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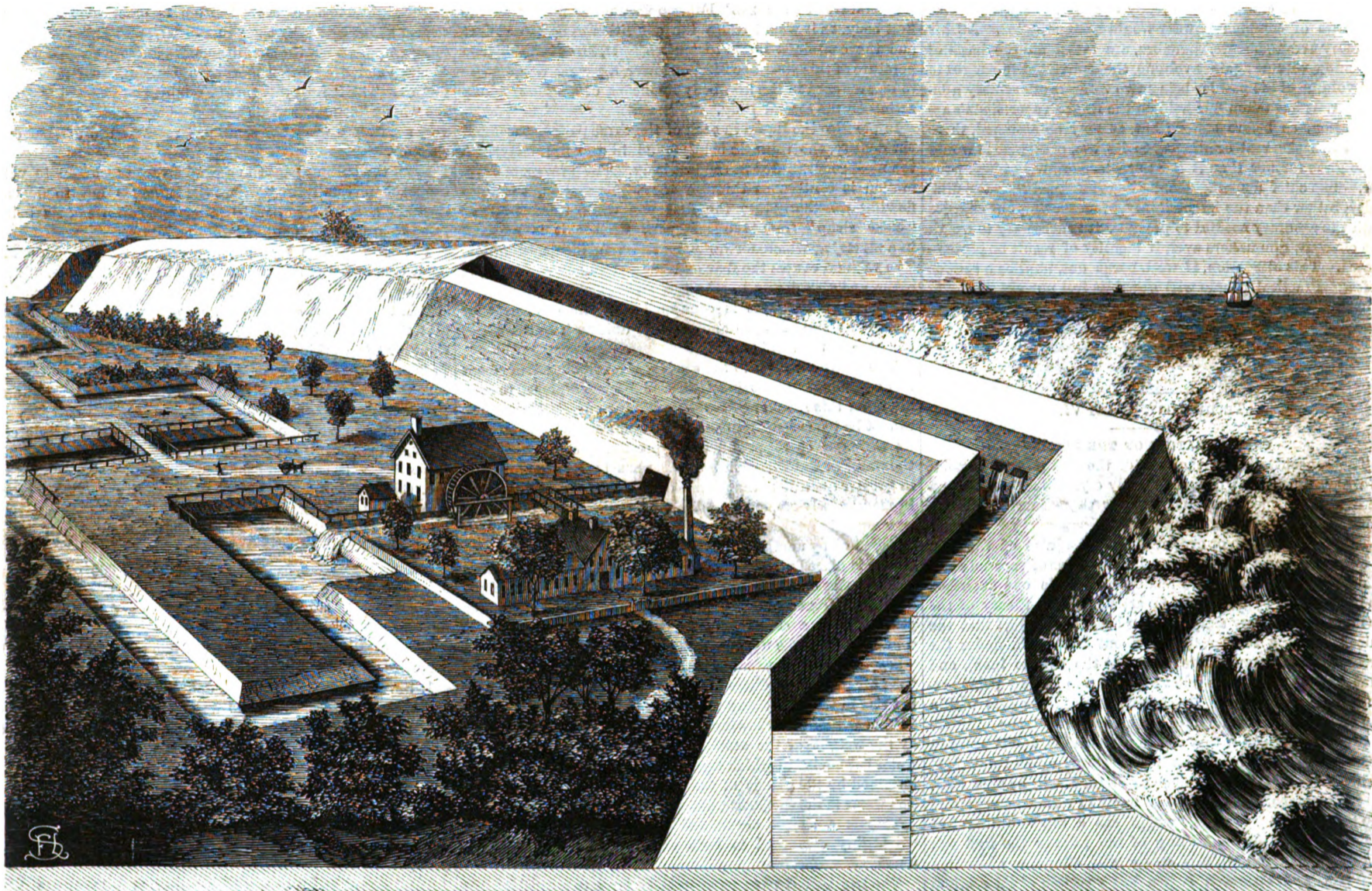
## Leon's Kimasthene.

People who live on the land and never visit the seashore or brave the dangers of a sea voyage, have very incompetent ideas of the force of combined wind and water. The force of a mass of water, as a wave thirty or forty feet high, moving even at a slow rate may be imagined, and possibly some idea of its effects on an obstacle in its course estimated from the descriptions of travelers; but the fact of the immense force of wind and wave must be, with all land dwellers, a myste-

of the wave. Within the dike may be erected mills of various kinds moved by water wheels driven by this stored-up power.

Now, to return this water to the sea the inventor proposes a canal of a zigzag course, leading from the tail race of the mill to the sea through the embankment, the canal at its debouchure widening and having a number of piers, arranged like the alternate squares on a chess board. The object of these and of the angles of the canal is to prevent the action

into plates of the required thickness by a veneer saw. The plates, when sliced, are laid under a manifold punch and submitted to pressure, whereby grains of not merely definite and varying size, but definite and unvarying shape (a matter of some moment as influencing the constancy of impaction), result. Grains are thus evolved at the very commencement of the manufacturing operation, unlike what happens in the case of black gunpowder, wherein the operation of grainage is the last operation but one—glazing; and sometimes, powder not being



LEON'S KIMASTHENE, A PATENT CONTRIVANCE FOR USING WAVE POWER.

ry. It has been stated that the waves of the Atlantic, the "stormy ocean," are at their fiercest, only thirty feet high; from our experience we incline to a much higher figure.

This, however, is merely the wave on the wide ocean without an obstacle to resist its course, but when sufficient resistance is offered, it is wonderful how high the wind's force will carry the water. We remember the storm of April, 1851, which swept away the Minot's Ledge lighthouse, off Cohasset, Massachusetts, and lasted three days and nights. We then, from Lynn beach, saw the waves carried up the face of the rocks, off the peninsula of Nahant, sixty feet high, and at least twenty feet above, and thrown in spray over the land. At the entrance of the Cromarty Firth, Scotland, the waves, in a northeast storm, meeting the obstacle of the precipitous rock known as the "South Sutor," rise to its top, not less than one hundred and ten, or one hundred and twenty feet. The object of the plan shown in the accompanying engraving is to utilize this uplifting power of the wind-driven water for purposes beneficial to man. If waves impelled by the winds will leap up precipitous rocks, they will rise much higher when the surface on which they strike is curved to present an easy ascent. Such is the design of the breakwater shown in the engraving.

It is the invention of a Spanish engineer, J. Ruiz Leon, and was patented in the United States, March 30, 1869. He describes its construction and operation substantially as follows: On the sea coast he raises a hollow dike, the exposed face of which is curved, the base being an inclined plane continued several feet below the sea level, and being pierced with a series of conduits, the inner ends of which are provided with valves opening to the inclosed space, or reservoir. These valves allow the entrance of the water from the surf, but prevent its escape to the sea as the wave retires. Thus a quantity of water passes into the reservoir at each uplifting

of the waves and to allow the water to be discharged at the ordinary ocean level. Already has this plan been successfully applied on the island of Cuba. Where the tides are insignificant in height this device yields the best results. Where the tide creates great differences of level it is necessary to modify somewhat the plan, by placing the wheel on a floating platform or raft. The patentee thinks that it will not be difficult to create a power by his plan that will be equal and continuous all the year round; a simple method being to store up water raised in storms in a reservoir to be used in seasons of comparative calmness.

Further information may be gained by addressing J. Ruiz Leon, care of J. N. Paulding, 30 Broadway, New York city.

## THE SCHULTZ WHITE GUNPOWDER.

We condense from an English exchange a description, of the white, or rather, tawny-colored powder lately devised by Captain Schultze of the Prussian service, and which, under the auspices of at least one London gunmaker, is finding large application among English sportsmen. The progress of manufacture is said to be most safe, as it is most ingenious. Only at the final stage of making this gunpowder is the process subject to any explosive contingency. In illustration of this, the following circumstance should be stated; in July, 1868, the manufactory of Captain Schultze at Potsdam, near Berlin, was consumed, burned quietly to the ground—burned, not exploded. The accident is altogether unprecedented; nothing like it could have happened to a manufactory of common black gunpowder.

We now come to the process of manufacture. The inventor begins by taking any of the common woods (he keeps the woods steeped in water) which have acquired celebrity for yielding gunpowder charcoal, and saving them transversely

invariably glazed, the last absolutely. The punched grains, being collected in a mass, are subjected to a treatment of chemical washing, whereby calcareous and various other impurities are separated, leaving hardly anything behind save pure woody matter, cellulose or lignine. The next operation has for its end the conversion of these cellulose grains into a sort of incipient xyloidine, or gun-cotton material, by digestion with a mixture of sulphuric and nitric acids. Practically it is found that absolutely perfected xyloidine (of which ordinary gun-cotton is the purest type), not only decomposes spontaneously by time, the chief products of combustion being gum and oxalic acid, but it is moreover liable to combustion of a sort that may be practically called spontaneous, so slight and so uncontrollable are the causes sufficing to bring it about. Cellulose, or woody matter, otherwise termed lignine, partially converted to xyloidine, is, Captain Schultze affirms, subject to neither of these contingencies. Chemists will understand that, inasmuch as the wood used as a constituent of the Schultze gunpowder is not charred, its original hydrogen is left, and by and by, at the time of firing, will be necessarily utilized towards the gaseous propulsive resultant. Next, washed with carbonate of soda solution and dried, an important circumstance is now recognizable.

The grains, brought to the condition just described, are stored away in bulk, not necessarily to be endowed with final explosive energy until the time of package, transport, and consignment. Only one treatment has to be carried out, and it is very simple. The ligneous grains have to be charged with a certain definite percentage of some nitrate, which is done by steeping them in the nitrate solution and drying. Ordinarily a solution of nitrate of potash (common saltpeter) is employed; but in elaborating certain varieties of white powder Captain Schultze prefers and uses nitrate of baryta.

Having traced the new powder to its final stage, we may





**Improved Self-Holding Adjustable Plow.**

The object of this device, as stated by the inventor, is to provide a simple and convenient arrangement for adjusting plows to the varying width and depth of the furrows, as may be required. Two views are shown in the accompanying illustrations, one exhibiting one side, and the other the opposite side of the plow with the truck attachment. The plow itself is an ordinary plow, such as is generally used, the attachment being capable of application as well to plows now in use as to those which may be built to receive the device. This itself is very simple: it being only two wheels of different diameters, on independent axles, the larger one to run in the furrow already made, and the smaller one to run on the untouched surface. By this contrivance any required depth and any required width of furrow may be assured, and the share made to take and sustain any angle.

On the plow beam, in front of the share, are bolted two plate sockets, one on each side, the holes in the sockets being square and vertical. In one, the shank of the bent axle of the small wheel fits, and is secured to any position by a set screw in the sleeve or socket. The other receives a bar similarly secured, the lower end of which embraces the straight axle of the large wheel. At the end of this axle is a slotted arm the lower end of which embraces the horizontal portion of the small-wheel axle, while a bolt passing through the slotted arm and the end of the large-wheel axle, serves to hold both axles in position. By these arrangements either wheel is made capable of vertical adjustment, and the large wheel may be also adjusted horizontally to govern the width between the furrows. The relative positions of the two wheels may be changed to adapt them to a right hand or left-hand plow. Both the uprights are provided with marked scales for adjusting the depth of the furrow.

According to the inventor, a plow with this device is self-holding, the driver needing only to attend to his team; any one who can drive a team can plow better than the best plowman with the ordinary plow, without the truck; an equal furrow in depth, width, and direction; the plowshare being self-sharpening as its point is kept always level; the draft lighter, and thus the labor less on the team—the truck bearing the load usually borne by the horses; the weeds being turned under and held by the large wheel and axle until covered, and other minor advantages evident to the practical reader without special notice.

Patented through the Scientific American Patent Agency March 2d, 1869. State and manufacturing rights for sale by the inventor, Joseph Clees, or J. N. Clees, Nashville, Tenn.

**Solid Emery Grinding and Polishing Wheels.**

Solid emery wheels have lately come into very general use for grinding and polishing. When well made they wear evenly and cut rapidly, and as they require no redressing, but last until entirely worn out, they are rapidly superseding the old-fashioned wooden wheel coated with emery, and even usurping some of the functions of the ordinary grindstone.

The engraving presents a perspective view of a machine for carrying one or two of these wheels, fixed on the same shaft and driven by the same belt. A stand supports two bearings with their boxes, in which runs a shaft carrying, in the space between the boxes, a pulley, and on its ends solid emery wheels. A slotted projection at the base of either bearing receives an ordinary rest, such as is used on a lathe for hand turning, that is held in position by a nut and bolt. The machine is bolted to a bench at any convenient point.

The machine can be used for grinding tools of every description, is a great saver of files in reducing and polishing surfaces, and does the work in either case much more rapidly than can be done on the grindstone. Parties having them in use commend them in the highest terms. The wheels used are those manufactured by the Tanite Company, Stroudsburg, Pa. For further information, address American Twist Drill Company, Woonsocket, R. I.

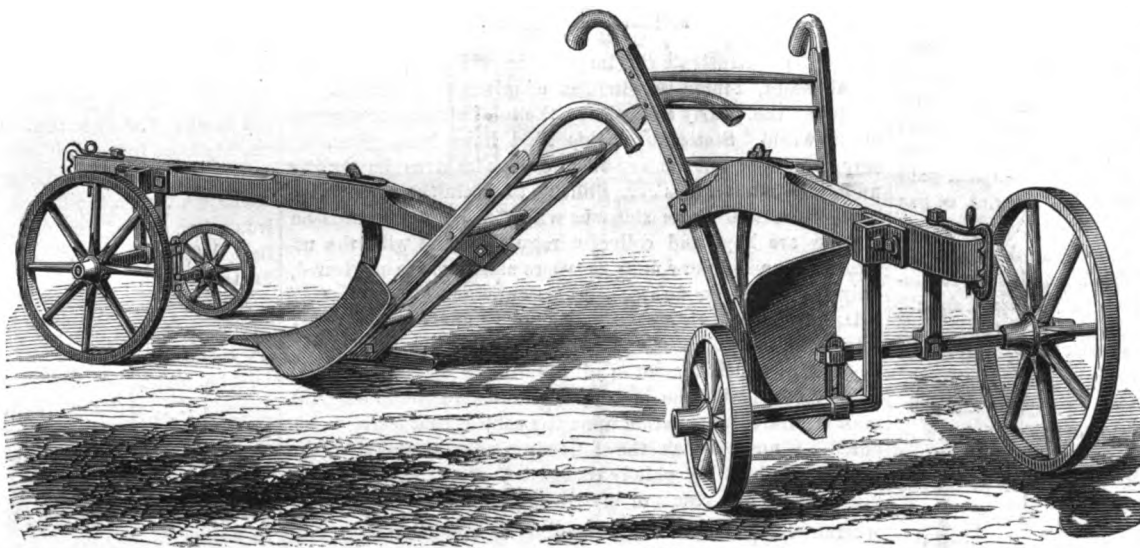
**Cleaning the Exterior of Buildings.**

This question, says the *Mechanics' Magazine*, has been recently taken into reconsideration by our Gallic neighbors, and toward the end of last year, an order was issued by the Prefect that the façades of all dwellings in the 3rd, 4th, 9th, and 10th divisions (arrondissements) of Paris should be periodically cleaned, the law to take effect on and after May 1, of the present year. So far back as 1852 there was a law promulgated to the same intent, but its injunctions have been so frequently neglected that the authorities have thought it requisite to call prominent attention to it by issuing what might be

termed a new edition. The old act ran as follows: "The façades of houses are to be kept in good repair. They are to be rubbed, plastered, painted, or the surface either renewed by cleansing in some manner or another, at least once in every ten years, at the expense of the proprietor. A non-compliance with this regulation will subject the offending party to a fine not exceeding £5. Although the legislation thus insisted on the general principle, the particular *modus operandi*, or means of putting the principle into execution, was left altogether to the discretion of the owner. The favorite method which has been successfully practiced for the last two years, is that of cleaning the walls by the employment of a jet of

or Croydon, and that many clusters of habitations are neither cities nor towns. Then naturally follows the question of how to deal with a limited amount of sewage? Of course, everybody will say, there are many ways of doing that. We admit there are, and we will now point out one of them, the most recent that has come under our notice. This is the system of M. Delbriel, which was explained to a meeting of gentlemen practically interested in the sewage question on the evening of 7th April. The meeting was held at the Inns of Court Hotel, Holborn, the Duke of Castelluccio in the chair. M. Delbriel's system of collecting and utilizing sewage is better known in France, where it is practically applied in several places as *vidance à vapeur*.

It consists in using a traction engine, to which are attached tanks, into which the sewage is pumped by the engine. During the extraction of the sewage, the mouth of the cesspool is covered with sailcloth steeped in sulphate of zinc. The mephitic vapors are drawn off from the tanks by means of pipes which communicate with the engine furnace in which they are burned. By these means, it is affirmed that no unpleasant smell or noxious vapor ever finds its way to the air, while the sewage in the highest condition for fertilizing purposes does find its way on to the lands of the farmers. Dépôts are established where the sewage is deposited, and from which it is distributed to the farmers. Or otherwise it is supplied on to their lands direct from the tanks. In all this there sounds to our ears—



CLEES'S PATENT ADJUSTABLE PLOW TRUCK.

water projected under steam pressure. There are many advantages attached to this plan of proceeding. It not only restores the façades to their original appearance, but it does not injure the more delicate, decorative, and ornamental portions of the building, neither does it destroy the then protecting coat which the stone has received from the influence of the atmosphere. By this method we insure the fulfillment of several valuable conditions. First, cheapness; second, the preservation of the more fragile and sculptural work upon the edifice; and, third, universality of application. If, in addition to the enforcement of some regulation of this description, with respect to the buildings in our principal streets and thoroughfares, those in our narrow courts and alleys were brought under the same jurisdiction, the result, in a sanitary point of view, might not be inconsiderable. It has been calculated that were the exterior of the buildings in London kept in a clean fresh condition, instead of being nearly black from top to bottom, there would be a gain of nearly half an hour's daylight in every twenty-four hours.

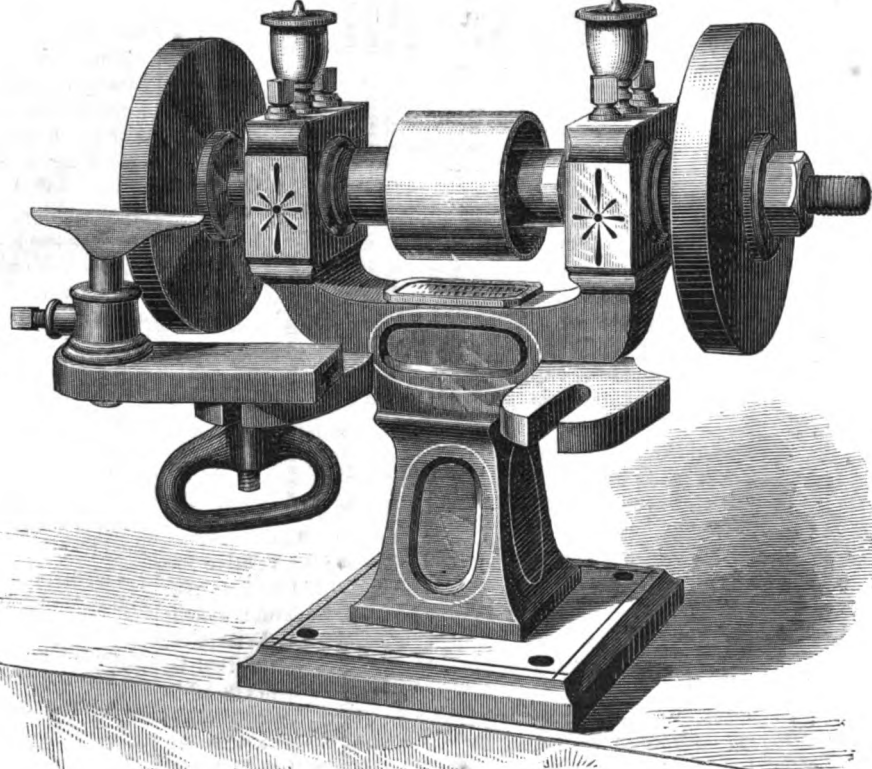
who have been accustomed to a widely different dealing with the same question—a return to the old cesspool system, the engine doing duty for the horse and men of the old night cart. But it must be borne in mind that with all our sanitary progress there are yet many spots in Great Britain where the system would be a great boon, and to these M. Delbriel proposes its application. That it has proved a great success in France is due to the very different sanitary and agricultural conditions of that empire as compared with the United Kingdom. On the whole, M. Delbriel's system is well worthy of consideration, and, therefore, we subscribe to the following resolution, which was passed at the meeting in question: "Considering the present great waste of the sewage of towns, etc., and the necessity of diverting it from rivers and streams, and the value of applying it to the purposes of agriculture, this meeting is of opinion that M. Delbriel's system is worthy the attention of the public, and more especially all persons interested in this important question, and that it is desirable that M. Delbriel should issue a translation of his pamphlet."—*Mechanics' Magazine*.

**Collecting and Utilizing Sewage.**

The two main points in the sewage question are, the effectual removal of refuse and fecal matter from our dwellings, and its efficient utilization upon our lands. Upon these points there exists a great variety of opinions, some ad-

**The Auroral Currents.**

We are asked if the currents produced on the wires during these displays are atmospheric, acting direct from these auroral phenomena, thus irradiating the heavens, and which weave their triumphal coronas up apparently among the planets? Although there are, unquestionably, large masses of electric clouds sailing in the upper regions of the air during the presence of these auroral displays, yet the fact that all, or nearly all, interference from the currents then exhibited can be prevented by simply using two wires instead of the earth and wire, proves that these currents are caused by a disturbance of the earth's normal electric state. The earth's ordinary electric tension is disturbed, and its currents are, so to speak, scattered by this induced current from the vast masses of electricity in the sky, but are ever seeking, by the violent action peculiar to them, to restore themselves to their normal condition, thus causing temporary electric currents of great power and rapid changes of tension. Thus they enter a wire from one earth connection in this effort at restoration, and are chased back by another from the opposite extreme, exhibiting the violent and changeful currents which mark these magnetic storms. The earth, itself, is a great reservoir of electricity, offering no sensible resistance to the entrance of electrical currents, yet varying in its electric tension or condition at different points. This causes an almost ceaseless action of the earth's currents, and at almost all times they can be felt upon the wires which they use to effect the equalization of their tension. During the auroral displays this action is excessive. At the same time it can scarcely be regarded as incorrect to say that it is the induction of vast volumes of electricity from the upper air which causes these extraordinary currents which, as



IMPROVED EMERY WHEEL GRINDING MACHINE.

vocating one method of removal and utilization, and some another. Into the various methods proposed, suggested, or in use, we need not here enter; they are sufficiently well known to all who know anything at all about the matter. We point to our Metropolitan main drainage as a sufficient answer to the first point in question, and to the Croydon irrigation works as an equally sufficient answer to the second. But it may be said that our cities and towns are not Londons

we have seen, can be utilized and harnessed for human service; and as a line can be worked by any polarity, provided the whole wire is worked with a like polarity, the changing currents do not prevent the line from being operated during the violent contest for the supremacy of the one current or the other.—*Journal of the Telegraph*.

MATTER and motive constitute the visible universe.

**Improved Low-Water Steam Port.**

Ever since the invention of the steam engine, the attention of scientific men has been directed to the discovery of means to guard against the danger of low water in boilers.

In consequence of the liability of supply pumps to become foul or defective, this danger is always imminent. A great number of devices have been tried, but nothing heretofore discovered was so eminently practical as to become a necessary appendage of the steam engine and an essential of every first-class boiler.

The void so long existing is now claimed to be filled by Cochrane's low-water steam port, constructed in accordance with principles of natural philosophy, well understood, and therefore always uniform in action.

A valve is made, composed of a spindle and piston united (10, 12). The latter is hollow, so as to make the specific gravity about the same as that of water. A chamber is constructed (8) in which the piston moves freely. The valve seat (9) in the head of this chamber is closed, as the valve rises, by a bulb (7) on the spindle. A tube (7) extends from the bottom of the chamber to low-water mark in the boiler. When there is a sufficiency of water, the steam forces it up the tube and fills the chamber. This sustains the piston and the pressure of steam upon the spindle and closes the valve. On the other hand, when the water is below the opening of the tube, the chamber is filled with steam instead of water, and the weight of the piston causes the valve to descend and open, allowing the steam to escape.

The action of this simple steam port is just as certain as the laws of nature on which it rests. It always gives timely notice of low water, and continues the warning till the boiler is supplied. The engineer will be greatly relieved, as it performs perfectly and constantly one of his most important and onerous duties. It does not merely act at the point of danger, but gives information in time for pumping to begin. Hence the boiler may always be worked with safety at the minimum of water, and with corresponding economy of fuel. Should this invention be the means of guarding against all danger from low water, its general use will mark an era in the history of the steam engine.

The inventor is J. C. Cochrane of Rochester, N. Y., who has secured patents in the United States and Europe. It is probable that the United States patent will be placed in a stock manufacturing company, either in New York or Boston, unless superior advantages are presented elsewhere.

**HARRIS' IMPROVED PATENT SHUTTER AND BLIND OPENER AND FASTENER.**

Opening and closing blinds and shutters from the inside of the house have formed the subject of a number of patents, some of which are of great merit, but few of them present equal claims to efficiency with that shown in the accompanying engravings, it having no springs or other adventitious aids to its proper operation.

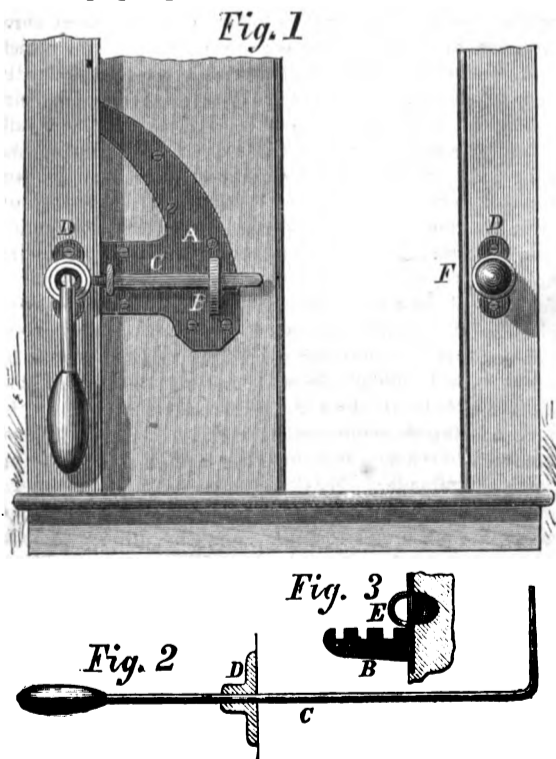


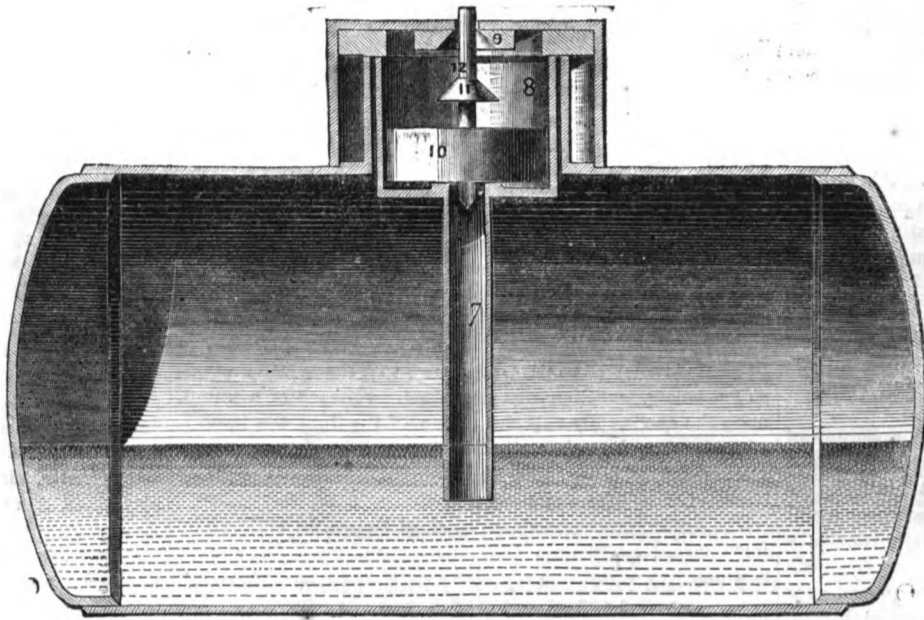
Fig. 1 shows one leaf of a shutter on which is secured a plate, A, shown in exaggerated proportions to exhibit the device plainly. On this plate is a catch, B, seen more plainly in Fig. 3, for receiving the bar, C, Figs. 1 and 2. This bar passes through a sleeve plate, D, secured to the stile or casing of the window frame, and is jointed, as seen in both figures—1 and 2. The bar or rod for ordinary blinds need not be more than three-eighths of an inch in diameter. A hinged loop or guide, E, guides the bar in opening and closing the blind. When the bar is turned partly around in its boss, D, so as to bring its bent arm to an upright position, and then pulled inward the shutter will be closed because of the connecting loop, E, and then by turning the bar in the opposite direction, the bent arm will again enter the catch, B. A reverse

motion opens the blind when the position of the handle of the lever will be, as seen, as at F, Fig. 1. The different notches in the catch, B, are intended to "bow" or set the blind at any angle required, and the position of the blind is assured in any position by means of a set screw in the boss, D, seen in Fig. 1. Thus the shutter, or blind, can readily be held either opened back against the building, partially closed, or securely fastened when entirely closed.

Patented April 6, 1869, by George A. and John B. Harris, who may be addressed at Deerfield, N. J.

**Property in Patents.**

The farmer "rises up early and eats the bread of carefulness;" he spends his time and his money in earnest efforts to



**COCHRANE'S LOW-WATER STEAM PORT.**

increase the value of his farm, his crops, and his stock. This property the law recognizes as his, and defends him in its possession. If a man steals one of his horses the law sends the thief to the penitentiary and public sentiment says "Amen!"

The inventor likewise devotes his time and money to the invention of that which will be useful to this farmer, and will aid him in the culture of his land or in securing his crops. He invents a reaper which gathers his grain, or a thrasher which makes it ready for the mill.

While the farmer is producing his crops he is furnishing bread to his family. While the inventor is devising his machine he is bringing in no bread to his family, but is exhausting the means already on hand, and his family is often in the greatest want.

Now, which should be the most sacred in the eye of the law, the horse raised by the farmer, or the invention perfected by the brain worker? Certainly it would be morally just as nefarious to wrong the inventor, by appropriating his property in ideas to which he has given an embodiment, as to steal a horse from the farmer. And yet how few regard the subject in this light. Many who see a new and valuable thing, look at it and want one, but say, "Well, I can make one good enough for me for half the money;" or a manufacturer will say, "I can modify that a little and make one just as good, and save paying that inventor a royalty." Is that man or manufacturer honest? And yet he would be shocked, and his friends would be shocked, if you were to insinuate that he was a thief. There is an impression that property acquired by physical labor is sacred, but brain work does not cost anything, and its creations are of no value. What a mistake! Brain work is immensely more exhausting to the vital forces than physical labor, and the discriminations of law and public sentiment, if any difference be made, should be in its favor.

We have been led into these remarks by the proposed passage of a bill by the Ohio Legislature, enacting that when an inventor sells a patent right, and receives a note therefor, the note shall state, on its face, that it is for a patent. Now, what sense is there in this? If the purchaser does not suppose that he is getting value received he should not give the note. The idea of the wise member who introduced the bill is, that the note thus drawn would not be negotiable, and if the purchaser of the patent finds it not as valuable as he supposed he may honorably repudiate. If this procedure is right, in this case, why not apply it in commercial transactions generally? Let a man give his note for a horse, saying, in the note, that it was given for a horse, the presumption being, as in the patent case, that if the horse is found unsound, the note shall be null and void, would that note have any market value? How would trade generally be affected under such a system of note giving? It would, at once, put us strictly upon the ready pay system, which, although best in the long run, is very unhandy when a man in want has not the money to supply his need. The proposed bill is an outrage upon inventors and manufacturers, and simply implies that they are a set of scoundrels whose main object is to swindle the public.

We had also another thing in view when we began this discussion, and that is the disposition of unprincipled manufacturers to defraud the very men whom of all others they should most befriend. Instead of welcoming the new invention and dealing fairly with the inventor by paying him a royalty for his invention, their disposition is, as before stated, to take the main idea, make a slight modification, and put out the invention as their own. The public sentiment should be

so changed that such a man shall, hereafter, be regarded as a dishonest man. Public sentiment makes law, and such a man acts honorably only through fear of the law.

[We find the above truthful remarks in the *Sorgo Journal and Farm Machinist*, published at Cincinnati, and commend them to legislators and others who are wanting in a proper appreciation of the rights of inventors.—Eds.]

**Diseases of Metal Workers.**

The fact that metal workers are liable to the attacks of special diseases is admitted by all medical writers. The lead colic and lead palsy of plumbers and painters, the metal ague of brass melters, the pulmonary affections of dry grinders and needle pointers, and the peculiar ails of japanners, lacquerers, gilders, enamellers, and others who are exposed to the fumes of mercury, lead, or arsenic, may be cited as some of the ills that working flesh is heir to. Dr. William Frank Smith, F.C.S., the physician to the Sheffield Infirmary, publishes his notes, in the *London Lancet*, on seven cases of a paralytic affection which he terms Hephæstic Hemiplegia, or Hammer Palsy, and which does not appear to have hitherto attracted much attention. Two table-blade strikers, a razor-blade striker, a hammersmith, an engineer, a file-forgers, and a silver-plater, were the patients. With one exception, they were either young or in the prime of life; temperate, healthy, and, with the exception of the continual use of the seven-pound, single-handed hammer of their trade, exposed to none of the causes of paralysis. It is satisfactory to learn that this new disease can be combated by medical skill, and that in all the cases recorded by Dr. Frank Smith complete or partial recovery has followed the use of phosphorus, iron, strychnia, and cod-liver oil, with absolute and prolonged abstinence from the forge.

**ROWE'S MODE OF FASTENING CARDS TO CYLINDERS**

There are two ways of clothing the cylinders of carding machines: one with sheets, and the other with filletings. The latter are used for "licker-ins," "deliverers," and "doffers," the other for the main cylinders. The cylinders are either of wood or iron; but in either case the material differs greatly from the leather that forms the basis of the card. This shrinks or stretches according to the temperature and length of time it has been in use, while the surface of the cylinder is not subject to these changes, or they are not equal in amount or coincident in time with those of the leather. In clothing the cylinder with sheet cards, the ordinary method is to tack the edges of the sheets to the cylinder, whether of wood or iron; in the latter case, holes being drilled in the iron and plugged with wood to receive the tacks. To strip the clothing off such a cylinder and replace them is a work requiring not only time, but skill and experience. In fact, the qualifications of a carder should be to clothe card cylinders as well as to manage the business of a carding room.

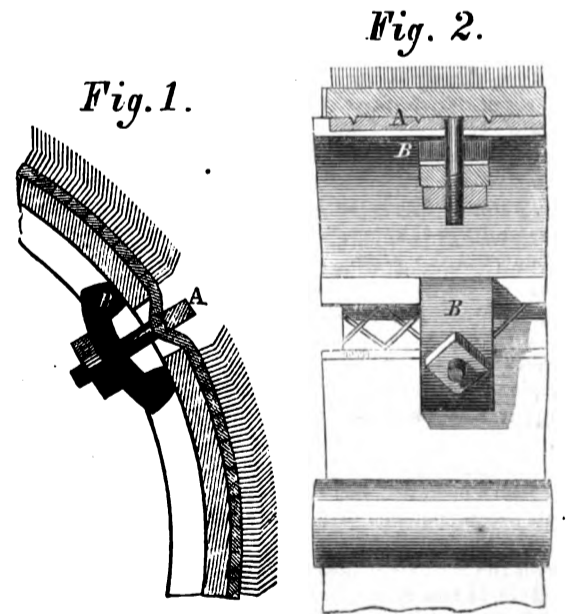


Fig. 1 of the device herewith illustrated is a vertical cross section of a portion of a cylinder, and Fig. 2 a longitudinal vertical section. The edges of the sheets are either sewed, riveted, or cemented to make a continuous band or covering. The cylinder at the requisite distance is scored with transverse grooves, about three-quarters of an inch wide, into which the edges of the card sheet are forced by means of a bar or rod, A, and a series of screw bolts and saddles, B, by which they are also held in place, and by which they can be adjusted as required. Card clothing by which means can be retained in place, and with sufficient tension to hold it until the card is entirely worn out. The advantages of this device are so apparent that any practical man cannot fail to appreciate them.

Patented Dec. 22, 1868. For further information address the assignees, Helmick, Mooney & Co., Pana, Christian county, Ill.

It is computed that the total number of persons annually employed in getting coal in Europe is 700,000. In Great Britain, 300,000; in Belgium and France, 120,000; in Prussia, 80,000, and the remaining 200,000 elsewhere.





**VIEWS ON THE CENTRAL PACIFIC RAILROAD.**

To those unacquainted with the locality it is impossible to convey by description any adequate idea of the irregularities of surface which occur in the Sierra Nevada mountains, which are traversed by this line. The tunneling required has been of small extent. The peculiarity of the line is the very extensive employment of trestle bridging, and it is with the view of illustrating this that our engravings have been chosen, Nos. 1, 2, 4, 5, and 6, being examples of trestle bridging, and No. 3 showing a cutting 68 feet deep and 800 feet long through cemented gravel and sand, of the consistency of solid rock, and which is only to be moved by blasting. The trestle bridging has been all constructed as strongly as possible, and of the best obtainable material. The ties, stringers, and caps are of best quality pine (that from Puget's Sound, nearly equal to oak), and the posts, braces, sills, and piles of red wood. The main posts, 12 inches square, are placed perpendicularly, let into a sill of the same dimensions with mortice and tenon, immediately under the bearing of the track stringers. Outside the main posts, two posts 12 in. by 12 in. extend down, with a run of 1 foot in 3 inches to the sill to which they are tenoned, beside being bolted at the top to the main posts with inch bolts and cast-iron washers. The sills rest on piles on stone foundations. Piles, when used, are driven so as to come directly under the main posts and braces. The posts are capped with a timber 12 inches square and 9 feet long, into which the posts are tenoned and pinned. Upon the caps rest corbels 12 inches square and 9 feet long, and upon them are laid the stringers, 12 in. by 15 in., secured by iron bolts passing down through them to the corbels. The caps are notched 1 inch to receive the corbels. The cross ties, or sleepers, are securely fastened to the stringers, and upon the sleepers are laid the rails in the ordinary manner. The "bents" or frames are placed at intervals of 15 feet from center to center. Trestling thus constructed is said to last from eight to fifteen years. When necessary it can be renewed at small cost, or filled with earthen embankment by transporting material on cars at far less cost and trouble than would have been incurred in constructing an embankment at first.

It now takes three weeks or more to reach San Francisco *via* Panama, from New York. When the line is complete the journey can be made in seven days, and ultimately, without doubt, in even less time.

**Prof. Tyndall's Lectures on Light.**

Prof. Tyndall has commenced a series of lectures on "Light," before the Royal Institution. Their publication will be awaited with eagerness on this side the Atlantic by those who have read his works on heat and sound. His opening address was of a very elementary character, but he introduced a new experiment to prove that the angle of incidence of light is equal to the angle of reflection. A rod of brass, graduated in inches, was supported in a horizontal position, and from its center a thread, drawn tight by a plummet descended into a basin of water, colored with ink in order to get rid of all but surface reflection. A small dimple was necessarily made at the place where the thread entered the ink. A small paraffine lamp was then placed with its flame nearly touching the rod, and at about a yard from the central thread. Upon bringing the eye along the other end of the rod, and watching the small dimple in

the water, it was seen to be most brilliantly illuminated when the eye was at the distance of a yard from the center of the rod, thus proving that the angle of incidence is equal to the angle of reflection. To whatever distance the lamp was shifted from the central thread, the eye had to be placed at a similar distance on the other side to get the most brilliant reflection.

**Blazing Stars.**

In the year 1866 a star blazed up in the constellation of the Northern Crown, rapidly attaining the second magnitude. It soon began to decline in brightness, falling in twelve days to

the photosphere, so as to render its spectrum more vivid. If, then, the stars are thus liable to become enwrapped in the flames of burning hydrogen, we may speculate as to what would be the fate of the inhabitants of the planets were our sun to emulate the vagaries of its sister orbs and burst out in mighty conflagration.—From "Spectrum Analysis," in *Lippincott's Magazine for May*.

**Modern and Medieval Architecture.**

It is a sad truth that there is something in the solemn aspect of ancient architecture which, in rebuking frivolity and chastening gaiety, has become at this time literally repulsive to a large majority of the population of Europe. Examine the direction which is taken by all the influences of fortune and fancy, wherever they concern themselves with art, and it will be found that the real, earnest effort of the upper classes of European society is to make every place in the world as much like the Champs Elysées, of Paris, as possible. Whenever the influence of that educated society is felt, the old buildings are relentlessly destroyed; vast hotels like barracks, and rows of high square-windowed dwellings thrust themselves forward to conceal the hated antiquities of the great cities of France and Italy. Gay promenades, with fountains and statues, prolong themselves along the quays once dedicated to commerce; ball rooms and theaters rise upon the dust of desecrated chapels, and thrust into darkness the humility of domestic life. And when the formal street, in all its pride of perfumery and confectionary has successfully consumed its way through the wrecks of historical monuments, and consummated its symmetry in the ruin of all that once prompted to reflection or pleaded for regard, the whitened city is praised for its splendor, and the exulting inhabitants for their patriotism — patriotism which consists in insulting their fathers with forgetfulness and surrounding their children with temptation.

Is this verily the end at which we aim, and will the mission of the age have been then only accomplished when the last castle has fallen from our rocks, the last cloisters faded from our valleys, the last streets, in which the dead have dwelt been effaced from our cities, and regenerated society is left in luxurious possession of towns composed only of bright saloons, overlooking gay parterres? If this be indeed our end, why must it be so laboriously accomplished? And are there no new countries on the earth, as yet uncrowned by thorns of cathedral spires, untormented by the consciousness of a past? Must this little Europe—this corner of our globe, gilded with the blood of old battles, and gray with the temples of old pieties—this narrow piece of the world's pavement, worn down by so many pilgrims' feet—be utterly swept and garnished for the mask of the future? Is America not wide enough for the elasticities of our humanity? Asia not rich enough for its pride? or among the quiet meadow lands and solitary hills of the old land, is there not yet room enough for the spreadings of power or the indulgences of magnificence, without founding all glory upon ruin, and prefacing all progress with obliteration?—*John Ruskin.*

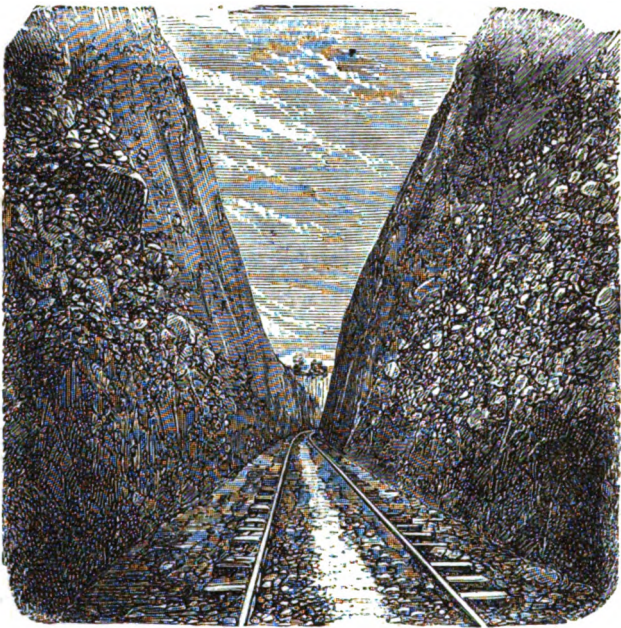
Simplicity is one of the greatest elements of utility in machinery. Complexity should, if possible, be always avoided



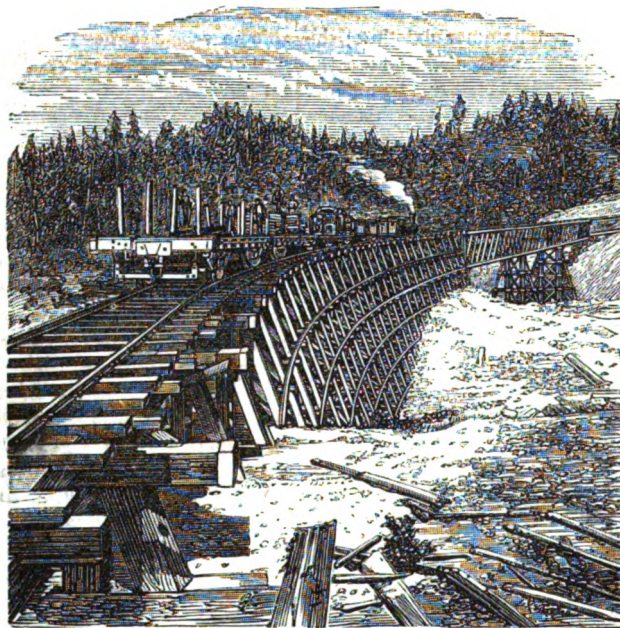
No. I.—TRESTLE OPPOSITE AUBURN.



No. II.—TRESTLE AND TRUSS BRIDGE, CLIPPER RAVINE, 100 feet high.



No. III.—BLOOMER CUT, 68 feet deep, 800 feet long.



No. IV.—LONG RAVINE, HOWE TRUSS BRIDGE AND TRESTLE, 115 ft. high.



No. V.—TRESTLE AT SECRETTOWN, 1,000 feet long, 50 feet to 70 feet high.



No. VI.—FIRST TRESTLE IN CLIPPER RAVINE.



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DISCUSSION OF PURELY SPECULATIVE TOPICS—TO CORRESPONDENTS.

We are always glad to give our correspondents a hearing upon subjects which we consider likely to be beneficial to our readers at large, but we find it necessary occasionally to hold our correspondents in check. At the present moment we find our desk loaded down with articles upon purely speculative topics, involving abstract theories which have puzzled the wisest of all ages. We cannot give up our columns to the discussion of such subjects, as very little can be evolved therefrom, either new or profitable to our readers. We prefer something practical, something that shall add to the general stock of useful knowledge, and aid in promoting and developing the industries of the world.

Let us enumerate some of the topics contained in this heap of rejected correspondence. We have several upon the "Fluid Character of Electricity;" another upon "The Cause of the Attraction of the Positive Pole of a Magnet for the Negative Pole;" another, which comprises as nearly as possible all the speculative inquiries of past and present ages, and which demands answers to no less than seventeen "whys," all pertaining to force considered as an abstract entity, and the origin of all existence; another upon the "Origin of all the Forces upon the Earth;" another upon the "Solidity of the Earth's Center," and so on to the bottom of the pile. Every one of these letters has been carefully read and considered.

What possible good can arise from the discussion of these and cognate subjects? We maintain that "why matter is and why matter moves" must, from the very nature of the case, remain beyond the pale of legitimate physical science, whose province it is to investigate the manner and succession in which natural events transpire, and not why things exist. The latter inquiry is either a subject for religious belief, or of speculative and transcendental philosophy, if that deserves the name of philosophy which is founded upon mere hypothesis. We know nothing of abstract force except by inference, if inference can be called knowledge. All that we can demonstrate is that matter under certain conditions moves in a manner always the same when the conditions are the same. This relation of motion to the conditions which precede it, is what we call law, a term which, in its physical sense, means only the constant relation which exists between any particular motion and the perceptible conditions under which it takes place. So far as we can see, matter and motion are always connected. If this is the result of an occult force, we know nothing of that force, and consider it impossible to demonstrate its existence. If its existence be admitted, we consider it just as legitimate a subject of philosophical inquiry to ask what underlies that force, and so on without end. If a first cause for matter and motion is a necessity of thought, what is the use of supposing intermediate causes between the first cause and matter and motion? We must finally stop at a cause uncaused, if we substitute a thousand intermediate causes. Why not say God created matter and put it in motion, and out of these facts, matter and motion, we have our universe? In this view, as soon as we step beyond matter and motion, we are in the presence of the first cause, Deity himself, and beyond the realm of physics. But it may be said the speculative theories which have suggested our correspondents' inquiries pertain, at least some of them, to this realm. We consider them of no greater value on that account. If their tendency was to point the way to probable discovery, they might be of some value; but so far as we can see, they do not: their discussion can therefore be of no benefit. We trust our readers will not

permit their attention to be distracted from practical questions. It is futile to seek by scientific methods for the "why" of existence, but we may find out the "how" of many things that will confer good upon ourselves and our fellow men. This is the lesson we set out to teach.

EXPLOSIVE COMPOUNDS.

The subject of explosive compounds for engineering purposes, which has been discussed in several late numbers of our paper, has attracted considerable notice, and though the articles in question have been valuable, they fail to give that precise information which practical men desire, especially in this country, where energy and enterprise are developed in the highest degree. Mining men wish to know what explosive will do the most execution, considering safety and expense, which includes "time" as well as actual outlay of capital. For example, a railway may have a tunnel to complete before the road, previously constructed, can be made available. At the Hoosac tunnel it is estimated that, with nitro-glycerin, the opening can be made from one to two years earlier than it can be done with gunpowder. We are also informed that the Union Pacific Railway has used large quantities of nitro-glycerin to hurry the completion of a tunnel, and in order to get even a small quantity, the contractors purchased a car, and sent with it, at considerable expense, a messenger to hasten it forward. These are practical evidences in regard to nitro-glycerin. But, then, we must not omit to consider the efficiency and relative safety of other modern explosives. In California, dynamite, or giant powder, has been introduced into over 700 mines. In Pennsylvania, the oriental powder has been considerably pushed, with some degree of success. Periodically, the world has thrust upon it, some new development in the useful arts, and, at the present, we have a variety of explosive agencies, forcibly recommended by inventors, each claiming superiority for their respective products, and each claiming positive safety. Before the questions are satisfactorily solved, commercially considered, there will be some loss of life, and we cannot do more than to hope that the loss will be small.

Colonel Shaffner, whose letter appears in another column, gives no information relative to the explosive point of the substances enumerated, when produced by concussion.

Gunpowder will explode at 600° Fah., Horsley's powder (called in America, Ehrhardt powder), at 430°, gun-cotton from 350°, Schultz's sporting powder 385°, nitro-glycerin 360°, and percussion cap fulminate 340° Fah. These respective degrees of explosion mean, that when each is put in a vessel or room, they will explode when the temperature given is attained. But who can tell the exploding point under conditions of percussion—under a tap of the hammer, whether of metal, stone, or wood? Each explosive may have thrown around it all the precautions of safety, but, after all, mining men will have the article that will best subserve their interests, and, thus considering the subject, we can only indulge the hope that a proper regard for human life will not be overlooked by manufacturers and consumers, and that they will exercise those precautions which will lessen hazard and secure success to the greatest number.

Among the most hazardous of all the explosives claiming the attention of engineers, nitro-glycerin undoubtedly stands at the head, and its efficiency over that of its derivative, dynamite, is not sufficient, in our opinion, to compensate for the hazard involved in its use and transportation. We feel it our duty to express a decided preference for dynamite, where a very powerful explosive is required. The frightful accidents which have occurred from the use of nitro-glycerin, have no parallel in the history of any other explosive compound, and when we take into consideration the difficulty in enforcing care in its handling and packing, we do not hesitate to assert our opinion that its indiscriminate use should be prohibited by statute.

We see that some foreign papers take opposite ground in regard to safety attending the manufacture of the Schultz sporting powder, from that taken by the author of the series of articles which have been called in question. In order that our readers may judge for themselves, we publish, in another column, a description of the process by which it is made. The subject of explosive compounds is an important one, and worthy of the fullest discussion.

COMPLETION OF THE PACIFIC RAILWAY.

The announcement is made that the Pacific Railway is completed. Amid the conflicting statements in regard to the manner in which the work has been performed, we know not whether the people ought to rejoice or to feel sorry. It is generally admitted that the road has been laid in an imperfect manner. Some will even have it, that it is a mere sham, only built as a matter of form to obtain the very liberal subsidies granted by the Government. This may be an extreme statement, but between those of the friends of the enterprise and its foes, there is room for no little fear that the immense franchise granted to the company has resulted in no adequate return to the people at large.

If this should prove to be the case, through want of vigilance on the part of the Government, we see no reason to find fault with the company. As business experts they would naturally give only what was demanded of them. The Government has had it in its power at any time to withhold its aid until the terms of the charter were complied with, and if the company have found pliant tools in the Government officials, who were willing to rob the people for their own profit, it was to be expected that they would use them.

We are confirmed more and more by daily developments in the belief that such enterprises should be either carried for-

ward entirely by the Government, or accomplished solely by private enterprise.

The system of making appropriations in aid of such works, is a vicious one, leading naturally to official corruption and fraud.

It is loudly asserted, in many quarters, that the company have made too much money, and that they have at least attempted to cheat the Government. If the latter part of this charge is true, and if it means that the acceptance of inferior work has been sought by concealment of deficiencies, it ought to divest the corporation of all the privileges it holds under its charter. The former is no charge at all unless coupled with dishonesty. The right to make money, if it can be made honestly, is one nobody has hitherto denied either individuals or corporations. If the company have built as good a road as they contracted to make, we care not how much profit rewards their enterprise. If they have made their money dishonestly, and by performing their work in a manner inferior to the provisions of their contract, a remedy for the people ought not to be difficult to find, a remedy that will teach future solicitors for Government help, that it is dangerous to trespass upon the rights of the people. If, however, the cheating has been done through the honorable gentlemen who were stationed to guard the public purse, the public will transfer their wrath from the company to these offenders.

We should not envy the position of those gentlemen should the people find that they have permitted themselves to be delict in their duty in this matter.

We give, on another page, a number of views taken from different points along the line of this road, which will interest those unacquainted with the peculiar features of the section it traverses.

AFFAIRS AT THE PATENT OFFICE.

Commissioner Fisher takes hold of the affairs of the Patent Office with an earnest purpose to effect a speedy reform of past abuses. He recently invited the Examiners and Assistant Examiners to his room, where some time was spent in interchange of views regarding the business of the office as it relates to the examination of cases, and he proposes to dispense with some of the present useless forms, in order to facilitate the procuring of patents. The Commissioner gave some opinions for the guidance of the Examiners, in order to secure more uniformity in the general practice of the office.

The following removals were made—viz., N. Peters, Examiner; D. Curle and C. L. Coombs, First Assistants; T. H. Sypherd, Second Assistant. Appointments were made as follows: John C. Tasker and George A. Nolan to be Examiners.

We are glad to learn that the present efficient Chief Clerk, Mr. Grinnell, is to be retained.

Mr. Tasker is a native of New Hampshire, and is a skilled and educated mechanic. He was, for several years, in charge of some of the most extensive works at Lowell, Mass; for the past three years has held a position as First Assistant in charge of the classes of wood working and of metal casting, and is said to admirably qualified for his new position. Mr. Nolan is a native of Massachusetts; was educated at Yale College, where he graduated with high honors, and was for some three years a tutor of mathematics and natural philosophy. He has been in the Patent Office as First Assistant about three years, and will make a most satisfactory Examiner.

J. W. Abert and J. H. Hawes have been appointed First Assistant Examiners; James Lupton and F. S. Lawson, Second Assistant Examiners. James Newlands and D. Wilson have been promoted from Second to First Assistant Examiners. W. A. Gutplim and A. R. Robinson have been promoted from temporary clerks to be Second Assistant Examiners. Michael Marley has been appointed chief Messenger in place of Chas. W. Thomas, resigned.

We are assured that these appointments will reflect credit upon the Commissioner and the Secretary of the Interior.

Commissioner Fisher has granted an extension to M. M. & J. C. Rhodes for their patent for a machine for leathering the heads of tacks. In the testimony taken in the case it was shown that over six millions of this style of tacks were used in the United States daily.

An interference case of some importance, in relation to a device for sharpening millstones, has also been decided by the Commissioner. The parties who were immediately interested were J. F. Gilmore, of Providence, Ohio, who had secured a patent, and George Hermon, of Paris, France. The claims of Hermon were sustained.

DUST.

At this period of moving, most people become familiar with the general appearance of dust, and the peculiarly disagreeable sensations produced by its getting into the eyes, nose, and mouth. Few pause to consider what it is or where it comes from. We repeat the passage, "Dust thou art and to dust thou shalt return," but we hardly realize that the almost palpable particles which exert their pungent power to compel us to sneeze, or cough, or make the tears to run down our cheeks, may be composed of the same matter that constituted the body of some ancestor a thousand years ago, and for whom we never felt called upon to weep until now.

Our readers will recollect the significant query, "Who ate Roger Williams?" and how it originated in the discovery that the body of that resolute controversialist had been appropriated to the growth of a greedy apple tree, which, not content with the theft, mimicked with its roots the body and limbs it had devoured. Of course the fruit produced on this tree, doubtless eaten with satisfaction, some of it perhaps by the descendants of Roger Williams, contained the very matter which once was a living being; and the same matter may have been a million times exchanged and transported, so that

the dust which is perhaps this moment provoking the reader to sneeze, may be a portion of that which once revolted against puritan persecution, and wended its way from the Colony of Massachusetts, to find a grave beneath a Rhode Island apple tree.

Dust is commonly regarded as being matter of death. But though upon examination with a powerful microscope we find it to contain myriads of skeletons of dead organic beings, we shall also find that we are not roaming in a microscopic grave yard merely. We shall find the reproductive bodies of the diatoms, about which so much has been written and said by microscopists as to whether they were plants or animals, finally resulting in the belief that they are plants. Ehrenberg has described several hundred kinds of diatoms found in atmospheric dust. There are also to be found encysted animalcules and rotatoria, and their germs; spores or seeds of fungi, algæ, lichens, and other cryptogamic or flowerless plants, intimately mingled with particles, consisting of cells and portions of cells, of both animal and vegetable tissues, and finely comminuted mineral substances.

Among the latter, salts of sodium are some of the most generally diffused, although near bodies of salt water they are to be found in largest quantity, being carried into the air in the spray of oceanic waves, and afterward precipitated by the evaporation of the water which held them in solution. Silica, alumina, lime, and oxide of iron, are always found. Near manufacturing establishments there are always more or less of the materials used in the works to be found, as sulphur, oxides of the metals, and carbon deposited from smoke. In the vicinity of tanneries tannin may be found; and near dye-works, coloring matters.

Dust is so universally diffused throughout the atmosphere that no place within the limits of animated existence can be said to be free from it under ordinary circumstances. To remove it even from small quantities of air requires quite complex mechanical and chemical manipulations.

In regions subject to miasmatic diseases, organic matter is found in the greatest abundance in the form of spores. Its presence is determinable by a very simple test. Strong sulphuric acid has the property of freeing carbon from its combinations in organic substances. If a piece of wood be immersed in it it will be converted into charcoal. If then, a watchglass containing strong sulphuric acid, be exposed to the atmosphere the acid will after a time become blackened by the carbonization of the organic matter deposited upon its surface. It has been found that in malarial districts, sulphuric acid thus exposed becomes blackened much more readily than in other places, thus proving the presence of organic matter.

In view of these facts it will be seen that streets filled with dust, must be prejudicial to the sanitary condition of large towns, and that the laying of this dust by sprinkling, is more than a mere matter of comfort to their inhabitants. Our readers have been informed of the method adopted last year in London, *i. e.*, the use of solutions of deliquescent salts, to lay street dust, and of the success that attended the experiment. We have no doubt of the value of this method and urge its trial in the large cities of this country. The additional cost of the salts would probably be compensated for by the diminished necessity for frequent application, and the increased health and comfort of the people, as well as the saving to merchants of the damage to their wares, frequently a serious matter along dusty thoroughfares.

#### THE VELOCIPEDE IN EUROPE.

One of Hood's quaintest fancies is carried out in sober earnest in London, according to the *London Daily News*, which says: "The academy at which old boys were put out to board, and from which one of the pupils describes how his fellows cannot play at marbles because the game necessitates stooping, and their rheumatics are so bad; or how hoop is rendered impracticable by gout, or prisoners' base by asthma, or details equally incongruous—this description is realized almost literally at the velocipede riding schools. These abound in London just now. East, west, north, and south of the metropolis are lessons being given to men of all ages, with a decided run upon bald heads and gray hair among the pupils.

"Down St. Luke's Hospital way, and about midway between Moorgate station and that Goswell street which has become classical ever since the embarrassing scene which took place in it between Mr. Pickwick and Mrs. Bardell, is one of the best known of the velocipede schools. From ten in the morning till six at night it is very busy. A couple of broughams and several hansom cabs are waiting at the archway, leading to it out of Old street, at the time of the visit. Past these, and up a sort of court, and we are in a large factory, with crowds of mechanics busily at work. Velocipedes in various stages of progress are to be seen everywhere. They hang in thick rows like onions from the roof, they block up the floor, they are piled in pyramids against the walls. The majority are unfinished. Long lines of wheels, unvarnished and unpainted, are seasoning, while handles, seats, axle trees, and smaller wheels are being manipulated, or lie ready for use. There is as much scope for fancy about the decorations of a velocipede as in aught else, and whether one of the scores which were being made to order should be picked out with yellow or red as a relief to its dark body color was a subject of earnest discussion between two elderly officers during our stay. The guiding bar is one of the things upon which extravagance is expected to center. Already we were shown a very handsome one in burnished steel and with ivory handles as an 'extra,' and that 'we shall have to bring them out in silver before the season's over,' is an opinion confidently expressed.

"So far we have kept to the manufactory and its approaches. The riding school is beyond. The first-named

place and the counting house adjacent have been full of signs of the sudden and enormous demand which has arisen for the last new hobby horse, while the school shows us how devotedly purchasers are qualifying themselves for riding it. Here is a stout country gentleman who has come up from a distant province for the sole purpose of receiving lessons. A stalwart attendant walks with him round the room, holding him on his velocipede, by keeping an arm firmly round his waist. The sitter keeps his head down and his knees in, as if he were attempting to master a particularly vicious and unmanageable young horse. His eyes are firmly fixed upon the wheels beneath him, his shoulders are up, his teeth are clenched, his hat is pressed resolutely over his eyes, and his entire demeanor is that of a man who sees his work cut out for him and who means to master it. At first his feet are allowed to hang uselessly down, while the attendant propels the velocipede by pushing it with his disengaged hand. The rider is directed to keep his attention to the handle, to balance himself by it, and to be careful at the turns.

"Round and round the vast bare chamber go the twain, the attendant walking slowly under his double task, and giving out instructions rather disjointedly for lack of breath, 'Give a looser hold to the handles, sir—(puff)—don't grip 'em as if you were afraid of tumbling off—(puff, pant, puff). I'll take care of that. (Pant.) Just feel 'em like; the lighter and gentler the better—(puff)—and whenever you feel your'r going over on one side, just turn an opposite handle, and you'll right yourself directly.' (Pant, puff, puff.) After a little time the novice is told to use his feet, and he then turns the wheels slowly for himself, being still held on by the attendant instructor. There are no fastenings for the foot—simply a rest which projects out from the axle trees; and whenever the handle is mismanaged, and the center of gravity lost, the rider comes to the ground on his feet, and so stands up in a very comic way. It is as if a very tall man were on a pony so small that he can at any moment allow it to run between his legs. But there is nothing corresponding to the stirrup in any way; and one of the most striking things we noted was the readiness with which even the least expert of novices could place himself at ease, by freeing himself altogether of the machine. Two such lessons as we saw given, would, we were assured, enable the gentleman before us to manage a velocipede for himself, and from this stage to a complete mastery, is a mere question of practice."

At a recent meeting of the Society of Inventors, in London, a paper on velocipedes was read by Mr. C. B. King, C.E. He began by noticing the gradually increasing public interest in the velocipede movement in England, as well as in America and France; and having given to a native of the latter country the credit of the invention of the bicycle half a century ago, he mentioned the names of various improvers from that time down to the present. One of their machines weighed half a ton, and would carry twelve persons; in another the brake, one of the most valuable features of the modern velocipede, was introduced. In order to bring them into general use, manufacturers should pay attention to springs, proportion, and finish. The exercise might be called "walking made easy," with the advantage of taking ten feet at a stride in place of two. He attached no importance to the supposed danger to pedestrians, inasmuch as, with ordinary skill, a velocipedist can stop more suddenly than he could pull up a horse. In America, with their usual appreciation of new ideas, they had established "Velocinasioms," and had invented such terms as "wobblers," "shavers," and "tumblers," to describe the several degrees of inefficiency of management. He urged, however, that, as a means of rapid and easy locomotion, the velocipede was well worthy of serious attention.

During a discussion which followed, it was suggested that inventors should endeavor to provide velocipedes suitable for ladies and children, as well as cheaper vehicles, on which working men could go to their employment, as some do in Paris. It was stated, however, that velocipedes are not fitted for London streets, and regret was expressed at their exclusion from the parks. Mr. Velogne said he had done the ninety miles between Paris and Rouen on a bicycle in one day. A mile had been done on good road in two minutes and four seconds: but the keeping up of so high a rate of speed was altogether exceptional. Eight or nine miles an hour would be done by an ordinary skillful man without great exertion. It was objected that at a tollgate on the Brighton road, velocipedes are charged under the same category as mules and donkeys. After the meeting, several bicycles were started, and did good work in Trafalgar Square, the Strand, and Fleet street.

At a sensation velocipede exhibition given, recently in Boston, one Master John Reardon is stated to have ridden a velocipede with gooved wheels along a rope stretched from one end of the rink to the other, about twenty feet from the floor. In addition to this a trapeze was hung to the velocipede and Mr. Harry M. Stevens performed a variety of feats upon it, while the velocipede was moving along the rope. Two little girls, aged three and five years, rode velocipedes around the rink with the ease of experts.

Mr. Henry C. Platt, of Augusta, Ga., sends us a drawing copied with the following extract from page 434, Vol. 5, of the "Second American Edition of the new Edinburgh Encyclopedia," printed in the year 1814.

"In the 'Triumph of Maximilian,' a work executed in the years 1516, 1517, and 1518, curious readers will find plates of various carriages or cars, some drawn by horses, some by camels, some by stags, others impelled forward by means of different combinations of toothed wheels worked by men. Of one of the most remarkable of them we give an exact copy in plate CXXXI (of which the drawing is a *fac simile*).

The drawing is extremely curious, and the machine is evidently a monocycle. We have sought in vain for the work

alluded to in the public libraries of this city. Is it available to any of our correspondents? If so we shall be happy to hear from them.

#### Editorial Summary.

A SPRIGHTLY young paper published at Trenton, N. J. called the *Young Men's Monthly*, is devoting considerable space to the exposure of "Swindling in New York." Mayor Hall has also given a note of warning through the press against the numerous vampires who prey upon the credulity of the innocent and unsuspecting, but all labor bestowed in that direction will be temporary until people learn that the only safe course for them to pursue is to transact their business with reputable business firms. Gift enterprises are generally swindles; a great majority of advertised patent medicines are positively injurious to those who take them, and the public should beware of all advertisements that offer to send something for almost nothing. Such "catch-traps" are so numerous that we cannot undertake to name them; but of one thing our readers may rest assured—viz., that what cannot be purchased either of or through a respectable tradesman, is ordinarily not worth looking after.

Dr. Brown-Sequard, reports a curious case of a dog which had just died, having fresh blood passed into the carotid. The dead animal was revived, stood on his feet, wagged his tail, and lived over twelve hours, when he died again.

The above item is going the rounds of the newspapers. The error about the matter consists in the statement that the dog was actually dead. We undertake to say that the dog was but apparently dead. The simple introduction of fresh blood into the carotid of any dead animal would have no effect whatever.—We make this assertion on the authority of the *New York Medical Journal*, which announces in its last issue the death of a child under peculiar circumstances, adding sapiently to the statement that it was dead, *it could not be resuscitated*.

THE *English Mechanic* in a recent issue discusses the defects in the British Patent System, and calls loudly for reform. It wants a cheaper system, one that will make patents more valuable, and less assailable by those who, lacking genius, cultivate cunning and roguery.—It appears that there is now a surplus patent fund amounting to the sum of \$2,000,000, out of which it is suggested that an industrial and inventor's museum should be established and endowed, and that the present patent fee should be reduced one-half. The gross injustice of charging such exorbitant fees is fully shown by the enormous surplus which has been accumulated under the present system. We therefore hope that the suggestions of our cotemporary may prevail.

THE work of clearing the obstructions at Hell Gate have come to an end for the present. Out of the general appropriation of \$1,500,000 made by Congress for river and harbor improvements, the paltry sum of \$80,000 only was allowed by the Secretary of War for this important work. We understand that Mr. Shelbourne, who was employed to blast out "Frying Pan" rock, has expended \$20,000 out of his own pocket in preliminary experiments and preparations. This work is one of great national importance and ought to be vigorously pushed forward.

PROFESSOR POWELL, who departed nearly one year ago in charge of the scientific expedition to explore the Rocky Mountains, has returned to Bloomington, Illinois, for the purpose of procuring four portable boats in Chicago, which are to be carried out on the Pacific railroad as far as possible. The party are to embark in these boats at the headwaters of Green river, and follow that and other streams into which it empties to the Pacific Ocean. The party will spend some ten months. Mrs. Powell has returned to Bloomington, and will not accompany the second expedition.

PROTECTING BIRDS.—The Legislature of Wisconsin, at its last session, passed a law making it a penal offense to destroy or kill, by any device whatever, brown-thrushes, blue-birds, martins, swallows, wrens, cat-birds, meadow-larks, or any other insect-eating birds, anywhere within two miles of any incorporated city or village in that State. The Legislature of Pennsylvania also passed an act, afterward approved by the Governor, which imposes a penalty of twenty-five dollars for the killing of any insectivorous bird, one-half of this fine to be paid to the informer.

THE appropriation for the survey of the lakes this season is \$100,000—much below the amount appropriated for 1868. The organization of the surveying parties has not yet been completed. It is proposed to finish the survey of Lake Superior. In addition to the other work, it is intended to continue the operation of gaging the rivers connecting the lakes, with reference to the supply and outflow of water. The problem is one of very great general interest.

THE return of Dr. Livingstone, the veteran English traveler, was expected about four months since, but up to the present moment his movements are wrapped in mystery. At last accounts, December 14, 1867, he was proceeding along the eastern shores of lake Tanganyika, but no idea can be formed respecting his subsequent course. His fate is regarded with some degree of uncertainty.

ENGLISH coach builders are beginning to announce that they are prepared to build light carriages on wheels imported from America. They have discovered at last that the Americans are half a century ahead of them in the matter of carriage building.

HONOR TO AN AMERICAN CITIZEN.—A telegram from Paris, May 4th, announces that the Geographical Society of France have decreed a gold medal to Dr. Hayes, of the United States, for his eminent services in the work of Arctic exploration and discovery. That day the president of the society, with a deputation of members, waited upon General Dix, the American Minister, and presented the medal, requesting him to transmit it to his distinguished countryman, and accompanied the presentation with an earnest aspiration for continued friendship between France and America. General Dix, in reply, thanked the president for his friendly expressions in regard to his country, and said it was a true pleasure for Americans to see France and the United States working together in traditional friendship for the promotion of discovery, science, and general progress.

CHIMNEY SWEEPING EXTRAORDINARY.—The Amsterdam Soot Company, is the name of an association of chimney sweeps in Amsterdam, Holland. The director has the title of "Royal Chimney Engineer." The managing agent is a distinguished advocate. The company have also a set of commissioners designated by the government, comprising an inspector of public works, a great diamond merchant, already president of one industrial association, and an architectural engineer, who is also a manufacturer. The company has for its business the sweeping of chimneys and trade in soot.

SCIENTIFIC EDUCATION.—The Lafayette College, Easton, Pa., has established a scientific department, A. Pardee, of Hazelton, Pa., having generously placed the sum of \$200,000 in the hands of the trustees for that purpose. The department embraces a thorough technical course of study, with an able corps of professors. We are pleased to notice that a number of scholarships have been placed at the disposal of the faculty, for the benefit of young men of talent and good moral character. Application for these scholarships should be made to the President, W. C. Cattell, D. D.

THE manufactures of Baltimore are growing. The Sun of that city says: "In different quarters new establishments are appearing, and the indications are of a steady advancement of Baltimore as a manufacturing city. Baltimore has long been celebrated for the building of locomotives and marine engines, for her machine shops, rolling mills, agricultural implement establishments, and other branches of mechanical production, but there are other manufactures of more recent growth and of considerable importance."

WITH microscope and blowpipe, Mr. Sorby is developing a new method for the examination of minerals. He fuses a small portion (a bead) of the substance to be examined in borax, adds various re-agents according to circumstances, keeps the bead at a dull red heat for a short time, when crystals appear characteristic of the substance, and in some instances singularly beautiful in form. The whole process can be seen and the crystals identified under the microscope.

THERE is no other spoken language so cheap and expressive by telegraph as the English. So the electric wires are becoming teachers of our mother tongue in foreign countries. The same amount of information can be transmitted in fewer English words than French, German, Italian, or any other European language. In Germany and Holland especially, it is coming to be a common thing to see telegrams in English, to save expense and ensure precision.

PROFESSOR NICKELS, of the Faculty of Sciences of Nancy, in France, recently met his death in a very peculiar manner—by accidentally inhaling the vapor of concentrated hydrofluoric acid, while engaged in making experiments to isolate fluorine. Professor Nickles was the author of many valuable published scientific works.

Commissioner of Patents.

Grant is making many judicious appointments, but none more fit and appropriate than that of Col. S. S. Fisher, of Cincinnati, as Commissioner of Patents. Col. Fisher is one of the most able and successful patent attorneys in the country. He is the author of "Fisher's Reports," the only compilation of reports upon patent causes in any language, and he has been occupied exclusively in patent practice for many years. He understands all the ins and outs of the Patent Office; its uses, abuses, and greatest needs; and he will make his administration illustrious by instating the Patent Department upon broader and higher grounds than it ever before occupied.

It should be stated that Col. Fisher did not seek nor desire the office, and is obliged to make very great pecuniary sacrifices in receiving it. In this case, like many others under the present administration, the office sought the man, and we have no hesitation in saying, that it sought and has secured the best man that could be found on the continent.

[We copy the above from the *Sorgo Journal*, published at Cincinnati, the home of Col. Fisher. It fully confirms all that we have said respecting him, and inventors have reason to thank General Grant for his careful consideration of their interests in making this selection.

Flooring Tiles and Slabs made from Slate Refuse.

The immense accumulation of refuse in the slate quarries has induced M. Sebille to convert it into paving tiles and other useful articles. The slate, with a certain proportion of river sand and pitch, all reduced to powder, is heated by steam, then poured into molds of the form required, and then subjected to hydraulic pressure. The tiles or slabs are then cooled in water, and the upper surfaces ground smooth if required. The density of these slate tiles varies between 2.2, and 2.5; they are not readily affected by acid or alkaline solutions, and will bear a temperature of about 160° Fah. without injury. The process is said to be cheap, and the artificial stones produced are harder than the slate from which they are made.

DECISION OF THE COMMISSIONER OF PATENTS ON DESIGN APPLICATIONS.

U. S. PATENT OFFICE, April 20, 1869.

In the matter of the application of Jason Crane for a patent for a design for a fur-set box. On appeal to the Commissioner of Patents.

The applicant designs a paper box, with compartments conveniently arranged for holding each of the articles composing a lady's set of furs. It is neat in appearance, as well as convenient in use, and has commanded a preference in the market over other boxes for that purpose.

It was at first claimed that the new arrangement of the compartments was the proper subject of a general patent. This was denied by the office on the ground that, although skill and good taste had been displayed in designing the article, it did not come up to what might properly be termed "a new invention."

A more limited patent is now asked for, to wit, for the design; and the question is presented, whether the case comes within the statute relating to design patents.

The construction which has been given to that act by the Office, ever since its passage in 1842, is, that it relates to designs for ornament merely; something of an artistic character, as contrasted with those of convenience or utility. It was upon this view of the statute that the application was rejected by the Examiner in charge and, on appeal, by the Board of Examiners-in-Chief. No judicial construction has as yet been given to this part of the act. Considerable reflection upon the subject has satisfied me that the objects and intent of the statute extend beyond the limit assigned to it by the Office. It provides, among other things, that any citizen, "who, by his industry, genius, effort, and expense, may have invented or discovered, in any new and original design, form, configuration or arrangement of a manufactured article, it comes within the provisions and objects of the Act creating design patents, whatever be its nature, and whether made for ornament merely or intended to promote convenience and utility."

The line of distinction between what is useful and what is merely ornamental, in some cases, is very indefinite. By some it is said that any form or design that is most useful is also most pleasing.

It would be impossible, in the view of such persons, to make any improvement in utility that did not at the same time add to the ornamental and artistic.

I can perceive no necessity for the distinction. There is a large class of improvements in manufactured articles that are not regarded as new inventions or as coming within the scope of general patent laws. They add to the market value and salability of such articles, and often result from the exercise of much labor, genius, and expense. They promote the best interests of the country as well as the creations of inventive talent. It seems to me to have been the intent of Congress to extend to all such cases a limited protection and encouragement.

Whenever there shall be produced by exercise of industry, genius, effort, and expense, any new and original design, form, configuration or arrangement of a manufactured article, it comes within the provisions and objects of the Act creating design patents, whatever be its nature, and whether made for ornament merely or intended to promote convenience and utility.

The construction given to the statute by the Board of Appeals seems to me to be erroneous, and I accordingly overrule their decision.

ELISHA FOOTE, Commissioner.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Improved systems of extraction by the use of steam power appears to have exercised a beneficial influence on the mining industry of Prussia. In 1837 there were 1,587 mines worked in Prussia, giving employment to 23 161 miners. In 1867 this number had increased to 2,452, with 43,351 miners. The total value of the mineral production, which in 1837 was 838,982, in 1867 amounted to upwards of 8,568,000.

Jay Gould has notified the Postmaster General that unless the Department increases the pay for the Erie railroad service from \$150,000 to \$380,000, he shall refuse to carry the mails. The Postmaster General has informed Mr. Gould that this exorbitant demand cannot be acceded to. The pay now received by the company is the same per mile per annum as received by the Central and other roads.

A writer in *Heart and Home* has found the best way to take starch out of bleached goods to be as follows: "Make strong soap suds, and dip the goods in it, and hang them out to dry without wringing. They will be perfectly soft and free from starch, and nice to work either by hand or machine."

A railroad route has been surveyed from Pittsfield, Mass., to Hartland and thence to St. Albans, Vt., about two miles beyond Hartland. The route is very level, and it is estimated the road could be built for \$16,000 a mile. The legislature has authorized the towns of Hartland and St. Albans to loan their credit for twenty per cent of their valuation, in aid of the enterprise.

It is stated that the committee of the New Orleans Chamber of Commerce invite proposals for deepening the water at the mouth of the Mississippi. The committee are also instructed to endeavor to obtain from the Government the dredge boat now in use, with the balance of the appropriation yet unexpended, for deepening the passes.

A railroad tie, of polished California laurel, mounted on each end with solid silver, accompanied by a spike of solid gold, costing \$300, was forwarded from San Francisco, on May 4, to the end of the Central Pacific Railroad. It is the last tie, and was to be laid by Leland Sanford, on Saturday, May 8, thus completing the Pacific Railroad.

The *Vancouver Register* says that an extensive coal bed has been discovered on the east fork of Lewis River, twenty miles from Vancouver. The vein is fourteen inches thick and seven feet in width.

A large amount of lumber and iron ore will be landed at Michigan City, Iowa, this season. One contract is for 7,000 tons of ore; and firms in Lafayette have contracted for the delivery of 4,000,000 feet of lumber and 3,000,000 shingles and lath.

A company has been organized, with the capital subscribed, to construct a telegraph line from St. Louis, through Texas, to the Pacific coast. Some of the parties were recently in Washington to perfect the arrangements.

At the Royal Bronze Foundry, at Munich, Bavaria, among other works in progress is Rogers' monument for the soldiers of Rhode Island, which, by the contract has to be finished and delivered at Providence about a year from this time.

The Commissioner of Internal Revenue has decided that the conditions printed on blanks for telegraphic messages are in the nature of an agreement and must have a five cent stamp.

In 1848 there were 4 247 patents in force in England. In 1868 the number had increased to 11,369, including 11 "prolongations."

Boston firms send about 17,000 casks of nails a month for building purposes all over the country, and dispose of nearly 2,000 each month at home.

In 1861, the boot and shoe manufacture of Baltimore amounted to only 500 pairs weekly; now, over 16,000 pairs are made in the same time, and the business is still increasing.

The iron foundries of Troy, N. Y., are all running on full time and employ an unusually large number of men.

Several locomotives were shipped lately from Paterson, N. J., for Minnesota and other Western roads.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

- 351.—TRACTION RAILWAY.—Wm. A. Sutton, New York city, and Eugene Crowell, San Francisco, Cal. Feb. 4, 1869.
- 751.—ATTACHMENT FOR ADJUSTING CORDS FOR HANGING PICTURES, ETC.—R. G. Heurouse, San Francisco, Cal. March 11, 1869.
- 844.—WATERPROOF OVERSHOES.—A. O. Bourn, Providence, R. I. March 19, 1869.
- 856.—APPARATUS FOR MEASURING LIQUIDS.—G. B. Massey, New York city, March 20, 1869.
- 904.—MACHINERY FOR FOLDING PAPER.—S. C. Forsyth, Manchester, N.H. March 25, 1869.
- 915.—MACHINERY FOR PRESSING OIL, TOBACCO, ETC.—Enoch Thomas, Craigville, and R. C. Walker and S. R. Hudson, Parassus, Va. March 25, 1869.
- 919.—ELECTRIC CLOCK.—S. A. Kennedy, Attleborough, Pa. March 25, 1869.
- 940.—BLOWING APPARATUS.—B. F. Sturtevant, West Roxbury, Mass. March 29, 1869.
- 911.—HORSESHOE NAILS, AND IN MACHINERY EMPLOYED IN SUCH MANUFACTURE.—S. E. Chase, Boston, Mass. March 29, 1869.
- 841.—WEIGHING SCALES.—Peter Falardo, Danbury, Conn. March 19, 1869.
- 843.—MOTIVE POWER FOR SEWING AND OTHER MACHINES.—Jacob Zuckerman, San Francisco, Cal. March 19, 1869.
- 827.—MOTIVE POWER ENGINES.—J. E. Culver, Hudson, N. J. March 20, 1869.

- 859.—HAY-TREDDING MACHINE.—L. H. Tasker, Boston, Mass. March 22, 1869.
- 873.—CHAIR.—J. E. Emerson, Trenton, N. J. March 22, 1869.
- 875.—MACHINERY FOR RUBBING AND MIXING PAINTS, ETC.—Robert Poole, Baltimore, Md. March 22, 1869.
- 877.—MACHINERY FOR MAKING MATCH SPLINTS, ETC.—F. de Bowens Philadelphia, Pa. March 23, 1869.
- 888.—HEATING OF CARRIAGES, VESSELS, BUILDINGS, ETC.—W. L. Burton Richmond, Va. March 24, 1869.
- 896.—MECHANISM FOR WORKING ORDNANCE.—J. B. Eads, St. Louis, Mo. March 24, 1869.
- 912.—MACHINERY FOR TILLING LAND.—R. W. Heywood, Baltimore, Md. March 25, 1869.
- 933.—PROCESSES AND APPARATUS FOR EXTRACTING OLEAGINOUS MATTER FROM VEGETABLE, ANIMAL, OR MINERAL SUBSTANCES, IN THE PREPARATION OF MATERIAL FOR DISTILLATION, ETC.—Thomas Sim and E. S. Hutchinon, Baltimore, Md. March 27, 1869.
- 937.—BRECH-LOADING FIREARMS AND CARTRIDGES THEREFOR.—Gustav Bloem, Dusseldorf, Prussia, and Ernest Scheidt, New York city. March 29, 1869.
- 944.—STEREOSCOPE.—J. F. Adams, New York city. March 29, 1869.
- 946.—SEWING MACHINE.—J. A. House and H. A. House, Bridgeport, Conn. March 30, 1869.
- 956.—DISTILLING HYDROCARBON OILS.—Henry Grogan, Flatbush, N. Y. March 30, 1869.
- 957.—SEWING MACHINE TABLE.—Singer Manufacturing Co. (Incorporated), New York city. March 30, 1869.
- 931.—ENGRAVING AND CHASING ARTICLES OF METAL.—Thomas Lipplatt, Orange, N. J. April 1, 1869.
- 920.—HAT.—Henry Herbert, Jersey City, N. J. April 1, 1869.
- 1,004.—COAL AND GRAIN BOAT ELEVATOR.—S. K. Hoxale, Philadelphia, Pa. April 2, 1869.
- 1,017.—BRECH-LOADING FIREARM.—Everett Boyd and P. S. Tyler, Boston, Mass. April 3, 1869.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

Wanted—Circulars and price lists of all goods kept by Hardware Merchants. Also, Tin and Stoves. J. J. Richards, Canton, Miss.

For Sale—Patent Office Reports from 1850 to 1866—\$55. Address A. Blum, 638 E. 9th st., New York.

To cure cuts, bruises, and burns, send 25 cents to the Liquid Court Plaster Co., Room B, 87 Park Row, New York.

For fifty cents, we mail, prepaid, a combined ruler, blotter, and paper cutter, indorsed as excellent by Mann & Co. Address Caleb Jones, Box 6, 721, New York Postoffice.

Saw Mills can find a steady purchaser for "Cheap" oak, elm, etc., sawed into shape, by addressing Box 6, 721, New York Postoffice.

Johnson's Adjustable Hangers for shafting. Diploma awarded by the American Institute. Shop rights twenty-five dollars. Pattern castings 6 cents per lb. Address Wm. Cowin, Lambertville, N. J.

The Tanite Emery Wheel—see advertisement on inside page.

An English machine-making firm is open to make arrangements to manufacture and introduce in England any good American invention. Satisfactory references given. Address Box 1238 Postoffice, N. Y.

Henry W. Bulkley, Mechanical Engineer, 70 Broadway, New York, intending soon to visit England, etc., will attend to professional business requiring an agent abroad.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Ct.

To let, with or without steam power, two well-lighted rooms, suitable for manufacturing. Rent low, 163 Christopher st., New York.

Wanted—A competent electro silver-plater. Address, with reference, Postoffice Box 887, Cincinnati, Ohio.

A complete set of Blanchard Plow-handle Machinery, consisting of lathe, bender with 40 forms, and finishing machine. Has been used but a short time, and is in good order. Address S. N. Brown & Co., Dayton, O.

Builders, and all who contemplate making improvements in buildings, can save time and money by addressing A. J. Bicknell & Co. Publishers, Troy, N. Y., or Springfield, Ill.

For sale at a bargain—a complete barrel factory, nearly new. Address Hartmann, Laist & Co., Cincinnati, Ohio.

Pickering's Velocipede, 144 Greene st., New York.

\$1 per year.—Inventors and Manufacturer's Gazette. The cheapest, best, and most popular journal of the kind published. Send stamp for specimen copy. Saldiel & Co., Publishers, P. O. box 448, or 87 Park Row, New York.

Machine for bending fellies—Patent for sale—the whole, or State Rights. Address DeLyon & Werner, Canton, Miss.

Diamond carbon, formed into wedge or other shapes for pointing and edging tools or cutters for drilling and working stone, etc. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

The Tanite Emery Wheel.—For circulars of this superior wheel, address "Tanite Co.," Stroudsburg, Pa.

The manufacture and introduction of sheet and cast metal small wares is made a specialty by J. H. White, Newark, N. J.

The Magic Comb will color gray hair a permanent black or brown. Sent by mail for \$1.25. Address Wm. Patton, Treasurer Magic Comb Co., Springfield, Mass.

For coppered iron castings address J. H. White, Newark, N. J.

W. J. T.—We think the patent asbestos roofing manufactured by H. W. Johns, of this city, is the best substitute for tin or slate. It cheap and easily applied.

Tempered steel spiral springs. John Chatillon, 91 and 98 Cliff st., New York.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Machinists, boiler makers, tanners, and workers of sheet metals read advertisement of Parker's Power Presses.

Mill-stone dressing diamond machine, simple, effective, durable. Also, Glazier's diamonds. John Dickinson, 64 Nassau st., New York.

Water-wheel Patents, Nos. 24,435 and 27,673 for sale. Price \$1,000. The "first" that used an adjustable diaphragm in wheel and guide. R. Ross, Middlebury, Vt.

Mortising Machines—Two second-hand Lane & Bodley hub-mortising machines, wood column. Will be sold cheap. Address S. N. Brown & Co., Dayton, Ohio.

Winans' boiler powder, N. Y., removes and prevents incrustations without injury or foaming; 12 years in use. Beware of imitations.

The paper that meets the eye of all the leading manufacturers throughout the United States—The Boston Bulletin. \$4 00 a year.

NEW PUBLICATIONS.

A HANDY BOOK FOR THE CALCULATION OF STRAINS IN GIRDERS AND SIMILAR STRUCTURES, AND THEIR STRENGTH. Consisting of Formulas and Corresponding Diagrams, with numerous Details for Practical Application, etc., etc. By William Humber, Assoc. Inst., C. E., author of "A Practical Treatise on Cast and Wrought-Iron Bridge Construction," etc., etc. New York: D. Van Nostrand, Publisher, Nos. 23 Murray and 27 Warren streets.

The scope of this work is to give, in a concise and convenient form, formulas for bridge and girder calculations, without giving more than is absolutely necessary for the complete solution of practical problems. A prominent feature of the work is the extensive application of simple diagrams to such calculations, involving only the use of the parabola and right lines. The work is a small octavo, and very conveniently arranged for reference, with numerous illustrations of joints for timber and iron structures, various sections of girders, etc., etc. We have not found time to examine minutely the various formulas given, but the work is undoubtedly a valuable publication.

TRANSACTIONS OF THE WISCONSIN STATE AGRICULTURAL SOCIETY. With the Report of the State Horticultural Society and Condensed Reports on the International Exhibitions of 1862 and 1867. Vol. VII., from 1861 to 1868, inclusive. Prepared by J. W. Hoyt, Secretary.

We are in receipt of the above volume by the courtesy of Secretary Hoyt, and find therein much interesting matter, some extracts from which we will, in good time, lay before our readers.

PRIMEVAL MAN. An Examination of some Recent Speculations. By the Duke of Argyll. George Routledge & Sons, No. 416 Broome street, New York city.

The author of this work is doubtless one of the ablest thinkers in Europe, and he has already given practical evidence of his ability in book making by the publication of a work on "The Reign of Law," which has received the commendation of the English press. The present work discusses the origin and antiquity of man and his primeval condition, reviewing the opinion of Sir J. Lubbock upon "The Early condition of Mankind," and Archbishop Whately's "Origin of Civilization." It therefore has to deal with questions which touch upon the profoundest problems of our nature and of our history, and is altogether a very interesting and instructive work, one that all may read with profit. Price, \$1.50.

We have received from the American Tube Works, Boston, Mass., a very neat specimen of advertising in the shape of a pocket-book, containing mechanical tables of value and other statistical matter, and entitled "Pocket Companion for Mechanics, Machinists, and Engineers." It is bound in morocco, with pockets for bills and papers, and is a very neat and useful article.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

A. H. C., of—wishes to know the amount of bituminous coal usually consumed in heating one ton of nail plate, we suppose he means during the cutting process; can any of our correspondents give the information?

J. E. B., of Mass.—Congress adopted the meter as a standard of measurement, July 27, 1866.

D. B., of Ca.—The substance used for gumming stamps is gum dextrine. It is applied like other similar substances.

L. V. B., of N. C.—The best thing to remove rust from needles is the common method of scouring them, by sticking them repeatedly in a small bag of fine emery.

G. B. F., of M. T.—We were well aware of the fact that Stringfellow exhibited a small engine at the Aeronautical Society's Exhibition in London, as we noticed it in the SCIENTIFIC AMERICAN, at the time; but no such engines can be obtained at the present time. The journal to which you refer is in the habit of taking our replies to correspondents and publishing them as its own.

E. R., of N. C.—There is no machinery in use operating upon the clock principle, that is capable of driving a watchmakers lathe. A small, cheap, and efficient power is much wanted for light work.

APPLICATIONS FOR THE EXTENSION OF PATENTS.

MACHINE FOR ENGRAVING CALICO PRINTERS' ROLLS.—John Hope and Thomas Hope, of Providence, R. I., has applied for an extension of the above patent. Day of hearing, Aug. 2, 1869.

SEWING MACHINES.—James Harrison, of Jamestown, N. Y., executor of the Estate of James Harrison, Jr., deceased, has applied for an extension of the above patent. Day of hearing July 12, 1869.

STRAW CUTTERS.—D. C. Cumings, of Smithville, N. J., has petitioned for the extension of the above patent. Day of hearing, July 19, 1869.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

BRAKE AND HORSE HOLDER.—G. B. Douglas, Sedalia, Mo.—This invention has for its object to furnish an improved brake, which shall be so constructed and arranged as to be self-locking, and at the same time serve as a horse holder for checking the horses should they start when left alone.

SLED RUNNER.—G. W. Hatch, Parkman, Ohio.—This invention has for its object to furnish an improved sled or sleigh runner, which shall be cheaper in construction, stronger, and more durable than the runners constructed in the ordinary manner.

CHURNING APPARATUS.—S. S. Allen, Belvidere, N. Y.—This invention has for its object to furnish an improved apparatus for operating a churn, which shall be so constructed and arranged as to do its work quickly and thoroughly, bringing the butter in a very short time.

LOG CARRIER.—Calvin Taylor, Handsborough, Miss.—This invention has for its object to furnish an improved machine for carrying logs, which shall be so constructed and arranged that a much greater amount of timber may be carried with the same team than can be carried in any of the ordinary modes.

HEATER.—Michael Lehmer, Oregon, Mo.—This invention has for its object to furnish an improved heater, which shall be so constructed and arranged as to furnish a large amount of heating surface, so as to utilize all the heat from the products of combustion before they pass off into the chimney.

FIRE GRATE.—George Williamson, Milwaukee, Wis.—This invention has for its object to improve the construction of fire grates, in such a way that when the grate is agitated, the ashes may be shaken down from above the entire surface of the grate, instead of being displaced only around the edges of the grate, as is the case with grates constructed in the ordinary manner.

VALVE GEAR FOR HYDRAULIC PRESSES.—Thomas Harbottle, Brooklyn, N. Y.—The object of this invention is to obtain a simple, and effective automatic valve gear for hydraulic presses, whereby the check valves will close instantly and automatically at the end of each stroke of the pump, and each of the relief valves will duly perform their respective functions without affecting the operation of the other check valves or relief valves connected with the same pump but different presses.

LAMP.—Solomon P. Smith, Waterford, N. Y.—The object of this invention is to provide for public use, a lamp in which a blast of air is supplied to intensify combustion, the parts which create and sustain the blast being so constructed as to operate without any of that disagreeable rattling and clattering that has heretofore prevented lamps constructed on the blast principle from coming into general use.

VELOCIPED.—Hiram T. Metzgar, Salem Cross Roads, Pa.—In this invention a novel method of propelling velocipedes is introduced, and the several parts are adapted to practical operation in connection therewith.

HORSE HAY FORK.—Samuel T. Nigh, Leitersburg, Md.—This invention consists in combining with the two tines of a horse hay fork, a certain elastic curved box, and a certain central key rod, in such manner as that the tines may be locked when spread apart to their fullest extent, so as that one may serve as a handle for forcing the other into the hay.

HORSE HAY RAKE.—Solomon Smith, Waterford, N. Y.—This invention relates to that class of horse hay rakes, in which wooden teeth are employed, and its object is to construct the rake in such a manner as to render it more perfectly adjustable to the inequalities of the ground and the character of the work than heretofore.

MULE SAW MILL.—L. Morrison and A. G. Harms, Allegheny City, Pa.—This invention relates to certain improvements in the manner of hanging and adjusting reciprocating saws, so that the same will operate and be regulated with ease and without any difficulty. The invention consists in providing for a lateral adjustment of the upper saw guides for the purpose of giving the saw more or less throw; also, in making the wrist on the lower saw buckle adjustable more or less far apart from the lower saw pivot.

BUCKLE.—F. C. Richer, Gilmer, Texas.—This invention relates to a new buckle, which does not require to be sewed to either of the straps which it is to connect, and which will securely fasten and hold the said straps or bands in any desired position. The invention consists in the use of a buckle which has four transverse slots, with teeth on the inner cross bars, and in providing a buckle with slotted end bars, that is to say, with horizontal apertures through the ends, through which the strap to be held is passed.

METHOD OF PRODUCING FROM PRINTED PAPER NEW PLATES FOR RE-PRINTING.—Charles Vogt and Christian Vogt, New York city.—The object of this invention is to devise a method for producing printing plates from printed paper, so that by means of such blocks, or plates, the design on the paper can be reproduced or reprinted on other paper or fabric. By this method, old, valuable, and difficult engravings, can, from single specimens, be transferred to metal plates and be copied with great accuracy. A new branch of industry will thus be established and the productions of renowned artists will become accessible to all.

DOUGH ROLLING MACHINE.—H. Goodwin and C. H. Bennett, 2d, South Berwick, Me.—This invention relates to improvements in apparatus for rolling dough into thin sheets for pie crust, and also laying it upon the tops of a pie or in a vessel, as may be required.

ENVELOPE OPENER.—W. H. Mantz, Centralia, Ill.—This invention relates to a new instrument for opening envelopes and for removing letters therefrom. The invention consists of three plates, united by a common pivot, the two outer plates being farthermore connected by rivet or otherwise so that they cannot turn separately on the pivot, while the middle plate which carries the cutter can be swung out to allow the sharpening of the tool. The outer plates may be extended beyond the cutting plate to form a pair of clamps for grasping a letter and withdrawing it from an opened envelope.

MONKEY WRENCH.—F. C. Richer, Gilmer, Texas.—This invention relates to a new monkey wrench, which is operated by turning the handle, and has for its object to arrange as few parts in as simple a manner as possible, so that the device will be substantial and not apt to get out of repair. The invention consists chiefly in swivelling the handle to the axis of the lower jaw, and in screwing it upon the screw shank of the upper jaw so that it will, when turned, cause the lower jaw to move longitudinally in the desired direction. The shank and body of the lower jaw are hollow and fit upon the polygonal upper part of the upper jaw shank, so that they cannot turn with the handle, but merely move longitudinally.

BRICK MACHINES.—Aaa Morgan, Cedar Bayou, Texas.—This invention relates to improvements in brick machines, whereby it is designed to provide a simple and effective machine that can be constructed cheaply. It consists mainly in the arrangement of the presses and the slide for delivering the filled molds, and the means of operating them.

LOOMS.—Wm. Rosseter, Accrington, England.—The object of this invention is to provide an improved arrangement of means for changing self-actingly the shuttle in which the web is broken or absent for another shuttle with the web ready for weaving without stopping the loom.

BEHIVE.—R. P. Starbuck, Gallatin, Mo.—This invention consists in making the separate frames, with which the interior of a beehive is sometimes provided for the attachment of single combs, with zinc sides, for the purpose of keeping the combs cool; also, in providing the entrance with a protector for the purpose of excluding drones, and arranging swinging outlets in said protector for the purpose of letting drones out that may have gained access; also in a peculiar construction of moth traps; and also in inclining the bottom of the main compartment and providing it with an orifice covered with a wire screen through which the litter of the hive may escape.

MILL BUSHES AND SPINDLES.—John Williams, Sullivan, Ill.—This invention relates to improvements in mill bushes and spindles having for their object to provide an improved arrangement for tightening and lubricating the bearing surfaces of the spindle and the boxes.

BEARINGS FOR VERTICAL SHAFTS.—E. A. Dayton, Richmond, Va.—This invention relates to improvements in bearings for vertical shafts, designed to be applied either as steps for the ends of the shafts, or intermediate bearings, which said bearings are especially adapted to facilitate the lubrication of the shafts.

CHURN DASHERS.—Jas. M. Buchanan, Lawrenceville, Ill.—This invention relates to improvements in churn dashers, such as are used with the common hand-dasher churns, and consists in the construction of the same, in a manner calculated to produce greater agitation of the cream.

FEED-CUTTING ATTACHMENT FOR THRASHING MACHINES.—G. W. Lee, Sandy, Ohio.—This invention relates to improvements in feed cutting apparatus, designed to provide a simple, cheap, and effective apparatus adapted for attachment to thrashing machines, and operated in combination therewith, in a manner to accomplish the work faster and in a better manner than can be done by cutting apparatus now in use.

SADRON.—Mrs. Julie Dietrich, Hoboken, N. J.—The object of this invention is to construct a sadron with a handle that can be readily removed, and with a shield by which the heat ascending from the iron is deflected away from the hand of the person using it. The invention consists in a novel manner of arranging a removable handle on the supports that project from the iron, and also in a novel method of suspending the shield from the said removable handle.

UTERINE SUPPORTER.—E. J. Fraser, M. D., Erie, Pa.—This invention consists in forming and applying a bell-shaped metallic ring, with supporting bows attached thereto, which ring is inserted and placed so that the base of the uterus is supported by, and rests within the ring.

ROTARY STEAM ENGINE.—Alpheus C. Gallahue, Morrisania, N. Y.—This invention consists in so constructing and arranging the parts that a continuous action of the steam upon the piston is obtained, and a uniform rotary motion is produced on the main shaft.

SPITTOON FOOTSTOOL.—John N. Morrison, Philadelphia, Pa.—This invention consists in forming a footstool with a hinged cover, and so as to inclose a spittoon.

CIRCULAR VELOCIPED.—George J. Sturdy and Solomon W. Young, Providence, R. I.—This invention relates to a new and useful improvement in velocipedes, whereby they are reduced to their proper and legitimate function—that is, a medium of amusement and exercise for children and youths as well as for "children of a larger growth," adapting it for play grounds, lawns, gardens, and play rooms.

AUTOMATIC COOK FOR FILLING BOTTLES.—E. Jeanjaquet, New York city.—This invention relates to a new and useful improvement in the method of filling bottles, or other vessels, from barrels, pipes, hogsheads, or other closed vessels, whereby the operation of drawing off the liquid contents of such barrels or vessels into bottles or other vessels is greatly facilitated.

SUBMERGED FORCE PUMP.—James H. Luddington, Bridgeport, Conn.—This invention relates to new and useful improvements in force pumps, which are operated when submerged in the water, as in wells and cisterns.

VELOCIPED.—John C. Smith, Brooklyn, N. Y.—This invention relates to a new and important improvement in the method of operating velocipedes, whereby they are propelled with greater ease, and whereby the limbs and muscles of the body are more generally brought into action than by any velocipede now in use.

MILKING STOOL.—Chas. F. Pollack and Nicholas Trickey, Theresa, N. Y.—The object of this invention is to provide a milking stool, which affords the means for holding the milk pail, and also for holding the tail of the cow so as to prevent the animal from annoying the person milking, by switching the tail.

REGULATING MAST HOOPS ON VESSELS.—Joseph Conway, Harrison, Md.—The object of this invention is to provide a cheap and simple device, which will prevent mast hoops from catching on the mast, and which will, by causing the hoops to slide smoothly up and down, greatly diminish the labor required to hoist and take in sail in fore-and-aft rigged vessels.

PIANOFORTE.—Daniel Stirn, Milwaukee, Wis.—In this invention a new form of sounding board and cast-iron frame, and a new arrangement of the sounding board with relation to the cast-iron frame, the strings, and the supports and fastenings for the latter, are employed for the purpose of giving greater volume, purity, sweetness, and brilliancy to the tone.

GAS GENERATOR.—Josiah Jonson, Toledo, Ohio.—The object of this invention is to provide for public use a cheap, convenient, and substantial carburetor, the action of which can be so adjusted and controlled as to present a greater or less carburating surface to the air, whereby the latter can be combined with any required proportion of inflammable vapor without changing the draft or quantity of air.

PAINT BRUSHES.—F. P. Furnald, Jr., New York city, R. W. Champion, Brooklyn, N. Y., and I. N. Davies, Bergen City, N. J.—The object of this invention is to provide a more durable and economical connection of the handles and bushes of paint and other similar brushes than is afforded by the present construction.

HAY ELEVATING APPARATUS.—O. E. Mable, Camden, N. Y.—This invention relates to improvements in hoisting apparatus for elevating hay and delivering it on to the bay, and consists of a tackle block, so formed that when the fork in its upward movement arrives at the said block from which it is suspended, the latter will become detached from its suspending device and permit the load to fall in a lateral direction upon the bay.

CULTIVATOR.—J. M. Culver, Gilbertville, Iowa.—This invention relates to improvements in cultivators, the object of which is to provide a light hand implement for garden use.

SCREW PROPELLERS.—Henrietta Vansittart, Richmond, England.—The object of this invention is to economize the power required in driving steam propellers for ships, or other vessels. This is effected by so modifying the form of the blades of screw propellers, as to cause them to act more effectively on the water and to prevent them from "churning" or uselessly stirring the water near the center of motion. The invention consists in an improved mode of determining the proper curvature of the blades, and of forming the said curves.

STARTING AND STOPPING CARS.—G. W. Davis and Albert E. Smith, Providence, R. I.—The object of this invention is to provide a simple and effective means for stopping and starting railroad cars. It is designed more particularly for street cars, but the stopping device is also applicable to steam cars.

NECK PAD FOR HORSES.—C. J. Fisher, Waukon, Iowa.—This invention relates to a new device for protecting the necks of horses between the upper ends of the collar, to prevent galling. For this purpose pieces of leather, cloth, or other material have heretofore been used, but without the desired success. Pads could not be made, as their inner faces could not be kept clear from wrinkles or protuberances, which are more injurious than the omission of a protecting device.

Official List of Patents.

Issued by the United States Patent Office.

FOR THE WEEK ENDING MAY 4, 1869.

Reported Officially for the Scientific American.

SCHEDULE OF PATENT OFFICE FEES: Oneach caveat..... \$10 On filing each application for a Patent (seventeen years)..... \$15 On issuing each original Patent..... \$20 On appeal to Commissioner of Patents..... \$20 On application for Reissue..... \$30 On application for Extension of Patent..... \$50 On granting the Extension..... \$50 On filing a Disclaimer..... \$10 On an application for Design (three and a half years)..... \$10 On an application for Design (seven years)..... \$15 On an application for Design (fourteen years)..... \$20 In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay \$500 on application.

For copy of Claim of any Patent issued within 30 years..... \$1 A sketch from the model or drawing, relating to such portion of a machine as the Claim covers, from..... \$1 upward, but usually at the price above named. The full Specification of any patent issued since Nov. 30, 1866, at which time the Patent Office commenced printing them..... \$1.25 Official Copies of Drawings of any patent issued since 1836, we can supply at a reasonable cost, the price depending upon the amount of labor involved and the number of views. Full information, as to price of drawings, in each case, may be had by addressing MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

- 89,546.—CORN HARVESTER.—B. F. Barney, Pontiac, Ill.
89,547.—POTATO DIGGER.—L. L. Bettys, Ontario, N. Y.
89,548.—SPINDLE STEP FOR SPINNING MACHINES.—E. Blakc, Chicopee Falls, Mass.
89,549.—HOT-AIR FURNACE.—Nathaniel A. Boynton, New York city.
89,550.—CORN SHELLER.—John Bowles, Augusta, Ga.
89,551.—MOUSE TRAP.—J. N. Bunnell, Unionville, Conn.
89,552.—BOOT-BLACKING MACHINE.—Martin Burnell, Arundel, England.
89,553.—ROPE GUIDE FOR WINDOW WEIGHTS.—Edward Burnham, Framingham, Mass.
89,554.—SNOW PLOW.—Robert Bustin (assignor to himself, J. D. McDonald, and George Bedell), St. John, New Brunswick.
89,555.—HORSE RAKE.—Joseph Bohner, Alden, N. Y.
89,556.—MACHINERY FOR PLANING.—John Casson, Sheffield Parish, England.
89,557.—BLIND STOP.—W. A. Caswell, Providence, R. I.
89,558.—TIRE MACHINE.—J. W. Cleveland, North Tunbridge, Vt.
89,559.—SAW TEETH.—Edward Colson (assignor to himself and C. B. Oakley), Fort Wayne, Ind.
89,560.—CHEESE-HOOP FOLLOWER.—Howell Cooper, Watertown, N. Y.
89,561.—WEFT-STOP MECHANISM IN LOOMS.—J. D. Cottrell, Hopedale, Mass.
89,562.—MEDICAL COMPOUND.—J. D. Curl and J. D. Bartlett, Mokena, Ill.
89,563.—CARTRIDGE.—G. H. Daw, London, England.
89,564.—FASTENING HANDLES TO TOOLS.—J. M. De Witt Chicago, Ill.

89,565.—PLOW.—J. M. Dornon, Claiborne Parish, La.
89,566.—AUTOMATIC FAN.—J. R. Dunn, Queens county, and G. B. Burroughs, Broo...

89,658.—SLEIGH RUNNER.—G. W. Hatch, Parkman, Ohio.
89,659.—NUT-LOCK FOR FISH PLATES.—J. W. Hazelton and A. A. Southard, Drayton Plains, and Oliver Merwin, Elba, Mich.

89,749.—DISTILLING APPARATUS.—Charles Louis Fleischmann, Washington, D. C.
89,750.—PROCESS OF EXTRACTING OIL FROM COTTON SEEDS.—Charles Louis Fleischmann, Washington, D. C.

89,839.—JOURNAL BOX.—Rufus Sibley, Greenville, Conn.

REISSUES.

- 85,983.—MACHINE FOR HEADING BOLTS.—Dated January 19, 1869; reissue 3,414.—J. R. Abbe, Providence, R. I.

DESIGNS.

- 3,469.—LID OF A WRITING DESK.—B. I. Beck, Brooklyn, N. Y.

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Table with 2 columns: Fee Item and Amount. Includes items like On each Caveat, On filing each application for a Patent, On appeal to Commissioner of Patents, etc.

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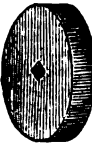
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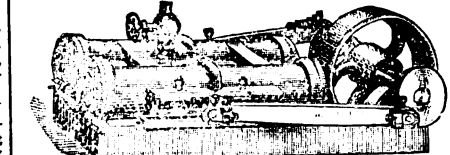
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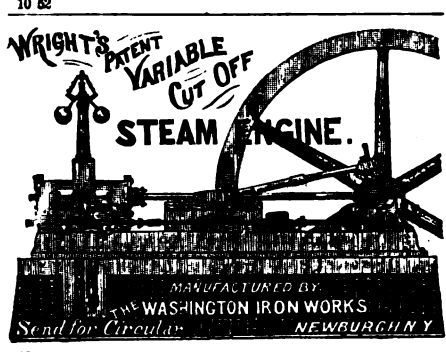
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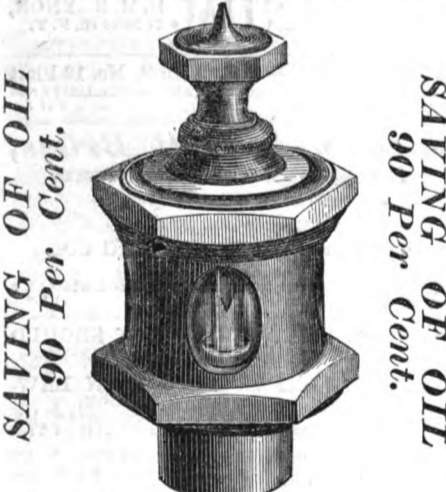
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