick ought to be made with raw cotton thread, because the bleaching is often done with chloride of lime, which communicates a reddish yellow tint to the exterior vapour; this should be avoided, since the blue colour is necessary for the success of the experiments.

With regard to the manner of blowing, sufficient skill should be acquired to be able to maintain the conical blue flame, well decided, and of a constant length, particularly without mixing the yellow flame with it; the exterior blue vapour is then perceived, unless the daylight be too strong; the experiments should then be made in the evening, in a dark room.

To make the experiments, hold a piece of the substance to be tried, in a platina-pincers, and when the flame is in a proper state, introduce it from below, upwards into the exterior vapour, before the blue point. The form of the specimen to be tried, depends on particular circumstances: it may be in smaller or larger pieces, in form of a wedge, in needles, or in small laminæ.

It is often necessary to pulverize it; then we make it into a paste in the hollow of the hand, spread it on a piece of charcoal, give it the proper form, and lastly, heat it till it has acquired sufficient consistency to be held by the pincers of platina.

The following is now the phenomenon which is commonly produced.—When the specimen to be tried, is put before the blue cone into the blue vapour, the latter is immediately changed for a reddish yellow atmosphere; the extent and intensity of which depends on the nature of the body submitted to experiment. By little and little, this atmosphere diminishes, and disappears. Then another phenomenon is produced:—the blue vapour surrounds (baigne) the specimen without being changed, and is scarcely visible; or rather it acquires a colour, which varies with the nature of the body, which is volatilized at that period of the experiment.

Hitherto, only three substances are known, which occasion a red colour: these are strontian, lime, and lithia (lithine). The tint is that of a deep carmine.

Carbonate, and sulphate of strontian, offer at the first moment a weak atmosphere, which soon gives place to a fine permanent red colour. The mixture of barytes makes the reaction of the strontian disappear.

Iceland spar, and argonite, give a colour a little less intense than that produced by strontian, as soon as the carbonic acid is expelled. The impure carbonates, and dolomites (dolomies), do not colour the flame red, or colour it but very slightly. Fluor spar gives an intense red colour; sulphate of lime, but a slight colour; and phosphate, and borate of lime, do not give rise to any.

When a bit of a substance, in an acicular form, containing lithia, is scarcely introduced into the blue dart, soon after fusion, a purple-red line appears, of great intensity; but the colour speedily vanishes, and it does not appear anew, unless a part of the specimen, not yet heated, be introduced into the flame. The petalite of Uto, which contains a great deal of lithia, nevertheless colours the flame but very slightly red.

The exterior flame of the blowpipe, is coloured of a light blue by arsenic; of a little deeper blue by antimony;

and of a sky-blue by lead. With antimonial galena, the blue is at first light, and afterward sky-blue.

Hitherto, I know but three substances which give the flame a green colour: these are boric acid, barytes, and oxide of copper.

Natural, or artificial boric acid, gives a beautiful green. Borate of lime, datholite, and botriolite, give a less distinct green colour. Borax produces a strong reddish atmosphere, and does not shew the green colour, unless previously moistened with sulphuric acid.

I have tried, in order to discover the presence of boric acid, to employ the flux, indicated by Mr. Turner, composed of fluate of lime, and bi-sulphate of potash; but these attempts have not succeeded with me, probably from want of practice. Be that as it may, all the minerals that Mr. Turner observed to colour the flame green, by mixing them with his flux, gave me the same reaction, by introducing them with some care, into the blue flame, without mixing them with any re-agent.

All minerals containing barytes colour the flame of a light green, inclining to white; the reaction is very decided: the colour appears only when the substance begins to melt, but it becomes more and more beautiful, and continues for a long time.

Most minerals containing copper, even in very small quantity, give a fine green colour at the point of the blue dart. Minerals of lead, containing a little copper, produce a flame of a fine blue colour, the extremity of which is green.*—*(Annales des Mines, V. 36)*.

* For further information respecting the use of the Blow-pipe, see Gahn's paper, in Thenard's Chemical Analysis, p. 300, (translated by A. Merrick); Berzelius on the Blowpipe (translated by J. G. Children); and Griffin on the Blowpipe, (Glasgow).—Tr.

Remarks on Animal Putrefaction. By CHARLES MATTEUCCI

EVERY body knows that animal substances, taken from under the influence of life, are not long before they undergo a change, develop fœtid gases, and finally, are destroyed. Air, water, and heat, are the exterior causes which give rise to this new order of decomposition. Water contributes to it by softening the fibres, and uniting with the products of putrefaction; heat, when in a moderate degree, separates them, and by destroying their cohesion, disposes them to new combinations; lastly, air exerts the principal and most marked influence, by yielding a part of its oxygen to the carbon, hydrogen, and azote of the animal substances; whence the carbonic acid, water, carbonate of ammonia, and acetic acid, which are the chief products of animal fermentation. The animal fibres then undergo this alteration, principally on account of the atmospheric oxygen, which combines with them, and consequently by removing the action of the oxygen, we might in that respect, hinder putrefaction. Now there is nothing easier than to change the affinities of bodies: it is sufficient for that purpose, to change their electrical state. By setting out on these principles, Davy made his fine and useful discovery of the method of preventing the oxydation of the copper sheathing of ships. Thus by considering oxygen as a body eminently electro-negative, to prevent its combination with animal fibres, it would be sufficient to establish in them a similar electric state, namely, a negative state. Persuaded, after some experiments of Sig. Bellingiri, of Turin, and others, not yet published, which I had made myself, that animal substances, when put in contact with metals, establish themselves in an electrical state, I determined to place some pieces of muscle on plates of zinc, other pieces on plates of copper, and others I left to themselves. It was not longer than a day, before I perceived that putrefaction had already begun in the pieces of muscle which I had left to themselves, whilst no alteration was manifested in those which were in contact with the metals. In these I afterward saw that the products of the alteration which took place later, were different, but always in relation with the electric state which had been determined therein, namely, with their affinity. Thus I observed ammoniacal products, and carburetted hydrogen in the muscles which were in contact with the zinc; and a great deal of acid, and of acetate of copper, in those which were in contact with the copper. These results, shew evidently that the muscles put in contact with the zinc, having become electro-negative, and being no longer capable of uniting with oxygen, have been retarded in undergoing a change, but have at length yielded to the affinity, though feeble, for hydrogen and azote; whilst on the contrary, the muscular fibres, placed upon the copper, combined entirely to form acid products: putrefaction may therefore be thus retarded, namely, by eluding the action of one of the two elements of the atmosphere. I have thus obtained similar results, and more marked results, perhaps, by determining in animal fibres an electric state, not by the electro-motive action, but by disposing them as conductors to the poles of a pile. Now it appears to me, that by setting out with these considerations, we may explain on better grounds the antiseptic property of some bodies, an explanation, which is not the same for all. Thus there are some, which act by removing the water; others by forming true anti-putresible combinations; and others, lastly, in my opinion, by determining peculiar electric state. Of this kind is, for example, the property of vegetable charcoal. It is a fact confirmed by chirurgical practice,* that if vegetable charcoal be put upon purulent, or putrid wounds, it is not long, before it takes off the bad smell, and prevents an ulterior development of fœtid matter.

Similar effects, doubtless, cannot be owing to the action of porosity only, for they would cease on prolonged contact, and they may be comprehended better, if the action of the charcoal be considered as the electro-motive, in consequence of which, by establishing on purulent wounds, and on flesh in putrefaction, electric states, they would lose those affinities, by virtue of which, they separate purulent matter, or are destroyed by a rapid putrefaction.—*Annales de Chimie.*

On the Preparation of Brandy from Potatoes.

By Mr. Hermstadt.

The potatoes are cooked by means of a steam apparatus. This is done in about ten minutes, if the apparatus is well constructed.

As soon as they are done they are mashed, as hot as possible, and thrown into the fermenting vat, containing, for 1000 pounds (= 1080 lbs. avoirdupois) of potatoes 416⅔ litres (= 367 quarts, English) of cold water, the temperature of which, however, should not be lower than 14° R. (= 63½° Faht.). Afterwards the whole is covered up and left to subside.

There are 750 pounds (= 810 lbs. avoirdupoise) of fecula or starch contained in the abovementioned quantity

* On the properties of Charcoal, see a pamphlet recently published in Paris, by Dr. Palman. The application of chlorine and chlorides, to fœtid ulcers has also been found of great service.---Tr.

of potatoes*, and this proportion is quite sufficient, with the 416⅔ litres of water added, to produce a mass of the consistency of soup, and the temperature of which should be from 48° to 50° R. (= 140° to 144½° Faht.): 31¼ of malted barley are now to be macerated with 250 pounds (= 270 lbs. avoirdupoise) of water, previously heated to 60° R. (= 167° Faht.), and the whole is to be left to cool down to the temperature of 22° R. (= 81½° Faht.); then 22½ pounds, (= 30·3 lbs. avoirdupois) of barm or yeast are to be added, stirring the mixture well, and leaving the whole well covered over.

When the mass of macerated potatoes is cooled down to 25° R. (= 88¼° Faht.), the prepared malt, in which fermentation has already commenced, is to be added to it, stirring again the whole well together. The vat is to be very slightly covered, and time allowed for fermentation, which proceeds very regularly, and terminates in from 48 to 60 hours. The fermented mass acquires a spirituous odour; and yields, by distillation, a result so abundant in brandy, that we obtain, for every 100 pounds (= 108 lbs. avoirdupois) of potatoes, eight *pintes* (= 1·65 imp. gallon) of brandy, the richness of which, in alcohol, is thirty per cent. according to the scale of Richter.

If, before putting the fermented mass into the still, it be passed through a fine sieve of iron wire, the pulp of the potatoes will be retained, and the brandy will then be more pure and more agreeable to the smell and the taste. It will

* Beautiful starch, as good as arrow-root for any purpose, is easily obtained from clean raw potatoes, by grating them into a pail of water. Being of greater specific gravity than the other vegetable matters with which it is mixed, it falls to the bottom, and may be purified by repeated washings with clean cold water, by decantation. Starch (amidon) is a white, pulverulent, insipid substance, without smell, unchangeable in the air, and crystalline when examined with a lens. It is not soluble in cold water, but combines readily with boiling water. It is given as food to children and sick persons, &c.—TR.

be still more pleasant, if we add to the strained mass $\frac{1}{2}$ of potash for every 100 pounds of potatoes, before submitting the whole to distillation. Lastly, if it be wished to have brandy, similar to that obtained from wine, it must be rectified.—*Industriel, October*, 1828.

A new method, employed at Frieberg, of separating Copper from Silver. By M. Gessinne.

The new method consists in roasting the alloy in a reverberatory furnace, heated by wood. A quick fire is made at first, to heat the metal red hot, and the heat is afterward so regulated, as to keep it at that temperature without melting it. It is turned over on the *sole*, twice. The roasting continues only five hours; but the alloy remains twenty-four hours in the furnace.

The roasted alloy, which is black, is put into a leaden vessel, to be digested with sulphuric acid, diluted with fifteen ounces of water, in the proportion of five ounces of the black alloy; it is heated to 60° (= 150° Faht.) for twelve or fifteen hours; then the liquor is run off through a cock, when its density no longer increases, and when we are sure that it no longer holds any silver in its solution.

The alloy treated with sulphuric acid, is roasted a second time, heating it red hot for six hours: it is afterward treated anew with sulphuric acid, using two ounces of the acid of commerce, and six ounces of water per *marc*, and leaving it to digest from sixteen to nineteen hours.

The same operation is repeated a third time, always diminishing the proportion of acid. After this treatment, the silver is carried back to the roasting furnace, but only to be dried; it is afterwards melted in crucibles of graphite, or black-lead pots.—*Annales de Mines*.

On the Manufacture of Red Glass. *By Mr.* ENGELHARDT.

To obtain glasses of a perfectly transparent red colour, a white glass is to be covered with a very thin stratum of red glass, coloured by oxide of tin. Such a glass, which is called a *double glass*, has the advantage of allowing the red stratum or covering to be made to disappear wherever it is desired to have white patterns, or designs enamelled with other colours for producing coloured patterns.

To prepare the stratified glass, the workman must have two crucibles, one for red glass, the other for white. He commences by dipping his blowing tube into the red glass, so as to take up a small lump, and afterwards he dips into the white glass. The cylinder blown with this mixture will give a glass of a very fine red colour. That the stratum of red may unite perfectly with the white glass, and not separate from it on cooling, it is necessary that the composition of the white glass be identical with that of the red glass; it will nevertheless be better to put a little more flux into the red mass than into the white. After having ascertained that the composition of the red glass contains no oxydising substances, a small crucible for the red is placed between the large crucibles. Into the first crucible, with the common mass, if it contains manganese, we introduce two ounces of oxide of copper, and two ounces of oxide of tin, for five pounds of the mass; and if it contains no manganese, we take, for every two pounds of sand contained in the composition, one ounce and a half of oxide of copper, and as much of oxide of tin.

To produce a scarlet stratum or covering, to twenty-five pounds of the mass add a pound and a half of oxide of tin, and three-quarters of an ounce of iron in very fine powder: these are to be added at the commencement of the operation.

When the mass is become transparent, pour in three-quarters of an ounce of oxide of copper, and mix the whole carefully. In general, it is necessary to employ every possible precaution for avoiding bubbles and lumps, which are very easily produced. It is also necessary to take care that the white mass and the red be raised to the same degree of fusion to be able to employ them in the work at the same time.—*Industriel.*

LAW OF PATENTS.

Examination of the Witnesses before the Select Committee of the House of Commons.

Continued from p. 307.

BENJAMIN ROTCH, Esq., *called in; and examined.*

HAVE the goodness to give the Committee any information you can upon the subject of the present inconveniences of the patent laws, and any remedies you think might be applied to them?—I am of opinion, from the experience that I have had in that particular branch, and to which I should say I have directed particular attention, that the difficulty and uncertainty attending patents and their specifications, is a cause why the government do not receive at least three or fourfold the amount they would, of revenue from that particular department; but I am not at all of opinion that the uncertainty of patents, and of their being maintained, depends particularly upon the faulty mode in which the description of the invention is often set forth in the specification; I know there is a very strong opinion abroad, by the public at large, that it would be desirable, if a commission was appointed, to examine into every specification, and that that commission having decided that a specification is good, the patentee should be absolved from all responsibility on that head. To that I think there are a great many serious objections, and particularly for this reason,—as a perfect description of the specification is the only thing the public get in return for the monopoly for fourteen years, which is certainly a very great boon for any individual, you take away certainly from the interest that the patentee has in giving that fair description which will enable the public, when the patentee is dead, we will say, or the patent expired, to benefit by the invention to the full extent that the patentee himself did; you take away his incentive to do that, if you take away his responsibility that it shall be correct, and throw that responsibility on the commissioners; for certainly my experience tells me that, in three cases out of four, it is the main object of the patentee to deceive the public if he can, and nothing but the dread and fear of losing his patent altogether keeps him constantly from imposing on the public by a false description. In some cases, even that fear will not operate; a case that I may mention is familiar to almost every body, and will illustrate what I have said as well as any thing I can say: in the case of those elegant visiting cards which have been lately shown about with an enamel on them, that is produced solely by a particular white colour which is brought from Germany; the inventor, a German, came to me on the subject of his specification, and told me it was done with the purest chemical white; I said, "it appears to me it must be the German white" (Kremnitz white); he said, "it is the purest chemical white;" shielding himself under the knowledge that the Kremnitz white was purer than any other; he would not allow me to put in his specification the Kremnitz white, but made me put it "the purest chemical white." I said, "you take the responsibility on yourself, and recollect if your patent is ever upset on this point you absolve me upon it," and I even made him write a note to that effect; and years afterwards, during the whole of which period the English manufacturers had been trying to make it and had failed, somebody says, "it is Kremnitz white;" I believe it was Akermann, who is a German, and they repealed the patent. I supported it all I could, and contended because Kremnitz white is the purest chemical white, it was accurately described, not *eo nomine*, but by a faithful description, in saying it is the purest chemical white; but the Lord Chancellor properly said at once, "this is not a description on which the public can act; at any rate the patentee knew a better one:" that will only show the Committee the feeling there is, if possible, to conceal something from the public. You might succeed with commissions nine times in ten. Commissioners almost uniformly get careless in their office by time: they have not the same motive to put so much zeal into their examination of specifications as the patentee has himself, if he knows it must be upset at any time, however long, if any fault is detected in it; therefore, when one considers monopolies (when that name is given to them) always have a degree of odium in the public eye, and when you consider that the specification is the only return a patentee makes for the monopoly, it does seem extremely desirable that every possible incentive to induce that man to do right should be held out to him. It is also a fact, that as the specifications are now drawn, certainly in the course of my practice, (and I have thought about the subject since my attention has been brought to it by the summons I received from the House,) I never recollect but one case in which a patent was upset for want of a proper description merely of the invention in the specification, that is, with regard to the mechanical means of carrying it into effect; that is to say, a description by which a person could not do the thing if he was set to work to do it. Many patents are upset on the specification, but then it is on points arising out of the law as it now stands, which is in itself uncertain, from circumstances that I will endeavour to explain, and which certainly, to my mind, wants most material alteration. In the first place, the statute of James, which is called the Statute of Monopolies, passed at the time when those injurious monopolies were granted, which are now restrained by the statute restraining all monopolies except those for patent inventions for fourteen years; and the words of the statute, which are extremely well calculated for those times, do not happen now at all to hit the necessities of the present period. The consequence is, that the judges are constantly straining the meaning of this Act to make it meet the necessity of the times. Thus it exactly depends on the extent of laxity that a judge will venture to give as to what the law at this particular day in any particular court happens to be on patents. The word in the statute is "manufactures"—that monopolies shall be granted for fourteen years for the sole working or making of any manner of new manufacture within this realm; then comes the question, what are "manufactures;" now if it is discovered, that in bleaching cotton, instead of dipping it, we will say, first in an acid, and then in a water to get rid of the acid; if it is found better to mix the acid and water together, it may be an improvement of thirty per cent. value to the manufacturer, and that advantage in the process is no doubt most important in the present time, when every thing depends on the excellence, the rapidity, or the cheapness with which you do a thing. In fact, three patents out of four are taken out for new processes, by which well-known ends are obtained; that cannot be considered as a new manufacture; a new process by which you obtain an old manufacture is not a new one; it is a mere mode of putting together known elements to effect a known end. But some judges, my Lord Tenterden for one, are so open to the necessity of granting patents for these things, because they are so vastly important, that they will say, "that is the meaning of the word, 'manufacture.'" Another who is a statute lawyer, would say, "nonsense; *manufacture* means no such thing, this is only a process." A man takes out his patent with this conflicting evidence as to the judges, for "a new manufacture of bleached linen." Then that will be upset in the specification, because one judge will say, "it is not a new manufacture, it is a new process." If he takes out his patent "for a new process of bleaching linen," he will again upset it, because he says, "you cannot have a patent for a process;" he will quote the authority of Lord Mansfield, who says,—the way in which you can determine what is a patentable article and what is not, is simply by asking yourself this question; Is it a vendible article or not? who shall say, mixing acid with water, instead of using them separately, is a vendible article. The judge, who is adverse to Lord Mansfield's decision, says, you cannot have a patent for a process. Then Lord Tenterden, in a celebrated judgment which I have here—The King and Wheeler, attempts to determine what a new manufacture is; the words of his Lordship show how completely he is puzzled to make it mean what patents ought to be granted for at the present day, to meet the times. He says, "the word manufacture has been generally understood to denote;" he only says, "has been *generally understood to denote* either a thing made, which is useful for its own sake, or vendible as such; as a medicine, a stove, a telescope, and many others; or to mean an engine or instrument, or some part of an engine or instrument to be employed either in making some previously known article, or in some other useful purpose, as a stocking frame, or a steam engine for raising water from mines; *or it may, perhaps, extend also*;" that is what I complain of, as the cruel judgment which makes the law uncertain; or it may, *perhaps*, extend also to a new process to be carried on by known implements or elements acting upon known substances, and ultimately producing some other known substance; but producing it on a cheaper or more expeditious manner, or of a better or more useful kind; but no merely philosophical or abstract principle can answer to the word "manufacture." That little word *perhaps* sets us all at sea, and nobody can say positively what title to a patent the courts will support or will not.

What remedy do you propose for that?—This difficulty embraces undoubtedly almost all the points on which patents are upset on the specification. I will come in a moment to the remedy. The second point is that on which patents are upset most frequently; for on these two points almost all patents are upset. It is the novelty of the invention, which has nothing to do with the specification at all; and it is a false idea to suppose it is the want of a just description, by which a mechanic can follow the process or make the engine that is the subject of the invention, which causes the patents to be upset on the specification. Now the remedy that I would suggest for this indecision in the judges, is to make an extension of the statute of monopolies. Another distortion, however, the judges have made of this statute, because it was not wide enough to meet the necessity of the case: the statute says, there shall be no patent granted "except to the true and *first* inventor thereof," and yet we find the judges sanctioning the grant of patents for importation of inventions from abroad; and the judges say (to my ear excessively absurd) that means an inventor;

a man who imports from abroad is an inventor; and in order to make it come within the statute, without which they could not grant it, they distort the meaning of 'original inventor,' by saying a man who has a friend, who writes a letter from abroad, "such a thing is in existence," takes out a patent for it as for an importation, expressly so stated in his affidavit, and that person is held by the judges to be the inventor. That is merely to show how the judges are obliged, from the change in the times, to strain the meaning of this unfortunate Act. The remedy therefore I would suggest, to put all this straight, is to adopt the common sense decisions of the judges, and to form a statute which shall embrace those objects which, although without the pale of this Act, are every day the object of patent grants, and sanctioned and supported as such in courts of law by the judges. Now I would therefore suggest, the new statute should not limit the granting of patents to fourteen years merely to any manner of new manufacture within this realm, but it should embrace the following heads, which I have taken the liberty of writing down, and which, as it appears to me, are all heads which are now sanctioned by law, although not by this statute, and confirmed by the decision of some of the judges. The first would be "A new manufacture or an article of sale;" and it is difficult to find a proper term to use; some people say an engine is not a manufacture; I adopt my Lord Mansfield's opinion then, that it means a vendible article: secondly, "A new process of making either a new or a known manufacture, or article of sale;" and, thirdly, "A new application of a known manufacture, engine or article of sale, such not being patented at the time." This will need a little explanation; it has been held by the judges, that when an individual has an invention which is patented, no improvement on that ought to be allowed as the subject of a patent, because the merit is in the original invention; as, for instance, the great steam engine; there were no improvements allowed on steam engines until after the patent had run out, except such as Watt and Bolton invented; after that had expired each man could have a patent for any particular improvement of his own. Therefore I have said a new application as one subject for granting patents; a new application of a known manufacture or article of sale, such not being patented at the time. Then the fourth head I should suggest should be, an improvement on any known manufacture or article of sale not being patented at the time, or being patented, not without the consent of the original patentee. Perhaps I might illustrate the first, of "A new application of a known manufacture," by referring to a pair of bellows; suppose a man has obtained a patent for a pair of bellows, and he only knew it as an engine for blowing the fire—increasing the heat of a furnace; it has been laughably enough said by my Lord Eldon, "would you then" (he was averse to granting patents for new applications to known inventions,) he said, would you then grant another man a patent, because instead of blowing a fire with those bellows, he blows the dust off his pictures with it; that is a new application; my answer is, no; but by a new application of a known invention, I mean such an application as requires some modification to adjust it to your purpose. For instance, a bellows being only known as an engine to blow a fire, I would say that the inventor who first applies it to the purposes of an organ, and arranges it and modifies it in such a way as to suit the purposes of that particular instrument, is entitled to a patent for his application of a bellows to that purpose; and therefore a new application of a known manufacture, or article of sale, I should limit to such an application as requires modification, and an invention of something for the purpose of so applying it.

Then under the fifth head, I would class "inventions imported from abroad not before used in this kingdom." I contend that they are not all provided for in the statute of monopolies, and that it is not only a strained meaning of the words to decide otherwise, but an absolute perversion of the statute. I think it highly important that inventions imported from abroad should be patented, because I have had much experience to show how many we never should have had if it had not been for that statute which protected them for fourteen years. That is the end of the list.

You have stated you would not allow a person to take out a patent for an improvement pending a patent for that article already obtained by another person, is that the distinction you draw?—It is; let me explain, that there is one modification attached to that also, which I omitted to mention, as there is to "A new application;" the new application, unless there is some new invention connected with it to make it applicable to this new purpose; so I would also put a qualification to the fourth head, which is the improvement, and which is in fact now held by the judges, namely, that you shall not have a patent for an improvement on a patented article, unless that improvement is something that may be sold totally separated from the article already patented, so that you shall not involve any part of the original invention to carry off, as it were, your improvement.

By that means, supposing you had a patent, and a great improvement was discovered by an individual; if he had your consent, if that was made into a law, would he be barred from going forwards, with the consent of the original inventor?—There could be no difficulty in that, and for this reason; he could still come to me and make an agreement with me, without that being part of the law; he could come and say, "You may have a great improvemen in your patent; your patent protects me already in that improvement, if you will agree with me; if I tell you the improvement and you adopt it, we may share in the profit;" but the original patent will always protect that improvement, and there is no necessity for a patent for the improvement. I think it desirable that the public, or that an individual should be restrained from, even with the consent of the party, taking out a patent for an improvement, because from my experience in these matters, I know it would lead to endless quarrels and disputes, as to the consent being given or not being given; and moreover, because I have always felt, although that is of course for the Committee and not for me, that it is useless to legislate on a point which protects itself; and that as the original patent protects the improvement, so the individual who takes out his patent, or who has an invention, goes to the patentee to get his consent to make use of it, which would be the advantage, as if he did it under a patent; with this exception, that he can only enter into that agreement for the remainder of the term of his patent: but look at the danger of allowing patents for improvements, even with the consent of the party, on articles that are already patented: it would continue a patent *ad infinitum;* improvement on improvement, just as their fourteen years are expired; because it is what patentees come to me constantly to know; if they cannot for some little improvement obtain a patent on their own patent, which would be an extension of the term to twenty-eight years instead of fourteen, and thereby shut the public out of the benefit they are to have at the end of the fourteen years.

To be continued.

NOTICE OF EXPIRED PATENTS.

JOHN COLLIER, of Windsor Terrace, Middlesex, Engineer, for a machine for shearing woollen cloths.—Dated May 1, 1816.

JOHN RANGELEY, of Oakwell Hall, near Leeds, Yorkshire, Gentleman, for certain further improvements of his hydropneumatic engine, being a new or improved method of constructing and working engines or machines for lifting or raising of weights, turning machinery of all descriptions, drawing carriages on railways, and capable of being applied to all purposes where mechanical power is required. Dated May 4, 1816.

RICHARD BANKS, of Hadley, in the parish of Wellington, Salop, Engineer, for certain improvements on wheeled carriages.—Dated May 4, 1816.

WILLIAM THREADGOLD, of Farm Street, Berkeley Square, Middlesex, Surveyor and Builder, for a machine or apparatus to prevent obstructions to the passage of smoke in and through chimnies.—Dated May 4, 1816.

ROBERT COPLAND, of Liverpool, Lancashire, Merchant, for a means of effecting a saving in the consumption of fuel.—Dated May 4, 1816.

BENJAMIN ROTCH, late of Castle Hall, Milford Haven, Pembroke, but now of Bath, Somerset, Gentleman, being one of the people called Quakers, for a flexible elastic horse-shoe, for the purpose of allowing the foot of the horse its natural motion when shod.—Dated May 11, 1816.— (*For copy of Specification, see Repertory, Vol. XXX. p.* 78.

Jean Samuel Pauly, of Knightsbridge, Middlesex, for certain improvements in the construction and use of fire-arms.—Dated May 14, 1816.

Thomas Ruxton, of Dublin, Esquire, for a lock for fastening doors, gates, drawers, desks, trunks, boxes, portmanteaus, and other things requiring fastenings, which he conceives will be of great public utility.—Dated May 14, 1816.—*(For copy of Specification, see Repertory, Vol. XXIX. p.* 129.)

Richard Francis Hawkins, of Woolwich, Kent, Gentleman, for a method, plan, or principle by which tunnel or tunnels, archway or archways, may be constructed or effected under the river Thames, or other rivers, for the passages of cattle, foot passengers, and other purposes.—Dated May 14, 1816.

Daniel Wilson, of Usher Street, Dublin, Chemist, for certain new and improved apparatus to be employed in the distillation of animal, vegetable, and mineral substances, and in various other processes.—May 14, 1816.

William Simmons, of Wigan, Lancaster, Writing Master, and Teacher of of Accounts, for certain improvements applicable to keyed instruments, as the organ, piano-forte, harpsichord, or to any instrument or set of instruments to which keys are, or may, or can be affixed.—Dated May 14, 1816.

Francis Richardson, of Queen Street, Westminster, Middlesex, Esquire, for improvements on the locks and barrels of fire-arms; and also an improvement or addition to bayonets.—Dated May 25, 1816.

Philip Taylor, of Bromley, Middlesex, Merchant, for a method of applying heat to liquors used in the processes of brewing, distilling, and sugar refining.—Dated May 25, 1816.—*(For copy of Specification, see Repertory, Vol. XXX. p.* 193.)

CHRISTOPH DIHL, of New Bond Street, Middlesex, Esquire, for an improvement or improvements in the making mastic cement or composition, and in the mode of working and applying the same to useful purposes; which cement or composition he denominates "Dihl's Mastic."—Dated May 25, 1816.

GEORGE DODGSON, of St. Paul, Shadwell, Middlesex, Pump and Engine Manufacturer, for a method of simplifying and improving the construction of extinguishing engines and forcing pumps.—Dated May 27, 1816.

ISAAC HADLEY REDDELL, of Orange Court, Leicester Square, Middlesex, Engineer, for certain improvements in or on the means of lighting the interior of offices, theatres, buildings, houses, or any place where light may be required. Dated May 27, 1816.—*(For copy of Specification, see Repertory, Vol. XXX. p. 268).*

ROBERT KEMP, Junior, of Cork, Smith and Brass Founder, for an improvement or improvements in making or manufacturing locks and keys,—Dated May 27, 1816.—*(For copy of Specification, see Repertory, Vol. XXIX. p. 327.)*

JOHN HEATHCOATE, of Loughborough, Leicestershire, Lace Manufacturer, for certain improvements upon a machine or machinery already in use for making hosiery or frame work knitted, commonly called a stocking frame.—Dated May 30, 1816.

LIST OF NEW PATENTS.

James Perry, of Red Lion Square, Holborn, in the county of Middlesex, Bookseller and Stationer, for an improvement or improvements in or on pens.—Dated April 24, 1830.—(*Six months.*)

John M'Innes, of Aucheureoch, and of Woodburn, North Britain, Esq. for the manufacture or preparation of certain substances which he denominates the British Tapioca, and the cakes and flour to be made from the same.—Dated April 24, 1830.—(*Six months.*)

Samuel Brown, of Billiter Square, in the city of London, Commander in our Royal Navy, for certain improvements in making or manufacturing bolts and chains. Dated April 24, 1830.—(*Six months.*)

Joseph Cochaux, of Fenchurch Street, in the city of London, Merchant, for an apparatus calculated to prevent or render less frequent the explosion of boilers in generating steam. Communicated by a foreigner.—Dated April 24, 1830.—(*Six months.*)

Paul Descroizilles, of Fenchurch Street, in the city of London, Chemist, for certain improvements in apparatus for economising fuel in heating water and air applicable to various purposes.—Dated April 24, 1830.—(*Six months.*)

Thomas Cook, of Blackheath Road, in the county of Kent, Lieutenant in our Royal Navy, for certain improvements in the construction and fitting up of boats of various descriptions.—Dated April 24, 1830.—(*Two months.*)

John Wilks, of Blue Anchor, Bermondsey, in the county of Surrey, Engineer, Millwright, and Machinist, (one of the co-partners in the firm of Bryan Donkin & Company, of the same place, Engineers, Millwrights, and Machinists), for an improvement or improvements in a part or parts of the apparatus to making paper by machinery.—Dated April 28, 1830.—*(Six months.)*

THOMAS PETHERICK, of Penfullick, in the parish of Tywardreath, in the county of Cornwall, Mine Agent, for machinery for separating copper, lead, and other ores from earthy and other substances with which they are and may be mixed, and which is more particularly intended to supersede the operation now practised or used for that purpose, commonly called Jigging.—Dated April 28, 1830.—*(Six Months.)*

JOHN WALKER, of Weymouth Street, in the county of Middlesex, Esq. for an improved cock for fluids.—Dated May 4, 1830.

HENRY ROBERT SALMON DEVENOGE, of Little Stanhope Street, May Fair, in the county of Middlesex, Gentleman, for certain improvements of machinery for making bricks. Communicated by a foreigner.—Dated May 8, 1830.—*(Two months.)*

THE

REPERTORY

OF

PATENT INVENTIONS.

SUPPLEMENT, JULY, 1830.

Specification of the Patent granted to Nathaniel Jocelyn, *of New Haven, State of Connecticut, Artist, for certain improvements in the preparation or manufacture of Blank Forms for Bankers Checks, Bills of Exchange, and other similar instruments or securities, by which forgeries and alterations in the same are prevented or detected.*—Dated December 3rd, 1829.

To all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Nathaniel Jocelyn, do hereby declare, that the nature of my said invention, and the manner in which the same is to be performed, is described and ascertained as follows, (that is to say):—

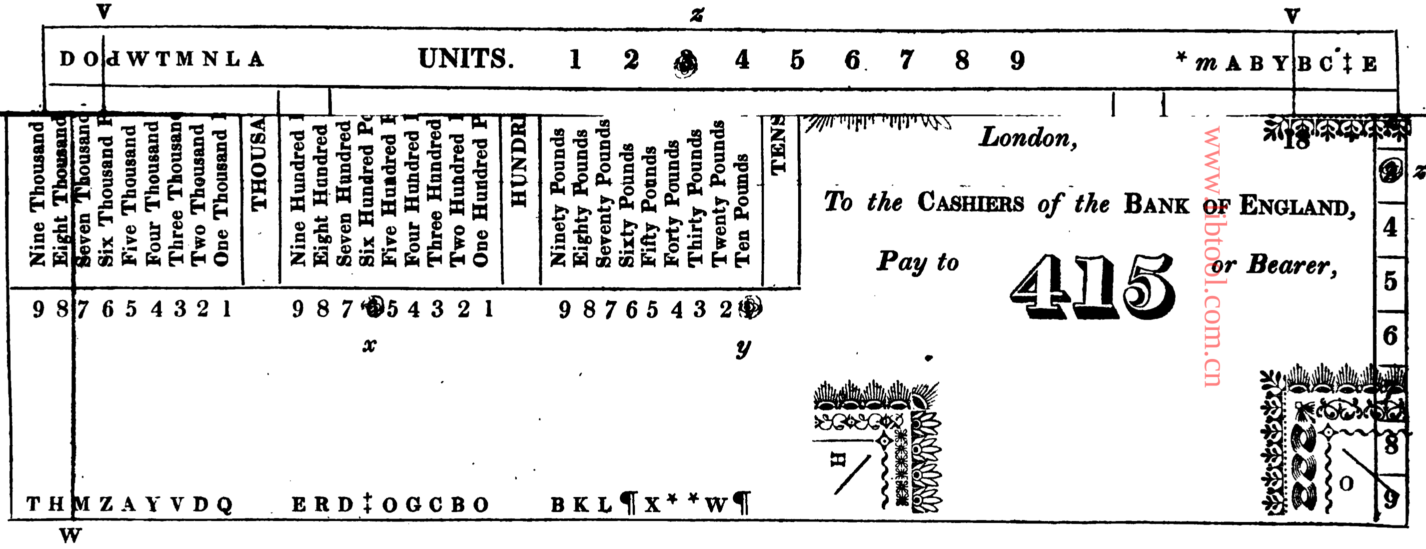
Those institutions or individuals, upon whom checks and bills are drawn, or by whom notes or similar instruments, as letters of credit, are to be paid, should furnish their customers with blank forms, to be filled up by the drawer or correspondent with a date, sum of money, payee's name, drawer's or correspondent's name, or other necessary matter. The common blank forms of these instruments are well known, and differ but very little from each other; and each institution or individual generally delivers out the same form of checks to all their customers or correspondents, but seldom delivers out any forms of bills or notes; it is necessary that they should all deliver out the latter forms. Forgeries may even then be easily committed by any one possessed of the blank forms, who will venture to imitate the hand writing, and it may be done, either by filling up a blank form entirely, or by making an alteration to a larger sum of a check or bill already filled up. My improvements in blank forms provide against these two descriptions of forgery. To prevent forgeries by filling up blank forms, I use a register mark, thus:—Print, upon a conspicuous part of a certain number of blank checks or bills, making a set sufficiently numerous for one person, a figure, number, letter, or mark, or other apparent device, so that no two sets of blank forms, for different persons, shall be similar to each other; and when any one set so marked is appropriated to a particular person, the same figure, number, letter, or mark, must be registered with that person's name to it, and it becomes his register mark or number. Also, for the greater security of the payer, he keeps a key-book, which contains certain rows or combinations of letters, figures, marks, emblems, or symbols, that are printed upon each blank form, with progressive numbers on the blank forms, to make them correspond with a like progressive numbering in the book. I call this the payer's test mark; it is thus done:—Print upon each of every set of blank forms a row or combination of letters, figures, marks, emblems, or symbols, so that each row or combination may consist of two, three, four, five, or some arbitrary number of these letters or symbols, and the row or combination on each blank form, being unlike that on any other blank form of the same set. It is a matter of indifference whether the drawer or correspondent has a copy of the key-book, but care must be taken, that the progressive numbers on the blank forms correspond with the progressive numbers attached to the rows or combinations in the key-book.

Again, as blank forms for checks are generally printed in books of five blank forms on a page or leaf, I have devised a method of connecting together a number of adjacent blank forms of the same set, by means of small figures or designs of any shape, each fourth part of which, an entire figure, is different from every other fourth part, in the work or appearance thereof. This I call the diversified match mark. This object is effected by stamps or dies, made to impress or print the designs or figures intended to be used with dissimilar lines, dividing them into four parts, and marked with letters thus—

By bringing the outer edge of the second leaf to match on, or upon any appropriate part of the first leaf, the operator, by one impression, places the figure upon the back of four blank forms (except in matching the top and bottom corners of the book, in which case only two blank forms are impressed at one operation), one half, more or less, upon two blanks in one leaf, and one half upon two corresponding ones in the next leaf; so that, when those blank forms are cut from the book of forms, the one fourth part, more or less, of the design or figure so impressed, will be found on the corners, and other appropriate parts, of the four blank forms. In the same manner, and by successive impressions, made with figures or designs, different from the first and from each other, and with different coloured inks, promiscuously used, all the remaining blank forms on the said two leaves, are to be impressed and matched, and so proceed to match the third leaf of blank forms upon the second, and the fourth upon the third, and so on, through all the leaves of the book. When the match-mark is to appear on the face of the blank forms, the first leaf must be laid on the second, and the second on the third, &c. When a check comes for payment, if suspected, it can be compared with either of those on file, which were connected with it by the matching, and with which it will agree, if genuine, in the line of separation between the two checks, or by the diagonal line and letters.

Having described the alterations or additions, which may be made in, or put on, the common blank forms, to great advantage, I subjoin specimens of my new blank forms for checks and bills. *(See illustration.)*

After an inspection of the annexed blank forms, the following description of my invention will easily be understood:—Place on some convenient part, or the margin of the blank form, the series of numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, with or without the word units connected therewith, for a heading; and on some other part or margin, the series of numbers 10, 20, 30, 40, 50, 60, 70, 80, 90, with or without the word tens, or the figures 10, as a heading connected therewith; and on some other part or margin, the series of numbers 100, 200, 300, 400, 500, 600, 700, 800, 900, with or without the word hundreds, or the figures 100, as a heading connected therewith; and on some other part or margin, the series of numbers 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000, with or without the word thousands, or the figures 1000, as a heading connected therewith; and so on, if required, for tens of thousands. These series may be expressed in figures or words, or in



Specimen of Key-books for Checks.

	THOUSANDS.	HUNDREDS.	TENS.
Nº. 103.	T H M Z A Y V D Q	E R D ‡ O G C B O	B K L ¶ X * * W ¶
Nº. 104.	L D N F A C G ¶ Y	B D D I Y R O C L	X A ‡ V H K m M I

both, and also by abbreviations. The word denoting the currency, as pounds, should be placed on the forms.

The mode of manufacturing or using my blank forms is as follows:—If the sum to be inserted in the check is some pounds sterling, but less than ten pounds, separate that part of the blank form which has upon it the series of units and common form of a check, from the residue, containing the series of tens, hundreds, thousands, &c. but cutting or tearing it in a straight line from the top to the bottom of the check, and you have a perfect blank form of check for any sum less than ten pounds. Fill up this form in the usual way, and with a punch or knife, or other suitable instrument, cut out, in the series of units, the figure or figures next in amount above that denoting the number of pounds, being the number drawn for. If the check is intended to be for a sum less than one hundred pounds, but more than ten pounds, cut or divide the blank form between such of the different numbers, in the series of tens, as to leave upon the blank form no higher number in that series, than is to be inserted in the body of the check. Then use the series of units as before, to denote the units contained in the sum, or cut out the figure 1 when the series is not wanted, and it becomes a perfect blank form of check for that sum so denoted by the figures, and then fill it up in the usual way. If the sum is less than one thousand pounds, and more than one hundred pounds, proceed in a similar manner, using the series of tens in the manner before described for units. If the sum of money be more than one thousand, and less than ten thousand, and also contain hundreds and an unit, as £7502, proceed as follows:—Cut away, or divide the check between the figures 8 and 7 in the thousands, punch or cut out the figure 6 in the hundreds, and the figure 1 in the tens, and the figure 3 in the units, and then fill up the check in the usual manner; and in the same manner checks may be made for tens of thousands, and so on. The fractional parts of a pound sterling may, of course, be written in the body of the check, but will not be denoted by my invention.

In the specimens before given it will be observed, that

415

is the register mark, 103 in the check, and 110 in the bill is the progressive number.

THMZAYVDQ, ERD‡OGCBO, BKL¶X**W¶ in the check, and DOdWTMNLA, **m*ABYBC‡E in the bill, is the payer's test mark, which is found to correspond with the key by means of the progressive number. The figure

is the diversified match mark; the lines V. W. shew the parts that are to be torn off from the check and bill; the marks at *x*, *y*, and *z*, shew the holes whence the figures have been cut from or punched out; and thus, every security against a forgery, either by filling up a blank check or bill, or by altering it after it has been filled up, is given to the parties interested.

From the above description and the examples given, it is quite evident in what way blank forms may be made for promissory notes and post bills, and for all similar instruments or securities, as foreign bills of exchange, letters of credit, stock receipts, &c.

Now I do not claim in particular the register number, nor the payer's test mark with the key book, nor the diversified match mark, but I claim the combination of them with blank forms for a check or bill, or other similar instrument so manufactured or made, that, by the manual operation of cutting and punching them in parts, the payer of the check, bill, or instrument, has great facilities for discovering, whether the check or bill was really drawn by the person who purports to have made it, and can immediately see for what sum the check, bill, or instrument, was intended to be drawn, without even reading the body part of the check, bill, or instrument, so as clearly and readily to ascertain, by inspection, whether it has been altered since it was drawn.

In witness whereof, &c.

Specification of the Patent granted to BENJAMIN COOK, *of Birmingham, Brass-Founder, for an improved method of making Rollers or Cylinders of copper and other metal, or a mixture of metals, for the purpose of printing Calicoes, Silks, Cloths, and other Articles.*—Dated April 23rd, 1829.

TO all to whom these presents shall come, &c. &c.—*Now know ye,* that in compliance with the said proviso, I, the said Benjamin Cook, do hereby declare, that my invention consists, first, in the novel form which I give to the mandrel or axle on which the cylinder or outer shell of copper, or other metal or alloy is mounted; and, secondly, in the internal form or shape of the copper, or other external shell, and the way or method employed for so forming it.

Instead of making the mandrels or axles of my improved printing rollers circular, that is, of a cylindrical form, and slightly conical, which is the way they have been made heretofore, I now shape the mandrel of an elliptical form, or, otherwise, eccentric or cylindrically rose shaped, which may be done by turning it in an oval or eccentric lathe, or by any other convenient means. Having prepared cylindrical ingots of copper, brass, or other proper alloys of suitable lengths and diameters, a cylindrical hole is to be bored, drilled, or otherwise formed through the axis of each ingot, leaving a small shoulder or inwardly projecting ring at one end to act as a stop against the mandrel when drawing the ingot down, that is, shaping it to the form and size required. I then introduce the mandrel into the hollow ingot which is to form its shell, and place them in a draw bench, or other suitable machine, and draw the external surface of the shell, perfectly cylindrical, through holes or draw-plates to the dimensions I wish, which causes the shell to form itself internally to the elliptical or eccentric figure of the mandrel; and when so fitted, and turned truly cylindrical, and polished on the outer surface, this constitutes my improved printing roller. The mandrel, on which the copper or other shell has been drawn, as above described, may have "journies" turned on it, and be employed as its working axle in the printing press; but, if not so used, all the axles or mandrels must be formed of exactly the same figure and dimensions as the original mandrel, in order that any number of external shells may fit in common upon them for changing the patterns. The designs of subjects employed for printing, are, of course, engraved on the polished surface of the external shells in the same manner as is now usually adopted for printing calicoes, silks, cloths, and other articles. Lastly, I do hereby declare, that my improved method of making rollers or cylinders of copper or other metals, or a mixture of metals for printing calicoes, silks, and other articles, consists in the above described employment of elliptical mandrels or eccentric axles on which the copper or other shells are formed, and fitted as aforesaid, and in the means employed for fitting exactly the inside of the ingots of copper, brass, or other alloy to the mandrel as above described.

In witness whereof, &c.

Specification of the Patent granted to Thomas Fowler, *of Great Torrington, Devonshire, for certain Improvements in, or for raising and circulating hot Water, hot Oils, and other hot Fluids, for domestic and other purposes.*—Dated October 20th, 1828.

To all to whom these presents shall come, &c. &c.—*Now know ye*, that in compliance with the said proviso, I, the said Thomas Fowler, do hereby declare the nature of my said invention to consist in causing water, oil, or other fluids to circulate through the medium of a bent tube, by raising the temperature of the fluid at one end of the tube, so that it is always warmer than that at the other end, and in such an arrangement of apparatus for that purpose as renders the invention applicable to domestic and other purposes; and in further compliance with the said proviso, I, the said Thomas Fowler, do hereby describe the manner in which my said invention is to be performed, by the following description thereof, reference being had to the drawing annexed, and to the figures and letters marked thereon, (that is to say):—

Description of the Drawing.

Fig. 6, (Plate X.) is an apparatus merely shewing the principle of my said invention, but not applied to any particular purpose: A B are two open vessels; A is placed over a fire-place, and B situated at any moderate distance from it, united by the connecting tube D,* which connecting tube may have a stop-cock E † in any part of it. The vessels A B are placed on a level with each other, and partly filled, as here shewn, with any fluid that will not corrode the materials employed. In the present case I will suppose

* Shewn on an enlarged scale in fig. 4. † Id. fig. 1.

water to be the fluid used. I J is a tube bent into the form of a semicircle, and suspended so that its ends may be immersed about half way in the water in the two vessels. This tube, which I call a Thermo-siphon, is furnished with the stop-cocks F and F near the ends, and the filling cock G * on its highest part. The end of the Thermo-siphon, which is in the vessel A, is bent with its orifice upwards, which should still be several inches below the surface of the fluid. This is done to prevent the air bubbles that arise from the bottom of A, when heat is applied, from going into the Thermo-siphon, and lodging in its upper part. In order to prepare the apparatus for action, water being put already in the two vessels A and B, stop the cocks F and F, open G, and with a funnel fill the Thermo-siphon with water until it overflows; stop G, and open F and F, the air below F and F will immediately rush upwards, and be replaced by water. Stop F and F, open G, and pour in more water until the Thermo-siphon be again quite full. Stop G, and open F and F, E being always open, and the whole will be now fit for action. Should any doubt, however, remain that the air is not all excluded, the process of stopping F and F, unstopping G, and filling, must be again and again repeated.† When the Thermo-siphon I J is full of water, stop G, open F and F, and also the cock E in the connecting tube D. Apply the fire to A, and the water will almost immediately begin to circulate from A through F I G J F to B, and return by the connecting tube D to A for a fresh supply of heat; and as the heat of the water in A increases

* Shewn on an enlarged scale in fig. 3.

† The extreme height of G must be regulated generally by the specific gravity of the fluid, and the degree of heat required. I find, by experiment, that when G is twenty feet high, water will rise and circulate through a tube sixty feet in length, and three-quarters of an inch diameter; and produce a temperature of from 140° to 150° in B, particularly when the form of fig. 10 is adopted.—(PATENTEE.)

or diminishes, so the circulation will be faster or slower. A small quantity of oil should always be kept floating on the surface of the water in the Thermo-siphon just beneath the filling cock G.

Fig. 11 is a still more simple apparatus, which may be made to act on the same principle. Here only one vessel (namely, the vessel A,) is used, while the lower part H of the Thermo-siphon I J answers he purpose of the vessel B, and the connecting tube D at the same time; and I should here state, that as the water always passes up that leg of the Thermo-siphon which is the warmest, and down the other, I shall call the former the ascending leg, and the latter the descending leg.

Having now described the principle of my said invention, it is only necessary for me to shew how it is applied to domestic and other purposes; and I will preface my description of the next two figures by observing, that in order to apply my principle, it is always necessary that the object to be heated by the circulation of hot fluids caused by the means aforesaid, (whether the same be a bath or greenhouse, or any other matter,) should always be situated somewhere between the highest point of the Thermo-siphon and its coldest end, as will be found to be the case in the following instances.

Fig. 18 represents the application of my said invention to the purpose of heating a bath, supposed to be on the first floor in a private dwelling-house. A is an open vessel, as before described, two-thirds full of water, and supposed to be placed on the kitchen fire; I is the ascending leg of the Thermo-siphon; W is the bath, with a double casing at the back and bottom; J J is the descending leg of the Thermo-siphon; and G being the highest point of the Thermo-siphon, it will be seen that the bath, which, in this case is the object to be heated, is situated between that highest point and the lowest, which is the coldest part of the descending leg of the Thermo-siphon. V is one of the inner walls of the house; and as the Thermo-siphon may be of almost any shape, however tortuous, of course the arrangement may be adapted to the premises. It is only necessary to state, that the highest point of the Thermo-siphon should not in any respect exceed thirty feet, as it acts in this respect on the principle of the torricellian column, and I prefer not to exceed twenty feet. Care should be taken also at all times to exclude the air completely when filling the Thermo-siphon, air-plugs being placed where necessary to permit the air to escape when filling, and to prevent its return.

Fig. 19 represents another application of my said invention for heating what is called a hot plate for copper-plate printers; for this purpose, it is only necessary to introduce a shallow metal box, as part of the descending leg of the Thermo-siphon as here shewn, and the object is answered.

Figs. 25 and 26, Plate XI. represent a ground-plan or horizontal section, and an elevation of another application of my said invention, which consists in employing the power of the descending fluid in the Thermo-siphon, for the purpose of causing hot fluids to flow from boiler to boiler, through connecting tubes of various lengths and forms, for the purpose of heating the lower parts or ground floors of hot-houses, conservatories, green-houses, and other buildings; and also for other purposes requiring heat on the ground, or in low situations, which may be varied with a greater or lesser number of boilers, with their necessary connecting tubes, according to circumstances. I K A are three boilers; L M L, L N L are connecting tubes between the boilers, fastened near their bottoms, with the parts of the tubes M and N of a flat oblong square, or any other form, made perfectly water-tight, to receive the hot fluid from the boilers, for the purpose of giving heat to hot-beds for forcing vegetables, or for heating the floors of buildings or rooms. C is an open vessel connected with A by the tube H, fastened near their bottoms. B is the vessel to receive the descending fluid. D is a connecting tube, with its stop-cock E. F G F is the Thermo-siphon, with its stop-cock and filling cocks as already described. The vessels and Thermo-siphon being filled with any fluid (say water), and fire applied to the boilers I K A as soon as the water boils in them (E being unstopped), if the water does not circulate stop E, and draw some of the water from B, this will destroy the equilibrium; put the water drawn from B into I, this will further destroy the equilibrium: hot water will pass from A to C through H, the Thermo-siphon acting at the same time to restore the balance with B, the temperature in C by this process will quickly be a little increased: now unstop E, and the flues being kept up, the circulation will go on with considerable speed—the connecting tubes L M L and L N L receiving boiling water direct from the boilers; and this circulation will not cease so long as there is a difference of temperature in the fluid in C and B, and the Thermo-siphon be kept full. If the parts M and N be of considerable extent, they will be found to give great heat in low situations in proportion to the size of the boilers. Also, in place of those hot surfaces, or enclosed vessels M and N, open vessels may form parts of the connecting tubes from boiler to boiler; the water in those vessels will rise to the level of the water in the boilers, and as this water circulates through the whole apparatus, it may be employed for making infusions for hot-water baths for chemical and for various other purposes. The different boilers may be placed over one fire (see figs. 7 and 8), or they may be formed of one large boiler, with water-tight partitions in it (see figs. 9 and 10): this latter form will probably be found the most useful and convenient; but, in either form the hot fluid will constantly circulate if the machine be properly constructed, and the descending part of the Thermo-siphon be of considerable extent, so as to allow the fluid to cool in descending.

In figs. 27 and 28, A, I, and K are the boilers, which may be of any form to fit together conveniently over one fire. C is the vessel connected with the boiler A, to receive the boiling fluid before it ascends in the Thermo-siphon. B is the vessel receiving the descending fluid. D is the connecting tube with its stop-cock. E L, M L, L N L, are connecting tubes, with flat surfaces or vessels as already described. F G F is the Thermo-siphon, with its stop-cocks and filling cock.

Figs. 29 and 30 are a form of my invention, with one vessel only for a boiler, divided into the four parts, A I K P. C the vessel to receive the hot fluid from the part A. L M L, L N L, L O L, are connecting tubes united to deep open vessels, or having in them shallow boxes (made water-tight of metal or other materials), &c. &c. B is the vessel receiving the descending fluid. D is its connecting tube, with the part I. F G F is the Thermo-siphon, &c. &c.

As it may be exceedingly difficult to keep water in the different parts of this vessel, or in the boilers represented in figs. 25, 26, 27, and 28, always boiling, should the connecting tubes with their adjuncts extend over a large surface, a separate boiler R, at a short distance from, and connected with the vessel, or part A, (see fig. 31,) should be used for the purpose of making the fluid very hot or to boil, before it passes into the vessel C from which it ascends. The boiler A I K P may have a greater or lesser number of partitions in it than four, as occasion may require, always observing that the different parts be properly connected by the tubes. Those latter forms of the apparatus are put in action in the same way as described for figs. 25 and 26.

It will be necessary, in every form of the apparatus, to take care when the cocks F and F, or either of them are unstopped, that G be not unstopped, or an air-plug be not opened, or that the fluid in the vessels be not suffered to descend below the orifices of the Thermo-siphon, as in either of those cases the Thermo-siphon will instantly empty itself, or at least one leg of it from the filling cock, or an air-plug will become empty, which may cause some inconvenience.

The various applications of which my invention is susceptible are far too numerous to detail: but whereas, I claim as my invention, the application of the bent tube, which I have called a Thermo-siphon, in manner aforesaid, to raise and circulate heated fluids, as shewn in figs. 6 and 11, and the mode of applying the same to domestic and other purposes, as shewn and described in figs. 18, 19, 25, 26, 27, 28, 29, 30, and 31; and such my invention being to the best of my knowledge and belief entirely new, and never before used within that part of His said Majesty's kingdom of Great Britain and Ireland called England, His said dominion of Wales and town of Berwick-upon-Tweed, or any of His said Majesty's colonies or plantations abroad, I do hereby declare this to be my specification of the same; and that I do verily believe this my said specification doth comply in all respects fully, and without reserve or disguise, with the proviso in the said hereinbefore in part recited letters patent contained, wherefore I hereby claim to maintain exclusive right and privilege to my said invention.

In witness whereof, &c.

*Remarks on the preceding Specification, with farther details of its general application.—By the Patentee.**

WITH ADDITIONAL PLATES.

The foregoing specification of my apparatus for circulating hot fluids, will explain the general principle of my invention; but as that document necessarily includes but few exemplifications of the purposes to which it may be applied, I will proceed to describe a few of the most useful.

Figs. 32 and 33, (Pl. XI) are a section or bird's-eye view, and an elevation of a very convenient form of this invention for a hot-house or green-house, in which one fire only may be used, and a boiler A I be placed in one corner of it. This boiler may consist of two vessels A and I, joined as in the figure, to cover the fire-place; or it may be one vessel with a partition in it, made water-tight, so that the two parts may be independent of each other.

It is not necessary that there should be a vessel to receive the descending fluid from the Thermo-siphon, but the Thermo-siphon may be continued as in the figures, until it enters the boiler at I. The dotted lines or partitions *o o*, in the boilers, are small partitions, extending partly across their bottoms, for the purpose of preventing the cold, or returning fluid from the tubes, going directly over their bottoms, into the tubes intended to receive the hot fluid. The Thermo-siphon F G F is filled in the usual manner; and if the vessel C be used for receiving the hot fluid from A, before it ascends, it will be necessary to have a stop-cock N in the tube L, by means of which, the circulation can be prevented until the temperature in C is increased a little, to

* For our own observations on this patent, we refer our readers to p. 225 of the present volume.

set the Thermo-siphon in action. The part M, forming part of the tube L L, on the ground floor, receives the boiling fluid from I. This part (M) may form the bottom, or *nucleus,* of a hot-bed for forcing vegetables, either within the house, or on the outside of it; or the tube L L, resting on the ground, may be carried round a hot-house, or other room close by the walls, or inside the skirting: it may also descend a few inches below the floor, for the convenience of a door-way, or for any other purpose. This arrangement will be found to give abundance of *pure heat* in a close room, even if the diameter of the tube does not exceed three or four inches.

To put this machine in action, the fluid in A and I being very hot, or boiling, and the Thermo-siphon filled, unstop E, stop N, take some of the hot fluid from I, by the cock P, and put it into A; this will cause hot fluid to pass into C, and the Thermo-siphon will immediately act on the common principle to restore the equilibrium between A and I. If the temperature of C be now found to be a little increased, unstop N, and it will immediately act on the principle of the Thermo-siphon; and if the descending leg (F) of the Thermo-siphon be extensive, and in a cold situation, the circulation through the whole will be rapid.

Figs. 34 and 35 are a section and an elevation of a model of this invention, now erected in my garden, for the purpose of giving an upper and an under heat to a bed of earth six feet long and five feet wide, encompassed with a brick frame, twenty feet distant from the boiler, and covered with glass in the usual way, having a southern aspect; A I the boiler, two feet diameter, and about fourteen inches deep, with one partition in it; C a tin vessel to receive the boiling fluid from the part A, through the connecting tube H; F G D the Thermo-siphon, with an open vessel W forming part of its descending leg, in imitation of the

Thermo-siphon bath, see fig. 18; PP, QQ, RR, XX, YY, ZZ, tubes connecting the upper and under or returning part of the Thermo-siphon,—the tube RR having a thin metallic box S, forming part of it, constructed in the same manner as the back or bottom of the bath; M a thin leaden case or box, four feet long, three feet wide, and 2½ inches thick, placed horizontally in the bottom of the brick frame, several inches below the level of the bottom of the boiler, and connected with its two parts near the bottom, by the tubes L and N, ¾ inch internal diameter. This case, when full of hot water, gives the under heat; it is therefore covered with common garden earth, to the height of about fifteen or sixteen inches above its upper surface, and the whole of the brick frame is filled with earth to the same level.

The upper or top heat is given by the leaden tube *a*, *b*, *c*, *d*, four inches diameter, of a rectangular form, five feet long and four feet wide, supported just above the surface of the earth in the brick frame. The end *d c* of this tube is divided in the middle, at *f*, by a circular plate or diaphragm of lead soldered across it, to prevent the fluid from passing from the side *d* to the side *c*, without going round by the angles *a* and *b*. *h h* and *i*, are two tubes, ¾ inch diameter, soldered to the lower part of the rectangular tube, one on each side of the diaphragm *f*. The tube *h h* descends so low as the case M, and passes under the ground by the side of L, until it nearly reaches the part F of the boiler: those two tubes are there united, as at *p*. *t* and *u* are stop-cocks in those tubes, near their junction at *p*. The tube *i* also descends, and is joined to the returning tube N, at *r*. This returning tube passes under the ground by the side of L, until it enters the part A of the boiler.

In one corner of the upper part of the case M, a small tube *w*, about two feet long, is soldered; and also an air hole is made in the upper part of the rectangular tube *a, b, c, d,* to permit the air to escape when this tube and the case M are filling with water from the part I of the boiler. The upper part of the rectangular tube is just level with the surface of the water in the boiler when both are filled.

In the ground plan or section, fig. 34, (Pl. XII), the Thermo-siphon is represented as lying nearly horizontal, to shew in a clear manner its connexion with the two parts of the boiler, the descending leg entering the part I at K. Its action in the present form of the apparatus is thus:— The water being made hot in the boiler, a small quantity is caused to flow from the part A, into the vessel C, which increases the temperature in this vessel a little. The cocks being now all open, except the filling cock G, the Thermo-siphon commences to act, drawing the boiling water from the part A, and returning it at a lower temperature into the part I; this causes boiling water to flow from the part I, through the tubes *h h* and L, into the rectangular tube *a, b, c, d,* and into the case M, and from thence by the returning tubes *i* and N, into the part A of the boiler, and from thence it is drawn again by the action of the Thermo-siphon, into the vessel C, through the tube H; it again ascends, and thus the circulation is complete, which may be continued so long as the water in the vessel A I is kept hot or boiling; and by means of the cocks *t* and *u*, an upper or an under heat, or both combined, may be thrown into the brick frame at pleasure.

It is curious to observe the effect of the Thermo-siphon on the two parts of the boiler. When it is in action in my small apparatus, it alters the level of the boiling water between those parts, causing it to stand one inch, and sometimes 1½ inch, more or less, higher in the part I than it stands in the part A, the cocks *t* and *u* being stopped, which is contrary to the commonly received opinion, that a fluid cannot be drawn from any vessel, and be returned into another at a higher level, without some mechanical action; in this case there is none whatever, the only agents being common atmospheric pressure, acting alike on both parts of the boiler, and the difference of density of the fluid in the ascending and descending legs of the Thermo-siphon. It appears to me that this property may be employed as a new agent in Mechanics, for a first mover, but whether the end may be worthy of the means necessary to be used to obtain it, it is not for me to determine; it is certain however, that by means of heat, a constant circulation of the same water, with very little addition for waste, may be continued for a first mover, and that to a considerable extent, which possibly, in some cases, may be found useful. I will endeavour to explain my ideas on this subject.

Having already said that by dividing the boiler into two parts, the action of my Thermo-siphon alters the level between those parts 1½ inch; this simple arrangement therefore gives a fall of 1½ inch to restore the level between those parts, and the Thermo-siphon still acting, a constant circulation with this disposable force is thus obtained. It may now easily be seen that this force may be multiplied to almost any extent: thus in fig. 36, let I A C B represent a section of a boiler divided into four parts, with the tubes *a b* and *c d* proceeding from the parts I and A, and joining the open sluice *b c*, just level with the water in the boiler. The tube *a b* having a stop cock *e* in it, if a Thermo-siphon be made to act between the parts B and I, its ascending leg being in or connected with the part B, and its descending leg in or connected with the part I, it will cause the water in I to stand 1½ inch higher than it does in B. Another Thermo-siphon acting from the part C to the part B will cause the fluid in C to stand 1½ inch lower than it does in B. Another Thermo-siphon acting from A to C, will still lower the fluid in A 1½ inch more than it stands in C, consequently the fluid in the part A will now be $4\frac{1}{2}$ inches lower than it is in the part I; thus by opening *e*, a constant current is obtained, with a fall of $4\frac{1}{2}$ inches through the sluice *b c*, and the quantity of water circulating will depend on the diameter of the Thermo-siphons. It is also evident, that by increasing the number of partitions in the boiler, and by uniting several boilers with Thermo-siphons, that a fall of three, four, or five feet, or more may be obtained.

This idea of a first mover may probably be found more curious than useful, in consequence of the great quantity of cooling surface required in the descending legs of the Thermo-siphons; one thing however, must, on reflection, be evident to every skilful engineer, that for the purpose of conveying heat by hot fluids, for agricultural, and an infinite variety of other purposes, the Thermo-siphon possesses very extraordinary powers, and that in all cases where the present level plan of circulating hot water in conservatories, &c. &c. is adopted, the Thermo-siphon may be added at a comparatively trifling expense, and it will be found to give tenfold energy to the circulation, besides its possessing properties peculiarly its own; for instance, referring again to figs. 34 and 35, I always found the temperature of the water in the vessel W, in the cold frosty nights of February last, (1829), to be from 135° to 150° Fahrenheit, although uncovered and fully exposed to the influence of a severe frost. As this temperature arises in consequence of heat transmitted by the circulating fluid in the Thermo-siphon, it is plain that earth or loam may be heated in such vessels in a similar way, and thus the front of a wall having a southern aspect, and protected with glazed upright frames, may be filled with pine apples, or other exotics requiring a bottom heat, and the necessary external heat may be regulated from the other parts of the apparatus. In this way the plants would also enjoy the full influence of the lowest winter's sun in our climate, which certainly is of the greatest consequence to healthy vegetation; and from the present facility of communicating artificial heat, it is probable that almost every exotic might be brought to its fullest perfection at any season of the year, as at that period in vegetable life, when the solar light in most cases is absolutely necessary in the wonderful scheme of reproduction, ordained by the Almighty Creator, it may with care be just sufficiently concentrated on the flower by a lens or concave mirror, even in December, so as to be a good substitute for the natural light and heat it would have received in its proper climate.

In the preceding observations I have reasoned from my own experience only, with regard to a difference of 1½ inch between the two parts of the boiler: a greater extent of cooling surface in the descending leg of the Thermo-siphon, must necessarily cause a greater difference in the level between those parts. In my small machine, the filling cock G is about eight feet above the top of the boiler: if it had an elevation of ten, fifteen or twenty feet above the surface of the hot fluid, it certainly would cause a much greater difference of level between the two parts on this account alone; and as this greater elevation would also give more facility for extending and cooling the descending leg, a difference considerably more than 1½ inch might thus be obtained with one Thermo-siphon only. The filling cock I have now in use is a brass taper plug, of ¾ inch diameter, ground very nicely into a short brass tube 1½ inch long, so as to fill nearly its whole internal part: the larger orifice of this tube is fastened into a hole in the bottom of a copper basin holding about two pints; the other end is soldered on a hole in the very highest part of the Thermo-siphon. A flat piece of brass lies across the top of the basin, having a female screw in its centre, through which the screwed shank of the plug passes: on the upper outside end of the shank is fastened a short lever handle, by turning of which, the plug can easily be withdrawn from the brass tube in the bottom of the basin, and consequently open a communication with the internal part of the Thermo-siphon: the basin is always kept full of water, which, covering the cock or plug, makes it perfectly air-tight. The stop-cocks or plugs in or near the ends of the ascending and descending legs of the instrument, must also be perfectly air-tight; they ought therefore to be always under the level of the water in the boiler (if possible).

By attending to those particulars, I find the instrument I have erected to be nearly perfect; it requires very little attention to the filling cock, as after forty-eight hours' use, I often find that not even a single air or steam-bubble arises through the water in the basin when the ends are stopped, and the plug turned out, the water under the cock at the same time having a temperature from 160° to 180°; this very much surprises me, as I certainly did not expect this perfection: I always supposed that steam would collect under the filling cock at temperatures from 160° to 180° or 190°; it certainly is a fact, however, that it does not at an elevation of eight feet, after the water has been well boiled, or, at least, it does not, as far as I can perceive by repeated and close attention. This almost inclines me to believe that the smallest constituent parts or atoms of water, (said to be individually composed of one atom of the base of hydrogen, and one atom of the base of oxygen gases, chemically united), are non-elastic, at least at low temperatures, even when appearing in the form of vapour, and that the elasticity of steam is, in consequence of the rarefaction of gases, mixed with those atoms; and also that without the aid of common air, or some other elastic gas, that steam never could be formed from water, unless by a chemical decomposition of some part at least of the water itself. A train of thought has led to more extensive ideas on this curious subject, but as I have neither the means nor the leisure to support them with demonstrative facts, I forbear to publish them, fearing I might call down severe criticism, should those ideas prove to be incorrect.

A form of the Thermo-siphon, represented in fig. 34, may be used with great advantage in gardens, having an inclination to the horizon, as the ascending leg may be laid on or under the surface of the ground, until the filling cock G attains a perpendicular height of ten or fifteen feet, (or even more, if necessary), above the level of the water in the boiler, which, after passing the filling cock, may descend, as in this form of the Thermo-siphon, in tubes and cases on the ground, giving out heat abundantly; or it may descend in any number of tubes and cases, independently of each other, into an open vessel, connected by a short tube with the bottom of the boiler, or those tubes and cases may unite in one large tube near the boiler, and thus enter its bottom. The power of an arrangement of this description would be very great in causing boiling water to flow, on a level, from the part I, through a great length of tube, into the part A of the boiler, if it be divided into two parts only, and hot water might be caused to descend in tubes some way below the bottom of the boiler, for the purpose of communicating heat below, and it would rise again, (although cooled), by the extraordinary action of the Thermo-siphon above.

As a considerable quantity of air is given out by water, when it is first heated, some of this air lodges in the upper part of the Thermo-siphon, where it expands, and often stops the circulation. It will be necessary, therefore, to re-fill it, in the way already described, viz. to stop F and F, (see fig. 6, Pl. X.) unstop G, and fill the Thermo-siphon with the sort of fluid already used: also, when the height of G approaches fifteen or twenty feet above the level of the water in the vessels, and the water in the boiler is at 180° or 200°, steam may collect or be formed in the higher part, and expand; which will, after some time, prevent the circulation. This may partially be remedied by pouring a small quantity of oil into the cock G when nearly full, so that it may cover the water in the tube with a thin film. This film will always swim on the surface of the water, and, in some degree, prevent its being converted into an elastic vapour. These unavoidable imperfections are, however, very trifling, when it is considered, that the operation of filling is so much simplified by the use of the cocks F F and G; in fact, this operation requires only the most common attention; it is done in less time than one minute; and this might not be required even once a day, when G does not exceed six or eight feet perpendicular height, and the water in A is not suffered to boil violently. I know, experimentally, that when G is about four feet high, the water circulates more than a week in a Thermo-siphon 2¼ inches diameter (erected in a greenhouse under my superintendance), without the least occasion to fill it, although the water in A is often boiling. But it would be advisable never to let the temperature of common water exceed 208° or 210°; for low elevations of G, and for heights of from fifteen to twenty feet, 160° to 180° in the boiler, is as much as the machine will well bear when common water is used, unless it has caloric rapidly extracted from its upper part, this will condense the steam which may arise. The highest useful temperatures of fluids, for particular elevations, can only be ascertained by experience and attention.

The boiler should have a recess in its side (fig. 7) to receive the end of the tube. This recess may project several inches, according to the size of the tube, from the body of the boiler, so as not to be immediately subject to the action of the fire. The fluid in this part will not be much agitated by ebullition in the boiler, but will ascend tranquilly into the machine, and take but few air or steam bubbles with it.

An horizontal section of the boiler and recess may be of a form resembling fig. 8; or another vessel may be united to the boiler by a short connecting tube of large diameter, and the end of the Thermo-siphon may be put into this vessel instead of the boiler. The three vessels may stand triangularwise, as in fig. 9, or they may stand in a straight line, with the boiler A in the middle.

In figs. 9 and 10 A is the boiler, B the vessel to receive the descending fluid; C the vessel to be supplied with hot fluid from A; H the connecting tube, through which the hot fluid runs from A to C; and D the tube, with a stop cock, E, through which the fluid returns from B to A. In this, or in any other horizontal position of the vessels, if one end of the Thermo-siphon be suspended in C, and the other end in B, and the vessels be filled, and also the Thermo-siphon in the way already described, it may be necessary, when fire is lighted under A, to have recourse to some expedient to raise the temperature of the fluid in C a little, or the Thermo-siphon may not act, unless A and C are near each other. This may be done after the following manner:—First, let the fluid in A be heated; and if this should not cause the Thermo-siphon to act, stop the cock E, draw some of the fluid from B by the cock I, and put it into A. This will instantly destroy the equilibrium; cold fluid will pass through the Thermo-siphon from C to B; the hot fluid will pass from A to C through H; and the temperature in this vessel being thus increased, unstop E, and the machine will immediately begin to act on the principle of the Thermo-siphon; and continue to do so as long as there is a difference of temperature in C and B, and the Thermo-siphon be kept full. In this arrangement the fluid in A may constantly be kept at a much higher temperature than otherwise, when heights of fifteen or twenty feet are required; and, for lower elevations, it may constantly boil, as it can be suffered to cool, as much as may be necessary, in its progress through H, before it ascends.

The figs. 11 and 12 represent another form of this invention, with *one* vessel only. A is the boiler, which should have a recess in it to receive the end of the Thermo-siphon, as already described. F, G, F, B, the Thermo-siphon, with its stop cocks and filling cock. It is fastened to a hole near the bottom of the boiler, at B, so as to communicate with its internal contents. The tube should descend a little lower than the hole to which its end is fastened before it ascends, purposely to prevent air or steam bubbles going up into it from the boiler. In every other respect it must be managed as already described for two vessels; it would be better were the end B fastened into a perpendicular projecting recess in the boiler, not subject to the action of the fire. Into this recess (fig. 12), the ascending end F of the Thermo-siphon could also be placed, above the opening to B.

Another form of this instrument, with *one* vessel, is exceedingly simple; figs. 13 and 14 will give an idea of it. A is the boiler, F, G, F, the Thermo-siphon, which is merely suspended in the fluid, and filled as usual. The ends of the instrument should be placed in recesses in the boiler, as in fig. 14; and should the Thermo-siphon, in its progress, descend and rise again in a serpentine, spiral, or other form, it must have air-plugs fastened on every high part, for the purpose of permitting the air to escape in filling. The filling cock must be placed on the very highest part of the whole. This cock also operates as an air-plug for that part; in fact, it performs this office in all cases, when air-plugs are not required, by permitting the air to escape when filling, just as the air escapes from the mouth of a bottle when a liquid is pouring into it. It must always be remembered, that every particle of air, or other elastic gas in the Thermo-siphon, is detrimental to its action, therefore every means must be taken to exclude it. When a tube with an air plug is filling, the stopper must first be taken out; for example, if we have to fill one of this form (fig. 15), stop F and F as usual, take out the stopper at I, and pour water into G. The air will immediately be heard escaping from I; and, at last, the water will issue from this place in a small jet. When it is thus running stop it with the plug, which may require a small weight on it before the instrument is put in action; now fill until it overflows at G; stop G; unstop F and F to fill below the cocks, and repeat the operation with the air-plug, &c. &c. as often as may be necessary, until the air be all excluded.

Any number of air-plugs (see fig. 23) must be managed in the same manner, taking them all out when the water is first pouring into G, and stopping them as the jet appears issuing clear and solid. After the tube is completely filled, the fluid will circulate immediately upon the heat being applied. In all cases the tube should be carried to its extreme height from the boiler as quickly as possible, without any air-plugs being required on this side the filling-cock; the reason for which is, that the hottest, and consequently the lightest part of the fluid, should pass the filling-cock before it descends. In descending, it may go into any form or convolution, and to any moderate distance, beforc it returns to the boiler, attention being given to the places requiring air-plugs, &c. &c.

Part of the Thermo-siphon may also be made in the form of a vessel or vessels for heating fluids, for *dying, hat-making, washing*, and a variety of other purposes, where a temperature below that of boiling water is required. The figure (No. 16) represents a form of this apparatus. L, M, N, O, is a cistern or vessel, with another vessel, *l, m, n, o,* of a similar shape *within* it, so much smaller than the external vessel as to leave a space of one inch, more or less, around the sides and between the bottoms when the rims or upper edges are even with each other; those rims must be joined together, so as to be perfectly air-tight, and the whole internal space between the vessels must be excluded completely from any communication with the external air. Let this internal space form part of the Thermo-siphon, by joining the tube (cut in two parts) to the ends of the outside vessel, with the filling-cock fastened on the very highest part of the rim, and air-plugs, where necessary, to allow all the air to escape in filling.

It might be contrived that the internal part, under the rims and bottom of the inner vessel, should have a gentle inclination upwards, to allow all the air to pass out at the filling-cock, in which case air-plugs would be unnecessary.

Before I proceed further, it may be proper to take a philosophical view of the pressure of the atmosphere at and near the surface of the earth, so that we may not be disappointed by using materials not sufficiently strong, or not adjusted so as to resist this pressure, which is immensely great where it might be little expected. It would hardly seem credible, that, in the vessel I have just described, acting at the height of twenty feet as part of a Thermo-siphon, a pressure of nearly 1440 lbs. takes place on every square foot of the sides and bottoms externally; that is, the sides and bottoms of the two vessels would have a tendency to collapse in proportion to this force.

It is known that a column of water, thirty-two to thirty-four feet high, is equal in weight to a similar column of air of an infinite height. A column of water one inch square, from thirty-two to thirty-four feet high, weighs about fourteen or fifteen pounds, consequently, a column of air of an infinite height presses on one square inch of an exhausted surface near the earth with a force of from fourteen to fifteen pounds. The upper internal part of a Thermo-siphon, above thirty-four feet high, suspending from thirty-two to thirty-four feet of water in it, must be a vacuum, that is, it must have an exhausted surface. The atmosphere, therefore, presses on this part with a force of from fourteen to fifteen pounds on every square inch. For the sake of round numbers, I will say, that thirty feet of water,* suspended in a Thermo-siphon in the way I have described, will cause a pressure of about fifteen pounds on every square inch of its upper outside surface, which is pretty near the truth. A height of twenty feet must therefore cause a pressure of ten pounds on every square inch, consequently, a square foot would be subjected to a pressure of 144 times ten pounds, or 1440 lbs. at this height. The diameter of the tube is of little consequence in the preceding calculation, unless it be very small, so as to subject the fluid to the influence of capillary attraction.

From the above statement, it appears, that if twenty feet elevation causes a pressure of ten pounds, ten feet elevation will cause a pressure of five pounds; and every foot elevation of the Thermo-siphon will cause a pressure of half a pound on every square inch of its upper and under outside surfaces, if the fluid employed be water. Mercury and other fluids, of course, will cause also a pressure in proportion to their specific gravities, &c. &c.

From these data we may easily contrive that vessels, made for the present purpose, shall effectually perform

* This is near enough for the present purpose: exact calculation can easily be made for the variable height of the barometer: here it is unnecessary.

their office at the heights required. Whatever substance is chosen for their construction it must be impervious to the air; and the sides and bottoms of the vessels kept from collapsing by small cylindrical blocks being fastened between them, at regular intervals, according to the height and the strength of the materials employed.

If the vessel represented in fig. 16 be constructed with reference to the preceding particulars, and the Thermo-siphon be filled until it overflow at G as usual, and fire be applied, the part encompassing the internal vessel will become very hot, and any fluid put into this vessel will acquire nearly the same temperature as that in the Thermo-siphon; and this temperature may always be kept under regulation by a stop-cock S on the ascending side of it.

Another Thermo-siphon would circulate the fluid from this inner vessel with a similarly constructed vessel in its upper part (see fig. 17), and thus, by a system of Thermo-siphons, heat may be conveyed to a considerable height, regard being had to the quantity of caloric abstracted in ascending; it being a peculiar property of this invention that the greater the abstraction of heat, after the fluid ascends to its utmost height from the boiler, or other open vessel containing the hot fluid, the faster will be the circulation.

Fig. 19 represents another application of the same invention for heating what is called a *hot plate for copper-plate printers.* For this purpose, it is only necessary to introduce a shallow metal box as part of the descending leg of the Thermo-siphon, as here shewn, and the object is answered.

I propose also to construct the Thermo-siphon so as to pass in one continuous line, either in a serpentine, spiral, or other form, (see figs. 20, 21, 22, and 23,) through a fluid; or even through a *solid substance, as a wall, for* *instance, for the purpose of heating it,* which it will often do rapidly, if care and attention be paid to its construction. In this arrangement the strength of vessels containing the fluid to be heated, or their construction, need not be attended to, as the Thermo-siphon itself only suffers the particular effects of atmospheric pressure.

If a hot surface be wanted, the descending leg of the Thermo-siphon may pass in a serpentine form (fig. 20) between two plates made water-tight at their edges, and filled with water. This water will very soon acquire the temperature of the water in the Thermo-siphon, and, consequently, heat the plates as much as it would if it circulated from the boiler. The tube may also descend, (fig. 22,) in a spiral or other form, like the worm of a still in a vessel full of any fluid. This arrangement will also heat the fluid very rapidly; or in proportion to the height of G. the quantity of fluid to be heated, and the quantity of surface of the tube in contact with the fluid.

I also apply this invention to the *making infusions of malt* and other substances by circulating hot fluids through them. Thus, in figs. 6 or 10, put the malt or other substance from which the infusion is to be made into the vessel B, on a perforated false bottom, supported just above the entrance into the connecting tube. Fill both vessels nearly full with water, and put the Thermo-siphon, having a very low elevation of G, into the vessels in the usual way. This instrument being filled, and fire applied, the water will circulate through the malt or other substance, and produce an excellent infusion, the circulation being kept up so long as may be found needful.

I apply this invention also to the purposes of *heating hot-houses, green-houses, and conservatories,* with or without the level hot-water apparatus at present in use. The Thermo-siphon will act in conjunction with the level mode of circulating hot water, giving it much greater energy and effect in all cases, and by its means heat may also be conveyed to any part or corner of the house above the level of the boiler.

I also propose to apply the Thermo-siphon to the purpose of *heating the fronts of garden and other walls* (see figs. 21 and 23), in or to which it may be fixed for forcing fruit-trees, and for various other purposes; and, to increase the effect, several of those Thermo-siphons may be made to act in conjunction from the same boiler (see fig. 24), or the Thermo-siphon may have only one ascending leg from the boiler to the filling cock, and immediately on its descent it may branch off into any number of descending legs of various sizes, to the vessel B. This latter plan will cause a very rapid circulation, if the descending legs be of considerable extent, as it is impossible that one drop of water, of a temperature lower than that at the filling cock, can remain stationary in any of them.

This invention may be applied also to *warm rooms*. Where the room is small, a single vessel and Thermo-siphon (see figs. 11 and 12) may be used, heated by the fire of the room. In larger apartments ornamented vessels may be used with Thermo-siphons, forming arches or other graceful figures between them. (See also figs. 25 to 35, with the explanations, by which it will be seen that this mode of heating rooms and buildings with hot fluids will admit of the most extensive application, particularly as it is the natural property of heated air to ascend.)

By using oil instead of water in the tube, water may be heated to the boiling temperature for domestic and other purposes. The form of the apparatus may be with the double vessel, (see fig. 16, or the *spiral*, see fig. 22,) or of any other convenient form. Oil may be substituted for water in most cases where a greater temperature is wanted.

When a tube is filled with good oil, it will seldom want refilling, unless a temperature far above that of boiling water is used.

In all cases where the greatest possible heat is required to be given out into the air by a tube containing hot fluid, it will be necessary to cover the tube with lamp-black, or some other conducting substance most convenient to be used.

The variety of forms in which this invention may be applied, for the purpose of communicating and transmitting heat, are innumerable; but the general principle of the apparatus is always the same, viz. it elevates and circulates the hot fluid from an open boiler or vessel containing the fluid, without the external application of any mechanical force or pressure whatsoever, except the common pressure of the atmosphere.

My invention also consists in employing the power of the descending fluid in the Thermo-siphon, for the purpose of causing hot fluids to flow from boiler to boiler through connecting tubes of various lengths and forms, for the purposes of heating the lower parts or ground floors of hot-houses, conservatories, green-houses, and other buildings, and also for other purposes requiring heat on the ground, or in low situations.

Having now endeavoured to point out some of the various uses to which this invention may be applied, many of which have in miniature come under my own personal observation, I can with confidence say, that in the hands of any skilful person acquainted with the principles of hydraulics and pneumatics, it may be carried to a very great extent, and the forms of its apparatus may be varied according to circumstances, almost infinitely, both for heating houses and buildings, and for all horticultural purposes requiring artificial heat; and as this heat is radiated

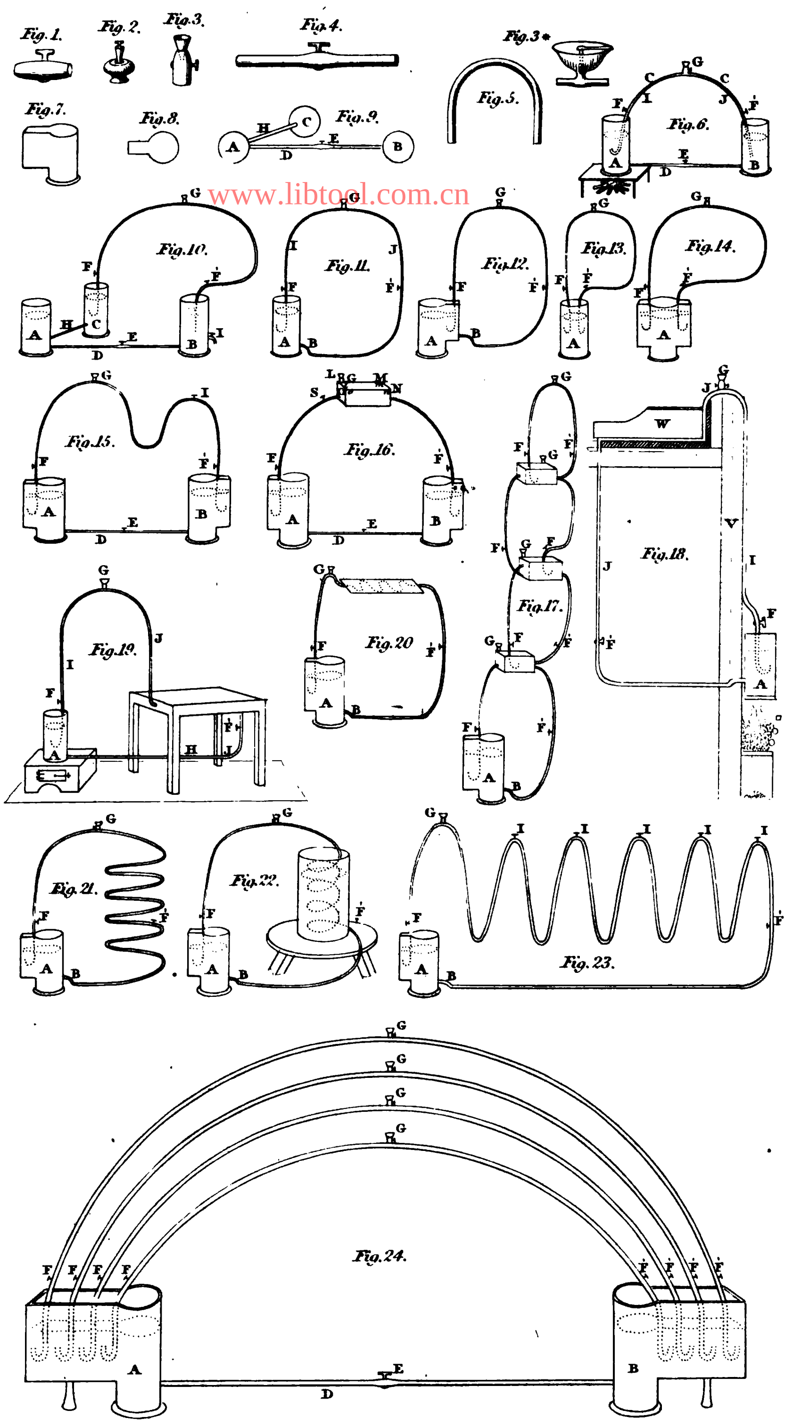


Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 3*
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.
Fig. 14.
Fig. 15.
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Fig. 18.
Fig. 19.
Fig. 20
Fig. 21.
Fig. 22.
Fig. 23.
Fig. 24.

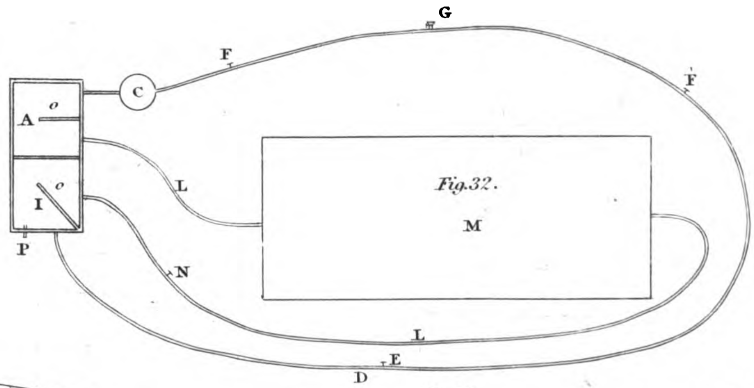


Fig.32.

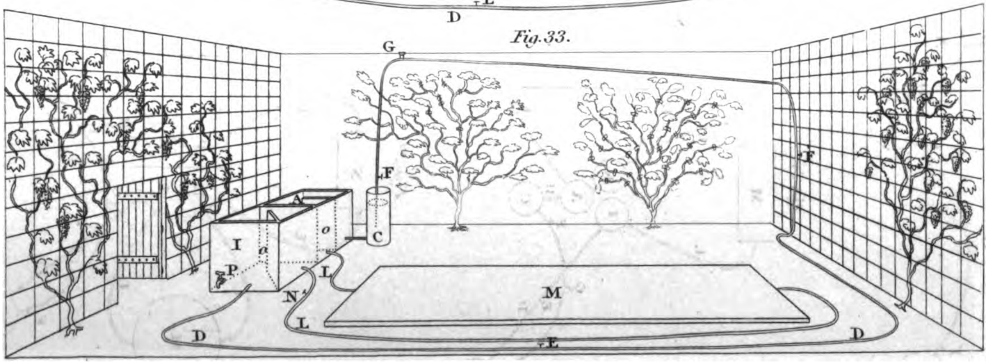


Fig.33.

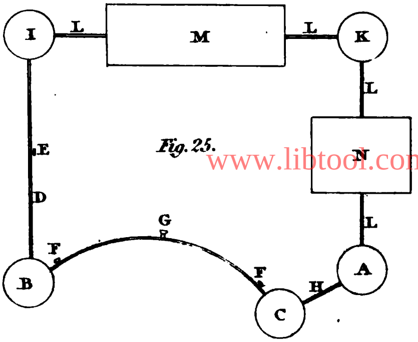


Fig. 25.

Fig. 26.

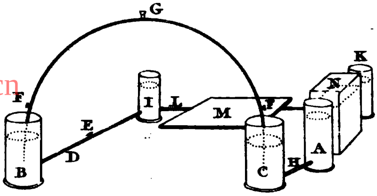


Fig. 27.

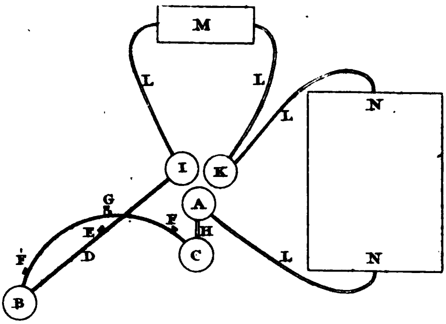


Fig. 28.

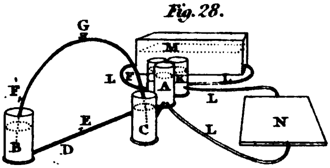


Fig. 29.

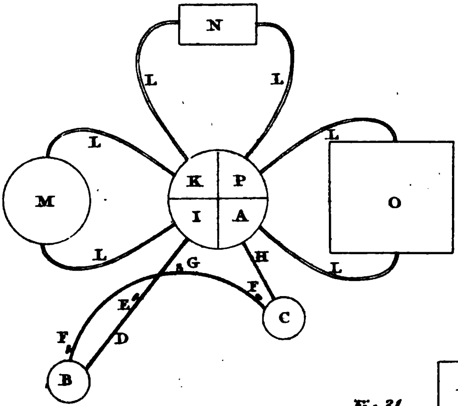


Fig. 30.

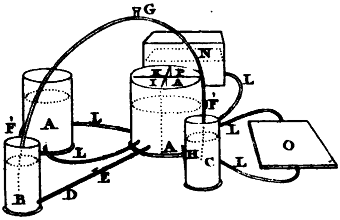
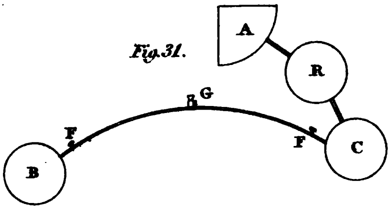


Fig. 31.



or transmitted from substances containing the hot or boiling fluid, it must be pure caloric,* not contributing in the smallest degree to the azotic or other gases, which are known to be so destructive to animal and vegetable life, if mixed in undue proportions with common or atmospheric air. This latter consideration alone speaks highly in favour of the hot water and steam systems of communicating heat, as it is almost impossible to prevent those deleterious gases escaping from horizontal flues, or from flues inclined in any great degree to the horizon, which are heated direct from the fire, should they be constructed with bricks and mortar, or, indeed, with any other substance whatever, unless it be made, and continues perfectly air-tight.

On the extraction of Citric Acid, contained in Gooseberries. By M. Tilloy, *of Dijon, Apothecary.*

The gooseberries are crushed and fermented, and when the fermentation is over, the mass is distilled over a naked fire, to obtain the spirit or alcohol which it contains. The liquor is separated from the sediment or grounds, and the latter submitted to the press. While the liquor continues hot, it is saturated with chalk. The citrate of lime (thus formed) is repeatedly washed, and then pressed. The citrate of lime obtained in this way, being still very much coloured and mixed with malate of lime, is diluted with water till of the consistency of a thin broth, and is then decomposed, with the aid of heat, by sulphuric acid, diluted with twice its weight of water. The acid liquor resulting from this treatment, and which is a mixture of

* This may be worthy the attention of consumptive patients and invalids.

citric acid with sulphuric acid, is saturated anew with carbonate of lime. The precipitate, collected on a filtre, washed with a great deal of water, then submitted to the press, is treated by sulphuric acid, and the clear liquor containing the citric acid is decolorized by animal charcoal, and, finally, evaporated. When the evaporation has been carried to a suitable degree, the residue is allowed to settle, the clear liquor is drawn off, and the operation is completed in stoves, heated to 25° or 30° (= 77° or 86° Faht.)

The crystals obtained, are coloured: they are purified by a washing, similar to the earthing (terrage) of sugars, then redissolved and crystallised.

Two thousand eight hundred kilogrammes (= 6173·6 lbs. avoirdupois) of gooseberries afforded M. Tilloy the following results.—

Expenses:

	Francs.
2800 kilogrammes of gooseberries, at five francs per 100 kilogrammes, mean price at Dijon	140
Carbonate of lime	8
Sulphuric acid	15
Fuel	24
Labour	40
	227

Produce:

182 litres (= 320·46 pints E.) of alcohol, at 20° (= 0·93 specific gravity), and at 50 centimes per litre	91
21 kilogrammes (= 46·3 lbs. avoirdupois) of citric acid, at 6·48 francs per kilogramme	136·08
	227·08

Hence it results, that the citric acid obtained by M. Tilloy, comes to only 6·48 francs (= 5s. 6d. nearly) per kilogramme (= 2·20486 lbs. avoirdupois), whilst the citric acid of commerce is still worth from 24 to 26 francs, (20·65 to 22·37 shillings), one franc = 10·325 pence, English. —*Journ. de Chim. Med.*

Analysis of the Arseniate of Iron of Loaysa, near Marmato, in the Province of Popayan. By M. BOUSSINGAULT.

THE arseniate of iron of which I here give the analysis, is found in a vein of hydrated auriferous iron (paco), which exists in the decomposed porphyritic greenstone (grünstein) of Loaysa. This mineral presents itself in porous masses of a very pale green. Its powder is white; but when triturated with a solution of caustic potash, it acquires a rusty yellow colour. With the blowpipe it exhibits all the characters peculiar to arseniate of iron: heated in a tube closed at one end, it yields water without disengaging arsenious acid.

The arseniate of iron of Loaysa, having appeared to me to approach very near to a mineral of the same nature, recently analysed by Berzelius, and which was brought from Villarica, in Brazil, I thought I should apply to it the same analytical method as that which was employed by the celebrated Swedish chemist.

One hundred gr. of the Loaysa mineral were heated in a small retort, to which a receiver was adapted: they produced 19·6 grains of water. The water began to be disengaged on the first impression of heat. When the retort had acquired a red heat, the smell of sulphurous acid was perceptible, and at the same time metallic arsenic was sublimed. I attribute the production of the acid and metal, to the reaction of some particles of pyrites, which are commonly disseminated in the mineral. After calcination, the arseniate had not, perceptibly, changed in colour.

One hundred gr. of arseniate, treated by hydrochloric (muriatic) acid, left a residue weighing 5·0 grains: it was silica, in which some grains of pyrites were distinguishable. After having ascertained that the hydrochloric solution contained no sulphuric acid, it was precipitated by hydro-sulphate of ammonia, added in excess, and the sulphuret of iron obtained, was washed with water containing a little hydro-sulphate (sic).

The sulphuret of iron was dissolved in very dilute hydrochloric (muriatic) acid; a black substance remained, which, by the blowpipe, was discovered to be sulphuret of lead, mixed with a small quantity of sulphuret of copper. The sulphuret of lead, converted into chloride, weighed 0·5, corresponding to 0·4 of oxyde.

The solution of iron in hydrochloric acid, was treated with nitric acid, in order to oxydize the metal, and then precipitated by ammonia: the oxyde of iron obtained, weighed 33·6 gr. This oxyde, suitably treated by caustic potash, 1·9 gr. of alumina; consequently the weight of oxyde of iron is reduced to 31·7 gr.

Into the liquor from which the iron had been separated by the hydro-sulphuret of ammonia, and which contained sulphuret of arsenic, hydrochloric acid was poured: a sulphuret of arsenic was deposited, which, washed and well dried, weighed 59 gr.

Fifty-eight gr. of this sulphuret of arsenic were dissolved in aqua-regia, 1·7 gr. of sulphur remained, and the solution yielded, on the addition of chloride of barium, 195 gr. of sulphate of barytes, equivalent to 26·9 gr. of sulphur. Hence the 58 gr. of orpiment contained 29·4 of arsenic, answering to 45 gr. of arsenic acid: proportionally, the 59 gr. of sulphuret, represent 45·8 gr. of acid.

After having boiled the liquor from which the sulphuret of arsenic had been extracted, ammonia was introduced into it, so as to render it alkaline; a precipitate was then thrown down of alumina, which, dried, weighed 0·7 gr.

Into the ammoniacal liquor, chloride of calcium was poured, and the mixture was put into a stopped bottle. Nothing precipitated, even after several days; there is not, therefore, any phosphoric acid in the arseniate of Loaysa. The products obtained are—

Arsenic acid	45·8
Red oxyde of iron	31·7
Oxyde of lead	00·4
Water	15·6
Alumina	2·6
Silica	5·0
Oxyde of copper	(traces)
	101·1

Or leaving out the matrix (gangue)

Arsenic acid	49·6
Oxyde of iron	34·3
Oxyde of lead	0·4
Water	16·9
	101·2

The increase of weight observed, proceeds, doubtless, from the super-oxydizement of part of the oxyde of iron, which in the mineral is found in the state of an oxydule.—*Annales de Chimie.*

On the spontaneous Purification of Thames Water. By John Bostock, *M. D. F. R. S.* &c.

From the Philosophical Transactions.

In the report, respecting the analysis of the water of the Thames, which I presented in April, 1828, to the Commissioners appointed by His Majesty to inquire into the supply of water in the metropolis, I have stated, that when the experiments were nearly brought to a close, a quantity of water was sent to me, purporting to have been "taken in the river, in the current of, and immediately at the mouth of the King's Scholars' Pond Sewer." I described it as "in a state of extreme impurity, opaque with filth, and exhaling a highly fœtid odour." When it had been about a week in my possession, a considerable quantity of black water subsided from it, but the fluid was still dark-coloured and opaque, and nearly as offensive as at first, while the odour and colour were only in part removed by being passed through a layer of sand and charcoal six inches in thickness.

The water remained for some time in my laboratory without being attended to, when, after an interval of some weeks, I observed that a great change had taken place in its appearance. It was become much clearer, whilst nearly the whole of the sediment had risen to the surface, where it formed a pretty regular stratum of about half an inch in thickness; the odour, however, still continued extremely offensive, perhaps even more so than at first. From this time the process of depuration, which had thus spontaneously commenced, was continued for about eight weeks, when the water became perfectly transparent, without any unpleasant odour, although still retaining somewhat of its original dingy colour.

After the formation of the scum mentioned above, the next change that I observed was its separation into large masses or flakes; to these, as well as to the scum itself, a number of minute air bubbles were attached, to which, no doubt, they owed their buoyancy: after some time, the masses again subsided, leaving the fluid almost totally free from any visible extraneous matter. The quantity of gas discharged, was inconsiderable, so that it was difficult to obtain any of it for examination. It seemed to be principally composed of carbonic acid, containing a little sulphuretted, and perhaps carburetted, hydrogen gas.

When the process of depuration appeared to be complete, the water was filtered through paper, and was then subjected to the same mode of analysis which was employed on the former occasion. It was now perfectly transparent, and without taste or odour, but still retaining a slight brown tinge. It sparkled, when agitated, or poured from one vessel to another, and by boiling, a quantity of gas was disengaged from it: at the same time a thin film of carbonate of lime formed on the surface, which gradually subsided: 10,000 grains left, by evaporation, a saline crust of a light brown colour, which, after being thoroughly dried, weighed 7·6 grains. By the appropiate tests, the water was found to contain lime, sulphuric acid, muriatic acid, and magnesia. There was a trace of alumine, and an indication of potash; but no ammonia, sulphur, or iron could be detected. The lime, the magnesia, and the sulphuric and muriatic acids, were all of them, obviously, in much greater quantity than in the specimens of the Thames water previously examined. If we suppose the sulphuric acid to be combined with a part of the lime, and the remainder of the lime to be in a state of carbonate, and that a part of the muriatic acid is combined with the magnesia, and the remainder with soda, as was conceived to be the case in the Thames water generally, the respective quantities of these salts in 10,000 grains will be as follows:—

Carbonate of lime	4.20	1.55	Salts contained in the Lambeth water, which was considered as the most impure of the specimens formerly examined.
Sulphate of ditto	.66	.12	
Muriate of soda ... / Muriate of magnesia	2.74	.23	
	7.60	1.90	

The result of this analysis shows, that although the water has, by this depurating process, freed itself from the great quantity of organic matter which it contained, and acquired a state of apparent purity, which might render it sufficiently proper for many purposes, yet that the quantity of saline matter is increased as much as fourfold. The greatest proportionate increase is in the muriates, which are very nearly twelve times more in the purified water than in the Thames water in its ordinary state. The carbonate of lime is between two and three times as abundant as before, and the sulphate of lime between five and six times. I may remark, that this water, when examined in its foul state, gave very obvious indications of both sulphur and ammonia, neither of which could be detected after depuration.

This depurating process may be denominated a species of fermentation; *i. e.* an operation, where a substance, without any addition, undergoes a change in the arrangement of its component parts, and a new compound or compounds are produced. The newly formed compounds were, in this case, entirely gaseous, and, except a part of the carbonic acid, were discharged. The saline bodies, being not affected by this process, remained in solution, leaving the fluid free indeed from what are considered as impurities, yet so much loaded with earthy and neutral salts, as to be converted from a soft into a hard water.* The source of the saline bodies may be supposed to be the organic substances, principally of an animal origin, which are so copiously deposited in the Thames; of these the most abundant are the excrementitious matters, as well as the parts of various undecomposed animal bodies. The different species of the softer and more soluble animal compounds act as the ferment, and are themselves destroyed, while the salts which were attached to them are left behind. It may be conceived therefore, that the more foul the water, the more complete will be the subsequent process of depuration; and we have hence an explanation of the popular opinion, that the Thames water is peculiarly valuable for sea stores, its extreme impurity inducing the fermentative process, and thus removing from it all those substances which can cause it to undergo any further alteration.

The brown colour which the water exhibited after its depuration, appeared to depend on the solution of a minute quantity of what is generally termed extractive matter, and which is observed in water that contains decayed vegetable substances; it is almost always present in the beginning of winter in the water of ponds, or of slow streams that have received the falling leaves. After the heavy rains that occurred in December, 1827, the New River water, with which my cistern is supplied, was observed to be very turbid and dark-coloured. By remaining some hours at rest, a quantity of earthy matter subsided, and left the water nearly transparent, but the dark colour still continued.†

* The terms hard and soft, as applied to water, are obviously relative; but water which contains as much as five grains in the pint of saline matter, is generally regarded as too hard for many economical and manufacturing processes. The water in question contained 4.36 grs. per pint.

† It is not easy to institute any exact comparative scale of the shades of brown. An infusion formed by digesting, for ten days, powdered galls in twenty times their weight of water, and afterwards diluting the infusion with an equal bulk of water, will exhibit a colour nearly similar to that of the New River water in the state in which I examined it.

I found that this colouring matter was not removed by boiling, nor by filtration through sand and charcoal, but that alum and certain metallic salts, especially when heated with it, threw down a precipitate, and left the water without colour. Of the metallic salts, the most effectual appeared to be the sulphate of iron; a drop of the solution of this salt, boiled with 500 times its bulk of the water, threw down a flocculent orange-coloured precipitate, and left the water perfectly colourless. I obtained the same results, only much less in degree, when these re-agents were added to the Thames water after its depuration.

The sediment which was removed from the water by filtration, as mentioned above, appeared to be a heterogeneous mass of various substances, about 9-10ths of which was siliceous sand; it also contained a black matter, which gave the whole a dark gray colour, and which was removed by a red heat; a number of fine fibres that looked like animal down; and some large fibres, probably of vegetable origin: there were also bits of wood, fragments of coal, and small shining particles of a metallic nature, which seemed to be sulphuret of iron. The mass, indeed, consisted of all those substances which were casually introduced into the Thames, and which had not been decomposed by the fermentative process. They must, of course, differ, both in quantity and in quality, in every different portion of the water, so as to render it unnecessary to attempt a more minute examination of them: in the present instance, the sediment, when completely dried at a temperature of 200°, was in the proportion of about nine grains in 10,000 grains of the water.

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ERRATA.

Page 181, line 29, *for* 11lbs. avoid., *read* 110lbs.
— 184, line 17, *for* but exists, *read* but it exists.
— 185, line 3, *for* than, *read* then, or afterward.
— Do. in the foot note, *for* Jory, *read* Ivry.
— 186, 2nd line of the foot note, *for* fore arm *read* fire arm