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Saltpeter is King.

The British Government has officially prohibited the exportation of saltpeter from the East India Company's territories to any other ports than Liverpool and London. The Government has also ordered all vessels that were loading in England with saltpeter and nitrate of soda for the United States to discharge the same. The ship *Catharine*, of New York, Captain Edmunds, which was loading at London for Boston, had been ordered by government to be discharged of the saltpeter on board.—These actions of the British Government afford some evidence that saltpeter can explode, that is when properly mixed with charcoal and sulphur, forming that compound called "gunpowder." Were the supply of saltpeter suddenly stopped it would very soon *explode* the war in the Crimea; take saltpeter on any side, *it will explode.*

Owing to the scarcity of saltpeter in the country, our powder mills, we understand, are not able to run full time, and some of them are about to stop. As we receive all our supply of this useful article from abroad, and are therefore dependent on other countries, it would be no more than an act of wisdom to offer rewards for the discovery of deposits of it at home; or the discovery of a substitute for it to be used in making gunpowder.

Improvement in the Telegraph.

Hon. Amos Kendall, in a letter to the *Union* (Washington,) states that the most serious obstacles to telegraphing operations is *imperfect lines.* He says:—

"Telegraphing by electricity is yet a new art, and to me it is rather a wonder that so much has been accomplished than that there are defects yet to be remedied. Nobody at first, and few still, appreciate the importance of great strength in the posts and conductors. With sufficient strength there, and a perfect insulation, we should, with Morse's apparatus, have the means of making as perfect a telegraph as the world will probably ever see.—Improved lines, and not new instruments, are what we need. Improvement in every other respect would follow.

The line of the Washington and New Orleans telegraph was built, under my direction, by Mr. William H. Heiss, Superintendent, and is of unusual strength, with an improved insulation. The working of a line 171 miles long, with a main battery of one cup only at each end, is believed to be wholly unprecedented. Yet this has been done on this line."

The Gasconade Bridge Disaster.

The Committee appointed by the citizens of St. Louis to investigate the affair of the bridge over the Gasconade river, on the Pacific Railroad, breaking and destroying so many lives, have reported that it was caused by the speed at which the train was going, the bridge being unable to sustain loaded trains running at more than five miles per hour. One of the Committee, Henry Kosier, presented a minority report declaring that the bridge was totally incapable of bearing even its own weight.

What a trifling there was in this instance with human life. But who is to blame? Nobody, we suppose.

PATENT SELF-REGULATING WINDMILL.

Fig. 1

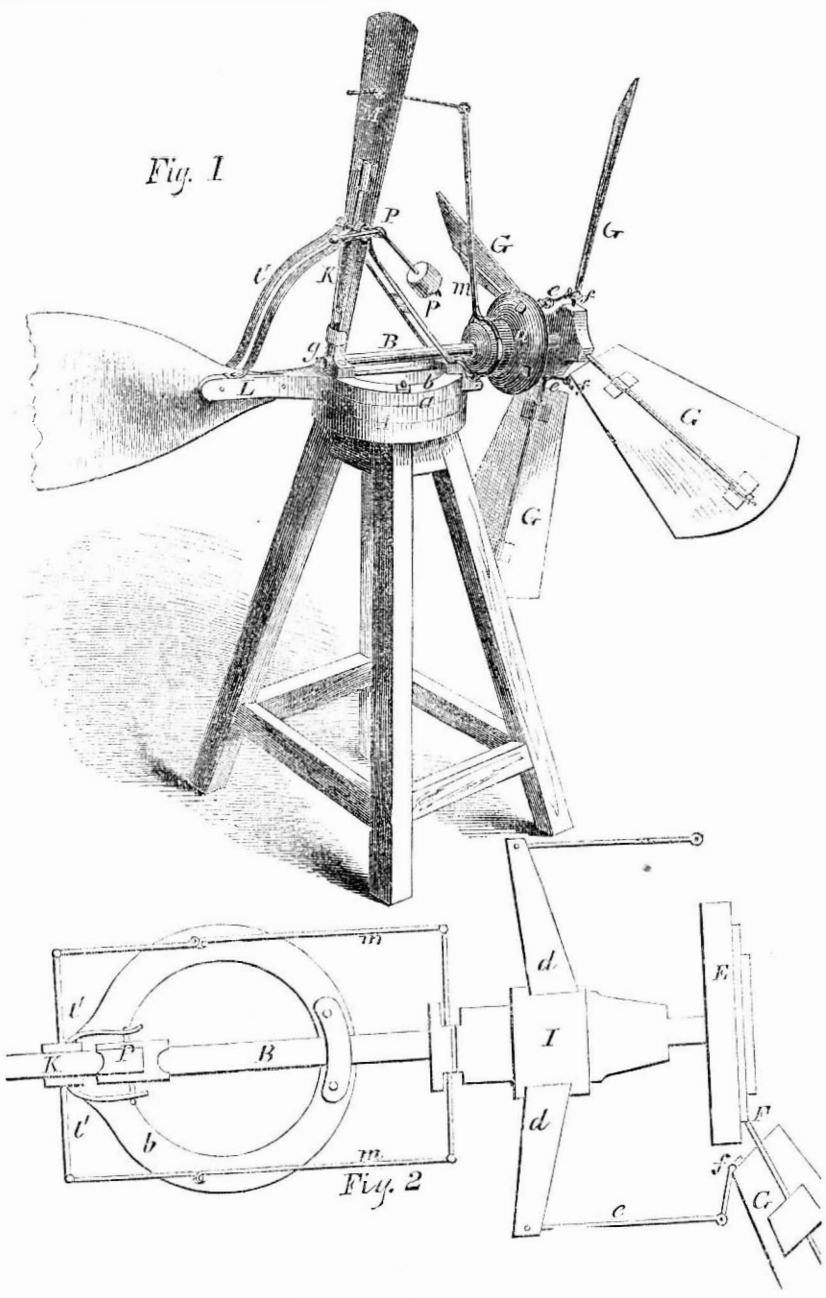


Fig. 2

The accompanying engravings are views of a Self-regulating Windmill, for which a patent was granted, on the 10th of last July, to Benj. Frantz.

Fig. 1 is a perspective view, and fig. 2 is a top linear view of the windmill, with a sail arm disconnected. Similar letters refer to like parts on both figures.

The nature of the improvement consists in the change of the position of the wings or sails by the direct agency of the wind, produced by a balance lever with a vertical vane on it, which, when the wind is too violent or comes in gusts, will be depressed and draw back a sliding head, to which the wind sails are connected, and turn them to an angle proportioned to the strength of the wind, and thus enable them to present the exact amount of sail surface to the wind, however strong, weak, or variable it may be.

A represents a framing, having upon the top thereof a circular ring, *a*, upon which the main shaft changes position in bringing the wings to the wind. B is a horizontal shaft furnished with suitable bearings on a cap plate, *b*, lying upon the ring, *a*. Upon the outer or projecting end of B, is secured a head, E, from which project arms, F F, on which the wings or sails, G G, swivel or turn. I is a sliding collar on shaft B, having radial arms, *d d*, projecting therefrom; *e e* are strap rods, having one end attached to *d d*, and the other to projecting pins on a short crank, *f*, upon the lower edge of the wings. K is a wind lever, having its fulcrum at axis P. It is supported on an arc, *t'*. M is its wing, and *g* a balance weight on its lower end. L is a bar, carrying upon its extremity a vane, by which the cap, *b*, is turned, and the wings, G, brought to face the wind. *m* is a rod connecting the sliding collar, I, with the wind lever, K, when the wind suddenly strikes the sail, M, it depresses it, drawing the rods and sliding collar on the shaft, B, which in turn draw the rods, *e e*, and thus bring the edge of the wings, G, if the force of the wind is extreme, to the eye of the wind, and necessarily arrests the rapidity of the mill by presenting less surface to its violence. On the axis, P, of the wind lever, K, is a balance weight, *p*, hung on the end of an arm, opposite to which is another arm on the same axis, the two arms forming an obtuse angle. The weight, *p*, always brings back the wind lever, K, with its vertical vane, M, to position, when the wind has lulled so as to present the sails, G, properly to the wind on all occasions. A cord or chain is attached to the arm opposite *p*, and extends down to the lower part of the building, where it is attached to another balance lever. By pulling on this chain or cord by the lower lever, (not shown,) the weight, *p*, will be elevated, which will operate the axis, P, of lever, K, throwing back the top of vane M, and drawing back the sliding collar, I, thus turning the sails, G G, sharp to the wind, and stopping the mill. A hollow shaft, extending from below with a bevel wheel on its top receives motion from a bevel pinion on shaft, B, to drive the machinery below. If this windmill is to be employed to pump water, its shaft, B, may be formed with a central crank on it attached direct with a joint to the upright rod of the pump's piston.

It will readily be perceived that according to the amount of the wind's pressure on the vertical vane, M, of lever K, so will the angle of the sails, G G, be regulated to the wind, and consequently the wind surface proportioned to the angle which they describe with the direction of the wind. In a moderate wind their entire surface is presented; in a high wind, their edges are presented to it. The parts of this windmill are few, and the means of self-adjusting the sails are simple and ingenious. This windmill can be used for various purposes, such as pumping, grinding, turning lathes, driving saws, &c., &c.

The assignees of the patent are Philips & Tritle, of Waynesboro', Pa., who have now a large number of orders for making them, and from whom more information may be obtained by letter, either addressed to the firm or John Philips, of said place.

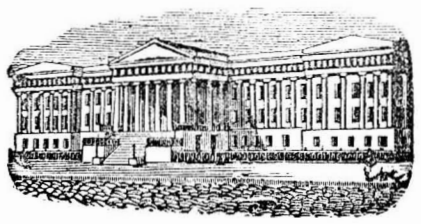
Brine a Poison.

M. Reynal, of the Veterinary School at Ayort, France, has communicated to the Imperial Academy of Medicine the results of investigations upon the poisonous properties acquired by brine, after a considerable length of time, in which pork or other meats had been salted or pickled. The poisonous properties, he states, are acquired in two or three months after the preparation of the brine, and its use then, mixed with food for any length of time, even although in small quantities, may produce death. A simple solution of salt in water, after the same length of time, does not produce the same effect. The poison acts as a local irritant, exciting violent intestinal congestion and inflammation. It likewise increases the secretion of the skin and kidneys, and exerts a direct effect upon the nervous system, giving rise to trembling, loss of sensation, convulsions, &c. Experiments were tried with it in the Veterinary School, upon horses, dogs, and pigs. As brine is sometimes used a second time for pickling and for other purposes, these facts should be remembered.

No brine should be used a second time without being boiled; still we cannot but think that M. Reynal has carried the matter a little too far. Will some of our professors of medicine make the experiments, in order to test the correctness or incorrectness of M. Reynal's conclusions.

Coffee Leaf as a Beverage.

Why do we use the berries or beans of coffee for making a drinking beverage, while we only use the leaves of the tea plant. In Sumatra, prepared coffee leaves, as stated in Prof. Johnston's "Chemistry of Common Life," is the only beverage of the people. A Mr. Ward, who resided in that country for a number of years, states that with "a little boiled rice and an infusion of the coffee leaf, a man will support the labors of the rice field for days and weeks successively, up to the knees in mud, under a burning sun or drenching rain." He states that he was induced to adopt it as his own daily beverage, and his practice was to take two cups of a strong infusion of it with milk in the evening, as a restorative after the business of the day. He found immediate relief from hunger and fatigue by its use. His bodily strength increased, and the mind was left clear and active. The natives of Sumatra prefer the leaf to the berry—they believe it is more nutritious, and they do not plant it for the bean, as is done in Brazil and Java. If the leaf of the coffee plant is so excellent, let some of our merchants inspect some of it, and give it at least a fair trial.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING NOV. 27, 1855.

METALLIC SADDLE TREES FOR HARNESSES—Samuel E. Tompkins, of New York City: I claim providing metallic harness saddle trees with an elevated bridge, B, substantially as, and for the purpose set forth.

And in combination with the same, I claim employing ribs, c c, on the front portion of the under seat, substantially as and for the purpose set forth.

[To make a light, neat, cheap and tasteful gig saddle, upon a metallic tree, has long been a desired object. With Mr. Tompkin's improvement, which is very utile, this object has been secured; as will be evident to every practical saddler, when he is informed that every facility for blocking is afforded—that a free passage for the back band is provided under the seat, and that the manufacturer can make the commonest work, or a second class saddle, on one of his trees, with all the beauty and symmetry of the best or first class, without the necessity of welting and seaming.]

BALANCE FOR DETECTING SPURIOUS COIN.—John Allender, of New London, Ct. I am aware that balances for proving coin have been made, with two levers hung upon one fulcrum, so arranged as to weigh all the coins upon one side of said fulcrum, and when the larger coins were weighed, the lever in which the small ones are weighted is turned to the opposite side of the fulcrum; therefore I make no claim to instruments constructed with more than one lever, and to weigh upon one side of the fulcrum only.

But I claim a single lever, of such a size and weight, and provided with cavities or countersinks, arranged at such distances, each side of the fulcrum as to weigh the smaller coins upon the lightest arm, without additional weight, and the larger coins, two or more, on the heaviest arm, with one weight in one position on the lighter arm.

BLACKSMITH'S STRIKER—D. S. Blue, of Fort Seneca, Ohio: I claim in the construction of a blacksmith's striker, the use of slotted lever treddle, the slotted lever, and the rock shaft, substantially as described.

STEAM HEATING APPARATUS—P. E. Chase, of Philadelphia, Pa.: I claim the peculiar arrangement of the pipes, c, and d, the draft pipes, G, and the tanks, O and C, in combination with the steam chamber, E, in the manner described and for the purpose specified.

BELT COUPLING—T. H. Corbett, of Brooklyn, N. Y.: I claim coupling the two ends of a belt, or any two objects together, by means of two clamps, B, and a double wedge key, substantially as and for the p rpose set forth.

[This invention, which is fully defined by the claim, must, we think, commend itself to all who employ belting for driving machinery: as it avoids the great inconvenience of coupling the two ends of a belt together, by any of the known methods, and also prevents a projection being formed on the belt, at the junction of the two ends—thus rendering the belt capable of passing over pulleys smoothly, or without jumping and occasioning additional friction and wear. This improvement prevents all possibility of the ends of the belt separating of their own accord; and yet allows of their being separated with ease, convenience and facility, when necessary.]

FENCES—H. H. Dennis, of Steam Mill, Pa.: I claim the described mode of connecting the rail and post, by mortise, with convex top and bottom groove, g, constructed, arranged and operating, substantially as and for the purpose specified.

DRILLING AND SCREW CUTTING MACHINES—Joel P. Heacock, of Marlborough, O.: I claim the use of pulleys, P, and S X, and Y, set ring, N, operating conjointly on the feather, a', in the manner and for the purposes set forth.

[An engraving of this invention will shortly appear in the SCI. AM.]

COOPERS' TOOL—J. P. Heacock, of Marlborough, O.: I claim constructing a cooper's tool in the manner substantially as described, for the purpose of over-shaving, as set forth.

CAT-HEAD ANCHOR STOPPERS—Peter H. Jackson, of New York City: I do not claim the hasp, e, in itself; neither do I claim retaining the upper end thereof, by means of a hook or locking piece.

But I claim the combination of the locking piece, g, with its cam, 7, combined with the hasp, e, so that said cam piece, 7, forces the hasp, e, out of the notch, I, as said locking piece, g, is turned to one side, and causes the ring or loop, over the hasp, e, to be thrown off or disconnected, as specified.

BAG LOOMS—L. B. Jillson & Geo. Sparhawk, of Lewiston, Me.: We do not confine ourselves to the particular mechanism by which the rising and falling movement for the purpose of opening and closing the shed is effected, what we consider to be the important feature of our invention, being applicable to many other lifting arrangements for opening and closing the shed.

But we claim, first, placing the two sets of studs of the pattern cylinder, for weaving the sides and bottom of the bag in slides, k k, fitted to the cylinder, to slide longitudinally thereto, substantially as described, so as to admit of the changing of the harness motion, from weaving the sides, to weave the bottom of the bag, or vice versa, by shifting the whole or any number of the said slides, according to the number of picks desired in the bottom.

Second, the combination of the sliding rod, r, having a fork, t, and finger, g, with the notched disc, J, carrying the pinion, the pawl, p, or its equivalent the worm wheel, G, and the endless screw, I, on the cylinder, all operating substantially as described, for the purpose of shifting the slides in the cylinder, to change the operation of the harness.

[The weaving of bags without seam is becoming quite an extensive branch of manufacture. The contrivance which forms the subject of this patent, is for the purpose of regulating automatically the operation of the harness so as to weave a bag of any length, then to close the bottom, afterwards to commence weaving open again, and so on. It can be applied to a common loom, four or six leaves of harness being required, according to whether a plain or twilled bag is desired. The principal feature of the invention consists in a studded pattern cylinder having the studs attached to movable slides, arranged longitudinally to the cylinders. By shifting these slides in one direction, the studs are brought to a proper position to cause the harness to operate in a suitable manner to weave the open part of the bag, and by shifting them in the opposite direction, the studs are brought into a position to cause the harness so to operate, as to close the bottom. These movements are all effected by self-acting devices, and can be so varied as to weave bags of any length desired. This is a very simple invention for the purpose.]

SEWING MACHINES—Geo. W. Stedman, of Vienna, N J.: I claim feeding the cloth or other material along by means of the thread, which is suitably acted upon for the purpose, in tightening each stitch.

CUTTING THE UPPERS OF BOOTS—John S. Lewis, of Athol, Mass.: I claim cutting the boot front all the way down, no wider, or but little wider than the usual width of the part which is to form the front of the leg, and filling the vacancy, b, which is thus caused when the front is crimped, by a separate piece, by extending the back or counter, or by a piece produced in any other way, whereby the saving is effected in cutting the fronts, substantially as described.

[This invention seems to be of some importance, inasmuch as its object is to save a very large proportion of the most valuable stock used in boot-making. It is customary to use for the fronts of boots, leather of much better quality than for the backs, and by the old mode of cutting them out, about one-fourth of that stock is wasted; as a piece one-third of the width of a front is sacrificed between every two fronts, for the sake of two small corner pieces which are required to connect the front with the lower part of the back or heel seat. By this invention the front is cut no wider at any part than the leg requires, and the corner pieces to connect with the heel seat are made up, either by letting in small pieces or by extending the counter. In this way nothing is wasted in cutting the fronts, except what is necessarily cut away to shape the front part of the foot properly. Mr. Lewis claims to be able, with his improvement, to cut four uppers out of a piece of leather, where only three can be had by the old plan.]

HANGING THE SCREENS OF WINNOWING MACHINES.—J. A. Krake, of Alden, N. Y.: I claim the peculiar arrangement and combination of parts described, by which the action of the screens, is confined exclusively to lateral vibratory motion, for the purpose specified.

ATTACHING CASTERS TO TRUNKS—Leonard S. Maring, of Fall River, Mass.: I claim constructing and arranging casters on trunks in the manner substantially as described and shown, and for the purpose set forth.

[This is a very good improvement in trunk casters, and we think will not be long in coming into general use, as it is neat and tasty in appearance: and almost if not quite as cheap as the casters now in use. Its object is to protect the corners and ends of trunks from being worn, as they are drawn from place to place. This is effected by placing the rollers in elbow shaped straps, arranged on the corners of the trunk in such a manner that a portion of the rollers extend out beyond the corners, and no matter how great the inclination given to the trunk, in drawing it from place to place, the rollers will bear and roll upon the ground, and thus protect the ends and corners of the trunk in a perfect manner.]

PREPARATION OF UMBRELLA STICKS, &C., OF RATTAN—Joseph Kleemann, of Meissen, Germany: I disclaim impregnating woods in general, but I claim the preparation of rattan by impregnating it with drying oils and varnishes, substantially as described, for the purpose of giving it flexibility, elasticity, tension, and an appearance similar to whalebone, the rattan so prepared to be used as a substitute for whalebone in the manufacture of umbrella and parasol frames, and for other purposes for which whalebone can be employed.

MACHINES FOR RASPING AND DRESSING THE HEELS AND SOLES OF BOOTS AND SHOES—Jean Pierre Moilliere, of Lyons, France. Patented in France Jan. 5, 1855: I claim the circular tools e f T' and U, with rasping and dressing the bottoms of heels and soles of boots and shoes, the whole constructed and operated substantially as described.

PRINTING PRESS—Cyrus A. Swett, of Boston, Mass.: I claim inking the blocks, X, with their appropriate colored inks by means of the rollers, k V, arranged as described.

I further claim the cylinder, C, vibrating bed or plate, J, with endless apron, L, attached, when the above parts are constructed, arranged, and operated as shown, for the purpose specified.

[The art of printing has of late years been reduced to such perfection that pictures in oil colors, equal and sometimes superior in artistic elegance to hand painting, are now produced by the press. The operation, however, is somewhat slow and costly, compared with common printing, for a separate impression and a distinct handling of the sheet is required for every color. Thus, in a landscape picture the sky needs to be printed blue, the grass green, the ground brown, while the dresses of the figures and other objects will perhaps require other colors. If six colors are used, the labor required to print is just six times greater than where only one is employed, and the expense is correspondingly augmented.

Mr. Swett's improvement is intended to facilitate the printing of color pictures. The blocks or engravings,—one of which for each color is required—are all placed upon the periphery of a cylinder, and are inked by separate rollers with diverse colors in the ordinary manner. The paper that receives the impression comes into the press from an endless roll. At each revolution of the cylinder the paper is moved by the mechanism, just far enough to permit a new color to be stamped with those previously printed. If six colors are used, six impressions, or one from each block is made, at every turn of the printing machine; of these impressions five are unfinished, but the last is complete. In effect, therefore, Mr. Swett's press throws off a finished picture printed with six colors, at every revolution, and thus brings down the cost of this species of work to almost nothing. We regard his invention as being one of importance.]

OVENS FOR BAKING BREAD AND OTHER ALIMENTS—Jean Louis Rolland, of Paris, France. Patented in France June 30, 1851: I claim the arrangement of the horizontal flues, G, within the hot air chamber, I, and beneath the baking floor, N, operating in the manner substantially as set forth.

FEET WARMERS—Nath. Waterman, of Boston, Mass.: I am aware hot water has been used for heating a foot-warmer, and that foot-warmers have been cushioned or covered by carpet, &c., this I do not claim.

But I claim placing the hot water vessel within a case made of wood except on that side on which the feet are to rest, which side is made of thin sheet metal, and cushioned and covered as set forth, the whole being for the purpose of retaining the heat longer and giving it out more regularly to the feet, as described.

FLUID LAMPS—Wm. Bennett, of Brooklyn, N. Y., assignor to the Union India Rubber Lamp Company, of New York City: I claim the elastic bag or receptacle, B, placed within the body of a lamp, or within a proper framing or support, to receive and hold the fluid substantially as described for the purpose specified.

[Here is another application of that useful and ubiquitous substance, india rubber. Within an ordinary glass or metal lamp, or within a suitable frame to support it, is placed an india rubber receptacle for the purpose of receiving and holding the spirit gas or fluid. This receptacle is provided with wick tubes like the ordinary lamp in general use. Lamps commonly employed in burning hydro carbon fluids, often burst in consequence of the pressure exerted against them by the gaseous substance generated within the lamp by the heat of the flame.

The india rubber bag or receptacle employed in Mr. Bennett's lamp, will expand under the pressure of gas or vapor, and thus remove the objection commonly made against fluid lamps. It has another important advantage, viz., should the lamp break by falling, the flexible bag will hold the fluid, and thus prevent it from coming in contact with the flame. It appears to us to be a very excellent improvement.]

CANNON—Alfred Krupp, of Essen, Prussia, patented in France, Dec. 16, 1847: I claim, first, the manufacture of cannons from solid pieces of cast steel, as described.

Second, I claim the surrounding of cannons and other parts of artillery, when made of cast steel, with an outer casing of cast iron, steel, or wrought iron, or gun metal, in the manner and for the purposes described and represented.

DESIGN.

STEAM TUBES AND HOT AIR COVERS.—James O. Morse, of New York City, and J. W. Adams, of Lexington, Ky.

Casting of the Horse for the Washington Monument.

The London *Builder* gives the following account of the casting of the bronze horse at Munich—Bavaria—for the Washington monument. "Fifteen tuns of bronze had to be melted and kept in a state of fluidity. For several days and nights previously a large fire was kept at these huge masses, which required to be stirred at times. When the bronze was liquified, an intimate assay was made in a small trial cast, and to highten the color some more copper was added. Successively all the chambers through which the metal had to flow in the form were cleared of the coal with which they had been kept warm, and the master examined all the air spiracles and the issues of the metal; the props of the tubes were then placed, and every man had his duty and place assigned to him. Finally, the master, amid the intense expectation of the many art amateurs present, pronounced the words, "In the name of God," and then three mighty strokes opened the fiery gulf, out of which the glowing metal flowed in a circuit to the large form.—The sight was magnificent, and in the little sea of fire stood the master, and gave his commands about the successive opening of the props. Hot vapor poured from the air spiracles; in the conduits the metal boiled in waves; still, no decision yet, as the influx of the bronze in the very veins of the figure could be but slow. At once flaming showers jumped out of the air conduits, and the master proclaimed the cast to have succeeded. A loud cheer followed, when the master approached Mr. Crawford, the artist of the Washington Monument, to congratulate him upon this success. Another cheer was given to M. de Miller, the chief of the royal foundry at Munich, who had personally conducted the work.

The Green Lakes of Onondaga.

The number for this month of *Putnam's Monthly* contains a short interesting article on the above subject. Near Jamesville, in this State, on a plateau, there sinks abruptly a huge circular basin of about seventy acres area, surrounded on three sides by a precipice one hundred and fifty feet high. The waters down in this huge natural bowl are of a clear green color. It is said to be so deep that although many efforts have been made to plumb it with very long lines, all have failed to reach the bottom. No wild fowl are ever seen sporting on its waters, and no breezes ever rouse it into waving billows. Near to Fayetteville—three miles distant from this—is another lake of a similar character; it is about three hundred yards in diameter, circular in form, with high precipitous banks, sweeping round and round one hundred and fifty feet above the dark green waters. Near its margin, as far as the eye can reach, it is filled with sunken trees, on which are deposited a white marly coating. It is 140 feet deep, and the waters at its bottom are impregnated with sulphur. Fish sport in it, but no feathered creatures ever dip their wings in its silent waters. The people in its neighborhood call it "Lake Sodom."

Orange and Pink Color on Silk.

A correspondent inquires of us how to dye the above-named colors, and having overlooked them in the articles on dyeing, we will now present them. The pink is dyed by using a small quantity of brazil wood liquor with some chloride of tin, in a clean vessel, and handling the silk in this liquor until it is about the depth of shade required. It is then lifted washed in cold water, run through a solution of clean soap suds, then washed again, and it is fit to be dried. The soap suds give the shade that delicate blue tinge necessary to the pink shade. Enough of the chloride of tin should be used to give the liquor a sharp sour taste. The color is very easy to dye.

ORANGE—This color is dyed on silk by handling the goods in a strong solution of anotta boiled in soda, until the silk acquires a deep yellow color, when it is taken out, washed, and then handled for ten minutes in dilute sulphuric acid—the taste should be moderately sour. The silk is then washed and dried.—This also is an easy color to dye.

Floating Logs.

In answer to a correspondent in the SCIENTIFIC AMERICAN, Nov. 24th, we doubted the assertion made in his communication to us, that by driving an iron spike into each end of a mahogany log it would afterwards float in water, although before this operation was performed it would sink. Since that time we have received a few letters on the subject, the substance of which we will present.

E. W. Sargent, of this city, states that he knows the sources from which our correspondent referred to above received his information about the floating of the mahogany logs at Porto Rico, and he believes the statement to be a fact, but is not surprised at our skepticism, in the absence of strong proof. He states that there are numbers of persons in our city acquainted with the mahogany cutting business in Porto Rico who can give us *prima facie* evidence on the subject. He also stated that hard wood, which naturally sinks in water, can be made to float and even raised from the bottom, if sunk, by simply driving a spike to the depth of two or three inches in the end of each log.

If iron were lighter than water, we could easily understand how a sunken log could be made to float by driving an iron spike into each end of it; but we must be excused from accepting such statements for facts until we see a sunken log rising to the surface with an iron spike driven into each end of it.

Geo. Merrick, of Hallowell, Me., states in his letter, that the old French inhabitants of Louisiana made use of the red cypress for boards and joists, and as it was heavier than water, when felled in the forest, it was made to float down the bayous by boring an auger hole in the end of each log, then plugging it up, enveloping a sufficient quantity of air to counterbalance the difference of gravity between the log and the water. This we can believe; it is reasonable.

In another letter of more recent date from Mr. Sargent, he states, that in some of the districts of Nova Scotia hard wood logs, which are too heavy to float in water, are made to do so by boring auger holes in their ends to the depth of about six inches, then driving in plugs of white pine. This we can also credit, for the reasons given respecting the floating of red cedar logs, but this does not confirm the iron spike story. The iron is heavier than the mahogany, and it would certainly turn the laws of gravitation upside-down if the iron made the log float. Upon the same principle of action a log of iron will be made to float by attaching a plug of gold to it, the latter being the heavier metal.

Explosion of a Locomotive.

On the evening of the 20th ult. while the passenger train on the Nashua and New Hampshire Railroad was approaching Nashua, the boiler of the engine exploded with terrific violence, killing the engineer instantly, but doing no damage to the passenger cars. The force of the explosion was very great; pieces of the boiler weighing 200 lbs. were thrown a quarter of a mile, but none of the cars were thrown off the track. The momentum of the explosion was extended in a forward direction, and drew as it were, the train to the distance of three-fourths of a mile forward after the brakes were applied, before the cars stopped. This explosion took place while the train was at full speed, and is supposed to have been caused by a deficiency of water in the boiler.

Yampert's Pump.

One of the pumps illustrated on page 28, this Vol. SCI. AM, has been put up by Mr. Yampert at No. 38 Broadway, this city, where it may be seen and its powers tested. It was constructed by Downs & Co., Seneca Falls, N. Y., for the inventor, and is a stout, well made pump. We witnessed its operations a few days since, and it threw a beautiful full stream of water with great ease. It is one of the most novel pumps ever brought before the public, and is worthy of examination by all who are interested in hydraulic engines.

[For the Scientific American.]

Oscillating Locomotives—Lap of the Valve.

Some extracts from the *Tribune*, on page 51, this Vol. SCIENTIFIC AMERICAN, gave us to understand that an extraordinary improvement in steam machinery has been made, which bids fair to revolutionize the present modes of application, and that engines constructed upon the oscillating principle have elicited general approbation in Paris, and will be shortly applied to locomotive engines, under the superintendence of Mr. Periere, etc. Being interested in American steam machinery, let us analyze this most remarkable advance in the science of machinery, as it has reference to the most important, and much improved part of the steam engine, the valve motion. Up to this day the improvements in the valve motion have been gradual, and to it we owe the greater part of the present economy and speed of locomotive engines, as, since the year 1829, the boiler, cylinders, blast, pumps, etc., have undergone (except in proportion) but little alteration to advance the economy of the locomotive.

The lap and the lead of the steam valve, but particularly the former, in connection with the link motion, is now considered, both among practical and scientific engineers, as an essential requisite to a perfect valve motion; and any valve motion, though it may work frictionless, must be a practical failure if it is unable to supply lap and lead. This will appear if we consider that the power consumed by the common valve motion amounts to about 4 per cent. of the whole power applied, while the application of lap has, in many cases, produced a saving of 50 per cent. of fuel. The following example being taken from Clark's Railway Machinery, page 25, gives the following data:

Gross average consumption of coke per mile:
49 lbs.—Old valve, 1-16 inch lap.
40 lbs.—Old valve, after the introduction of a new mode of delivery of coke to the engines.
36 lbs.—Valves with 3-8 inch lap.
32 lbs.—Valves with 3-4 inch lap.
28 lbs.—Valves with 1 inch lap.
22 lbs.—Valves with 1 inch lap, with increased care in firing.
16 lbs.—Valves with 1 inch lap, applied to new engines with enlarged exhausting passages, larger tubes, closer fire bars and superior construction.

Mr. Clark remarks, "The necessity and advantage of lap was established by these experiments, both as to its facilities for affording a free exhaust, and for working steam expansively. Without lap there could be no expansion; and though it was introduced primarily for the purpose of an efficient release, its advantages as a means of working expansively, became likewise apparent; and it quickly found its way into common use on other lines of railway. The engines having thus, by the application of lap, got relieved of the greater part of the overpowering resistance of back pressure, the refinements of variable expansion gear were introduced."

The application of Tousley & Reed's engines to farming purposes, as manufactured by the New York Locomotive Works, may do very well, as in such places fuel is generally abundant, and this is a proof of the superior judgment of American engineers to those of France, as it is by no means to the credit of Mr. Periere, the great railroad king of France, to select this valve motion for locomotive engines as its principle does not supply the well known requisites of a perfect motion.

H. A. LUTTGENS.

Paterson, N. J.

On the Purchasing of Machinery.

MESSRS. EDITORS—Having troubled you several times about information in the way of machinery, we take the liberty again for the same cause. We are erecting a new building, at present arranged for a steam bakery, for which we purchased, through the means of your direct information and that of the SCIENTIFIC AMERICAN, one of Treadwell's patent revolving ovens, Paul & Crum's patent for making family bread; Read's oscillating engine-patent, a dough mixer, and other modern improvements. The building is at the same time intended for a flour mill (driven by steam.)

One of us had been, for some years past, a practical miller in Europe, and must confess that the improvements in the United States beat all those in Europe. E. Harrison, New Haven, Conn., advertises a portable mill, also Messrs. Clark, Lancaster, Pa., a patent flour mill, but we are unable to get the right information about their practicability on a large scale. As we intend to adopt the latest and most practical improvements, we would desire your opinions about any of them, which will be received with the greatest consideration.

CLAUSSEN BROTHERS.

Charleston, S. C., Nov. 28, 1855.

[The above is one of many letters which we receive, showing the position occupied by the SCIENTIFIC AMERICAN, in supplying useful information to those who require the best improvements in machinery for various purposes. These advantages are very great, not only to manufacturers, but also to inventors and patentees who have good improvements to bring before the public.

A Pamphlet on Boiler Explosions.

We have before us a new pamphlet on the cause of boiler explosions and their remedy, by Jacob Harshman, of Dayton, Ohio. In some respects it is a droll work. Its useful part contains the history of a great number of steam boiler explosions which took place on boats on our Western waters; and from certain marks of pieces of the boilers, and the great force to which some of them were projected to an extraordinary distance, he comes to the conclusion that mere steam could never exercise such destructive powers, and that some other mysterious agency did the work. He takes for illustration the case of the *Moselle*, which exploded her boilers at Cincinnati, on the 20th April, 1838. The boilers of this steamboat, four in number, exploded like a mine of gunpowder; fragments were thrown across the Ohio river, and some of the bodies of the victims were thrown to the distance of a quarter of a mile. Dr. Lock, who was appointed one of the committee to investigate the causes of the disaster, reported that there must have been a pressure of 500 lbs. of steam on the square inch (the valve was tied down,) and the explosion was caused by nothing else but inordinate pressure. To no such conclusions does Jacob Harshman arrive; he asserts that such a pressure—500 lbs. on the square inch—would only have ruptured the boiler, not shattered it to pieces. And what reason does he advance for such a conclusion? He says "with such an elastic force but little damage would have been the result. But, instead of a simple steam pressure of 500 to 700 lbs. per square inch, there was most likely, in this case, from 20,000 to 30,000 lbs. per inch pressure of an instantaneous developement from explosive elements. It will be seen that there is a great difference between these forces. The former, at 600 lbs. pressure, extends expansively only to an open area of 30 feet diameter, a distance entirely inadequate for the projection of pieces of iron and human bodies, as in the case of the *Moselle*. The latter, at 20,000 lbs., extending explosively to an area of 200 feet in diameter, a distance equal to, but not more than would be required for a projectile force necessary to throw the heavy pieces of the boilers and the victim's bodies as described."

That is to say, the fragments of the boilers of the *Moselle* ought to have been thrown to a distance of 30 feet only—the expansive limit of the steam at 500 lbs. pressure—therefore, as they were thrown a much greater distance, some other agency than steam was the cause of the explosion. Thus Jacob Harshman reasons; and he has but to carry out his reasoning a little further to prove that some mysterious agency in cannons projects the balls, not the gunpowder. Here is the way he would prove it:—

Gunpowder, when ignited, expands to about two thousand times its bulk, therefore a cubic inch of gunpowder must project a ball of a cubic inch of lead to a distance of only two thousand inches, but as an inch ball is projected from a gun with a cubic inch of powder to a distance of more than five thousand feet, why some other agency than the powder must project the balls.

Jacob Harshman believes that there are extensive columns, of cylindrical form, of a peculiar matter which move in the atmosphere and sometimes strike the earth; and that these often produce pestilence. None but vegetarians can appreciate their presence, but it seems the bodies of such persons are perfect aerimeters, and they can tell when they are present, and thus be prepared against danger. Well, he brings into play some such agency in the production of boiler explosions. He speaks of *polarity* and its laws (what is polarity?) as if he had caged polarity and had viewed it with a microscope tearing up the boilers on the Ohio river, and shivering to peices those on the Mississippi. Electricity, which he mystically calls ethereal caloric, is the wonderful agent. This is not a new idea, nor does it belong exclusively to Mr. Harshman. Mr. Andrand, of Paris, presented an address last year to the French Minister of Agriculture, on this very subject, attributing to electricity the cause of steam boiler explosions, asserting that a preventive was to be found in electric conductors to carry off the electricity as soon as it was formed. Mr. Harshman defends his boilers from ethereal caloric, and prevents it entering the boiler to explode it, by the use of a copper cover; he and M. Andrand are on the same tract exactly; they just employ different methods of talking about something which amounts to nothing.

If there is one thing which ought to convince Jacob Harshman, and others who entertain similar crude notions upon this subject, that the cause of steam boiler explosions is perfectly well-known, it is the working of the New Steamboat Law. We have now before us the able report of Jas. H. McCord and H. Singleton, U. S. Inspectors at St. Louis, to D. Embree, Esq., the Superintending Inspector for the past year, ending the first of October last, and it presents the pleasing and astonishing facts that, of 1,045,269 persons carried in that time on steamboats on the Mississippi river, not one life was lost by an explosion. As a satisfactory proof of the triumph of the new steamboat law, the report states, "within this district no explosion of boilers constructed according to law has yet taken place. Nor do we believe that any such has taken place in the whole country, not a life has been lost by that dreaded catastrophe—the explosion of a boiler—although double the number of passengers were carried last year in comparison with the previous year to and from St. Louis. So extraordinary a fact ought to make a deep impression on steamboat men and on the public."

The favorable working of this admirable system of inspection appears to be entirely ignored by the author of this pamphlet, and we are quite sure that the theories set forth by him, if allowed to pass unnoticed, are likely to do more evil than good, by creating a wrong impression on the minds of many, who do not seek out and trace up causes to their true source.

The Climate for Consumptive Persons.

We have received a circular published semi-annually by Dr. Mauran, of St. Augustine, Meteorologist to the Smithsonian Institute for the State of Florida, containing statistical tables of the range of the thermometer, the prevailing winds, and the state of the weather for a period included between January 13th and July 1st, 1855, and conveying a highly favorable impression of the mildness of that climate during the winter months, and its adaptation to invalids suffering from pulmonary complaints. The observations were taken daily, at 8 A. M., 2 P. M., and 10 P. M. The lowest temperature in January was 30 degrees (on the morning of the 27th), the highest, 76 degrees (on the afternoon of the 21st). In February, the thermometer ranged, at 8 A. M. between 30 and 62; at 2 P. M., between 45 and 76; at 10 P. M., between 39 and 70. In March, the range at 8 A. M. was from 37 to 71; at 2 P. M., 45 to 85; at 10 P. M. from 39 to 80. The prevailing warm winds are from the eastern quarter, the temperature of the air being raised by the Gul Stream, which sweeps along the coast but a few miles from the city. The highest temperature during the six months was on May 23rd, when the thermometer stood in the afternoon at 98 deg. The hottest weather in June was on the 21st and 23rd, when the mercury was at 86 deg. We publish these facts for the benefit of those who are compelled to resort to a more genial climate than their own during the winter and spring months, believing that they will find the city of St. Augustine a comfortable and agreeable place of refuge."

[This extract is from the *Boston Medical Journal*, and to its conclusions we have to say, that in the Northern States, valleys exposed to the warm south winds, are the most unhealthy for consumptive persons. Dry, hilly districts, protected from the south winds, we have been informed by more than one consumptive person, were the most favorable to their health.

The Ignition Engine.

MESSRS. EDITORS—Will you grant me a small space in your valuable journal, to remark that the percussive action of explosive mixtures of gas and atmospheric air, when fired in a properly constructed engine, is not of that injurious character you suppose, much of the *jar* in the working of the machine you saw being the result of a sudden and violent shutting of the valves at the moment of ignition—a fault which will be remedied by the use of larger and better arranged ones. This has been demonstrated.

You have overlooked also the ability of using as fuel the *liquid* hydro-carbons, as turpentine, naptha, oil of tar, &c., the vapors being generated by the escape heat. The use of these products as fuel enables us to dispense with the gas, and the space they would occupy would not be more than *one-twelfth* of that required for coals.

There being no boiler, there is much economy in the first cost of an engine, and with the small bulk of fuel, gives great additional room for freight or passengers, making long and continuous voyages, even to China, practicable, or the running of a locomotive engine for a distance of 500 miles, with a few barrels of liquid fuel. In this latter case, express locomotive engines could be built as light as desirable, and as there would be no boiler to exhaust, there would be no difficulty in maintaining speed. To these advantages, hastily summed, up may be added *security;* no danger from explosion nor from fire, either accidentally communicated, or from the spontaneous combustion of the fuel.

With great respect, your obedient servt.,

ALFRED DRAKE.

Public Clocks.

There are really but two or three public clocks in our city that are at all reliable.—Beekman street church clock has always kept good time, and, for the last two years the City Hall clock has been remarkably accurate, and has done much to retrieve its former reputation. Some two years ago the Common Council authorized the Faculty of the New York University to build a tower on their building on Washington Parade Ground, in which astronomical time could be taken by means of proper instruments and apparatus, and from which telegraphic wires would diverge to every police and railway station and public clock in the city, giving them the true astronomical time without variableness or shadow of turning the year around. So far, this really excellent idea has not been carried out by the Faculty, not from any remissness on their part but from pecuniary considerations. It is of importance to have correct time at banks, at railway stations and ferries; and every business man must have felt how inadequately this great public want has been supplied. It has been suggested that all the great public thoroughfares, Broadway, Bowery, and Grand st., might be supplied with lamps to which should be attached electric clocks that would give the time by night as well as day.

Present to an Inventor.

The Troy Rope and Cordage Co. have recently presented Mr. W. R. Dutcher, Master Mechanic of their works at Lansingburgh, N. Y., with a beautiful gold watch as a testimonial of their esteem. He is, in part, the inventor of the ingenious Cordage Machine exhibited at the late Fair of the American Institute in this city, and which is employed at the Rope and Cordage factory of the Company.

The Albany Observatory.

Dr. B. A. Gould, who has been appointed astronomer of this new Observatory, has concluded a contract for the construction of a new meridian circle for it, and a transit instrument for the use of the United States Coast Survey. The telescope is to be ten feet in length—in short, the entire instrument is to be as large as the largest in the world—the one at Greenwich—and is to have all the most recent improvements, with additional improvements suggested by Dr. Gould's own experience as an observer.

New Inventions.

Marble Sawing Machine.

A Mr. Henry Burt, of Newark, N. J., patentee of a marble sawing machine, publishes through his attorney, Jas. P. McLean, in the Philadelphia *Railroad Journal*, a long description of his invention. Mr. Burt takes occasion to cast a slur at the SCIENTIFIC AMERICAN, for the reason, we suppose, that we have neglected to notice, in our columns, this last effort of his genius. The reason why his patent has not been noticed is because he did not deign to furnish us with a copy of the grant. In our weekly comments upon the claims of new patents, it is not to be expected that we shall speak of those about which we have no information. Being now posted-up in regard to Mr. B.'s case it would be impolite to delay any longer. He says :—

"Henry Burt, of this city, (Newark,) has taken out a patent for sawing marble into acute angular forms, and had it only have passed through the precinct of our *scientific* neighbor's office, we have no doubt but that he would have taken the great *Vermont Prize.* But, unfortunately, it was not through their agency.

"The inventor of this machine ranks with our master spirits of invention. It was he who first invented a machine for knitting garments n their proper shape, and having made various improvements in machinery—therefore went scientifically to work and carefully constructed a working model of a machine for sawing stone into sundry angular shapes."

[Here follows a bungling mixture of words, supposed to be intended for a patent specification, in which set screws, pivots, and ball joints occupy a prominent place; the whole concludes with the following disclaiming claim :—

I am aware that different adjustable apparatuses have been used for sawing wood, and that horizontal saw frames have been used for sawing stone into square blocks, paralelograms, thin slabs, &c. Also, connections of various kinds have been used for working saw frames.

I do not, therefore, claim the above devices separately. But what I claim, and desire to secure by letters patent of the United States, is the combination of the saw frames, B B', pivoted, swinging, adjustable guide frames, A A', and connection rods, d d', arranged and operated in the manner and for the purposes set forth. H. BURT.

By JAS. P. MCLEAN.

The above claim is about as broad as a piece of mahogany veneer set up edge-wise, and about as valuable as a three cent piece cut in two. Mr. Burt is mistaken about the would-be value of his discovery, in case of employing our agency. Had he applied to us, we should have advised him to save his money, go home, and go to bed. In bringing forth that marble saw his "master spirit" must have been excrutiatingly tortured.

Railroad Car Patent Case.

One of the most important patent trials that ever took place in our country was closed (for we cannot call it *terminated*) in this city on the 24th ult. The parties were, the patentee—Ross Winans, of Baltimore—plaintiff, and the Harlem Railroad Co., defendants. The action was instituted to recover damages for the infringement, by the defendants, of the plaintiff's patent for improvements on *eight wheeled* cars. As a great number of our railroads are implicated with the defendants, great interests were at stake on the verdict.

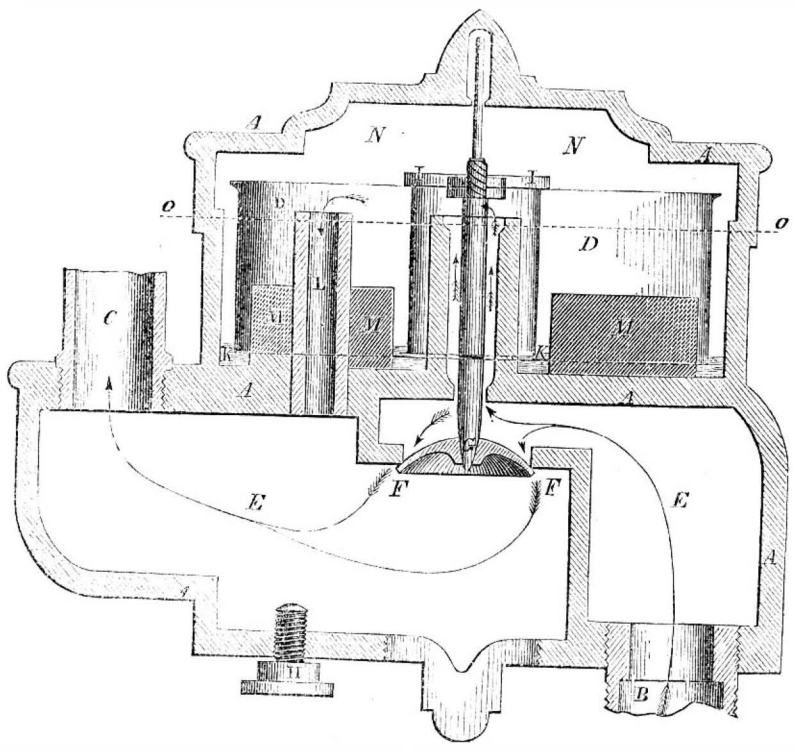
The defendants denied that Ross Winans was the inventor of the improvements claimed, also, that if he was, he had forfeited his invention by allowing cars constructed according to his claims to go into public use in 1834, before he took out his patent, this being prior to 1836, when the law was changed, to allow inventors two years of grace in the public use of their inventions. The presiding judge (Nelson) gave a charge, which appears to us favorable to the plaintiff's claims, but the Jury could not agree, and were discharged; and it has been stated that there were only two of them in favor of the plaintiff. Thus has ended the matter, for the present.

In the charge of Judge Nelson we find two very important principles of patent laws defined, principles with which every inventor ought to be well acquainted. The evidence of Mr. Insley, of Baltimore, was given by the defendants who stated that he had made a rough sketch of an improved eight-wheeled car in 1829, and made a contract with the Frenchtown Railroad Co., to build one, but their contract fell through, and he did not build one until 1834, in Philadelphia. Respecting the value of such evidence, Judge Nelson said :—"Now the circumstance that a person has had an idea of an improvement in his head, or has sketched it upon paper, has drawn it, and then gives it up, neglects it, does not, in judgment of law, constitute him an original and first inventor. It is not the person who has only produced the idea that is entitled to protection as an inventor, but the person who has *embodied the idea into a practical machine*, and reduced it to *practical use*. He who has first done that is entitled to protection." We presume no one will question the correctness of this exposition of a principle of patent law.

The other principle of patent law laid down by the Judge is as follows :—"A person engaged in producing some new and useful instrument or contrivance, and who has embodied it into a machine and endeavored to reduce it to practice by experiments; if those trials fail—if he fail of success and abandon it and give it up—that consideration affords no impediment to another person, who has taken up the same idea or class of ideas, and who has gone on perseveringly in his studies, trials, and experiments until he has perfected the new idea, and brought it into practical and useful operation. He isthe person—the meritorious inventor—who is entitled to the protection of aw."

No one will question the correctness of this, any more than that of the previous exposition of a principle of patent law. The patent law does not recognize the claims of any persons but those who have produced some tangible improvements, which will be beneficial to the public. Every inventor should be very careful to prosecute every new idea of an improvement to a successful issue. If he does not do so, he cannot set up any legal claim afterwards against another inventor, who may have taken up his idea and carried it out successfully.

KIDDER'S PATENT GAS REGULATOR.



The accompanying engraving is a vertical section of an apparatus for regulating the supply of gas to burners, for which a patent was granted to Walter Kidder, on the 12th of October, 1852.

A is the outside frame, which is solid cast iron. B is the brass connection, where the attachment is made to the outlet coupling of the meter, and passes into the regulator with a screw. C is the connection with main pipe up through the building. D is a small cylindrical gasometer (of sheet iron) which overbalances the valve and closes the aperture at F F as the pressure increases. E is the gas reservoir into which the condensed water, tar, &c., will flow and prevent its coming in contact with the working part of the machine, and obstructing or flooding the same. F F are apertures around the valve where the gas is supplied to the main pipe, and thence to the burners. G is the bottom valve to govern supply, and is acted upon by the gasometer which balances itself in the street pressure. H is the screw for letting off condensed water. I is a weight, used to govern the pressure by increasing or diminishing, as the lights may require. K is mercury in which the gasometer floats, and seals the escape of gas, thereby preventing dangerfrom escape. L is the gasometer supply tubes. M is a solid iron bed to prevent the use of too much mercury. N is the cap of machine which encloses the whole inside. O is the aperture where the cap is removed. The cap is held down by screws. In a factory or building where a number of lights are used, a certain amount of gas must be supplied to the main pipe to keep them all burning; but if some of the burners are shut off, it is evident that the pressure in the main pipe will be increased, consequently the lights which are left burning will be supplied with more gas than is required. While this does not increase their brilliancy, it wastes a great deal of gas. The object of a gas regulator is to give a uniform supply to each burner in a building or factory in which it is applied, thereby economizing the gas. The patent for this gas regulator was transferred to the New York Gas Regulator Co., in this city, which was established with a large capital in 1853, the agent of which is J. L. Douglass, who has furnished us with the following statements respecting its action and utility: "As this regulator has been in use for nearly three years, it is no longer an experiment as to its efficiency and correctness of operation. It has been tested by the most scientific gentlemen of this city in several hundred experiments, and every one proved perfect. It completely controls and equalizes the pressure without regard to distance or hight, and one single burner, or one hundred, will burn at any given rate at which it may be set without the slightest variation; tested by a water gauge. A street pressure of four and a half inches of water will be as equally controlled, and at the same point as a pressure of one inch. It is a well-established fact, that three cubic feet of gas burned at a pressure of 5-10 will give as much light as 4 cubic feet at a pressure of 15-10, or as 6 cubic feet at a pressure of 30-10, and at this low point a perfect combustion is gained, and the consumer gets the full benefit of what he pays for. A steadiness of light combined with great purity, render this invention truly valuable, in addition to its being so great an economist as from 25 to 60 per cent. has been saved. Some recent experiments at the Astor House, with machines that have been in use over two years, prove the above figures true, and it is now conceded on all sides, that gas cannot be burned as cheaply by any other method as by the regulator. It is small, neat, concise, and effective, for a judicious economy in burning gas."

In this regulator the condensed water and tar being gathered into one place apart from the machinery, it entirely obviates any evil from such deposits in obstructing the action of the moving parts. This is positively a necessary provision to the correct working of a gas regulator, as in some cities the impurities of the gas are very great, and were the gasometer, D, on the bottom (as in some,) the tar and water would completely vitiate its action.

Those desiring information about the cost, etc., of the regulator, can obtain it by communicating with J. L. Douglass, Agent for the Company, No. 262 Broadway, New York City.

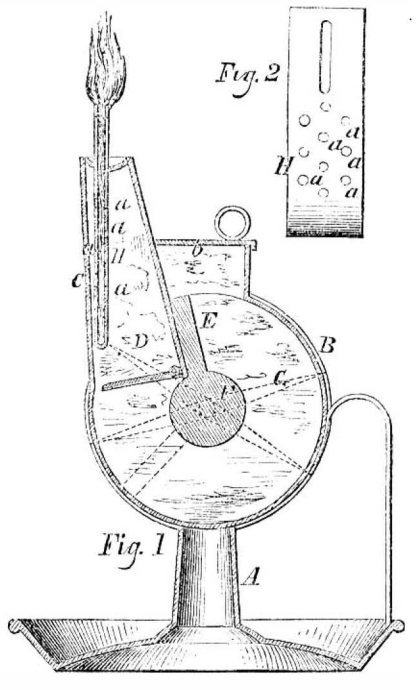
Creative Power of a Mechanic.

An engineer in England being examined at a trial, where both the judge and counsel attempted to brow-beat him, made use in his evidence of the expression, "the creative power of a mechanic;" on which the judge rather tartly asked him what he meant by the "creative power of a mechanic?" "Why, my lord," said the engineer, "I meant that power which enables a man to convert a goat's tail into a wig."

Hays' Patent Lard Lamp.

On the 3d of July last a patent was granted to James D. Hays, of Mount Morris, Ogle Co., Ill., for the improved lamp for burning lard oil represented in fig. 1, a vertical section, and fig. 2, a detached side view of the wick clamp.

A represents the base of the lamp, to which a cylindrical chamber, B, is attached, said chamber having a wick tube, C, attached tangentially to its upper part. The lower end of the wick tube, C, is provided with a valve, D, opening upward, and the chamber, B, has a piston, E, fitted within it, said piston being attached to a shaft or axis, F, which passes through the center of the chamber, the edge of the piston bearing lightly against the inner surface of the chamber, B. To the outer end of the axis, F, a lever, G, is attached, as shown by dotted lines fig. 1. H is the clamp in which the wick is secured; it is fitted within the wick tube, C, as shown. This clamp is made of a sheet metal plate, bent so as to form two elastic plates, between which the wick is secured or held. These plates are perforated with holes or apertures, *a*. The piston, E, is moved back till its edge reaches the wick tube, C, and the lard is then placed within the cylinder, B, through an opening, *b*, at its top; the piston, E, is then turned by operating the lever, G, and the lard is pressed upward within the wick tube, C, raising the valve, D. The flame, therefore, is supplied with lard, which may be put in the chamber, B, in a cold state, as it is immediately melted by the flame, in consequence



of being forced close to it by the piston. Th holes or apertures, *a*, afford a free communication of the lard to the wick, causing the lamp to burn a considerable time without operating the piston, as the lard will be in contact with the wick as far up as the holes or apertures, *a*, extend. The valve, D, sustains the lard in the wick tube when the piston is moved back to refill the chamber, B. Owing to the method o keeping the lard close to the wick in this lamp, it gives out a brilliant flame.

More information may be obtained by letter addressed to Mr. Hays, at Mt. Morris, Ill.

Scientific American.

NEW-YORK, DECEMBER 8, 1855.

Reform of Patent Laws.—Important Meeting of Inventors at Buffalo, N. Y.

MESSRS. EDITORS—Several meetings of inventors and those interested in the subject matter of patents, have been held in Buffalo, N. Y., to take into consideration the propriety of urging upon our Representatives in Congress the necessity of some modification of the Patent Laws, so as to afford greater protection and security to inventors and owners of patent property. A series of amendments have been proposed and discussed at these meetings, of which the following is a synopsis :—

First, the Patent Office to be entirely separated from the Department of the Interior and made an independent Department of itself. The Commissioner to be appointed in the same manner, and with like tenor of office and like pay as Judges of the Supreme Court of the United States.

Second, Sec. 2 recommends certain qualifications in respect to moral character, experience, and ability in those who are appointed to the office of Examiner.

Third, a fee of twenty dollars shall be paid on filing a specification, which shall be sufficient to admit the same to examination. If a patent shall be granted, an additional fee of thirty dollars shall be paid.

Fourth, one drawing only shall be required on filing a specification. If a patent is granted, the office shall furnish a copy of this drawing to accompany the patent.

Fifth, Sec. 5 allows the applicant (in case the report of the Examiners are adverse) to appear in person or by attorney before the Examiners and explain his case on a re-hearing. Also allows of an appeal to a Board of Examiners. Also allows a further appeal to the Commissioner, whose decision shall be final.

Sixth, the fact that an invention may have been known, published, or practiced in a foreign country shall be no cause of rejection of an application for a patent for the same thing by a *bona fide* inventor in this country.

Seventh, when an application shall be rejected, the applicant shall be allowed to withdraw his model.

Eighth, when a patent shall have been duly granted, it shall, in all cases, be *prima facie* evidence, and its validity shall not be called in question in any judicial proceeding on any collateral issue. The only method to impeach its validity or its evidence shall be by a direct proceeding in the U. S. courts, instituted for that purpose.

Ninth, citizens to be allowed to take patents for foreign inventions "by communication" similar to that allowed by the English law in such cases.

Tenth, State Courts of Record to have original jurisdiction in all actions for damages for infringements arising within the territorial jurisdiction of such courts, and for all actions for penalties affixed by the Patent Laws.

Eleventh, it shall be a penal offence for any person, either directly or indirectly, to offer, or pay any money, present, reward, or bribe to any officer or person connected with the Patent Office, in order to influence the action of such officer or person upon any business connected with the Patent Office.

Twelfth, it shall be a penal offence for any person or officer to accept or receive, either directly or indirectly, any money, reward, present or bribe from or in behalf of any person or persons interested in the business of the Patent Office.

Thirteenth, it shall be the duty of the Commissioner to underline with red ink that part of the drawings which refers to the particular part, device, or thing patented, so that the same may be readily distinguished from that which is not patented, in all cases when it is possible to do so. The like distinguishing marks shall also be put upon the part or parts of the specification which relates to the particular thing, device, or combination invented. Patents shall also be carefully classified in respect to original grants and subsequent improvements, which classification shall be noted on the patent when issued.

Fourteenth, a report of the Patent Office proceedings shall be published weekly in pamphlet form, and furnished to subscribers at a reasonable price. This report shall contain the claims of patentees, as allowed, with such further description as shall give a clear idea of the thing patented. It shall also contain all notices for extension of patents, cases of interference appeals, and such other matters as may be of general interest to inventors.

Fifteenth, in cases where patents shall be granted for a "process" or "composition of matter" the specification or description thereof shall be filed in the confidential archives of the office, and shall not be made public until after the expiration of the patent.

Sixteenth, Sec. 16 provides for taking evidence and trying cases of interference of patents for a "process, or composition of matter" in such a manner as not to make a public exposition of the process of either party.

Seventeenth, the knowing and willful infringement of a patent by the manufacture or sale of the theory patented shall be a penal offence.

Eighteenth, a special jury of mechanics, or persons skilled in the art, shall be allowed on the request of either party to a suit in all cases where juries are now allowed by law.

Nineteenth, the citizens of the North American British Provinces shall be permitted to take patents upon equal terms with citizens of the United States as soon as their government shall extend similar privileges to citizens of the United States.

A resolution was also passed requesting the SCIENTIFIC AMERICAN, and other papers interested in the subject matter of these suggestions to publish the same. Also that similar movements in other parts of the United States be invited, so that soon there may be a concert and unanimity of action upon the subject.

The undersigned were duly appointed a committee to transmit these proceedings to the SCIENTIFIC AMERICAN for publication.

E. B. FORBUSH,
S. G. CORNELL.

Buffalo, N. Y., Nov. 15th, 1855.

[We give place to the foregoing communication with pleasure, We have long urged the necessity of a reform in the Patent Laws, and are glad to see inventors begin to wake up to the subject. The reforms contemplated in the above outline, with few exceptions, meet our approbation. We have had in preparation for some time past the draft of a Bill for the consideration of Congress, in which the chief features of the Buffalo Convention are contained. We shall present it to our readers ere long, and if approved by the inventors of our country, as we doubt not it will be, their aid will be solicited to obtain its adoption.

The separation of the Patent Office from its unnatural alliance with the Department of the Interior, is a project which meets with very general favor among inventors and friends of improvement. That measure is, of itself, one of great importance.

If it can be carried this winter, though nothing else should be done, a great benefit will have been accomplished for the Patent Office, and for the country generally.

The allowance of patents to bonafide inventors for improvements that are new in this country, without examination to ascertain whether the same have been previously known in foreign lands, is a much needed item of reform. The present law is very defective on this point. It frequently happens that the Examiner, in pouring over the musty folios of the Patent Office library, in accordance with the statute, discovers a stray paragraph in some old book of German text, perhaps, relating to the invention then under application for a patent. If the Examiner so finds, he is bound to reject, even though the paragraph consists of a mere suggestion of the invention, without evidence of its ever having been practically tested, or of an intention to make an experiment. In so far as our laws render the issue of patents to American citizens a matter of contingency, subject to foreign claims, we are decidedly Know-Nothings. We go for the expurgation of such laws, and the adoption in their place of those that are thoroughly American.

The idea of rendering the infringement of a patent a penal offence is a bad one, and we think will find no encouragement. The present law may be amended so as to become more summary and quick in its operations, and less expensive to the parties interested. This will answer all purposes, and give the patentee, in the end, better security against infringers. It would be next to impossible to obtain a condemnatory verdict, where the defendant was to be sent to States prison. The jury being bound to give the prisoner the benefit of their doubts, he would, nine times out of ten, be acquitted; in all doubtful cases, therefore, the adjustment would, of necessity, be in favor of infringers.

The *red line* arrangement to denote the feature in which the claims rest, will fail, we fear, to answer any useful purpose. It is intended, we suppose, for the benefit of verdant individuals, by preventing frauds in the use and sale of patents. There is a class of persons who are so wanting of intelligence as to believe that the parchment certificate of a granted patent, say, for example, on the cut of a wheel spoke, covers, as a matter of course, the right to the entire vehicle, and the innocent inventor loudly proclaims his monopoly as such. The purchaser, equally ignorant as the inventor, pays a round sum for the patent, and then builds castles in the air from the supposed great revenues he is to derive in making all the wagons in the world to bring him tribute. Our Buffalo friends may rest assured that *red ink* will never take the place of *common sense*. No legislation can bring about such a radical change in nature, however desirable the transformation may seem.

We should be glad to see a weekly publication issued, as proposed, from the Patent Office, provided it could be done with regularity.—The wheels of office and of public service move too slowly, however, for such a dispensation. The annual reports of the Department, which ought to be ready printed, and distributed promptly at the close of each year, seldom make their appearance till six months or more after their date; nearly all the government printing is carried on with the same degree of sloth, and probably will be for a long time to come. For the *interim* we would suggest an amendment to section No. 14, making it the duty of the Commissioner to cause the claims and descriptions to be published weekly in some journal of a scientific and mechanical character, always selecting the one that has the *largest circulation*. This would give us compensation for a service that we now render gratis. Indeed, instead of being paid *we actually pay the government* a large sum annually for the privilege of doing what is, legitimately, a part of its own duty. Every line of the claims that appear weekly in our paper, cost us a round cash tariff. From our columns the few sickly magazines that ape a scientific name steal those claims, and thus obtain, free of charge, the most interesting portion of their contents—without which they could not exist for a month.

There are several features in the above manifesto, beside these glanced at, that merit criticism and are open to objection; but we must omit our examination of them until another occasion. In the main, as before stated, we approve of the reforms contemplated, and shall lend our aid towards securing their realization. The initiative having now been taken at Buffalo, we trust that inventors, in all parts of the country, will meet together, discuss the patent laws, suggest improvements, and send us information of their doings.

One and Two Cylinder Engines.

Some very interesting letters have appeared in our columns on the above subject, and yet, from these, to a person who was about to engage in manufacturing, and wished to purchase a steam engine to drive his machinery, it would be impossible for him to make up his mind whether to select a double or single cylinder engine; one having advocated the double engine, while another has shown that a single engine is just as good as a double one. Who then is right, and what is the best kind of engine? There can be no mistake about the price of the two, the double one is the most expensive. If a single cylinder engine, then, can drive machinery with as steady and uniform speed as a two cylinder engine, and work as smoothly itself, it is to be preferred; if not, the double engine should be chosen.

We have three letters now before us, detailing the experience of three of our correspondents with different engines; the substance of these is as follows :

Stephen J. Loughran, of Davenport, Iowa, states that a double cylinder engine condenses more steam than a single one, and therefore requires more heat—in other words, consumes more fuel according to the power given out. There is also more friction involved in the two pistons, valves, &c., of the double engine. He states that a single engine is worthless without a fly wheel; but a double cylinder engine, working steam expansively, he contends, does not give a uniform motion either. A fly wheel, properly made, meets with little or no atmospheric resistance; there is little friction on its journals, and it assists to prevent torison of the shaft. When well proportioned, he asserts that a single cylinder requires no more wheels or gearing than a double one for getting up the speed in flouring mills. His opinions, on the whole, are in favor of the single cylinder engine; and he maintains that the back-lash, in nine-tenths of the single engines, is caused by badly arranged and constructed valves, to remedy which he recommends all engineers to read scientific periodicals more, and trashy papers less.

G. W. Allison, of Columbiana, Ohio, states that his experience has been sorely against double cylinder engines for running mills, especially as it regards the use of fuel. He started two six-inch cylinder engines of 18 inch stroke, with boiler 40 inches in diameter, 20 feet long, having two flues. With this power he could not grind 6 bushels of grain per hour, using a fan, on a single run of 3 feet 8 inches stones. He is now using one single cylinder of 7 inch bore, and 36 inch stroke, with the same boiler and other settings, and he can drive three run of stones, grinding from 5 to 8 bushels in one hour without a fan or blower, and with less than half the fuel. He is satisfied that two fast motioned engines cannot profitably be run together.

James L. Dunning of Atlanta, Ga., has had a great deal of experience in mill building, in which steam and water power have been used. In the use of steam power for grinding, he states that a uniform motion cannot be obtained without a fly wheel on any engine. The balance wheel must be proportioned to the work to be done. Its momentum must be one-fourth greater than that of the piston, that is, the product of its weight multiplied into its velocity, must be one-fourth greater than the steam pressure on the area of piston multiplied into its velocity. We must conclude, from the evidence which has come before us, that a single cylinder steam engine, when well made and arranged, can drive a grist or other mill more economically than a double cylinder engine.

Rejected Models.

From time to time we have enlarged our premises, and provided additional shelving for the benefit of our friends who deposit models with us for exhibition, or have sent them to learn if they possessed novelty of a patentable character.

We take the best care of all models entrusted to our attention that we possibly can, and so long as our shelving room will permit, they are safe, and many of them ornamental to our office, while inventors are benefitted by leaving them on exhibition. But so large has been the number received latterly, and so crowded are our premises, that we must dispose of several hundred models before the first of January next, to make room for the press of new ones, of which we are in daily receipt.

Such models as have been on our shelves the longest, and are of the most indifferent construction, of course we shall dispose of first. Persons having models of inventions in our possession which they conclude come under the above category, are advised to order them away at once; otherwise, about the first of January next, their specimens of ingenuity will be likely to be put to such a fiery ordeal as will render their restoration very difficult.

Seymour's Sewing Machine for Shoes.

This invention, for which a silver medal was awarded at the late Fair of the American Institute, Crystal Palace, N. Y., is manufactured by J. Seymour & Co., Newark, N. J.

British Association for the Advancement of Science.—No. 2.

Photographic Lithographs—Prof. Ramsey read a paper describing a process by Robert McPherson, of Rome, who had succeeded in obtaining beautiful photo-lithographs—specimens of which had been hung up in the Photographic Exhibition in Buchanan Street, Glasgow. The steps of the process are as follows: 1. Bitumen is dissolved in sulphuric acid and the solution is poured on an ordinary lithographic stone. The ether quickly evaporates, and leaves a thin coating of bitumen spread uniformly over the stone. This coating is sensitive to light, a discovery made originally by Niepce. 2. A negative on glass, or waxed paper, is applied to the sensitive coating of bitumen, and exposed to the full rays of the sun for a period longer or shorter, according to the intensity of the light, and a faint impression on the bitumen is thus obtained. 3. The stone is now placed in a bath of sulphuric ether, which almost instantaneously dissolves the bitumen, which has not been acted upon by light, leaving a delicate picture on the stone, composed of bitumen on which the light has fallen. 4. The stone, after being carefully washed, may be at once placed in the hands of the lithographer, who is to treat it in the ordinary manner, with gum and acid, after which proofs may be thrown off by the usual process. Prof. Ramsey then proceeded to state that the above process, modified, had been employed with success to etch plates of steel or copper, without the use of the burin: 1. The metal plate is prepared with a coating of bitumen, precisely in the manner noticed above. 2. A positive picture on glass or paper is then applied to the bitumen, and an impression is then obtained by exposure to light. 3. The plate is placed in a bath of ether, and the bitumen not acted upon by light is dissolved out. A beautiful negative remains on the plate. The plate is now to be plunged into a galvano-plastic bath, and gilded. The gold adheres to the bare metal but refuses to attach itself to the bitumen. 5. The bitumen is now removed entirely by the action of spirits and gentle heat. The lines of the negative picture are now represented in bare steel or copper, the rest of the plate being covered by a coating of gold. 6. Nitric acid is now applied as in the common etching process. The acid attacks the lines of the picture formed by the bare metal, but will not bite into the gilded surface. A perfect etching is thus obtained.

Boiler Explosions—On this subject Mr. Fairbairn, who had been appointed a committee to make experiments, stated that he had not been able, as yet, to make many experiments, but had a boiler made so as to determine not only the proportionate strength of boilers, but also to offer suggestions for their management. The boiler was 17 feet in diameter, with two internal tubes, 3 feet in diameter. It had stood a pressure of 80 lbs. on the square inch, but at 100, one of the tubes collapsed. Their object was to discover a means of proportioning the strength of all the parts. It was also desirable to discover something as to the elastic force of steam, and its properties. In reply to a question, Mr. Fairbairn said he had investigated no less than a dozen explosions, and there was in the press a series of papers, stating, so far as he knew, the causes. Sometimes they arose from gross negligence, but he believed the majority arose from excess of steam; and it was desirable to be able to proportion the strength of all the parts.

The Valley of the Amazon—Senor Susini read a paper on this subject. In his introductory observations he states that "talk as people may of Cuba and of Japan, of all the diplomatic questions of the present period, the most important and the most valuable as regards our country, is that of the free navigation of the above-mentioned majestic rivers and their tributaries. The regions watered by the Amazonas, reclaimed from the savage tribes, ferocious animals, and noxious reptiles which now infest them, and traversed by the plowshare, might be capable of sustaining the population of the entire globe. The district in question is pre-eminently adapted for the growth of rice, which commonly yields there forty-fold, and which is reaped five months after being planted in the ground, and irrespective of season." Senor Susini then described the characteristics of the South American climate and soil.

Screw Propellers—G. Rennie read a paper on this subject. He stated that from experiments which had been made under his observation, it was desirable that screws of vessels should be of small dimensions, light, and of rapid motion, and that their effect would be increased by their being as deeply immersed as possible. He also recommended the disk screw.

Several members questioned the effect attributed in the paper to deep immersion.

On Railways—W. B. Adams read a paper on this subject. In order to prevent the delay and inconvenience arising to other sorts of traffic from running express engines, he proposed the formation of express lines, which could be managed by a very small staff, without the expense of stations, and could run at the rate of fifty to sixty miles an hour. He proposed improved springs, better modes of communication, and larger carriages, with all convenience of arrangement, &c. He also proposed that an arrangement should be made with the French Government for the extension of the principle, and that a large steamer should be made to overcome the turbulence of the Channel, and projecting piers at Folkestone. He suggested that lines of rails should be laid on the level part of turnpikes, to be used either with horse or by means of locomotives. The latter might, when not in use, be employed in farm operations.

On a new Form of Cyanic Acid—Prof. Liebig read a paper on this subject. In the course of some experiments on the fulminate of mercury, he observed that that compound, when kept boiling in water, changed its color, and lost its fulminating properties. On examining the change that had taken place in the composition of the fulminate, he discovered a new acid, which had exactly the composition of cyanuric acid, but which differed entirely from that acid in its properties, and in the properties of the salts which are produced with the alkaline bases—salts remarkable for their beauty and for the distinctness of their crystalline form. Taking for the equivalent of hydrated fulminic acid the formula C.2, N.O. H. O., the new acid is produced in a very similar manner. The elements of three equivalents of the new acid. This acid is monobasic; its salt of silver is soluble in hot water, and crystallizes from it in long, silky, while needles.—The alkaline salts of the new acid are very easily prepared by boiling the fulminate of mercury with an alkaline chloride. The fulminate of mercury is first dissolved; then gradually two-thirds of the oxyd of mercury precipitates, and the alkaline fulminate, with a certain quantity of chloride of mercury and potassium, remains in the solution. By employing the chloride of sodium, or the chloride of barium, we obtain, of course, a salt of the new acid, with a base of soda or of barytes. With chloride of ammonium an ammoniacal salt is obtained, the crystals of which are distinguished from all others by their high degree of power and luster. These crystals belong to the Klinerhombic system, and possess double refraction almost as strongly as Iceland spar. The hydrated acid is easily obtained by decomposing the basic lead salt by means of sulphuretted hydrogen. It has a strongly acid re-action, and when reduced by evaporation to a state of syrup, it is transformed by degrees into a crystalline mass, which dissolves in alcohol, and which, by the action of acids, is changed into carbonic acid and ammonia.

Obtaining Glycerine—A paper on manufacturing glycerine, and its uses, was read by G. F. Wilson. The manner in which it is prepared is by placing a piece of common fat in a quantity of super-saturated steam; the fat is decomposed, and resolves itself into two substances, viz., an acid and glycerine. The latter having a taste like sugar, is applicable to the cure of burns, rheumatism, and ear diseases; it is a substitute for cod-liver oil, and also for spirits of wine; also for the preservation of flesh; and can be applied to photography and preserving animals in their natural colors.

On the Weight of Bread—Dr. Maclagan read a paper on this subject. He gave the results of some experiments which he himself had made. The amount of moisture in bread was less, and consequently the nutritive value greater, than was generally allowed. The late Prof. Johnson had stated that a sack of flour produced one hundred quartern loaves. But, according to his (Dr. Maclagan's) examination, the sack of 300 lbs. gave 94 1-4 loaves or bread. The majority of bakers were of the opinion that the sack produced, on an average, 92 loaves, and there was no great discrepancy between this and the result of his own analysis. Unfermented bread contains, of dry flour, 60, moisture, 10, water added by baker, 30. 300 lbs. of flour will yield 100 1-2 quartern loaves of unfermented bread.

Liebig made a few observations on the new mode of making bread introduced into Germany. Lime-water had been used in the preparation of the dough, and the loaf was rendered still more nutritive than that made by the common mode.

Value of Mechanics in Australia.

In an inaugural address lately delivered at the Mechanics' School of Arts, in Sydney, by Sir Thomas Mitchell, D. C. L., the President of the Institution, we find some noticeable details of the progress of that colony, and of the difficulties overcome in acquiring a geographical knowledge of Australia.—"In first scaling the hights of Australia Felix," Sir Thomas remarked, "a house carpenter was to me, in a small way, what Tullius Labienus was to Julius Cæsar in his passage into Gaul. Wheelwrights and blacksmiths were my best soldiers on the banks of the Murray. By such aids my little party were enabled to effect the passage of that great river during one of its mightiest floods, and at a season when the earth was so soft that our wheel-tracks, although made twenty years ago, are still visible in many parts where our progress with heavy carts through mud was not more sometimes than one mile in a day. Few are aware that but for very nice mechanical appliances, the expeditionary party that reached the shores of the Southern Ocean would never have returned. Two boats carried on a wagon, and slung in canvas so as to float within a frame, were taken from Sydney across the Blue Mountains, down the Lachlan, to the River Murray, so as to enable me to force a passage, as I have said, during a heavy flood, in the face of hostile natives. Again we packed up our boats, and carried them to the Glenelg, navigating and surveying which at one time we reached that shore which now encircles so much wealth. Through mud, the same boats were brought back; and through 'Expedition Pass,' where, as if to efface all remembrance of such toils, the very name of 'Mount Byng' has been changed to Mount Alexander." In building bridges for the infant colony there were great difficulties until Sir Thomas accidentally lighted upon "a mechanic, who was then employed on day wages, cutting the coping-stone of the dwarf wall in front of the Council Chambers in Macquarie street. I allude," the lecturer stated, "to Mr. David Lennox, who left his stone wall at my request, and with his sleeves still tucked up, came with me to my office, and undertook to plan the stone bridges we required, make the centering for arches, and to carry on such work, by directing and instructing the common laborers then at the disposal of Government. Thus originated all the bridges this colony possesses at all worthy of the name." Another mechanical genius is thus commemorated: "When our late King's Astronomer at Parramatta, Mr. James Dunlop, F. R. S., was assisting the fitting-out of an exploratory expedition, destined for the interior, in 1835, he conld not find in the blacksmith's shop at Parramatta a pair of pincers that would grip the cistern of a mountain barometer he wanted to unscrew and repair. To the amazement of surrounding smiths, he thrust the useless pincers into the fire, set the bellows a-blowing, with the hand of a master in the craft, and very soon produced upon the anvil the form he required for his purpose. Mr. Dunlop was a remarkable instance of original genius. Originally a mechanic, his mind rose to the noblest objects of human pursuit, and whilst at the Observatory of Parramatta, he was the referee on all subjects connected with astronomical phenomena, much assistance did he afford on other subjects—even in mechanics. The boat carriage alluded to above was modelled by Mr. Dunlop.'

[The above is a noble and just tribute to the value of mechanics in Australia, and is applicable to those of all nations. It is, however, designed as an advice to every mechanic to study and show himself to be a thoroughly accomplished, in short, a scientific workman.—Let no mechanic lose heart in laboring day after day faithfully in learning to do all things well. David Lennox, the stone mason mentioned above, learned to be a scientific man. He was not content with merely acquiring the art of cutting stone, and putting up a common wall; no, he studied practical architecture, and became a mason engineer. He labored patiently, and learned well, and at last he found his right place. The same may be said of James Dunlop. Many instances of the same kind have come under our own observation.

The Discovery of Making Shot.

In the Scientific American of the 17th in giving an account of a cast-iron shot tower and shot making, it is stated that this method of making shot originated with a plumber named Watts, in Bristol, England, who about the year 1782 dreamed he was out in a shower, and the clouds rained lead instead of water.

I was well acquainted with the family of Watts, and you are correct in attributing the discovery to them, but not to Mr. Watts. The following account of the discovery I obtained from them personally, and being rather singular, I present it to the public through your valuable paper:

Watts was by trade a plumber, and all shot, previous to this discovery, was made by persons engaged in that business. They let the melted lead drop into water, and the part that first came into contact with the liquid was always flattened. Mrs. Watts assisted her husband in the business, and it was her particular province to cast the shot. They were both anxious to make them round, and Mrs. W. was one whole day employed trying if she could round them; she dropped the metal into oil, and many other liquids, but they all came out indented on one side. She retired to rest that night full of anxiety, her mind being entirely absorbed by round shot. During the night she dreamed of going into a neighbor's shop, a hatter by trade, and while talking to him she heard shot falling, and on asking him if he made shot, he went out, brought in a handful, and they were perfectly round. In much surprise, she exclaimed, "my God, how do you make them round?" "By dropping them from a great hight," says the hatter. Mrs. Watts awoke under the exciting discovery, aroused her husband, informed him of her dream, when they both dressed themselves, tried it from the highest place on their own premises, and found the shot rounder than before, but still indented. The next day they tried it from the tower of St. Thomas' Church, that leans some feet over its base, when they attained shot rounder than the home attempt, but not yet perfect. The next attempt was made in the shaft of a coal mine, a few miles from Bristol, at a place called Kingswood, and from this trial they obtained perfectly round shot. Watts ascertained the hight necessary to make them round by trials at different depths, entered a caveat for a patent, made known his discovery to a wealthy acquaintance, erected a shot tower, realised eighty thousand pounds, undertook to erect a large block of buildings at Clifton, sunk all he had made before they were half finished, and became poor in his old age. I have passed this unfinished block many times, and it was called Watts' Folly.

Wm. Partridge.

Binghamton, Nov. 29, 1855.

Three Masted Schooners.

Eckford Webb, of Greenpoint, L. I., has already constructed two three-masted schooners that have excited very general attention among ship owners, in this country and in Europe.—Two others of 700 tuns each are now being built by him, for Thomas Dunham & Co., this city. The first, which will be named Hartstein in honor of Commander Hartstein of the navy, is already in frame, and the other nearly so. Their dimensions are: 143 feet on deck, 19 1-2 feet hold, and 32 1-2 feet breadth of beam. Live oak and locust constitute their frames, they are planked with white oak and ceiled with yellow pine. These vessels are designed for the freighting business between New York and Glasgow, Scotland.

TO CORRESPONDENTS.

E. C., of Vt.—You ask us for advice upon a subject in no way connected with our business, and request us to reply by mail. You could not expect us to furnish the information, even if in our power to do so, and write you a letter prepaying the postage. This would be charging us for the privilege of giving you valuable information.—Those who write to us expecting a reply by mail, should always enclose a stamp to pay return postage, and if it is on business not pertaining to our professional avocation should remit a small fee for our trouble in looking up the information. Our correspondence is immense, and the postage tax is consequently very heavy.

M. B. T., of N. Y.—The machine to which we think you refer was patented by Ward & Hubbell, of Naugauck, Ct. It consists of a cutter wheel made of a series of metallic rings secured to a shaft, and the cutters attached to the periphery of the circle, are adjustable. The pattern is developed on the surface of the cutting cylinder reverse to the shape intended to be turned. The spokes are geared so as to rotate with this cutting cylinder, and are then cut out according to the shape given to the knives. Several spokes might be arranged, we should think, to be cut by the cylinder of knives.

A. D., of N. Y.—It is always much better to place the engine and boiler as closely together as possible.—If, however, it is desirable to remove the boiler a considerable distance from the manufactory for purposes of safety, much care is necessary in protecting the pipes from the action of cold—they should be covered with thick hair felt, or any other non-conducting substance, over which wrap a covering of canvas. By this means steam has been carried more than 800 feet without condensation. This was successfully accomplished at the London Exhibition, where the steam boilers were placed a sixth of a mile from the engines. At the French Exhibition an attempt was made to carry the steam through copper pipes a distance of nearly three-eighths of a mile without covering them at all. It failed as any sensible engineer ought to know it would, and before the steam was half through the pipes it was little better than tepid water. Iron pipes were substituted, and covered, and the result was successful.

F. S., of Pa.—The "pneumatic battery" is an English invention. The gunpowder is deposited in its proper place, and a gutta percha syphon tube extends upwards from it, and descends into a gutta percha vessel containing sulphuric acid, another gutta percha tube extending to any distance necessary for the safety of the operator, connects the vessel with an air pump. A few grains of white sugar and chloride of potash are mixed together and placed on the top of the gunpowder, then the air pump is worked, which forces a little sulphuric acid through the syphon, bringing it in contact with the sugar and chloride, and the chemical action produces an instant explosion. It has been successfully employed for mining and quarrying.

R. B., of N. Y.—We understand your plan to be the using of two water wheels, the one placed above the other, the first to drive mechinery in a factory, and the second or lower one to pump back the water to the cistern of the upper wheel. You may depend upon it, that it makes no difference whether the power of the water is admitted on two or one wheel, it will require the whole power of the water from the top of the entire fall to pump back the water from the bottom of it, the loss of friction is not counted in this estimate. The power of the water will be expended on the first wheel, the same as if it were a single fall in itself. To get the full value of the power of the water, it should leave the wheel without motion. Do not be discouraged with one mistake; that will never do.

T. S., of Tenn.—The hot-blast in cupolas, after melting the iron, is used over again in many iron works for raising steam, and for other purposes. Dr. Nott obtained a patent for using the waste heat of smelting furnaces, more than twenty years ago. Your plan, as described, for using the heat over again, could not be patented.

T. A. R., of Ohio—Gun cotton is better than gun powder for blasting rocks, but as it requires nitric acid to make it, it will rise in price equally with gunpowder, since both are made from saltpeter. You will find a full description of the method of making it on page 211, Vol. 8, Sci. Am.

H. Van O., of N. Y.—The straw paper which you have sent us is not so good nor so beautiful as other samples received by us, of the same material. The Philadelphia *Ledger* is printed on paper made of straw mixed with rag pulp.

J. R. E., of Mass.—It will cost you but little to try an experiment with your eccentric air boxes. You will then find out that the pressure is equal on all sides, and will not make a perpetual motion.

D. H. M., of Ohio.—Why not give your own conclusions respecting the weight required to break a model brick and stone arch, of the dimensions stated, before you ask the opinions of others on the subject?

J. H. W., of Va.—We will endeavor to get you the information respecting the æolian harp.

M. P. W., of Mass.—The small ball dropped into a hole in the earth would exactly reach its attracting focus and move in a straight line.

B. C., hr., of N. H.—The heat of compressed air may be used to heat water and generate steam, but a surplus power cannot thus be gained, by using the compressed air to return the force that was employed to compress it. The reason is, that when deprived of its heat, it loses its elasticity—re-active force.

T. D. J., of Mich.—Some of the aroma of coffee is expelled by burning the beans in an open pan. The best way to roast them is in a close sheet-iron cylinder made to rotate over a moderately hot fire. The beans should be enclosed in a tight tin case immediately after roasting.

J. W. P., of Mich.—It has been attempted to use air compressed by a water wheel, and forced to a distance of two miles through a pipe, to drive machinery, but it was a failure. The best way to use the water power of Niagara, is, as we have stated, on the spot.

S. R. J., of Pa.—In answer to your letter we would state that it is possible there is the difference you speak of in the floats, but we are correct in our reference to the patent of 1852 for a float having an adjustable cutter connected to a shank by means of a pivot which turns loosely in the bearing, so as to permit the float to adjust itself to the proper positions to cut the pegs from the heel to the toe of the boot. You have not the exclusive privilege to make your invention until the Letters Patent are issued. That is the object of the issue of the patent.

I. W., of ——Please send us a model of your water wheel, and we will proceed with it. Send also Patent Office fee, $30.

G. T. B. E., of Vt.—It is customary in all but the smallest engines to use the steam expansively, which is effected by cutting off the supply after the piston has made only a portion of its stroke—sometimes one half, and often much less—and not exhausting till the stroke is completed. This can be done, and is done in most cases with only one cylinder, though there are engines in which the steam is worked at light pressure in one cylinder, and exhausted into a larger one, in which it is used on the low pressure principle.

M. P., of Md.—The data of Mr. Conger and ourselves respecting the amount of atmospheric pressure on a square foot, was obtained from tables of experiments, with apparatus measuring the wind's velocity. We would like to get the data of experiments of the pressure of the atmosphere on a body moving through it at the rate of fifty or one hundred miles per hour. It may be sometime before we can publish your letter.

J. McM., of Ky.—We are of opinion that there is nothing patentable in your molds for casting. It has been customary when a hard surface has been required on any portion of a casting to make the corresponding portion of the mold of metal. That portion of the mold has also been made hollow and supplied with water by a tube. In view of this, and the use of cast iron molds for casting other metals, there is not novelty enough in your invention to entitle it to a patent. It seems to us that the metal molds are not applicable to the casting in iron of any articles but those which are required to be or would admit of being chilled all over.

B. P. F., of Mich.—The sketch of your sash fastener has been examined. By reference to page 312, Vol. 9, Sci. Am. you will there find an engraving of the same invention. It has been secured by patent and therefore there is no hope for you.

R. H. B., of Ct.—Your adjustable desk appears to be a very convenient affair, and in consideration of the advantages it possesses of being arranged so as to enable the writer to sit or stand, we should think a patent ought to be granted for it. We confess, however, that we are somewhat doubtful on this point, on the ground, not of utility, this is self-evident, but on the ground of novelty, which it scarcely possesses. A cabinet maker has no moral right to use it without your consent. Your legal rights, however, are only secured by the actual issue of Letters Patent. We have sent you a circular of instructions.

E. G., of Leipsic, Saxony—We have carefully examined the drawings and specification relating to your improved gig mill. You can take a patent in this country after the invention has been patented in other countries. Only one model and one set of papers can be employed under one fee, therefore there was no necessity in your sending several sets of drawings, covering several modifications of the machine. There is in use in this country a machine for stretching cloth in the direction of its width, which is essentially like yours, therefore you must abandon all expectation of a claim upon it. The connection of the draft wheels one with another, for obtaining a continually uniform tension of the cloth throughout its length, is not patentable, as it is customary here to connect such parts of any machine as are required to move at corresponding speeds, and the adaptation of such connection to any particular machine involves no invention. The other points embraced in your invention we believe are new and patentable.

G. M., Jr., of Ill.—We do not discover anything patentable in your boiler setting, as substantially similar setting, with flues similarly arranged, has been employed for boilers of portable steam engines.

M. B., of Ky.—The binding of your volume is paid for. Will retain as desired.

L. Bellinger, Mohawk, N. Y.—Wishes to procure a machine for turning wooden match boxes.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Dec. 1, 1855:—

W. & K., of Iowa, $25; R. T. S., of Geo., $30; J. V. B., of Ill., $25; S. B. R., of Vt., 30; J. H., of N. Y., $10; E. T., of Ct., $30; S. A. K., of S. C., $30; S. S. T., of Pa., $10; W. M. McG., of —— $30. C. & P., of N. Y., $100; J. A. A., of Ct., $25; C. E. B., of N. Y., $30; G. T. T., of Mass., $250; G. L. I., of R. I., $50; T. W. L., of N. Y., $50; J. H. P., of N. Y., $30; J. L. & Co., of Ill., $25; J. J. B., of N. Y., $10; D. E. H., of N. Y., $10; C. B., Sr., of Ind., $10; S. & B., of Mich., $60; M. & B., of S. C., $10; S. T., of Ind., $50; I. Z. A. W., of Pa., $35; E. V. P., of N. Y., $50.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Dec. 1:—

W. H. B., of Pa., (2 cases); W. C. B., of N. Y.; D. L., of N. Y.; W. W. H., of Va.; W. & K., of Ind.; T. H. of England; R. D., of N. Y.; J. A. A., of Ct.; S. T., of Pa. R. W. J., of Ind., A. E. & W. H. C., of N. Y.; S. A. K. of S. C.; G. L. J., of R. I.; J. L. & S., of Ill.; T. D., of N. Y.

Science and Art.

Are the Position of Countries Changing?

As the remains of tropical animals are found in England, and other countries nearer the arctic regions, some philosophers have concluded that there must be a slow motion of different portions of the earth towards the north, and that England was, at one time, situated in the tropical regions, and will, in the course of ages, be covered with perpetual snows, and lie under the dayless gloom of the Arctic circle. It is true, that the remains of animals now inhabiting the tropics are found in England, thus affording evidence that the climate of that country must have been much warmer at some former period, or that these animals were endowed with powers to live in a colder climate. Another class of philosophers—the plutonists—entertain the idea that the earth was once a mass of molten fire, and having afterwards cooled slowly, the internal heat given out at one period gave a tropical temperature to the present arctic regions, thus enabling tropical animals to flourish there.

The advocates of the plutonic theory have been very cautious in fixing the time when the earth was in its intensely heated state, but the "pole-changers"—those who advocate the different theory described—have not shown so much prudence. At the late meeting of the British Scientific Association, Evan Hopkins, author of a work on geology, and a believer in the change of the earth's polar position, also a believer in magnetism being the cause of the motions of the heavenly bodies, expressed his opinion in a paper on the Geological Changes of the Earth, that about 9,000 years since England basked under a tropical sun, and was now slowly drifting up to the north pole. These views created some fun and discussion among the *savans* present, but from the published remarks, none of them answered him conclusively, as they ought to have done.

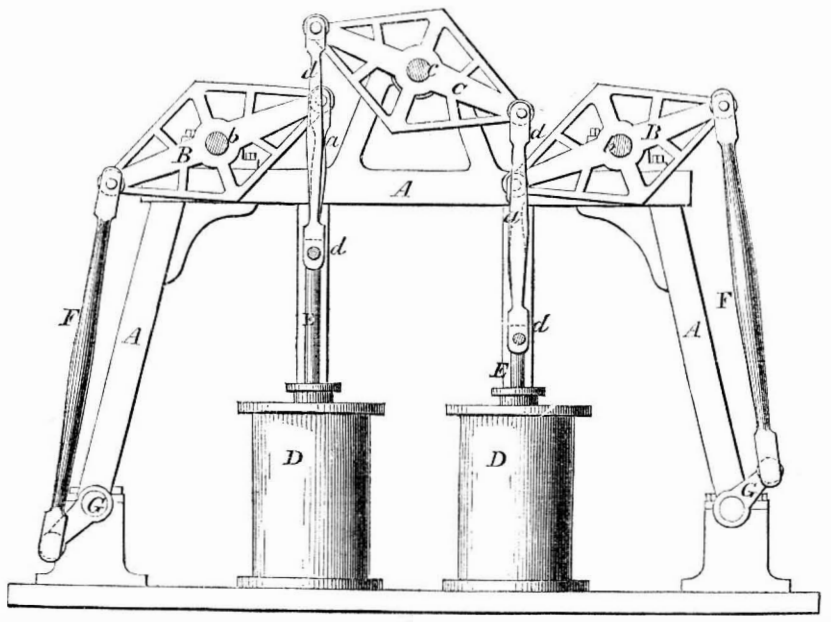
As Britain lies between the degrees of fifty and sixty latitude, it follows, that in order to have moved fifty degrees from the equator in 9,000 years, it must have been running north at the rate of one degree in one hundred and eighty years, (9,000÷50=180,) or about 69 miles,—2,024 feet every year. If Britain had moved at this rate, from south to north, since 1575—fifty-five years after the landing of the Pilgrims—we rather think it would have been found out by this time. Instead of having thus moved, however, all the observations and measurements of geographers and astronomers do not give a single point of variation in the change of England's position on the globe for 200 years. Mr. Hopkins should have been more cautious; he ought to have placed the period of change 1,000,000 instead of 9,000 years, and then, in all likelihood, he would have acquired a very high reputation for profound investigation and observation. There is nothing like a little obscurity in treating such subjects; most of the philosophical theorists know this, and practice upon it.

Blackening for Foundries.

E. Bow, of Glasgow, Scotland, has recently patented the application or employment and use of what is commonly known in Scotland as the "Boghead or Torbane Hill mineral," or coal, in the manufacture or production of what is technically known by the iron founder as "blackening," used for foundry purposes in the preparation of the molds in which castings in metal are to be made. The argillaceous bituminous mineral, hereinbefore referred to, is prepared for use, in the manufacture of blackening, by subjecting it to the action of heat. It is taken as dug from the earth, and is primarily burnt or distilled, or otherwise treated by a heating process, in such a manner as to evolve and carry off its chief volatile constituents—the solid residuum or cinder alone being retained, and applied in the preparation of the blackening. This residual matter or cinder is ground or reduced to the condition of a powder, in any convenient manner, and the reduced mass, so prepared, is treated in any ordinary manner, as pursued in the manufacture of blackening of the common kind. The blackening prepared in this manner is of excellent quality, and is much cheaper than that usually employed. Although the Boghead and Torbane Hill minerals have been mentioned as the material especially suited for the manufacture of blackening for foundry purposes, yet all coals or mineral substances, of the class or family above indicated, or embodying the general constituents of these minerals, and Parrott coals generally, are suited for carrying out this invention. The patentee claims the application and use of what is commonly known as Boghead or Torbane Hill mineral or coal, or other argillaceous bituminous minerals embodying the general constituents of such substances, in the manufacture or preparation of blackening for foundry purposes.

The same kind of blackening can be made from the Cannel coals of Virginia, Pennsylvania, and Kentucky, and as great quantities of it are used throughout our country, it might be a very profitable business to some of the owners of coal mines to engage in its manufacture.

DOYLE'S PATENT ON BEAM ENGINES.



The accompanying figure represents a new arrangement of two beam engines connected to drive parallel shafts, for which a patent was granted to Thomas Doyle, of this city, (N. Y.) on the 6th of last November.

The invention consists in the arrangement of two beam engines in line with each other—that is to say, with their beams in the same plane—and with the cylinder ends of the engines contiguous to each other, and connecting their piston rods or beams by an intermediate beam. By this means the two shafts which are parallel with; and at some distance from each other, are caused to rotate at an uniform speed. The main object of this invention is its application to drive two pairs of paddle wheels to propel a vessel, but it may also be used for driving two parallel shafts for other purposes.

A A is a strong frame-work supporting the bearings for the centers, *b b* and *c*, of the engine beams, B B, and intermediate beam, C. D D are the cylinders, the centers of which are at a distance apart about equal to the engine beams. E E are the piston rods, which are connected with the beams, B B, in the usual manner by links, *a a*. F F are the connecting rods, and G G the crank shafts. The intermediate beam, C, is of a length to correspond with the distance between the cylinders, and consequently of about the same length as the engine beams, B B. Its center, *c*, is placed at an equal distance from both engine beam centers, *b b*, and higher than the latter centers, in order that the intermediate beam may work clear of the engine beams. The connection between each engine and the intermediate beam is effected by means of two long links, *d d*. With the above method of connecting the engines, the cranks of the two shafts are always kept in opposite positions, and when one piston is descending the other is always ascending. This mode of connecting the engines appears to form a simple and effective arrangement for driving two shafts, to which it causes the power to be transmitted equally if the resistance be equal, or always in proportion to the relative amount of resistance.

More information may be obtained by addressing Mr. Doyle, at No. 47 Nassau st., N. Y.

Lead and Iron Pipes.

The *Daily Times* of the 30th ult., in an article on the above subject, describes very correctly the difference between the two kinds of pipe for conveying water, pointing out the advantages and disadvantages of each. But, as it describes only small pipes for domestic use, of course it only refers to lead and wrought iron pipes, the latter being liable to rust, and decay rapidly.

If small cast-iron pipes could be made as cheap and neat as the wrought iron kind, they certainly ought to be preferred to all other pipe. They are not liable to rust like those made of wrought iron, and they are more safe than lead, inasmuch as salts formed by the action of pure water on lead are poisonous.

Proposition to Convert the Ohio River into a Slack Water Canal.

At a late meeting of the Pittsburg Board of Trade, Mr. Ellett submitted a proposition on the subject of improving the Ohio river, by converting it into a slack water canal. The suggestions were unanimously approved by the Board, and were earnestly recommended to public consideration. The distance from Pittsburg to the mouth of the Ohio is 977 miles with an aggregate fall of 425 feet. It is assumed that to convert the entire river into slack water would require only fifty locks, an average lift of eight and a half feet, which would create pools of an aggregate length of 132 miles. The average cost of the work is from $7,000 to $10,000 per mile, which is supposed to be about half the expense of an ordinary canal, or about one-third the average cost of a railroad.

Alumina in Soapstone.

The Rev. Samuel Haughton, on a late tour in Cornwall, had occasion to examine the serpentine porphyry at Kynance Cove and Gue Grease. In the porphyry there are only traces of alumina to be found; at these places the serpentine is traversed by dykes of granite, and the soapstone lies spread out in sheets at the junction of the serpentine and granite. He therefore, considers the soapstone to be the result of the contact of these rocks at a high temperature, the serpentine giving the magnesia, and the felspar of the granite supplying a sufficient quantity of alumina to form the soapstone. The result of an analysis of soapstone at Kynance gave—Silica, 42·47; alumina, 6·65; magnesia, 28·83; water, 19·37; making a total of 92·32. That from Gue Grease did not materially differ. Mr. Haughton differs both from Dr. Boase and Sir Henry De la Beche; he does not consider it diallage, as they did, but altogether of serpentine.—[London Mining Journal.

We regret to learn that Capt. Ericsson had a part of two fingers cut off last week while experimenting with a working model of a new air engine.

The California steamship "*George Law*" brought two millions of gold into this port last week.

Literary Notices.

THE CONSTITUTIONAL TEXT BOOK—A Familiar and Practical Exposition of the Constitution of the United States, and of portions of the Public and Administrative law of the Federal Government, by Furman Sheppard. Childs & Peterson, publishers, No. 124, Arch st., Philadelphia. This is a happily conceived and admirably arranged text book for the use of schools. It treats of subjects that are vastly important to every citizen of the Republic, and it is a matter of regret that so many of our people who boldly approach the ballot box on every election day are so confoundedly ignorant of the fundamental principles of the government, and of the history of our country. To correct the general ignorance that exists in regard to our Constitution, we urge this valuable work, not only for the use of schools generally, but we also urge every citizen in our land to purchase a copy for family use. A great deal of solid and useful information can be gathered from it. The book has a valuable appendix, which contains, first, the Declaration of Rights. Second, the Declaration of Independence. Third, the Articles of Confederation. Fourth, Washington's Farewell Address to the Americans—a rich legacy, which cannot be read too often, or esteemed too highly for its sound counsel and fatherly admonitions. The work contains about 325 pages, and cannot cost over $1.

THE CRISIS is a very ably edited journal, devoted to the doctrines initiated by Emmanuel Swedenborg. The Editor, Rev. H. Weller, comes up boldly to the discussion of all the abstruse points in theology, and no doubt feels an abiding confidence in the doctrines he professes. It is not our province to join issue with the "Crisis," in discussing the subjects treated in its columns, we merely announce the *animus* and *status* of the work, that our readers may know where to find this exponent of Swedenborgism. Published at Laporte, Ind.

THE OLIVE BRANCH—Published weekly in Boston at $2 a-year, by E. A. Norris & Co. This paper was established many years since, by Thomas F. Norris, the father of the present proprietor. It has attained to an influential circulation, and has long been known as one of the purest and most unexceptionable family journals extant. It loses nothing by age, on the contrary, it seems to be improving in tone, quality, and temper, and compares favorably with any other literary and miscellaneous journal now published. We wish the "Olive Branch," what it so well deserves, a long life of prosperity and usefulness.

PUTNAM'S MONTHLY—This excellent magazine for December, is a capital number. It contains a very judicious and friendly criticism of Longfellow's new poem, "Hiawatha," an article on the "Armies of Europe," "Life among the Mormons," concluded, and several other fine literary effusions. Dix & Edwards, No. 10 Park Place, publishers.

BLACKWOOD'S MAGAZINE—The November number of this sterling monthly contains the continuation of the "Crimean War," by an officer in the army, and also the continuation of "Zaidee," a romance. It contains an able and interesting review of the gifted Prof. Johnston's last work, "The Chemistry of Common Life." We wish that every person who can read would read it. This is an excellent number. Messrs. Leonard Scott & Co., publishers, No. 54 Gold st., N. Y.

The NATIONAL MAGAZINE, for December, reminds us of the approach of sturdy old winter, with its piercing winds, blustering snows, and happy firesides—alas! and cheerless ones, too. The article on "Christmas Customs" suggests the days of "Auld lang syne," and makes us almost "wish we were a boy again," once more to live over those happiest of our days. But they are gone to an eternity of days, we know not where. This magazine is full of interest this month, and sustains its excellent reputation for high moral and intellectual worth. A new volume begins with January. Carlton & Phillips, publishers, 200 Mulberry st., N. Y.