THE

LONDON JOURNAL

OF

Arts and Sciences;

CONTAINING

FULL DESCRIPTIONS OF THE PRINCIPLES AND DETAILS OF

EVERY NEW PATENT,

ALSO

Original Communications

ON OBJECTS CONNECTED WITH

SCIENCE AND PHILOSOPHY,

PARTICULARLY SUCH AS EMBRACE THE MOST RECENT

INVENTIONS AND DISCOVERIES

IN

Practical Mechanics.

BY W. NEWTON,

CIVIL ENGINEER AND MECHANICAL DRAFTSMAN.

VOL. IX.

[SECOND SERIES.]

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PREFACE.

In closing the Ninth Volume of the London Journal of Arts and Sciences, the Proprietors beg respectfully to express their thanks for the steady support which this Work has received from its commencement, in the beginning of the year 1820; and for the permanent foundation upon which it is now established by a numerous and extended circle of scientific readers, as a standard work of reference for all improvements in the various branches of the Manufacturing Arts.

Before the commencement of this Journal, the details of recently patented inventions were almost exclusively confined to the pages of one respectable periodical publication, The Repertory of Arts, Manufactures, and Agriculture; a work comprehending a considerable range of valuable information connected with those branches of science, but defective in one point, namely, that it embraced only a few, not the whole of the subjects for which Patents had been taken; and consequently, failed in the very important feature of representing the actual state of improvement in the Mechanical Arts.

It is known that the "London Journal of Arts and Sciences," commenced with the professed object of giving to its readers full descriptions of the principles and details of every invention, for which

the Royal Grant of Letters Patent, in England, under the Great Seal, should be obtained. Arduous as the accomplishment of this task has been, and attended with difficulties not anticipated, the Editor has the pleasure of saying, that in the preceding volumes of the "London Journal of Arts and Sciences" (consisting of fourteen, forming the first series, and nine the second series), will be found accurate descriptions of the principles and details of EVERY INVENTION, the specification of which has been inrolled in Chancery, for which a patent has been granted in this kingdom from the beginning of the year 1820 to 1830,—in the whole, one thousand three hundred and seventy patented inventions.

The circumstance of associating the REPERTORY OF ARTS with the LONDON JOURNAL OF ARTS, in consequence of purchasing the copyright of the former work in 1832,* induced the Editor to commence the new *Conjoined Series*, now in course of publication, in which the same prominent and important feature, that of reporting the specification of *every*

* A periodical, under the title of "Repertory of Patent Inventions," has been subsequently foisted upon the public by some anonymous *Editor*, as a continuation of the original work, but with which it has no connexion whatever; the entire copyright of the REPERTORY, *First, Second, and Third Series*, having been sold by Mr. W. H. Wyatt to the proprietors of the "London Journal of Arts."

new patent invention, will be faithfully adhered to, in order to render the work a complete Journal and Repertory of all the improvements introduced into the various branches of the Manufacturing Arts.

For the purpose of making this Work more extensively useful as a magazine of reference, it is intended to publish, in an appendage to the current numbers, portions monthly, until complete, of an ANALOGICAL INDEX, arranging the subjects treated of throughout the twenty-three volumes of the "London Journal of Arts and Sciences," according to their respective classifications, denominations, and objects; so that, in each of the various branches of the Arts and Manufactures, every invention which has been made the subject of patent right, during the preceding ten years, may be immediately referred to.

As a further source of reference, after the completion of the above-mentioned Index, it is intended to revise the early volumes of the *Repertory of Arts,* and to give, as a RETROSPECT OF THE ARTS, an epitomised report of all the specifications contained therein, with their original plates, and also such specifications as have been omitted in that work, in order to form a complete catalogue of all the patent inventions, with their principles and objects, which have been granted in England from the commencement of the present century.

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THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XLIX.

[SECOND SERIES.]

Original Communications.

On the Employment of Machinery.

To the Editor of the London Journal of Arts, &c.

Sir,—It is to be regretted that the question of advantage or injury resulting from the use of machinery, still continues to divide the opinion of may classes of persons employed in manufacture. Being anxious to remove any unfavourable impressions, which, in some unthinking minds, may have arisen from the partial discussion of this subject, I venture to take an opportunity of offering you a few simple and obvious thoughts on a question of such vital importance to the interests of the whole community.

Impelled by the natural love of association, men in the early ages of the world, congregated together, and thus laid the foundation of that social edifice, which time, labour, and art, has subsequently erected, improved, and ornamented.

In the first formation of society, we must suppose men's wants were few; and from the difficulty of satisfying even the demands of necessity, they were induced to make common cause; each bringing together such subsistence as he could collect, and exchanging his little surplus with his companions, for any part of their stores, which he might desire to share, and of which they have more than they can immediately consume. Thus commences that system of barter, or exchange, which, carried on in a more extended scale, acquires the name of commerce.

The bare and actual necessaries of savage life we have supposed to be but few; and in general they are such as the bountiful hand of nature gratuitously supplies, viz. fruits, roots, herbs, and water. But for desiring man these are not long sufficient. He sees the beasts of prey feeding upon the small and timid animals around him, and naturally concludes that had he skill to catch them, they would likewise furnish him wholesome and agreeable food. To acquire such means first awakens his ingenuity; and the rude pleasures of the chace soon engage his arrested attention. Success crowns his endeavours; and he not only thus obtains food, but warm and substantial clothing. In a gradual progression towards a state of civilization, man's cunning or ingenuity furnishes him with various means to increase the productive power of his labour, and every little aid thus derived, awakens in him new desires, and suggests further improvements to his active mind.

Every accession of power, beyond that bodily strength with which nature has blessed us, is obtained alone by combinations of mechanical powers, and every means by which such accession of power is converted to useful purposes, is a machine.

We will now suppose man to be in possession, not only

of the bare necessaries of life, such as food and covering, but of even some of the ruder luxuries, which he obtains only by hard and incessant labour for six hours per day. To be more easy and explicit, we will limit the number of individuals, who have agreed to make common cause or have entered into a state of society, to one hundred: fifty males and fifty females; all which number of males are to be actively employed in providing for their own wants, and in contributing their respective shares to satisfy the wants of their companions. After the six hours labour has been performed by each, their remaining eighteen hours may be passed in rest, in idleness, or sport. One of the fifty, naturally more ingenious than the others, contrives, by the assistance of such uncouth implements as he can frame, to render his labour more productive, or to obtain the same result from his five hours labour per day, that the others obtain from their six. All eagerly copy his invention, and possess themselves of similar means; so that shortly the whole fifty are required to labour but five hours per day, to provide the same quantity of subsistence that previously occupied them six hours in procuring. One little improvement suggests another, one rude invention calls forth further ingenuity, so that in a short time the whole fifty individuals can be more plentifully and variously supplied with the necessaries of life by one hour's daily labour, than they could at first by six hours severe toil.

Here it may be objected, machinery does not secure similar advantages to us; for universal practice is opposed to such simple theory. I answer, that its operation as here shown is purposely divested of all the accumulated encumbrances which burden a progressive state of society, and which obscure the effects of machinery upon industry through the long labrynth of the divisions and

subdivisions of labour; and contend, that the advantages which we derive from machinery, are equally great, and far greater in amount, than those above shown; but admit, that they are not so palpably obvious to every mind, owing to the increased complexity of the social state.

We resume our subject, supposing that the fifty male individuals, by aid of the invention of their ingenuity, are obliged to labour but one hour per day to provide themselves, and their companions, with all the necessaries of life: a reduction of five hours from the original amount of their time of labour. But this reduction will not long continue; their numbers increase; each female becomes the mother of a child; and shortly, still further additions are made to the rising community During the early and tender years of childhood, the fathers must provide their offspring with subsistence, and until the children are able to labour for themselves, their parent's toil will be thus increased (we will say) from one hour, to two hours per day. The assistance and improvements of art may have again reduced their time of labour to the fifty men, from two hours to one hour and a half per day; when one of their numbers becomes studious and wishes to devote himself to the service of religion. To assist him in his priestly duties, we will suppose that four others, who have also become drones under the effect of his example, join him in this new and sacred calling. Here is the productive power of five individuals to be swept from the account, who with their wives and children, are now to be supported, in a state of unproductive inaction, by the additional labour of the remaining forty-five. This, under the slow and gradual improvements of the ingenuity of uncultivated minds, will again increase to the forty-five, their time of labour, from one hour and a half, to three hours per day.

Whilst enjoying the pleasures of the chace, another of the remaining forty-five discovers, that in some distant part of their country, there are numbers of other individuals who have likewise formed themselves into a rival society, which may be likely to affect their interest. These must be immediately conquered, and dispersed. Fifteen of their ablest men are quickly chosen to set out on a murderous expedition of war, leaving their wives and children to the care of the remaining thirty. Of the chosen fifteen, five perhaps, never return, and of the ten, who survive, one half have acquired a distaste to revert to the former drudgery of labour, and employ themselves for the future, in making weapons of defence, and in preserving order and discipline throughout their little domains. So that thirty-five are now compelled to perform the labour of the fifty, in providing subsistence and clothing for themselves, their companions, their wives, their widows, and their gradually increasing community. Notwithstanding their ingenuity, their inventions, and the improvements of art, this diminution in the number of productive labourers, will increase the total amount of their time of labour to the industrious thirty-five, from three hours, to five hours per day.

We will now suppose, as a very natural consequence, that five of the individuals, who had returned from their hostile expedition, and had resumed their former occupation as labourers, being desirous of novelty, and dissipated by a love of roving, are induced to attempt the construction of a vessel, in which they may explore the banks of the rivers, and extend their incursions along the coasts of the sea. Here are five more to be taken from the number of productive labourers, as some time must necessarily elapse before their vessel can be serviceably employed; for at first, it can only serve to gratify a restless curiosity. So that only thirty are now left to pro-

duce subsistence for themselves, the remaining fifteen males, fifty females, and the whole of their families.

To perform this without the aid of their simple machinery would be impossible. Even with the assistance of such implements as their ingenuity may have furnished them, with the gradual improvement of those implements, and with the invention of new ones, the thirty industrious, and productive labourers, would be worse off than ever, being now obliged to work not only five hours, but seven hours per day, for the maintenance of their fifteen surviving companions, who are less productively, or quite unproductively employed, and for the maintenance of their wives, widows, and children.

During this period, some of the younger members of the community would have arrived at years of sufficient maturity to render them also serviceable, by adding their little stock of labour to the general amount. This would in time lessen the burden of the industrious thirty, provided their families suffered no farther increase; but otherwise, the accession of the labour of the elder children would no more than counterbalance the increased demands occasioned by their still more rapidly increasing numbers. As they continued to increase in numbers, and as those numbers grew up into manhood, it would be necessary for the preservation of peace, good order, and proper subordination, to select some head or chief to be invested with suitable authority. Then first commences the unavoidable burdens of government. All such additions to the unproductive classes will naturally take place in every advancing society, each of which, proportionately reduces the amount and the reward of productive labour. To render this diminution less apparent and oppressive, further inventions, more efficient machinery, must be brought into action.

Contributions must now be made from the common stock to support their government in becoming honour and dignity, however simple it may be in form, and inexpensive in operation. To produce a sufficient surplus to defray the expenses of their government, would oblige the industrious individuals in the community to labour nine hours, instead of seven hours per day.

They will now no longer continue satisfied to make common cause without apportioning out the already cultivated lands, and each taking his share under his own immediate protection, by increased industry creates a surplus stock, which in time, renders him wealthy and independent of further labour. Next, laws must be framed for the preservation and security of their respective properties; and some individuals, more subtle than the rest, after framing such laws, will pretend to devote their time to maintain, defend, and explain them. Here again another unproductive class of persons spring up, and throw themselves a burden on the industry of the remainder. These will shortly render it necessary for the hard-working labourers to toil ten hours per day. As society proceeds in its more complicated form, various other classes of indolent consumers swell the numbers of the community; such as those which prepare ornaments to please the eye, provide amusements to gratify the ear, and delicacies to pamper the taste; but these individuals are more immediately lost sight of in the throng and bustle of the busy crowd; though like noxious vermin, they still continue to sap the roots of industry, and undermine every foundation of wealth, for they must all be supported out of the produce of the labour of industry.

These constant drawbacks upon the improvement of our condition, these incessant reductions of the reward of industry, shortly compel the hard working, industrious la-

bourers of the country, to toil, not only ten, but twelve and thirteen hours per day, notwithstanding the introduction, and continued improvement of machinery, and the consequent increase of the productive power of labour.

To trace out all the advantageous effects of machinery through the different ramifications and complexities of a risen society,—to ascertain the extent of assistance afforded by machinery to the productive labour of man,—to enumerate the amount of blessing which it confers upon an increased manufacturing population, would be utterly impossible; but from the brief and hasty sketch here given, which endeavours to show the operation of machinery upon a rising society, I hope it will be seen that machinery, instead of being injurious, alone enables us to bear all the long accumulated burdens of our community, by the facilities it affords to our labour and industry in carrying on the great and indispensable work of production.

Here then we see an infant society, whose numbers, limited to few, for the sake of perspicuity, are enabled, by their rude efforts of natural ingenuity, to obtain all the necessaries of life, and that, by the trifling exertion of one hour's daily labour; yet, as this society farther advances to a state of maturity, increasing in ingenuity and skill, and assisted more and more by machinery and art, its members are gradually reduced to a state of greater hardship and severer toil. How much more heavily does this toil and hardship fall on the labour of a matured society, where not only the necessaries of life, but innumerable comforts and luxuries are demanded; where competition has forced itself into every branch of production; and where the endless burdens of increased taxes are to be levied from the produce of the industrious, for the maintenance of the likewise increasing numbers of the idle and unproductive. Ought we to blame machinery as

a source of unparalleled injury, when by the increase which it effects in the productive power of labour, it alone enables us to bear so many burdens, and to maintain so many indolent classes of consumers. If any odium can be cast upon machinery, it must arise from its having furnished us with the means of supporting the numerous burdens imposed upon the labour and industry of the nation by these unprofitable idlers. To rid our country and community of the many classes which belong to the drones of our hive of industry, is impossible, many of whom furnish those luxuries which we, by habit, have now been used to call the indispensible necessaries of life; and however much the introduction and employment of machinery may have given life, and added numbers, to these unwelcome inmates, we ought, knowing our inability to eject them, to feel thankful and grateful to the system which enables us to support them without total immediate ruin to all.

Besides the impossibility of providing even the bare bare necessaries of life for a pressing population, without the aid of machinery, how let me ask is any improvement to be ever effected in our social condition, by the addition of conveniences, comforts, and luxuries, unless facilities be afforded by ingenuity and skill, to render labour more productive, and to increase the amount of consumable articles beyond what unassisted nature could effect. Little do they "who clamour against machinery" consider that every comfort and luxury they enjoy, is secured to them (only) by the gratuitous assistance of what they deprecate as ruinous to the best interests of the community. In short were we blind enough to allow their views of the abolition of machinery to be carried into effect, from being wealthy, powerful, and civilized as a nation, we should irremediably fall at once into a state

of the most abject poverty, and weakness, and soon relapse into barbarism. As well might the bees of a well stored hive tear off the wings which had borne them from flower to flower, collecting honey, merely because some worthless drones idly and unprofitably consumed the produce of their toil, and thus increased their total amount of labour necessary to replenish the empty cells.

Trobridge, Wilts, Feb. 1832.

Yours, I. A.

Recent Patents.

To MILES BERRY, *of the Office for Patents, Chancery Lane, in the parish of St. Andrew Holborn, in the county of Middlesex, engineer and mechanical draftsman, in consequence of a communication made to him by Monsieur Jean Nicholas Senechal, ingenieur, des ponts et chausses, residing at Versailles, in the kingdom of France, for an invention or discovery of certain improvements in the boilers or generators of steam and other vapour; and in engines to be worked by steam or vapour, for propelling or actuating machinery on land, and boats, vessels or other floating bodies on water; and also in the mode of condensing such steam or vapour.*—[Sealed 28th September, 1831.]

THE subjects of this Patent, among other ingenious suggestions, present two striking novelties viz. a self regulating mode of abstracting heat from a boiler, in the event of the steam rising in temperature or pressure beyond that at which it is intended to be worked; and also a mode of effecting the condensation of the eduction steam, without employing an air pump; by leading

it through tubes into boxes connected with the paddle wheels of a boat, or the fly wheel of a land engine, which in revolving through water and air, sufficiently refrigerates the vapour to produce a vacuum in the working cylinder. The inventor of these improvements is Monsieur Galy Cazalat, formerly of the School of Arts, now Professor of Mathematical and Physical Science, at the Royal College of Versailles in France. The following is the substance of the specification:—

These improvements in the boilers or generators of steam and other vapours, and in the engines to be worked by steam or vapour, consist in the following general features:—First, in connecting certain parts of a boiler to a bath containing a dense fluid, by which a portion of heat may he absorbed, from the steam if accidentally raised above a given pressure, and thereby the possibility of explosion prevented, without the necessity of a single valve in connection with the boiler; and which absorption expands the dense fluid, and by that means causes a mechanical action to take place, which removes the fire-grate or furnace, and hence suppresses the quantity of heat applied to the boiler. Secondly, in the peculiar arrangement and construction of certain parts of the engine, viz. the crank shafts which are made hollow, for the purpose of carrying away the eduction vapour to the condensers: by which the air pumps may be partially if not entirely dispensed with; and the adaptation of tubes which convey the condensed vapour away from the axle into the receiver below. Thirdly, in the construction of a moveable condenser, in connection with, or forming part of the paddle wheel of a marine—or fly wheel of a land engine: by the rapid motion of which through the water and air, the cooling and condensation of the vapour is effected.

In plate I. fig. 1, is a longitudinal section of the tubes and chambers constituting the boiler or generator, and its flues; fig. 2, is a transverse section of the same; A, B, C, are cylindrical tubes placed longitudinally, and intended to contain water, or other liquid from which steam or elastic vapour is to be generated. These longitudinal tubes are connected together by vertical tubes, in any convenient way, and communicate through the necks, *a* and *b*, with a larger cylindrical tube D, placed longitudinally above. The system of tubes A, B, C, which may be otherwise arranged and connected, is enclosed within a tight casing of iron, or other fit material, formed as a box E, E, E. This box is divided into passages for flues by flanges or partitions extending from the sides of the tubes, and attached to the case; and through these flues the flames, vapour, and smoke from the furnace F, passes in the directions shewn by the arrows; and, after heating the tubes, the smoke or vapour ultimately escapes at the chimney G. The whole of these tubes, with their furnace and flues, are encompassed by an outer vessel of iron, or other suitable material, H, H, H, H, open at top, which forms another boiler, intended to be filled with water, containing the dense fluid, a solution of potash in water. The top of this liquor is to be covered with a layer of tallow or oil, in order to prevent the liquor evaporating before it becomes heated to the boiling point, which would not take place until its temperature is raised to 284 of Fahrenheit's thermometer. On the top of this liquor a flat board or cover I, I, floats, and ascends or descends as the fluid becomes expanded or contracted by variations in its temperature. The tubes A, B, C, are to be filled with pure water, which has been exhausted of its air; and this water must also rise or flow through the necks *a*, and *b*, into the upper tube D, until it has occu-

pied about one-sixth of that tube's capacity. A force or injecting pump may be employed to effect this object.

The atmospheric air, to support combustion in the furnace F, is admitted through a door K, by means of which the flames and heated vapours are made to pass through the flues, and round the water tubes as before described. The steam generated by these means rises from the several tubes into the upper one D, and proceeds from thence through the small tube L, to the working cylinder of an engine placed near it. If it should happen that the temperature of the steam in the generator at any time rises too high, the solution of potash in the outer vessel which surrounds the tube D, will absorb a portion of the heat, and it will continue so to do until the solution begins to boil, which will take place at a temperature of 284° Fahrenheit. The water in the outer vessel will then, by evaporating, carry off the surplus heat, and leave the solution still at a temperature of 284° Fah.; the consequence of which is, that if the boiler D, be made capable of resisting the force of the working steam (say 320° of Fahrenheit), the bursting of the boiler will be physically impossible.

It is, nevertheless, advisable at all times to prevent the saturated water (which is termed preservative liquor) from boiling. To this intent the fire grate F, is mounted upon small wheels or pulleys, which roll upon a rail way frame, formed by two parallel rods M, bearing as levers upon a knife-edged fulcrum N, behind the furnace; and at the front supported by a perpendicular chain O, attached to the end of a long lever P, placed above the boiler. The fire grate, by these means, stands upon an inclined plane, the lowest part of which is in front, as shewn at fig. 1. But in the event of the saturated fluid becoming heated beyond the temperature of 266° Fah. (at which point it begins to dilate considerably) it will,

by its expansive force, raise the floating board or cover I, I. This board is connected by a rod or arm Q, to the lever, P; and, consequently, in rising moves the lever P, upon its fulcrum joint in the standard R; this movement of the lever lifts the chain O, and raises the front part of the inclined plane M, so as to cause the fire grate to run back by its own gravity into the closed space under the boiler as far as the stop S. The flame of the furnace will, in this situation, quickly die away, and the combustion consequently decrease. As the working steam becomes consumed, the temperature which had been raised will now diminish, the preservative liquor will contract again, and the float I, and lever P, will descend, and lower the rods, so as to bring the fire grate back to its former position.

The boiler for a large engine is composed of several sets of tubes, arranged as above, and placed one by side the other; and the small chimneys all lead into one large chimney. The several sets of boiler tubes cummunicate with each other by a lateral tube, at T, or in any other convenient situation; and into this lateral tube the pump forces the water or liquid from which the steam or vapour is to be generated. The several steam tubes D, are likewise connected together, and lead to one common steam chamber; and lastly, a similar pipe is intended to form a communication between the several vessels or troughs of preventive liquor, which are at first filled by a pump adapted in any convenient way; and by the same means they may be replenished, occasionally, with water, when it is found to have diminished its volume by evaporation through the superincumbent layer of tallow or oil.

By the above described arrangement of apparatus, it has been found perfectly practicable and safe to employ spirits of different kinds, either alone or mixed with water,

for the purpose of generating an elastic vapour, capable of working an engine in the same way that steam would be employed. Either, for instance, may be used in lieu of water; by lowering the level of the water in the tube D, to about one tenth of its capacity, and then injecting, by means of the pump, about another tenth of either. The preservative liquor, in this case, may be pure water, or water saturated with any kind of salt, will do equally as well as potash; but a superincumbent surface of oil or tallow must, in all cases, cover the preservative liquor, to prevent evaporation.

The novel arrangement of the engine is represented, with all its parts at fig. 3, one of the working cylinders, with its appendages, being shewn in section, and the other in its external appearance. These working cylinders A, A, are both fixed upon a strong metallic chest B, B, which is designed to be a reservoir, from which the pumps feed. A double beam *c*, *c*, mounted upon an axle at D, vibrates, one on each side, the engines being between, as shewn in the plan view, fig. 4. The two piston rods are connected to the beams, near the ends, by lateral rods E, E, and, of consequence, the piston in one cylinder ascends, while that in the other cylinder descends. At the extremities of the beams, the crank rods G, G, are attached by swivel joints, and the crank shafts are made hollow, for the purpose of effecting a condensation of the eduction steam, in a way that will be hereafter explained.

The crank shafts turn in bearings at H, H, H, or in any other convenient situations, and their extremities are connected to the stationary sockets I, I, by union joints at K, K; the piston rods are guided by pulleys L, L, running up and down between the standards M, M, fixed on the tops of the working cylinders, and to the frames or carriages of these pulleys, the upper ends of the lateral rods E, E, are attached. The feeding pumps N, N, are worked by

rods connected to the beams at *x*, *x*, and the slide valves are worked by excentrics O, O, upon the crank shaft.

The steam or vapour generated in the boiler, either in the way above described or by ordinary means, being conveyed by a pipe, enters the steam box at P, and being inducted through the aperture *a*, into the working cylinder, depresses the piston; at the same time the eduction steam from the opposite side of the piston passes from the aperture *b*, into the recess of the slide valve Q, and from thence through a passage *c*, on the side of the cylinder, by a pipe to the stationary sockets of the hollow crank axle I, I, before described, through which the condensation is affected.

As it may be advantageous to allow the steam or vapour to work by expansion, the sliding valve in that case must be constructed accordingly, and may be made upon any of the plans in common use.

To prevent, as much as possible, the eduction steam or vapour from becoming chilled while working, the cylinder is enclosed within a jacket or case R, R, filled with a dense fluid, consisting of a solution of potash or other salt. This fluid may be heated by means of a connection with the boiler;—supposing a part of one of the sets of tubes described above (of which several sets constitute the complete boiler) to be disconnected from the other sets of tubes, for the purpose of supplying this dense fluid in a heated state to the jacket or the engine.

In this individual boiler, or rather portion of the general boiler, the communication of the upper tube D, and the middle tube B, with the other tubes A, and C, is cut off; these last mentioned tubes are then filled with the dense fluid which flows from thence into the jacket, filling it also nearly to the top, and surrounding the working cylinder, on the surface of which there must be a coating or layer of oil or tallow, to prevent the evaporation of the water, before the temperature of the dense fluid is raised

to the boiling point. This oil or tallow floating at the top, will at the same time grease the rods of the piston and of the sliding valve.

The rubbing surface of the piston is formed of tempered steel, bent into the form of hoops, the ends of which are united by a piece of leather, which completes or closes the circles, thus allowing them to expand or contract. These metallic hoops or circles are attached at the upper and lower edges, to the circumferences of two leather disks, nailed upon a wooden disk of convenient thickness, which occupies the solid central part of the piston; and these are pressed together by two outer plates or discs of iron. The piston, thus surrounded by the metallic hoops, must fill the interior of the cylinder as tightly as possible, without producing too great friction.

The piston is formed with a hollow rod, into which melted tallow is poured; this tallow is intended to pass by a small internal channel, and to ooze through between the wooden disk and the circle surrounding it, for the purpose of greasing the piston in the working cylinder; and in order to give sufficient force to expand the metallic ring, the tallow is pressed by a small plug or piston inserted in the top of the hollow piston rod at *e*, and adjustable by a screw which forces it down; and the tallow being thus pressed, expands the metallic hoop tightly against the interior surfaces of the cylinder.

The moving condenser is formed in connexion with the paddle-wheel of a marine engine, or the fly wheel of a land engine. The steam, after escaping from the eduction, passes as before said, into the hollow crank shaft of the engine, and from thence through hollow rods, or arms, extending from the said hollow shaft to boxes at the back of the several paddles of the propelling wheel, or into chambers in the circumference of the fly wheel, which,

by passing round, become cooled by successively dipping intu the the water, in which the vessel floats, or intc a pool or reservoir, placed conveniently for the purpose.

One paddle is shewn at fig. 3, in the situation in which it would stand when immersed in the water. The parts of the wheel, and the arms by which the paddles may be fixed, are here omitted, as not necessary to the illustration. Fig. 5, is a section, or edge view, of the paddles, the face of which, or surface that strikes the water, is flat, as usual; but behind there is a box, or hollow space w, formed by the back of the paddle, and a corrugated, or fluted, sheet of metal attached thereto. This corrugated sheet of metal is designed to expose an extended surface to the refrigerating medium, both of cold water and air. The pipe from the hollow crank shaft leads down into this box or chamber, and conveys the eduction steam into the chamber, to be condensed. Every one of the paddles is intended to be so furnished with a condensing box, and, in the fly wheel of a land engine, similar chambers may be made in or near its periphery, to which the eduction steam is to lead through the arms.

The liquor produced by this mode of condensing the eduction vapour, will, when the arm of the wheel rises, flow into the hollow axle, and assist the condensation of the steam through which it passes. The vapour, when thus liquified, will flow along the crank axle into the reservoir below, by the perpendicular tubes, and from thence the feeding pumps are intended to inject it again into the boilers. There are two syphons z, connected to these perpendicular tubes, the bulbs of which are partly filled with mercury; they are intended as guages, to shew the state of condensation, and as escapes to the air in blowing the engine.

By this arrangement of the parts, the engine if employed for propelling ships, boats, &c. may be placed trans-

versely in the vessels, which allows of considerable simplicity in its construction, and, by the use of the condensing boxes, in the way described, the dimensions of the air pumps may be diminshed, if not altogether dispensed with; and, in using pure distilled water, exhausted of air, to feed the boilers, in the way above explained; their surfaces will never become foul, or require cleaning.—*Inrolled in the Rolls Chapel Office, March,* 1832.

Specification drawn by Messrs. Newton and Berry.

To EDWARD DAKEYNE, *and* JAMES DAKEYNE, *both of Darley Dale, in the county of Derby, merchants, for their having invented 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 fluid.*—[Sealed 21st January, 1830.]

THIS is a sort of rotatory engine, the centre upon which it moves being a ball and socket joint, and the piston a flange or broad ring, extending from the equatorial part of the ball, but called by the Patentees an *ecliptic* ring; which is designed to move with a rolling motion within a circular box. The water, steam, or other fluid intended to actuate this engine, is admitted into the circular box on one side, through an aperture, against a perpendicular partition which bisects the ring in a notch, allowing it to vibrate; and the water or steam acting within the box upon the surface of the oblique ring, or piston, causes it to be depressed on one of the circular boxes, and elevated on the other side, thereby moving the ball to which the

ring is affixed upon its central point, and giving a vibratory motion to its pole.

The construction and operation of this engine is by no means clearly made out in the specification. Its description is of very considerable length, and encumbered by a multitude of far-fetched expressions and scientific terms, which in their appropriation are more impressive in sound than expressive in sense. We shall, however, render the subject as clear as we can, under the circumstances, assisting our explanation by figures of the most important parts of the machinery.

Plate II. fig. 1, is an elevation of thecomplete machine supposed to be in working order. Fig 2, is a section taken vertically through the centre of the machine, shewing its principal working parts; of which the Patentees commence their description in the following words:—

"The fluid used for the purpose of working the machinery, revolves through a circular groove or channel A, A, formed round the equatorial circumference of a globe B, having ingress and egress through two narrow openings *a*, *b*, close on each side of a stop or partition *c*, placed across the said channel (see the horizontal view fig. 3;) and the circumition of the fluid gives conical motion to the poles of the said globe B, on the centre C, effected by pressure on the planes of a circular plate or flange D, united to the equatorial circumference of the said globe B, which we denominate the ecliptic ring."

"The said globe B, beingplaced in an oblique position, the said ecliptic ring thereon forms semicircular inclined planes longitudinally across the said channel, the fluid pressing on which, causes the said poles to revolve conically in orbs or circles on the vertex of the centre C; and by the said conical motion of the poles of the said globe B, revolving motion is communicated to machinery by

means of the taper rod E, which is fixed in the upper pole of the said globe, as in fig. 1. The opposite pole of the said globe may also act conjointly therewith, as shewn in the arrangement at fig. 4, hereafter described."

The circular box G, which encloses the ball and its ring, is made in two parts, and united in the middle by two horizontal flanges bolted together; the vertical sectional figure of which is seen at fig. 2, its periphery being turned smooth, and in the form of the equatorial part of a concave sphere, against which the periphery of the ecliptic ring acts being tightly packed on the edges, as pistons usually are.

The specifications go on to describe, in a very learned strain, "a system which appertains to the fulcrum of the machine" (the ball and socket joint in the centre, we presume;) connected with which there are "certain spaces or superficial areas of defined dimensions *g*, *h*; and *g*, *i*, encompassed on the polar surfaces of the said globe B; the said surfaces being partially enclosed by spherically concave cups or shells, constructed on each division of the said case G, and their junctures to the said surfaces being secured by water-tight packages near the poles at *h*, and *i*, the said spaces are circumscribed thereby immediately betwixt, the before-described packages *g*, on the said surfaces beneath the said cups or shells."

"The said stop or partition *c*, which cuts off the communication, or excludes the junction of the ingress and egress fluid, and causes the circumition round the said channel A, A, consists of a thin plate constructed of wrought iron or brass, or other strong or suitable material, and is fixed stationary in the said channel, in the radius, to the centre of the said globe B, and right angularly across the said channel A, and made firm and stationary in grooves to the three

internal angular planes *e*, and *f*, *f*, and is curved to form a juncture to the moveable globe B, and made as nearly as possible water or steam-tight thereto, by a package of leather or other proper material laid into a groove, or otherwise, by any of the known methods."

"The said two narrow openings *a*, and *b*, for the ingress and egress of the fluid, are constructed close on each side of the said stop or partition, and perforate; the periphery of the said channel A, A, and also the said opposite planes *f*, *f*, thereof, laterally, on each side of the said stop or partition."

The specification proceeds to explain the ecliptic ring, which we have described above, and then its action, as follows:—"And the said planes of the said ecliptic ring, being constructed in the radius to the centre of the globe B, and turned true and smooth, form water or steam-tight joints, with the similar constructed internal opposite planes *f*, *f*, of the said channel A, A; and by the inclination of the poles of the said globe B, the ecliptic ring forms a diagonal circular division longitudinally athwart the said channel, each of its sides being in contact with the internal opposite planes of the said channel, through the centre, and circumvolves or rolls in the circle round the said channel, with conical motions of the poles of the said globe B. The respective definite radii of each plane or surface of the ecliptic ring, meeting those of the internal opposite planes of the said channel A, A, forming opposite each other, through the centre two water or steam-tight radial joints, revolving the said channel A, A; which action we denominate the ecliptic circumvolution. And in spontaneous succession one or the other side of the half circular plane or surface of the ecliptic ring, athwart the said channel A, A, the circumition of the propelling fluid round the said channel having ingress at one of the said

narrow openings, close to one side of the said stop or partition, and egress at the other close to the contrary side thereof, impels the described motion by pressure, effecting conic revolutions on the poles of the said groove B, with regular impetus impressed from the impelling cause continued."

It is by this, and what follows in the specification, to be understood that the ecliptic plane moves round in the box, and that the pole of the globe is made to move in a course resembling an inverted cone, to give motion to a wheel or other machinery connected to its extremity. It appears to be unnecessary to pursue the elaborate description of this machine, as the intention of the Patentee must be perceived.

There is certainly considerable ingenuity, and, we believe, novelty, in this contrivance; but we are by no means satisfied that it would act in the way described, or, at least, with any advantage over other constructions of steam engines for driving machines.

In the modification of the machine, shewn in section at fig. 4, an axis is carried through the globe, and it is then proposed to adapt the mechanical power exerted by both poles, to the driving of the machine. It is further suggested that the same contrivance may be employed as a force pump, in which case power must be applied to the pole to drive it.—[*Inrolled in the Petty Bay Office, July*, 1830.

To MARGARET KNOWLES, *of Lavender-Hill, Battersea, in the county of Surrey, Spinster, for her invention of an improvement in axletrees, for, and mode of applying the same to carriages.*—[Sealed 4th July, 1829.]

THE object of the Patentee appears to be that of enabling a carriage to turn within a smaller space than the ordinary constructions of the fore axle of a travelling-carriage or waggon will allow, which moves round or locks, as it is termed, upon a centre pin, fixed in or near the perch in the middle of the fore part of the carriage. The improvement consists in attaching a distinct best axle on each side of the carriage, which is mounted in a suitable frame, and turns horizontally upon a vertical pin.

Plate II. fig. 5. represents an elevation of the axletree proposed; *a, a* are the ends of the axles, on which the running wheels of the vehicle are to be mounted; *b, b* are elongations of the axles, extending inwards; *c* is a vertical pin, passing through *b*, which is fastened to the top and bottom brackets *d, d*, and *e, e* are braces to keep the axles and pins firmly together; the two brackets *d, d*, being held fast by a block *f*, bolted to them in the middle between the two axles.

Fig. 6. is a variation of the contrivance, shewn in a horizontal view; *a, a* are the ends of the axles to receive the wheels as before; *b, b* their elongated parts; *f, f*, is the axeltree attached to the pole or perch *g*. The axles *a, b*, and the axeltree *f*, are connected together by brackets *e, e*, turning upon pins *c, c*, the ends of the brackets being attached to the pieces *b*, by joints at *i, i*. This contrivance is stated to be for the purpose of giving

play when the body of the carriage is mounted upon springs.

Fig 7, is another horizontal representation, we suppose, of the same construction; the pole or perch of the carriage being inclined on the side, as in turning, and the short axles turned also.

It must be confessed that this description is insufficient in many points, to render the invention evident, or capable of being brought into operation. We have, however, given as complete an account of it as the specification will permit, and must therefore leave our readers to reconcile the obvious impracticability of the scheme in the best way he can.—[*Inrolled in the Inrolment Office, January,* 1830..

To THOMAS SALMON, *of Stoke-Ferry, in the county of Norfolk, maltster, for his having invented an improved malt-kiln.*—]Sealed 9th July, 1829.]

WHEN malt or other grain is exposed upon a flat surface, to be dried by the application of heat beneath it, the steam evaporated, passing through the bed of grain, becomes cooled, and instead of flying off, condenses, and settles upon the upper surface, to the injury of the grain and the protraction of the drying process. The Patentee, therefore, proposes to apply heat, both to the under and upper surfaces of the grain, when spread out to dry, by the following means:—

Plate II. fig. 8, is supposed to represent in perspective, a small part of the drying floor of a kiln, formed by square tiles, placed side by side, with small perforations

through them, which allow heated air to pass from below. When this floor is covered with malt, or other grain, to the usual height, or thickness, the flues below are made hot, and the tiles, through which that heat is transmitted, communicate it to the under-layer of grain, which becoming heated, sends steam upwards through the mass; and this steam, being partially condensed by the wet grain above, and the cold air, falls again upon the upper surface, and thereby, greatly impedes the operation.

In order to heat the upper surface of the grain at the same time as the lower, the Patentee proposes to remove a square tile in several parts of the floor, and to introduce a pyramidical chimney of sheet iron or other suitable material, into each aperture, as at *a*. The chimney is open on the under side to the flue, and consequently the heated air from the flue passes readily through it into the apartment or chamber, in which the grain is spread to dry. The air on the upper surface of the grain, by these means, becomes heated, and prevents that condensation of the steam, which would otherwise take place.

The aperture at the top of the building, under these circumstances, may be contracted considerably; that is, an opening of three feet will be amply sufficient to discharge the steam from the floor of a twenty-seven foot square kiln.

The chimneys must rise high enough from the floor to be quite clear of the upper surface of the grain, and a cap or cover to each chimney must be made capable of rising or falling, to different heights, so as to allow of regulating the delivery of hot air, as may be required by partially opening or closing the aperture.—[*Inrolled in the Inrolment Office, August*, 1829.]

To BENJAMIN MATTHEW PAYNE, *of the Strand, in the parish of St. Martin-in-the-Fields, and county of Middlesex, scale maker, for certain improvements on weighing machines.*—[Sealed 18th August, 1828.]

THE specification of this Patent does not set forth the particular points which the inventor may consider to be new. A drawing is attached, exhibiting a steelyard of the ordinary construction, suspended at the fulcrum, with a scale pendant at one end, and a sliding weight, to be adjusted to any graduation, from the fulcrum, according to the quantity of material to be weighed. A moveable graduated piece is also made to slide upon the beam, with a small weight appended, to determine fractional parts of the whole numbers represented by the larger weight; this small graduated piece is, we presume, the proposed novelty.

Plate II. fig. 9, represents the apparatus as given in the specification; *a*, *a*, is the beam of the steelyard, swinging upon its fulcrum pivots at *b*. The scale *c*, may be displaced, and any other mode of suspending the articles to be weighed substituted, according to circumstances; *d*, is the sliding weight to be moved upon the gratuated beam as usual; *e*, is a small graduated piece attached to the index of the weight, and divided into fractional parts of the whole numbers marked upon the beam, having a small weight *f*.

If the beam be designed to weigh hundreds, then the small sliding piece may represent quarters and half quarters of a hundred; if the graduations of the beam are equivalent to pounds, then the small slide will give ounces. The Patentee proposes even further, that in the

event of the larger divisions of the beam representing ounces, the sliding scale may give pennyweights or grains.

There is a standard *g*, with a square spring at top, in which the end of the steelyard is confined; this is merely designed as a rest, and to prevent the beam from moving through too large an angle.—[*Inrolled in the Inrolment Office, February*, 1829.]

To FRANCIS HORATIO NELSON DRAKE, *of Clayton House, in the county of Devon, Esq. in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in tiles for covering houses, and other buildings.*—[Sealed July 25, 1829.]

THE object of this improvement is to form roofs with tiles of clay, properly baked, which shall be so connected together that the surface of the whole roof may be perfectly smooth—that is, without any visible overlaps, and yet conduct the water away safely, however little elevated the roof may be.

Plate II. fig. 10, exhibits one of these improved tiles as it would appear detached, and seen on the upper side. The part *a*, is lower—that is, only about half the thickness of the part *b*, there being a ledge formed at *c*, *c*, for the bottoms of the two next adjoining tiles to fit up to. Diagonal grooves are cut at *d*, *d*, which lead into lateral channels *e*, *e*, for the purpose of conducting the rain-water that may insinuate itself through the joints of the upper tiles. This water will, of consequence, pass along the ledge *c*, and by that means will be carried off by a

wedge-formed channel *f*, in the middle of the part *b*, to the next tile below, and so on till it reaches the eaves or gutter of the roof, and thus having a ready means of escape, does not lodge on the tiles. These are to be moulded in clay, and baked in the ordinary way, and may be coloured and glazed to resemble slates.

Fig. 11, shews the face and edge views of an improved pantile, the form of which enables the tiles to lock iuto each other, when laid upon the roof.

These tiles are said to possess the following advantages.—They present a plain surface (referring to the flat tile first described,) and are not acted upon by the wind, are perfectly immoveable, except when singly raised in the order in which they were placed, as every tile is confined by those which lie above it; and as respects the pantiles, every one is held down by three above it, so that they lock each other, and no cement or mortar is necessary to confine them. When broken, by accident, any one can be replaced with the greatest facility.

A roof constructed of these tiles is impervious to the heaviest rain or snow, and is far more durable than any other kind of covering; when coloured they resemble slates, and are much lighter on a roof than the best kind of slates; as 360 of them weigh only one hundred weight, and will more than cover a hundred square feet. They may also be used, with great advantage, as a coating for walls. — [*Inrolled in the Inrolment Office, January*, 1830.

Steam Carriages.

Report of the Committee of the House of Commons.

(*Continued from* Vol. VIII.)

"The Committee have throughout their examinations been most anxious to ascertain whether the apprehension, very commonly entertained, that an extensive use of these Carriages on roads would be the cause of frequent accidents and continued annoyance to the public, were well founded.

"The danger arising from the use of Steam Carriages, was stated to be twofold—that to which passengers are exposed from explosion of the boiler, and the breaking of the machinery; and the effect produced on horses, by the noise and appearance of the Engine.

"Steam has been applied as a powerful draught in two ways; in the one, both passengers and Engine are placed on the same carriage; in the other, the engine carriage is merely used to draw the carriage in which the load is conveyed. In either c se, the probability of danger from explosion has been rendered infinitely small, from the judicious construction of boiler which has been adopted.

"These boilers expose a very considerable surface to the fire, and steam is generated with the greatest rapidity. From their peculiar form, the requisite supply of steam depends on its continued and rapid formation; no large and dangerous quantity can at any time be collected. Should the safety valve be stopped, and the supply of Steam be kept up in greater abundance than the engines require, explosion may take place, but the danger would

be comparatively trifling, from the small quantity of steam which could act on any one portion of the boilers.

" The danger arising to passengers from the breaking of the machinery need scarcely be taken into consideration. It is a mere question of delay, and can scarcely exceed in frequency the casualties which may occur with horses.

" It has been frequently urged against these carriages, that, wherever they shall be introduced, they must effectually prevent all other travelling on the road; as no horse will bear quietly the noise and smoke of the engine.

" The Committee believe that these statements are unfounded. Whatever noise may be complained of, arises from the present defective construction of the machinery, and will be corrected as the makers of such carriages gain greater experience. Admitting even that the present engines do work with some noise, the effect on horses has been greatly exaggerated. All the witnesses accustomed to travel in these carriages, even on the crowded roads adjacent to the metropolis, have stated, that horses are very seldom frightened in passing.

" The Committee, having satisfied themselves that steam has been successfully adopted as a substitute for Horse Power on roads, proceeded to examine whether tolls have been imposed on carriages, thus propelled, so excessive as to require legislative interference, and also to consider the rate of tolls by which steam carriages should be brought to contribute, in fair proportion with other carriages, to the maintenance of the roads on which they may be used.

" They have annexed a list of those local acts, in which tolls have been placed on steam, or mechanically propelled carriages.

"Mr. Gurney has given the following specimens of the oppressive rates of tolls adopted in several of those acts: On the Liverpool and Prescot road, Mr. Gurney's carriage would be charged 2*l.* 8*s.*, while a loaded stage coach would pay only 4*s.* On the Bathgate road the same carriage would be charged 1*l.* 7*s.* 1*d.*, while a coach drawn by four horses would pay 5*s.* On the Ashburnham and Totness road Mr. Gurney would have to pay 2*l.*, while a coach drawn by four horses would be charged only 3*s.* On the Teignmouth and Dawlish roads the proportion is 12*s.* to 2*s.*

"Such exorbitant tolls on steam carriages can only be justified on the following grounds.

"First, because the number of passengers conveyed on, or by, a steam carriage, will be so great as to diminish (at least to the extent of the difference of the rate of toll) the total number of carriages used on the road; or, secondly, because steam carriages induce an additional expense in the repairs of the road.

"The Committee see no reason to suppose that, for the present, the substitution of Steam Carriages, conveying a greater number of persons than common coaches, will take place to any very material extent; and as to the second cause of increased charge, the trustees, in framing their tolls, have probably not minutely calculated the amount of injury to roads likely to arise from them.

"The Committee are of opinion that the only ground on which a fair claim to toll can be made, on any public road, is to raise a fund, which, with the strictest economy, shall be just sufficient, first to repay the expense of its original formation; secondly, to maintain it in good and sufficient repair.

"The Committee would direct the attention of The

House especially to the Evidence of Mr. Macneil,* whose observations on this branch of the subject, being founded on a long course of very accurate experiments, are peculiarly interesting and useful. He estimates that the feet of horses drawing a fast coach, are more injurious to the road than the wheels, in the proportion of three to one nearly; that this proportion will increase with the velocity; that by increasing the breadth of the tires of the wheels, the injury done to roads by great weights may be counteracted. He considers that on a good road, one ton may be safely carried on each inch of width of tire of the wheels.

"Mr. M'Adam and Mr. Telford have given corresponding Evidence as to the greater wear caused by horses' feet than by wheels of Carriages.

"Each of the above Witnesses agrees, that, adding the weight of the horses to that of the coach, and comparing the injury done to a road by a steam carriage of a weight equal to that of the coach and horses (the wheels being of a proper width of tire), the deterioration of the road will be much less by the steam carriage than by the coach and horses.

"Apprehension has also been entertained, that although the peculiar action of the wheels may not be injurious, yet that, from the great power which may be applied, if the steam were worked at a very high pressure, or if the size of the engine were increased, greater weight might be carried than the strenghth of the road could bear.

Mr. Macneil's evidence before the Committee shews him to be a man of science, cool judgment, and a scholar; the minutes of his evidence will be read with great satisfaction by mathematicians generally, but more particularly by those interested in the subject of wheel carriages.

"Undoubtedly, in proportion to the advance of the science, will be the increase of weight drawn by an Engine with a given expenditure of fuel; but there are many practical difficulties to be surmounted before the weight so drawn can reach the point when it would be destructive of roads. There are no theoretical reasons against the extension of the size of the engines. The difficulties, according to Mr. Gurney, are of a practical nature, and only in the "difficulty of management of a large engine." In proportion as we augment the power of the engines, we must increase their strength, and consequently their weight; the greater weight will be a material diminution of their efficiency. To a certain extent the power may be increased in a greater ratio than the weight; but, with our limited knowledge of the application of Steam, and with the present formation of the Public Roads, the point will be very soon attained, when the advantage of increased power will be counter-balanced by the difficulties attendant on the increased weight of the engines.

"The weight drawn, at the rate of ten miles per hour, by Mr. Gurney's engine, has not, on any extent of road, exceeded the weight of the drawing Carriage; nor is it likely, with the difficulties to be encountered on the present lines of road, from their quality and the numerous ascents, that the weight drawn will be in excess of the strength of the roads. The immense quantity of spare power required to surmount the different degrees of resistance likely to occur, would render the engine too unmanageable. This will appear evident from the force of traction required to draw a waggon over the Holyhead and Shrewsbury road, which varied from 40 to upwnrds of 300 lbs.

"In considering the effect on roads, we must not over-

look one peculiarity, in which they have a great advantage over other carriages. In coaches drawn by horses, the power being without the machine to be moved, it becomes an object of the greatest importance to give as much effect as possible to the power, by diminishing the resistance, arising from the friction of the wheels upon the surface of the road. For this purpose, the proprietors of coaches and waggons have adopted every possible contrivance, so to reduce the tiers of their wheels, that a very small portion of them may press on the road; in some coaches they are made circular in their cross section, so that the entire weight of the carriage presses on a mere point; should the materials be soft, such wheels cut their way into the road like a sharp instrument. The owners of waggons, too, have adopted a similar plan. Mr. Macneil states that the actual bearing part of the tire of apparently broad-wheel waggons, is reduced to three inches by the contrivance of one band of the tire projecting beyond the others.

"With Steam, on the contrary, a certain amount of adhesion to the roads is required to give effect to the action of the machinery, or the wheels would slip round, and make no progress. It appears of little importance, therefore, so far as relates to the engine, whether the requisite amount of friction be spread over a broad surface of tire, or be concentrated to a small point; but as the wheels, by being too narrow, would have a tendency to bury themselves in every soft or newly-made road, and thus raise a perpetual resistance to their own progress, it actually becomes an advantage to adopt that form, which is least injurious to the road. The proprietors, who have been examined on this point, seem to be quite indifferent as to the breadth of tire they may be required to use.

"These considerations have convinced the Committee

that the tolls enforced on steam carriages have, in general, far exceeded the rate which their injuriousness to roads, in comparison with other carriages, would warrant; they found, however, considerable difficulty in framing a scale of tolls applicable to all roads, in lieu of those authorized by several local acts.

"Mr. Gurney has delivered in a scale of tolls, graduated according to weight and width of tire of the wheel. As this has been drawn up by a person interested in the success of steam carriages, it might have been expected to be more favourable to them. The Committee, however, have not adopted it, because of the difficulties and interruptions, which a fluctuating rate of toll would induce.

The only fair plea for charging tolls on such carriages, in proportion to their weight, is to prevent a load from being propelled or carried, which would permanently injure the road.

Experiments and observations on diverging streams of compressed air. By Mr. T. Hopkins.

(From the Transactions of the Literary and Philosophical Society of Manchester.)

On the eleventh of October, 1824, Mr. Roberts affixed a valve to the aperture of a pipe, used as a waste pipe, for the purpose of regulating or equalizing the force of a blast of air which was blowing a furnace. To his surprize, however, he found that the valve, instead of being readily blown off by a strong blast, remained at a small distance from the aperture of the pipe, and was removed to a greater distance only by a considerable exer-

tion of the power of the hand. This singular phenomenon was witnessed by many gentlemen, members of this society, in the same week, and appeared to be viewed by them all, as equally new and extraordinary.*

Mr. Roberts made some experiments on his air-valve at the time, and various theories were then suggested to account for the adherence of the valve to the pipe. It was not, however, until the month of September in the present year, that I agreed to join him in making further experiments, a part of which, I now proceed to give.

A vertical section of part of the apparatus used is given in Plate I. fig. 6, where *a*, is a pipe, three inches diameter, with the aperture contracted to $2\frac{3}{8}$ diameter, at *b*, *b*, and surrounded by a flange *c*, *c*, $10\frac{3}{4}$ diameter, to form a seat for a valve. On this seat was placed a circular disk or valve *d*, *d*, six inches diameter, with a pin in its centre, by means of which it was left at liberty to rise or fall freely, and kept at the same time perpendicular to the aperture.

The valve was attached to one end of a scale beam by a string, and balanced by weights placed in a scale *e*, attached to the opposite end of the beam. The valve being thus placed on the seat without any weight of its own to press downward, the stream of compressed air was admitted into the pipe *a*, when the valve *d*, rose from the flange or seat *c*, 1-32nd of an inch, and there remained stationary. Thirteen ounces, avoirdupoise weight, were now put into the scale *e*, which raised the valve to 1-12th of an inch above the seat. Twenty-six ounces raised it to 1-8th of an inch, and thirty-two ounce raised it to 1-4th of an inch, but any weight beyond this last caused the valve to fly abruptly off.

It thus appeared, that when the valve was raised from its seat

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* Monr. Clement, of Paris, was said to be in Manchester at this period, and saw the air-valve adhere to the pipe, yet he afterwards, it appears, represented the discovery to have been made in France long subsequent to the time he saw it at Mr. Roberts' works.

a quarter of an inch, there was the greatest difference between the force of the issuing current of air pressing against the *under* side of the valve, and of atmospheric pressure on the *upper* side of the valve. The pressure of the atmosphere was greater than the force of the issuing stream of previously compressed air, a weight of thirty-two ounces being requisite to establish an equilibrium.

That we might ascertain what was the state of the stream of air under the valve, in different parts of it, four double syphon tubes were procured, and proper quantities of mercury being put into them, they were inserted in holes made through the valve at certain distances from each other, as shown in Figs. 6, at 1, 2, 3, 4. The inserted limbs of these tubes being thus left exposed to the action of the stream of air, the compressed air was again admitted into the pipe *a*, and the valve rose as before, 1-32nd of an inch.

The tube 1, in that part of the valve *d*, which was over the aperture *b*, had the mercury in it $1\frac{1}{2}$ inches higher in the *outer* than in the inner limb, and consequently shewed a pressure from the compressed air below it, above atmospheric pressure, equal to $1\frac{1}{2}$ inches of mercury. The tube 2, which was near to the aperture *b*, but over the inner edge of the seat *c*, shewed a rise of the mercury of 3-10ths of an inch in the *inner* limb of the tube, and consequently a pressure from the air below it *less* than atmospheric pressure by 3-10ths of an inch,—or a partial vacuum of 3-10ths of an inch of mercury. The tube 3, at the same time shewed a similar vacuum of 1-8th of an inch of mercury. The mercury in the tube 4, was undisturbed.

The valve with the four tubes in it was now raised above its seat from 1-32nd of an inch until it was $1\frac{1}{2}$ inches above the seat, by gradations of 1-32nd of an inch each, and the heights of the mercury in the tube, were noted at each step, distinguishing by a *p*, or a *v*, whether they shewed pressure from below, or a partial vacuum, and thus a table of five columns

was formed. The first column shewed the height of the valve above the seat, and the other four columns, the heights of the mercury in the four tubes, and whether they indicated pressure or vacuum.

This table shewed, that the pressure from the stream below, on tube 1, continued at $1\frac{1}{2}$ inches of mercury, until the valve was raised from its seat to 1-16th of an inch above it; but from that elevation until it was raised to $1\frac{1}{2}$ inches from the seat, the mercury shewed a gradually diminishing pressure, and at that height the pressure was only 6-10ths of an inch.

Tube 2, shewed its greatest degree of *vacuum*, which was 1 and 8-10ths inches of mercury, when the valve was raised 3-32nds of an inch; from which point, as the valve was further elevated, the vacuum became less, until at a height of 3-8ths there was no vacuum,—the mercury in the two limbs of the tube being at the same level. On raising the valve from 3-8ths to $1\frac{1}{2}$ inches, this tube shewed an increasing *pressure* from the stream of air below, and at the least named height the pressure was 4-10ths of an inch of mercury.

The tube 3, shewed its greatest degree of vacuum to be 7-20ths of an inch of mercury, and it was when the valve was up 11-32nds of an inch. As the valve was raised higher, the vacuum became less, until at the height of $1\frac{1}{2}$ inches it was nothing.

In tube 4, the mercury began to shew a small degree of vacuum when the valve was raised 3-32nds of an inch; when it was up $\frac{1}{2}$ an inch the vacuum was $\frac{1}{4}$ of an inch, being its greatest degree; from this point the vacuum diminished, and when the valve was $1\frac{1}{2}$ inches high, there was very little difference in the levels of the murcury in the two limbs.

A similar course of experiments was gone through with a valve 8 inches diameter, with some small variations in the results, which were noted in another table; but the only one worth mentioning is, that while the 6-inch valve required a little more than 32 ounces in the scale *e*, to detatch it from its seat, the 8-inch valve required 48 ounces.

From a general view of the results thus obtained, it appeared that while the valve adhered to the seat, and remained at but a small distance from it, a circular stripe or flat ring of attenuated air was found between the valve and its seat, and near to the aperture *h*, the air at the same time in the parts further from the aperture becoming more dense, until close to the periphery, it became nearly of atmospheric density; but as the valve was raised, the ring of the attenuated air approached the outer part or periphery of the valve.

To find the form and nature of this ring, it now appeared desirable that the different heights of mercury in the same tube, indicating degrees of vacuum should be ascertained at small and equal distances, beginning at the edge of the aperture, and proceeding along a radial line to the periphery of the valve. To accomplish this, a moveable slide was dovetailed into the valve, and in this slide was inserted the lower limb of one of the double syphon tubes with mercury in it as before, shown at Fig. 7, where the tube is placed over the aperture, and indicates a pressure from the compressed air of $1\frac{1}{2}$ inches of mercury.

This valve being placed on the seat, the slide *f*, *f*, was moved until the tube came over the seat, and the distance of the tube from the edge of the aperture was noted when the mercury first indicated a slight degree of vacuum. From this point the slide, and consequently the tube, was drawn outward 1-32nd of an inch, and the height of the mercury indicating vacuum again noted. In this way, by stages of 1-32nd of an inch each, the tube was drawn to the outer edge or periphery of the valve, and at the height of the mercury noted at each stage. The different heights of the mercury in all these stages, with the exact places of the tube at the times, were then marked by dots on paper, and these dots being connected by lines, we obtained the curve represented in Fig. 8. In this diagram *g*, shews the point at which the vacuum was first indicated, and the line from *g*, to *h*, represents the increase of the degree of vacuum, until at *h*, it is $1\frac{3}{4}$ inches of mercury. From this point the reduction of the degree of vacuum is seen by the curve from *h*, to *i*. The straight line *k*, a little

lower down, represents the pressure which the mercury shewed when the tube was over the aperture.

The valve was now raised higher from its seat, and the tube moved as before, and data obtained for the formation of other curves. When the valve was 3-16ths above the seat, the tube being placed over the aperture, shewed a pressure of only one and 4-10ths of an inch of mercury; but the tube being brought over the seat at a distance of 5-32nds from the edge of the aperture, shewed a vacuum of one and 8-10ths of an inch of mercury. From that point proceeding outward, the vacuum became less.

These experiments shewed, that until the valve was raised to a certain height above its seat, the under side of that part of the valve which was over the aperture, was exposed to a pressure of $1\frac{1}{2}$ inches of mercury more than atmospheric pressure; and the under side of all the rest of the valve, forming an outer stripe or ring, was exposed to a pressure less than atmospheric, or had a partial vacuum varying from one and 8-10ths of an inch of mercury up to atmospheric pressure, The superior pressure against the under side of the centre of the valve, must then have been counterbalanced by the inferior pressure against the under side of that of the valve which is nearer to the periphery,—and more than counterbalanced, for atmospheric pressure on the top of the valve was still so superior as to admit of a weight of 32 ounces being applied, before that pressure could be overcome and the valve raised.

Valves of various smaller sizes were now tried, and it was found that one of $4\frac{1}{4}$ inches diameter, was what may be called the neutral size over an aperture of $2\frac{3}{8}$ diameter; as, when it was balanced it would just adhere to the seat when the air was admitted, but the least weight placed in the scale raised it. Valves of any size smaller than this did not adhere to the seat, and would therefore be proper valves for such a pipe.

A conical valve was now procured, the greatest diameter of which was 6 inches on the upper side, and its least diameter was $2\frac{3}{8}$ inches, the same as the aperture, and its thickness $1\frac{1}{2}$ inches. This valve being fitted into a proper seat, required as many ounces

fitted to raise it from its seat as the flat 6-inch valve did. See Fig. 9.

Another conical valve, whose greatest diameter was the same as the flat neutral valve, $4\frac{1}{4}$ inches, its least diameter $2\frac{3}{8}$, and its thickness 3 inches, was fitted like the preceding one, into a seat of equal thickness with itself. This valve, however, if less than six ounces in weight, was blown off by the blast. And thus it appeared, that a conical valve, may be less disposed to adhere to the seat than a flat valve, the diameter of the upper sides of both being the same. See Fig. 10.

A phenomenon, singular in appearance, was exhibited while using these conical valves. It became necessary to fasten a seat with a hollow cone to the flange, and, in the experiments, the issuing stream of air was made to pass between the cone and its seat. But when this seat was liberated from the flange, and the stream of air suffered to flow, one stream rushed between the cone and the seat, and another between the seat and the flange. And thus the seat of the cone was held in its situation by the two streams of air, without being in contact with any thing else.

During the experiments, burning paper was placed on the valves, that the flame and smoke might shew whether there was any atmospheric current rushing down upon it. But it was only at the periphery that the flame was drawn down, until it came in contact with the stream of air issuing from under the valve, which cut off the flame as abruptly, as it could have been cut through with a knife, apparently from its force and coldness. On the valve the flame blazed in the way in which it ordinarily does, when their is no current of air acting upon it.

In endeavouring to account for these phenomena, it appeared, that the air in the aperture was projected or driven from the aperture as from a centre, in radial lines in every direction through enlarging circles, and thus became attenuated as it was thrown off from the centre, in the way that light is diminished according to its distance from its radiating point. For the purpose of ascertaining whether this was a correct view, or not, another experiment was made.

Instead of a circular valve, one of the form of a cross was used, six inches in diameter, of which fig. 11 is a plan. The centre of this cross valve just covered the aperture *b*, in fig. 6, and the four arms *l*, *l*, *l*, *l*, extended to the diameter of six inches. The four angular spaces between them left on the seat of the valve were covered with pieces of wood *m*, *m*, *m*, *m*, fitted to the spaces and fastened to the valve seat, leaving the cross valve at liberty, to be raised between them. By this contrivance, the compressed air, on issuing from the aperture, was confined to four separate streams of equal and uniform breadth, which could not diverge, but passed under the cross until they escaped at the ends of its arms. The tubes with mercury, as in Fig. 6, having been inserted in the arms shewed not more than 1-8th of an inch vacuum in any part of the arms, and less towards their outer extremities; and this small vacuum probably was the result of some air making its way under the angular pieces *m*.

The cross was now raised enough to leave considerable spaces for the stream to expand from its previously compressed state, and to become rarified, but no greater attenuation was indicated by the mercury. And thus it appeared, that when there was but little space, only 1-32nd of an inch, under the circular valve for the air to be projected into, there was an attenuation, or partial vacuum, of $1\frac{3}{4}$ inches of mercury, but when the cross valve was gradually raised from 1-32nd to the height of half an inch from the seat, and when of course there was ample room for expansion, not more than 1-8th of an inch vaccuum was indicated.

From these various phenomena it appeared that the vacuum under the circular valve was produced by the spreading of the air from a smaller to a larger circle, immediately after it left the aperture. For on the air being prevented from spreading by the pieces of wood, *m*, Fig. 11, when fastened to the seat of the valve, the vacuum nearly disappeared in the streams under the arms of the cross valve; but by attaching the angular pieces to the cross valve, and suffering both to rise together, the full vacuum of $1\frac{3}{4}$ reappeared as with the circular valve.

When the circular valve *d*, in Fig. 6, is placed on the seat, there is stagnant atmospheric air within the aperture *b*. On the condensed air being admitted into the pipe *a*, the stagnant air is put into motion, and before it can overcome the inertia of the valve, is forced between the outer parts of the valve and its seat. The air, while being thus forced, is, however, compelled te diverge from a circle, whose diameter is 2 and three-eighths to one of a larger diameter, and is consequently dilated and attenuated. The impulse given by the compressed air on its first admission to the stagnant air in the pipe, causes the stagnant air to commence the process, but the compressed air follows instantaneously, and through the force with which it is impelled by the original moving power, is projected under the valve, and there forced to diverge with a velocity proportioned to the amount of the projectile force.

The projectile force acting through the stream of compressed air, and the peculiarly shaped and confined space through which the air is driv n, are then the causes of its dilatation, until its degree of rarity is beyond that of the atmosphere, when atmospheric pressure on the upper side of the valve preponderates.

This view will, perhaps, be illustrated, by supposing the compressed air at the edge of the aperture, to be an elastic ring of two 3-8ths diameter, and that every part of this ring shall be struck with equal force from the centre, in a radiating direction to the circumference: by the time that the ring is projected to a sufficient distance to be a diameter of, say 4 inches, it will be stretched from a smaller to a larger circumference, and every part of the ring will be equally stretched or attenuated. A part of such a ring may be supposed to be represented in Fig. 12. It is not, however, necessary that the substance projected should be elastic, for if the ring were made of lead, the effect would be the same; or if grains of sand, or small lead shot, could, in like manner, be thrown from a centre, in al directions around, it is clear that as they were removed farther

from the centre, the grains or shot would be more distant from each other, or the stream of them would be more attenuated.

By a reference to the curve, Fig. 8, representing the degrees of vacuum, it will be seen that the circle of greatest vacuum is near to the aperture; and it may be inferred, that this fact is opposed to the theory of forced divergence, as on that theory it may be thought that we ought to have the greatest vacuum where the divergence was the greatest, and consequently near to the periphery of the valve. But it should be borne in mind, that the issuing stream of air has to overcome atmospheric resistance; and when, by diverging, it has become rarer than the atmosphere against which it is acting, the momentum requisite to keep it so is soon expended, and the stream under the outer parts of the valve, not having sufficient force to overcome atmospheric resistance from without, yields to it, and is brought to common atmospheric density. If the velocities of the stream under the different parts of the valve could have been ascertained by stages of thirty-seconds parts of an inch, in the same way that the degrees of vacuum were found by the heights of the mercury, it is presumed, that this point would have been established by experiment, instead of being left dependent on an inference.

The moving of the circle of greatest vacuum outwards, as the valve was elevated, does, however, exhibit evidence of the justness of the inference. When the valve was but little raised, the force of the stream was expended in diverging a part of itself, near to the aperture, but when the valve was considerably raised, the superior density of the stream was not confined to that part immediately over the aperture, but shewed itself also between the valve and a part of its seat. When it was raised half an inch, the same point point, *h*, which in Fig. 8, shews the greatest vacuum, indicated a pressure of a quarter of an inch of mercury, while the circle of greatest vacuum, had removed farther from the aperture.

It has been suggested, that the formation of the vacuum may be accounted for from the known tendency of a compressed spring,

when liberated, to fly beyond the point at which it will finally settle. But this action of a spring is only one instance of the operation of a general law of nature which is applicable to all bodies. When any body elastic or non-elastic is put in motion, its inertia causes it to continue in motion in the direction in which it has been impelled until its force is expended. The force of a liberated metallic spring is expended in the effort to overcome the tenacity of the substance of which it is composed, while the force of a cannon ball, fired into an earthen bank, is expended on the resistance presented by the earth; but it is projectile force that is expended in both instances.

In a short time after the phenomenon of the adherence of the air-valve was observed by Mr. Roberts, he ascertained, by experiment, without knowing that it had been done before, that *water*, when forced through a conical pipe, with considerable velocity, will draw out other water, placed below in an open vessel, if one end of a small tube is inserted in the conical pipe, and the other end is immersed in the water, in the vessel below: thus showing that water, an inelastic fluid, produced the same effect that air did, when rushing out in a stream, confined in a peculiar manner. And at the time this paper was going to press, water was by pressure from a column of considerable height, made to issue from a pipe with a valve placed over it, similar to what is exhibited in Fig. 6, when the valve, instead of being forced off by the issuing stream of water, was found to adhere to the seat, at a small distance from it. And when the apparatus was inverted, and the value consequently placed below the seat, upon the water being permitted to flow, the valve, instead of obeying the law of grovity and falling by its own weight, or of being driven off the force of the stream of water, adhered, with considerable firmness, to the seat.

Scotch Patents.

(*Continued from* p. 341.)

To Richard Edwards, of Dewsbury, in the county of York, leather and flock seller, for the invention of an improvement on, or a substitute for glass, sand, emery, and other scouring paper or substances.

To Joel Benedict Nott, of Schenectady, in the State of New York, now of Barry Street, St. James's, in the county of Middlesex, for the invention, communicated to him by a foreigner residing abroad, of certain improvements in the construction of a furnace or furnaces for generating heat, and in the apparatus for the applicotion of heat to various useful purposes.—Feb. 18.

To Bartholomew Redfern, of Birmingham, in the county of Warwick, gun-maker, for the invention of a lock, break-off, and trigger, upon a new and improved principle, for fowling-pieces, muskets, rifles, pistols, and small fire-arms of all descriptions.—Feb. 21.

To John Wallace, brassfounder in Leith, for the invention of an improvement or improvements upon the safety-hearths for the use of vessels.—Feb. 23.

To Joh2 Macdowall, of Johnston, near Paisley, for the invention of certain improvements on the pistons, valves, and boilers of steam-engines.—March 2.

To William Morgan, of York Terrace, Regent's Park, in the county of Middlesex, Esq. for the invention of certain improvements in steam-engines.

To Jeremiah Grime, jun. of Bury, in the county of Lancaster, copper-plate engraver, for the invention of a certain method of dissolving snow and ice on the trams or railways, in order that locomotive steam engines and carriages, and other carriages, may pass over railroads, without any obstruction or impediment from such snow or ice.

To David Napier of Warren Street, Fitxroy Square, in the county of Middlesex, engineer, and James and William Napier

of Glasgow, machinists, for an invention of "certain improvements in machinery for propelling locomotive carriages."—March 14.

To Robert Stephenson of Newcastle-upon-Tyne, in the county of Northumberland, engineer, for an invention of "an improvement in the axle and parts which form the bearings at the centres of wheels for carriages which are to travel upon edge railways."—March 24.

To Henry Pratt of Bilston, in the county of Stafford, miller, for an invention of certain kiln-tiles made and manufactured of clay, iron, and other metals and materials, for the purpose of drying wheat, malt, oats, and other grain, and for various other purposes, with the formation of the fire-place and kiln.

To Thomas Baily and Charles Baily, both of the town of Leicester, in the county of Leicester frame-smiths, for an invention of certain improvements in machinery for making lace, commonly called bobbin-net.—April 22.

To James Milne, of the city of Edinburgh, brass-founder, for an invention of an improvement or improvements on gas-meters.—April 27.

To David Napier, of Warren Street, Fitzroy Square, in the county of Middlesex, engineer, for an invention of certain improvements in printing machinery, with a method of economising the power applied to the same, which method of economissing power is also applicable to other purposes.—April 11.

To John Dickson, of Abbots Langley, in the county of Hertford, paper-maker, for an invention of an improved method of manufacturing paper by means of machinery.—April 29,

To John and James Potter, of Smedley, near Manchester, spinners and manufacturers, for an invention of certain improvements in machinery, or apparatus applicable to the spining or twisting of cotton, flax, silk, wool, and other fibrous materials. —May 2.

To William Rutherford, *junior*, of Jedburgh, writer and bank agent, for an invention of a combination or arrangement of apparatus or mechanism, to be used by itself, or applied to locks and other fastenings, for more effectually protecting property.—May 3.

To Samuel Mordan, of Manchester, in the county of Lancaster, in the kingdom of England, merchant, for an invention of an improved stretching machine.—May 18.

To Andrew Smith, of Princes Street, Leicester Square, in the parish of St. Martins-in-the-Fields, in the county of Middlesex, mechanist, for an invention of certain improvements in machinery for propelling boats, vessels, or other floating bodies on the water, and in the manner of constructing boats and vessels for carrying such machinery; part of which said improvements are applicable to water-wheels for driving mills or machinery, and also to windmills.—May 19.

To Thomas Knowles, of Charlton Row, in the county of Lancaster, cotton-spinner. for an invention of certain improvements in certain machinery, by aid of which machinery spinning machines, commonly called mules, are or may be rendered what is termed self-acting—that is to say, certain improvements in certain machinery, by aid of which machinery spinning machines commonly called mules, are or may be worked by power, without requiring the usual application of the strength of the spinners to give motion to the handles or wheels, and to such other parts of mules as are commonly worked by the strength of the spinners.—May 20.

To Samuel Lambert, of Regent Street, in the parish of St. James, Westminster, in the county of Middlesex, gold-lace-man, for an invention of an improvement in throstle spindles for spinning and twisting silk, cotton, wool, flax, and other fibrous substances.

To Sir Thomas Cochrane, Knight, commonly called Lord Cochrane, of Regent's Park, in the county of Middlesex, for an invention of an improved rotatory engine to be impelled by steam; and which may be also rendered applicable to other puposes.—June 2.

To Sir Thomas Cochrane, Kight, commonly called Lord Cochrane, of Regent's Park, in the county of Middlesex, for apparatus to facilitate excavating, sinking, and mining.—June 4.

To Andrew Ure, of Finsbury Circus, in the county, of Middlesex, M. D., for an invention of an apparatus for regulating the temperature in evaporization, distillation, and other processes.

To George Stephenson, of Liverpool, civil engineer, for an invention of an improvement in the mode of constructing wheels for railway carriages.—June 6.

To Alexander Craig, of Ann Street, St. Bernard's, in the parish of St. Cuthbert, and county of Mid-Lothian, in consequence of a communication made by a certain foreigner. residing abroad, of an invention of certain improvements in machines or machinery for cutting timber into vineers or other useful forms. —June 6.

To Michael Donovan, of the city of Dublin, druggist, for an invention of an improved method of lighting places with gas.—June 10.

To John Aitchison of Clyde Buildings, in the city of Glasgow, and county of Lanark, merchant, for an invention of certain improvements in the concentrating and evaporating cane juice solutions of sugar, and other fluids,—June 10.

New Patents Sealed.

To George Freeman, of Tewkesbury, in the county of Gloucester, lace manufacturer, for his having invented certain improvements in machinery for ornamenting and producing devices upon lace. — Sealed 22d Feb. — 6 months, for Inrolment.

To Alexandre Beattie Shankland, of Liverpool-street, in the city of London, in consequence of a communication made to him by a foreigner resident in America, for a new method of cutting, working, and planing of wood, minerals, and metals, by means of machinery.—23d Feb. 6 months.

To William Crofts, of Lenton, in the county of Nottingham, frame smith, for his having invented or found out certain improvements in machinery for making lace or net, commonly called bobbin-net lace.—23d Feb. 6 months.

To Ralph Watson, of York-place, Portman-square, in

the county of Middlesex, Esq. in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of a certain improved lamp.—23d Feb. 6 months.

To Thomas De La Rue, of Crown-street, Finsbury-square, in the county of Middlesex, card maker, for his having invented certain improvements in making or manufacturing, and ornamenting playing cards.—23d Feb. 6 months.

To William Church, of Bordesley Green, near Birmingham, in the county of Warwick, gentleman, for his having invented or discovered certain improvements in machinery for making nails.—25th Feb. 6 months.

To Samuel Walker, of Millshaw, near Leeds, in the county of York, clothier, for his having invented or discovered certain improvements in gig machines for dressing woollen cloths.—1st March, 6 months.

To John Joyce, of Portland-road, in the parish of St. Mary-le bone and county of Middlesex, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of a certain improvement or improvements in machinery for making nails of iron, copper, and other metals.—1st March, 6 months.

To Charles Beard, of Coggleshall, in the county of Essex, ironmonger, for his having invented or found out an improvement in the construction of cocks for taps for drawing off liquids.—1st March, 2 months.

To George Oldland, of Hillsley, in the parish of Hawkesbury, in the county of Gloucester, cloth worker, for his having invented or discovered certain improvements in machinery or apparatus for shearing, dressing, and finishing of woollen cloths, and other fabrics.—3d March, 6 months.

To William Wells, of Manchester, in the county of Lancaster, machine maker, for his having found out and discovered a new and improved method of making and constructing gig machines, otherwise called raising machines, or machines for raising the nap or pile of, and brushing and dressing woollen and other cloths.—8th March, 2 months.

To Thomas Petherick, of Penpelleck, in the parish of Tydwardrestle, in the county of Cornwall, mine agent, and John Filmore Kingston, of Islington, in the county of Devon, gentleman, for their having invented improvements in certain machinery and apparatus for separating copper, lead, and other ores from earthy and other substances, with which they are or may be mixed; the said improvement being applicable to the machinery for which a patent was granted by his late Majesty to the petitioner Thomas Petherick, bearing date the 28th day of April, 1830.—8th March, 6 months.

To Frederick Collier Bakewell, of Hampstead, in the county of Middlesex, gentleman, for his having invented certain improvements in machinery or apparatus for making or manufacturing soda water, and other aerated waters or liquids.—8th March, 6 months.

To Joseph Gibbs, of the Kent Road, in the county of Kent, engineer, and William Chaplin, of the Adelphi, in the county of Middlesex, coach maker, for their having invented certain improvements in wheeled carriages, and in the means of constructing the same.—8th March. 6 Months.

To Henry Warner, of Loughborough, in the county of Leicester, hosier, Charles Hood, of the same place, framesmith and setter-up, and Benjamin Abbot, also of the same place, framework knitter, for their having invented certain improvements upon machinery now in use

for making or manufacturing stockings, stocking net, or framework knitting, warp web, warp net, and point net.—8th March. 6 months.

To John Day, of Birmingham, in the county of Warwick, brass founder, for his having invented an improvement in the manfacture of cocks, used for the stopping and drawing off gass and water, and for other purposes for for which cocks are new used.—15th March. 6 months.

To Henry Brewer, of Surrey-place, Old Kent Road, in the parish of Saint George Southwark, in the county of Surrey, wire weaver, for his having invented or discovered certain improvements in machinery or apparatus for making paper.—15th March. 6 months.

To John Walmsley, of Manchester, silk winder, for his having invented a machine for cutting off fur or hair from beaver and other skins.—15th March. 6 months.

To Matthew Towgood, of Dartford, in the county of Kent, paper maker, for his having invented certain improvements in cutting paper.—15th March. 6 months.

To William Day, of Gate-street, Lincoln's Inn Fields, ni the parish of Saint Giles in the Fields, in the county of Middlesex, lithographic printer, for his having invented or discovered certain improvements in the construction of printing presses.—22nd March. 6 months.

To Bennet Woodcroft, of Manchester, in the county palatine of Lancaster, printer, for his having invented or discovered certain improvements in the construction and adaptation of a revolving spiral paddle, for propelling boats and other vessels on water.—22nd March. 6 months.

To William Alexander Brown, of Liverpool, in the county of Lancaster, merchant, and Herman Hendricks, of Passz, near Paris, in the kingdom of France, but now residing in Russel-street, Covent Garden, in the

county of Middlesex, gentleman, in consequence of a communication from a certain foreigner residing abroad, by which they are in possession of an invention of an improved method or methods of manufacturing the prussiates of potash and soda, and the prussiate of iron, also for the construction of certain apparatus, vessels, or machinery, to be used in the said manufacture, and a new or improved method of employing the said prussiate of iron, or other prussiates of iron, as a substitute for indigo, in dying all sorts of wools, and whether in the fleece, skin, spun, or woven into cloth, stuffs, or otherwise; also in dying silks, cottons, or linens, and in fact, all other sorts and descriptions of textile or other substances fit for the purpose of receiving colour of a blue, blue-black, black, greens, bronze, or any other colours for which indigo has hitherto been used, either as a ground work or auxiliary; and also for an improved arrangement of certain utensils and machinery, to be used in the said dying process.—22nd March, 6 months.

To Benjamin Cook, of Birmingham, in the county of Warwick, brass founder, for his having invented an improvement in the application of a material hitherto unused in the manufacture of paints, varnishes, and for various other purposes.—22nd March, 6 months.

To Peter Young, of Fenchurch-street, in the city of London, rope and sail maker, in consequence of a communication made to him by a foreigner residing abroad, for an invention of a new mode of manufacturing mangel wurzel, for the purpose of producing certain known articles of commerce.—22nd March, 6 months.

Chancery Lane,
London.

Newton & Berry
Office for Patents.

Meteorological Journal, 1832.

1832.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	Hig.	Low	
JAN.					
26	42	25	29,80	29,77	
27	36	25	29,97	29,82	
28	35	22	30,15	30,06	,35
29	48	32	30,26	30,11	,025
30	45	32	30,23	30,13	
31	43	35	29,98	29,81	
FEB.					
1	45	32	29,49	29,25	
2	47	34	29,22	29,18	
3	43	26	29,70	29,40	,025
4	53	37	29,86	29,74	
5	53	38	29,95	29,87	
6	52	35	29,79	29,60	
7	45	32	30,06	29,73	,075
8	48	22	30,26	30,24	
9	50	29	30,33	30,25	
10	43	24	30,46	30,43	,05
11	43	29	30,40	30,28	
12	43	28	30,26	30,10	
13	41	30	30,02	30,00	,05
14	39	32	30,02	29,96	
15	39	20	30,00	29,94	
16	38	19	29,86	29,60	
17	45	30	29,79	29,62	,025
18	46	33	30,22	30,02	
19	42	30	30,22	30,20	
20	42	21	30,25	30,22	
21	48	29	30,23	30,19	
22	37	24	30,26	30,25	
23	37	25	30,30	30,18	
24	37	20	30,14	30,04	
25	37	21	30,07	30,00	

1832.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	Hig.	Low.	
FEB.					
26	43	30	30,13	30,06	
27	41	28	30,09	30,05	
28	37	29	30,13	30,12	
29	43	30	30,13	30,05	
MARCH					
1	42	30	30,10	30,20	
2	45	34	30,24	30,22	
3	44	32	30,25	30,13	
4	48	35	29,95	29,69	,1
5	46	33	29,66	29,58	,275
6	46	32	29,49	29,34	,15
7	43	29	29,35	29,34	
8	38	25	29,38	29,39	
9	48	23	30,10	29,93	
10	47	20	30,36	30,28	
11	45	30	30,34	30,16	
12	47	30	29,99	29,90	
13	45	30	29,86	29,60	
14	50	32	29,52	29,32	
15	43	31	29,66	29,29	
16	44	25	29,76	29,73	,05
17	51	30	29,65	29,42	,125
18	51	33	29,49	Stat.	
19	50	32	29,76	29,66	,05
20	51	36	29,76	29,48	,25
21	57	33	30,08	30,00	
22	54	35	30,10	30,00	
23	54	43	29,92	29,87	
24	39	30	29,92	29,72	,075
25	48	30	30,14	30,04	,025

Edmonton.

Charles Henry Adams.

CELESTIAL PHENOMENA, FOR APRIL, 1832.

D.	H.	M.	
1	0	0	Clock before the ☉ 3 m. 55 s.
1	0	0	☿ in perihelio
1	0	0	☉ rises 5 h. 33 m. sets 6 h. 27 m.
1	22	11	♀ passes the meridian
1	22	16	♃ passes the meridian
3	11	0	♀ in conj. with ♃ long. 14. in Aquarius, ♀ lat. 1. 17. S. lat. 58 S. diff. of lat. 20.
4	56	0	☿ passes the meridian
5	0	0	☉ rises 5 h. 25 m. sets 6 h. 35. m.
5	0	0	Clock before the ☉ 2 m. 44s.
5	3	34	☽ passes the meridian
6	8	0	☽ in perige
6	9	0	♂ in conj. with ♅ long. 14 in Cap. ♂ lat. 1. 16. S. ♅ lat. 40 S. diff. of lat. 36.
7	9	40	♄ passes the meridian
7	13	49	☽ in □ or first quarter
7	21	59	♃ passes the meridian
8	0	0	♀ in Aphelio
10	0	0	Pallas R. A. 22 h. 47 m. Decl. 3. 14. N.
10	0	0	Clock before the ☉ 1 m. 18 s.
10	0	0	☉ rises 5 h. 15 min. sets 6 h. 45 min.
11	0	0	occult. of Saturn, 1m. 3 h. 26m. Em. 4. h. 10 m. mean time.
13	1	12	☿ passes the meridian.
13	20	13	♂ passes the meridian.
14	16	0	Ecliptic oppos. or ○ full m.
15	0	0	Clock after the ☉ 1 m.
15	0	0	☉ rises 5 h. 6 m. sets 6 h. 54 m.
15	12	46	☾ passes the meridian
17	22	0	☾ in conj. with ϕ in Oph.
18	0	0	Vesta R. A. 8 h. 27 m. Decl. 25. 6. N.
18	19	53	♅ passes the meridian
19	14	36	☉ enters Taurus
20	0	0	Clock after the ☉ 1 m. 11 s.
20	0	0	☉ rises 4 h. 56 m. sets 7 h. 4 m.
20	19	45	☾ passes the meridian
21	3	0	☾ in Apoge
21	19	23	♅ passes the meridian
22	16	12	☾ in □ or last quarter
22	0	0	Juno R. A. 9 h. 52 m. Decl. 11. 23. N.
23	22	0	in conj. with ♅ long. 18. in Cap. ☾ lat. 55 S. ♅ lat. 40. S. diff. of lat. 15.
24	0	0	☿ Stationary near ζ in Aries
35	0	52	☿ passes the meridian
25	0	0	Clock after the ☉ 2 m. 10 s.
25	0	0	☾ in conj. with ♂ long. 1 in Aquarius ☾ lat. 1. 57. S. ♂ lat. 1. 32. S. diff. of lat. 25.
25	0	0	☉ rises 4 h. 47 m. sets 7 h. 13 m.
25	20	3	♂ passes the meridian
25	22	30	♀ passes the meridian
26	0	0	Juno R. A. 9 h. 54 m. Decl. 11. 30. N.
26	10	14	☾ in conj. with ♃ long 19 in Aquarius ☾ lat. 3. 17. S. Jup. lat. 1. 2. S. diff of lat. 2. 15.
26	21	30	☾ passes the meridian
27	32	0	☿ in conj. with δ in Aries.
28	7	50	☾ in conj. with ♀ long. 14 ♓ ☾ lat. 4. 36. S. ♀ lat. 1. 32. S. diff. of lat. 3. 4.
30	0	0	Ceres R. A. 0 h. 56 m. Decl. 2. 46. S.
30	0	0	Clock after the ☉ 2 m. 56 s.
30	0	0	☉ rises 4 h. 38 m. sets 7h. 22 m.
30	0	28	☿ passes the meridian
30	3	40	Ecliptic conj. or ● new moon
30	15	28	☾ in conj. with ☿ long. 17. in Aries, ☾ at. 4. 56. S. Merc. lat. 1. 29. N. diff. of lat. 6. 25.

None of the eclipses of Jupiter's satellites are visible in London this month.

The waxing moon ☽.—the waning moon ☾

J. LEWTHWAITE.
Rotherhithe

THE

London

JOURNAL OF ARTS AND SCIENCES,

No. L.

[SECOND SERIES.]

Recent Patents.

To JOHN MOORE, *of Broad Wier, in the city of Bristol, gentleman, for certain new or improved machinery for propelling carriages; also for propelling ships, vessels, or other floating bodies, and for guiding propelled carriages, and apparatus for condensing the steam of the steam engines after it has propelled the steam engine piston.*—[Sealed 30th Sept. 1829.]

THE subjects of this Patent are divided into two heads; first, an apparatus for actuating and guiding the running wheels of a locomotive carriage, or driving the paddle wheels of a steam vessel; and, secondly, the employment of an air valve in the eduction tube of the steam engine, for the purpose of promoting the condensation. The manner in which these improvements are described in

the specification, render it very difficult to discover the whole of the Patentee's inventions; we shall, however, give the best explanation we are enabled to make under these circumstances, observing, that in our opinion, those parts of the invention, which are intelligibly shewn, do not appear likely to become practically useful for the purposes proposed.

Plate III. fig. 1, is a horizontal representation of the locomotive engine; *a, a, a,* is a square or oblong frame through which the axle *b,* of the running wheel *c, c,* passes, and at right angles to this is the perch *d, d,* of the carriage; *e, f,* and *g, h,* are vibrating levers, turning upon the perch *d,* as their fulcrums or axle; the ends of these levers are attached by joints to the lateral levers *i,* and *k,* which turn upon the axle of the running wheels as their fulcrum. At the ends of these lateral levers *i,* and *k,* clips *l, m, n, o,* are affixed, which are severally designed to take hold occasionally of the periphery of the running wheels, in order that, by depressing one end, and raising the other end of the lateral levers *i, k,* the clips having hold of the wheels, may force them round.

The driving powers, which may be that of a steam engine mounted in the carriage, is to be connected by a rod to one of the arms *e, f, g,* or *h,* and by its reciprocating action these arms will be alternately raised and depressed, and the lateral levers *i,* and *k,* consequently be made to vibrate upon their fulcrums on the axle *l.*

This vibratory action of the lateral levers *i,* and *k,* will, it is said, cause the clips *l, m, n, o,* to take hold of the periphery of the wheel, and to drive it through part of a rotation, and it is by a succession of these vibratory strokes, that the wheels are to be pushed round, and the carriage or vessel to be propelled forward.

Such is the scheme proposed, but it must be confessed, that the drawing does not exhibit a practicable method of accomplishing the intended motion, and, if really accomplished, it is quite obvious that the movement must be too slow for any such purpose, as that of propelling the running wheels of carriages, or the paddle wheels of steam vessels.

The mode of steering or guiding carriages, is not more intelligibly made out in the specification than the preceding. A rectangular frame *p, p, p, p,* which is placed before the carriage already described, at fig. 1, is mounted upon two moving wheels *q, q,* which constitutes the fore carriage; *r,* is the steering cross, upon the axle of which there is a pulley or roller with a cord or chain *s, s, s, s,* passing round it, and over pulleys at the angles of the frame; and after embracing a pulley at *t,* the ends of this cord or chain are made fast to the frame of the hinder carriage.

There is no explanation given of the way in which this is to turn or guide the carriage, and we are left in a very unsatisfactory way to conjecture it.

Fig. 2, is intended to exhibit the improvements for condensing steam after it has passed from the working cylinder; *a,* is a section of the working cylinder, with its piston; *b, b,* the boxes with the induction and eduction valves, from whence a tube *c, c, c,* passes from a boiler to convey the steam into the cylinder, and the tube *d, d, d,* carries off the steam from the eduction; *f,* is a box with a valve, opening to admit atmospheric air, for the purpose of aiding the condensation, the water being discharged by the pipe *e.* There is another plan proposed, shewn at fig. 3, which, it is said, will answer equally well. All that we can make out of this, is, that cold water is to be poured down the

tube *g*, *g*, to aid the condensation, and the water to run off at bottom.—[*Inrolled in the Petty Bag Office, March*, 1830.]

To EDWARD TURNER, *of Gower-street, in the county of Middlesex, M. D. and* WILLLAM SHAND, *of the Burn, in Kincurdineshire, in that part of the United Kingdom called Scotland, Esq. for their having invented a new method of purifying and whitening sugars, or other matter.*—[Sealed 26th June, 1830.]

THE removal of the colouring matter from sugar is usually effected by filtering water through the sugar in a conical vessel. The broad end of the vessel is placed uppermost, and being filled with the moist sugar, its surface is covered with wet clay, from which the water descends through the sugar, and carrying with it the colouring matter in solution, passes off at bottom through a hole in the apex of the inverted cone.

The plan proposed by the Patentees is not materially different from that above described, excepting that they propose to force the water through the sugar, instead of allowing it to descend slowly by its own gravity.

Plate II. fig. 12, represents a vessel *a*, formed as the frustrum of a cone: it is proposed to be made by staves of wood, combined as a cask, with iron hoops round it, having a bottom perforated with small holes. On the top edge of this vessel there is a flange or flat rim *b*, *b*, into which the plate *c*, of fig. 13, is intended to fit.

The vessel is placed in a tripod stand for convenience, and when filled with sugar fresh from the boiler, it is allowed to get cold; then the plate *c*, is placed over it,

and the two are made fast together by screws or bolts passed through the flanges. Water is then poured into the funnel *z*, which, when the stop cock is opened, passes down the perpendicular pipe or column *e*, into the vessel *a*, and there descending through the sugar by its gravity, passes out at bottom, bringing the colouring matter from the sugar with it in solution.

A coarse cloth should be laid upon the surface of the sugar, to prevent its being disturbed by the descending water; and leather should be introduced between the flanges to prevent the water oozing out at the joint.

Syrup or molasses may be used, or other fluids, instead of water, as the invention consists in applying a column of liquor of any suitable kind, on the top of a vessel containing sugar, for the purpose of carrying off the colouring matter in its descent through the sugar with greater expedition than is effected by the ordinary means of clarifying.—[*Inrolled in the Inrolment Office, December*, 1830.]

To MOSES POOLE, *of Lincoln's Inn, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of certain improvements in the apparatus used for certain processes of extracting molasses or syrup from sugar.*—[Sealed 26th June, 1830.]

THE object of this invention is precisely the same as the preceding, but the mode of effecting it is different.

An open vessel is to be made with what is called a false bottom, that is, a double bottom, the inner one being

perforated with many holes; this false bottom is to be concave as a basin, and to be covered with a horse hair cloth, to prevent the materials passing through.

When filled with the sugar from which the colouring matter is to be extracted, an exhaustion is to be produced in the vessel under the false bottom, which will cause the liquid matter above to pass rapidly through by the superincumbent pressure of the atmosphere, and thereby carry off the colouring matter quickly, which may be occasionally drawn from the bottom of the vessel, by opening a stop cock for the purpose.

The exhaustion to be produced under the false bottom, is proposed to be effected by condensing steam. No drawings accompany the specification, though the Patent is granted for "improvements in the *apparatus* used for certain processes of extracting molasses, &c." We should rather say improvements in the process of extracting, &c. It is, however, said that a jet of cold water is to be thrown into the vessel filled with steam, or rather a shower by a rose head distributor, which by cooling and condensing the steam, will produce an exhaustion of the air under the false bottom of the vessel containing the sugar without employing an air pump.—[*Inrolled in the Inrolment Office, December*, 1830.]

To John Lane Higgins, *of Oxford-street, in the county of Middlesex, gentleman, for certain improvements in wheel carriages.*—[Sealed 11th August, 1828.]

The intention of the Patentee is to construct an improved apparatus for locking the fore wheels of a carriage, in which, instead of the axletree turning upon a centre pin,

fixed in for part of the axletree, as in the ordinary way, it is here made to move round horizontally upon a changeable centre in the following manner :—

Plate III. fig. 4, is a horizontal or plan view of the carriage running upon three wheels, the body being removed to shew the parts more clearly ; fig. 5, is an elevation of the fore wheels and axle taken transversely ; *a*, *a*, are the fore wheels ; *b*, the hind wheel ; *c*, *c*, *c*, *c*, the fore carriage for supporting the body of the vehicle, having springs under it affixed to the axletree as usual ; *e*, is called the sway bar, which is connected to the fore carriage under the perch ; *f*, *f*, is a double perch, formed through and secured to the transome *g*. The bed of the fore carriage is at *e*, fixed upon the axletree ; *i*, *i*, is an iron staple, firmly fixed to and standing up from the bed, seen best at fig. 5, the ends of which staple form the double or changeable centres.

The double perch *f*, *f*, bears upon the bed *h*, under the staple *i*, *i*, in the fore carriage, and upon the springs or axletree of the hind wheels. Two curved pieces *k*, *k*, are framed into the transome *g*, and made fast to the ends of the perch. These pieces *k*, *k*, are segments of circles, the radius of which is equal to the length of the staple *i*. There is a bolt fixed at *l*, intended to work against the bent piece *m*, when the carriage is on the lock.

The perch is drawn forward by the ends of the staple *i*, bearing against the segment piece *k*, *k*, and when it is upon the lock, as shewn by dots in fig. 4, one end of the staple becomes the centre of motion, while the other end moves round within the arc of the segment piece by which it is confined.

The Patentee says, a body being fixed upon the fore carriage, and turning with it between the wheels in the

same manner as a two wheeled carriage, the driving is rendered much safer and easier than an ordinary four wheeled carriage; a great advantage is also gained by this construction of carriage, when backing or going down hill. The two ends of the staple bearing against the transome, 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 may be made of any of the usual materials, and the form and proportions may be varied according to the kind of body or seat for which it is intended.

The Patentee concludes by saying, "My invention does not consist in any specific form or construction of the wheel, axletrees, springs, or other parts 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 centre perches. The figures of the drawing shew how the parts are to be combined to form a carriage of the above kind, but the arrangements, 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."—[*Inrolled in the Inrolment Office, Feb.* 1829.]

To WILLIAM MENCKE, *of Park-place, Peckham, in the county of Surrey, gentleman, for certain improvements in preparing materials for and in the making or manufacturing of bricks.*—[Sealed 11th August, 1828.]

THERE are two objects proposed under this Patent; the first is, to improve the quality of bricks by the admixture of chalk with the clay; and, secondly, the employment of a peculiar construction of press for forming or moulding the bricks in a more perfect and expeditious manner, than by hand moulds.

In the first instance, the clay is to be prepared with chalk, by grinding the two substances together in an ordinary pug mill. The mass of material, after having been ground, is to be mixed with a considerable quantity of water; and when it has been allowed to settle, the water is to be drawn off from the top by a portable pump, the trunk of which must be gradually lowered into the fluid, so as not to disturb the mixture, or become itself clogged by the clay. When the water has been sufficiently withdrawn, a quantity of sulphuric acid is to be poured upon the clay, which will cause the materials to mix more perfectly together. The proportions of clay and chalk are not stated, nor the quantity of sulphuric acid, but these will probably require to be varied, according to the qualities of the material.

When the chemical action of the acid upon the earthy matters has sufficiently operated, and the materials have been properly incorporated together, the plastic stuff is to be spread out to dry in slabs, and when dry, is to be fed by hand into the press or machine, in which the bricks are to be formed.

Plate III. fig. 6, represents an elevation of the brick-making press, consisting of two strong iron pillars *a*, *a*, which are the main supports; *b*, is the cross beam at top, through which the screw *c*, passes; and *d*, the cross beam at bottom, having a reservoir of water with the plug or stem *e*, working in it, as an ordinary hydraulic press.

The box or mould in which the bricks are made, is shewn at *f, f*, fixed to and supported by the standard pillars. It consists of a rectangular frame with partitions, dividing the box into any number of spaces corresponding to the form and size of the intended bricks, of which eight, twelve, or any other desired number may be moulded at one time. This box is open both at top and bottom; the under side is to be closed when the machine is in operation by a flat board *g*, supported by the flat table, called the follower *h*, which is mounted on the stem *e*, of the hydraulic press; and the force pump being worked as usual in other hydraulic presses, the water will be forced through the pipe *i*, and raise up the follower *h*, and board *g*, to the under side of the mould; the screw *c*, is attached to the plunger *k*, having a number of blocks on its under side, corresponding to the number of bricks intended to be made at one operation in the mould, which blocks, are designed to compress the material, and to force the bricks out of the mould when formed.

The clay and other material compounded as above stated, is to be thrown into the mould *f*, in a dry state, by a labourer, and when the mould is solidly filled, the material is to be spread level with the top of the frame *f*; the lever *l*, of the fly press being now swung round, the blocks of the plunger *k*, will descend into the compartments of the mould, and press the material into a compact form. The valve of the hydraulic press may now be opened, which will cause the follower *h*, to descend, when by further turning the lever *l*, of the fly press, the brick will be discharged from the moulds through the bottom on to the board *g*, by which they may be removed from the press to be dried, and another batch of bricks made in the machine in the like way.

The bricks after having been thus formed, are to be dried ready for burning, by piling them in open ranges, in an arched oven. The construction of the oven for drying is not very material, but it is proposed, to make a series of long narrow ovens, with arched roofs, the furnace of each being in front, and the chimney at the back, by which means, the heat will be conducted

through the stacks of bricks, and the moist vapour be carried off by the chimneys.

When the bricks have been rendered sufficiently dry by these means, they are to be removed from the ovens, and are to be again stacked within the same ovens with fuel; and in that way they are to be burned and rendered fit for use.

Bricks made in this manner will be found to be of a very superior quality, more compact, better shaped, and more durable than any bricks that have been heretofore made by any other means or materials.—[*Inrolled in the Inrolment Office, February*, 1829.]

To JOHN BOASE, *of Albany-street, gentleman, and* THOMAS SMITH, *mechanic, of Augustus-street, both in the Regent's-park, in the county of Middlesex, for their having invented certain improvements in machines or machinery for scraping, sweeping, cleaning, and watering streets, roads, and other ways, which machines or machinery may be applied to other purposes.*—[Sealed 10th December, 1828.]

IT appears to be the intention of the Patentees to save part of the labour of scavengers, by driving a machine, containing a rotary brush and scrapers, over the surface of streets and roads, in order to bring the mud, without the labour of hand sweeping, to one side of the way, where it may be taken up by scoops, and thrown into the mud cart by hand labour, as usual, in order to be carried away.

Plate III. fig. 7, shews a plan, or horizontal representation of the machine; *a*, *a*, is a rectangular frame, mounted upon a rotary axle *b*, to which the running wheels *c*, *c*, are affixed; *d*, *d*, is an axle placed diagonally, which has a cylindrical brush fixed upon it. This axle turns in bearings in the frame *a*, and is driven round by a bevel pinion on the rotary axle *b*.

Horses are to be attached to this carriage by means of the

shafts in front, or it may be drawn by hand as a truck. The rotation of the running wheels *c*, *c*, as the carriage goes forward, gives, through the bevel pinions, an opposite rotary movement to the cylindrical brush, which sweeps the mud in a diagonal direction to the side of the road.

In order to collect that portion of the mud which has the stiffest consistency before sweeping, scrapers are employed to precede the brush; these scrapers are made by plates of metal *e*, *e*, *e*, suspended by rods or chains from the shaft *f*, which is placed diagonally in the fore part of the carriage. The shaft is made capable of turning upon its axis, in order to raise the scrapers to any height from the ground that may be desired; being in many pieces, they are enabled to give way if any stone or other obstruction comes against them. A tail scraper, of a half-moon shape, is affixed to the back part of the carriage at *g*, to collect and scrape the mud into a heap on the side. A tank with water may also be placed on the top of the machine, if required, to water the ground.—[*Inrolled in the Inrolment Office, February*, 1829.]

To Henry Cruger Price, *and* Charles Fox Price, *of the city of Bristol, ironmongers, for their having invented or found out an improvement in and upon certain apparatus already known for the communicating of heat by means of the circulating of fluids.*—[Sealed 20th August, 1829.]

The apparatus to which this improvement relates, is for the communicating of heat to air, for the purpose of warming the interior of apartments in dwelling houses, or for shops, or manufactories; of churches and public offices; of hot houses and conservatories for plants, or other buildings in which a moderate degree of artificial heat or warmth is required to be given to the air therein contained; the com-

munication of that heat being effected by means of the circulation of hot water through a system of pipes and hollow vessels; one of which vessels is situated at the lower part of the apparatus, and is exposed to the heat of fire, in the manner of a boiler, in order to give heat to the water therein contained; and other hollow vessels which are situated at the upper part of the apparatus, and are surrounded with the air which is to be warmed, by communicating to that air a part of the heat which the contained water received when the same was in the boiler.

The circulation is kept up in that direction which will always cause the water which is heated in the boiler, to flow out from the upper part, through ascending pipes, into the other pipes or vessels which are exposed to the air; and as fast as the same water becomes cooled, by communicating part of its heat to that air, it flows out from the vessels, through descending pipes, and returns into the lower part of the boiler, where it becomes heated again, and as fast as it is so heated it rises to the upper part of the boiler, and passes away again through the ascending pipes to the upper hollow vessels, so as to keep up a continual circulation of all the water that is contained in the apparatus, through every part of the system of pipes and hollow vessels; for the water goes out of the boiler as soon as it is heated by the fire that is applied thereto, and it returns back into the said boiler, after it has become cooled within the vessels which are exposed to the air that is to be warmed by the apparatus.

The said circulation results from the manner in which the said boiler and pipes and hollow vessels are disposed, arranged and combined one with another, into a system, whereof that part where the fire is applied is on a lower level than the other parts which are surrounded by the air that is to be warmed: and the ascending and descending connecting pipes between one part and the other of the apparatus are so arranged, that the columns of water contained in each of the said pipes

respectively shall be of equal vertical height; but nevertheless that the water constituting the column within the boiler (and the pipes ascending from it), shall be hotter than the water constituting the column within the vessels that are exposed to the air that is to be heated (and the pipes descending from them): in short, the apparatus must contain two distinct columns of water, one hotter than the other, which communicate freely at their respective lowest levels, where the boiler is situated, and also at their highest levels, where the vessels that are exposed to the air are situated.

The two columns are of equal vertical heights, or altitudes, but the water in one column being colder, and consequently heavier than the hotter water in the column, will preponderate, and weigh up that other column, so as to cause motion and circulation of the water through the apparatus, by virtue of those alterations of specific gravity which take place in water, or other fluids, whenever they are heated or cooled.

For instance, when heat is communicated to water, so as to raise its temperature, the water expands; that is, its bulk or volume increases, and consequently, the specific gravity of the water is diminished; for any given measure of it will weigh less than it would have weighed when the temperature was lower. Or on the other hand, when heat is withdrawn from water, so as to lower its temperature, that water shrinks or contracts in bulk, and consequently its specific gravity is increased. On this principle, if one of the columns of water in the apparatus is always kept hot by the application of fire to the lowest part of it (that is, under the boiler), and if the other column is always kept cool by the communication of part of its heat to the air that is to be warmed (that cooling taking place at the upper part of the column), then the greater specific gravity of the cold water in the latter column will outweigh the hotter water in the other column, so as to displace the hot water out of the boiler, and drive it upwards through the ascending pipes into the vessels which are exposed to the air, as fast

as the cooler water runs out therefrom through the descending pipes into the boiler; and the heated water so entering those upper vessels, being cooled in its turn by communicating part of its heat to the surrounding air, becomes heavier, and then descends, forcing up out of the boiler a fresh quantity of water which has become heated again therein, and consequently lightened; and thus the water in the boiler, at the bottom of the two columns, being continually heated by the fire, and the water in the upper vessels being continually cooled by warming the air with which they are surrounded, a constant circulation of the water is produced through all parts of the apparatus, whereby that water becomes a vehicle for the conveyance and distribution of heat from the fire to places at a distance, where that heat is required to be communicated to air.

And whereas apparatus of the above description is already known, and is not of our invention, it is not necessary to describe the same more minutely: what is hereinbefore stated being sufficient to explain the kind of apparatus to which our improvement is to be applied: and our improvement consists in a certain arrangement and combination of pipes and vessels (hereinafter described) to be connected with the upper part of the ascending pipes from the boiler, which ascending pipes contain the column of heated water, in order to receive the increase which takes place in the volume of the water that is contained in the apparatus as it becomes heated. Our improvement operating in such manner as to avoid overflowing by that increase, and yet to keep the boiler and the vessels which are exposed to the air, which is to be warmed, (as well as the ascending and descending pipes connecting between the same), always full of water.

And further, our improvement consists in constructing the aforesaid vessels, which are exposed to the air that is to be warmed, in a particular manner (hereinafter described), with several cylindrical vessels of different diameters, which are put one within another, in pairs, the upper and lower edges of each pair being joined together, in order that the space left vacant

between the two cylinders may form a vessel to contain the hot water. A series of such cylindrical vessels are disposed one within another, leaving narrow cylindrical spaces between them for the passage of the air that is to be warmed by the hot water, which is contained within the vessels; consequently, the said air will be exposed, or spread out in thin layers, which are situated between extensive surfaces of the vessels containing the hot water; and, conversely, the hot water so contained, will be spread out in thin layers, between the said extensive surfaces of the vessels exposed to the air; and that air is caused to ascend in a continuous current through the narrow cylindrical spaces allotted for it betweeen the said cylindrical vessels, at the same that the hot water flows downwards through the interior of the cylindrical vessels, whereby the heat of the water will be rapidly and completely communicated to the air.

And for the full explanation of our improvement we have hereunto annexed a drawing, which represents so much of an apparatus for the communicating of heat to air, by means of the circulation of hot water through the apparatus, as is requisite for the full explanation of our improvement, and the adaptation thereof to the apparatus already known.

Plate IV. fiig. 1. is an elevation of the apparatus with our improvement. Figs. 2, 3, and 4, are horizontal sections of what we term our water stove, being our aforesaid series of vessels, one within another, by which the heat is communicated from the hot water to the air: and fig. 5, is a vertical section of the same stove. The same letters of reference are used to denote the same parts in all the figures; *a*, represents the boiler, which is of the kind commonly used for steam engines; and the only difference in the use of it is, that it is quite filled with water. The boiler is heated by applying fire to it in any of the modes in use for steam boilers; but the furnace is much smaller, in proportion to the boiler, than is usual in steam boilers. The construction of the boiler forming no part of our invention need not be further described.

b, is an ascending pipe, joined to the upper part of the boiler, to convey the hot water therefrom up to the cylindrical vessel *c*; the ascending pipe *b*, is no part of our invention. The vessel *c*, with the pipes and vessels marked *d*, *e*, *f*, *g*, *h*, *i*, and *k*, we term our safety reservoir, and we claim the whole thereof as part of our invention. The cylindrical vessel *c*, is of such size as will facilitate the union of those pipes with it; and it also serves as a reservoir, which contains an extra quantity of water beyond what would be absolutely necessary for the performance of the apparatus, and thereby allows hot water to be drawn off from the apparatus (when required for any useful purpose), without interrupting the operation of the apparatus; *d*, is a pipe joined to the top of the vessel *c*, and to the bottom of the upper vessel *e*, in order to convey the increased and superfluous quantity of water (whether arising from the expansion of the water by heat, or otherwise), from *c*, into *e*.

The pipe *d*, is curved, or looped down and up again, to form an inverted syphon, which will prevent the circulation of water that might otherwise take place between *c*, and *e*, in consequence of the water contained in *c*, (which is the lowest) being hotter than that contained in *e*, (which is higher); *e*, is a vessel in the form of a frustum of a cone, open at top, and the pipe *d*, joins it at bottom. It receives the water that may proceed from *c*, in consequence of the increase of the volume of the water contained in the apparatus when it becomes heated. As the vessel *e*, is provided to allow for that expansion, its capacity should be made suitable to the increase of bulk consequent upon the application of heat. When the fluid employed is water, the capacity of the vessel *e*, should be one twentieth part of the quantity of water contained in all the other parts of the apparatus, because water, at the mean temperature of 52 degrees of Faht. expands about one twentieth of its volume when it becomes heated to 212 degrees, or the boiling point. The vessel *e*, is made conical, in order that as the water rises within it the extent of surface it exposes to the atmosphere may be diminished, and the evaporation propor-

tionably lessened; *f*, is a cylindrical vessel, within which the conical vessel *e*, is contained as it were within a case. The vessel *f*, is open at top, and its use is to receive such part of the water as may overflow the top of *e*, in consequence of the generation of vapour in the boiler, or any other cause. The waste of water from the apparatus, whether by evaporation or by being withdrawn for useful purposes, or from other causes, may also be supplied by pouring water into the vessel *f*; and *g*, is a pipe descending from *f*, to *c*, with a stop cock in it at *h*, to let down the water from *f*, into *c*; *i*, is a short pipe joined to the lowest part of the loop in the pipe *d*, and to the pipe *g*, where it joins to the top of the vessel *c*; it has a stop cock *k*, in it. When the cock *k*, is opened, it allows the loop of *d*, to empty itself of water which might otherwise obstruct the escape of the air from the apparatus when it is to be filled, preparatory to working; *l*, is a pipe from the bottom of the vessel *c*, to the bottom of our stove *m*. The pipe *l*, is no part of our invention; *m*, (see also figs. 2, 3, 4, and 5), is our stove, which we do claim as part of our invention; *n*, is a pipe descending from the bottom of the stove *m*, to the bottom of the boiler *a*; it serves to conduct the water down from the stove *m*, (as it becomes cooled therein) to the boiler, that it may be heated again. The pipe *n*, we do not claim as our invention. The vessel *c*, should never be entirely empty; and to ascertain the height of the water within it, a small vessel *s*, is joined at the lower part of it, by the pipe *r*, and cock *t*, to the bottom of the vessel *c*; therefore, when the cock *t*, is opened (the cocks *h*, or *k*, being also opened to establish a free communication with the atmosphere), the water will rise within the vessel *s*, to the same height as it stands within *c*. The vessel *s*, is open at top, and that top is on a higher level than the top of *c*; *s*, may be made of glass, to see the height of the water within it. The parts *r*, *s*, *t*, we do not claim as part of our invention. The stove *m*, is made of concentric cylinders, placed one within the other, leaving narrow spaces between the cylinders, which are united in pairs at top and at bottom, so that the space left between each pair, will serve as a vessel to contain

water, as shewn by the spaces *d*, *e*, in figs. 3 and 5. The spaces or intervals *f*, *f*, *f*, between the several cylinders *c*, *d*, *e*, that contain the water, are left vacant for the passage of the air that is to be warmed by the hot water that is contained within the vessels *c*, *d*, *e*. The cylindrical vessels *d*, *e*, of the stove, are each composed of two cylinders of metal, which enter one within the other, leaving a space of about two inches wide for water between the two cylinders; and they are united to each other by flanges, at top and bottom of each; viz. the flange at the bottom of the smallest or interior cylinder projects outwards from the base thereof; whilst the lowest flange of the larger or external cylinder projects inwards therefrom; and the under surface of the latter flange applies upon the upper surface of the before mentioned flange. Suitable packing is interposed between the flanges, and they are united by screws put upwards through the lowest flange, and screwed into the other. In like manner the flange at the top of the inner cylinder projects outwards; whilst the upper flange of the outward cylinder projects inwards; but those upper flanges fit one into the other to form one plane, the outside circumference of the flange of the inner cylinder being of the same size and figure as the inside circumference of the flange of the exterior cylinder; and the crack between those two circumferences is covered by a flat circular ring applied over the top surface of the two flanges, with suitable packing under the ring, which is fastened down by screws put down through the ring, and tapped into the flanges.

Note.—It is obvious, that in order to put the cylinders together, the lower flange of the outer cylinder must be large enough within side to drop over the upper flange of the inner cylinder; but ears may project within the interior circle of the said lower flange of the outer cylinder to receive the screws, and corresponding indentations being made in the exterior edge of the upper flange of the inner cylinder, will allow one cylinder to drop over the other; also the interior of the upper flange of the outer cylinder must have ears projecting inwards, to fill up the said indentations.

Each of the vessels so formed of two cylinders, has two necks projecting from it, viz. one at the bottom, projecting downwards, to connect with the branches *m*, *m*, of the pipe *n*, to convey the water away from the stove; and the other neck, projecting upwards from the top, to connect with the branches *x*, *x*, in order to introduce the hot water into the vessel: for this purpose the pipe *l*, is joined to the bottom of a large pipe *c*, which stands up in the centre of the smallest of the vessels. That large pipe may be considered as a continuation of the pipe *l*, only enlarged in diameter, to form a small vessel, and expose more surface; an interval is left all round it, for the passage of the air that is to be heated; and at the top of the vessel *c*, the branch *x*, *x*, is joined, to connect with the upper necks of the concentric vessels *d*, and *e*, in order to introduce the hot water freely and equally into both of them.

Note.—The upper neck of each vessel, where the hot water is introduced into it, should be situated at that part of its interior capacity which is the most remote from the lower neck, by which the same water makes its exit from the same vessel, in order that the water may be compelled to pass through every part of the interior of the vessel.

The bottom of the stove is raised up from the floor of the apartment in which the stove is placed, by supports, in order to admit the external air beneath the bottom, that it may pass freely up into the spaces left vacant for its passage upwards, between the several water vessels *c*, *d*, *e*. The top of the stove is a dome *a*, covering all the cylindrical vessels of which the stove is composed, and receiving all the air that rises through the spaces *f*, *f*, *f*, *f*, between them: at the top of the dome *a*, is a turning register, of the same kind as usually applied in other air stoves; that register serves to regulate the exit of the warm air from the stove, according to the quantity that is required to be discharged into the place where the stove is situated; *h*, is a small tube, joined to the highest part of the top branch *x*, *x*, which connects the three vessels *c*, *d*, *e*, ; the tube *h*, passes up through the centre of the turning knob of the register, at the

top of the dome *a*, and has a small air cock *m*, at the top, which is opened to allow the air to escape from the spaces *c*, *d*, *e*, when they are to be first filled with water, but when they become full the air cock *m*, is to be shut.

To fill the apparatus for action, all the stop cocks *h*, *k*, *t*, fig. 1, and *m*, fig. 5, must be opened, and water being introduced into the upper vessel *f*, fig. 1, it will flow through the pipe *g*, and cock *h*, into the vessel *c*, and from thence by the pipes *b*, *l*, and *n*, it will run down and fill the boiler *a*, and the stove *m*, until every part thereof is full. When the water begins to issue at the cock *m*, fig. 5, that cock must be closed, and also when the height of the water in the transparent or other vessel *s*, fig. 1, indicates that the vessel *c*, is full to the top, all the other cocks *h*, *k*, and *t*, must be shut.

Note.—This mode of filling the apparatus from the vessel *f*, is that which may be commonly practised, though it is by no means essential that the water should be introduced at *f*. If convenience requires, the water may be introduced (either by a pump, or by a pipe from an elevated reservoir) into any part of the apparatus, even into the boiler *a*, the only condition being, that the whole apparatus shall be completely fitted up to the level of the top of the vessel *c*.

The fire is then to be lighted beneath the boiler *a*, and as the water within it becomes heated (and consequently becomes specifically lighter than the water in the other parts, which have not been heated), the circulation will begin, by the colder and heavier water in the descending pipe *l*, *n*, overbalancing the hotter and lighter water in the ascending pipe *b*, and therefore the colder water will force its way into the lower part of the boiler *a*, and displace and force therefrom a corresponding quantity of hot water up the ascending pipe *b*, and into the vessel *c*; it is obvious that a corresponding quantity of water will at the same time run down the descending pipe *l*, and pass through the stove *m*, where it will communicate part of its heat to the air that is contained in the spaces *f*, *f*, *f*, *f*, fig. 5, and the water thus becoming cooled (and consequently heavier), will descend through the descending pipe *n*, fig. 1, into the bottom of the boiler, forcing up a

like quantity of heated water by the ascending pipe *b*, and so the circulation will go on. The fire under the boiler continues giving heat continually to the water that is within it, and the stove always communicates part of the heat of the contained water to the air that is passing through it, and which surrounds it. Hence the difference of specific gravity, which causes the circulation, is continually kept up so long as the fire is continued, and the apparatus kept at work. It is obvious, that the heat given to the water should never be accumulated so much as to produce steam in the boiler.

Note.—The ascending pipe *b*, and the vessel *c*, should be covered with wrappers of non-conducting substance, to avoid loss of heat by radiation and contact with the air, because the ascending column of water in *a*, *b*, *c*, must be kept hot, whilst that in *l*, *m*, *n*, is cooled. If more convenient, the ascending pipe *b*, may be carried up within the chimney of the furnace for the boiler. The above apparatus is represented with only two of our stoves *m*, but the same boiler and pipes, and our safety reservoir (consisting of the vessel *c*, with the pipes and vessels marked *d*, *e*, *f*, *g*, *h*, *i*, *k*), may supply several of our stoves, situated either in different places, or together in the same place, according to the distribution of heat and heated air that is required to be effected by the apparatus. It is advisable to place the stoves *m*, on a level, as much higher than the boiler *a*, as convenience will allow, because the circulation will be the more rapid, and consequently the communication of heat will be more effectual. The water which has passed through one of our stoves, may afterwards be conducted through another stove, as shewn by the figure, so as to serve both.

The dimensions of the apparatus, and the form and disposition of the several pipes and vessels, must be adapted according to the situation in which the apparatus is to be fixed, and the space which is to be heated thereby; few situations being alike in all respects, no rule can be laid down for dimensions, but the same must be left to the judgment of the artificer who is to construct the same, and he must adapt it according to the local circum-

stances of each particular case; and as to the materials of which the parts of the apparatus are to be composed, we prefer cast iron for the large pipes and reservoirs, and for the stoves; and wrought iron for the boiler. The smaller pipes and cocks may be of copper and brass, and although the vessels of which the stove is composed are stated to be cylindrical, they may be made square, or of any other form that is preferred for giving them an ornamental appearance.—*Inrolled in the Petty Bag Office, February*, 1830.

To JOHN FORD, *of Wandsworth Road, Vauxhall, in the parish of Lambeth, and county of Surrey, machine maker, for his invention of certain improvements in machinery for clearing, opening, scribbling, combing, slubbing, and spinning wool, and for carding, roving, or stiffening and spinning cotton, short stapled flax, hemp, and silk, either separately or combined; and for spinning or twisting long stapled flax, hemp, silk, mohair, or other fibrous substances, and either separately or combined.*—[Sealed 13th May, 1828.]

HOWEVER extensive the pretensions of this Patent may appear from the all-engrossing title above recited, yet the specification extends greatly beyond even the limits prescribed, branching into subjects which could scarcely have been contemplated as connecting themselves in any way with the business of clearing, opening, scribbling, combing, carding, slubbing, roving, twisting, or spinning, of any of the substances alluded to.

The inventions referred to are displayed by elaborate drawings in no less than *one hundred and three figures*, and of course these are very scientifically explained by a

voluminous description of the parts, pointing out all the particulars of process and construction, but scarcely hinting at the beneficial object which all this is intended to effect.

Out of so much matter it might be expected to find at least some features of novelty; we have not however been fortunate enough to discover them.

Taking up the subjects *seriatem*, we find, first, an apparatus for beating, breaking, or opening wool; one of those machines which are commonly called a *devil*. It consists of two rotary fan-formed beaters, each turning upon a horizontal axle within a close box, the under part of which box is an open grating. The wool to be operated upon is conducted into the machine, or as it is termed, fed in by a creeping cloth, and is delivered to the beaters between a pair of feeding rollers, where it becomes opened or separated by the rapid rotary action of the beaters as it is discharged from the rollers.

The progress of the wool through the machine is assisted by a blowing apparatus, consisting of a box, containing a rotary fan, the air being received into the box by openings near the axle, and expelled through a narrow channel close beneath the delivering rollers, by which means the wool, when opened, is carried in the current of air through the machine, and the dirt allowed to fall down through the grating.

The creeping cloth or endless web by which the wool is fed in, is distended upon two rollers, which are proposed to be cut on their peripheries with longitudinal ratchet flutes, which, it is said, will cause the cloth to move on much more evenly than if the rollers were plain; and the novel feature is a rack and pinion under the feeding frame, which, it is said, allows of regulating the supply of material to the beaters; and which contrivance

may also be usefully adapted to carding and scribbling engines, and to drawing and roving frames. We have examined this contrivance, but cannot comprehend how it is to effect the object proposed.

The next improvement is in covering the pressing rollers of a drawing or roving frame with leather cut in a particular way, and wound upon a roller in a spiral form. This, it is said, will prevent the filaments of wool from adhering to the top rollers, which is frequently a matter of great inconvenience and loss.

Instead of pressing down these top rollers by weighted levers, it is proposed to place flat brushes, bearing upon their upper surfaces. These brushes are to be made with thin bristles standing parallel to each other, not diverging; and to accomplish this, a very long dissertation is given, describing the Patentee's method of manufacturing these brushes, the mode of tying up the bristles, of cutting them off in tufts, of attaching them to leather and wood as holders, of the materials to be used for the purpose, and the implements to be employed, and so on.

After wading through this mass of irrevelant matter, we come to the improvements proposed in the twisting and spinning machinery, which are so indefinitely described, that we can only say, the filaments of wool, or other materials, are conducted from the drawing rollers horizontally through spinning boxes, which carry their flyers round in vertical directions, and that the thread is ultimately taken up upon bobbins turning horizontally; in all of which we do not perceive any novelty. But one particular feature, as connected with the spinning apparatus, is dwelt upon at great length, which is the mode of moulding and casting the frame work of the machinery, involving a treatise upon sand and loam, and the Patentee's

own particular views and mode of proceeding in preparing to make the castings for the spinning machine.

It will be unnecessary for us to labour further through the labyrinths of this specification, as our readers may rest assured that we have given the essence, if such it may be called, of the above recited invention.—[*Inrolled in the Inrolment Office, Nov.* 1828.]

To THOMAS FOWLER, *of Great Torrington, in the county of Devon, stationer, for his invention of certain improvements in or for raising and circulating hot water, hot oils, and other hot fluids, for domestic and other purposes.*—[Sealed October 2, 1828.]

THE Patentee states in his specification, that his invention consists in causing water, oil, or other fluids, to circulate through the medium of a bent tube, or tubes, by raising the temperature of the fluid contained in a vessel at one end of such tube, or syphon, so that it may be of a less density than the fluid contained in a vessel at its other end; consequently, it will rise up through that end of the tube, and after parting with a portion of its heat to the surrounding atmosphere, descend down the other end into the opposite vessel, thus keeping up a constant circulation of heated fluid in the pipes.

Also in such an arrangement of apparatus for that purpose as renders this invention applicable to domestic and other purposes. Fig. 6, Plate IV. is a view of an apparatus which will sufficiently explain the nature of this invention; *a*, *b*, are two open vessels placed upon the same level, each containing water or other fluid, con-

nected together at their lower extremities by the pipe *c*, having a stop cock in it; *d*, is the bent tube called the Thermo-syphon, having two stop cocks near its ends next the vessels *a*, and *b*; and also the funnel *e*, upon its highest part, with a stop cock upon its connecting tube. The Thermo-syphon is suspended so that its ends may be immersed about half way in the fluid contained in the two vessels, the end immersed in *a*, being bent upwards, as shewn in the figure, to prevent any air which may be disengaged and rise from the fluid as it becomes heated entering the syphon.

In order to put this apparatus into operation, a fire is to be made in the furnace under the vessel *a*, and the air removed out of the Thermo-syphon by shutting off the cocks near its ends, and introducing water into it through the funnel *e*, its cock being open. When the air in the tube has been completely removed, the cock of the funnel is to be shut off, and those on the extremities of the syphon opened, as also the one on the tube *e*, when the apparatus will be ready for operation, which will commence as soon as the fluid in the vessel *a*, becomes sufficiently heated.

Fig. 7, is a more simple apparatus, which may be made to act on the same principle, having only one vessel; and the lower end of the Thermo-syphon *a*, answering the purpose of the vessel *b*, and the connecting tube *c*, at the same time; the water always passing up that leg of the Thermo-syphon which is the warmest, and down the other.

The Patentee states that having described the principle of his invention, it is only necessary to shew how it is applied to domestic and other purposes; and prefaces his description of the next two figures by observing, that in order to apply his 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-syphon and its coldest end.

Fig. 8, represents this invention applied 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; *b*, is the ascending leg of the Thermo-syphon; *c*, is the bath, having a double casing at the back and bottom; *d*, *d*, is the descending leg of the syphon; and *e*, is the funnel on the highest point. It will be seen that the bath, which is to be heated, is situated between the highest point and the lowest, which is the coldest part of its descending leg; *f*, is one of the walls of the house; and as the Thermo-syphon 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-syphon should not in any respect exceed thirty feet, as it acts in this respect on the principle of the torricellian column, and the Patentee prefers it not to exceed twenty feet.

Care should be taken also at all times to exhaust the air completely when filling the Thermo-syphon, air-plugs being placed where necessary to permit the air to escape when filling, and to prevent its return.

Fig. 9, represents another application of the 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-syphon as here shewn.

When this invention is to be applied to the purposes of heating hot houses, green houses, conservatories, or other

places where the heat is required on the ground or in low situations, the apparatus may be varied according to circumstances, and a greater or less number of boilers, with their connecting tubes, be used as required, each boiler having a separate furnace; or they may all be placed over one fire, and their connecting tubes communicating to various shaped vessels placed in different parts of the building; the Thermo-syphon must always communicate from one of the boilers, or a vessel nearest in connection with them, to one of the vessels most remote from them; so that the circulation of the hot fluid from one boiler to another may be kept up through their connecting tubes to the vessel from which the syphon receives the hot fluid.

The great difficulty of making syphons act regularly for any considerable time, and the tendency the water has to find its equilibrium in all the vessels, will prove a great hindrance to this invention ever being made to act as desired; besides which, the Patentee has made so little difference in the length of the receiving and discharging legs of the Thermo-syphon, that it cannot be supposed he intends to avail himself of any assistance from the construction of the syphon, but depends upon the greater density of the fluid contained in one of its legs to cause it to descend, and the hot or lighter fluid to rise in the other end, and thus keep up its circulation.—[*Inrolled in the Inrolment Office, Nov.* 1828.]

To THOMAS TIPPETT, *of Gwennap, in the county of Cornwall, engineer, for certain improvements in the construction and mode of working engines with steam and air, and in the boiler or generator of steam, and in the application of such improved engines to a new method of propelling of vessels and other floating bodies.*—[Sealed 2d October, 1828.]

THE Patentee states, in his specification of the above invention, that the improvements in engines to be worked with steam and air, or atmospheric pressure, and in the boiler; and also in the application of such improved engines consist the following heads:—

First, the improved engine is constructed by erecting two working cylinders (furnished with pistons, valves, pipes of communication, and other parts, usually employed with the working cylinders of steam engines); one of these cylinders has four times the internal capacity of the other, and is open at one end to the atmosphere, the other or smaller cylinder being closed at both ends; the piston rods of both cylinders are connected at the same end with the beam of an engine in the usual manner, the piston rod of the larger cylinder being farthest from the centre of motion of the beam.

After blowing out the air from these cylinders, by the admission of steam from the boiler, the steam is allowed to pass from the boiler by a proper steam pipe, to the upper internal part of the smaller close cylinder above its piston, and at the same time cause the valves to open, which permit the steam to pass from the lower part of this cylinder, and from the lower part of the large open cylinder, beneath their pistons, through pipes to a condenser, in the usual manner; by which means an

approximation to a vacuum will be formed beneath the said pistons, and the larger piston will be pressed downwards, or towards the closed ends of its cylinder, by the pressure of the atmosphere acting on the upper side; while the piston of the smaller cylinder will be also pressed downwards, or in the same direction with the other, at the same time, by the pressure of the steam from the boiler. The communication between the lower extremities of both the cylinders and the condenser is then closed by the usual means, and at the same time a communication is opened through a pipe properly arranged for the purpose, between the upper end of the smaller closed cylinder and the lower end of the larger open cylinder, beneath its piston, while a communication is likewise opened between the boiler and the lower extremity of the smaller cylinder beneath its piston; the effect of which combined operations will be, that the pistons of both cylinders will be forced upwards, the piston of the smaller cylinder, by the force of the steam from the boiler, and the piston of the larger open cylinder, by the difference or excess of the pressure of the steam beneath it, acting on its larger surface, above that of its pressure on the piston of the smaller cylinder in the contrary direction, which latter piston has only a fourth of the area of the other piston, and which excess will be farther aided by the effect of the steam acting expansively, in passing from the upper part of the smaller cylinder to the lower part of the larger open cylinder beneath its piston; an effect well known to experienced engineers, and long since calculated and used by Mr. James Watt, in other modes of application, by which he proved, that, in some instances, a given quantity of dense steam would perform double the work in the same time, that it would if employed with an uniform pressure.

An air pump is used with the condenser, of the common construction, but the Patentee prefers that its rod should be connected with that part of the engine beam which lies at the opposite side of its centre of motion, from that to which the piston rods of the two before described working cylinders are united. The valves of the engine are opened or closed as required, and perform all other operations necessary for the engine, by any of the approved means commonly used for such purposes. The connecting rod, by which the engine is to be made to operate on a fly wheel, or momentum wheel, for turning machinery, or on pumps for raising water from mines and other depths, is connected in the usual manner to the end of the beam that is most remote from the working cylinders; and the working of the engine is continued as long as is necessary, by reiterating the above operations.

Second, the improvements on the boiler or generator of steam, are effected by placing a semi-cylindrical vessel above and parallel to a cylindrical boiler, with its flat side downwards, and connecting the two by several vertical tubes, which are arranged in three rows, between the top of the cylindrical boiler and the bottom of the semi-cylindrical addition; one of which rows of tubes is to range along the summit of the cylindrical boiler, and the other two rows to be disposed at equal distances from it, at its opposite sides. The Patentee prefers having the fire place made within the cylindrical boiler, in the manner usual for those of this kind; and having an additional smaller preparatory boiler, of the same depth as the cylinder, and the same breadth, but of very little length, placed upright, near the farther end of the cylindrical boiler, from its fire place, and connecting the upper parts of the two together by a horizontal tube,

the heated vapours and flame are passed from the fire place through the cylindrical boiler, and then to ascend to the bottom of the semi-cylindrical addition, and after passing along its whole length, in a direction contrary to the first progress, the flame and vapour then descend by external flues along the sides of the cylindrical boiler near its front, and pass beneath its bottom, as in their first direction, to the lower part of the preparatory boiler, behind which they again ascend, as far as the top of the semi-cylindrical addition, along the whole extent of which the flame and vapour pass to the chimney, erected immediately over the front of the boiler; the flame and hot vapours are made to circulate as mentioned, by a proper arrangement of the brick work, in which the whole is inclosed, by means sufficiently well known to the erectors of furnaces, to need more particular description. The combined boiler, thus constructed, is to be supplied with water by a forcing pump, worked by the engine; the supply of water enters the bottom of the preparatory boiler, through a pipe; from the force which the boiler, after receiving some heat, it will pass into the cylindrical boiler, and from thence will rise up the vertical tubes, into the semi-cylindrical addition, and a sufficient height to admit of a large part of it being heated there, though not so high as to prevent the semi-cylindrical addition from also serving as a steam reservoir, by occupying too much of its interior. By constructing the boiler in this manner, the Patentee conceives that he will be able to heat the water in it much quicker, and with less expense of fuel, than by a common boiler, on account of the much more extensive surface of water that is in it, exposed to the action of the fire.

Lastly:—The new method of propelling vessels, to which the power of the new engine hereinbefore described is to be applied, is effected, first, by having two or more hollow cylinders placed horizontally within each vessel, at its stern, beneath the level of the water, with one of the ends of each opening into the water, but properly secured all round, so as to prevent any water from running into the vessel, between its sides and the planks and timbers of the latter; in the cylinders pistons are placed to work forwards and backwards by means of cranks, or other fit modes of effecting the operation, by the primary power of the steam-engine, which means or modes are well known to most engineers, regulating the motion, however, in such a manner, that the velocity with which the water is driven out backwards from the vessel, shall be considerably greater than that with which it enters the cylinders: the Patentee also causes strong metallic rods to be moved backwards and forwards horizontally, through stuffing boxes in the stern of the vessel, beneath the level of the water, by means similar to those by which the motion of the said pistons is effected above mentioned; and to the outer ends of these rods are attached, by proper joints, vanes, or flat plates, capable of shutting close to the rods, or in their line of direction, when the said rods are drawn inwards, and of opening outwards from the rods again when they are thrust out backwards from the vessel, to a position extending at right angles to the rods; this may be easily effected by stops, fastened to the said vanes, or constructed in the joints, by which they are attached to the rods; and these vanes, by pressing against the water with their extended surfaces, when the rods are driven outwards, will impel the vessel by their reaction, while, on the other hand, by being folded up as mentioned, they will present but a comparatively small surface

to the resisted water, and thereby make but little resistance to the way of the vessel, when they are retracted, preparatory to another protrusion.

To farther explain the nature and intent of the before described improvements, the Patentee annexed drawings of one of the methods in which his improved engine worked by steam and air, or atmospheric pressure is arranged, and also of one of the methods in which the improved boiler or steam generator is formed, according to the foregoing descriptions.

Fig. 7, Plate IV. is a representation of one of the improved engines, worked by steam and air, or atmospheric pressure, in which is the beam of the engine; *b*, the large cylinder, open at its top to the atmosphere; *c*, the smaller closed cylinder; *d*, the pipe of communication between the top of the smaller cylinder and the bottom of the larger cylinder; *e*, the valve box, at the upper end of the smaller cylinder; *f*, the valve box, at the bottom of the same cylinder; *g*, the valve box, at the bottom of the larger or air cylinder; *h*, *h*, the eduction pipes, from both cylinders to the condenser; *i*, the condenser; *k*, a pipe leading from the condenser to the air pump; *l*, a valve in said pipe, opening towards the air pump; *m*, the air pump; *n*, the rod of the air pump; *o*, the plug rod, by which the gear or apparatus for working the valves is moved; *p*, the orifice for the steam pipe that communicates with the boiler; *q*, the head of the beam, to which a connecting rod is to be attached, for turning a fly wheel to work machinery, or for working pumps for raising water from mines or other depths; and *r*, *r*, the piston rods.

Fig. 8, represents the side of one of the improved boilers; *a*, denotes the semi-cylindrical steam generator; *c*, the cylindrical boiler; *d*, *d*, *d*, *d*, the vertical pipes

which connect the cylindrical boiler with the semi-cylindrical steam generator; *e*, the preparatory or feeding boiler; *f*, the pipe that connects the preparatory with the cylindrical boiler; *g*, the feeding pipe of the preparatory boiler; *h*, the main passage in the boiler; *i*, the safety valve; *k*, part of the pipe that leads to the engine.

Fig. 9, is a representation of the front end of the boiler; *a*, the semi-cylindrical steam generator; *b*, the fire-tube that contains the fire-place and ash receptacle; *d*, *d*, *d*, the vertical tubes which connect the cylindrical boiler with the semi-cylindrical steam generator.

To WILLIAM ROGER, *of Norfolk-street, Strand, in the county of Middlesex, Lieutenant in the Royal Navy, for certain improvements in the construction of cat-head stoppers.*—[Sealed 30th Sept. 1829.]

THESE improvements in cat-head stoppers for anchors, are shewn in Plate IV, fig. 13, which is a general representation of part of a ship's bow and cat's-head, with an anchor suspended to it, by Lieutenant Rogers's improved cat-head stopper, the particular construction of which is shewn on an enlarged scale in figs. 14, 15, 16, &c.

Before proceeding with the description of this invention, it may be as well to state that the stopper commonly used, consists of a chain or rope, one end being fastened to the cat-head, and the other passed or reeved through the ring of the anchor, and then made fast to the timber head placed for that purpose. These improved cat-head stoppers consist of a chain with a pair of jaws, formed like a pair of forceps, attached to its end. Fig. 17, is a front, and fig. 18, an edge view of one

limb or jaw of the forceps. Fig. 14, is a front view of the forceps, with the jaws open, ready to take hold of the ring of the anchor. Fig. 15, is a view of the forceps closed, after having taken hold of the ring of the anchor, and fig. 16, is an edge view of the same; *a*, is the front pin or bolt, which is passed through the limbs of the forceps, and connects them together; this bolt is also passed through the eyes of a shackle *b*, and rivetted, as shewn in the figs. 14, 15, and 16; *c*, *c*, are two other shackles, which connect the stopper chain *d*, by the two short pieces of chain *e*, *e*, with the upper ends of the limbs of the forceps, as shewn in the figs.; *f*, is another piece of chain, called the slip chain, having one end connected with the shackle *b*, and its other joined to the eyebolt *g*, fig. 1, by a shackle, which eyebolt is fixed securely into the cat-head.

The Patentee then proceeds to explain the method of using these improved stoppers, when the anchor is to be catted in the usual manner. The jaws or forceps are to be lowered by the chain *d*, so as to allow of their laying hold of the ring of the anchor. This is effected by opening them sufficiently wide to receive the ring, and as shewn in fig. 14; the chain *d*, is then to be pulled tight enough to close the jaws of the forceps, and then fastened to the timber head in the usual manner, see fig. 1. The jaws or forceps will then be seen, as in figs. 15, and 16. On reference to fig. 1, it will be perceived, that the chain *d*, is reeved or passed through the hole in the cat-head, that is generally used for the standing part of the common stopper; and in order to prevent it being chafed or cut by the friction of the chain, it is protected by a cast iron socket, with a flange let into the upper part of the cat-head, and firmly secured thereto, as shewn in fig. 1. Fig. 19, represents a top view, and fig. 20, a section of this socket on an enlarged scale. When the anchor is to be let go, it is only necessary to slack the stopper chain *d*, until the strain comes upon the slip chain *f*, which relieves the forceps, and lets the ring of the anchor open the jaws, and slip out of them.

It will be perceived, that the heavier the anchor is, the greater will be the compression of the limbs of the forceps, so that the anchor cannot be released from them, unless the stopper chain *d*, be slackened, so as to allow the strain to come upon the slip chain *f*, which is made sufficiently long, to prevent that taking place, unless the stopper chain be slackened intentionally, in order to let go the anchor. The size, length, and strength of the forceps and the chains, are of course to be regulated by the weight of the anchors. The anchor must be fished, and its flukes secured in the usual manner.

The Patentee states, he does not intend to claim as his invention, the various parts herein shewn and described, which are already known, but claims as his invention the application of the forceps, as shewn and described in connexion with the chains and tackle necessary to enable them to answer the purpose intended.—[*Inrolled in the Inrolment Office, March*, 1830.]

To WILLIAM ROGER, *of Norfolk-street, Strand, in the county of Middlesex, Lieutenant in the Royal Navy, for his invention of certain improvements in the construction of anchors.*—[Sealed 21st August, 1829.]

THE invention described by the Patentee in his specification, consists of certain improvements in the construction of anchors, partly consisting of improvements upon a former patent granted to the said William Roger, 13th March, 1828, for certain improvements on anchors, for a description of which, see the Seventh Volume, Second Series, of this Journal, page 29. The Patentee states that the present improvements are the result of experiments made by him, with a view to determine the best and strongest forms which could be given to anchors,

made upon the principle of his patent; and that he has found it advisable to alter the form of the iron plates, of which the shanks of the anchors were made, in order to give additional strength to them when formed of combinations of wood and iron; and also to introduce several additional plates hereinafter described, and to combine them together, with or without a central piece or core of wood, as it is only used to facilitate the operation of combining them, and not with a view to give an additional strength to the shank, but which core will serve to prevent water from entering the shank if it were made hollow.

The whole of the parts of the anchor are to be bound together by means of iron bands or hoops, in place of bolts, or pins and hoops, as described under his former patent; and likewise, in order to strengthen the arms or flukes, the inventor has adopted another method of connecting or uniting them to the iron plates of which the shanks are formed.

Fig. 1, Plate V. is a side view of a complete anchor, formed upon the present improved construction, and fig. 2, a plan of the same; fig. 3, an end view of the crown and flukes, or arms; fig. 4, represents the two principal iron plates *a*, *a*, *a*, *a*, of which the shank is constructed, bent so as to form parts of the stump arms to which the flukes are to be connected; the method of forming the shank pieces is as follows:—The fig. 5, is a view of one of them previous to bending; it is notched at *b*, in order to afford a facility in bending or curving it, as in fig. 6. The gap occasioned by bending it, is to be afterwards filled up with iron, as shewn by the dotted lines, and firmly welded therein, so as to form the knee of the anchor.

The shank plates being ready for joining together,

the Patentee proceeds to describe the centre piece with which they are to be united. Fig. 7, is one of two thin iron plates, of which the centre piece is partly composed. Fig. 8, shews two plates combined. Fig. 9, one of two other thin iron plates, which are to be united to the two former. Fig. 10, is a section of the four iron shank plates, by which it will be seen that the centre piece is a hollow square frame, which it is desirable to fill with iron for the reasons already mentioned.

The two plates *c*, *c*, have their ends thickened, as shewn in fig. 8, and are to be welded together. The two other plates *d*, are then to be placed within the former ones, and to be welded firmly to them at their ends; previously to placing the plates *d*, within the plates *c*, *c*, a core or central piece of wood should be introduced between them, to keep the plates *f*, in their proper places, and to prevent their collapsing during the operation of welding. This wooden core or central piece, which should be made of African oak, or other desirable wood, should not approach so near to the ends as to be liable to be burnt when welding them. The centre piece is then to be placed between the plates *a*, *a*, see figs. 1 and 4, and to be confined by thin temporary loops of iron. The ends of the iron plates *a*, *a*, are then to be welded to the centre piece, and also to each other at the end *j*, through which end the hole for the shackle pin, and also the hole for the forelock key to pass through are made. The crown piece, shewn in figs. 5 and 6, is to be welded to the stump *c*, *c*, fig. 4, as well as to the end L, of the centre piece H, H, and as shewn in fig. 1, and the scarphs M, M, are to be cut to receive the arms or flukes, figs. 10 and 11, and which are also to be scarphed to correspond therewith. Previously, however, to uniting or

connecting the arms or flukes with the stump arms, the crown and throat of the anchor are to be strengthened by the application of the crown slabs *n*, fig. 4, which are to be welded on each side of the crown, overlapping the end of the centre pillar *h*, and the throat or knees of the stump arms and the crown piece. The stump arms are then to be strengthened in a similar manner by the thin flat peices *p*, *p*, which are to be welded on each side.

The palms are united to the flukes by welding in the usual way, and the flukes are also united to the stump arms by means of the long scarphs *m*, *m*; and when the shank of the anchor has been thus formed and united with the flukes, the anchor-smiths' work may be said to be complete.

The temporary hoops are now to be removed, and to be replaced by other permanent hoops, as shewn in figs. 1 and 2; and in order to prevent the hoops from shifting their places in the event of the shank being strained, small pins are driven through the holes formed in the hoops.

Another of the improvements in the construction of anchors claimed under this patent, consists in a new method of affixing the stock upon the shank of the anchor, which is effected in the following manner: in fig. 2, the stock is shewn affixed to the anchor; in fig. 12, it is shewn detached. It may be made either of one or two pieces of timber as may be found most convenient. It is however to be observed, that the stock is to be completed before fitting on to the shank. After the stock is shaped, a hole is to be made through the middle of it to fit that part of the shank to which it is to be affixed. Two stock plates are then to be let in, one on each side of the stock,

and made fast by countersunk nails and straps or hoops; other straps or hoops of iron are also to be placed round the stock as usual.

In place of nuts formed upon the shank of the anchor, it is proposed to secure the stock by means of a hoop *x*, and a key *y*. By this contrivance, the stock is prevented from going nearer to the crown of the anchor than it ought to do, and the key prevents it from sliding towards the shackle.

As fitting the stock to the shank of an anchor by this method, prevents the use of a ring, as in the ordinary manner, the Patentee says, that he in all cases substitutes a shackle for the ring, and which is all that is required for a chain cable, but when a hempen cable it to be used, he connects a ring to the usual shackle, by means of a joining shackle, as in figs. 1 and 2.

The specification concludes with these words, "I do not mean or intend hereby, to claim as my invention, any of the various parts herein shewn and described, which have already been included in my former patent, or which may be known, or in use; nor do I claim the manner of strengthening the crown of the anchor, by means of the crown piece, or the manner of connecting the arms or flukes as shewn, such having been already practised; but I claim the peculiar method of forming and combining the different parts of which the shank of the anchor consists, as heretofore described, which by combining the said shank with the other parts in the manner described, produces an improved anchor on this new construction.

I also claim the method of fitting the stock upon the shank of the anchor, in the manner described and shewn, which admits of its being put on, and taken off without removing the hoops to separate it into two parts as usual,

and consequently without the assistance of a carpenter.—[*Inrolled in the Inrolment Office, February,* 1830.]

Note—By mistake in the foregoing pages, the name of the Patentee has been put ROGERS, whereas it should have been RODGERS.

To GEORGE DICKINSON, *of Buckland Mill, near Dover, in the county of Kent, paper manufacturer, for his invention of an improvement or improvements in making paper by machinery.*—[Sealed 21st Feb. 1828.]

IN the machinery employed for making a continuous sheet of paper, as originally patented by Mr. Henry Fourdrinier, the endless web of wire gauze constituting the mould on which the semi-fluid pulp is first poured out, must be submitted to a lateral shaking motion in a horizontal position, for the purpose of getting rid of the water, and enabling the fibres of the pulp to settle and become firm paper. This lateral shaking motion of the web is stated to be injurious to the fabric of the paper, by bringing its fibres more closely together breadthwise than in length, and by that means tending to produce long ribs or thick streaks in its substance.

To obviate this inconvenience, the present Patentee proposes to give a rapid up and down movement to the wire gauze web as it conducts the pulp along, by which means the water will be sufficiently shaken out, and the pulp left in a compact, undisturbed, and smooth substance.

Various methods might be devised of effecting this up and down movement of the endless web of wire gauze, all of which the Patentee considers to come within

the compass of his invention, viz. that of giving a vibratory up and down movement to the web, instead of a lateral horizontal movement, as heretofore. One mode however he describes, which is that of mounting the rollers that conduct the horizontal endless web and pulp forward upon a vibrating frame. The fore part of this frame is attached to the standards of the machine by hinge joints, and the hinder part, or that on which the pulp is first poured out, is supported by vertical rods connected to a crank on a shaft below. Rapid rotary motion being given to this crank shaft, the hinder part of the frame necessarily receives a quick up and down vibratory movement, which causes the water to be shaken off, from the web as it carries the pulp forward in the machine, and thus effects the object of setting the fibres of the pulp with much greater equality than in the machines, formerly used.—*Inrolled in the Inrolment Office, June*, 1828.

To GEORGE RENNOLDSON, *of South Shields in the county of Durham, miller for his having invented certain improvements in rotary steam engines.*—[Sealed 4th December, 1828.]

THE subjects of this patent are some peculiarities in the construction, and mode of working a rotary steam engine, or steam wheel; that is a hollow cylinder in which a piston, affixed to a central axle, is made to travel round by the pressure or force of steam, and by so doing to communicate a rotary power, capable of driving other steam machinery.

Plate V, fig 13, is an end view of the cylinder, and fig 14, is a transverse section of the same, taken near one of

its ends, in which the mode of working the sliding steam tops is shewn; the cylinder may be of any desirable length (the Patentee proposes about four times its diameter,) and a long box or recess is made, extending the whole length of the cylinder, on each side, to receive the sliding steam stops when they recede.

In fig. 14, *a*, *a*, is the circular race of the piston *b*. The axle *c*, to which the piston is affixed, is hollow, and the steam passes through one of its ends, and through an aperture *d*, into the circular race, where, by exerting its force the piston is driven round in the direction of the arrow; the stop *e*, acting as the fixed point of resistance, and the axle *c*, is thereby made to revolve.

At each end of the revolving axle *c*, a wheel is fixed, represented by the dotted circle *f*, *f*, in fig. 13. In the face of each of these wheels, there is a groove formed, shewn by dots at *g*, *g*, *g*; part of this groove is concentric with the axle, and the other part excentric, which is intended to receive rollers at the end of the levers *h*, *h*, as the wheel goes round, for the purpose of moving the steam stops in and out.

In the position of the parts shewn at fig. 14, it will be seen that the stop *e*, is projected across the steam way, and in that situation acts as a resistance to the steam as above said, while the other steam stop *i*, is slidden back into its recess, allowing the piston to pass. The levers *h*, *h*, are fixed upon short axles in the boxes *k*, *k*, and upon those axles within the boxes are also fixed similar levers *l*, *l*, the ends of which will be seen in fig. 14, taking into a notch in each slider. Now it will be perceived that when the rotary axle *c*, has been carried round to a certain point, the excentric part of the groove *g*, will cause the lever *h*, to move outwards, by which act one of the steam stops *e*, or *i*, will be drawn back out of the steam

race, and the other projected forward across the steam race. By these movements of the steam stops, the point of resistance against which the steam acts, become successively changed, and the piston being allowed by the receding of the stops to pass freely, a continued rotary motion of the axle is the consequence, as long as the steam is supplied.

After each active volume of steam has expended itself, the projecting of the stop forward cuts off its communication with the induction, and allows it to escape through an aperture into the opposite end of the axle, and so to pass away. Though the above construction of a rotary steam engine is fully set out, yet the novelty claimed by the Patentee in this specification appears to be very inconsiderable; as it is limited in the first place to the mode of tightening the piston to prevent the escape of steam, by placing hemp or gaskins behind the metallic packings, and pressing them outward, by wedge formed pieces or inclined planes; and, secondly, in making the joint of the caps or ends of the cylinder as frustrums of cones, which will admit of their being tightened up as occasion may require.—[*Inrolled in the Petty Bag Office June*, 1829.]

To VALENTINE LLANOS, *of Hampstead, in the county of Middlesex, gentleman, in consequence of a communication made to him by a person residing abroad, for an invention of an improvement or improvements on bits.*—[Sealed 15th December, 1828.]

THE object of this invention is to construct the bit for a horse's mouth in such a manner as to protect the palate and the tongue from injury, and at the same time

to retain perfect command over his actions. Plate V, fig. 15, shews the improved form of the mouth piece, which is made with a peculiarly formed bow *a*, in the middle. The cheeks of the bit are intended to turn upon the necks *b*, *b*, but are to have a small pin in each, which shall work in the recesses or grooves at the end of the mouth piece. These grooves are formed one quarter round the ends of the mouth piece, and consequently the cheeks of the bit are limited in their action, to ninety degrees of circular range.

The particular advantages of this contrivance are not very intelligibly set out in the specification, excepting that it is said, a horse may be fed without removing this bit from his mouth, which will be very advantageous to cavalry soldiers when in action.

The novel features claimed by the Patentee are, the particular shape of the mouth piece, which protects the palate and the tongue from injury; the method of connecting the mouth piece with the cheeks, so as to limit their action to ninety degrees; and the joint which allows of feeding the horse, without removing the bridle from his head.—[*Inrolled in the Petty Bag Office, June,* 1829.]

To Lewis Roper Fitzmaurice, *of Jamaica-place, Commercial Road, in the county of Middlesex, master mariner in the Royal Navy, for improvements on ship's and other pumps, which improvements are also applicable by certain alterations to turning lathes and other purposes.*—[Sealed 11th August, 1828.]

The subject of this invention is an apparatus resembling in principle a rotary steam engine or steam wheel; that

is, there are a series of radial pistons attached to a rotary wheel, which, by passing round in a close circular chamber, produce a vacuum behind.

Plate V. fig. 16, represents a rectangular box *a, a, a,* cut through the middle in vertical section, with the rotary wheel within; *b,* is the axle of the wheel; *c, c, e,* the circular recess or chamber, in which the pistons *d, d, d,* are intended to act, their edges touching the surface of the chamber that is fitting closely as they pass round, and the whole enclosed and packed air tight.

Each piston is mounted upon a radial arm or axle, and is enabled to turn round with its axle, which it is made to do on coming against an inclined plane, that places it edgewise. This inclined plane is shewn at *e, e,* in the lower part of the circular chamber; and it will be seen that the pistons as they arrive successively at this inclined plane are turned edgewise, and pass round in that position through a narrow channel in the box, until they reach the part *f,* where the circular chamber opening to its broad area, the piston is by the coiled spring upon its axle forced round again into its former position.

The construction of the machine being understood, it remains to explain its operation. If a winch be applied to the axle of the wheel, and it is turned in the direction of the arrow, the air will become exhausted, and water will flow up the syphon pipe *g,* the lower end of which is supposed to be immersed in a reservoir of water, such for instance, as the hold of a ship, and the water thus drawn up will be discharged as the wheel goes round, at the tube *h,* in the lower part of the box.

Another plan, which the Patentee calls a modification of the foregoing, is shewn at fig. 17, which represents a vertical section of a circular box or chamber having a series of flaps or pistons attached to a wheel and car-

ried round a ring formed chamber rendered air tight; *a, a, a,* are the flaps or pistons attached by hinge joints to the wheel *b*, which turns upon an axle in the centre; *c*, is a cam fixed to the side of the box, for the purpose of guiding the pistons or flaps by means of their tail pieces, which act against the periphery of the cam as the wheel goes round.

At the lower part of the circular chamber there is a curved ledge *d*, projecting from the side of the box, which, as the flaps or pistons come round in the direction of the arrow, cause them to fall back into the periphery of the wheel, and *e*, is a block, or stop, which closes up a part of the chamber.

When the wheel is driven round by a winch, or other power applied to its axle, the flaps or pistons fitting closely to the surfaces of the chamber, produce a vacuum or exhaustion of the air behind them, which causes the water to rise in the syphon pipe *g*, as in the former instance, and which, descending with the rotation of the wheel, is discharged at the aperture or tube *h*.

The flaps or pistons having fallen into the periphery of the wheel, as they proceed along the lower part of the chamber, when they have respectively passed the stop or block *e*, the cam *c*, takes hold of the tail of each flap, and turns it over upon its hinge joints into its former position, where it again becomes a piston, carrying on the pumping or exhausting operation, and drawing the water up the syphon pipe from the reservoir below.

It is considered that this apparatus may be made to drive machinery where only a small power is required, as in turning laths, and other operations of that kind. In this case the syphon pipe is removed, and a perpendicular pipe attached to the aperture *g*, through which a des-

cending column of water is to pass from a reservoir at the top of the building, in which the machinery is placed By these means the pistons will be carried round with a power equal to that of the weight of the descending column of water, and that power communicated from the axle may be employed to drive the lathes or other machinery.—[*Inrolled in the Inrolment Office, February,* 1829.]

To PHILIP FOXWELL, *clothier,* WILLIAM CLARK, *cloth-dresser,* and BENJAMIN CLARK, *cloth dresser, all of Dye House Mill, in the parish of Minchin-hampton, in the county of Gloucester, for certain improvements in machinery for shearing, cropping, or cutting, and finishing woollen, and other cloths, and cassimeres.*—[Sealed 19th August, 1828.]

THE subject of this Patent applies to a machine for shearing or cropping the pile from woollen cloth. The general construction of the machine to which these improvements are adapted, does not appear to differ materially from the shearing machines formerly made by Mr. G. F. Davis, of Nailsworth, and against whom several actions at law were maintained by Mr. Lewis in 1828, for an infringement of parts of their prior patent rights; a particular account of which, with accurate representations of the machines are introduced in the Second Volume of the Second Series of this Journal.

In this machine the cloth tightly distended by hooks, or what are called habits, travels breadthwise, that is, from list to list, under the shears, and the pile of the cloth becomes cropped or shorn as it passes, by a vibrating blade, acting against a fixed ledger blade; there is also a transversing brush for raising up the pile, previously

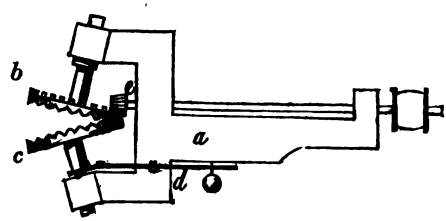
to its coming under the operation of the shears, which brush is worked to and fro by a crank.

There does not appear to be any novel features in the construction of the parts or movements of the machinery, but the claims of invention are, first, the adaptation of a japanned or varnished cloth, as a bed for the shears to act upon, and second, a shaft with ratchet wheels and palls, for drawing up tightly the habits and lists.—[*Inrolled in the Inrolment Office, February*, 1829.]

To EDWARD BARNARD, *of Nailsworth, near Minchinhampton, in the county of Gloucester, clothier, for certain improvements in weaving, and preparing cloth.*—[Sealed 19th, August 1828.]

THERE are two objects proposed under this Patent; the first is, an apparatus for keeping the selvages or lists of cloth uniformly distended, while weaving in the loom; the second is, a contrivance for raising the pile or nap of the cloth, previously to shearing it.

The figure shewn below represents one of the appara-



tus for distending the cloth. The frame *a*, is to be fastened to the breast beam, or to the side of a loom, by screws, or any other convenient means; the two indented wheels *b* and *c*, extending into the loom, so as to allow the list or selvage to pass between the angle of the two wheels, and to be taken hold of by the parts in contact.

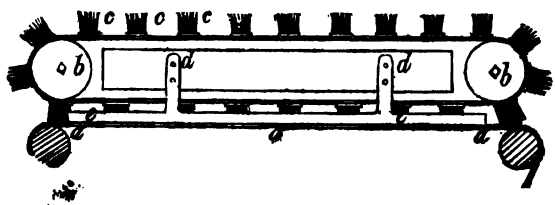
The teeth of both wheels are made extremely obtuse, so that they may only take hold, not enter into the list or edge of the cloth.

The wheel *c*, is pressed up into contact with the wheel *b*, by a weighted lever *d*, or by a spring, which acts under a shoulder in the stem or shaft of the wheel *c*, and by that means the teeth of the two wheels are kept in contact at one point.

At the back of the wheel *b*, there is a circle of teeth, into which a pinion *e*, works, and this pinion being driven by a band and pulley on its axle, turns the wheel round, and draws the list or selvage of the cloth to the desired width.

It will of course be understood that one of these apparatus is to be placed on each side of the loom, taking hold of the list or selvage of the cloth as it passes, and thereby keeping it distended; but as the progress of the cloth is slow, so must be that of the wheels *b*, *c*, the pinion *e*, therefore is made to turn very slowly, by an occasional movement of the pulley, actuated by the advance of the slay, through the agency of a ratchet and click, or by any other convenient means.

The contrivance by which the pile or nap of cloth is proposed to be raised, when about to be shorn, consists in a series of brushes, made to travel across the cloth while



the cloth is passing through the shearing machine. The figure above represents the cloth *a*, *a*, *a*, tightly distended

and supposed to be passing through a shearing machine; two pulleys *b*, *b*, are mounted in the machine, and made to revolve upon their axles, by any suitable contrivance; over those pullies an endless band is passed, which carries a series of brushes *c*, *c*, *c*, and on the wheels *b*, *b*, turning, the brushes are made to travel across the cloth, and to raise the pile ready to be taken hold of and croped by the shears, which are in operation behind the brushes, but not shewn in the figure,

From a board *d*, *d*, two arms extend, which support a rod *e*, *e*. This rod is intended to press upon the surface of the cloth, for the purpose of keeping it smooth as it advances through the machine.

This last described piece of mechanism is mounted on arms or levers extending from the front of a shearing frame, and is enabled to rise or fall on hinge joints, for the convenience of being readily raised up from the cloth.—[*Inrolled in the Inrolment Office, February*, 1829.]

Report of the Committee of the House of Commons on

Steam Carriages.

(Continued from p. 36.)

"The only fair plea for charging Tolls on steam Carriages in proportion to their weight, is to prevent a load from being propelled or carried which would permanently injure the road, Within this limit it would be as injudicious to interfere with their progressive efficiency, (which can only result from the improvements of the machinery and the system of generating and applying Steam),

as it would be to tax Carriages drawn by large and well bred horses more heavily, than such as were drawn by horses in worse condition, and of smaller size and power.

"To charge a Toll according to the number of passengers conveyed, is scarcely less objectionable. If a fluctuating Toll be intended, it would be as inadmissible as to propose a similar mode of charging for fast Coaches, and would be open to all the cavil and interruptions to which a fluctuating Toll would be liable. If the Toll were fixed according to the number of passengers the Carriage were capable of conveying, it would imply the necessity of a licence, limiting the number of passengers, and cramping the progress of improvement of a machine, the capabilities of which can only be ascertained slowly and by continued experiment.

"The trustees of the Liverpool and Prescot road have already obtained the sanction of the Legislature to charge the monstrous Toll of 1*s.* 6*d.* 'per horse power,' as if it were a national object to prevent the possibility of such Engines being used. Besides they have supplied no standard of their own conception of horse power; engineers have differed very much in their estimates of this power; there is not, therefore, much probability that the opposite interests of a Steam Coach proprietor and Toll collector would lead to any agreement as to the meaning of the term. But suppose the Legislature were to settle this point, and to arrange that a certain length of stroke and diameter of cylinder should represent a certain power, we still fail to ascertain that which alone it is essential to know; viz. the actual efficiency of the Engine. Can we regulate the density of Steam at which an Engine of a given size should be worked? To be effectual, it would be also necessary to ascertain the quantity of water consumed, and even this check would be inadequate with an Engine on Mr. Trevithick's principle. If the toll be left as at present on 'horse-power,' it would be the obvious interest of the proprietor to work with the smallest nominal power, but to increase as much as possible the force of his Steam, thereby increasing the probability of explosion.

"Some Trustees have placed the Toll upon the number of

wheels. The Committee would object to this mode of charge, if only because it interferes between the rival modes of Steam travelling, and gives a bounty in favour of that, in which the Engine is placed on the same carriage with the passengers, The opposite plan, of separating the Engine from the Carriage, is that which probably the public will prefer, until the safety of the mode of conveyance shall have been fully ascertained.

" There is still a more serious objection to this mode of charge; it tends to discourage the use of separate Carriages; although it must be evident, that if a certain weight be carried, it will be much less injurious to the road when divided over eight wheels, than when carried on four only. On this point the Committee must again refer to Mr. Macneil's evidence. They cannot, therefore, recommend the House to adopt a scale of Toll, which shall increase in inverse proportion to the injury done to the road. It will be seen in Mr. M'Adam's evidence, that the Toll on Steam Coaches imposed by the Metropolitan Roads Act, is liable to this objection.

" Some of the local Acts have placed an unvarying Toll on Steam Carriages. This, if moderate, would be unobjectionable; but the Committee could not propose any sum which would adapt itself to the necessary varieties of expence in keeping up different roads, by which the Tolls on common Carriages have been regulated. A fixed Toll has, too, this disadvantage, that light experimental Carriages, or such as are built solely for speed, would be liable to the same toll, as Steam Carriages heavily laden.

" The Committee do not anticipate that, for a considerable period, Steam will be used as a propelling power on common roads for heavy waggons. It appears to have been the general opinion of the witnesses, that in proportion as the velocity of travelling by Steam on common roads is diminished, the advantages of Steam over horse power are lost. The efficiency of horses in draught is rapidly diminished as their speed is increased; while, on the contrary, the weight which could be carried or

propelled, at any great velocity, by Steam, could not be more cheaply conveyed, were the speed decreased to that of the slowest waggon.

"As speed, therefore, is the cause of greatly increased expense where horses are used, while with Steam it is comparatively unimportant, it is probable that the latter will be chiefly resorted to when rapidity of conveyance is required. Mr. Gurney considers, that, under four miles per hour, horses can be used in draught more economically than Steam. Should it, however, be deemed profitable to convey heavy goods by Steam Carriages, the Committee recommend that there should be as little interference as possible with the number of carts employed; as the effect on the surface of roads would be infinitely more injurious if heavy loads were placed on a single cart, than if the same weight were divided over several. The Committee recommend that where Carriages, containing heavy goods alone, are propelled by Steam, the weight of the load should be charged, without reference to the number of carts on which it may be carried.

"In conclusion, the Committee submit the following Summary of the Evidence, given by the several witnesses, as to the progress made on the application of Steam to the purposes of draught on common roads.

"Sufficient evidence has been adduced to convince your Committee,—

1. That Carriages can be propelled by steam on common roads at an average rate of ten miles per hour.
2. That at this rate they have conveyed upwards of fourteen passengers.
3. That their weight, including engine, fuel, water and attendants, may be under three tons.
4. That they can ascend and descend hills of considerable inclination with facility and safety.
5. That they are perfectly safe for passengers.
6. That they are not (or need not be, if properly constructed) nuisances to the Public.

7. That they will become a speedier and cheaper mode of conveyance than Carriages drawn by horses.

8 That, as they admit of greater breadth of tire than other Carriages, and as the roads are not acted on so injuriously as by the feet of horses in common draught, such Carriages will cause less wear of roads than coaches drawn by horses.

9, That rates of Toll have been imposed on Steam Carriages, which would prohibit their being used on several lines of road, were such charges permitted to remain unaltered."

Mr. Gurney, in commenting upon this Report, observes "Colonel Torrens' arguments are so conclusive, in regard to the effects of Steam Carriages to agriculture and commerce, that any further remarks here will be unnecessary and presumptuous. I would, however, call to mind, as a *practical illustration* of the truth of these arguments, the immense benefit which has already acorued to agriculture in particular, by the substitution of *wheel carriages for pack horses*. The state that society, and agriculture especially, would be in, had not this introduction of machinery taken place, may easier be conceived than pointed out. In short, the number of horses necessary to do the work which is now done by wheel carriages, would consume almost all the produce of the country. This improvement, with the substitution of the Steam Engine for horse power in stationary situations, has alone enabled this country to support its increased population.

The advantages of machinery are too well know to require any observation; but the propable effects on society, so far as this particular machine is concerned, viz., the Steam Carriage, I would extract from the minutes my evidence given before the Committee of the House of Commons.

I said "generally, in regard to the main improvements on Steam Engines, by which this country has been so much benefitted, and the prospective advantages to be derived from Steam Carriages, that they always have been and will be in direct ratio

with the removal of horses. The great and splendid improvements of Mr. Watt have generally been supposed to be principally connected with the separate condenser of the Steam Engine; but before Mr. Watt's day, we could draw off the water from our mines in Cornwall, and we could do a variety of other simple work by the Steam Engine: and so far the improvement of Mr. Watt was simply productive of a saving of fuel. I consider that the great national advantage arising from Mr. Watt's improvement, has been his application of the Steam Engine to machinery; and the extent of that advantage to the community has been in direct proportion to the removal of horse power: a most unproductive labourer and a dead expense to the country.

" If this view of the subject be entertained, the application of steam to propelling carriages on common roads will be as important above its application to machinery, generally, as the number of horses employed in locomotion, exceed those necessary to machinery, which bears no small proportion with respect to each other. At Hounslow alone, there are at this moment upwards of 1,000 horses employed in stage coaches and posting. On the Paddington Road, a distance of five miles only, there are upwards of 1,000 horses employed at this moment. Throughout Great Britain it is almost impossible to say how many horses are employed, but I should perhaps be within bounds if I were to say millions, in posting and stage coaches. If it is possible to remove those horses by an elementary power (which I firmly believe is practicable), the national advantage must be in proportion to the number of horses so removed; and if it is shown that one carriage horse can be removed from the road by the present state of steam carriages, I see no reason why every horse so employed should not be so removed.

" It has been decided that the consumption of a horse, from the produce of the land, is equal to that necessary for eight individuals, so for every horse that is removed and is supplied by elementary power, we make way for the maintenance of eight individuals. If it is possible, and I see no objection to it, to do

the principal work of horses by steam, or other elementary power, the Committee may imagine to what extent we may provide for our increasing population. We may do much by political laws, but natural laws will do more, and when pointed out by the finger of Providence, may be made thus to provide for his wise dispensations.

" I firmly believe that the introduction of steam carriages will do much for this country; I have always had this impression; I left an honourable and lucrative profession, in which I was extensively engaged, in order to attend to this subject, because I was convinced of its importancs and practicability; I have always entertained the same idea as I do at present. Imperfections may exist in the machinery; but I conceive that the main points of difficulty have been removed by the experiments I have made, and that all those now remaining are practical difficulties, which will be removed by further experience; and if there is no cause opposed by the Legislature, or any other source, I will be bold to say, that in five years, steam carriages will be generally employed throughout England. I have not hesitated, having these feelings, to devote all my time for the last six years to the subject, and am mentally recompensed by the present state of the sublect."

These sentiments are, however, but a matter of *individual opinion*, although, I believe, no impartial person can question their truth. The Report of the Committee of the House of Commons expresses the sentiments of a body of men constituting the most able and competent tribunal; and is conclusive, so far as the decision of men can be, whose opinions have been governed by the *best evidence*. The following document, however, is still more important and conclusive, because it states the *results of actual work*; it is therefore *positive*, and admits of no exception.

This, with other valuable documents of a practical nature, was not submitted to the Committee, because immediately after I had given my evidence I left London, and the only subject before them then was that of Tolls. The Committee, in the course of

their inquiry, impressed with the importance of the subject, had extended their report to the " probable utility which the public may derive from steam carriages." I had no agent or person to represent my interest in London; and, consequently, when, on this latter inquiry, these documents ought to have been laid before them, there was no one to do so. I have the greater satisfaction now in making them public, because they practically confirm a most important part of their report, and shew the value to be attached to the other views entertained by them.

" The principal document in question, is an exact amount of the time of each journey, during the four months the carriage continued to run between Cheltenham and Gloucester, the number of passengers taken in every journey, the monies received for fares, the monies expended in power, and the wear and tear of the machinery. These heads comprehend all the points which affect comparative value. I am indebted for these particulars to Mr. Stone, who has had the management of the Steam Carriages of Gloucester, and who has superintended most of my experiments from the commencement.

" It is said in the Report of the Committee, that " Mr. James Stone states that the Engine drew five times its own weight nearly, at the rate of from five to six miles per hour, partly up an inclination." As the fact appears only in the minutes of evidence without the particulars, I shall first give here, in Mr. Stone's own words, the particulars of an experiment which I have no doubt is the one, or one similar to that, alluded to. They were written the day of making the experiment.

[*To be continued.*]

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Recent Patents.

To WILLIAM FARISH, *of Cambridge, Jacksonian professor in the University, for his having invented an improved method or methods of cleaning out water courses.*—[Sealed 4th December, 1828.]

THE principle of this invention is the employment of a vessel suspended upon pivots, to receive water by any slow drainage, which vessel when filled to a certain height shall, by the preponderating weight of the water accumulated on one side of its axis, immediately tip over and discharge the whole of its contents in a copious flood, the force of which flood is intended to carry away any filth that may have deposited in the drain. There is also a contrivance for applying the same apparatus as a moving power, to open a sluice for the occasional discharge of a

large body of water from an embanked pond or reservoir, the rapid current of which water is intended to wash away the sediment from the ditches or drains connected therewith.

Plate VI, fig. 1, represents a tray or shallow vessel, suspended upon pivots; one end of the tray having a shoot or bevelled edge. This vessel is intended to receive water by means of a pipe, or a drain delivering into it. When the vessel is filled to a certain height, the weight of the water towards the shoot end will preponderate, and cause the vessel to tip over and discharge its contents suddenly; which will produce a powerful flow of water, calculated to wash away any deposits in the drain into which it is discharged.

Fig. 2, is another modification of the same contrivance, in which a cylindrical vessel suspended upon pivots is employed, having a lip formed as a tangent to the cylinder. If water be allowed to run into this vessel until it rises to the top of the lip, a preponderating weight will by that means have accumulated on the lip side of the axis, which will turn the vessel over, and cause it to discharge its contents at the lip part into the drain below.

Fig. 3, represents the section of an embanked pond or reservoir, the contents of which are required to be discharged occasionally with considerable force through the drain below. An apparatus similar to that last described, is enclosed within a water tight box z, z, at the bottom of the pond, and a perpendicular pipe y, extends upwards from the top of this box. When the water in the pond has risen to the level of the upper orifice of the pipe y, it then flows down the pipe, and is conducted into the cylindrical vessel, by means of a trumpet mouthed tube. The vessel having become filled with water to the height of the lip, the preponderating weight on that side causes

it to turn upon its pivots, in doing which it also carries round the toothed wheel *x*, affixed to its side; and this wheel taking into a rack on the edge of the horizontal rod *w*, draws that rod, and with it the sliding valve *v*, from the aperture or mouth of the drain *u*, hence the contents of the pond immediately flow down the drain, and wash away the filth which may have settled there.

The water discharged from the cylindrical vessel into the box *z*, runs off by the small drain *t*, and the cylinder being furnished with a counter-poise weight, is, when empty, brought back to its former position, and the valve *v*, sliden back over the mouth of the drain, allowing the pond to fill again gradually. On the water rising to the aperture at top of the pipe, the same effects take place again, and thus the apparatus occasionally empties the pond, discharging the water with great force, for the purpose above described.

The Patentee states, that he does not intend to confine himself to the apparatus described, but claims the application of every sort of contrivance by which an intermitted flow of water may be effected; and he further states, that the Patent is taken at the suggestion and for the use of Mr. Jowett, of Great Queen Street, Lincoln's Inn Fields, and that the apparatus is to be called Jowett's apparatus for cleansing out water courses.—[*Inrolled in the Inrolment Office, March*, 1829.]

To JOSEPH RHODES, *the younger, of Alverthorpe, in the parish of Wakefield, and county of York, worsted spinner, for his having invented certain improvements in machinery for spinning and twisting worsted, yarn, and other fibrous substances.*—[Sealed 18th September, 1828.]

NEITHER the novelty or the advantage of these "improvements in machinery for spinning, &c." appear to be pointed out in the Specification, and we are at a loss to discover what the merits of the invention consist in—a small part of a spinning machine is represented, for the purpose of explaining the kind of apparatus employed.

Plate VI. fig, 4, is an end view of a portion of the machine, showing the operative parts, with one spindle and flyer. The cop of worsted, or other yarn intended to be spun, is placed upon the frame at *a*, from whence the yarn passes through drawing rollers *b*, *b*, *b*, to the interior of a hollow tube *c*. This tube is mounted in bearings in two fixed horizontal bars *d*, *d*, and is made to revolve by means of the pulley *e*, and cord passing round the driving drum *f*. At the lower end of this tube is affixed the flyer *g*, and the spindle *h*.

The thread or yarn proceeds through the tube *c*, and through the arm of the flyer *g*, at the end of which it passes on to the bobbin *i*. The end of the spindle which carries the bobbin, protrudes through the rail *k*, and it is by the rising and falling of the rail *k*, that the bobbin is slidden up and down upon the spindle, so as to enable the yarn to wind progressively upon the bobbin in uniform coils.

The rail *k*, is supported by arms *l*, one of which arms extend from the lower end of the lever *m*, the fulcrum of

this lever being a pivot at *n*. The periphery of a heart wheel or cam *o*, driven by a toothed wheel *p*, affixed to its axle, acts against a pin in the lever *m*, and as the heart goes round the lever is made to vibrate, by which means the rail *k*, and the bobbin *i*, are progressively raised and depressed, for the purpose of laying the yarns evenly upon the bobbin.

When the bobbin is full of spun yarn it must be removed from the spindle, or as it is termed doff'd, by lowering the rail *k*. This is done by shifting aside the lever *m*, so as to withdraw the pin from the periphery of the heart, and throw it into the position shown by dots. The elasticity of the lower parts of the lever allows of this side movement.

As we have above said, the invention, or novelty, is not evident from this Specification; the Patentee distinctly *disclaims every part of the machine* as already known and in use, but claims the arrangement of the whole as exhibited.—[*Inrolled in the Inrolment Office, March*, 1829.]

To WILLIAM SHARP, *of Manchester, in the county palatine of Lancaster, cotton spinner, for certain improvements in machinery for spinning or roving cotton, silk, wool, or other fibrous substances.*—[Sealed 19th August, 1828.]

THESE improvements apply to that description of machinery commonly called the "bobbin and fly frame." The object of the inventor is to enable a machine to spin and wind upon bobbins, rovings, or yarns, of various qualities

of fineness, by occasionally removing the driving pinions of the machine, and supplying others with different numbers of teeth.

The Specification, which is of very considerable length, describes all the minutiæ of a bobbin and fly frame of the ordinary construction, with the addition of two pinions united together, and fixed on the axle of the front drawing rollers, which pinions have dissimilar numbers of teeth. These pinions, or rather this double pinion, takes into two trains of wheels, the one train actuating the spindles which give the twist to the filaments of yarn, the other the bobbins, upon which the twisted yarns are to be wound; and the proportions of the diameters, and numbers of teeth, on the two parts of the double pinion, are accurately calculated to effect the taking up or winding on, according to the degree of fineness of the twisted yarn.

The differential movement which regulates the rotary speed of the bobbins, according to their increasing diameters—or, in other words, that causes the bobbins to turn slower as they augment in bulk by the accumulation of the yarns, so as to take up or wind on at all times a given length of yarn on to a corresponding extent of surface, is effected by a rack, as in other spinning or roving frames, which rack being moved progressively, shifts the conductor of a strap that embraces a conical drum, and by passing this strap to the larger diameter of the drum, causes it to turn slower, and consequently to drive the bobbins (which it actuates) with less speed.

This rack, however, in the improved machine, is to be moved by a pinion of like diameter, and a number of teeth, to that pinion which regulates the winding on already mentioned; this pinion being driven by means of connection with the other moving parts of the machine. When it is required to vary the speed the double pinion first

described, and also the pinion last described, must be removed, and other pinions of suitable numbers of teeth substituted in their place; which adaptation of pinions for the purpose above stated, appear to constitute the whole matter of the present invention.

The Patentee says, he claims "the contrivance for giving to the taking up motion of the machine, a distinct and separate motion from the twist, which are to bear a relative proportion to each other," and also the "property by which the rack is moved, without requiring to be changed for different qualities of yarn;" and the Specification concludes, by saying, that the inventor does not confine himself to the mode above described of performing the object, as it may be varied, and effected by many other contrivances.—[*Inrolled in the Inrolment Office, February*, 1829.]

To WILLIAM LOSH, *of Benton House, in the county of Northumberland, esq. for his having invented certain improvements in the formation of iron rails for rail roads; and in the chairs or pedestals, in or upon which, the rails may be placed or fixed.*—[Sealed 18th September, 1828.]

THIS invention is said to consist in two particulars: first, a mode of giving additional strength to the iron rails of the road in those parts which have been found most likely to give way, by the pressure of the heavy carriages passing over them; and secondly, a particular mode of joining the ends of the rails, so as to cause them to lock into and confine each other, and thereby prevent the shifting of any of the rails from their proper situations.

The Patentee employs a rail of the ordinary sectional form, that is with a top edge like the rail of a stair-case bannister, slightly rounded on the upper side with over-hanging edges. The bar which constitutes the lower part of the rail, is increased in depth toward the middle of its length, for the purpose of preventing it bending. Its ends, which are to bear upon the chains, or sleepers are formed with ears of a semi-cylindrical shape, resting in cast iron blocks as chairs, which have corresponding concavities, and the ends of the bars are made with lateral indentations, as mortices and tenons locking into each other, the joints being secured by wedges or keys.

The rails, if of malleable iron, are proposed to be made by passing bars in a red hot state between indented rollers, as in the ordinary way of rolling bars to any particular figure; but the increased depth of the rail in the middle is to be produced by making the groove of the roller excentric; and the ends are to be formed by forging or any other convenient means.

The claim of novelty, consists in giving the additional depth to the middle part of the rail to afford strength, and the mode described of forming the junctions at the ends of the rails, and supporting them in cast iron chairs, fastened to the sleepers for the purpose of preventing them from shifting from their situations.—[*Inrolled in the Inrolment Office, March,* 1829.]

To EDWARD JOSEPHS, *of Haydon Square, Middlesex, merchant, for his having invented certain improvements on the wheels, axletrees, and other parts of carts, waggons, and other conveyances.* — [Sealed 18th December, 1828.]

THE Patentee considers, that by the employment of large running wheels for carriages, the draft will be very considerably relieved, as the peripheries of such wheels would roll over hollows in the road, whereas smaller wheels would sink into those hollows and cause repeated obstructions and concussion.

As, however, the axles of such large wheels would be higher than it might be found convenient to raise the bed or bottom of the cart or waggon, it is proposed to form the axletree as a crank, the boxes or naves of the wheels fitting on to the ends of the cranks, some distance above the bed of the cart or waggon, which is to bear upon the lower or receding part of the axletree.

In this mode of mounting a carriage upon crank axles, the bed may be brought very near the ground, which will afford considerable convenience to the loading and unloading of heavy goods. For the convenience of locking, the front wheels must be smaller, and may be allowed to pass under the bed of the waggon much in the usual way.

The Patentee says, that he "does not claim any of the parts as new, but he claims the general arrangement of the whole;" a claim not very easily maintained or even to be understood, if none of the parts in themselves are new. — [*Inrolled in the Inrolment Office, June,* 1829.]

To FRANCIS NEALE, *of the city of Gloucester, barrister at law, for his having invented a certain machine, apparatus, or combination of machinery for propelling vessels.*—[Sealed 7th January, 1829.]

THIS is another adaptation of the well-known mechanical contrivance called the "lazy tongs," consisting of a series of levers jointed together, to the extremities of which series the paddles are to be appended that act in the water; and by the expanding and contracting of the lazy tongs or jointed levers, the paddles are worked to and fro in the water, for the purpose of propelling the vessel.

Plate VI, fig. 5, represents the side of a vessel to which the series of jointed levers is attached. A crank *a*, supposed to extend from the main rotary shaft of the engine within the vessel, is connected by a joint to the central pair of levers at their upper ends; the opposite joint of the central counter levers being upon a fixed stud below, at *b*.

To the extreme arms or outer levers of the series are connected the horizontal frames *c*, *c*, which carry the paddles. One or more paddles *d*, may be attached to each frame *c*, and they may be suspended upon swinging axles, bearing between two horizontal bars, with cross bracings, which constitute the frames.

Two sweep rods *e*, *e*, turn upon fixed studs or pivots at *f*, *f*, and, at their reverse ends, are jointed to the outer levers of the series.

It will be perceived, that if the crank *a*, be made to revolve, it will carry the upper joint of the central levers round in the dotted circle; and as all the levers must preserve their parallelism to each other when the crank has arrived at the highest point of its rotation, the series of

levers will be drawn up into the position shown by dots, causing the paddles *d*, *d*, to approach the centre, in which movement one paddle will be in ction and the other out of action.

Behind the joint of each paddle there is a stop-piece with a bevel edge, which, as the paddle advances previously to giving its stroke, allows it to fall into an inclined position, and to slide through the water without obstruction; but as the paddle recedes for the purpose of giving its stroke, the resistance of the water throws it into a perpendicular position, when it bears against the stop: and now is brought into operation the force exerted by the machinery, through the agency of the paddles against the resisting fluid, and the vessel is propelled in the opposite direction.—[*Inrolled in the Inrolment Office, July*, 1829.]

To Robert Parker, *of Hackney, in the county of Middlesex, lieutenant in the Royal Navy, for his having invented an improved drag or apparatus which is applicable to stage coaches and other wheeled carriages, and whereby the motion thereof may be retarded and stopped when required.*—[Sealed 31st January, 1829.]

The Patentee says that his apparatus consists of a mechanical contrivance resembling in principle the structure of the human leg, having the knee joint and the ankle joint. It is constructed by an iron lever, which may be called the leg, attached to the axle-tree of the carriage by a knee joint, which enables it to be raised or lowered. At the bottom of this lever is a broad piece held by the

ankle joint, called the shoe; which, when the drag is brought into operation, slides upon the ground, and lifts the running wheel up from its bearing.

Plate VI, fig. 6, shows the apparatus drawn up under the carriage, and of course not in operation; the wheel is represented by the dotted segment of a circle as running upon the ground. Fig. 7, shows the drag in operation, the shoe being in contact with the ground, and the running wheel of the carriage raised up off the ground; the weight of the vehicle being supported by the drag instead of the wheel, and consequently as the shoe slides along the ground, a very considerable friction takes place, and the progress of the carriage is consequently impeded.

The axle of the hind wheel of the carriage is represented at *a*, and immediately below it is the knee joint or pivot of the leg *b*, affixed to the axle tree. This leg is a straight bar of iron, at the lower end of which the foot or shoe *c*, is attached by the ankle joint. At the back of the foot or shoe piece *c*, there is an elongation *d*, through which the pin or swivel joint of the eye piece *e*, is protruded. A bent lever *f*, turning upon a fulcrum pin in the leg, is passed through the eye piece, and is confined in the elevated situation shown at fig. 7, by a loop *g*, which drops over its end.

Thus it will be perceived that the bent lever *f*, when confined by the loops *g*, holds up the eye piece *e*, and the elongated part of the foot *d*, and by that means keeps the foot or shoe in the proper position for the sole to bear against the ground, in which position it is still further held by the drag chain *h*, suspended from the under part of the carriage.

When it is required to bring the drag into operation, a person seated at the hinder part of the coach, on the out-

side, lets down the apparatus from the position shown at fig. 6, by releasing the chains, which are all connected together above, and by drawing the chain *i*, powerfully, the bent lever is raised, bringing the eye piece, and with it the foot, into the position shown at fig. 7, at which time the loop *g*, falls over the end of the bent lever, and confines it securely in the position for dragging.

In order to raise the drag from the ground, and allow the wheel to come again into action, the chain or cord *k*, attached to the loops *g*, is to be first drawn up, which causes the loop to slip off the end of the bent lever, when the lever immediately falls and allows the eye piece to fall also, and the foot to turn up as the periphery of the wheel comes into contact with the ground. The drag may then be drawn up by means of the chain into the position shown at fig. 7, and be there made fast to a hook or staple on the side of the carriage.—[*Inrolled in the Inrolment Office, July*, 1829.]

To MOSES POOLE, *of Lincoln's Inn, in the county of Middlesex, gentleman, in consequence of a communication made to him by a foreigner residing abroad, for an invention of certain improved machinery for preparing or kneading dough.*—[Sealed 19th June, 1829.]

THERE are three different constructions of machinery proposed under this patent, either of which are to be employed for kneading dough, for the making of bread or biscuits.

In the first machine described in this Specification, the

dough passes to and fro under a heavy roller mounted in a trough, which roller has a reciprocating rotary action given to it, by means of a wheel, pinion, and winch, driven by hand on the outside of the trough. The second contrivance is a trough with several compartments for kneading different kinds of dough at the same time; which trough is mounted upon pivots, and is made to revolve upon standards by a wheel, pinion, and winch connected to its pivot, the kneading of the dough being principally effected by the rolling over of a heavy ball in each compartment as the trough revolves. The third contrivance is a series of arms and oblique hoops or rings attached to an axle, which is made to revolve within a semi-cylindrical trough, for the purpose of stirring up the flour and water and kneading it into dough.

Plate VI, fig. 8, represents the section taken transversely of a trough for kneading, made of wood; it should be lined with hard wood or with smooth plates of iron. The lower part of this trough is curved to prevent the dough from lodging in any corners. An iron or hard wood roller *a*, extending the whole length of the trough, is mounted upon an axle, the pivots of which pass through the ends of the trough. This roller is intended to revolve near the bottom of the trough, but may be raised or lowered at the pleasure of the workmen when in use, the bearings of the pivots being in sliding-frames attached to levers moved by racks and pinions.

Above the roller *a*, there is a fixed wooden partition *b*, extending the whole length of the trough, which partition is beveled on its lower edge, and nearly meets the periphery of the roller: it is intended as a scraper, and to prevent the dough from passing over the roller.

Upon the end of the axle of the roller *a*, a toothed

wheel is fixed, shown by dots; this takes into a pinion on the axle of the fly-wheel *c*, to which a winch is attached for driving the machine by manual labour, or a rigger may be placed upon the same axle for working the machine by any other motive power.

The fly-wheel being put in motion, the roller *a*, is made to revolve, and the flour and liquor having been previously introduced into the trough and covered by the lid, the materials are drawn through the space between the bottom of the trough and the roller, and become partially mixed.

When this operation has gone on for a short time, the dough partially formed will have been nearly all drawn to one side of the trough, the rotation of the wheel *c*, and roller *a*, must then be reversed, and the dough will pass back again under the roller to the other side of the trough. Thus, by a reciprocating action of the roller *a*, the materials will be properly mixed and kneaded into dough ready for the oven.

Fig. 9, represents the second construction of machinery; *a*, is a long box or chest made of wood, with iron bindings, of which this fig. is an end view. This box or chest is divided into any number of compartments, and the whole is covered with a lid fastened down by hoops or staples. The ends of the box or chest have pivots in the position of an axis, upon which the chest is balanced in standards, and it is made to revolve upon those standards by means of a toothed wheel, pinion, fly-wheel, and winch, or by other convenient means.

The flour and liquor being introduced into the several compartments of the box or chest, a heavy iron ball, like a cannon ball, is placed in each compartment, and attached to the side of the chest by a chain: the chest is then

closed securely by its lid, and being turned round upon its pivots the ball rolls over and over and from side to side among the materials, and causes them to mix; and when so mixed into dough, the weight of the ball, as it continues to roll, kneads the dough perfectly, and brings it into a state fit for baking.

By dividing the rotary chest into several compartments, the Patentee considers that he shall be enabled to mix and knead different kinds of meal at the same time, and by one operation of the machine.

The third kind of kneading apparatus is shown at figs. 10 and 11; it consists of a semi-cylindrical trough, shown in section at fig. 10, in which a series of oblique rings and radial arms are attached to a rotary axle. A portion of this rotary apparatus is shown detached from the machine at fig. 11.

The semi-cylindrical trough *a*, *a*, is intended to extend for a considerable length, perhaps ten or twelve feet long. It is to be stationary and mounted upon legs, and has a lid or cover *b*, which being turned over on to the trough *a*, *a*, incloses the rotary axle.

Flour and liquor being introduced into the trough, and the lid closed down, the rotary axle is to be put in motion, which will cause the arms and oblique rings of the axle to pass through the materials in the trough, and to stir them up so as to produce a perfect mixing, or incorporation of the meal and the liquor, and hence to knead it into dough ready to be made up into loaves of bread. [*Inrolled in the Inrolment Office, December,* 1829.]

To GEORGE HENRY MANTON, *of Dover-street, Piccadilly, in the county of Middlesex, gun maker, for his invention of an improvement in the construction of locks for all kinds of fowling pieces and fire arms.*—[Sealed 2d September, 1829.]

THIS improvement applies solely to guns and pistols which are to be fired upon the detonating principle, the object being a means of allowing the fulminating powder to escape readily from the touch hole when exploding; as it has been found that by the employment of detonating primings, the force of the fulminating powder in the touch hole not being allowed to escape readily, has caused the piece to kick.

The Patentee proposes to remedy this inconvenience by opening the side of the touch hole at the same instant that the cock strikes the nipple, which will allow the fulminating powder to blow out.

Plate VI. figs. 12 and 13, show the side of a fowling piece, with a lock for firing by percussion; *a*, is the cock; *b*, the nipple upon which the detonating cap is to be placed; *c*, and *d*, is a double armed lever turning upon a pin in the bridge piece *e*.

A flat disc at the end *c*, of the lever, covers a lateral opening in the side of the touch hole, as seen at fig. 12, and thus keeps the touch hole closed and protected from the intrusion of wet to the priming. At the other end *d*, of the lever, there is a small friction roller, which bears against the edge of the cock, the lever being kept up to its bearing by a small spring.

On discharging the fowling piece, the descent of the cock forces the lever into the position shown at fig. 13, which shifts the disc *c*, from the aperture of the touch

hole, and allows the ignited priming to blow away without causing the gun to recoil.

The Patentee says that the opening and closing of a lateral aperture from the touch hole may be effected in several other ways beside that which he has shown, and he therefore claims the exclusive right to every mode of letting off or relieving the exploded priming from the touch hole at the time that the piece is discharged.—[*Inrolled in the Inrolment Office, November*, 1829.]

To THOMAS ROBINSON WILLIAMS, *of Norfolk-street, Strand, in the county of Middlesex, Esq. for his having invented improvements in the making or manufacturing of felt, or a substance in the nature thereof, applicable to covering the bottoms of vessels, and other purposes.*—[Sealed 23d May, 1829.]

IN sheathing the bottoms of ships it was found desirable to place between the wood work and the copper plates, sheets of brown paper steeped in tar, for the purpose of protecting the wood work from the anger worm; latterly sheets of felted wool, steeped in tar, have been employed for the same purpose, and the object of this Patent is to prepare such sheets of felt by means of machinery.

Plate VI. fig. 14, represents the section of an apparatus to be employed for this purpose; *a*, is a vat or vessel containing tar; *b*, *b*, are two cylindrical rollers mounted in suitable bearings, over which rollers an endless web of wire gauze is passed. This web is conducted also over two guide rollers above the tar in the vat, and beneath a roller *d*, immersed in the tar; *c*, *c*, are two similar cylin-

drical rollers carrying another endless web of wire gauze, which passes under a weighted guide roller *e*, and also under the roller *d*, in the vat.

The loose wool which should be first prepared by carding, is to be spread out evenly of a sufficient thickness upon the inclined surface of the wire gauze, between the two front rollers *b*, and *c*, and the rollers being then made to revolve, the thickness of wool is drawn in by the two webs between the front rollers *b*, *c*, and is thence conducted down into the vat, where it becomes saturated with the tar, and being further carried between the two webs, it passes upwards beneath the pressing roller *e*, which gives it firmness, and is then led off and discharged from the webs in a stiff sheet on to the table *g*, where it may be cut into suitable sized pieces. After this the pieces are hung up to dry, and are then fit to be used for covering the bottoms of ships to protect the wood work.—[*Inrolled in the Inrolment Office, November*, 1829.]

To EDWARD HANCORNE, *of Skinner-street, in the city of London, nail manufacturer, in consequence of a communication made to him by a foreigner residing abroad, for an invention of certain improvements in making nails.*—[Sealed 16th October, 1828.]

THIS is a machine for manufacturing nails by cutting, pressing, and stamping rods, or slender bars of iron.

The rods or bars having been prepared either by rolling or hammering, or by cutting them from sheets or plates of iron, called slitting, are then to be made red hot, and in that state passed through the machine to be cut into suitable lengths,—pressed into wedge forms for

pointing, and stamped at the end to produce the head. A longitudinal view of the machine is shown in Plate VII. at fig. 1 ; but, as it is very complicated in its details, and its principles appear to have beenp reviously embodied in the machinery for making nails, patented by Mr. Thomas Tyndell, of Birmingham, in 1827 (see London Journal of Arts, Second Series, Vol. III. page 184), we do not consider it necessary to describe all its minutia, as the general operations of the machine may be very well understood from this figure.

A strong iron frame work, one side of which is shown at *a*, *a*, supports the whole of the mechanism ; *b*, is a table capable of sliding to and fro. Upon this table lying horizontally are the clamps, which take hold of the sides of the rod as it advances, and also the shears which cut the rod into short lengths, suitable for making from each length a separate nail.

These clamps or holders consist of a fixed piece and a movable piece, the latter being brought into action by a lever. The shears or cutters are situate and perform much in the same way.

The rod or bar of iron shown at *c*, having been heated to a red heat, is passed into the machine by sliding it forward upon the table *b*, when the table is in its most advanced situation ; rotary motion is then given to the crank shaft *d*, by means of a band passed round the rigger *e*, which causes the table *b*, to be drawn back by the crank rod *f* ; and as the table recedes the horizontal lever is acted upon, which closes the clamps. By these means the clamps take fast hold of the sides of the heated rod and draw it forward, when the movable chap of the shears, also acted upon by a lever, slides laterally, and cuts off the end of the rod held by the clamps : the piece thus separated being intended to constitute one nail.

Let it be supposed that the nail situate at *g*, having been thus brought into the machine and cut off, is held between clamps, pressing it sideways, but which are not seen in the figure: in this situation it is about to be headed and pointed.—The header is a steel die *h*, intended to be pressed up against the end of the nail by a cam *i*, upon the crank shaft, which cam at this period of the operation acts against the end of a rod *k*, forming a continuation of the die *h*, and forces up the die so as to compress the solid metal into the form of a head.

The process of pointing the nail is performed by two rolling snail pieces *l*, *l*. These snail pieces are something broader than the width of the nail, and turn upon axles supported in the side framing. As the table *b*, advances, racks *m*, on the edge of the table take into toothed segments *n*, *n*, on the axles of the snails, and cause them to turn.

The snails at first pinch the nail close under its head with very little force, but as they turn over the longer radius of the snail coming into operation upon the nail, its substance is then very considerably pressed, and forced into a wedge form. This completes the nail, and it is immediately discharged from the clamps or holders; the carriage is then sent forward again by the rotation of the crank shaft, and another portion of the rod *c*, is brought forward, cut off, and formed to the desired shape of a nail, in the way above described.—[*Inrolled in the Inrolment Office, April,* 1829.]

To EDWARD DAKIN PHILP, *of Regent-street, Saint James's, in the city of Westminster, and county of Middlesex, chemist, for his having invented an improved distilling and rectifying apparatus.*—[Sealed 29th November, 1828.]

THIS is an apparatus to be placed upon a still head, for the purpose of separating the aqueous from the alcoholic vapours, which it professes to do with better effect than has been accomplished by any other contrivance heretofore employed.

Plate VII, fig. 2, exhibits the external appearance of the apparatus placed upon a still; fig. 3, shows its internal arrangement in section upon a larger scale; *a*, is the head of the still, from which a cylindrical tube *b*, *b*, *b*, rises as a head. This tube is divided into several compartments *c*, *c*, *c*, *c*, (four are proposed) by horizontal partitions *d*, *d*, *d*, *d*, *d*. All communications from one compartment to the next is cut off by these partitions, except through the apertures *e*, *e*, *e*, *e*, *e*, and these are guarded by water joints.

Within the compartments *c*, inner chambers are formed by inverted cylindrical boxes *f*, *f*, *f*, *f*, and the vapour emitted from the still, after entering the lower compartment *c*, passes from thence into the interior of the box *f*, by apertures at the lower parts of the inverted box, or the boxes may stand within the compartments upon legs, the object being to make the way free for the flow of the vapour from the lower part of each compartment into the inverted box within it.

Each compartment is circumscribed by a cylindrical vessel *g*, *g*, containing water for the purpose of refrigerating the vapour, and promoting its condensation, and

the water is supplied to the upper vessel by a pipe *h*, from whence it flows into the lower vessels by other pipes *i*, *i*, *i*, and is discharged ultimately at *k*.

The construction of the apparatus having been described, we proceed to explain the mode of its operation:—The vapour rising from the still passes, through the lower aperture *e*, in the head *b*, into the lower compartment *c*, as shown by the arrows. In this compartment the vapour becomes partially cooled by the surrounding vessels of water, and its aqueous parts become condensed, which fall to the bottom of the compartment, and flow away into the still again by the descending pipe *l*, while the alcoholic vapour rises through the apertures *m*, *m*, at bottom into the box *f*, *f*, and thence proceeds from the box *f*, up the tube *e*, as shown by the arrows into the second compartment *c*. Then the vapour becomes again cooled by the surrounding vessel of cold water, and is further condensed, the aqueous part falling to the bottom of the compartment, and flowing away through the water joint to the lower compartment, and the alcoholic vapour rising as before through the aparture *e*, to the next compartment and so on, until it reaches the top of the still head, whence it proceeds in a highly rectified state by the pipe *n*, to the worm tub, or ultimate refrigerator, where the alcoholic vapour becomes condensed into a pure spirituous liquor.

The Patentee does not confine himself to any particular dimensions or number of compartments, boxes, and vessels *c*, *f*, and *g*, nor does he define the precise features of his invention, but states that he does not claim any of the parts of the apparatus which may have been so employed before.

After his indefinite claim, we feel ourselves bound to refer our readers to the patented inventions of Mr. Saint-

mare, applicable to distilling apparatus, (see the first Series of the London Journal of Arts Vol. X. page 77. and Vol. XIII. page 198,) in which the more perfect condensation of the vapour emitted from a still, is sought to be effected by passing it through a succession of chambers in connection with refrigerating liquor, until the vapour is discharged at top in a highly concentrated state; also, the flow of water through the surrounding vessels *g*, *g*, by which the coldest medium is applied to the most highly concentrated portions of the vapour, is an adaptation of the same principles as those claimed under Yandal's Patent, refrigeration, (see also Vol. XIII. page 95.)—[*Inrolled in the Inrolment Office, May*, 1829.]

To JOHN FORBES, *of Cheltenham, in the county of Gloucester, architect and surveyor, for his new invented method of burning or consuming smoke.*—[Sealed 15th December, 1828.

THE principle feature of this invention is placing one fire grate immediately under another, by which the smoke emitted from the lower fire will pass up through, and be consumed by the upper fire.

The object of the invention, we presume, is to cure smokey chimnies, but upon what principle the additional fire is to effect this, we do not perceive.

Plate VII, fig. 4, is a section of the fire place and chimneys; *a*, is the upper or ordinary grate; *b*, is the lower grate. The smoke and combustible vapours from the fire of the lower grate *b*, is intended to pass through the fire of the upper grate *a*. A blower *c*, is made to

slide up and down in the frame at top, which is proposed to be suspended by weighted chains passed over pulleys, as shown by dots.

To an aperture in the back of the grate the pipe *d*, is connected, which leads the smoke of the fire up the chimney; it has a cap at top to guard against the descent of wind; a recess *e*, is formed by plates of iron in the back of the grate, into which the smoke of the lower fire passes, and by it is conducted into the upper fire to be consumed. This throws a considerable heat into the part *f*, behind the grate, and the air thus heated in ascending, greatly promotes the draft of the chimney.

On the sides of the grate there are hollow chambers; formed by the bevelled faces or surfaces marked *g*, through which the atmosphere of the room passes; and there becoming heated, is returned into the room for the purpose of warming it.

The claims of the Patentee are, first, the employment of two fire grates; second, the recess *e*; and, third, the back chamber *f*, for promoting the draft.—[*Inrolled in the Inrolment Office, June*, 1829.]

To JAMES NEVILL, *of New Walk, Shad Thames, in the county of Surrey, engineer, for his having invented an improved machine or apparatus for obtaining mechanical power from falls and running streams of water.*—[Sealed 25th September, 1828.]

THIS invention is called a water wheel, but we should rather describe it as a chain pump, acting by he weight of water depressing its buckets.

Plate VII, fig. 5, shows one mode of adapting the apparatus for obtaining mechanical power from the fall of a running stream, which is called an undershot water wheel; it consists of a series of buckets *a*, *a*, *a*, attached to an endless chain that moves vertically, which is passed over two drum wheels *b*, *b*, commonly called lantern drums, their peripheries being formed by rods, leaving open spaces between every two for the buckets *a*, *a*, to fall into.

A shaft or well is formed for the chain and buckets to descend through, and the water flowing over at top, fills the baskets successively, and causes them to descend, which turns the drum wheels *b*, *b*, and from the axles of these revolving wheels the mechanical power is to be derived.

Fig. 6, shows another arrangement of the same contrivance, but adopted to an overshot water wheel, in which the buckets *a*, *a*, travel diagonally, or in an inclined plane.

The endless chain carrying the buckets, pass over similar drum wheels *b*, *b*, and the water flowing over the upper drum fills the buckets successively, and causes them to pass down the inclined plain on the outside, and hence to give the rotatory impulse to the wheels.—[*Inrolled in the Inrolment Office, March*, 1829.]

To ROBERT STEIN, *of Regent-street, Oxford-street, in the county of Middlesex, gentleman, for his having invented certain improvements in distillation.*—[Sealed 4th December, 1828.]

THE subject of this Patent is a still, or rather a distilling apparatus of a very complicated construction, the leading object of which appears to be that of presenting the wash

or fermented liquor to the heat in an extremely attenuated form or finely divided state, that is, in jets, or a shower, or, as the Patentee expresses it, in the state of a mist.

The wash descends from the vat by a pipe, which conducts it through several vessels called baths, as they are surrounded by hot chambers formed by casings or outer vessels, which constitute the passages for the steam or vapour emitted from the still to pass to the refrigerator. By these means the wash becomes heated, and the vapour cooled.

In describing this invention, we must commence at two opposite ends of the apparatus at the same time, namely, at the reservoir, on the right hand, from whence the cold liquor flows through the heated vessels into the still, and at the boiler on the left, from which steam is passed through the still and round the wash vessels to heat them.

Bearing in mind these two prominent features, let it be observed that the still itself stands about midway between the boiler on the one hand, and the wash vat on the other: and is totally unlike stills in common use, being a long cylindrical vessel placed horizontally, and divided into several compartments by vertical partitions made of thick cloth.

The wash, after passing through three several vessels, each surrounded with a casing filled with steam or hot vapour, is conducted in a heated state by a series of pipes leading respectively to a small force pump, connected to each of the compartmentsof the cylindrical still. These pumps are all acted upon by one large piston working in a cylindrical vessel, into which the wash is delivered by the pipes, and from whence it is ejected through the pumps.

Here one important feature is to be remarked:—each pump has an air vessel connected to it, by which an elas-

tic pressure is exerted upon the surface of the wash as it rises in each pump barrel, and by that means, when the piston is set to work, the wash is thrown into the several compartments of the still in continued jets. In order, however, to divide the wash into the most minute particles, as a shower or a mist, a plate is placed a little distance above each jet within the still, for the purpose of distributing the wash when it strikes upwards, and causing it to be scattered widely over the still, and thereby become greatly exposed to the action of the heat.

Having explained the manner in which the wash is distributed in a shower or mist within the still, we proceed to show the mode by which it becomes heated; this is effected by the passage of steam through the still.

As before said, a boiler is placed at the left hand end of the apparatus, from whence steam rises, and is introduced into the left hand extremity of the cylinder. There it mixes itself with the heated wash in the finely divided state described, and carries away those portions which are reduced by the heat to an alcoholic vapour. The cloth partitions of the cylinder are close enough to prevent the passage of the wash from one compartment to another, but yet allow the steam and vapour to pass on to the end of the cylinder, and thence to escape through a pipe to the jacket of one of the wash vessels, when it becomes partially condensed; but that portion which remains in a state of vapour, proceeds onward to the jacket of the second wash vessel, and from thence to the third: and ultimately the most volatile parts of the vapour passes down into the worm or refrigerator, and are then condensed in the form of concentrated spirit or alcohol, from whence it is taken for rectification.

Referring again to the consideration of the wash, it is to be observed that it flows first from the reservoir placed

at an elevation, into a vessel surrounded by a jacket containing the heated vapour which passes from the still, as before described, and the effect of this is, that the vapour becomes partially condensed by the cold wash, and the wash heated by the hot vapour.

The wash on flowing into the second and third vessel, and the vapour passing round them, in like manner effects a transmission of the heat, which assists in condensing the vapour prior to its reaching the worm, and of heating the wash before it is injected into the still.—[*Inrolled in the Inrolment Office, May*, 1829.]

To ABRAHAM LOUIS, *of Dean-street, Birmingham, in the county of Warwick, mechanic, for his having invented a mechanical volti suvito to assist the players of music quickly to turn their leaves of music books whilst playing.*—[Sealed 10th December, 1828.]

THE inconvenience which a performer experiences in turning over the leaves of the music book while playing, has induced the Patentee to construct an instrument which, by a slight touch, shall turn over one leaf at a time.

The instrument is attached to one corner of a square board, which is to stand nearly upright, as a back to the book. The parts that are to turn over the leaves may be called long fingers or arms; they are jointed to the board much in the same way as a pen-knife is attached to its handle; and when prepared for operation, the fingers are turned down severally over the top of a leaf.

To each of the fingers or arms a spring is connected, called a *volti*, and a lever which is to be touched when a leaf requires turning over, acts upon a sort of trigger,

and lets off the arm, which, in rising, turns the leaf of the book over with it.—[*Inrolled in the Inrolment Office, February*, 1829.]

[This apparatus bears a close resemblance to one proposed for the same purpose, and for which a Patent was granted to Mr. John Chancellor, of Dublin, in November, 1828.]

To JAMES SINISTER, *of Bull-street, Birmingham, in the county of Warwick, for his new invented improvements in weaving, preparing, or manufacturing a cloth or fabric, and the application thereof to the making of stays and other articles of dress.*—[Sealed 18th December, 1828.]

THE object of this invention is to prevent the necessity of cutting out pieces of cloth, and sewing them together for the purpose of forming long bags, to receive strips of whalebone, steel, or wood, for women's stays; which is to be effected by weaving two thicknesses of cloth at the same time, and connecting the thicknesses together in certain places.

The Patentee has described this invention by particular reference to such threads of the work as are to be raised or depressed at certain times, but these are subject to vary according to the forms of bags intended to be made.

The only material feature to be observed, is that two warps are to be employed, each wound upon a separate beam; that they are to be passed through separate reeds

in a double race slay, and that two shuttles are to work together, one above the other, the warps being drawn together at certain intervals by the operation of the healds or headles; and by that means the double web in certain places becomes woven into one.

Fabrics or cloths by these means may be produced with different colours on opposite sides, and they may have variously formed bags suited to receive padding, wadding, whalebone, steel, wood, or any other materials as springs or stiffenings for stays, riding belts, braces, and other articles for dress; and the same contrivance will also apply to the making of purses, and various other goods of the like kind.—[*Inrolled in the Inrolment Office, June*, 1829.]

To James Fraser, *of Limehouse, in the county of Middlesex, engineer, for his having invented or found out a new and improved arrangement of a flue or flues, to communicate with the various parts of culinary apparatus, such as steam, soup, or water boilers, oven or ovens, hot plate or plates, hot closet or closets, and stewing stove or stoves, to render them more compact; and to appropriate parts of the said apparatus to effect other useful purposes*—[Sealed 27th January, 1829.]

The subjects of this Patent are divided into "*two series*," as the Patentee expresses it; that is, the adaptation of the invention, first, to a portable cooking apparatus, as a ship's hearth, and secondly, to a permanent cooking range, with oven and boiler to be fixed in the kitchen of a mansion.

The features of novelty, if there are any, connected with this invention, consist in the precise construction,

arrangement, and disposition of the fire place, flues, boiler, oven, hot plate, air vent, &c. as set forth in a series of figures accompanying the specification. As, however, these several parts of a cooking apparatus have been so variously contrived as to form a disposition in the many inventions for similar purposes which have formed the subjects of previous Patents, we find ourselves, in the absence of any definite claim, unable to point out any peculiar features which we should consider to be new.

The flame and heated vapour passes from the fire in the grate under a hot plate for stewing, and then partly round an oven, and partly under a boiler, and from thence through flues, proceeds to a chimney, after having completely exhausted its heating powers.

There are dampers for shutting off the current of heat from the boiler if desired, and for directing it to any other part of the apparatus, but none of these appear to be capable of producing any new or superior effect; and the only part which is particulary insisted upon as of importance in the arrangement, is a tube or chimney for conducting the steam and hot air from the stewing plate, which does not communicate with the chimney, and therefore prevents the possibility of smoking the victuals while cooking.

The forms of the ship's hearth, or portable cooking stove and the stationary stoves for the kitchens of mansions, of course differ considerably in form and external appearance, but a similar arrangement of the parts occur in both, and the same apparent want of novelty presents itself; we therefore deem it unnecessay further to describe this invention.—[*Inrolled in the Petty Bag Office, March,* 1829.]

To JOHN DICKINSON, *of Nash Mill, in the parish of Abbots Langley, in the county of Hertford, paper manufacturer, for his having invented a new improvement in the method of manufacturing paper and other materials into single sheets or pieces, by means of machinery.*—[Sealed 14th January, 1829.]

THERE are three subjects embraced by this patent: first, a mode of expressing the water, and compressing the fibres of the pulp of the paper immediately on its coming from the machine mould, by passing the fresh-made sheet between rollers, previous to its reaching the drying apparatus; secondly, introducing threads of flax, cotton, or silk, or lace, or web of a fibrous character into the substance of the paper when making; and, thirdly, the construction and employment of a machine for cutting the length of paper when finished into separate sheets.

The apparatus to be employed for expressing the water from the new made sheet of paper, is to be adapted to one of those machines constructed upon the principle of *Fourdrinier's* patent for making endless paper, the particular features of which are well known, and therefore need not be here described.

The present invention consists in adapting to a convenient part of the machine two pairs of pressing rollers made of metal, between which the endless sheet of paper immediately from the mould, is to be conducted by endless webs. The pulp is in a great measure freed from the water in which it floated by the shaking of the wire-gauze strainer, but by passing with its felt between these pressing rollers, not only is the water expressed and more perfectly discharged from the sheet, but the paper becomes more compact and firm.

It is proposed that one of the rollers of each pair should be made hollow and be heated by steam passed into it through its axle, and the surface of the sheet being brought in contact with the periphery of this heated roller, that side of the sheet will become smooth and glossy. In passing the sheet from the first to the second pair of pressing rollers, it is to be turned over by changing the direction of the endless belt, in order that the other side of the sheet may be exposed to the heated surface of the pressing roller, and thereby become glossy also.

In order to introduce threads of flax, cotton, or silk or lace, or other fibrous web into the substance of paper, the patentee forms the sheet of paper of two thicknesses of pulp, the one being moulded upon the horizontal wire web as usual, the other on the periphery of a wire drum; and these two thicknesses being brought into contact, are (as it is technically termed) couched together, with the threads or other fibrous material between them.

The construction of a machine capable of effecting this object in the way described, is not claimed as new, but its application to that particular purpose is claimed.

The threads of flax, cotton, or silk, intended to be introduced into the paper, are to be wound upon bobbins, placed in a frame at the end of the machine, and these threads being conducted thence are made to pass over a guide roller, having grooves round it at an inch or any other desirable distance apart, the threads severally lying in the grooves, for the purpose of being conducted in parallel lines.

The ends of the threads are all to be brought under the wire drum, and as the drum goes round, the pulp forming upon its periphery partially imbeds the threads in the surface of the endless sheet of paper, which by the travelling felt is brought up to meet the other endless

sheet coming from the horizontal mould. The surface of the two sheets of paper are thus united or couched together with the threads between them, and their adhesion may be made more perfect by passing between them pressing rollers, as described above.

Lace, or any other fibrous material, may be employed instead of threads; in which case the material must be tightly wound upon an even roller, and carried forward in a distended form under the wire drum, from whence it will, with the sheet of paper, be conducted by the travelling felt to meet the other sheet, and then the two will be couched together in the way described.

The patentee has not stated the object for which such a combination of paper and threads, or other fibrous materials, are by him intended to be employed. About a year before the date of this patent, the same contrivance was proposed by Mr. R. J. Routledge as a mode of making paper for bank notes, in order to render forgery more difficult; we had some of the paper, but the intended patent was not proceeded with.

The machine for cutting lengths of paper into separate sheets is shewn in Plate VIII. at fig. 1. The paper previously made in a very considerable length, is in the first instance wound upon a cylindrical roller, *a*, mounted upon an axle, supported in an iron frame or standard. From this roller the paper in its breadth is extended over a conducting drum, *b*, also mounted upon an axle turning on the frame and standard, and after passing under a small guide roller, it proceeds through a pair of drawing or feeding rollers, *c*, which carry it into the cutting machine.

Upon a table, *d*, *d*, which is firmly fixed to the floor of the building, there are a series of chisel-edged knives, *e*, *e*, *e*, placed at such distances apart as the dimensions of the cut sheets of paper are intended to be. These

knives are made fast to the table, and against them a series of circular cutters, *f*, *f*, *f*, mounted in a swinging frame, *g*, *g*, are intended to act. The length of paper being brought along the table over the edges of the knives, up to the stop, *h*; the cutters are then swung forward, and by passing over the paper against the stationary knives, the length of paper becomes cut into three separate sheets.

The frame, *g*, *g*, which carries the circular cutters, *f*, *f*, *f*, hangs upon a very elevated axle, in order that its swing may move the cutters as nearly in a horizontal line as possible, and it is made to vibrate to and fro by an excentric, or crank, fixed upon a horizontal rotary shaft extending over the drum, *b*, considerably above it, which may be driven by any convenient machinery.

By a suitable connection of gear work, the paper might be fed into the machine; but it is proposed that the workmen should draw the paper from between the rollers, *c*, and bring it up to the stop, *h*, in the intervals between the passing to and fro of the swinging cutters.—[*Inrolled in the Inrolment Office, July*, 1829.]

To THOMAS SMITH, *of the borough of Derby, in the county of Derby, engineer, for his having invented or found out an improved piece of machinery, which being combined with parts of the steam-engine, or other engines, such as pumps, fire-engines, water wheels, air pumps, condensers, and blowing engines will effect an improvement in each of them respectively.*—[Sealed 14th January, 1829.]

THE subject of this patent is a rotary engine, to be

actuated by steam or by water, or any other fluid, as a first mover for driving machinery; or, by reversing its action, it may be employed as a pump for raising or forcing water, or of injecting air as a blowing machine.

The apparatus consists, first, of a hollow drum or cylinder, within which two quadrant-shaped pistons are made to revolve, but with dissimilar speed; that is, the one piston moves rapidly round the cylinder, the other following it slowly. The consequence of this dissimilarity of movement between the two pistons is, that the face of the slowly moving hinder piston operates as a stop or surface, by which the pressure of the steam or other fluid is resisted, and made to force the advanced piston forward.

By the time that the first piston has arrived close up against the back of the second piston, the last mentioned will have advanced far enough to have opened a communication between the induction pipe aud the narrow space between the back of the second piston and the face of the first. The first piston now in its turn becomes the stop, and advances slowly, while the force of the steam or other fluid drives the other piston forward with speed, until it comes up to the back of the former, and so on: the two pistons moving fast and slow reciprocally. This alternation of speed is regulated by a peculiar mode of connecting or gearing the two pistons together by means of a pair of elliptical wheels, or by some such contrivance, which will be hereafter explained.

Plate VIII. fig. 2, is a view of the interior of the cylinder, the end place being removed to shew the pistons within. Fig. 3 is a longitudinal view of the axis, with the two pistons attached threto, shewing the face of one piston and the back of the other: *a* is the axle passing horizontally through the centre of the cylinder, *b*, *b*, *b*,

which is made fast to the ground; *c*, and *d*, are the two pistons respectively fixed upon those portions of the axle marked *a*, *c*, and *a*, *d*, the two portions of the axle being united by a pin and socket, shewn by dots in fig. 3, which allows *a*, *c*, and *a*, *d*, with their respective pistons, to turn independently of each other.

If steam or any other fluid be allowed to pass into the engine at the induction aperture, *e*, it will proceed along the groove or channel, *f*, formed round the edge of the piston *c*, and will flow into the space, *g*, between the two pistons, and there exerting its force, either elastic or gravitating, it will force the two pistons asunder, and the face of the piston, *d*, operating as a stop or resistance, the piston, *c*, will consequently be driven forward rapidly in the direction of the arrow. The piston, *d*, at the same time moving slowly onward, will open the eduction aperture, *h*, to its groove or channel, *i*, by which channel the steam or other fluid will then be enabled to escape from the lower portion of the cylinder, marked *k*, leaving that part of the cylinder in a state of vacuum.

Before the piston, *c*, in its rotary course, has overtaken the piston, *d*, the latter will have so far advanced in its rotation as to have brought its groove or channel, *i*, into communication with the induction aperture, *e*, in the same way that *c*, appears in fig. 2, and the piston, *c*, will then be about to open the eduction passage, *h*, for the purpose of letting off the steam or other fluid which forced it round. In this way, by the succession of the reciprocating actions of the two pistons, the two parts of the axle, *a*, *c*, and *a*, *d*, will be made to revolve with interrupted or varying speed; but this varying speed being communicated to one general shaft, through the agency of two pair of elliptical wheels, the interrupted motions

will resolve themselves into a uniform rotary motion of the shaft so driven.

The manner of gearing by elliptical wheels being well understood, it is not necessary to explain their construction; but the peculiar contrivance proposed by the patentee, of obtaining an interrupted gear motion, for the purpose of giving a slow movement to the following piston derived from the quick movement of the advancing one, will constitute the concluding part of this subject.

Fig. 4 exhibits a wheel with two circumferences of teeth, *z*, and *y*, the one having a greater radius than the other, and upon an axle, placed parallel to that of the wheel, two toothed segments of different radii, *x*, and *w*, are fixed, which segments respectively take into the teeth, *z*, and *y*, of the wheel. Supposing the shaft, *v*, of the wheels, *z*, *y*, to be the general shaft above mentioned, into which the varying speed of the two pistons are to be resolved, for the purpose of driving it with a uniform rotary motion, and the segments, *x*, *w*, to be fixed upon the end of that portion of the axle marked *a*, *c*, in fig. 3. The piston, *c*, being now driven forward in its cylinder by the force of steam or other fluid, and the segment, *x*, taking into the larger radius of the wheel, *z*, the general shaft, *v*, will revolve with a speed commensurate to that of the piston, *c*, as long as the segment, *x*, remains in gear with it; but when the segment, *w*, comes into gear with the wheel in the circle of teeth of smaller radius, *y*, then a different speed would take place.

Let it now be supposed that a wheel similar to *z*, *y*, is fixed upon the axle of the other piston, as *a*, *d*, fig. 3, and that two toothed segments, as *x*, *w*, are fixed upon the general shaft, *v*, and in an opposite direction to the former, so as to take into the last-mentioned wheel in the way above described; it will then be perceived that

the moment the segment, *x*, of the first axle, *a*, *c*, has ceased to act in the circle of teeth, *z*, on the first mentioned axle, the corresponding segment, *x*, on the general shaft, *v*, will begin to gear in with the corresponding circle of teeth, *z*, in the wheel fixed on the axle, *a*, *d*, of the other piston. Hence, the general shaft, *v*, will, by the two pistons alternately acting, be kept in constant rotary motion. But on the segment, *w*, alternately coming into gear with the wheel, *y*, of the smaller diameter, the pistons connected to them respectively will be retarded and carried forward on the cylinder slowly, in the way and for the purpose explained above in reference to fig. 2.

Another contrivance for producing an interrupted gear movement from a uniform rotary motion, is shown at fig. 5, which is to be employed in a similar way to the mechanism last described, by mounting the wheel, *u*, upon the axle of one of the pistons, as *a*, *c*; and the pinion, *t*, upon the general shaft, *v*, or *vice versâ*, and when either of the concave portions of the wheel are acting upon the pinion, the shaft of the pinion will revolve slowly, but when the convex parts of the wheel are in gear, the pinion will turn rapidly. — [*Inrolled in the Inrolment Office, July*, 1829.]

To WILLIAM ERSKINE COCHRANE, *of Regent Street, in the county of Middlesex, for his having invented an improvement in, or on, paddles for propelling boats and other vessels.*—[Sealed 14th January, 1829.]

THIS is a contrivance, by which the paddles of the propelling wheel of a steam vessel are made individually to

turn round upon centers, in order that they may enter the water and leave it edgewise. A similar object has repeatedly been made the subject of a patent, more or less resembling in detail the scheme herein suggested, which may be described in a very few words:—

Instead of fixing the paddles (or float-boards, as they are sometimes called) firmly to the rims of the wheels, as in the ordinary construction, the improved paddles have each two axles, the one mounted in the outer rim of the wheel upon which the paddle turns, the other axle connecting the paddle to a ring, which is placed in an eccentric situation with reference to the axle of the wheel. By this arrangement the several paddles are always kept in perpendicular positions in every part of the wheel's rotation, and consequently enter the water and leave it edgewise, passing through the water when making the propelling stroke, with their faces perfectly at right angles to the surface of the stream, by which the greatest possible propelling effect is attained.

This mode of constructing paddle-wheels is so well known that a representation of it is unnecessary; precisely the same contrivance formed the subject of a patent granted to Samuel Lambert, dated 4th April, 1819, for the specification of which see the first volume of the *London Journal of Arts*, first series, page 341.—[*Inrolled in the Inrolment Office, June*, 1829.]

To THOMAS OSLER, *of Birmingham, in the county of Warwick, chandelier furniture manufacturer, for his having invented or found out certain new improvements in the construction of glass and metal chandeliers and other articles of ornamental lighting.*—[Sealed 10th November, 1829.]

THIS invention of improvements in chandeliers consists in a method of combining separate and detached prismatic and other pieces of flint glass, hereinafter described, in such a manner as to produce various ornamental and refractive forms and substances not hitherto used, and applying them to the manufacture of glass and metal chandeliers, or other articles employed in ornamental lighting.

The pieces of glass selected for this purpose are either prisms, by which I mean pieces of glass cut into different oblong surfaces, the sides of which are parallelograms pyramidal, having their respective surfaces convergent towards a point. I have found those prisms produce the best effect which are tri-lateral and equi-lateral, by which I mean such as have equi-lateral triangles for their bases, and the same observations will apply to pyramidal pieces.

These separate pieces being cut to the dimensions required, and very accurately polished, are to be arranged, combined, and fastened together by methods which will be readily understood with the assistance of the figures represented in Plate VIII.

Having manufactured or procured such pieces of flint glass as are before described, and two of which are shewn in figures 1 and 2, I next cut away a small portion from each end, in the manner exhibited in figures 3 and 4,

leaving a small portion on one side as a projection or ledge (see *a*, *a*, *a*, *a*,) to be fixed into light metallic frames, which purpose will be best effected by some strong cementing substance.

These frames may be made of almost any metal, but for economy and facility of working, experience has led me to prefer fine brass of the best quality, which is afterwards plated with silver, and preserved from discolouration by any transparent and colourless varnish.

The frames consist of two circular grooves of any required diameter, which being carefully turned out with a strap or bar across each (see *b*, *b*, figures 5 and 6), are united to each other by a hollow or solid rod or pillar from centre to centre (see *c*, *c*, figure 7), and have a notch or opening, *d*, *d*, into the groove, of such a size as will easily admit the glass projection or ledge before spoken of, and represented at *a*, *a*, *a*, *a*, in figures 3 and 4. This aperture may be cut in one or both of the circular grooves, for although one opening will in general be found quite sufficient, I am not aware of any practical objection to the use of one in each groove.

When it is intended to apply one of these combinations, as a covering to the reservoir of a lamp, or for the concealment of any thing unsightly, two, three, or more slips of metal, fixed at each end, and at equal distance, to the inside of the circular grooves (see *e*, *e*, figure 8) are substituted for the central rod or pillar which I use in other cases.

It can be scarcely necessary to observe that when these circular grooves are connected by slips or pieces of metal, as is here shewn, to their inner surface, that the strap or bar across the centre (see figures 5 and 6, *b*, *b*,) is also rendered unnecessary. I would here observe, that it is not essential that openings shall be made on

either side of the said strap, or bar (see *f*, *f*, in the same figures); but I recommend them, on account of the convenient access they give to the inside of the cylinder or truncated cone, for the purpose of cleaning it, and because it is desirable that the whole should be as light as is consistent with stability.

The frames being thus prepared, the several pieces of glass, cut to either of the forms before mentioned (see *a*, *a*, *a*, *a*, figures 3 and 4), are to be successively passed through the aperture, *d*, figure 7, within the grooves, and then secured with any tenacious cement; I have, hitherto, found no cement more useful or efficacious than good plaster of Paris.

In this manner it will be at once evident that cylinders (see fig. 9 and section), truncated cones (figure 10 and section), inverted truncated cones (figure 11 and section), as well as any combinations of these, and of so great a variety of diameters, may be easily produced, that it would be difficult to assign a limit to them; and by accurately adapting these forms to others constructed on the same principle (see figures 12 and 13), a very considerable degree of length or height is also readily attainable.

An effect almost exactly similar may be obtained by several other methods of uniting the pieces of flint glass before mentioned to metallic grooves, hoops, rings, or plates; all which I have carried into effect, and worked to, and a part of which I shall enumerate; but after much experience of their respective facilities or objections, I decidedly prefer the method already specified, with one exception, which consists in cutting a groove across the largest end of the pyramidal pieces, or across either end of the prismatic pieces (see figures 14, 15, 16), which groove so cut in the glass is to include either one side

of a metallic groove as at *g*, figure 17, or a part or the whole of a single metallic ring (see *h*, fig. 17), the smaller end being secured in an inclined groove, the bottom of which is formed by a moveable plate or plates screwed to its or their position after the prisms are arranged, as is shewn by a sectional cut line (see *i*, *i*, in the same figure) and the interstices of both ends being filled with cement, as was stated in the method first mentioned.

In constructing forms of extensive size, or forms having such an outline as require the pieces of glass to be placed in a position approaching the horizontal, I prefer this method to that recommended in the construction of other forms already specified; first, on account of the difficulty of making circular metallic grooves of a large size, yet of so light a substance or weight as would be desirable; and secondly, because the metallic groove or rim, which it is always better to keep out of sight, is in a considerable degree hidden by its inclosure within the grooves in the glass pieces.

At figure 18, I have exhibited a very slight variation from the method illustrated by figure 17, shewing, however, no other difference than is required by the form of the pyramidal piece employed, the larger end of which is slightly notched in the manner represented by figure 16, and the smaller end cut to a slope, as at fig. 19.

A third method of combining and securing the glass pieces before mentioned, and the only one which I employed for several weeks, is to cut a deep notch, triangular, square, circular, or elliptical in the projection or ledge already described (see *a*, *a*, *a*, *a*, figs. 3 and 4); and fastening them to a circular, or any other metallic substance, by a broad-headed screw, the head of which may be of cut glass (see fig. 20), or used with the additional ornament of a flower or rosette, also of glass, as

in fig. 21, or a hole through the projection or ledge may be substituted for the notch (see fig. 22), using the screw, or screw and rosette, in the same manner.

A fourth method of binding and securing the pieces of glass before mentioned, and which I have also practised occasionally, is to cut a shallow groove or notch in the projection or ledge (see fig. 23), of each piece, and binding the whole series to a circular or other metallic groove or plate, with a band of fine catgut or wire gradually and cautiously tightened so as to hold the several pieces of glass in their proper places. I may here also observe, that though I consider the circular to be far the most convenient and advantageous form for the metallic grooves or plates to which the glass pieces are to be affixed, yet it is by no means an indispensable one, inasmuch as a polygonal groove or plate (see fig. 24), the angles of which correspond with the pieces of glass to be attached to it, will produce as good an effect as a circular one; and I did in fact work to these polygonal grooves or plates for many weeks, but discontinued using them on finding the circular ones so much more convenient.

A fifth method of combining and fastening the pieces of glass before mentioned, which I have likewise practised before the use of the aperture in the grooves (see *d*, fig. 7), and which may be effected either with or without the assistance of the hollow or solid central pillar, *c*, *c*, fig 7, or the slips of metal *e*, *e*, fig. 8, is that of inserting the several projections or ledges of the pieces of glass at the one end into the lower groove, with a sufficient quantity of cement to enable them to retain their position for a short interval, and then placing the upper groove (previously filled with cement over them like a cap), see fig. 25, pressing it gently but firmly downwards, and

continuing the pressure till the cement has become hard and tenacious.

In this manner I have repeatedly constructed cylinders of considerable strength, but when truncated cones are to be formed in this way, the several pieces require to be supported by a block of proper shape and size on the inside till the upper groove is securely fixed. I mention this as a method of accomplishing my object, which, in the earlier stages of my invention, I have repeatedly and successfully had recourse to; but since easier and more secure means have been devised, I cannot recommend it to other manufacturers either for convenience or stability.

The several forms or outlines herein-before described, or any combinations or varieties of these or of any part of them being thus completed, the beauty and richness of their appearance will certainly be much improved by covering, or in any other manner concealing, as far as it is practicable, the metallic parts, which are essential to their construction. This is to be effected in a great variety of ways, and especially by enclosing such metallic parts within circles of glass, richly cut to such designs or patterns as individual taste may suggest; but these are altogether distinct and separate from any thing which I claim as an invention; and must therefore be left entirely to the discretion of the manufacturer.—[*Inrolled in the Inrolment Office, May*, 1830.]

Specification drawn by the Patentee.

To THOMAS BROWN, *of Birmingham, in the county of Warwick, coachmaker, for his having invented an improved coach, particularly adapted for public conveyance and luggage.*—[Sealed 5th August, 1829.]

THE Patentee commences his specification in the following words.

The subject of this invention is an improved coach, comprising a new combination and arrangement of the various parts which have been heretofore used in carriages of different descriptions; but which parts being combined together and arranged in this improved coach, in the manner exhibited in the Plate, and which will be hereinafter described.

It possesses the united qualities of lightness and consequent ease of draught, safety from overturning or breaking down, steadiness of motion, and great capacity of carrying luggage; and the luggage being on springs, and locked up under cover, secure from loss and damage from weather, or by jolting. And the Patentee further states, that it will be found on trial to possess all these qualities to a greater extent than any coach now used for public conveyance of passengers and luggage. This improved coach is constructed without a perch or frame, whereby much weight is saved, and, consequently, much ease of draught is gained; and the coach is built much lower, or nearer to the ground than any heretofore used; and the whole of the springs of this improved coach are placed lengthwise of the coach, and none crosswise, as heretofore, thereby another saving of weight is effected.

Plate IX, fig. 1, is a side elevation of the improved coach, in which there does not appear to be any peculiar features of novelty. It is, as before said, without a perch. The fore part of the coach is supported upon elliptical springs affixed to the fore axletree, and the locking is as usual. The hinder wheels are mounted upon what is commonly called a crank axle: that is, the axle instead of being straight is depressed in the middle, being bent at right angles on each side within the wheels, for the purpose of enabling it to pass under the hind boot of the coach, which is designed to be very near the ground. This arrangement, it is said, affords considerable safety and steadiness, and as the springs are all in one direction, none of them being placed crosswise, the carriage will by those means not be liable to swing or rock, and may be made much lighter as to the substance of its materials, and still afford sufficient strength.

The claim of the Patentee is to the general arrangement of the parts of a travelling carriage as represented, and not to any of its parts separately.—[*Inrolled in the Inrolment Office, February*, 1830.]

To GEORGE KING SCULTHORPE, *of Robert-street, Chelsea, in the county of Middlesex, gentleman, for his having invented certain improvements on axles or axletrees, and coach and other springs.*—[Sealed 4th July, 1829.]

THERE are three improvements proposed under this Patent, the first is, the employment of short axles for the wheels of carriages; one portion of each axle is to be fixed into the nave of the running wheel, and the other part to turn freely in a box attached to the under part of the carriage.

The second improvement is the introduction of a wedge between the axle and its box, for the purpose of increasing friction when the progress of the carriage is required to be impeded, as in descending hills. The third improvement is, the adaptation of a forked spring acting within a hollow frustrum of a cone, which spring is increased in tension by the resistance of the sides of the box as the superincumbent weight depresses the fork into the contracted part of the cone.

Plate IX, fig. 2, shows the short axle *a*, *b*, attached by a frame *c*, to the under part of a carriage; fig. 3, represents the same, as it would appear if viewed on the upper side. The part *a*, of the axle is made square for the purpose of being fixed into the nave of a wheel; the part *b*, is nearly cylindrical, and turns in the bearings, which form parts of the frame *c*, fixed on each side, under the carriage. An adjusting screw *d*, is employed to tighten the axle and prevent its having too much freedom endwise in its bearings. The rotary part of the axle and its frame may be enclosed within a box or casing, to protect it from dirt and dust and also to contain oil for lubrication.

The second feature of improvement, viz. the wedge for producing friction upon the axle, is seen at *e*, in both figs. 2, and 3. A lever *f*, is attached to the smaller end of the wedge *e*, which lever moves upon a fulcrum joint at *g*.

When the chain or cord *h*, passed over a pulley up to the seat of the driver is drawn forcibly, the lever will be made to bring the wedge forward between the axle *b*, and the frame *c*, which by the great friction it produces upon the axle will impede or stop its rotation, and when the chain or cord is released, the spring *i*, acting against the smaller end of the wedge, will force it back and relieve the axle.

Fig. 4, represents in section a conical box *a*, *a*, affixed

to the framing of a carriage. Within this box a perpendicular rod *b*, slides up and down through an aperture with packing, at the lower end of which rod there is a forked spring attached, or two blades of steel *c*, *c*. These blades press against the inclined sides of the box, and according to the force of the weight supported by the top of the rod, so will the springs be brought into tension.

This construction of spring is designed to support carriage bodies, and it is contemplated by the Patentee that it may be applicable to other situations.—[*Inrolled in the Inrolment Office, January*, 1830.]

To JOSEPH CLISELD DANIELL, *of Limpley Stoke, in the county of Wilts, clothier, for his having invented certain improvements in machinery applicable to dressing woollen cloth.*—[Sealed 8th July, 1829.]

THE subject of this Patent is represented to be a further improvement upon the machine called a gig-mill, for which several former Patents have been granted to the same inventor, see Vol. IV. of our Second Series.

It is stated, that for the purpose of enabling the teasles to act with greater delicacy upon the face of the cloth under the dressing operation, it was found desirable to introduce rollers between the respective boards of teasles in order that such rollers might support the cloth as it passed over the surface of the gig barrel, this was the subject of one Patent; and, that the teasles might be made to act against the cloth with an elastic force, the teasle boards were mounted upon joints with springs, this was the subject of another Patent. The present is precisely the same contrivance as the last mentioned, adapted to gig boards, on which wire cards are mounted.

Plate IX, fig. 5, represents a segment of the gig barrel, on which is mounted a board *a*, with a fillet of cards or wire brush; *b*, *b*, are the two guard rollers mentioned above; *c*, *c*, is a portion of cloth under operation, against the face of which, the cards are acting as the barrel goes round in the direction of the arrow.

The board that the cards are mounted upon is attached to the gig barrel by a hinge joint at *d*, on which it moves up and down; *e*, is a pin, screwed into the board, the height of which pin limits the depression of the board, and is capable of adjustment; round this pin there is a spiral spring which raises the board, and thereby keeps the points of the cards in contact with the face of the cloth, and affords the elastic pressure.

The only difference between this and the preceeding invention above alluded to, appears to be, that in one instance, teasles were used for dressing the face of the cloth, in the other wire cards.—[*Inrolled in the Inrolment Office, January*, 1830.]

To MAXWELL DICK, *of the town of Irvine, in the county of Ayr, North Britain, bookseller and publisher, for his having invented an improved railroad and method of propelling carriages thereon by machinery for the purpose of conveying passengers, letters, intelligence, packets, and other goods with great velocity.*—[Sealed 21st May, 1829.]

THE Patentee proposes to propel carriages, as he expresses it, by "suspension lines of railroad, by means of which a velocity of conveyance by wheeled carriages may be gained, hitherto unknown in the annals of commerce."

Palmer's suspension rail-road is alluded to, (see Vol. V. of our First Series, page 56) but the invention of the present Patentee is stated to be on a very different principle.

For our part we consider that if any principle can be made out from the confused and unintelligible specification before us, Palmer's principle of a railroad elevated upon posts or pillars, is indisputably involved in the present invention.

It appears that the Patentee proposes to employ four lines of rails or rods placed parallel to each other, and all affixed at their ends to posts, pillars, or piers elevated from the ground; by means of which contrivance, however undulating the surface of the earth may be over which the line of rails are to pass, or whatever obstruction may intervene, as rivers, brooks, ponds, pits, cross-roads, buildings, &c., the line of rails may be made horizontal and straight.

Two lines of rails are to be placed in horizontal coincidence for the running wheels on each side of the carriages to travel upon, and the other two lines are to be placed parallel to the former at a little distance below, which appear to be for the purpose of guiding the carriage, and preventing it from jumping off the rails. There are anti-friction rollers attached to the under part of the carriages, which run against the last mentioned line of rails.

The pillars or supports are to be placed at considerable distances apart, dependent upon their height and the strength of the rods or lines of rail. The carriages, if we understand right, are to be attached in some way by frames to yokes, but the mode of attachment is not shown, neither does it appear by what means the yokes are to pass the supporting pillars.

The great propelling power which is to drive with such extraordinary velocity, is to be obtained by the employment of toothed wheels and pinions, and these are to be put in action, if we understand right, by steam engines placed at certain distant stations on the line of way.—[*Inrolled in the Inrolment Office, November*, 1829.]

To WILLIAM LEESON, *of Birmingham, in the county of Warwick, in consequence of a communication made to him by his late partner, William Toft, of the same place, deceased, for an invention of certain improvements in, or additions to, harness and sadlery, part or parts of which improvements are applicable to other purposes.*—[Sealed 8th July, 1829.]

THE subjects of this Patent are spring fastenings to be attached to harness. The first is called a spring stop hook, to be employed for connecting the traces to the harness of a gig horse; the second is called a spring shaft tug for attaching the shafts of a gig to the horse's saddle.

Plate IX., fig. 6, is a side view of the spring stop hook, consisting of a box *a*, or hollow piece, the side of which is removed to show the parts within. The end of the box is made solid, and forms a hook *b*. This hook is closed so as to constitute a ring by the sliding stop piece *c*, which is capable of moving up and down in a groove formed by the sides of the box. There is a notched lever *d*, which is attached to the sides of the box by a pivot, and a spring behind it throws the lever outwards.

In the figure the ring part of the hook is shown closed, by the stop piece *c*, being slidden up, and the notch of the lever *d*, keeping it there secure. When it is required to open the ring of the hook, as in taking off the traces, the notched lever *d*, must be pressed back, the sliding stop *e*, may then be slidden down, as shown by dots, which will open the hook; and on sliding the stop *c*, up again as before, the notched lever *d*, will hold it securely.

The spring shaft tug shown at fig. 7, is made with a jointed clasp *c*, which is held by the spring catch or stop

lever *d*. In order to loosen the tug from the shafts of a gig, the spring catch must be pressed back, when the clasp *c*, may be raised.—[*Inrolled in the Inrolment Office, January*, 1830.]

To Ross Winaus, *of Vernon, in the county of Sussex, and State of New Jersey, in the United States of North America, at this time resident in London, for his invention of certain improvements in diminishing friction in wheeled carriages to be used on rail roads, and other roads, and which improvements are applicable to other purposes.*—[Sealed 28th May, 1829.]

There are two objects proposed under this patent; the first is to relieve the friction of the axles of rail-road waggons and carriages, by preventing the rubbing of the axles against their bearings, or within the boxes or naves of the wheels; the second is a means of preventing the friction caused by rubbing the peripheries of rail-road waggon wheels upon the rails when travelling over curved lines.

The first of these objects is intended to be effected by substituting, in place of fixed bearings for the axles, anti-friction wheels, in which the ends of the axles run. Plate IX., fig. 8, represents one of the running wheels *a*, of a rail-road waggon. This wheel is affixed to the axle *b*, and, consequently, turning with it, the outer part of the axle being elongated as at *c*. The body of the waggon is supported by a frame-work *d*, which extends round it, and two blocks *e*, *e*, are affixed to the under part of the frame-work which carry the axle of the anti-friction wheel *f*: these parts are shown in section in the figure.

The anti-friction wheel *f*, has a groove within it into which the end of the axle *c*, protrudes, and by these means,

the end of the axle running against the internal circle of the anti-friction wheel, bears the weight of the waggon and its load.

It will now be perceived that as the end of the axle *c*, does not run against a fixed bearing, but a moveable one, that any rubbing or friction, which might arise from the contact of the axle and its bearing, will be relieved by the anti-friction wheel being driven round by the friction of the rotary axle.

As the end of the axle and the groove of the anti-friction wheel are much exposed to dirt and dust, it is proposed, under some circumstances, to enclose those parts by a close iron box or casing. The manner of effecting this is shown at fig. 9, which represents the anti-friction wheel *f*, and its box or casing *g*, in section. The end of the axle *c*, is passed through an aperture in the casing, which aperture is guarded by a collar on the axle.

This iron box, which carries the antifriction wheel and its axle *f*, may form part of an iron framing, extending round the waggon in place of the wood framing *e*, described above, and the box being made tight, may contain oil for lubricating the rotary parts.

In reference to the second part of the invention, it is proposed that the periphery of the running wheels should be made conical, in order that on such parts of the line of railway as may be curved, the larger diameter of the wheel on one side may run upon the more extended line of curve, while the smaller diameter of the opposite wheel may pass along the shorter line or lesser curve.

It is lastly stated that the above mode of diminishing friction in wheeled carriages will apply to carriages generally for the conveyance of goods and passengers on ordinary roads, and that the same is also applicable to mule carriages employed for spinning.—[*Inrolled in the Inrolment Office, November*, 1829.]

To WILLIAM SHAND, *of the Burn, in Kincardineshire, in that part of the United Kingdom called Scotland, Esq. for his having invented a certain improvement or improvements in distillation.*—[Sealed 10th August, 1829.]

THE subject of this Patent is a peculiar arrangement of apparatus for distilling spirituous liquors.

Plate IX, fig. 10, is an elevation of the entire apparatus; *a*, is a still or alembic placed over a fire. In this vessel the wash or other materials intended for distillation are to be placed, and when heated, the vapours will rise up to the still-head *b*, and proceed by the pipe *c*, into the first rectifying vessel *d*.

In the bottom of this vessel there is a central aperture closed by a dish *e*, below, which dish is to be filled with water, and the pipe *c*, having a bell-formed extremity, descends into this dish, and deposits there the vapour emitted from the still, which by the water becomes condensed in the dish.

As this first condensation necessarily produces only a weak spirit, a cock and pipe *f*, is placed at the bottom of the vessel *d*, for the purpose of drawing off this weak spirit and carrying it back again into the still. But the more volatile parts of the spirit which may be evolved from the dish, pass upwards in the vessel *d*, and strike against the top and dome head *g*.

This dome head being exposed externally to a colder temperature than within, causes a further condensation of the vapour to take place, which, falling to the bottom of the vessel, may be drawn off likewise by the cock and pipe *f*, and passed into the still.

Such portions of the vapour as contain the spirit in a more highly concentrated state pass from the dome head of the vessel *d*, by the pipe *h*, into a second rectifying vessel *i*,

where a similar operation goes on, and from thence to a third rectifying vessel *k*, and thence into the refrigerating and condensing worm enclosed in the tub *l*.

The water intended to occupy the lower part of the rectifying vessels and the dish below, may be introduced by a funnel in each dome head, and the water may be drawn off by small cocks in the bottom of each dish, and the spirit condensed in the rectifying vessels may be led from one vessel to the other through pipes with stop cocks, as shown in the figure.

The Patentee does not confine himself to the employment of any precise number of rectifying vessels, as a greater or less number of vessels may be used, according to the required strength of the spirit, neither does he feel it necessary to make the rectifying vessels in distinct vats, as they may be formed in one vessel with partitions, having communications by pipes one into the other; and in order to increase the condensation, the upper part of each rectifying vessel may be covered with cold wash or low wines; and if any spirit should be likely to be evolved, the tops of the vessels might be closed, and a pipe from each lead off into the still.—[*Inrolled in the Inrolment Office, February*, 1830.]

To JAMES ROLAND, *of Heneage-street, Brick-lane, Spital-fields, in the county of Middlesex, and* CHARLES M'MILLAN, *of the same place, engineers and millwrights, for their having invented a new or improved process or mode of constructing, forming, or making streets, ways, carriage roads, and highways in general.* —[Sealed 11th August, 1829.]

THE inconvenience of occasional partial sinking of the paving stones in streets, lanes, and other highways, have

induced the Patentees to construct a framing of iron, to be laid upon the ground, previously prepared and levelled, for the purpose of receiving the paving stones, which must be all squared and trimmed to a similar size.

The form of the iron framing is shown in Plate IX., at fig. 11, which represents the horizontal appearance or upper surface of one portion of the framing; fig. 12, is a vertical section of the same.

The frame consists of a rectangular rim with cross and diagonal bars of cast iron. Two blocks *a*, *a*, are fixed at two of the corners, which are intended to overlap the end of the next frame connected thereto. A rib *b*, passes along the middle of the bar on the upper side, as a bearing for the line of paving stones, and diagonal ribs *c*, *c*, on the under side, are designed to give strength and to support the frame-work.

Fig. 13, shews a series of these frames connected together in one range by bolts or screws passed through the blocks *a*, *a*, at their ends, forming a cross section of the road. The ground, made of hard materials, as gravel or broken stone, is to be levelled and then pecked, and the frames placed in connexion, the diagonal ribs bearing upon the ground, which should be slightly sloping towards the sides.

A provision for hollow gutters is to be made at the sides of the road by iron troughs *d*, *d*, shown in the last mentioned figure, these troughs being supported on one side by the frame-work, and on the other side by a line of stones placed upon the hard ground, so connected and extended over any space or area in breadth and length.

Upon this frame-work the paving stones are to be placed in rows as shown, the joints crossing or blocking, and wedging up tight against each other, and they may be slightly rammed, to drive them to their bearings. The small

interstices between the stones are then to be filled up with fine gravel or cement, made with sand and lime, or any of the usual materials.

By the employment of this contrivance, the paving stones will not be liable to sink in hollows, and the road will be found to be extremely durable.—[*Inrolled in the Petty Bag Office, February*, 1830.]

To NATHANIEL JOCELYN, *of Newhaven, State of Connecticut, in North America, now residing in the city of London, artist, in consequence of a communication from foreigners residing abroad, and from much study of his own, for an invention of certain improvements in the preparation or manufacturing of blank forms for bankers' cheques, bills of exchange, promissory notes, post bills, and other similar instruments or securities for the exchange or payments of monies, by which forgeries and alterations in the same are prevented or detected.*—[Sealed 3d August, 1829.]

IT is with very great difficulty that we have been enabled to collect a single idea of the Patentee's intentions from the specification now before us.

The Patentee expatiates upon the manner in which bankers' cheques and bills of exchange are usully drawn, and the facility of fraud being practiced by dishonest persons in altering the sums expressed in such cheques and bills. To obviate this, the Patentee would induce the bankers to mark their blank cheques, before delivering them to their customers, with some private sign, to be known only to the banker and the drawer, by which blanks with

certain signs should be appropriated to certain sums only, and hence if any other sum was expressed upon the cheque, the forgery or alteration would be immediately detected.

Another suggestion is, that in the event of several blank cheques being printed upon one sheet, that stamps with some marks, such as scroll work, should be printed upon the spaces between every two, so that the marks might be cut through when any cheque was cut off, and these and the number of the cheque being compared by the banker before payment, any fraud would be instantly detected.

It would be a waste of time to say any more upon this subject, as the absurdity of the suggestions must be obvious to every reader.—[*Inrolled in the Petty Bag Office, December*, 1829.]

To THOMAS ARNOLD, *of Hoxton, in the county of Middlesex, tin plate worker, for his invention of a new or improved machine or gauge for the purpose of denoting the quality or strength of certain fluids or spirituous liquors, and for measuring or denoting the quantity of fluid or spirituous liquors withdrawn from the vessel or receptacle in which the same are contained, and which machine or gauge may be so constructed as to effect either of the above objects without the other if required.*—[Sealed 26th May, 1829.]

THIS is an apparatus designed to show the quantity of liquor which has been drawn from a vat or cask in any certain space of time, and also to show the strength of the

spirit or specific gravity of the liquor contained within. It is, we presume, intended to be employed as a check upon the person who is entrusted to draw the liquor for retail trade from the pipe in the lower part of the apparatus, as, upon inspection, it will indicate the quantity that has passed through the feeding cock into the receiver, and consequently that which has been drawn out, as the feeding cock and the discharging cock act simultaneously.

The manner in which these objects are proposed to be effected is by the employment of a hydrometer to be immersed in the fluid, and a hollow wheel or drum having partitions dividing the drum into compartments, which, as they successively become filled, denote the quantity.

Plate IX., fig. 14, represents the apparatus partly in section; *a*, is a cock, which, by the screw *b*, is to be inserted into the vat from whence the liquor is to be drawn. The key of the cock is shown at *c*, having a lever handle; *d*, *d*, is a vessel intended to receive the liquor as it is drawn off, having a cylindrical part *e*, *e*, with a conical bottom and discharge cock in the lower pipe *f*.

The measuring wheel *g*, turns upon an axle, and on the outside is connected to a set of counting wheels, with an index and dial plate, to denote the same number of rotations of the wheel, which will give the quantity by measure of the liquor delivered into and discharged from it.

It is proposed that the capacity of each chamber of the measuring wheel shall be equal to half a quarter of a pint. As the liquor flows from the cock *a*, it falls into one of the chambers of the wheel or drum, and when the liquor rises up to a certain height in the chamber, its weight causes the wheel to turn and discharge the liquor into the vessel *d*, from whence it runs down to the cylinder *e*, below.

When the drum or wheel has made one third of a revolution, a small click stops its progress; and as the next

chamber gradually fills, the wheel passes a little way round, and by so doing raises the click so as to allow the wheel to move onward without impediment, another third of a rotation on the next chamber becoming filled.

In this way the successive chambers of the drum, filling and discharging, give rotary movement to the drum, and the number of rotations made in any space of time being indicated by the index upon the dial, shows the quantity of liquor passed from the cock.

A glass float *h*, is introduced into the liquor in the cylindrical vessel *e*, and a wire or thin rod *i*, is inserted into a cork in the neck of the float, the upper end of the rod being attached by a slot and stop pins to the lever or key of the cock *c*. When the liquor in the cylindrical vessel *e*, is low from the quantity drawn off, the float, of course, is depressed, and the rod descending with the float *h*, brings down the lever and opens the way of the cock, at which time the liquor flows into the chamber in the wheel *g*, which, as before said, keeps revolving as long as the liquor is delivered into it from the cock. But as soon as the quantity discharged into the cylindrical vessel is sufficient to raise the glass float up to its highest position, the rod *i*, will have lifted the lever and closed the cock. No more liquor can, therefore, be delivered from the cock into the chambers of the drum *g*, until a quantity has been drawn off below. Such is the operation of the measuring part of the apparatus.

In order to indicate the strength of the spirit and detect its fraudulent dilution, a cylindrical glass tube *k*, is placed in the lower part of the apparatus connected with the pipe *f*; when the cock *l*, of this tube is opened, liquor will be allowed to flow into the tube; and when that has been done, a hydrometer may be introduced into the glass

tube, by the floating positition of which the strength of the spirit will be indicated.

The principles and construction of the measuring wheels with curved chambers are well understood, particularly in their application to gas meters; and also the construction and mode by which the counting wheels are connected to and made to indicate the number of rotations of the measuring wheel, is well known; it is not, therefore, necessary to describe them more particularly. The principal construction and mode by which a hydrometer indicates the strength of spirits is also understood; there is, therefore, no need of explaining it more fully; and as these things are not new in themselves, it is to be understood that the Patentee claims only their adaptation in the way shown to the construction of an apparatus which shall indicate the quantity of spirits or other liquors that have been drawn from a particular vessel in a certain space of time, and also show its specific or spirituous strength.—[*Inrolled in the Petty Bag Office, November*, 1829.]

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[SECOND SERIES.]

Recent Patents.

To LOUIS QUETIN, *of Great Winchester-street, in the city of London, professor of mathematics, in consequence of a communication made to him by a certain person residing abroad, for an invention of a new or improved vehicle, or combination of vehicles, for the carriage or conveyance of passengers, and also luggage and goods, constructed upon a principle of security against overturning or upsetting, and possessing other advantages which he conceives will be of public utility.*—[Sealed 25th July, 1829.]

THIS is an extraordinary project for obtaining safety, and preventing a carriage from overturning, consisting of a plan for running the carriage upon a single wheel.

A broad wheel, or rather a bowl-shaped roller, is provided with an elongated axle extending at both ends. To this axle a strong rectangular horizontal frame is attached, with uprights, called a cage, circumscribing the wheel on which carriage bodies, with suitable boxes or boots, are fixed by the sides of the wheel, before and behind it, and also on the top. These carriage bodies and boots are to be so exactly balanced, that the whole weight may be supported and poised upon the wheel or roller in the centre.

The construction of such a ponderous vehicle may be readily conceived. The framework or cage that is to circumscribe the central wheel, must be made exceedingly strong in order to support the carriage bodies, which may be formed agreeable to the taste of the builder, or in the usual appearance of carriage bodies suited to receive passengers, having capacious boxes or boots as magazines beneath for the stowage of heavy goods and luggage. On the tops of these carriage bodies cabriolas are to be placed for outside passengers; and the whole, that is, the carriage bodies, boots, or magazines, and cabriolas, are to be so mounted upon springs connected with the framework or cage, that any concussions caused by passing over obstructions on the road may be neutralised.

As the vehicle may be subjected to some vibratory or swinging action in its travelling upon roads, there are to be anti-friction rollers attached under the carriage magazines or boots at the sides, which come in contact with the ground in case of any preponderance of either side of the vehicle, allowing the carriage to roll on without obstruction.

The vehicle is to be drawn by horses, as other carriages, having a pole in front; and we presume that the bowl shape of the wheel will allow of its turning, without much difficulty, to the right or left, out of the straight course.

A variation of this scheme is also described, but the precise construction of which we do not exactly perceive. It is proposed that a broad wheel of large diameter without spokes shall be employed, within which a carriage body is to be suspended by some means which are not intelligibly explained. We presume that the carriage body is to hang upon something like gimbles or universal joints, within the wheel, as it is stated, that its erect position is to be pre-

served by weighting the under part of the carriage body, which, as the wheel goes round, will preserve its position by means of its gravity.—[*Inrolled in the Petty Bag Office, January*, 1830.]

To WILLIAM SHAND, *of the Burn, in Kincardineshire, in that part of the United Kingdom called Scotland, Esq., for a certain improvement or improvements in distillation and evaporation.*—[Sealed 21st August, 1829.]

THIS invention applies both to a still and to a boiler, wherein the syrup is to be evaporated for the crystallisation of sugar, in which the heat from the fire is communicated through the medium of an oil bath to the bottom of the still or evaporating vessel.

The employment of oil as a medium of heat for the purpose of evaporation, has been preferred to that of water or steam, because oil is capable of being raised to a higher degree of temperature than water before it is passed off in vapour. But it having sometimes happened, or has been supposed to have happened, that highly elastic gas has been given off from the oil bath, which, by its explosion, has been productive of very serious injury, the Patentee proposes by this invention to condense any such gas as it may arise, and thereby to render the apparatus perfectly safe.

The form of the still or of the evaporating pan constitutes no part of the invention. Its bottom is to be immersed in the oil bath, which is placed over the fire. One part of the top of the vessel containing the oil bath is to be open, and communicate with a serpentine channel, like a flue, which passes round the sides of the still or evapo-

rating pan; and this channel is enclosed at top by a vessel of cold water, which circumscribes the upper part of the still or pan. Any vapour which may arise from the heated oil will pass up this serpentine channel, and at top strike against the under part of the vessel containing the cold water, by which means the vapour will become condensed, and fall down again into the bath in the liquid form of oil.

As the water in the upper vessel would rapidly imbibe heat, it is necessary to keep a constant current passing through it, which is proposed to be done by feeding it through a pipe from a reservoir of cold water above, and allowing the heated water to flow away by a waste pipe below into a discharging gutter.

The furnace, flues, and boiler, whether for a still or for a sugar pan, or any other evaporating vessel, may, of course, be constructed in any convenient form or way; but the Patentee claims the exclusive use of the "serpentine channel by which the vapour is allowed to rise; the water channel at top by which the vapour is condensed; and the water gutter which receives the overflow, as the chief means of performing the improvement."—[*Inrolled in the Inrolment Office, February,* 1830.]

To MOSES POOLE, *of Lincoln's Inn, in the county of Middlesex, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for certain improvements in the apparatus for raising or generating steam and currents of air, and for the application thereof to locomotive engines, and other purposes.* —[Sealed 8th July, 1829.]

THE two features of improvement proposed in the title of this patent, consist in a peculiar construction of steam

boiler, and in a mode of promoting the draught of a chimney or flue.

The boiler in which steam is proposed to be generated is formed by a series of small tubes like gun barrels, placed horizontally, and connected together by the open ends of the tubes being inserted into coupling boxes, so as to produce a zig-zag continuation of tubeing from the beginning to the end of the range.

The form of the boiler may be assimilated to a cage, as the series of small tubes are to be ranged round the sides of the furnace, and at the top and bottom, the fire being in the middle; and the tubes are to be affixed to the boxes at their ends by a rod passed through each tube, with screw nuts at its extremities, which will allow of the tubes being readily opened and cleaned when required.

The water is to be supplied to these tubes by a force pump through a pipe leading in at the commencement of the range, and the steam is to pass off at the other extremity into a cylindrical vessel constituting a steam chest, where any water which may be carried over will become deposited by its gravity, and return to the reservoir of the force pump while the steam proceeds onward to the induction aperture of the engine.

This construction of boiler is proposed, as particularly eligible for locomotive engines, to which it is shown adapted, though in a very imperfect manner, in several figures of drawings accompanying the specification; but as there is nothing claimed as new in the construction of the engine or carriage, and there is obviously no novelty in the boiler, we do not consider it necessary to give engravings of the figures.

It is stated that as the internal diameter of the tubes which form the boiler are very small, and would soon burn through if the water became evaporated, whenever the

carriage is stopped the engine must be still kept at work, in order that water may be constantly pumped into the tubes, so as to keep the boiler always charged.

As the hinder wheels of the carriage are connected by gear to the engine, it will, whenever the carriage is intended to stop, be necessary to raise the hinder wheels off the ground. This is proposed to be done by letting down a lever from behind the carriage, which is to act as a prop, having a broad foot or drag slipper at its end, which is to be brought under the periphery of the wheel. This prop lever, when required, is to be forcibly draw into a perpendicular position by means of a drag chain connected to the rod of a piston in a small auxiliary cylinder fixed under the perch of the carriage.

To bring this apparatus into effective operation, a volume of steam must be let into the small cylinder at such times as the drag or prop is required to act, when the pressure of the steam forcing up the piston causes the chain to draw the prop lever, and bring it nearly into a perpendicular position by the side of the wheel, the drag slipper being then in contact with the ground beneath the periphery of the carriage wheel. This auxiliary piston and steam cylinder, it is proposed, shall be employed to bring the drag into operation whenever the velocity of the carriage requires to be retarded, as in passing down steep descents.

The steam discharged from the eduction aperture of the engine passes into a cylindrical vessel placed parallel to the steam chest, above described, which vessel is intended to be a partial condenser. The eduction steam is conveyed into this vessel by a groove in a jecket round the working cylinder, in which, we presume, the slide valves are intended to act; but this part of the apparatus is so imperfectly described, that its construction and mode of operating is altogether beyond our comprehension.

The concluding part of the Specification states that the uncondensed steam is to be blown off from the cylindrical vessel last described into the flues or chimney of the boiler, for the purpose of creating by the velocity of its exit a strong current or air draught through the furnace, which may be regulated by a suitable stop cock, as the draught shall require increasing or diminishing. This application of a current of steam is also proposed generally for all situations in which a powerful draught of the flues and chimney of a furnace is required.—[*Inrolled in the Inrolment Office, January*, 1830.]

To THOMAS SHAW BRANDRETH, *of Liverpool, in the county of Lancaster, barrister at law, for a new method or methods of applying animal power to machinery.*—[Sealed 9th September, 1829.]

THE subject of this Patent is one of the varieties of locomotive machinery in which a horse or other animal is placed within the vehicle for the purpose of exerting his muscular strength by pushing with his feet against a receding floor, connected by gear to the running wheels of the carriage.

Upon this principle the power has usually been obtained by the horse or other animal walking upon an inclined plane, or upon the descending part of the periphery of a rotary drum as a treadmill; in which cases the gravity of descending weight of the animal principally produced the power by which the machinery was to be actuated. In the present instance, however, the muscular exertion alone is brought into operation, the weight of the animal not being made conducive to the production of power.

The present machine, which is denominated a CYCLOPED, is intended to be the agent for drawing a series of

loaded carriages behind it upon a railway. Four running wheels, like those usually employed for railway carriages, are affixed, two to the fore axles and two to the hinder axles of the cycloped, the axles turning in bearings secured to the under part of the horizontal frame of the carriage. Two cylindrical barrels are also mounted upon axles supported by the frame, round which barrels an endless band, or two parallel endless chains, are passed. To this endless band or chains a series of transverse battens or rails of wood, placed close together, are attached, which being supported by a series of small rollers, mounted transversely in the side frames of the carriage, form a horizontal platform for the horse or other animal to stand or walk upon.

The axles of the running wheels, and those of the cylindrical barrels, are connected together by toothed wheels and pinions, so that any rotary motion being given to the barrels will be communicated to the running wheels, and cause them to carry the cycloped forward.

On the top of the horizontal framework of the carriage upright posts and side rails are erected, forming a sort of stall to enclose the horse, with a trough or manger in front, that the animal may feed as it goes on. A collar is placed round the horse's neck, with traces or chains attached to the harness, which traces are hooked to staples in the side rails.

The horse being now made to pull by his collar, the traces draw from the staples in the side rails, and in making this effort to advance, the horse's feet act as levers against the rails of the moveable floor or platform, which being by these means slidden back, causes that rotary movement of the drums connected to the platform, and of the toothed pinions upon their axles, which turn the axles of the running wheels, and impels the carriage forward upon the railway, drawing the train behind it.—[*Inrolled in the Inrolment Office, March*, 1830.]

To CHARLES WHEATSTONE, *formerly of the Strand, but now of Conduit-street, in the county of Middlesex, musical instrument maker, for his having invented a certain improvement or improvements in the construction of wind-musical instruments.*—[Sealed 19th June, 1829.]

THE subjects of this patent are several highly ingenious methods of constructing and of adapting keys to the German musical instrument called the *Æolina*. This instrument is formed by a series of sonorous metallic springs something like the tongues of *Jews-harps*, which are mounted in a box, and are made to vibrate and give out musical tones by the pressure of wind either from the breath of the performer, or from a small portable blowing apparatus.

The improved instruments are denominated SYMPHONIONS; they are constructed in several different shapes, and are played upon by the fingers something in the way of a flagelet, that is, the mouth is applied to the embouchun, and the fingers touching small projecting pins raise the keys, which allow the sounds to be emitted through the apertures, or if adapted to a small round bellows, the keys are touched in like manner by the fingers of the performer, as the bellows are expanded or compressed, and the passage of the wind through the apertures, as the keys are opened, cause the metallic tongues to vibrate, and to emit the sounds of notes in tuneful succession.

One form of the Symphonion intended to be inflated by the mouth is represented in plate X, consisting of a metal box with apertures in the sides in each of which a metallic tongue is placed, but the apertures are closed at the back by lever keys, and the interior of the box being filled

with wind by the breath of the performer through a mouthpiece, whenever one of the keys is raised the wind, in passing through the aperture, puts the spring or metallic tongue in a state of vibration, which produces the sound of a musical note.

Fig. 1, is an external representation of the box in which the levers and keys are seen. Fig. 2, is an edge view of the same, showing also the mouthpiece. Fig. 3, exhibits the interior of the box, the face plate on the mouthpiece side of the box being removed. Fig. 4, is a section taken across the box, showing the positions of the several operative parts.

The frame and box *a, a, a,* is made of any shape convenient for being held by the fingers; *b,* is the mouthpiece through which the performer blows into the interior of the box; *c, c, c,* are the springs or metallic tongues mounted in front of the apertures made in the face plate; *d, d, d,* are the pins or keys to be played upon by the fingers, which are connected to the lower valves *e, e, e,* covering the apertures.

The box *a,* being filled with wind through the mouthpiece *b,* by the breath of the performer, on depressing any one of the keys *d,* by the finger, the lever connected with that key will open its valve at *e**, fig. 4, when the spring *c,* will by the passage of the wind be made to vibrate, and consequently give out the tone or musical note.

The metallic tongues or springs must be so formed and attached to the plate of the box, as to be capable of severally producing the tones of common chords. This will be understood by musical instrument makers, as well as the modes of tuning them, and the means of obtaining sharp or flat notes.

It is unnecessary to show all the modifications as to shape, under which the Patentee proposes to construct the

Symphonion, the leading principles of construction being the same as those above described.

One other construction of the instrument, however, is proposed, varying considerably from those already described, which is stated to be a modification and improvement of the Chinese organ. It is formed by pipes having vibratory metallic tongues at their ends. Two of these pipes are shown in different positions at figs. 5, and 6; *a*, being the aperture at which the wind is admitted, and *b*, the vibratory tongue from whence the sound is given out.

Any required number of these pipes may be arranged and attached to a board, as fig. 7, their lengths and also their tongues being adjusted and tuned as organ pipes.

This series of pipes it is proposed to place within a bellows, as fig. 8, which being expanded and collapsed by the hands of the performer, will cause the required pressure of wind to be forced into the unstopped apertures or mouthpieces *a*, of the pipes and the fingers of the performer, at the same time pressing in succession upon the keys on the outside, will open such of the pipes as may be required to produce the tones.

The arrangements of the musical springs or tongues, and also of the keys in the instrument, will be dependant upon the convenience with which the fingers of the performer may be enabled to touch them so as to play any tune upon the instrument with facility.—[*Inrolled in the Inrolment Office, December*, 1829.]

To HENRY BOCK, *of Ludgate-street, in the city of London, Esq., in consequence of a communication made to him by a certain foreigner residing abroad, for improvements on machinery for embroidering or ornamenting cloths, stuffs, and other fabrics.*—[Sealed 2d May, 1829.]

THIS is a machine which, however ingenious in its construction, must be considered to be more curious than useful. It is designed to conduct a series of needles with threads to and fro through a distended sheet of muslin or other material, for the purpose of producing upon the face of such material the kind of raised needle-work called embroidery.

Plate X, fig. 9, is a front view of the machine complete; fig. 10, is a longitudinal section of the same, showing the positions and operations of the several parts.

The Patentee has described this invention under three distinct heads. First, the manner in which the frame holding the sheet of muslin or other material to be worked upon is to be shifted when in operation, for the purpose of bringing different parts of the sheet into proper situations for the needles to pass through according to the pattern or device intended to be worked thereon. Secondly, the means by which the machinery carrying the holders of the needles is to be moved in order to conduct the needles to and fro, and pass them through the interstices between the threads of the sheet of muslin or other material about to be embroidered. And, thirdly, the method by which the respective series of fingers, pincers, or holders, are closed or opened in order to take hold of the needles for the purpose of carrying them, and to release the needles when they have been protruded through the material.

The machinery is supported in an outer stationary frame-

work of iron *a*, *a*, within which are mounted two movable frames *b*, *b*, and *c*, *c*, connected together. The frame *b*, *b*, carries two rollers *d*, *d*, on which the muslin or other material *e*, *e*, intended to be embroidered is rolled, and by these means is tightly distended in a vertical position in the middle of the machine. Two series of pincers or fingers *f*, *f*, are fixed upon each of the carriages *g*, *g*, which carriages respectively run to and fro upon lateral rails *h*, *h*, at the back and the front of the machine.

The second set of pincers mounted in the lower part of each carriage, are to be considered only as repetitions of the upper series, the additional holders being introduced for the purpose of performing a greater extent of work, that is, causing a double series of needles to operate upon two parts of the sheet of muslin at the same time.

The needles are formed as shown upon an enlarged scale at *s*, fig. 11, having two points, and the eye in the middle; and the pincers or fingers which hold the needle are also represented in this figure considerably enlarged. These pincers or fingers are placed in opposite positions on the back and front carriages, as seen in the section, fig. 10, that is, the opening of the chaps face each other so that the respective needles, conducted toward the muslin by the one set of holders on the advance of the carriage, are, after their points have been passed through the muslin, taken hold of by the opposite set of holders, and are drawn through the muslin by the retiring of the other carriage.

The general objects of the machine being stated, we proceed to explain the particular construction of its parts, and the manner of their operating.

The muslin or other material having been rolled, as above said, round the rollers *d*, *d*, the axles of those rollers are mounted in bearings in the frame *b*, *b*, and the muslin

is drawn tight by turning the winches of worm pinions, acting in the oblique teeth of the wheels *i*, *i*, on the ends of the rollers *d*, *d*.

As the approaching and receding movements of the carriages *g*, *g*, are upon stationary horizontal planes, the needles would be brought to the same spot upon the muslin at every advance of the carriages, if the frame in which the muslin is distended remained stationary; it is therefore necessary, in order to work a pattern or device upon the muslin, that the frames carrying it should be moved a little distance after every passage of the needles. For this purpose, therefore, the frame *b*, holding the rollers, is enabled to slide upwards, and the frame *c*, to which *b*, is connected, to slide laterally.

By reference to the front view of the machine, fig. 9, the manner of moving the sheet of muslin in working a pattern will be perceived. The outer frame *c*, *c*, mounted upon the standards, is enabled to slide to and fro horizontally by means of anti-friction wheels running upon a transverse rail *k*, fixed to the standards and the inner frame *b*, *b*, in which the rollers *d*, *d*, are mounted, being suspended by a counterpoise weight and cord *l*, passed over pulleys, is enabled to move vertically by its guides *m*, *m*, *m*, *m*, sliding against straight edges attached to the outer movable frame *c*, *c*.

The movements of both these frames *b* and *c*, are regulated by a piece of machinery composed of jointed levers *n*, *n*, *n*, called by the Patentee a pentagraph. The fulcrum of this pentagraph is a joint *o*, attached to the standard, and it is balanced by a counter weight and cord passed over pulleys.

The frame *b*, is connected to the pentagraph by a joint *p*, and at the reverse extremity of the pentagraph there is a handle and tracing point *q*, which, being passed over the

face of a pattern card *r*, affixed by a bracket to the standard, causes the frames *b* and *c*, to be moved both vertically and horizontally.

The subject drawn upon the pattern card is that which is to be worked or embroidered by the needles on the sheet of muslin; and by shifting the tracing point of *q*, from place to place previous to each passage of the needles, the pentagraph will cause the situation of the sheet of muslin to be shifted in a corresponding degree, and the different parts brought opposite to the points of the needles, so that they may enter a different part of the sheet at each movement, and by a succession of stitches produce a spreading pattern.

The means by which the needles are passed to and fro through the muslin is now to be considered. The longitudinal section, fig. 10, will best illustrate the manner of working the needles. Carriages *g*, *g*, are mounted upon bevel-edged wheels running upon longitudinal bars *h*, *h*. These carriages support the series of fingers, pincers, or holders *f*, *f*, *f*, *f*, extending across the machine, each of them being designed to take hold of one end of the needle, as shown upon an enlarged scale in fig. 11. These carriages are made to travel to and fro upon the lateral rails by means of bands passed over the pullyes *tt*, *tt*, *tt*.

The operator, when he has adjusted the point of the tracer *g*, upon the pattern board, draws the band, and brings one of the carriages, with the pincers holding the needles, up to the sheet of muslin, as shown at the right hand of fig. 10, the points of all the needles being by this means protruded through the muslin. The other carriages, with the chaps of its pincers, open as at the left hand in fig. 10, is then advanced in like manner, and brought up so that the opposite points of the needles may stand within the open chaps of the pincers. This being done, the chaps of the holders are then closed by means which will be

described hereafter; and the needles being thus held fast by the back series of pincers, the chaps of the front or right hand series of pincers are then opened. The left hand carriage being then made to retrograde, the needles will by that means be drawn through the muslin, and the stitch of embroidery be formed.

Previously to the next advance of the left hand carriage, the situation of the muslin must be shifted a trifling distance by moving the point of the tracer as above described, which will cause the points of the needles to be introduced in other parts of the muslin, and so extend the stitches, by which the embroidery is to be worked.

The specification does not point out the mode in which the thread is to be supplied to the needles. There is some thread represented by the drawing in the centre of the eye of the needle, which may possibly be a very small bobbin carrying the thread; but this we only conjecture, and conceive that it would be scarcely possible for it to pass through the muslin.

There are curved surfaces called shields *v*, *v*, *v*, *v*, placed across the middle of the machine, as shown in the section fig. 10, which are covered with plush for the purpose of taking hold of the loose threads from the needles as they pass, and causing them to be drawn tight at every stitch.

The third feature of the invention is the contrivance by which the series of pincers or fingers are opened and shut at the proper periods for releasing the needles from one series, and taking hold of them by the opposite series.

To the hinder part of the upper chap of every one of the holders there is a small chain attached, which leads down to a crank *u*, *u*, extending across the machine under each of the carriages. This crank is moved up and down by an arm or lever *w*, *w*, fixed to its axle, which lever is acted upon by a rotary cam *x*, *x*.

When the operator wishes to open the chaps of one

of the series of holders *f*, he presses upon one of the treadles *y*, which, by means of a band or cord passed round the pulley on the end of the longitudinal shaft *z*, causes that shaft to revolve; and in so doing, by means of one of the bevel toothed wheels, to turn one of the cams *x*, into such a position as shall act against the arm or lever *w*, when the carriage passes it, and thereby cause the crank *u*, to which the tail chains of the pincers are attached, to draw down those chains, and consequently to open the chaps of that series of pincers which are advancing, in order to receive the points of the needles. As soon, however, as the open chaps of the pincers have arrived at the situation of the needles, the lever *w*, slips away from the cam *x*, and the spring beneath the upper chap (see fig. 11,) then forces up the tail lever of each of the pincers, and causes the needles to be held fast.

The cams and levers by these means opening and closing the chaps of the pincers, cause the series of needles to be taken hold of and held fast by the pincers, or to be released at certain periods; and hence, by the traversing of the carriages to and fro, the needles are conducted through and through the fabric stretched upon the vertical frame, and the embroidery is effected.—[*Inrolled in the Inrolment Office, November,* 1829.]

To FRANCIS DAY, *of the Poultry, in the city of London, optician, and* AUGUSTE MUNCH, *of the same place, mechanic, in consequence of a communication made to them by a certain foreigner residing abroad, and improvements by themselves, for an invention of certain improvements on musical instruments.*—[Sealed 19th June, 1829.]

THIS invention applies to wind musical instruments of the organ kind, or organised piano-forte, and like the inven-

tion which forms the subject of the preceding patent, consists in the adaptation of metallic spring tongues like the tongue of a Jew's harp, which, by their vibrations, give out musical tones.

The Patentees describe the invention as a new substitute for the pipes of an organ forming a stop, that is, an additional series of notes on the organ technically denominated a *stop*.

These metallic tongues have been applied to organs and other wind musical instruments in Germany, and are found to produce very fine and rich effects of tone; it is for the adaptation of them to similar musical instruments in England that the present patent is obtained.

Over the aperture of the wind chest in place of one of the ordinary organ pipes, a wooden box is fixed, the under part of which box has a metallic plate with a long slot or opening in it suited to receive the metallic tongue or spring, from the vibrations of which the musical tone or note is to be produced. The upper part of this box is open for the free discharge of the sound; but in order to effect variable modulations of tone, a wooden flap or valve is placed upon the top of the box, by means of which the open end can be more or less closed, as may be desired.

The tongue or sonorous spring may be flat, and fastened by its root to the metallic plate, allowing it to vibrate in the slot or lower aperture of the box, or it may be of a bent form, its root or fulcrum being fixed, and its spring part allowed to play freely in the aperture. The metal at the vibratory end of the tongue should be thicker than at the root for emitting grave notes, but of thinner substance for high notes. The wooden valve at top of the box may be raised or depressed by a rod connected to a pedal, or by any other means; or the valve may be formed by a slider instead of a flap, if preferred; and the box itself may be square, or of any other convenient form.

A series of these boxes with metallic tongues or springs below, and valves above, are to be mounted over the several apertures of the wind chest of a common organ, or other similarly constructed instrument, and the keys of the instrument being as usual connected by levers, with valves to the apertures of the wind chest, those apertures are opened by the depression of the keys, as the fingers of the performer act upon them; and hence the wind, in passing from the chest through the lower apertures of the boxes, puts the tongues into a state of vibration, producing the notes or musical tones required.

It is obvious that this simple contrivance of adapting musical springs or metallic tongues to organs, instead of pipes of large magnitude, will admit of the construction of very powerful musical instruments of small dimensions compared to ordinary organs; and as the mechanism by which organs are usually worked, or as it is more technically called *played*, is well understood, and of course admit of some variety in construction, it is not intended by the Patentees to limit themselves to any particular arrangement of mechanism. They therefore define the claim of exclusive right of adaptation in the following words:—

"The formation of a new substitute or stop for the pipes of an organ by the combining of metal tongues or springs, with wooden boxes fitted with regulators or modulators of the tone; also the application of pallets or valves to the tops of the said boxes, and the remova thereof from the insides of the wind chests of the organ, to which this latter form of our new stop may be applied; and also the manner of raising or lifting the said regulating pallets or valves."—[*Inrolled in the Inrolment Office, December*, 1829.]

To ROBERT TORRENS, *of Croydon, in the county of Surrey, a lieutenant-colonel in the Royal Marines, for certain apparatus for the purpose of communicating power and motion.*—[Sealed 9th September, 1829.]

THE subject of this invention is an engine to be worked by the force of elastic gas instead of steam. The general mechanism is the same as that usually employed for condensing engines, but the generator, and also the working cylinder, are surrounded by hot mediums of oil or water contained in vessels which enclose the generator and working cylinder. The condenser is, in like manner, surrounded by a medium of cold water contained in a vessel which encloses the condenser.

The gas in the generator is intended to be rendered elastic by the heat transmitted from the medium of hot oil or water which surrounds it; and having been so rendered elastic, it passes by means of a pipe to the working cylinder of the engine, in a similar way to that in which steam is conducted in an ordinary steam engine.

The heating mediums are kept under pressure in close vessels for the purpose of allowing the heat to be increased to a degree of intensity, and also to prevent the fluid from evaporating.

The working cylinder being surrounded by a medium of heated oil or water, increases the elastic force of the gas by further expanding it; and having forced the piston to the end of the cylinder, the gas then passes off by an eduction valve, as usual, to a condenser.

The condenser is formed of thin metal, in order that the heat of the gas when passed into it may be readily transmitted to the surrounding water, which, by means of pumps, is to be kept in a continued current for the purpose

of carrying off the accruing heat from the generator, and receiving a supply of cold water to keep up the refrigerating state of the medium.

When the eduction gas has been lowered in its temperature in the condenser, it is from thence forced up by a pump again into the generator, to be heated and expanded as before.

Safety valves and air vessels are provided; and in putting the machine to work, the gas is allowed to blow through by means of lateral pipes, for the purpose of driving out any atmospheric air which may previously have occupied the vessel.

The specification does not state what material is to be placed in the generator from which gas is to be evolved, nor can we comprehend the Patentee's intention, as in the drawing of the engine which accompanies the specification, a liquid is represented as occupying the lower part of the generator, and that is written upon "condensed gas."

It is quite evident that the whole is a very crude and undigested project, full of incongruities, which, though elaborately described in the specification, is very far from being intelligibly explained. The principal features claimed appear to be that of enclosing the generator and the working cylinder within vessels of heated oil or water, and keeping those medii under pressure. There is no feature of novelty proposed in the construction of any parts of the mechanism of the engine, and therefore we do not consider a figure representing it at all necessary.—[*Inrolled in the Inrolment Office, March*, 1830.]

To JOHN MILNE, *of Edinburgh, architect, for a machine or engine for dressing of stones used in masonry, by the assistance of a steam engine, a wind, a horse, or a water power, whereby a great quantity of manual labour will be saved.*—[Sealed 15th September, 1829.]

A MACHINE for picking and dressing stones by attaching the tool to a falling lever, worked like a tilt hammer, the stone being placed upon a movable carriage below, formed the subject of a patent granted to Alex. Dallas, in April, 1824.—(See the first series of our journal, vol. ix., p. 301.) The invention of the present Patentee is for the same object; but in this instance the tools (for there are many) are attached to the periphery of a rotary drum or barrel, and the block of stone is progressively carried along upon a sliding frame under the rotary drum.

The barrel or drum is proposed to be of from eighteen to thirty-six inches in diameter, and from eighteen to forty-eight inches long. Round the periphery of this drum the tools, whether pecks, chisels, addices, or droves, are to be placed in several series spirally, that is, winding round the periphery of the drum like a screw, so that the several tools may in succession be brought into operation one after the other, upon different points of the stone.

The stone intended to be dressed, is in its rude form to be fastened upon the sliding carriage by cramps, and as the drum goes round the carriage is intended to move on slowly, so that the points of the tools may strike against and chip off portions of the surface.

When the stone has passed once under the operation of the tools on the rotary drum, it is to be slidden back again upon its carriage; and the frame of the carriage with the stone

oeing then raised a trifling distance by means of segment racks and pinions beneath, the carriage with the stone is again passed under the rotary drum, and the tools, pecking as before, chip off further portions of the irregular surface. This operation is to be repeated, and the position of the stone shifted until the surfaces are worked down or dressed to the desired figure.

The rotary drum carrying the working tools is proposed to be driven by toothed gear connected with a steam engine or other first mover; and the progressive motion of the carriage on which the stone is supported may be produced by connecting it with the rotary motion of the drum, or the carriage may be moved independently by hand. If the former contrivance is adopted, it is obvious that any desired speed may be given to the carriage by changing the wheels of the gear which connect the drum and the carriage together.

It is proposed when bevels are desired to be worked upon the surface of the stone that the rotary barrel should be shaped accordingly, and the tools adapted both in position and figure to produce such surfaces. In a similar way it is proposed that grooves may be cut in the stones, and that after pecking, the surface may be rendered smooth by the tools called droves.

The Patentee does not confine himself to any particular forms, dimensions, or positions of the parts, but claims a rotary drum or barrel, carrying the dressing tools, and a carriage beneath for conducting the rough stone along for the purpose of bringing it under the operation of the rotary drum.—[*Inrolled in the Inrolment Office, March*, 1830.]

To JOHN M'CURDY, *of Great James-street, Bedford-row, in the county of Middlesex, gentleman, in consequence of a communication made to him by a foreigner residing abroad, by which he is in possession of an invention or discovery of certain improvements in the method of constructing mills and mill-stones for grinding.*—[Sealed 2d November, 1829.]

THERE are three principal features claimed under this patent; the first is adopting a bolting apparatus to the mill in such a way, that the flour, in descending from the stones, may pass immediately into the bolting drum, for the purpose of having the bran and other husky matters separated from it.

The second feature is, cutting peculiarly formed grooves or recesses in the faces of the stones, and filling up holes or faulty places in the faces of the stones by a cement.

The third is a method of hanging the top stone in such a way, that it may be readily adjusted to any required distance from the bed-stone. The bed and also the running stones being mounted in a strong framework of cast-iron or other material, the bolting apparatus is placed beneath, and is actuated by the same moving power that drives the revolving stone of the mill. The particular arrangement of the parts, however, is not claimed, but only the adaptation generally; and there does not appear to be any novel features in the mechanism, but the same contrivances are used as are employed in driving ordinary corn-mills, and ordinary bolting machinery.

T e peculiarly formed indentations made in the faces of the burrs or grinding stones are,—a series of spiral or convolute grooves, cut from the circumference to the centre in the face of the upper stone, and an arrangement of straight

angular grooves in the face of the bed-stone, which, acting together, it is considered will break the corn more effectually than the form of grooves usually cut in the faces of mill-stones.

In order to fill up any small holes which may and often do occur in the faces of these stones, it is proposed to break up portions of French burr stone into small pieces, and also to pulverise some portions of these burr stones, and with them to mix a quantity of alum. These materials being placed in a ladle over a fire, will, by the alum melting, become a sort of fluid; and being applied as a cement to the holes in the faces of the stones, those holes will be effectually filled up, and the surfaces at those parts made even.

The new mode of hanging and adjusting the upper stone does not appear to be very clearly described in the specification; there seems to be a cross-bar, through which the spindle passes, with a screw on the spindle, by which the stone may be raised or lowered at pleasure. The contrivance appears altogether to be designed for portable mills, or for small mills for grinding and preparing flour for private families.—[*Inrolled in the Inrolment Office, January*, 1830.]

To WILLIAM DODGSON, *of Lower Shadwell, in the county of Middlesex, pump and engine maker, for his invention of certain improvements in ships' scuppers, and which may be applied to other purposes.*—[Sealed 17th November, 1829.]

THE scuppers or apertures on shipboard, by which water is discharged, are proposed by the Patentee to be furnished with valves or flaps opening outward, in order that the

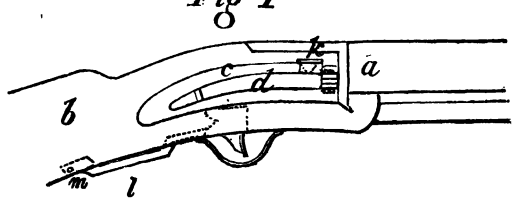
water may run off freely from the interior of the vessel, but that no water may be allowed to enter through the same aperture.

When the scupper hole is in a horizonal position, the flap or valve which closes it must be furnished with a counterpoise or loggerhead behind its hinge joint, the purpose of balancing its weight and keeping the flap up against the hole; but when the flap hangs perpendicularly, its own weight will keep it to its seat.—[*Inrolled in the Inrolment Office, May,* 1830.]

To DAVID LAWRENCE, *of Stroud, and* JOHN CRUNDWELL, *of Ashford, both in the county of Kent, gun-makers, for certain improvements in apparatus to be applied to fowling-pieces and other fire-arms in place of locks.*—[Sealed 15th September, 1829.]

WE should call this invention a gun-lock of a peculiar construction, certainly not a substitute for a lock, because without a gun-lock the improved apparatus would be useless.

Fig 1

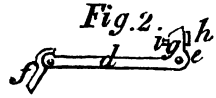


The improved contrivance applies to those kind of fowling-pieces or other fire-arms which are primed by detonating compositions, and discharged by percussion. The detonating composition may be placed in a cap, as usual, or be employed in the form of small balls; a very

slight variation in the construction of the apparatus rendering either mode applicable.

Fig. 1, shows a portion of a fowling-piece, with the improvement adapted thereto: *a*, represents the breech part of the barrel; *b*, the butt; *c*, the lock plate; *d*, a lever which forms the principal feature of the improvement.

Fig. 2.



The lever is shown detached in a horizontal view at fig. 2; it is attached to the lock plate by a hinge joint at *e*, and is opened by a thumb piece *f*, the part *g*, being designed to receive the detonating composition.

The internal construction of the works of the lock forms no part of the present improvement: the kind of lock employed is one in which the stroke is given by the smart thrust forward of a plunger against the breech at the end of the barrel where the touch-hole is situate, and at the mouth of which touch-hole the detonating composition must be exploded. This blow may be produced by various contrivances, which are well known as applicable to gun-locks.

In fig. 2, the piece *h*, *i*, inserted at *g*, represents the nipple, which is perforated longitudinally. The broad end *h*, is intended to lie against the orifice of the touch-hole, and the small cylindrical part *i*, to receive upon it the detonating cap. In order to prime the gun, the lever *d*, must be thrown open from the lock plate by turning upon its hinge joint; and when the detonating cap has been placed upon the nipple *i*, the lever is then to be closed, as at fig. 1, which will bring the part *h*, up against the touch-hole, as described. The trigger being then drawn in the ordinary way, the plunger of the lock will be let off; and by striking with a smart blow against the detonating cap

placed upon the nipple at *i*, the explosion will take place; and the fire passing through the nipple, will proceed through the touch-hole into the barrel, and discharge the contents of the gun.

In the event of small detonating balls being employed instead of detonating caps, those balls may be placed in a small magazine or box shown at *k*, in fig. 1, affixed to the lock plate. This box is conical within; and through a small hole at its under part one priming ball is enabled to descend whenever the lever *d*, is thrown open. To receive this priming ball a recess is made in the part *g*, of the lever; which recess, when the lever stands open, is brought immediately under the delivering hole of the magazine. Hence on the opening of the lever *d*, a priming ball descends into the recess, and on the closing of the lever the longitudinal aperture is brought into coincidence with the touch hole. A sliding pin or piston must in this instance be introduced in place of the nipple at *i*, against which the blow of the plunger striking when the trigger is drawn, the ball will be exploded and the contents of the barrel fired. This piston, after each discharge, may be forced outward again by a small helical spring embracing it.

At the outer end of the lever *d*, the thumb piece *f*, has a joint, and also a tooth or catch intended to bear against a stop when closed, for the purpose of keeping the lever fast against the lock plate.

In order to prevent the gun being discharged accidentally, a contrivance is applied which bolts the trigger. This contrivance is shown at *l*, in fig. 1; it is a bent lever mounted upon a fulcrum pin at *m*, the reverse end of which lever acts as a bolt against the trigger. When the gun is brought to the shoulder for firing, the hand, as it approaches the tail of the trigger, presses against the lever *l*, and forces it upwards, which brings the bolt end of

the lever opposite a notch in the trigger, and thereby sets the trigger free; but without thus acting upon the lever *l*, the trigger would remain locked, and the gun could not be discharged.]—*Inrolled in the Inrolment Office, March,* 1830.]

To JOSEPH GIBBS, *of Grayford Mills, in the county of Kent, timber merchant, for his invention of improvements in machinery for cutting marble, wood, and other substances.*—[Sealed 12th November, 1829.]

THIS is a machine in which ornamental devices in bas-relief, are to be wrought in wood, metal, stone, or other material from patterns or models; the operating part of the machine working in the manner of a vertical drill.

There are two flat tables fixed one above the other, and perfectly parallel to each other; upon the lower of which tables, the piece of wood or other material intended to be cut or carved in bas-relief is to be made fast; and immediately over this, on the upper table, the bas-relief pattern or model of the device is to be securely fixed.

The working drill is mounted in a swinging frame, and is driven by a band from a rigger, passed round a pulley upon the drill; and in the same swinging frame, immediately above, and precisely coincident with the axis of the drill, a smooth-pointed pin is fixed, the pin and the drill being so adjusted in the frame, as to their distance apart, that when the point of the pin above touches any part of the surface of the bas-relief, pattern, or model, the point of the drill below shall touch a corresponding part of the material to be carved or wrought.

The frame carrying the drill and the guide point is mounted upon a vertical shaft, fixed to a standard, or to the side of the apartment or building in which the work is

to be performed. The frame is enabled to turn or swing round horizontally upon its shaft, so that the point may be passed over the surface of the model; and it is also enabled to advance or recede by adjusting screws. Besides swinging round horizontally, the frame carrying the point and drill is enabled to slide up and down vertically, in order that the guide point and the drill may together, that is simultaneously, be raised up, the one from the surface of the model, and the other from the work; which is to be done by a lever, or treadles and rod, connected to the frame, over which the attendant workman has command.

In this way the guiding point is intended to be shifted to every part of the surface of the model in succession, and in so shifting, to bring at the same time the operating drill below, over a corresponding part of the piece of wood, metal, stone, or other material about to be wrought to a similar pattern or device.

According to the subject to be cut or carved, so must drills, with different sorts of points or heads, be employed and shifted, as occasion may require, from the drill stock, and others applied in their stead. Some of the drills are to have rose heads, others spear heads, and various forms suited to the excavation intended to be made in the material under operation.

Let it now be supposed that the guide point, by means of the swinging frame, is brought over the model, and that the drill is made to revolve by means of the strap and pulley, as before described, the point or head of the drill will, as it revolves, penetrate into the surface of the material fixed on the lower table, until the guide point above has descended to the surface of the model fixed on the upper table, then the drill will be prevented from cutting further, and the frame must be raised by the workman bearing upon the

lever. The point being then brought over another part of the model, the drill will be allowed, as before, in like manner to cut away the surface of the wood, metal, stone, or other material. The guide point being thus shifted from place to place, the drill will, by a succession of operations, cut or carve out the complete copy of the model over which the guide point has been conducted.

Thus copies of ornamental scrolls, foliage, and devices, of a variety of kinds, principally for decorating buildings, may be cut or carved in wood, metal, stone, and other materials from models, by the different sorts of drills, guided by the parallel guide point, in a machine of the sort described; and which operation may be performed with considerable expedition and cheapness.

There are several sheets of elaborate drawings accompanying the specification, exhibiting this machine in different positions and in detached parts, which we cannot, with any convenience, compress into our present limits: nor do we consider it at all necessary to exhibit these figures, as the general features and operation of the machine may be easily understood from what has been said; and it does not appear that any novelties in the mechanism are claimed, but only the arrangement and adaptation of the whole to the purpose described.—[*Inrolled in the Inrolment Office, May,* 1830.]

To WILLIAM GOOCH, *of Mount-street, Berkley-square, in the county of Middlesex, for his having invented certain improvements on baths of different descriptions, which improvements are applicable to other purposes.*—[Sealed 7th November, 1829.]

THE invention which forms the subject of this patent, consists merely in combining in one apparatus several well

known contrivances which have been heretofore commonly used separately; as a portable shower bath, a vapour bath, and a slipper bath. These are proposed to be adapted together so as to constitute one apparatus, in which all these several operations may be performed in succession without removing the patient.

Supposing one of the upright shower bath closets resembling a sentry box be employed, in the upper part of which the vessels and other apparatus are suspended in the ordinary way for producing a shower. In the lower part of this closet, that is, upon its floor, a pot or other vessel is to be placed containing aromatic herbs or medicinal materials, which pot is covered with a lid pierced full of holes like a colander. A pipe from a small boiler, on the ordinary fire of a bedchamber, is to be passed through the side of the closet into the pot containing the medicinal materials, for the purpose of conducting steam into the vessel, which steam, acting upon the herbs, will cause an aromatic vapour to be evolved, and to be passed upwards through the perforations in the lid of the vessel into the closet.

The person intending to be operated upon by the vapour bath, is to be enclosed within the closet, covered with a cloth hood, as usual, having an aperture in the top to pass the head through; and in this way the steam atmosphere which rises from the vessel below will be made to act upon the body, or upon any part of the body, without affecting the respiration.

When this sudorific operation has been continued a sufficient length of time, the steam may be shut off, and the patient may receive a shower bath without quitting the closet.

Another arrangement of the invention is designed for giving the vapour, the shower, and also immersion to a patient, by one apparatus.

A vessel generally known as a slipper bath is to be employed, having a partially perforated bottom, through which, from a chamber below the bath, the steam and aromatic vapour from a pot or vessel, as above described, is to be allowed to pass upward to the patient reclining in the slipper and covered by a hood of cloth. When the sudatory has operated as long as may be thought necessary, a shower of cold water may be let fall upon the patient from a suitable apparatus above, and after this the slipper may be filled with water so as to immerse the patient.

The claim of invention is the combination of these contrivances in one apparatus, and not the contrivances themselves taken separately.—[*Inrolled in the Inrolment Office, May*, 1830.]

To HAYWARD TYLER, *of Warwick-lane, in the city of London, brass-founder (being one of the people called Quakers), for certain improvements in the construction of water-closets.*—[Sealed 23d September, 1829.]

IN this improved construction of water-closets it is not proposed to deviate materially from the general arrangement of the ordinary parts of a water-closet, but to adapt certain appendages for the purpose of forming air-tight valves, which shall prevent the passage of offensive effluvia up the discharge pipe.

It will not be necessary to describe all the parts of the mechanism of a water-closet, as they are sufficiently known: we shall, therefore, merely point out the proposed improvements.

Immediately under the discharging aperture of the pan or basin of the water-closet a horizontal sliding valve is intro-

duced, which closes the aperture perfectly air-tight when the closet is not in use, and which is to be opened by a lever when the soil is required to be discharged.

This valve is formed by a circular plate or disc of metal, mounted upon a pivot or centre-pin, the plate being packed so as to be perfectly air-tight, but yet allowed to turn freely in a horizontal direction.

The disc or plate of metal forming the valve has an excentric circular hole through it, in such a situation that as the disc is turned round upon its pivot, this hole may be brought into coincidence with the discharging aperture at bottom of the basin. When that is the case, the soil and water will be allowed to pass down into the discharge pipe; but when the disc is so turned that the solid part of the metal is immediately under, and intercepts the discharging aperture of the basin, then the passage is so completely closed that neither water can pass down nor effluvia up; the packing in which the disc or plate slides being sufficiently close to constitute an air-tight valve.

It will readily be perceived that this disc may be turned round by a variety of mechanical contrivances: that which the Patentee prefers is a segment rack fixed to the axle of the disc, and acted upon by a pinion connected to a lever, which is worked by a handle rising above the seat.

The other contrivance applies to a dish valve; that is, a dish or hollow vessel hung upon a hinge joint under the discharging aperture of the basin, which is intended to contain water sufficient to form a water valve that is to close the aperture of the basin, and by means of the water to prevent the offensive effluvia rising from the discharge pipe.

But as it may sometimes happen that the water will escape from the dish, and thereby leave the communication open, it is proposed, as the improvement, that the edge of

the dish all round shall have a rim of leather fitting exactly against the lower edge of the basin, and being kept up thereto by a balance weight, the valve will be tight, and the effluvia be prevented from passing, even though the water may have discharged itself from the dish.—[*Inrolled in the Inrolment Office, March,* 1830.]

To THOMAS HALL ROLFE, *of Cheapside, in the city of London, musical instrument maker, for his new invented improvement or improvements upon the self-acting piano-forte.*—[Sealed 11th August, 1829.]

THE specification of this patent would fill a volume: its extraordinary length, therefore, obliges us to give only the leading features of the invention.

These improvements apply to a self-acting piano-forte; that is, an instrument in which the keys are worked by a revolving barrel, the periphery of the barrel being studded with wire staples as tappets, which, as it revolves, depress the keys in succession, and cause the hammers to strike the strings, and give out the tones as when played upon by hand.

The objections which are stated to have presented themselves in the construction and performance of the self-playing piano-fortes heretofore made are the difficulty of shifting the barrel in order to change the tunes; the labour which the barrel has to perform in producing the forte and piano gradations of tone; and the monotonous sounds resulting from the too sudden action of the dampers.

To remedy these defects certain novel contrivances are proposed to be adapted to the instrument, which are

described under three several heads: first, a simple and easy mode of shifting or sliding the barrel laterally for the purpose of changing the tunes, that is, bringing other sets of staples or tappets upon the barrel to act upon the keys; secondly, an improved method of producing the forte and piano tones by an auxiliary barrel and levers; and, thirdly, the adaptation of an additional set of dampers applicable to the self-acting part of the instrument, and independent of those dampers which are connected to the keys worked by the fingers.

Under the first head the revolving barrel is described as being pressed toward one side of the frame or case by a powerful spring coiled round its axle, which spring keeps the barrel up to a certain bearing. This bearing, however, is capable of being moved by means of a wedge or inclined plane situate behind it, by which inclined plane the barrel may be forced back, the spring giving way. Hence it will be perceived that the position of the wedge or inclined plane will govern the situation of the barrel, and that by sliding the wedge which moves the barrel, the tappets, for any tune desired, may be brought into operation.

On the upper edge of the inclined plane or wedge a rack is formed, which is acted upon by a toothed sector, the sector being moved by a pinion and train of wheels above. Connected to this train of wheels there is an index or pointer to be turned upon a dial plate on the outside of the case; which index, on being brought to point to any tune named in the dial plate, causes the toothed gear to slide the wedge so as to bring the barrel into the proper position for acting upon the keys as the barrel goes round to produce the desired tune.

In producing the forte and piano tones upon the instrument heretofore, high staples inserted into the periphery

of the barrel have been employed; but these high staples, having to bear very considerable weight and pressure, impeded the operation of the instrument. An apparatus is therefore proposed, under the second head of this invention, which shall produce the effect with greater facility.

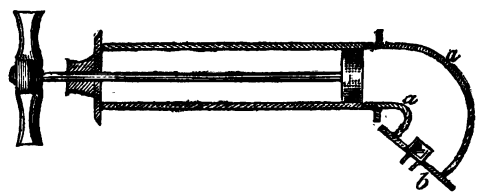
An auxiliary shaft, connected by wheel work with the going fusee or spring barrel, carries certain tappets, intended as they go round to act upon sliders which communicate with levers that raise or depress the parts called the forte and the piano keys, for the purpose of opening or closing those keys at such particular parts of the tune as may be required to be expressed either with particular force or peculiar softness.

The third head of the invention applies to an additional set of dampers connected to those keys, which are worked by the rotation of the tappet barrel, and having no connexion with the dampers of those keys which are played by the fingers.

It is stated that when the dampers are allowed to strike the strings suddenly, as in the self-playing pianos heretofore made, the notes finish with so much abruptness as to destroy the desired effect of expression and feeling in the music. To remedy this defect the Patentee attaches to the hinder part of each damper a weight, in order that as the damper rises in returning to stop the vibration of the string after every note, the gravity of the weight may partially retard its approach toward the string, and thereby cause the vibration to be gradually discontinued.—[*Inrolled in the Petty Bag Office, February*, 1830.]

To DANIEL MACDOUGALL, *of Edinburgh, horticulturist, for his invention of certain improvements on, or additions to syringes, applicable to garden and other purposes.*— [Sealed 10th November, 1829.]

THE subject of this patent is a syringe, intended to be employed for washing the branches of shrubs in order to remove insects. It consists in attaching to the extremity of the syringe a bent tube with a perforated cap, by which water may be forced in the form of a shower upwards or sideways, for the purpose of washing the under parts of the branches and recesses between them, to which access might by any other means be difficult.



The above fig. represents a longitudinal section of the syringe, the cylindrical barrel and the piston of which are of the ordinary form and construction: *a*, is a bent tube attached to the end of the barrel, having a perforated cap-plate *b*, with a small valve in the middle opening outwards.

By introducing this end of the tube with the valve into a vessel of water, and drawing the piston back, the barrel will become filled with water; and then, by forcing the piston forward, the water will be expelled through the small holes in the perforated cap in the form of a shower, at an oblique angle to the direction of the piston.

The claim of invention is the bent tube at the end, and the introduction of the valve in the cap or rose head.— [*Inrolled in the Inrolment Office, May*, 1830.]

To JOHN STEWART, *of George-street, Euston-square, in the county of Middlesex, piano-forte maker, for his having invented certain improvements on piano-fortes.*—[Sealed 2d November, 1829.]

THE improvement proposed under this patent is a slight variation in the form of some of the rods or levers which constitute what is called the action part of a piano-forte, and the introduction of a horizontal rail, upon which the fulcrum joints of such levers are intended to be supported. The advantages proposed from this variation or peculiarity of construction, are not pointed out in the specification, and are by no means obvious from an inspection of the drawing; and as it would be impossible to give a just idea of the plan without exhibiting a section of the interior of the piano-forte with all its working parts, we trust that this notice of the invention will, in this instance, be considered sufficient.—[*Inrolled in the Inrolment Office, January,* 1830.]

To FRANCIS NAISH, *of Stoneaston, near Wells, in the county of Somerset, gentleman, for his having invented or found out certain improvements in the manufacture or application of silks, mixed or combined with other articles.* [Sealed 2d November, 1829.]

THE object of the Patentee is to combine soft waste silk with cotton or wool, or other fibrous material, for the purpose of manufacturing it into articles of wearing apparel and other fabrics.

The refuse or floss silk rejected by the spinner is to be cut into short lengths by any convenient hand implement,

and having been picked and sorted as to its colours, it is then to be chopped into short staple by a chopping machine of a particular construction.

After this the silk is to be passed through another machine called a breaker, and then to be mixed with a suitable quantity of cotton or wool, or other fibrous material, in the machine called a tucker or devil, usually employed for opening or separating the fibres of cotton and wool.

When the silk and other materials have been thus mixed, they are ready to be operated upon by the scribbling and carding engine, and then by the slubbing billy and spinning jenny or throstle in the ordinary way of preparing yarns for the weaver.

The onlv feature of novelty, however, which the Patentee proposes to claim under this patent, is the machine for chopping the silk into short staples, and that for breaking it afterward, both of which are so very imperfectly exhibited, in the rudely sketched perspective views which accompany the specification, that we are utterly unable to describe them.

The apparatus called the chopping machine has a straight knife, intended to be moved up and down, as we suppose, with a quick vibratory action; but the means of actuating it is not shown, neither is there any bed or bench represented upon which the material is to pass under the knife, or any thing against which the knife is to chop. The representation of the breaking machine is equally defective; we can simply understand that there is to be a revolving barrel with teeth or combs as it is expressed; but in what manner these rotary teeth are to be brought into operation upon the material we are unable to explain.—[*Inrolled in the Petty Bag Office, January,* 1830.]

To JOHN COWDEROY, *of Britannia-street, City-road, in the county of Middlesex, gentleman, for his having invented certain improvements in machinery for making bricks.*—[Sealed 2d November, 1829.]

THE general construction of this brick-making machinery resembles in its leading features most of the other machines which have been projected for the same purpose, but the present has some peculiar parts designed for particular objects, which we shall presently describe.

The machine or engine consists of substantial side frames or standards of cast iron, in which are mounted the axles of transverse rollers carrying an endless chain, whereon a series of moulds are mounted, in which the clay is to be pressed for forming the bricks.

This endless chain, as the rotation of the rollers carries it forward, slides upon a flat table firmly secured to the framework, the table constituting the resisting surface against which the force is exerted in pressing the earth into the moulds.

Above the series of travelling moulds, a box or hopper is placed containing the brick earth, supplied thereto from a barrow occasionally, which falls down into the moulds as they move onward, and, in their progress, passing under an inclined surface, the clay or brick earth becomes pressed firmly into the moulds, and is made smooth on their upper surfaces by a horizontal scraper.

As the moulds travelling with the endless chain arrive successively at that part of the machine where they pass down over the roller, the bricks are intended to drop out of their respective moulds on to an endless band, or creeping cloth extended over a pair of rollers, which creeping cloth is made to move progressively forward by gear, or

other suitable connexion, with the moving part of the engine; and from this creeping cloth the bricks are successively taken by boys, and carried to the drying ground.

The above shows the general construction and movements of the machine or engine for making bricks; the following are the particular features of improvement.

As there has always been found considerable difficulty, from the adhesive nature of the clay, of discharging the bricks from the moulds, it is proposed that each mould shall be formed of several pieces jointed together, which pieces are confined and held tight while the clay is pressed into the moulds, but are made to open when the moulded brick is to be discharged. The ends of the moulds therefore are formed by pieces standing up perpendicularly from the joints of the chain, and the sides of the moulds by pieces connected to the long links of the chain by hinges.

When the moulds are passing along the horizontal table under the clay trough, the parts of the moulds are confined and held firmly together, but when they arrive respectively at that part where the chain passes down over the roller the ends of the moulds open radially, and the side pieces of the moulds fall back on their hinges. The new-moulded bricks are by these means released from their adhesion to the sides and ends of the moulds, and at the same time a small plunger in the bottom of each mould rising up, pushes the brick from its seat, and causes it to fall down on to the creeping cloth, as before described.

As it is necessary, in order to carry away the soft new-moulded bricks without injuring their form, to deposit each of the bricks as they fall from the mould upon a small square board, a considerable number of these square boards are placed one upon another in an upright trough, from which they are to descend one at a time through the

bottom on to the endless band or creeping cloth, into suitable situations for receiving the bricks as they fall from the moulds.

For the purpose, therefore, of delivering these boards singly and with regularity on to the creeping cloth, a square block is made to revolve under the trough which has a spring upon each of its four sides. These springs, as the block goes round, each take hold of a board as it descends and conduct it to an inclined plane, upon which the boards respectively slide down on to the creeping cloth. In this manner the boards are all regularly ranged upon the creeping cloth, ready, as the cloth moves on, to receive the bricks successively falling from the moulds.

For the purpose of clearing the moulds from any portions of clay which may adhere to them, an apparatus is placed beneath the machine, by which water is thrown up against the interior of the moulds as they pass along after discharging the brick, and by which the moulds are wiped out.

This apparatus consists of, first, a spring scoop placed in a vessel of water under the travelling moulds, against the outer end of which scoop a tappet wheel acts. As this tappet wheel goes round, the end of the spring scoop is occasionally depressed, and then being suddenly let go, a portion of water is by the recoil of the scoop thrown upwards into the moulds. Immediately behind this a wheel carrying a series of sponges is kept in constant rotation; which sponges, as the wheel revolves, wipe the interior of the moulds clean from any clay that may have attached itself to their interiors.

After each successive mould has proceeded beyond the washing and cleansing apparatus just described, a similar spring scoop is adapted for the purpose of throwing up dry sand from a sand box below against the moulds as they

pass; which sand is intended to attach itself to the interior of the moulds for the purpose of preventing the adhesion of the clay thereto, when the moulds again pass under the hopper, and become charged with the material in continuing the operation of moulding the series of bricks in the way first described.—[*Inrolled in the Petty Bag Office, May,* 1830.]

Here ends the Reports of all the Specifications of Patents for Inventions, granted previously to the year 1830.

The whole number of Patents for Inventions granted in England from the beginning of the year 1820 to 1830, amounted to *one thousand four hundred and forty-one;* and of these, from accident, or other causes, known only to the Patentees, the Specifications of seventy-one have not been inrolled in Chancery, as directed in each grant; consequently, no accounts of those inventions can be given. The Patent rights, in those instances, have become null and void.

The following are the numbers of Patents granted in the several years :—

1820	granted	-	95	Specifications not inrolled				7
1821	-	-	115	-	-	-	-	5
1822	-	-	106	-	-	-	-	4
1823	-	-	136	-	-	-	-	2
1824	-	-	179	-	-	-	-	8
1825	-	-	247	-	-	-	-	15
1826	-	-	131	-	-	-	-	7
1827	-	-	150	-	-	-	-	6
1828	-	-	152	-	-	-	-	6
1829	-	-	130	-	-	-	-	11

Cunningham and Salmon, Printers, Crown-court, Fleet-street.

List of Patents

That have passed the Great Seal in Ireland from the beginning of the Year 1820 *to* 1830.

1820.

To Francis Fox, the younger, for a new improved method of facilitating and ensuring the discharge of fire-arms.—12th January.

— Israel Grundy and Edward and Josiah Neave, for an application of various gases to certain useful purposes.—12th April.

— William Brockedon, for an invention of certain improvements in wire-drawing.—12th April.

— William Mallett, for his invention of a lock with sliding guards.—23d May.

— James Bristow Frazer and George Lilly, for improvements in propelling boats and other vessels.—9th August.

— William Kendrick, for improvements in tanning hides.—14th August,

— Samuel Fletcher, for improvements in saddles.—14th August.

— John Rider, for improvements in steam-engines.—17th August.

— Apsley Pellatt, for incrusting devices in glass.—24th August.

— Honourable William Erskine Cochrane, for improvements in the construction of lamps.—9th September.

— Robert Frith, for an invention of dyeing and printing colours on linen, calico, &c., so as to make the same permanent.—10th December.

1821.

— William Bruntin, for certain improvements in fire-grates.—10th March.

— Joseph Main, for improvements in preparing and spinning wool, cotton, silk, flax, &c.—23d March.

— Ilario Pellafinet, for an improvement of machinery for breaking, bleaching, preparing, and spinning yarn, hemp, flax, &c.—18th April.

— William Frederick Collard, for an improvement in piano-fortes.—4th May.

To John Winter, for an improvement in chimney tops.—11th March.

— Phillips London, junior, for an improvement in the application of heat to coppers and other utensils.—22d May.

— John Leigh Bradbury, for a new method of engraving and etching metal rollers used for printing, &c.—15th June.

— Samuel Hall, for an improvement in the manufacture of starch.—6th August,

— Robert Salmon, for an improvement in the construction of instruments for the relief of hernia and prolapsis.—6th August.

— John Lethbridge, for a new and improved method of obtaining gas from oil, &c.—31st October.

— Marquis of Chabannes, for a new mode of attracting and catching fish.—8th November.

1822.

— Thomas Masterman, for machinery to be moved by steam without cylinder, piston, &c.—26th January.

— Thomas Morton, for a method of dragging ships out of water on land.—1st February.

— Henry Robinson Palmer, for improvements in the construction of railways or tram-roads, and of the carriages to be used thereon.—1st February.

— Dominique Pierre Deurbrocq, for an apparatus for condensing the alcoholic steams arising from spirituous liquors.—26th June.

— John Poole, for improvements in plating iron or steel with brass, copper, &c.—26th June.

— William Erskine Cochrane, for improvements in the construction of lamps.—26th June.

— Pierre Erard, for improvements on the pedal harp.—18th October.

— Richard Ormrod, for improvements in the mode of heating liquors in boilers.—18th October.

— Pierre Erard, for improvements in piano-fortes and other keyed instruments.—14th December.

1823.

— William Cleland, for an improved apparatus for evaporating liquors.—January.

To Sir Anthony Perrier, for an apparatus for distilling.—15th February.

— John Barlow, for improvements in the manufacture of gas, but particularly from peat or turf.

— James Fox, for improvements in apparatus for distillation.—6th June.

— Jacob Perkins, for improvements in steam-engines.—6th June.

— William Lister, for improvements in spinning wool, silk, mohair, &c.—6th June.

— Robert Winter, for an improved method of conducting the process of distillation.—1st August.

— Joseph Woollams, for an improvement in wheeled carriages.—1st August.

— Robert Mushett, for an improvement in copper for sheathing of ships.—1st August.

— Philip Chell, for improvements in drawing and roving and spinning hemp, flax, &c.—7th August.

— Charles Mackintosh, for rendering flax, wool, cotton, silk, leather, &c., impervious to water.—15th August.

— John Leigh Bradbury, for improvements in printing, painting, and staining silks, cottons, &c.—27th September.

— William Wigston, for improvements in steam-engines.—5th December.

— John Greene, for improvements in machines for roving and spinning cotton, flax, silk, and other fibrous substances.—5th December.

— Samuel Hall, for improvements in lace, net, muslin, &c.—8th December.

— Richard Roberts, for improvements in machines for weaving plain and figured cloths.—12th December.

— Joseph Rogerson Cotter, for improvements on musical instruments.—24th December.

1824.

— Thomas Bewley, for improvements in wheeled carriages.—5th February.

To Louis John Pouché, for improvements in casting and making metal type.—19th February.

— Charles Anthony Dean, for an apparatus for extinguishing fire or extricating property therefrom.—25th February.

— John Foster Gimson, for improvements in doubling and twisting cotton, silk, &c.—25th February.

— William Furnival and Alexander Smith, for an improved boiler for steam-engines and other purposes.—19th April.

— Francis Gybbon Spilsbury, for improvements in farming.—29th April.

— John Malam, for improvements in gas apparatus.—29th June.

— Jean Jacques Saintmairc, for improvements in distilling.—10th July.

— Thomas Gethan, for improvements in metallic plates, rollers, pipes, &c.—12th July.

— Daniel Tonge, for improvements in reefing sails.—12th July.

— John Crossby, for improvements in the construction of lamps and lanterns, for the better prevention of light against wind.—August.

— John Viney, for improvements in water-closets.—27th Sept.

— Jephtha Amery Wilkinson, for improvements for manufacturing weavers' reeds by water and other power.—2d October.

— Robert Lloyd and James Rowbotham, for improvements in hats.—2d October.

— John George Bodmer, for improvements in cleansing, carding, &c., cotton.—7th October.

— George Vaughan, for improvements in steam-engines.—7th October.

— James Easton, for a machine for breaking, scutching, and preparing flax, &c.—5th November.

1825.

— William Busk, for improvements in propelling ships' boats, &c.—7th March.

— Josiah Parkes, for a certain method of manufacturing salt.—7th March.

To Pierre Jean B. V. Gosset, for improvements in looms for weaving.—22d March.

— John Heathcoat, for improvements in manufacturing silk for weaving.—22d March.

— William Weston Young, for improvements in the manufacture of salt.—30th March.

— John Bellingham, for improvements in the use of gas for illumination.—16th April.

— Thomas Masterman, for an apparatus for bottling wine, beer, &c.—16th April.

— John Masterman, for an improved method of corking bottles.—15th April.

— John Phipps and Christopher Phipps, for improvements in machinery for making paper.—16th April.

— David Gordon, for improvements in the construction of portable gas lamps.—2d May.

— James Hanmer Baker, for improvements in the art of dyeing and calico printing.—16th May.

— William Furnival, for improvements in the manufacture of salt.—16th May.

— James Surrey, for a new method of applying heat for the production of steam.—20th April.

— John Potter, for improvements in looms to be impelled by mechanical power.—14th June.

— Charles Mackintosh, for a new process in making steel.—14th June.

— Abraham Henry Chambers, for improvements in paving horse and carriage ways.—18th June.

— Simeon Broadmeadow, for improvements in manufacturing and purifying inflammable gas, by the introduction of atmospheric air.—18th June.

— Samuel Browne, for an engine for effecting a vacuum for raising water, and for putting machinery in motion.—18th June.

— William Chell, for improvements in drawing, roving, and spinning flax, wools, &c.—18th June.

To William Harrington, for an improved raft for transferring timber.—20th June.

— Richard Badnall, for improvements in winding, doubling, &c. silk, wool, cotton, &c.—20th June.

— George Augustus Lamb, LL.D., for a new composition of malt hops.—30th June.

— John Leigh Bradbury, for a new mode of twisting, spinning, or throwing silk, cotton, &c.—1st July.

— Charles Ogilvy, for an apparatus for storing gas.—15th July.

— Benjamin Rotch, for an improved fid for upper masts of ships' vessels, &c.—22d July.

— Cornelius Whitehouse, for improvements in manufacturing tubes for gas, &c.—6th August.

—Timothy Burstall and John Hill, for a locomotive or steam carriage.—16th August.

— Walter Hancock, for improvements in pipes or tubes for the passage of fluids.—16th August.

— William Grimble, for improvements in the construction of an apparatus for distilling of spirituous liquors.—20th August.

— James Tullock, for improvements in machinery for sawing marble.—7th September.

— Ralph Cordner, for the combination of an apparatus for washing and bleaching by steam, with other agents.—7th September.

— John Charles Christopher Raddatz, for improvements in, or connected with steam-engines.—23d September.

— William Mason, for improvements in axle-trees.—23d September.

— Edmond Jordin, for a new mode of obtaining power applicable to machinery.—30th September.

— Maurice de Jongh, for improvements in spinning machines.—30th September.

— Richard Roberts, for improvements in machinery for spinning.—30th September.

— Thomas Dwyer, for improvements in the manufacture of buttons.—10th October.

— John Wilks and John Ecroyd, for an engine for cutting nails, sprigs, and sparables.—1st November.

To George Hunter, for improvements in the construction and application of wheels.—22d November.

— John Martin Hanchett and Joseph Delvale, for improvements in looms.—25th November.

— Benjamin Sanders, for improvements in constructing or making buttons.—29th December.

1826.

— John Bowler and Thomas Gibson, for an improvement in the manufacture of hats.—17th January.

— James Bythe Waynman, for improvements in the manufacture of hat borders.—9th February.

— George Thompson, for improvements in the construction of riding saddles.—11th February.

— Thomas Steel, for improvements in the construction of diving bells.—24th February.

— Alexander Lamb and William Suttell, for improvements in machinery for preparing, roving, drawing, &c., flax, hemp, silk, &c.—22d March.

— John Harvey Sadler, for an improved power loom for weaving silk, cotton, &c.—22d March.

— Jean Jacques Saintmairc, for improvements in the process of distilling.—22d March.

— John Frederick Smith, for improvements in machinery for cording, roving, drawing, &c., wool, cotton, &c.—22d March.

— Henry Holdsworth, junior, for improvements in winding bobbins, &c.—22d March.

— Francis Molineux, for improvements in machinery for spinning and twisting silk, wool, &c—.20th May.

— Nicholas Hegesippi Maniclor, for a new preparation of fatty substance for the purpose of affording light.—30th May.

— John Stephen Langton, for a new mode of seasoning timber and other wood.—14th June.

— Joseph Alexander Taylor, for a new polishing apparatus for household purposes.—18th July.

— Timothy Burstall and John Hill, for a locomotive steam-engine.—31st August.

To Marquis de Combio, for improvements in the construction of rotatory steam-engines.—4th September.

— Thomas Cooke, for improvements in the construction of carriages and on harness to be used therewith, whereby greater safety to the persons riding in such carriages and other advantages will be obtained.—4th September.

— Edmund Luscombe, for a method of manufacturing or preparing an oil or oils extracted from certain vegetable substances, and the application thereof to gas light and other purposes.—4th September.

— Richard Mee Raikes, for a method of applying steam without pressure to pans, boilers, coppers, stills, pipes, and machinery, in order to produce, transmit, and regulate various temperatures of heat in the several processes of boiling, distilling, evaporating, inspissating, drying, and warming, and also to produce power.—7th November.

— Samuel Browne, for certain improvements on his former patent for an engine or instrument for effecting a vacuum, and thus producing a power by which water may be raised and machinery put in motion.—8th December.

— James Kay, for improvements for spinning hemp, &c.—9th December.

1827.

— Theodore Jones, for an improvement or improvements on wheels for carriages.—8th January.

— John Oldham, for certain improvements in the construction of wheels designed for driving machinery, which are to be impelled by water or by wind, and which said improvements are also applicable to propelling boats and other vessels.—2d April.

— John Frederick Daniel, for certain improvements in the manufacture of gas for the purposes of illumination.—1st May.

— Henry Charles Lacy, for a new apparatus on which to suspend carriage bodies.—1st May.

— Dominique Pierre Deurbrocq, for an apparatus adapted to cool worts or must, previous to its being sent to undergo the process of fermentation, and also for the purpose of condensing the steam arising from stills during the process of distillation.—7th May.

To William Mallett, for portable iron beds.—21st May.

— John Pollock, for a method of manufacturing gas, fit for illuminating purposes from rosin, and producing a residuum, from which spirits of turpentine and pitch are extracted.—2nd June.

— William Nicholson and Charles Barwell Coles, for a new method of constructing gasometers or machines, or apparatus, for holding and distributing gas for the purpose of illumination. —16th June.

— Robert Stirling and James Stirling, for certain improvements in air-engines for the moving of machinery.—20th June.

— Morton William Laurence, for an improvement in the process of refining sugar.—24th June.

— Francis Halliday, for certain improvements on engines or machinery, to be actuated by steam; which improvements, with or without the aid of steam, are applicable to the raising or forcing of water.—24th June.

— William Wilmot Hall, for an engine for moving and propelling ships, boats, carriages, mills, and machinery of every kind.— 11th July.

— Robert Moore, for certain improvements in the process of preparing and cooling worts or wash from vegetable substances for the production of spirits.—13th September.

— Robert Moore, for certain processes for rendering distillery refuse productive of spirits.—13th September.

— John Patterson Reid, for an improvement or improvements on power-looms for weaving cloth of various kinds.—21st Sept.

— Walter Hancock, for an improvement or improvements upon steam-engines.—23d October.

— Joseph Tilt, for certain improvements in the boilers used for making salt, commonly called salt-pans, and in the mode of applying heat to the brine.—10th December.

— Solomon Robinson, for improvements in machinery for hackling or dressing and cleaning hemp, flax, and tow.—10th December.

— Lambert Dexter, for certain improvements in machinery for the purpose of spinning wool, cotton, and other fibrous substances.— 10th December.

1828.

To Count de la Garde, for improvements in machinery for breaking or preparing hemp, flax, and other fibrous materials, which he denominates "The Rural Mechanical Brake."—4th January.

— Bennet Woodcroft, for certain processes and apparatus for printing and preparing for manufacture yarns of linen, cotton, silk, woollen, or any other fibrous material.—11th February.

— Thomas Bonnor, for certain improvements on safety-lamps.—29th February.

— Peter Humphrys, for an apparatus or mode for the saving of fuel in the boiling and heating of liquids.—3d April.

— Robert Stein, for an improvement in applying heat to the purpose of distillation.—22d July.

— John Bayley Hammet, for certain improvements in four-wheeled carriages in a new application of springs above or below the axle-trees, and has invented a newly-constructed hindermost and fore-carriage.—22d July.

— Sir James Anderson and William Henry James, for certain improvements in the construction of steam-carriages, and in the apparatus or machinery for propelling the said carriages; part of which improvements are applicable to other useful purposes.—22d July.

— Mathew Bush, for certain improvements on the machinery or apparatus for printing calicoes and other fabrics.—22d July.

— Joshua Jenour, junior, for a cartridge or case, and method of more advantageously enclosing therein shot or other missiles for the purpose of loading fire-arms and guns of different descriptions.—25th August.

— James Beaumont Neilson, for an invention of the improved application of air to produce heat in fires, forges, and furnaces, where bellows or other blowing apparatus are required.—22d December.

1829.

— William Strachan, for an improvement in the making or manufacture of alum.—24th March.

— Count de la Garde, for a method of making paper of various

descriptions from the bullen or ligneous part produced from certain textile plants, and in the process of preparing the same textile plants by the rural mechanical brake, and which substances are to be employed alone or mixed with other suitable materials in the manufacture of paper.—24th March.

To Granville Sharp Pattison, for a new and improved method of applying iron in the sheathing of ships and other vessels, and of applying iron bolts, spikes, nails, pintles, braces, and other fastenings, used in the construction of ships and other vessels.—8th April.

— Maurice de Jongh, for an improvement or improvements in machines, adapted for spinning, doubling, twisting, roving, and preparing cotton and other fibrous substances.—25th May.

— Samuel Hall, for a method and apparatus for generating steam and various gases to produce motive power, and for other useful purposes.—8th July.

— John Lihou, for an improved method of constructing ships' pintles for hanging the rudder.—18th August.

— Joshua Bates, for a new process or method for whitening sugars.—18th December.

— Joshua Bates, for an improved method of constructing steam-boilers or generators, whereby the bulk of the boilers or generators and consumption of fuel are considerably reduced.—18th December.

END OF VOL. IX.

Berry's Imp.d Steam Engine &c.

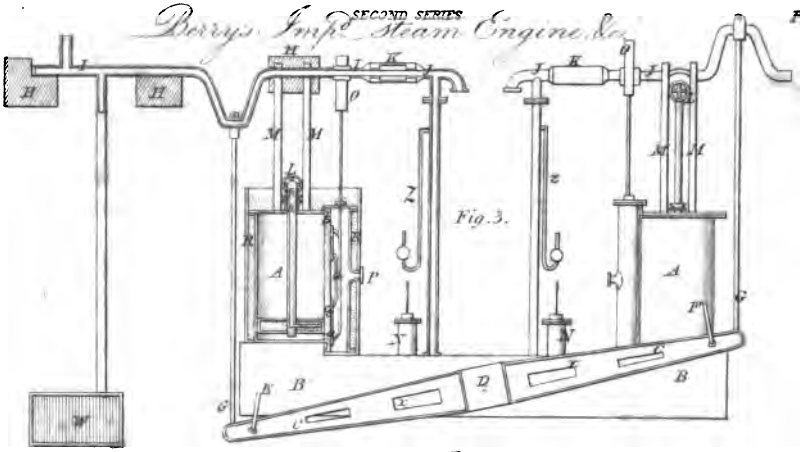
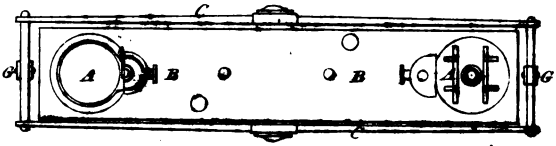


Fig. 3.

Fig. 4.

Fig. 5.



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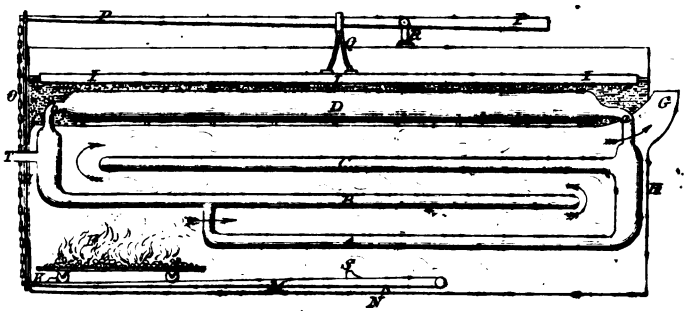


Fig. 2.

On Disc Valves.

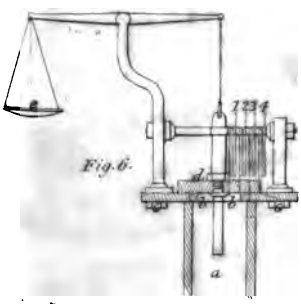


Fig. 6.

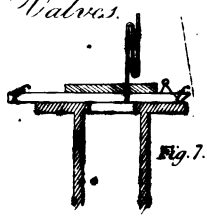
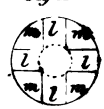
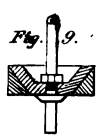


Fig. 7.

Fig. 8.

Fig. 11.





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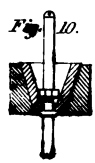
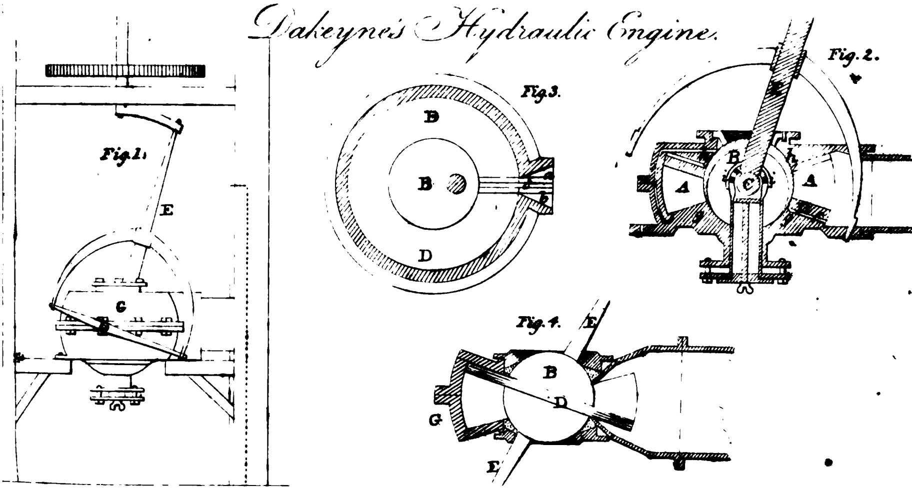


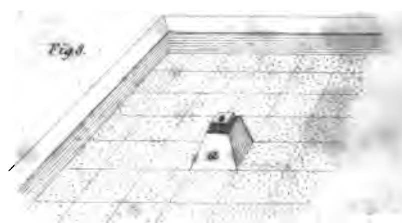
Fig. 10.

Fig. 12.

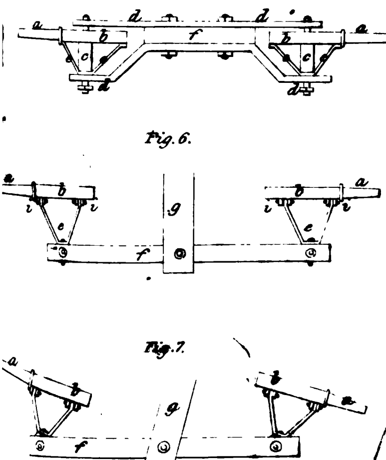
Dakeyne's Hydraulic Engine.



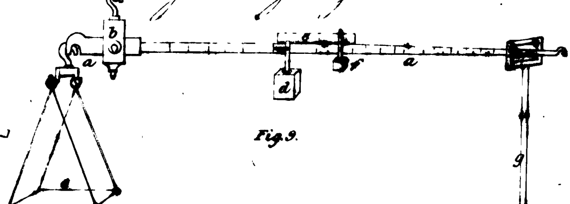
Salmons Malt Kiln.



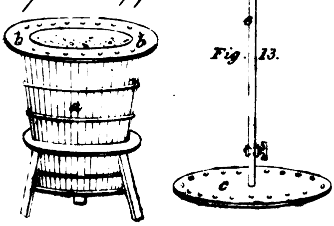
Knowles's Axletrees.



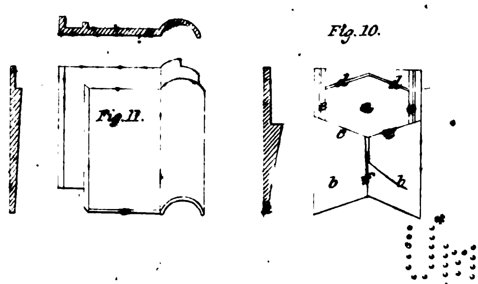
Paynes Weighing Machine.



Turner & Shands Sugar Refin.g App.ts



Drakes Tiles



Moor's Propelling Appts

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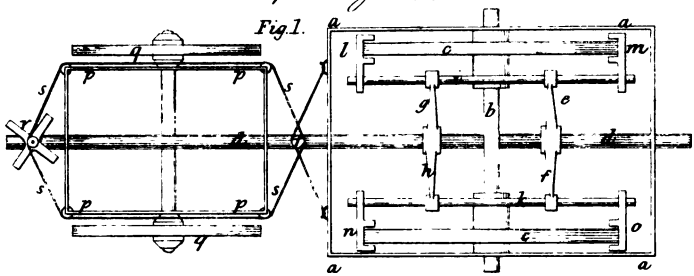

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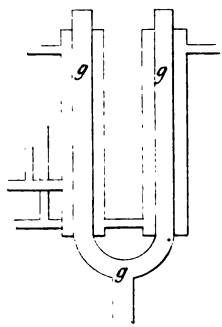

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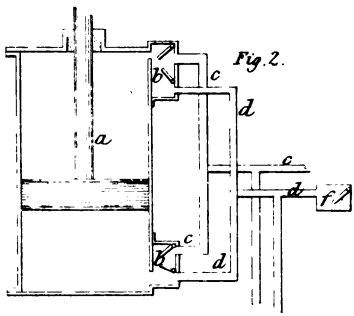


Higgins's Impd Carriage

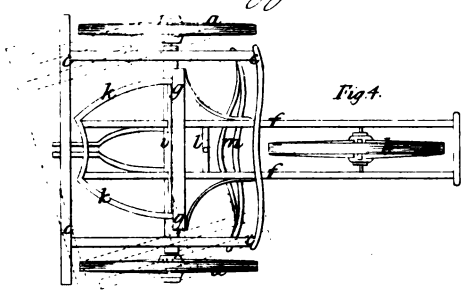
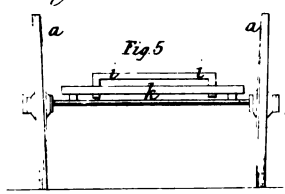
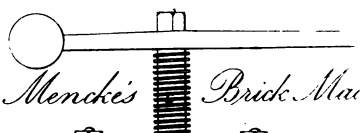


Fig. 4.

Fig. 5

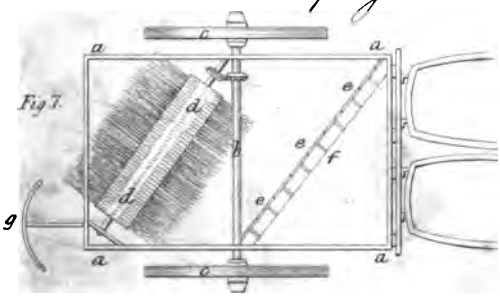


Menck's Brick Mach.



Boase & Smith's Sweeping Mach.

Fig. 7.



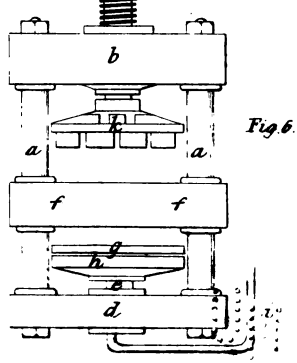
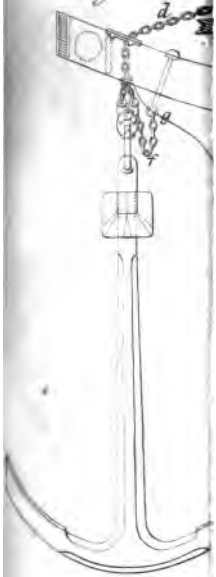


Fig. 6.

PLATE V.

Rodger's



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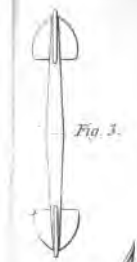
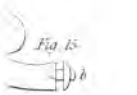
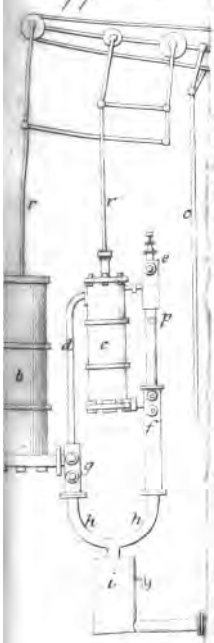


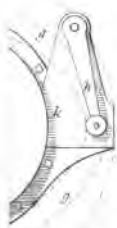
d Bit.

Fig. 4.



Tippetts





Rodger's Imp.d Anchors.

Fig. 1.

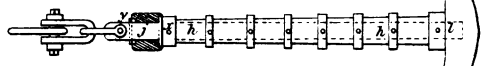


Fig. 2.

Fig. 3.

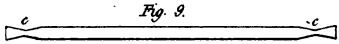
Fig. 4.

Fig. 7.

Fig. 10.

Fig. 8.

Fig. 9.



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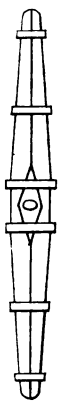

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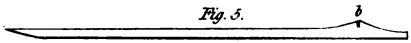

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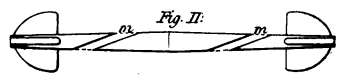
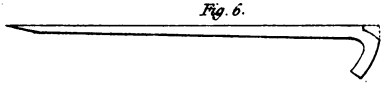
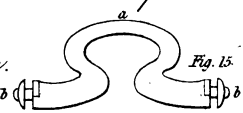


Fig. 6.



Llanos's Imp.d Bit.



Rennoldson's Imp.d Steam Engine.

Fig. 14.

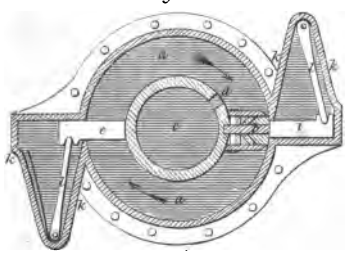
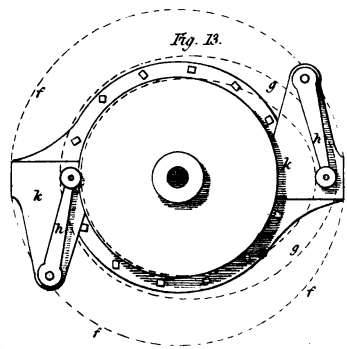
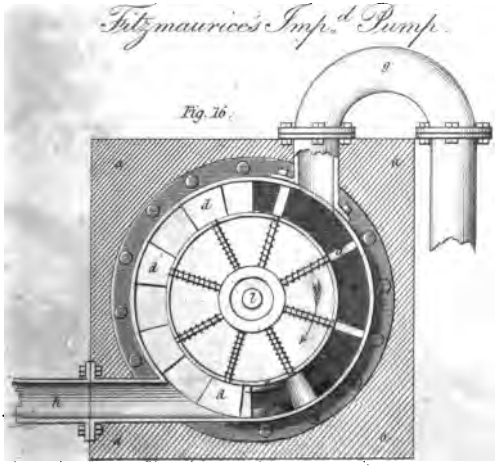


Fig. 13.



Fitzmaurice's Imp.d Pump.

Fig. 16.



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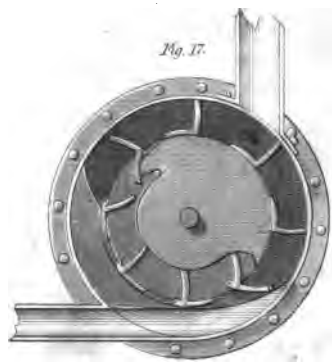


Farish's Water Valve.

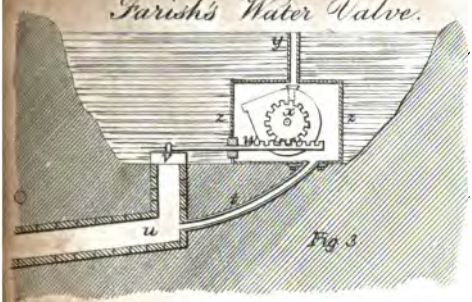


Fig. 3

Rhode's Spinning Machine.

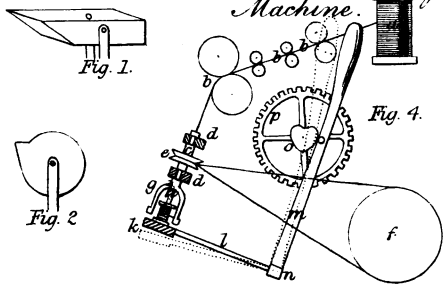


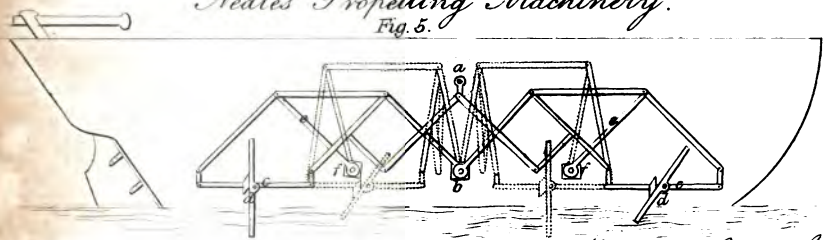
Fig. 1.

Fig. 2

Fig. 4.

Neale's Propelling Machinery.

Fig. 5.



Manton's Gun Lock.

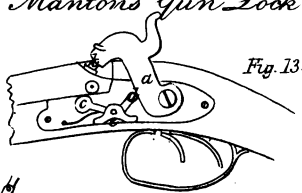
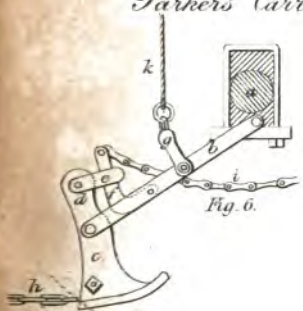


Fig. 13.

Parker's Carriage Drag.



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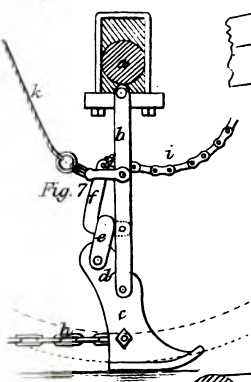


Fig. 7

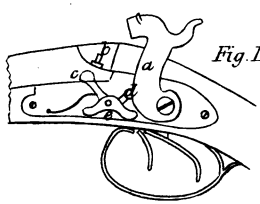


Fig. 12.

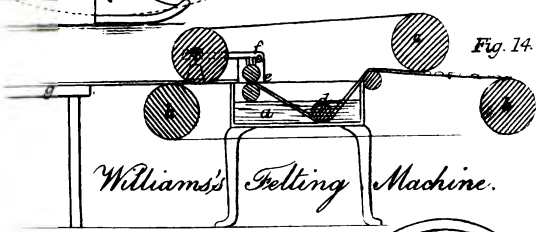
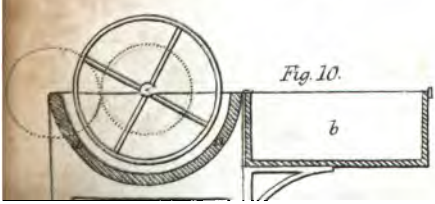


Fig. 14.

Williams's Felting Machine.

Poole's Kneading Machinery.

Fig. 11.



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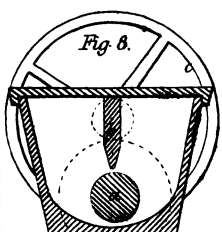

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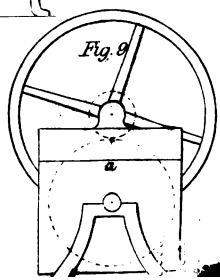


Fig. 9

Hancorn's Nail Machine.

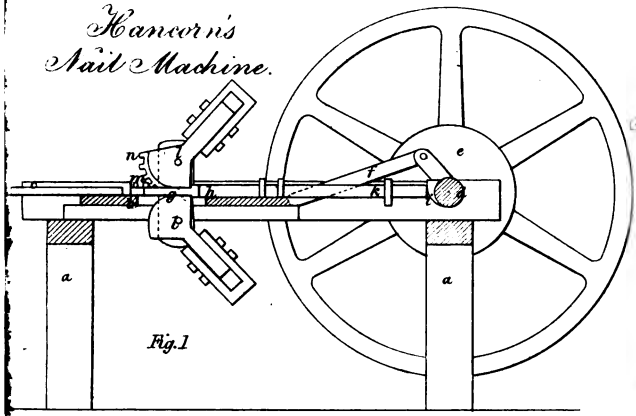


Fig. 1

Forbes' Imp.d Stove Grate

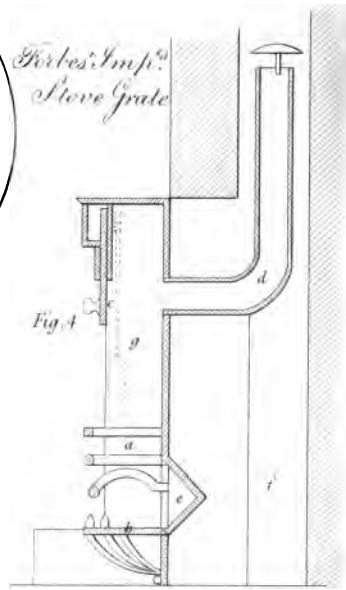


Fig. 4

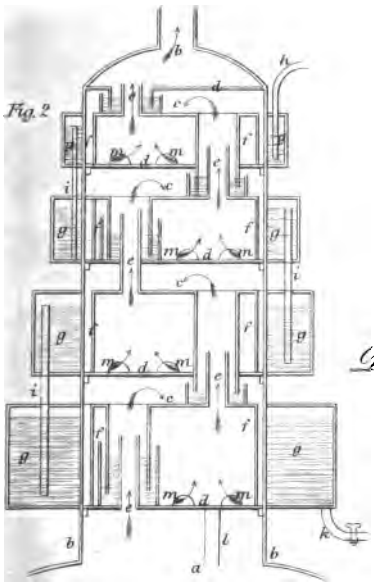


Fig. 2

Philp's Distilling Apparatus.

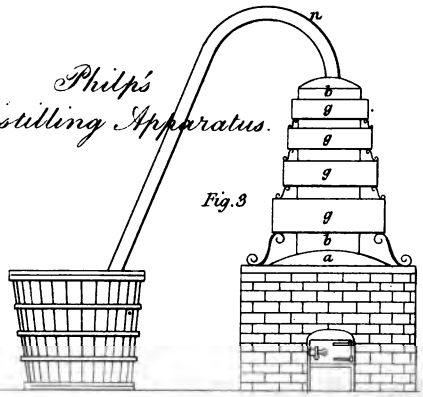


Fig. 3

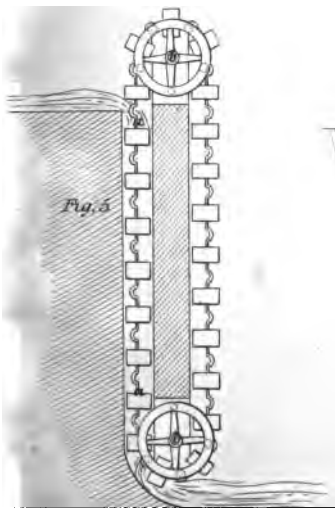


Fig. 5

Nevill's Water Wheel.

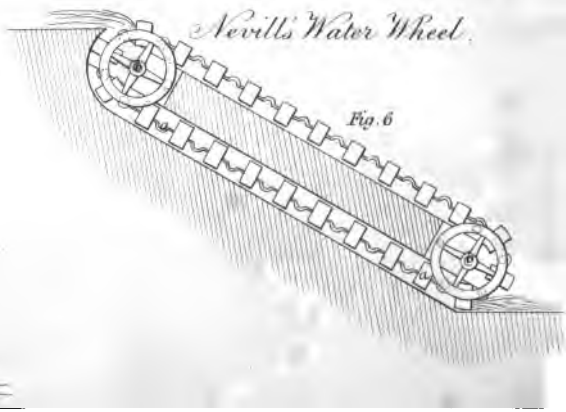
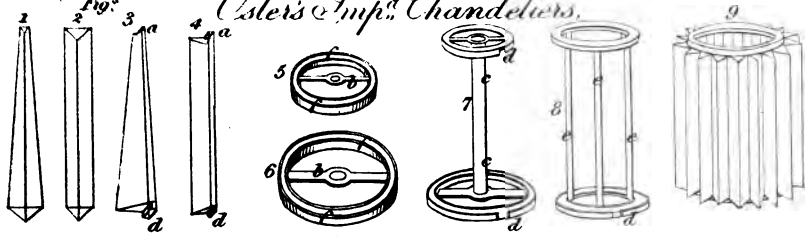
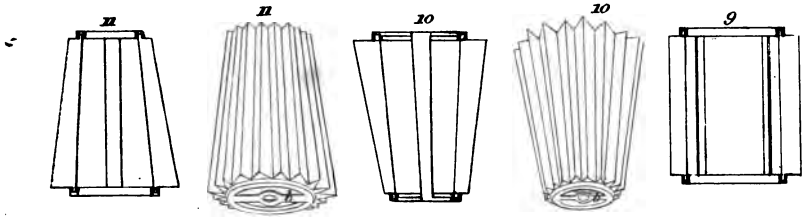


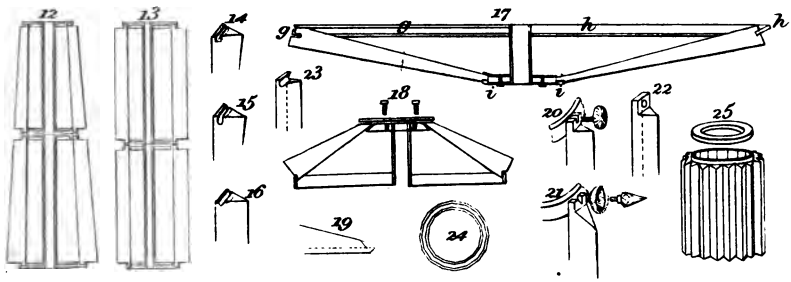
Fig. 6

Osler's Imp.d Chandeliers.

Figs.







Smith's Imp.d Rotary Engine

Fig. 4.

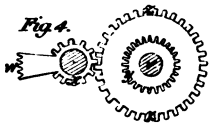
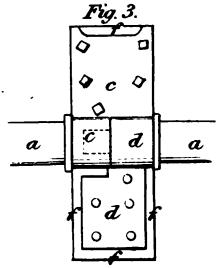


Fig. 3.



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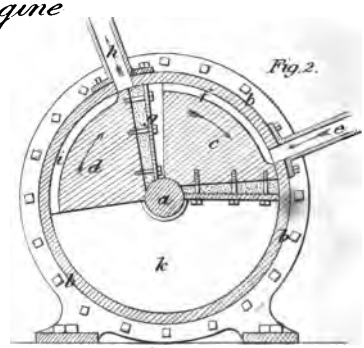
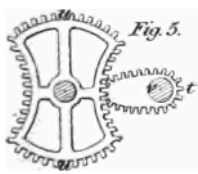
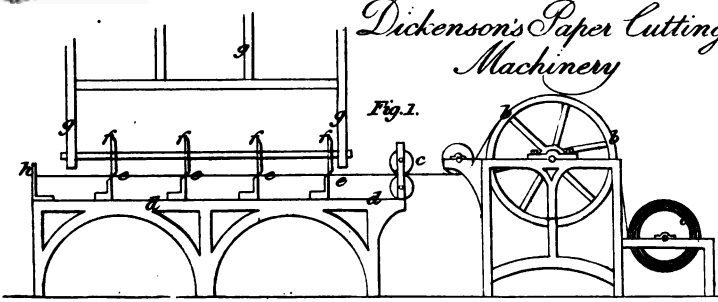


Fig. 5.

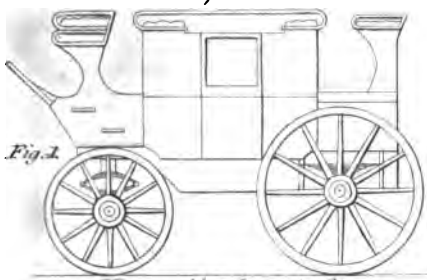


Dickenson's Paper Cutting Machinery

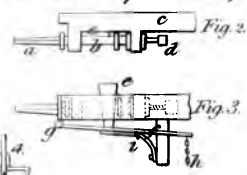
Fig. 1.



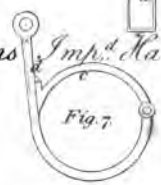
Browns Impd. Coach



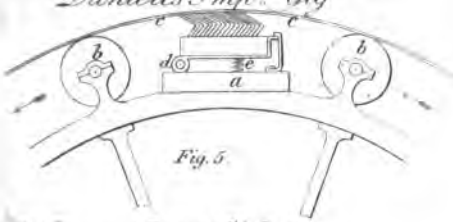
Sculthorpe's Impd. Axles



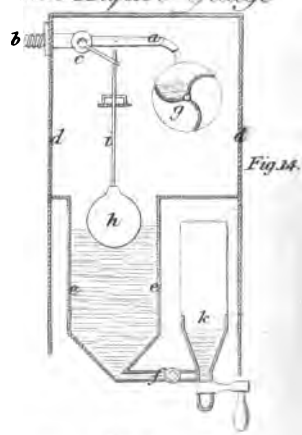
Leesons Impd. Harness



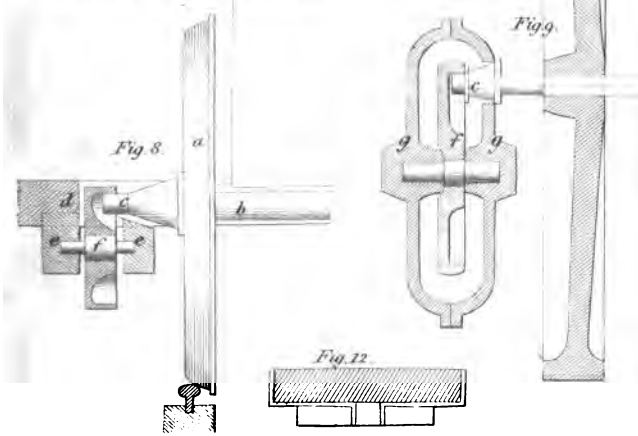
Daniells Impd. Gig

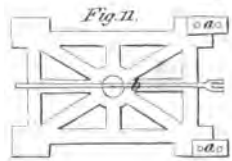


Arnolds Liquor Gauge

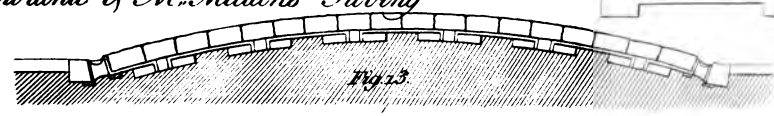


Winans Impd. Wheels

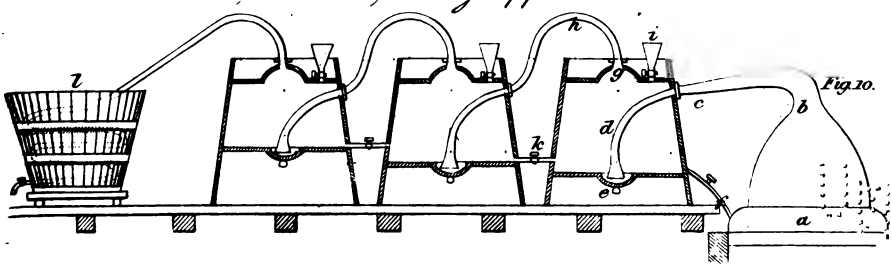




Rowland & Mc. Millans Paving



Shands Distilling Appts.



SECOND SERIES.

Wheatston's Musical Instruments

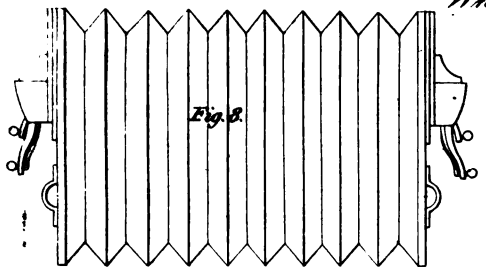


Fig. 8.

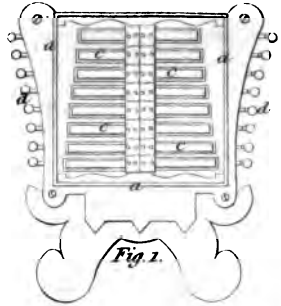
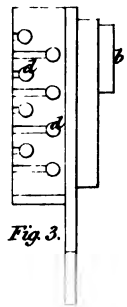


Fig. 1.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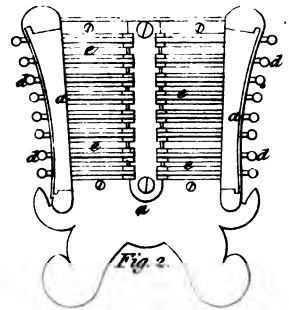
Fig. 2.

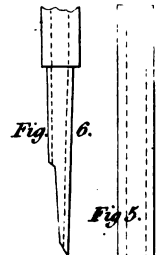
Fig. 6.


Fig. 5.

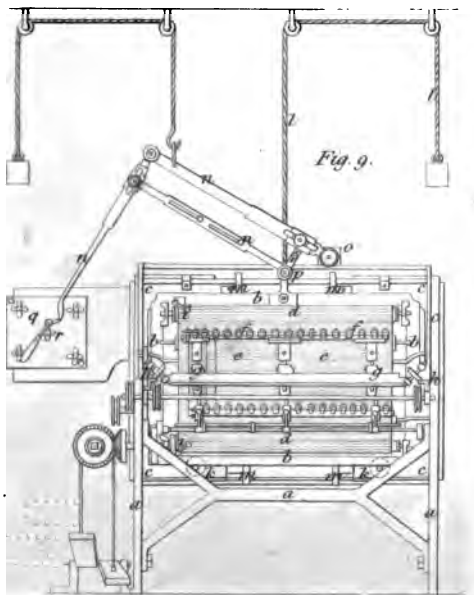
Fig. 9.

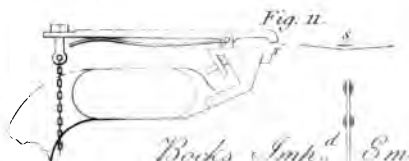
Fig. 11.

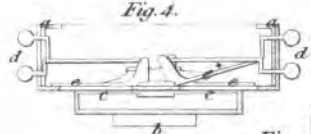
Fig. 4.

Fig. 7.

Books Imp.d Embroidering Machinery

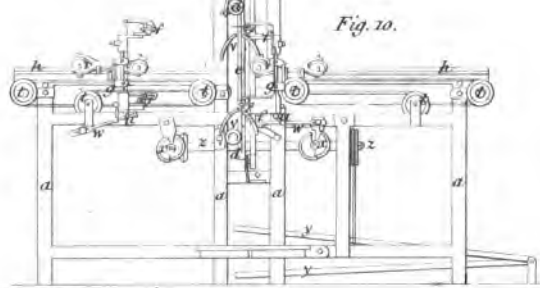
Fig. 10.

1st May 1834.

T. Phillibrown Sculp.