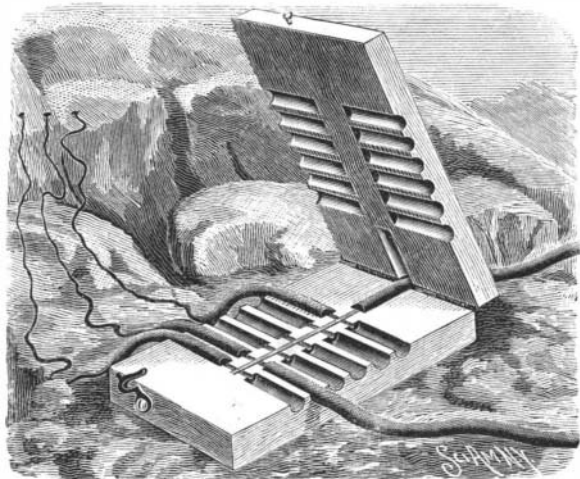


A MULTIPLE FUSE IGNITER.

The device shown in the illustration is designed to promote safety in blasting, providing for such purpose a simple and very efficient means of safely holding and simultaneously firing any number of fuses. The improvement has been patented by Mr. William J. C. Doyle, (box 874) of Aspen, Col. It consists of two block-like pieces, hinged together, so as to be folded one upon the other, and firmly secured in such position by a

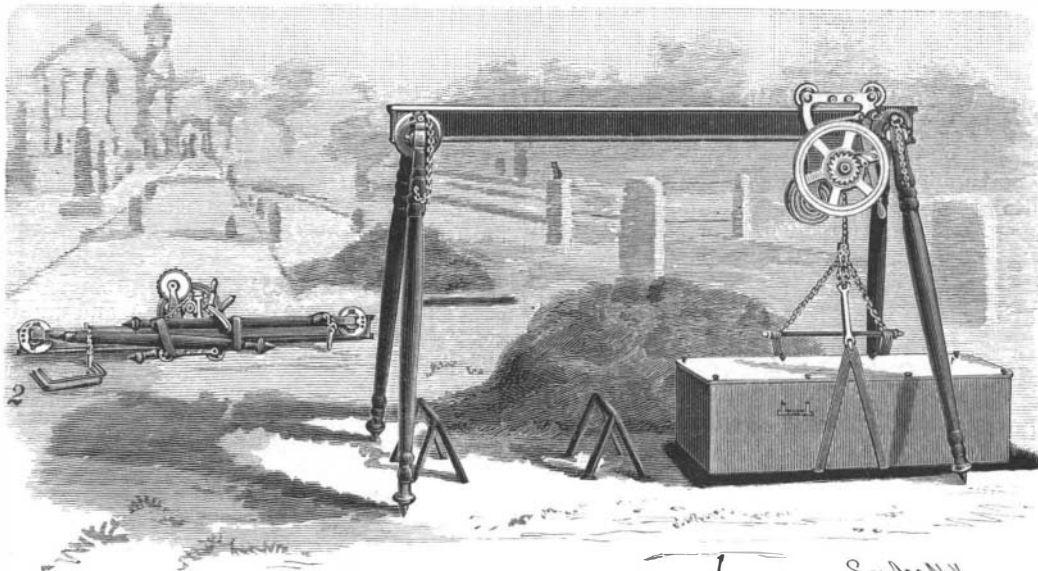


DOYLE'S FUSE IGNITER.

simple form of fastening. On each side of the inner faces of the blocks are short semi-cylindrical grooves, which, when the parts are closed, register and fit closely upon the fuse, and these several grooves are connected by a small branch groove in one of the blocks, this groove being adapted to contain fine powder, by which fire may be communicated to the several fuses. The fuse by which the others are fired may be located in the registering grooves in the hinged end of the block. If desired, ordinary black powder may be mixed damp to form a paste and moulded into the small branch grooves to dry there in position. For wet blasting, the edges of the blocks may be first smeared with cartridge soap, to make a water-tight joint.

A COFFIN-LOWERING APPARATUS.

The accompanying illustration represents an improved apparatus for the use of undertakers, the small view showing the device folded for transport. It has been patented by Mr. John B. Beugler, of Dayton, Tenn. Upon a beam supported by four legs travels a carriage having friction rollers and a lock lever by which the carriage may be locked in a desired position. Near the center of the carriage are depending ears in which is pivoted a grooved pulley in side recesses of which are coiled springs, one end of each spring secured to the wheel hub and the other end to the ears. A chain attached to this wheel passes over a sprocket wheel on a shaft, which also carries a large loosely mounted grooved wheel outside of the carriage, a ratchet wheel on the shaft being engaged by a pawl on the loose wheel, the latter being surrounded by a brake strap and acting as a brake wheel, for which a brake lever is held in convenient position. The lower end of the chain is attached to a bar, to each end of which one end of a strap is secured, the opposite ends of the straps being also connected by a shorter bar. A locking device of novel character is employed, by which the proper adjustment is effected when the casket has been placed upon the straps. This adjustment is readily made with the coffin either at the foot or side of the grave, when, by turning the large wheel, the coffin is sufficiently raised to be readily guided to the proper place in the grave or vault. The operator, by means of the brake lever, has full control of the speed of descent, and should the coffin catch or lodge



BEUGLER'S APPARATUS FOR LOWERING BURIAL CASKETS.

on any projection, the locking device would not cause its release. When, however, the coffin comes to rest, the chain is slightly slackened, and the locking device then disengages itself, and the chains with the straps constituting the sling are automatically carried upward out of the way, the chain being rewound. The legs being adjustable, the device is designed to operate on a side hill as well as upon level ground.

"THE EXPERT" RUBBER BAND DATING STAMP.

The R. H. Smith Manufacturing Company, of Springfield, Mass., who have been for over twenty years leaders in the manufacture of rubber stamp goods and who are the sole owners of the metal-bodied rubber type so widely used, have recently placed on the market a new dating stamp called "The Expert," that has a number of valuable and novel features. The illustrations which we give in this connection show the construction of this stamp very clearly.

The dates and other shiftable printing characters are upon three endless belts, which are mounted to revolve around a central core, the lower end of which forms the backing for the characters while in position to print. From the upper side of this core block rise three standards, the center one for the day belt being highest, as that belt has thirty-one characters and the other two but nineteen each; central on each standard rises a thin blade-like support having a crotched or open bearing at its top end, and upon each of which freely revolves a steel wheel having a central axis. The belts run over these wheels and are shifted by a very novel device which clamps the belt firmly to the wheel, moving both along just the distance from one printing face to another. Between each wheel and the flat shoulder of its standard is interposed an elliptical sheet steel spring, having a slot through it allowing it to pass on over the blade; the lower edge of the wheels resting upon the crowned side of the springs, which, by the tension of the belts, are compressed nearly straight, thereby imparting to each band a gentle tension of about four ounces, and as the belts are so made as to bend only in squares, each square of printing characters is thus effectually held in line while printing—an important advantage never before attained.

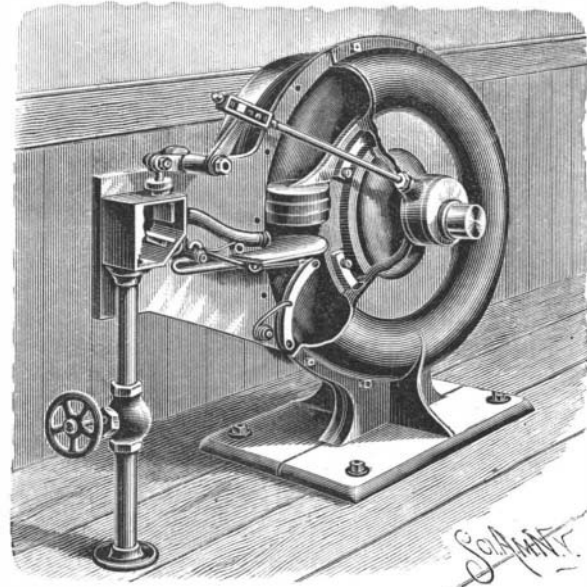
The case or shell is cast all in one piece, of hard, white metal, with partitions running through the center, forming a compartment for each band, making it impossible for the bands or their wheels to interfere with each other or become displaced. The core, with its mounted printing belts, slides into the case on substantial guides, and is adjusted to the height of the fixed die by screws passing through ears at each end of the core block, drawing it against a spiral spring in a manner admitting of ready adjustment to the thickest or thinnest die, or even a die thicker at one end than the other.

All of these parts are clearly shown in the accompanying engravings. The finger piece of each shifting clamp projects through a slot in the case. The whole is well made and nickel plated. It will also print the day of the week in connection with any hour of the day, and the side of the stamp on which the year is given has a number of words not found on any other stamp, such as "Received," "Ans'd," "Ent'd," "Paid," "Filed," "Sent," etc. This stamp is an important advance in dating stamps. The manufacturers will be pleased to give additional information to those interested.

EXPERIENCE in electrical welding shows that the metal is strengthened at the point of welding.

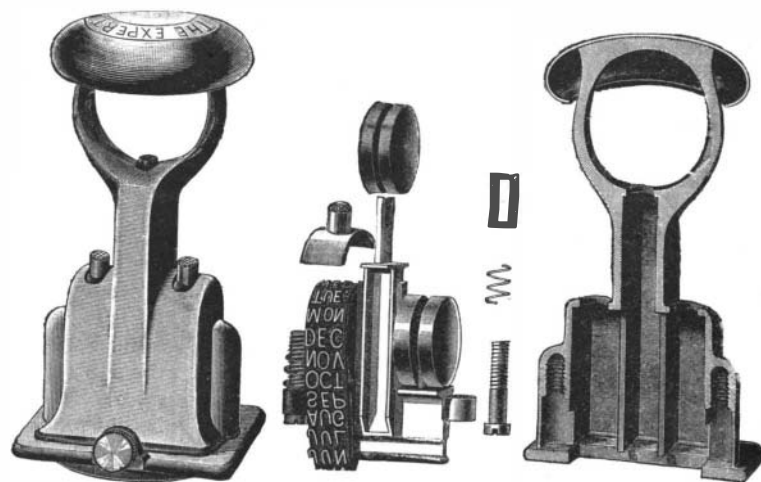
AN IMPROVED ROTARY ENGINE.

This improved engine, which has been patented by Mr. Hermann Betten, is designed to utilize the steam or other motive agent to the fullest advantage. The cylinder and its base preferably con-



BETTEN'S ROTARY ENGINE.

sist of two parts bolted together, and the piston, secured on the main shaft, has a circular head traveling in the outer circular space of the cylinder. Below the steam inlet pipe a gate is arranged to slide into or out of the cylinder, a spring-pressed arm connected by a link with the gate holding the latter in its inner position, as shown in the illustration, during the most of the revolution of the piston. As the revolution is nearly completed, the piston head strikes the arm, whereby the gate is drawn outward until the head has passed. The gate is also pivotally connected by a link with a



NEW RUBBER BAND DATING STAMP.

valve in the steam chest, so that the steam is shut off during the time the gate is withdrawn as the head is traversing this portion of the cylinder. The steam chest has a transverse partition dividing it into two compartments, one of which is connected with the source of steam supply and the other with the pipe leading to the cylinder. In the latter compartment slides the cut-off valve controlling the amount of steam admitted to the cylinder, this valve being connected with one arm of a bell crank lever, and the other arm of the lever being adjustably connected with an eccentric rod operated from the main driving shaft. This form of engine may be arranged with two cylinders attached to a main driving shaft if desired.

For further information relative to this improvement address Messrs. Naber & Betten, New Vienna, Iowa.

World's Fair Notes.**A WHALER AT THE FAIR.**

The old whaling bark Progress, which has now reached Detroit on her way from New Bedford, Mass., to Chicago, where she and her contents will constitute for the benefit of World's Fair visitors a complete exhibit of the whale-catching industry, has a remarkable history. She has made 17 trips around Cape Horn, all of them successful. Forty times has she crossed the Arctic Ocean in search of the whale and his valuable blubber. In 1869 she set sail and joined the Arctic fleet. In 1871 terrific storms scattered the fleet and all met disaster except the Progress, which came back to New Bedford with 300 sailors, seven captains, five women, and three children, the survivors of the wreck. She carries six whaleboats, which have all seen actual service, and each one is provided with a complete equipment of paraphernalia. These boats are sharp at both ends, and can be driven at great speed by six good oarsmen.

Plaster of Paris.

The Berlin *Bautechnische Zeitschrift* gives some curious particulars in regard to the use of plaster of Paris. The employment of this material is much less general with us than it is abroad, but there are still many mechanics and artists here who would like to know enough of its properties to handle it to advantage. In the first place, a great deal of plaster of Paris is spoiled in the calcination by the notion that it is necessary to raise it, like quicklime, to a high temperature. The consequence is that the commercial plaster is burned very much at random in kilns, which deliver one portion overburned, and, therefore, inert, a second portion underburned, and also inert, and the rest calcined to the proper degrees, but, if coal is used for burning, often contaminated with sulphide of calcium, and, therefore, unsuited for use. Before delivery, all these qualities are ground up together, the mixture thus depending for its setting quality entirely on the comparatively small percentage of properly burned and pure plaster which it contains. In consequence of this irregularity of the commercial material, sculptors abroad usually prefer to calcine their own plaster. They buy, when they can, powdered gypsum from a deposit known to be granular, rather than stratified, and heat it on a sheet iron plate over a gentle fire to about the temperature of boiling water. If there is good access of air to the mass of gypsum, the heat may be somewhat less than that of boiling water, and it should never much exceed it, or the resulting plaster will be overburned and inert. As the heating of the gypsum powder proceeds, steam, or watery vapor, disengages itself from the mass, at first first freely, and then locally, from little craters, which form themselves for a moment and then disappear. When this phenomenon is observed, the powder should be stirred until the craters cease to form, and a cold piece of glass held over the heap of powder is not dimmed by the vapor. The operation is then complete, and the plaster should be removed from the fire and allowed to cool. So prepared, plaster can be used over and over again. After it has been mixed with water, hardened and used for moulds, it is still plaster, with nothing added but water, which can be driven off by pulverizing and heating the powder exactly as before, when the plaster is recovered in as good condition for use as ever.—*Am. Architect.*

Soldering Metal for Aluminum.

This is the invention of Alexius Rader, of Christiania, Norway. It consists in combining cadmium, zinc and tin mixed in substantially the following proportions, viz.: cadmium, fifty parts; zinc, twenty parts; tin, the remainder. The zinc is first melted in any suitable vessel, then the cadmium is added, and then the tin in pieces. The mass must be well heated, stirred and then poured.

This soldering metal can be used for a variety of different metals, but is especially adapted to aluminum.

The proportions of the various ingredients may be varied in accordance with the use to which the article is to be put. For instance, where a strong and tenacious soldering is required, a larger proportion of cadmium can be used; where great adhesion is desired, a larger proportion of zinc would be used; and where a nice and durable polish is desired, a greater per cent of tin would be used.

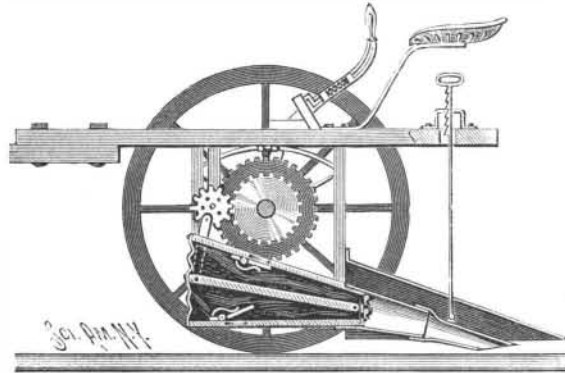
The alloy thus made, independent of its use as a solder for aluminum, is light in weight and capable of taking a high polish.

THAT inebriety is a disease of a physical nature is susceptible of the clearest demonstration, and is generally recognized. There is now no question or doubt of its being hereditary, and no one doubts that it is acquired by social customs. That it is also a disease of the moral nature, engendered by allowing the intellectual faculties to remain inactive, by not exercising the power of conscience and will, by permitting the

power of appetite and passions to dominate over conscience, by the lack of a positive character, by defective moral education, and by the want of self-culture, is equally as certain, and can be as clearly proved.—*Dr. Day.*

A NOVEL DEVICE FOR BLOWING DUST FROM HIGHWAYS.

"It is as important to remove the worn-out material from a stone road as to put on new material," and "all mud should be brushed from the road surface before applying more stone." These were leading precepts in the mind of John Loudon Macadam, the



ROAD CLEANER-SECTIONAL VIEW.

Scottish engineer whose name has for half a century been connected with the excellent road-making system he introduced, and which now everywhere bears his name. Road making, after his system, was practically commenced in England in 1816, and within eight years from that time over twenty thousand miles of the public roads of Great Britain were macadamized. The proper cross section and grading being established, with adequate provision for thorough drainage at all times, the Macadam system primarily consists of laying small angular broken stones directly upon the earth, a yielding bed being preferred to a rigid foundation, and the angular shape of the stones causing them to bind together to a greater or less extent, as they are fixed in their places first by the roller, and afterward by the traffic upon the road. The number of courses and their thickness and the different sizes and kinds of stone will, of course, vary with the location and circumstances and the amount to be expended on any given length of roadway, but the precepts above quoted, as to the removal of dust and

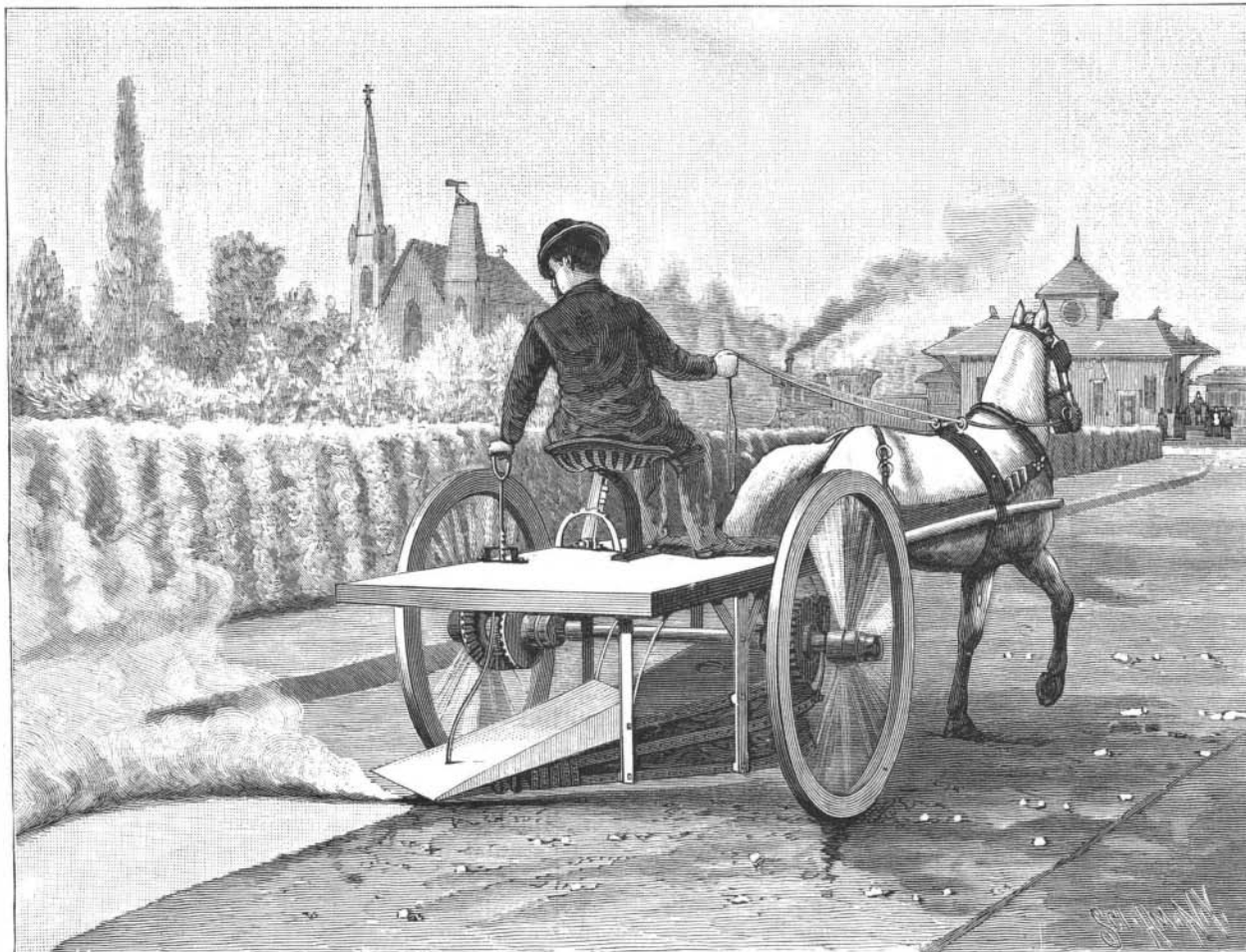
whence it may be conveniently removed, as may be desired by the operator of the machine. This feature of the machine adapts it for use for efficiently cleaning streets in country towns as well as for work on the public roads beyond such limits.

Upon the inner face of one of the two traction wheels, loosely mounted on the axle of the machine, is a bevel gear meshing with a bevel pinion supported by a bracket, the pinion meshing with a bevel gear splined upon and having a slight longitudinal movement along the axle. The latter gear is moved by a hand lever extending upward through the platform, and having a thumb latch for engagement with a rack or other keeper, the arrangement being such that, according to the adjustment of the hand lever, the axle will or will not be rotated, as may be desired, by the revolution of the traction wheels as the machine is drawn along. A double-acting bellows, supported in a diagonal position under the platform, affords a continuous blast of air when the machine is in operation, the top and bottom plates of the bellows being rigidly attached to the supports, and a central pivoted partition having an up and down movement communicated from a gear mounted on the axle. An adjustable connection, through a pinion, affords means of giving more or less throw to the central pivoted partition of the bellows, or other gearing may be employed to increase the power of the bellows, the force of the air blast being readily adjustable for the purpose of placing the dust in windrows at one side or blowing it to a distance from the road. The bellows has a supplemental nozzle, adjustable vertically and laterally, the distance at which this nozzle is supported above the ground being conveniently regulated by a hand lever within easy reach of the driver. To keep the dust from flying upward, a hood covers both the nozzle proper and the auxiliary nozzle.

It will be seen that, by means of this machine, an air blast of almost any desired force may be obtained, and that it can be readily directed by the driver in such way as to be most efficient in completely clearing the roadbed of dust or any light or loose foreign matter. The great advantage this machine has over brushes is that there is nothing in the air blast to wear out or to remove the solid part of the roadbed.

The subject of road making has come into a good deal of prominence during the past few months, largely from the efforts of a few public-spirited individuals, who have taken pains to point out, in a most conspicuous manner, the generally wretched character of our roads. Road making has been too

much neglected since the railway age set in, and the farmer and country people generally are paying dearly for such neglect. In the making of new roads, using broken stone, and rolling, as is most common, there has lately been started a healthy movement, but it will be years before we shall see such an improvement as is most urgently to be desired. It has been more for the sake of aiding such efforts than for any other reason that this inventor has given his attention to the subject, and has constructed the practical and efficient machine shown in the illustration.



J. J. ASTOR'S PNEUMATIC ROAD-CLEANING MACHINE

loose material from the surface, apply in all cases where a good and permanent roadbed is to be maintained.

The pneumatic road-cleaning machine shown in the accompanying illustration, which has been invented by Mr. John Jacob Astor, of New York City, and a model of which is in use on his place at Ferncliff, Rhinebeck, N. Y., is especially designed to facilitate the thorough, rapid, and inexpensive removal of this worn-out material, or detritus, from the roadbed, either blowing it into the bushes or over the adjacent fences at the side of the road, or laying it in windrows,

connection with electrical instruments for measuring the velocity with which the shots traveled. In the test made, the object was to obtain the velocity of a 250 pound shot fired from an 8 inch gun with a charge of 81 pounds of hexagonal prismatic powder. The standard set down for these conditions is 1,700 feet per second, or at the rate of about 1,200 miles per hour. The instruments showed a velocity of 1,702 feet for the first shot fired; this came so close to the standard that further tests were considered unnecessary. This is said to be one of the most satisfactory tests made in the history of modern ordnance.

The Velocity of a Cannon Ball.

The first firing was done on the new proving grounds of the Bethlehem Iron Works on the 28th of July. Screens were arranged in