

Implement for Repairing Roads.

The machine seen in the engraving is intended primarily for filling in the ruts, leveling the surface, and compacting the material of roads. It is a plow, scraper, and roller combined, and appears to be a very useful implement for agriculturists. A strongly braced rectangular frame, A, of wood, supports all the working parts, which consist of a guiding wheel, B, colter, C, plow share, D, and roller, E, with their appurtenances. The wheel, B, is mounted in a circular metallic frame by means of arms passing through the frame on each side of the wheel and extending up to a forked lever, F, by which the forward end of the whole machine may be raised. The circular frame on which the wheel is mounted partially rotates in another, denoted by G, and bolted to the frame, A. It will be seen that the driver may guide the machine or regulate the height of the forward part, and thus the depth of the plowing, by means of the lever, which is easily accessible from his seat.

The machine may be drawn by a yoke of oxen or span of horses. When in use for repairing roads the guiding wheel runs in the rut to be filled, and the plow shares, D—of which there are two, one on each side, converging at their rear ends—lift the earth or gravel from each side of the rut and deposit it in the depression. The colter, C, which is simply a double plow share, is used only when there are very hard and compacted ridges in the road to be broken up. Whether in filling ruts or leveling ridges the heavy roller, E, over which is the driver's seat, compresses and solidifies the work. The machine works over one half of the road at a time and then returns on the other side. The patentees confidently claim that one man with the team can finish five or six miles per day and do it better than fifty men with picks, shovels, etc.

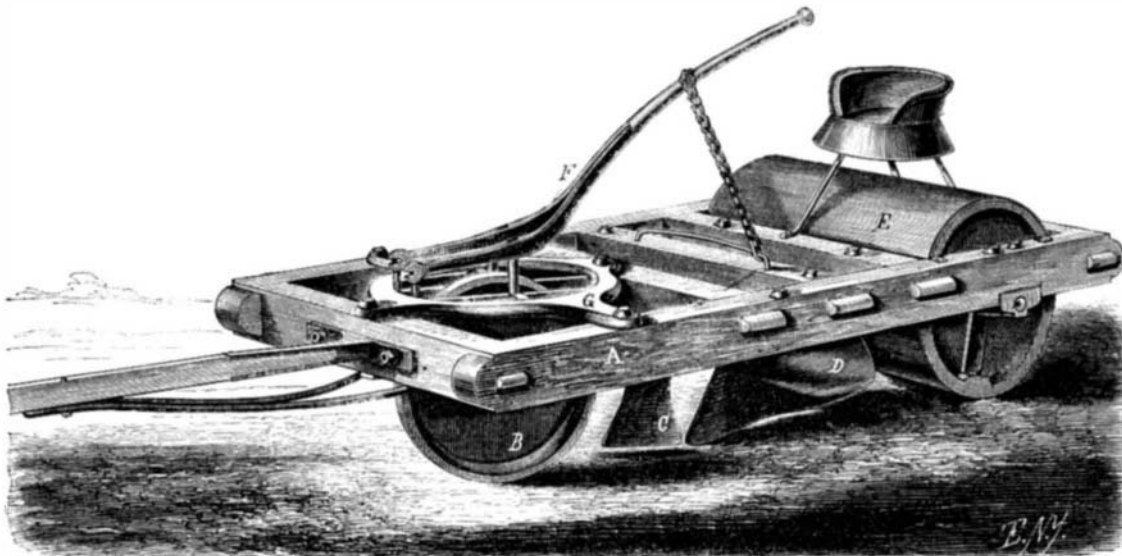
By the removal of the roller and the substitution of a shaft carrying a pair of wheels, the shares being taken out, the machine is adapted to ridge land in parallel rows with a channel on the top of the ridge for the seed, as for cotton and some other crops. Patented through the Scientific American Patent Agency Sept. 17, 1867, by Minor and Ward, who may be addressed at New Bedford, Mass. Models are now on exhibition at the Fair of the American Institute, New York city.

Improved Double Acting Pump.

Few mechanical contrivances have been the subject of so many improvements, or attempted improvements, as the pump, whether the ordinary lifting pump or the combined lifting and forcing pump. In those of the last mentioned character the principal difficulty has been that the upward flow of the water has been checked and turned in a new direction before any proper results could be obtained. This entails an immense loss of power which ought to be employed in raising the water. The prevention of this loss of power is the object of the inventor of this pump; he constructs it on the principle of the incompressibility of water, using the water itself as a ram or solid piston at each alternate stroke.

The engraving is a sectional view of the pump when used in a horizontal position. The cylinder of the pump is of unequal diameter, the portion, A, being much less than the chamber, B. Inside the cylinder is the hollow piston, C, packed at the ends, D and E, and worked by the piston rod, F, through the stuffing box, G. This hollow plunger is open at the forward end and closed at the rear end by the flap valve, H, of the inlet pipe, and J, is the discharge pipe, which may be carried in any direction. In the engraving the pump plunger is seen as making a forward stroke, the water contained within it and held by the valve, H, acting as a solid ram to force the water in the cylinder, A, out of the discharge pipe, J. The return stroke opens the valve, H, by the back pressure of the water in B, which rushes through the cylindrical plunger, C, to be in turn discharged. It will be noticed that the chamber, B, is of much greater diameter than the plunger, C, so that they bear the relative proportions of two to one. This insures always a full cylinder and makes a continuous stream, without check or interruption. One of these pumps in the fair of the American Institute delivers a continuous, full, round stream by the working of a vertical lever moved by one hand, requiring no greater expenditure of power than that which could be exerted by a child of eight or nine years. When used for very deep wells the pump is ver-

tical and the hole or holes seen in the side of the chamber, B, are stopped and the down or backward stroke of the plunger creates a vacuum in the annular space between the chamber and the hollow plunger, which, on the forward or upward stroke assists in raising the weight of the connecting rods and the water column. Valves for opening and closing these holes can be readily attached which may be operated automatically. An air chamber may be connected to the pump if desired, but it is not necessary. It is understood



MINOR & WARD'S ROAD REPAIRING MACHINE AND COTTON LAND RIDGER.

that this pump may be arranged to work either horizontally or vertically.

It was patented July 23, 1867, by Henry Getty, of Brooklyn, N. Y., who may be addressed for further particulars or the sale of rights, etc., at McNabb and Harlin's, 86 John street, New York city.

CRUSHING COAL FOR BURNING IN BOILER FURNACES.

A few days since we inspected an apparatus erected in the fireroom of the steamer *Warrior* at the Delamater Iron Works—Mulford & Ripley—for pulverizing the coal and forcing it into the furnaces, over the fire, by means of a blowing apparatus.

Circumstances prevented us from examining the internal structure of the crusher and blower as critically as we should have been pleased to do, but the former was apparently a pair of cast iron rollers, over which was erected a hopper for the purpose of supplying them with coal; from the under side of these rollers the pulverized fuel is emptied into a blower with tight fitting, revolving pistons, which force it through about five inches diameter pipes and sprinkle it over the fires.

The crushers and blowers, of which there are two each, are driven by a 15-inch by 15-inch cylinder engine erected on the

ARTIFICIAL STONE FOR BUILDING—RANSOME'S PROCESS IN AMERICA.

We have from time to time called the attention of our readers to Mr. Ransome's process of making artificial stone for building, and especially in our issue of 25th July, we copied an article from *Engineering* which explained the process of its manufacture, and gave the results of such experiments as had then been tried to test its value as a building material.

Recently, through the kindness of Hon. David Naar, President of the "Ransome Patent Stone Co., of New Jersey," we have had an opportunity of witnessing the process ourselves. We confess ourselves to have been unexpectedly pleased not only with the simplicity of the process, but with the facilities which the company have for the manufacture of the stone, and the beautiful results which they accomplish.

The article above referred to went so fully into the *modus operandi* that we do not deem a long explanation of the chemical process necessary. It is a successful imitation of nature's own methods. Grains of sand are agglutinated by cement. The sand is washed from all impurities, thoroughly dried, and intimately mixed with the silicate of soda of commerce. It is then molded into the form desired and subjected to a bath of the solution of chloride of calcium. A double decomposition takes place and induration commences. In a few moments the plastic mass begins to ring under a slight blow of the trowel. The results of the decomposition are the insoluble silicate of lime and chloride of sodium (common salt), which is easily soluble in water. As soon as the mass has hardened throughout, or when the chloride of calcium has been brought in contact with every particle of the sand so mixed with the silicate of soda, it is boiled in a solution of chloride of calcium, which drives the salt to the surface, from which it is washed by a shower bath of water. The stone is then dried and is ready for use.

The stone, as compared with the sandstones in use, is considerably cheaper, and when capitals or ornamental moldings are required, the cost is not more than one eighth. Its weight is about 140 pounds to the cubic foot. The color is about the same as the Portland stone, depending of course upon the color of the sand used. It is easily colored, however, to any tint required. It has been subjected to the severest tests as to its durability, and so far shows greater resisting and durable qualities than the sandstones in use.

It is being made not only in Europe but in several parts of this country, and is beginning to be used for building purposes, and the true test, that of time and the weather, is being applied to it.

We cannot predict that it will endure as long as the Pyramids, but its composition is such, and it so well stands the tests to which it has been subjected, as to give us good reason to hope and believe that it is equal if not superior in durable qualities to most of the building stone in use.

Those who have been foremost in undertaking the manufacture of the stone in this country deserve success, and we believe the article will fill a want long experienced by builders, and we hope they will not let prejudice deter them from giving it a fair trial.

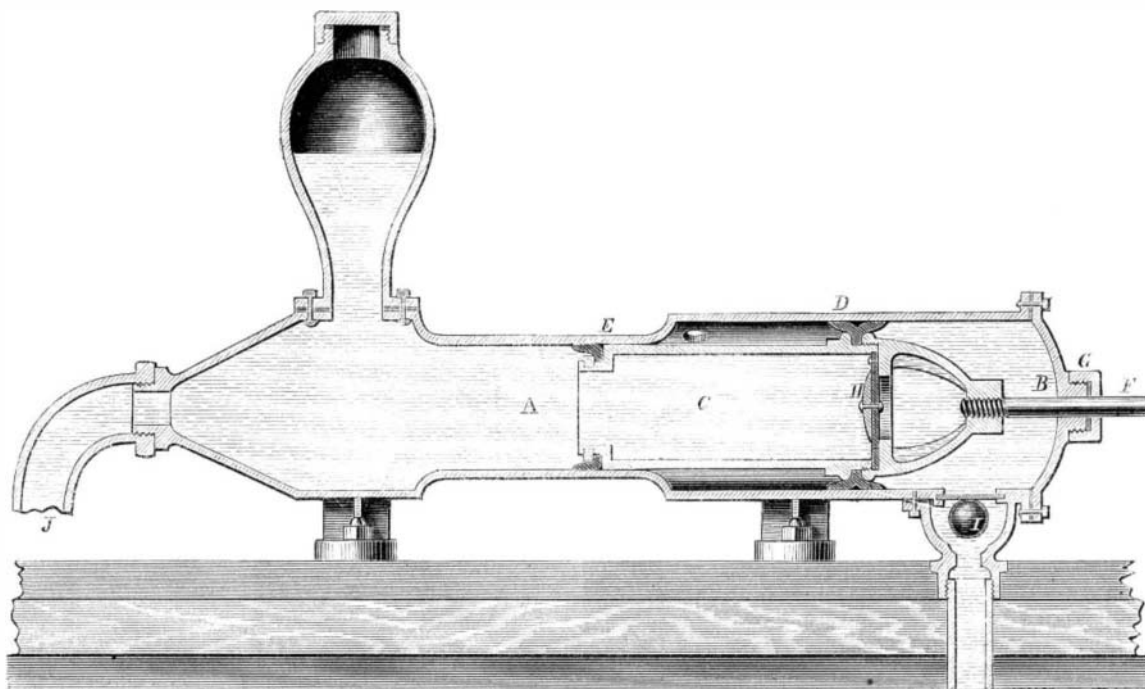
It is not remarkable that such a discovery has been made; the wonder is that it has not been made before.

Our exchanges from England mention the Ransome process as a practical success for nearly every purpose for which stone is used, even to the manufacture of grindstones. What Great Britain can do in this line can be equally well done by us, and we predict for the New Jersey company financial success.

New Use of a Device.

A new use of a thing without being claimed in combination with some other and new element, or as part of a new combination, in the device where such thing is introduced, is not patentable, it being considered simply the application of an old thing to a new use. Toward such a view would appear to be the leaning of the courts. The point was touched upon in the case of *West vs. Silver Wire and Skirt Manufacturing Company* lately decided in the Southern District of New York.

COLOR OF SUNLIGHT.—M. Brucke has observed that diffused solar light, instead of being perfectly white, is tinged with red. The light of burning magnesium, which appears to be so like sunlight, has a tinge of violet.



GETTY'S IMPROVED PUMP.

deck. It transmits its motion to the crushers and blowers through an intermediate shaft driven by gearing and from which belts are led to them. Altogether it looks like a rather complicated fix.

With regard to the efficiency of this contrivance we cannot speak from observation, but we are free to confess that for use on board of steam vessels it impressed us very unfavorably. Indeed we were unable to discover what was the object of the engineer who contrived it, except perhaps to save the trouble of opening the furnace doors to "fire up," but this seeming advantage is attended, it seems to us, with several serious drawbacks, among which is the fact that if the draft is good a considerable portion of the "powdered coal" will be carried into the flues and up the chimney.

There are only four furnaces in the *Warrior's* fire room, and this fact, taken in connection with the machinery necessary for this small number of furnaces, will enable one to form an idea of the complication such an apparatus would render necessary in the fire room of a first-class ocean steamer.