

IMPROVED SELF-LOCKING PADLOCK.

The novel form of self-locking padlock represented in the engraving is the invention of Mr. D. K. Miller, of Philadelphia, a well known safe and bank clock manufacturer and a lock expert of some celebrity. In points of workmanship and construction the device possesses the merits of simplicity and convenience; while its durability is enhanced by its being made entirely of brass. The pins at all movable joints are wrought of that metal, so that deterioration from the effects of weather is amply provided against.

Fig. 1 shows the exterior of the lock and its key. In Fig. 2 the outer plate is removed in order to exhibit the mechanism. A is the dog, which is so pivoted as to fit into a recess of the latch, B, when the latter is pushed down. The end of the lower arm of the dog is formed with an angular projection, C, which, engaging against a properly shaped shoulder at the bottom of the recess, holds the latch in the position mentioned, in opposition to the upward tending force of one arm of the spring, D. At E are the tumblers, either six or seven in number, according to the size of lock, all of which are pivoted on a single pin, and each provided with a bent wire spring, as shown. The upper portion, F, of one of these springs, instead of taking, as do the others, against the projecting part in the shell, is brought forward and under the straight arm of the dog, so that its tendency is to force the lower arm of the latter against the tumblers, causing the projection, C, to enter notches in the tumblers when the same are brought into proper position.

It will be readily understood that, owing to the angle of the notches in the tumblers, and to the dog being in a solid piece, it is only when all the notches coincide that the projection can enter them; and hence, if each notch were placed in exactly the same position on the edge of the tumblers, then any square bit of metal pushed in through the key aperture, at G, would lift all the tumblers together until the coincident notches met the projection. But this evidently would at once defeat the purpose of the invention, for one of its main features is that no two locks are alike: the key that fits one must be, and is, entirely useless to open another. The important advantage, however, is easily secured by varying the positions of the notches on the tumblers; so that in order to render all the notches coincident, a key having peculiarly formed projections and recesses at its extremity must be employed, which, acting on all the tumblers simultaneously, lifts each the exact distance required.

The key is merely pushed into the proper aperture, freeing the dog as above described, and allowing the latch to be acted upon by the spring, D, and so lifted upward into the position indicated by the dotted lines in Fig. 2. Motion in this direction is then limited by the catch, H, which is held against the side of the latch by the upper arm of the spring, D. The angular projection shown on the left hand lower corner of the latch engages in a corresponding projection in the catch, the lower part of the latch being guided in its ascent by the dog on one side and the straight part of the catch on the other.

We learn that this invention has, after thorough testing, and against a number of competitors, been adopted by the United States Government. The present device was patented in this country July 26, 1870, and October 21, 1873. Similar protection has been obtained in England, France, and Belgium.

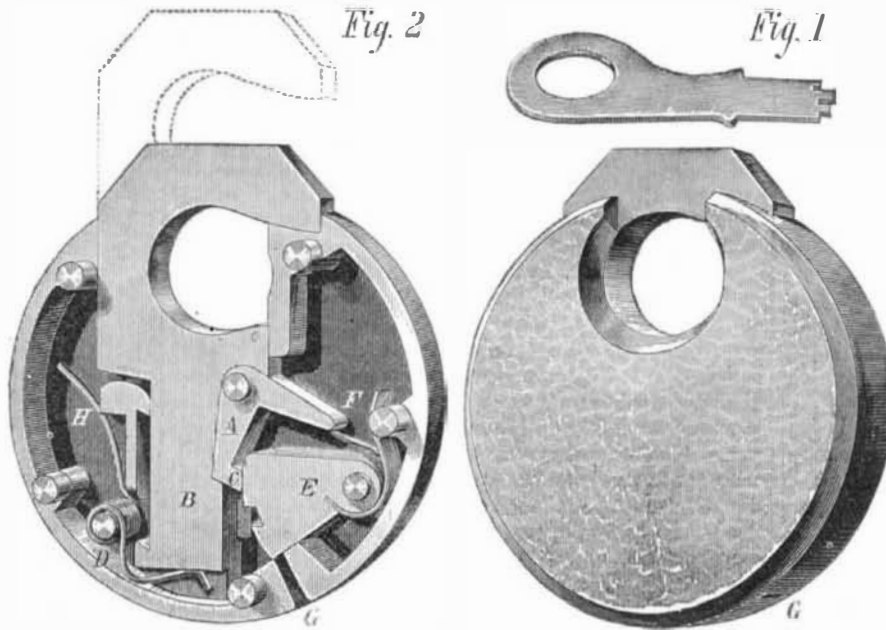
For particulars regarding sale of foreign patents and other information, address the manufacturers, the D. K. Miller Lock Company, 712 Cherry street, Philadelphia. The locks are for sale by the hardware trade generally.

IMPROVED DISINTEGRATOR.

Among the industries based upon the utilization of waste products, that of grinding bones, in order to prepare them for use as fertilizers, is believed to be one of the most profitable. Immense quantities of material are obtainable in the neighborhood of cities, and especially in the cattle raising districts of the Southern and Western States, and this, we are informed, at a cost which, including the expense of transportation to almost any locality in the country, renders the erection of mills and machinery, for its preparation, no small inducement to investors.

The disintegrating mill, which we illustrate in the annexed engraving, is especially adapted to the treatment of bones as above mentioned, and also to the pulverization of a large variety of other substances. Among these may be noted Peruvian guano, alone and mixed with other mate-

rials; South Carolina phosphates, also either alone or mixed; and slaughterhouse tankage, bone ash, salt cake, carbonated soda, cracklings, coal, corn and cob, sugar, oyster shells, clay for fire and building brick, animal matter in almost all conditions, mortar, cement, and numerous others. The machine consists of several cylindrical cages, formed of round bars secured to disks and annular rings, one inside the other, and made to revolve in opposite directions, presenting, however, no scrubbing or grinding action. The materials to be disintegrated are received into the inner cage, and, by the rapid revolving of the cages, are projected through the latter by the creation of a powerful centrifugal force. The ef-

**MILLER'S IMPROVED SELF-LOCKING PADLOCK.**

fect is to disintegrate the substances by a system of free blows from which no friction ensues.

The strength, durability, and capacity of this mill are very great. No skilled labor is required for its running, and the operations of sharpening or dressing are, of course, done away with. As ordinarily constructed the machine, it is claimed, will pulverize the hardest known ores. In bone grinding, where large pieces of wrought iron (that is, larger than $\frac{1}{2}$ or $\frac{3}{4}$ metal, pieces of which do no harm) are found in nearly every lot of bones, the disks of the mills to be used for the purpose are so reinforced that the entrance of a large fragment of iron can do no more damage than to break a few pins, and these last, owing to peculiar construction, may be quickly and readily replaced.

For grinding coal and pitch for coke and patent fuel ma-

Compressed Air as a Street Car Motor.

Some time ago, in discussing the question of a cheap and effective motive power, for street cars and for use under similar circumstances, where opportunities exist for replacing the stored-up force after its employment for a given time, we intimated the possibility of some mechanism being devised whereby, for the purpose, the power of a strong spring might be advantageously employed. The suggestion, like many others which have appeared in these columns, set one person, at least, thinking; the train of thought led to experimenting, and this, in the end, has culminated in the invention of a novel plan for the adaptation of the natural spring of compressed air to the impulsion of street railway cars.

We have recently inspected a working model of a vehicle provided with the new machinery, and have obtained from the inventor, Mr. Henry Bushnell, of New Haven, Conn., an outline of the proposed plan. The project will, in a measure, call to mind the fireless locomotive, inasmuch as it requires the use of relay stations at which the power expended, in making the intervening journeys, is restored by filling the reservoirs with new supplies of the motor. At these stations the air is compressed into strong receptacles (by means of machinery devised by the above named inventor, through which he is enabled to secure a pressure of over 2,000 pounds per square inch), and is drawn off as required into metal tubes 18 feet long by 8 inches in diameter, four of which are located under the flooring of every car. We are informed that a force, equal to two mechanical horse power, capable of driving the vehicle for three hours, is thus stored. From the tubes the air passes through a regulating device located at one end of the car, by which the pressure, transmitted to drive the engine located at the opposite extremity, may be adjusted as desired. In order to avoid the effects of the extreme cold due to the expansion of the air, the valves and cylinders of the engine are completely jacketed, and a pump is employed to compress air within the jacket to a pressure of some 75 pounds. The model exhibited ran quite rapidly over about 80 feet of track, and we were informed that it would readily ascend a grade of one foot in six. The invention has not yet been tested under actual practical conditions, so that its economical value remains, as yet, undetermined.

The Telegraph between Great Britain and Ireland.

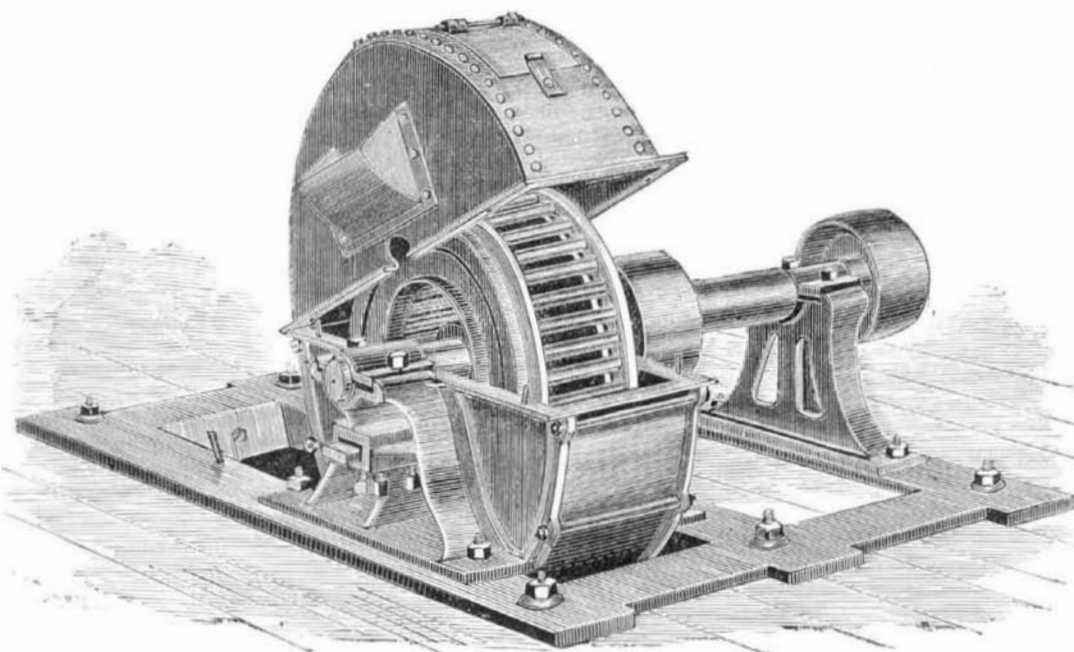
Telegraphic communication with Ireland is maintained by means of four submarine cables, submerged between different points in Great Britain and the Irish coast. These cables contain in all twenty-two separate wires.

One of the largest cables—that between Holyhead and Dublin—has been laid since the post office acquired the control of the telegraphs, and all of them have been under repair during the same period. The rocky nature of the bottom along the Anglesea coast has, it appears, seriously affected the condition of the Holyhead and Dublin line, the newest of all the Irish cables; in many places the outer iron wires which form the chief protection of the core have been completely chafed through from constant friction. Quite a new feature has also developed itself in connection with this fault, namely, the eating away, by a kind of worm, of the gutta percha covering of the core, in much the same way as wood is bored and eaten away by these destructive insects. The post office can hardly be congratulated on the possession of these lines to Ireland, as they have been a constant source of trouble and expense ever since the transfer of the telegraphic system to the government.—*London Times*.

The Passivity of Iron.

M. de Régnon, in order to produce in a certain manner the somewhat capricious phenomena of passivity, uses rods of fencing foil or iron wire, the surface of which is protected for a certain length by a glass tube or a layer of mastic. The free extremity, to a length of 0.9 inch, is plunged entirely in the acid. The conclusions recently reached by the above means show that most of the causes which produce passivity in iron may be reduced to a voltaic force carrying the oxygen to the iron and polarizing it on the surface of the metal. Most of the causes which destroy the passivity of iron may be reduced either to a voltaic force of the contrary direction, or to a current, due to the polarization of the oxygen and by which it is exhausted; or, lastly, to an absorption of the polarized gas by a body that has a avidity for oxygen.

These phenomena of passivity are believed to be more general than is now supposed. The acid employed in the experiments was nitric, marking 35° B.

**DAVIS' DISINTEGRATOR.**

king, the apparatus is also well suited. Many of the machines of three feet in diameter, and a few of four feet in similar dimensions, are, we understand, in successful use by brick makers in disintegrating wet, dry, or frozen clay. The stones found in the material are pulverized as thoroughly as the clay itself. Sand may also be mixed with the latter during the operation, or a small stream of water may be run into the mill for dampening the clay. We are informed by the manufacturers that the mill, three feet in diameter, will disintegrate clay sufficient for 3,500 bricks per day, and they report a very large sale of their machines, during the three years which have elapsed since their introduction. Parties ordering mills will be supplied with complete drawings for foundation and for the erection of mill and machinery. If speed of shaft, from which the machine is to be driven, is given, the size of pulleys and other useful particulars will be furnished. Manufactured under the patent of Mr. G. B. Davis, by Messrs. Denmead & Son, North and Monument streets, Baltimore, Md.

ONE of the latest discoveries in the excavations at Rome is a magnificent bust, in perfect condition, of the Empress Plotina, wife of Trajan.