

steam engines, as on men of war, and in warfare for casting shell, etc., and in many other situations. In foundries where it is found requisite in cases of "breakdowns" to work unexpectedly late at night, this invention will be of great value, as it can be got to work within a very brief time without any engine power. A further improvement in this apparatus will shortly be completed, by means of which the upper portion of the cupola will be surrounded by a boiler, which will supply steam to the cupolas at a still further reduction on the present trifling cost. Several of the largest ironworks in Manchester are applying the invention to their present cupolas; and there is little doubt that in a few years this mode of smelting iron from the ironstone as well as from the pig will become general.—*Iron Trade Circular.*

#### RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

**Hernia Truss.**—This truss is a very superior one for ordinary inguinal hernia, whether by the oblique or direct descent. The pad is of an elongated, conoidal form, and is so arranged as to adapt itself most perfectly to the groin and thigh, to which it is secured by means of a soft, buckskin strap. The spring extends as far as the spine, where it is connected with a band carried round above the opposite hip, and fastened to the pad in front. The device is well suited for cavalrymen, mechanics and laborers, who are obliged to perform varied and sudden movements and contortions of the body, as it does not shift its position upon the parts. Its merits have been confirmed by reports of investigation by adepts in the medical profession. The inventor of the above is Dr. C. W. Betzel, of Philadelphia, Pa.

**Illuminated Sign.**—The object of this invention is to obtain a sign with transparent letters so constructed and arranged that it may be inserted in a sidewalk flush with the pavement or upper surface thereof, and be sufficiently strong to sustain the weight of persons passing over it, and admit of having a light placed under it, to render the letters visible during the night. J. L. Tarbox, New Orleans, La., is the inventor.

**Mouthpiece for Cigarettes and Cigars.**—This invention consists in the use of short, rounded pieces of rattan or bamboo, which are purified before use by passing steam through the pores of the same. They are afterwards inserted in the ends of the cigarettes, which are filled with Killickinick or other tobacco, in the usual manner. The advantages of this mouthpiece are that it absorbs the oil of tobacco contained in the smoke, and prevents the fine particles of the tobacco from being drawn into the mouth, and it affords a clear draft, and its cooling properties are great, for the reason that the smoke is obliged to pass through so many small holes in the mouthpiece before it reaches the mouth, which tends to purify it as well as cool it. The same article is also used as a mouthpiece for cigars, which provides a firm bearing for the teeth while smoking. The advantages of cigarettes over cheap cigars are, that they last nearly as long, draw freely, and are of uniform quality. T. C. Richards, of New York city, is the inventor, and the cigarettes are manufactured by Richards & Co., of No. 97 William street, New York.

**Shingle Machine.**—This invention relates to a new and improved shingle machine of that class in which a circular saw is used, and it consists in having the bolt from which the shingles are cut fitted in a swinging frame, arranged in such relation with the saw, provided with a novel feed mechanism, and operated in such a manner that the shingles will be sawed from the bolt and the latter fed to the saw by an automatic arrangement throughout. Isaac N. Voris, Pescadora, Santa Cruz County, Cal., is the inventor.

**Boring Wells.**—This invention has for its object the boring of oil and other deep wells, and it consists, among other things, of a method of clearing the bore of the well of the debris produced by the action of the drill, by forcing water down through the drill rod, which is made hollow, and compelling it to ascend outside the rod to the surface of the earth, bringing with it the said debris from the bottom of

the bore. Leonard Atwood, Norwich, Conn., is the inventor.

**Fire-arms.**—This invention promises to revolutionize the art of war, by placing in the ranks or in a defensible position an effective force equal to one hundred and fifty discharges per minute from each gun. From experiments made under the inspection of ordnance officers, a rate of three discharges per second was kept up, the penetration being superior to the Springfield rifle, and the range being varied from one hundred to eight hundred and fifty yards. It was conceded that one of Mr. Gatting's guns worked by two men would put a larger number of shots into an average target at four hundred yards than one hundred men. The shooting was performed under the inspection of the officers having charge of the experimental department. The barrels and locks rotate in concert and continuously, and each load is delivered as its barrel arrives at a certain point. Fixed ammunition is used, being fed to the gun from cases set into a hopper. R. J. Gatting is the inventor.

**Loom.**—This invention consists in the application of two endless screws gearing in wormwheels on the axles of the calendar rolls, which carry the warp threads and the finished fabric in such a manner that a positive and uniform strain is exerted on the fabric as well as on the warp threads, and no back motion is possible; also in a peculiar shedding motion, consisting of a rocking frame applied in combination with the rolls delivering the warp threads, in such a manner that by the rocking motion of said frame yarn is given to the tread at the proper intervals, and the strain exerted on the warp threads by the operation of producing the shed is materially reduced; further, in a peculiar device for producing the selvedge on both edges of the worm fabric by imparting to one or two threads, at each side of the loom, an up-and-down motion independent of the motion of the harness; also in a peculiar double stop-motion, consisting of a rockshaft which extends across the loom in front of the batten and which is provided with two hooks, one at either end, to operate in combination with an oscillating dog and with the belt shipper, in such a manner that when the weft thread breaks or gives out at either end of the shuttle race the oscillating dog engages with the tail of one of the hooks on the rockshaft and the belt is changed; but if the weft thread is intact in its place, the hooks by coming in contact with the same turn the rockshaft and the oscillating dog produces no change in the position of the belt. Wm. Tunstell, assignor to T. H. Conklin, No. 33 Courtland street, New York, is the inventor.

**Improved Governor.**—This invention consists in the use of two semicircular springs hinged to the top of the governor spindles, in combination with three balls, two of which, with the governor balls, are secured to the springs on opposite sides of the spindle, whereas the third ball or weight is connected to the lower ends of both springs, and also to the rising and falling rod, which connects with the throttle valve in such a manner that when the speed of the engine rises beyond a certain point, the gravity of the middle ball or weight and the force of the springs are overcome by the centrifugal force of the governor balls, and the valve is partially or wholly closed; and as the speed of the engine slackens, the gravity of the weight and the force of the springs cause the governor valves to recede and the valves open. The governor balls are secured to the springs by means of screw rods, so that they can be adjusted closer to or further from the center of rotation and the governor can be adapted for different speeds without changing its driving pulley. F. S. LaFrance, of Elmira, N. Y., is the inventor.

**Sewing Machine.**—This invention relates to certain improvements in that class of sewing machines which are used to sew on the soles to boots and shoes, and the mechanism is arranged to imitate the operation of sewing on the soles to turned round shoes, or to such shoes which are turned inside out in order to sew the soles to the upper. A curved hook needle inserted into a suitable head is made to pierce the sole and upper, which are secured to the last and held in the proper position by an adjustable gage. The last is adjustable on a movable platform, which is arranged to receive lasts of different size, and an adjustable feeder feeds the work along and determines the length of the stitches. The stitch is pro-

duced by the combined action of the hooked needle, of a looper which works side by side with the needle, and catches and retains each loop, until the needle with a new loop has passed through, and of a curved oscillating thread-guide, which delivers the thread at suitable intervals to the hooked needle. The stitch is drawn up tight as the needle recedes, and during the time the needle moves forward, and the thread is relieved from all strain, the feed takes place, which would be impracticable during the time the thread is subjected to a strain, or while the needle recedes. M. J. Stein, New York city, is the inventor.

#### Coal at Cost.

*Hunt's Merchant's Magazine* contains an article on the "Coal Fever," from which we extract a part referring to coal-at-cost companies: it gives an insight into the management of them:—

One day a man came into the office of the writer—an honest hard-working letter carrier, who had proved his thrift by laying up from such a slender business, a little sum of \$200. He came to ask about one of these companies—whether he would better invest his \$200 in ten shares of the stock, and so be insured an annual perpetuity of ten tons of coal at cost. "Why do you think of it?" asked I.

"Because you fellows are making three or four dollars a ton out of me on coal."

"Speak for yourself, my friend—I have no interest in coal, though I know others who have. But how do you know that anyone is making three or four dollars a ton out of you?"

"Because everybody says so. Didn't the \_\_\_\_\_ have an article last night saying that coal can be bought at Mauch Chunk at \$3 50, and sent here for \$3 50—making \$7—and here," pulling out a receipt, "is Anthracite & Co.'s bill for my last at \$12."

"True, and in another column of the same paper you find the notice of the 'Consumers-own-your-own-mines Company,' don't you?"

"Exactly, and as I thought you knew something about it, I just came in to ask you."

"Well," I suggested, "I don't know that there is any connection between the two notices, and I'm sure the honest editor has no suspicion of it, but I happen to know something of the company spoken of, and advise you to turn over in your mind as you carry round your letters, the reason, if you can, why people are so anxious to sell their coal property, when they are getting five dollars a ton profit on the product."

The poor fellow scratched his head doubtfully; but suddenly a bright idea struck him.

"It is always the way with you fellows," he said—determined to class me with the capitalists—heaven send he be a prophet! "You are always keeping a fellow down. You are in the trade, and you want to keep me from getting coal cheap. I'll put into this company and try it."

"But," I replied, with missionary spirit, "suppose a time comes when coal is sold by all the dealers at considerably less than cost, as it will be, if they have any stock on hand when the war ends, and gold goes down—what then?"

"Well, then I won't buy my coal of my company, but get it as cheap as I can."

"But what will become of your stock, then, in a company that was 'watered' 100 per cent, and that has to sell coal under that disadvantage below cost?" Scratch.

"And then, suppose coal continues high and profitable, what is to prevent your company from passing a resolution some day that they find this supply of subscribers at cost a losing operation, and rescinding the whole arrangement?"

"But they can't do it."

"Don't trust them—that's my advice."

My friend gathered up his package of letters, smiling.

"Ah, you fellows are always down on a poor man—I believe I'll take the stock."

And so he will, and the fact may be a good enough comment on the uselessness of advising a man who has made up his mind.

On the 31st December last there were 143 Lenoirs' gas engines working in Paris, and giving every satisfaction to the users. The Paris Gas Company state that the sale of their gas has increased in consequence of the use of these engines.

**Improved Spading Machine.**

This machine is intended to be attached to an ordinary wagon box or frame, and be operated from the wheels or axle of the same, so that by this attachment and an ordinary vehicle as much work can be done as with a heavier and more costly machine.

This device is so simple in its construction and action that it hardly needs a detailed description. That the reader may comprehend it clearly, however, we will state that the spades, A, which may be of any desired form, are fastened to the rods, B, and that these rods receive a thrusting motion from the crank shaft, C, which is to be driven by a pulley or gears from the wheels of the wagon. The rods, A, have slots or grooves, D, in them, in which there are pins, E; these pins have rollers, so that they work easily in the grooves.

The reader will observe that the groove is formed at the bottom (near the spade) into a spiral, so that when the rod, A, is forced through the stationary collar, F, on nearing the bottom the pin runs in the spiral and turns the rod, so that a twisting motion is given to the spade, such a movement, in fact, as is given by the laborer in turning up the ground. One of the spades, it will be seen, is shown turned edgewise; this is the position assumed in leaving the ground; that of entering is shown with its face forward. If deemed desirable, forks may be used instead of spades, and an attachment may be put on so as to distribute manure at the same time. This machine was patented through the Scientific American Patent Agency by Charles H. Stratton, of Towanda, Pa., Jan. 10, 1865. For further information concerning sale of rights, etc., address as above.

**Improved Stone Lifter.**

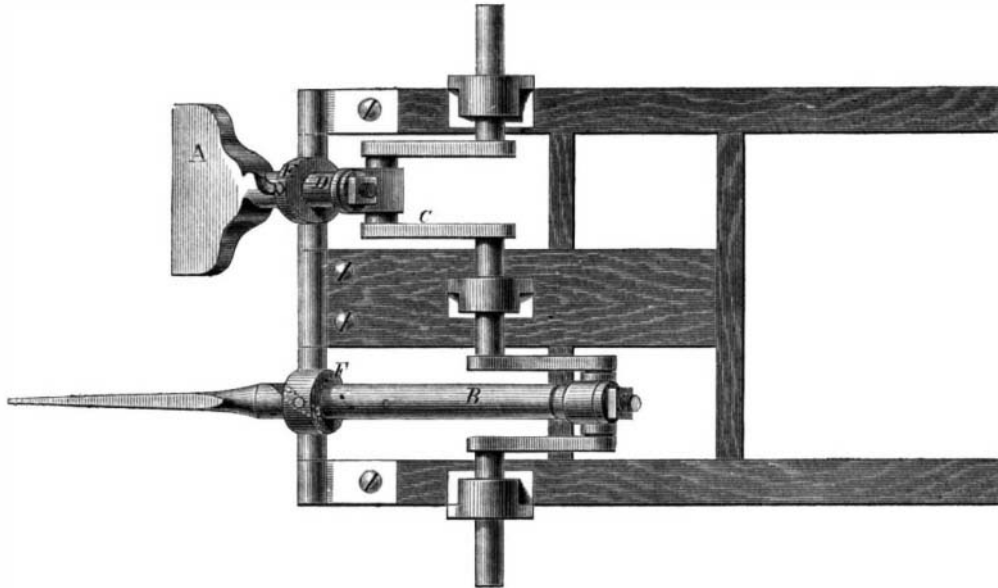
Farmers, road-contractors and others will appreciate the stone-lifting truck herewith engraved, for it is so simple in its construction, and withal so efficient, that rocks of great size and weight, which could not be moved on a "stone boat" or sledge, can be easily transported by it to any point and there thrown off. The expedition with which this can be done is one great point in its favor, for it adds very much to its utility. The appended description will enable every one to understand its construction and operation.

The truck has a strong wooden frame, A, well supported by bolts and braces, which is mounted on the wheels, B. These wheels run between the sides of the truck frame, which is so constructed as to afford a clear space in the middle to swing the stone in.

The forward end of the frame is carried on another truck with one wheel underneath, and two strong legs or braces, C, run from the truck frame to the upright, D, which carries the lifting machinery. This latter is simply a wheel and axle, E, one of the mechanical powers having a chain which is wound over the axle in opposite directions. This chain has a pulley wheel at the bottom to which is fixed a hook, which fastens in the sling around the stone to be lifted. By simply

removing the team from the pole of the machine and attaching it to the chain, F, the stone is raised, and may be sustained by the pawl and ratchet, at G, while it is carried off the field to its final destination.

The peculiar feature in the forward wheel or wheels is, that by turning it or them at right angles with the other pair behind, the truck is firmly anchored without requiring any other attachment. The pulley receives the front end of the chain and guides it, at the same time obviating the necessity of using a

**STRATTON'S SPADING MACHINE.**

snatch block, which takes time, and is a trouble to secure. Thus all the necessary qualities of a stone lifter are provided in this machine. An application for a patent is pending through the Scientific American Patent Agency. For further information, address Gilbert L. Sheldon, Hartsville, Mass.

**The Magnesium Light for Light-houses.**

The *London Mechanics' Magazine* says:—An extensive series of experiments have recently been made in France with a view to testing the suitability of the magnesium light for light-house purposes, and for signaling at sea. The result of these experiments appears to be that, for the applications in question, the light of burning magnesium is not only by far the

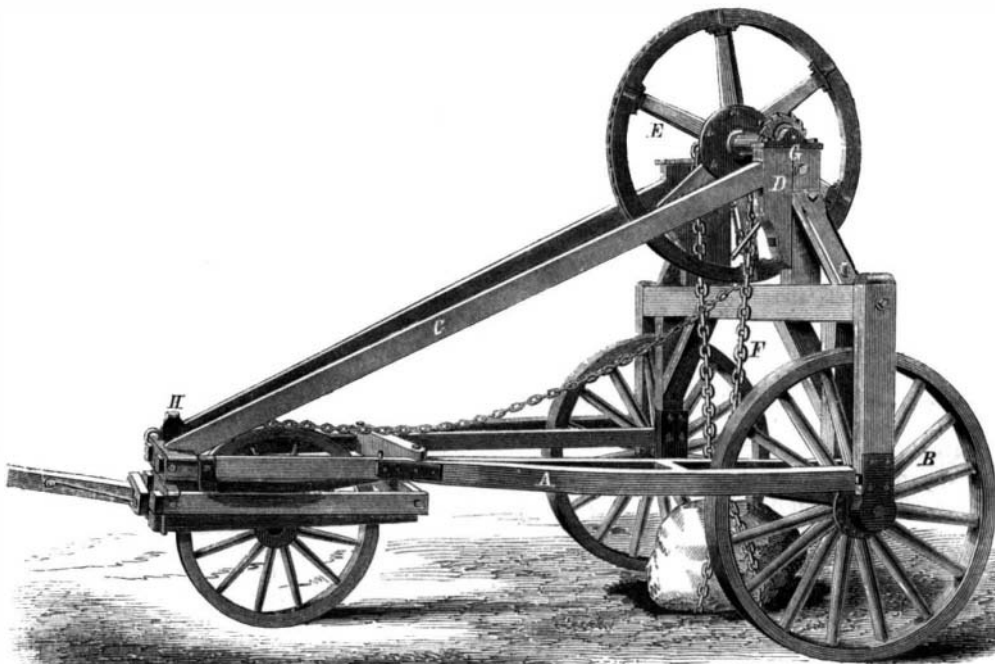
light as a magnesium flame; and whereas the electric light requires for its production very complicated apparatus, difficult of transport, costly to work, and very liable to get out of order, all that is required for the production of the magnesium light is a supply of magnesium wire and a match to light it, while enough magnesium wire to supply a light-house for a whole night could easily be carried in a waistcoat pocket. As regards cost, M. Gaudin, of the Bureau des Longitudes, who has gone very minutely into that question, reports that, for signaling at sea, with magnesium at thirty shillings an ounce—its price has been reduced within the last fortnight to twelve shillings an ounce—the magnesium light need cost only one penny per signal, for signals visible for twelve miles at noon-day, and for thirty-six miles at night. By means of burning magnesium, the commander of a ship at sea might illuminate the ocean on every side of him, as often as he chose per night, and at a cost of only a few shillings per time, sufficiently to enable him to see any object which at the same distance from him he could see by day, and might thus prevent any vessels which wished to elude him having any better chance of doing so at midnight than at broad noon.

**ANCIENT MEXICAN ZODIAC.**

*Le Monteur* says that M. Montholon has just caused to be executed a copy of the great Mexican zodiac which was disinterred in the foundations of the grand temple of Mexitli in 1790, and which is now deposited against the northeast wall of the cathedral. This zodiac is an enormous stone of porphyritic trap, with a base of basalt, thirteen feet in diameter, and weighing 25 tons.

The sculpture in relief has all the finish of Mexican works. The concentric circles, the divisions and subdivisions without number, are traced with mathematical exactness. The more this sculpture is examined in detail the more there is discovered that taste for the repetition of the same forms, that spirit of order, that sentiment of symmetry which, among semi-civilized people, replaces the sense of the beautiful.

This zodiac, to which is joined a calendar, shows that the civil year of the Aztecs—solar year—was 365 days. It was divided into 18 months, of 20 days each, after which there were added 5 complementary days before commencing a new year. As among the people of Benin and the ancient Javanese, 5 days constituted their week. They had periods of 13, 52 and 404 years. Their civil day, like that of the Persians, Egyptians, Babylonians, and for the most part the people of Asia, with the exception of the Chinese, commenced at

**SHELDON'S STONE LIFTER.**

the rising of the sun. As among the Romans, it was divided into eight intervals, four of which were determined by the rising and setting of the sun and his two passages of the meridian. The comparison of the Mexican zodiac with that of Denderah cannot fail to be of great interest for science. The copy made by M. Montholon is expected soon in Paris.