New Inventions.

Automatic Alarm for Locomotives.

Harrison's Automatic Whistler, a device which we noticed at some length on page 245 of the last volume, for sounding the whistle of a locomotive at every point on the track for which it may be previously set, was tried by an excursion on the New York and Harlem Railroad, on Thursday, the 16th, to the perfect satisfaction of a considerable number who had been invited. We accompanied the engine several miles, and from observation as well as from the assurance of the engineer who has it in constant use, are fully confirmed in the favorable opinion already expressed.

Burr Stone.

This is a quartz rock containing cells. It is as hard as rock crystal; and its peculiar value for grinding is owing to its hardness and cellular texture, which gives it a rough surface. In the best stones the solid and cellular parts occupy about equal spaces. The "French burr stones" are obtained near Paris from the tertiary formation. To make millstones the rocks are cut in wedge-shaped panes, which are cemented and bound together with iron hoops. A cement for this purpose consists of about one part, by measure, of calcined alum ground into powder, mixed with twenty parts of plaster of Paris, by measure, made into a proper consistency with water.

Good burr stone is found in Ohio, Georgia, and Arkansas. In Ohio, at Hopewell, Richland, Elk, and Clinton, the manufacture of burr stones is carried on to a considerable extent.

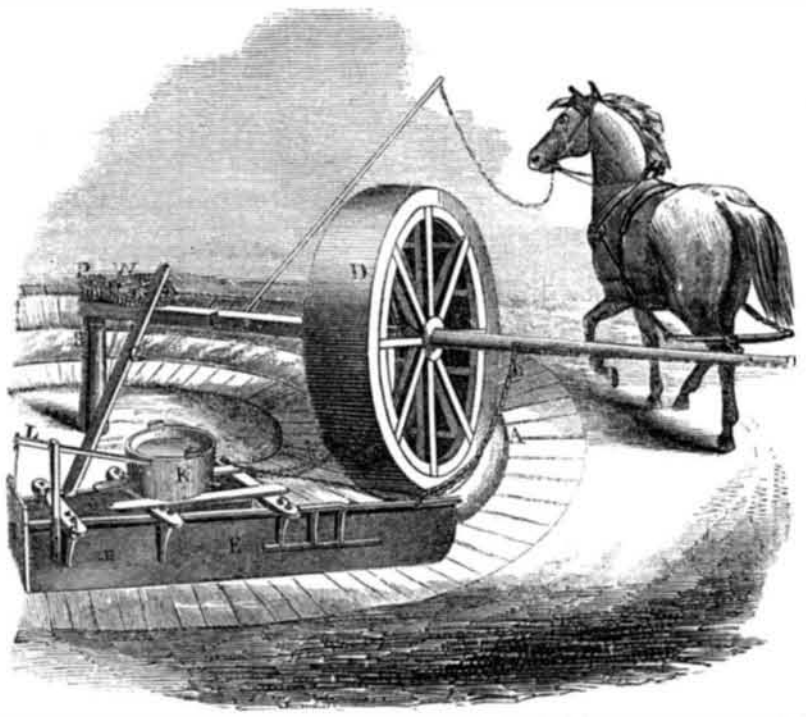
Patent Mortar Mixer.

This figure is a perspective view of a machine for making mortar, not only to supersede the severe drudgery of manual labor, but to make superior building cement. Good mortar is composed of lime and clean sand, thoroughly mixed together, and rendered into a pasty consistency. The common method hitherto pursued in mixing these materials has been by hand labor, using a hoe or a spade for the purpose. This machine is the first of its kind known to us, excepting the old pug mill.

A is the mortar-way—a path on which the materials are mixed; B is a post, like that of a horse-power shaft, rotating on a step bearing; C is a lever to which the horse is attached—it is secured to the post; D is a large roller wheel on the lever, on which it revolves as an axis. This roller revolves on the path, A spreading out the mortar, and mixing the lime and sand together. E is a drag, with two sides, which have curved runner fronts, like those of a common sled. This drag is narrow at the rear end, the runners spreading out in front; it is attached by chains, *b b*, to lever C, and is drawn round in the path, A, behind the roller. F is a door in the back end of the drag; it is raised and lowered by a lever L; K is a water tank on the drag; it has a spout and faucet in it to supply and sprinkle the lime and sand with a proper quantity of water; G is a bar attached to the cross-piece, H, on the drag, and also to the wheel, W, to which it is connected with a pin; P is a pinion fast on the top of post B, but wheel W is free to revolve. There is a small trap door made in the path, which is opened, and all the mortar when properly made forced down into a receptacle by the drag.

Operation.—The lime and sand in proper proportions are spread upon path A, the faucet of the water tank, K, is opened, and the machine set in motion by the horse moving round the track. The door, F, of the drag is then kept open until the mortar is completely mixed. The runners, D, of the drag gather up the lime and sand into a ridge; the roller D spreads this ridge out, pressing the lime and sand particles together into intimate union, and at the same time the hind end of the drag has a wabbling motion given to it by the bar, G, through wheel W, on which it is set eccentrically. It is thus that the lime and sand receive a mixing togther of a more thorough character than by hand labor. Unless every particle of sand is enveloped with a coat of wet lime the mortar is not perfectly mixed. By hand labor this is seldom, if ever effected. It is evident that such a result is easily obtained by working a sufficient length of time in this machine. After the materials are thoroughly mixed, and the mortar properly formed, the trap door, F, is shut

PATENT MORTER MIXER.

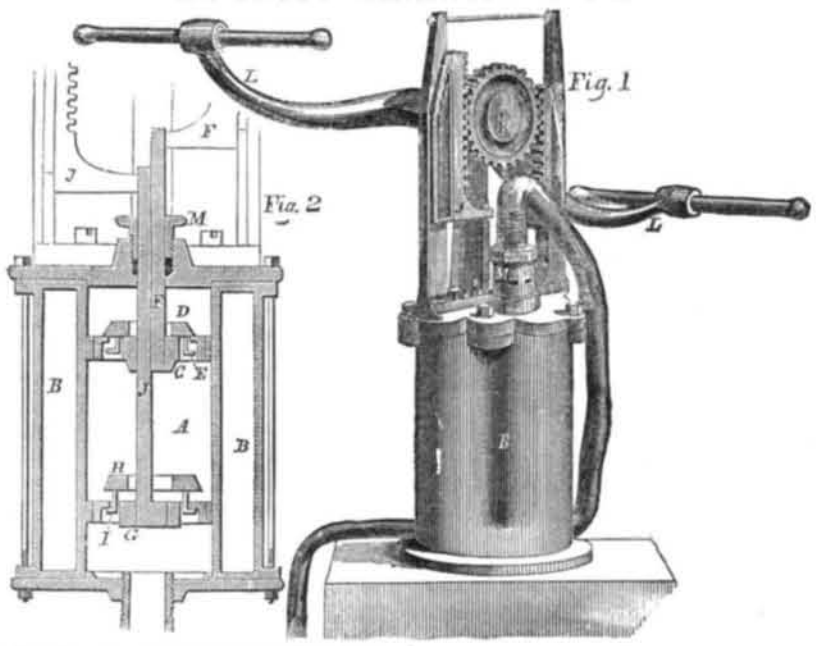


down, the drag then gathers the mortar formed into a heap, if desired, or pushes it down into the receptacle described, through a trap door in path A. The lime employed is previously slacked before it is put on the way, A. A few revolutions of the roller and drag mixes the materials.

A patent was granted for this machine to Messrs. Henry W. Hunt and John Sands on the 8th of April last year, since which date it has been fairly tested. These gentlemen inform us, that with the labor of one man and a horse, thirty casks of lime can be made into plastering or building mortar by it in one day, and that the mortar is of a very superior quality. It works as smooth as fine cement under the trowel, and it sets and hardens much sooner than common mortar.

More information respecting it may be obtained by letter, addressed either to Mr. Hunt, Peekskill. N. Y., or Mr. Sands, Armonck N. Y.

BURNAP'S IMPROVED PUMP.



Few devices in so common and universal employment are capable of such an almost infinite variation in form as the machine denoted by the simple work "pump." The absence of tools capable of boring a true cylindrical hole, and perhaps, we may add, the want of an almost equally essential requisite, cheap *iron* to be employed as material, forbade the employment of such luxuries by the ancient nations, and various expensive and troublesome "norias," "swapes," "Archimedian screws," "spirals," "chains of buckets," etc., were necessarily employed in the few situations where such could be made available.

Later days have developed almost an infinity of combinations for the same purpose, but in nearly all the "tight and easy" motion of a piston, or its equivalent, valve, or solid, playing in a smooth cavity, is a principal feature, perhaps the only feature common to the class, and entitling them to rank together. Some are for simply lifting to the spot, and others for forcing to any reasonable hight above. The pump now under notice belongs to the latter class, and attracts attention as much by its compactness and strength as by its peculiar combination of novel parts. The device was patented by the inventor, John A. Burnap, of Albany, this State, July 24, 1855.

The cylinder is upright, and is wholly or partially surrounded by an additional stout shell of cast iron. The space between this shell and the cylinder serves as a very compact and strong, and at the same time very capacious air chamber.

Fig. 1 is a view of the pump as actually constructed in practice, while fig. 2 is a section copied from the patent drawings. Both are identical in their general features, but this explanation will account for any discrepancies in the details. In the section, for example, the air chamber extends quite around the pump proper, while in the other it is confined entirely to one side, it being found by experiment that ample space to fulfil all the conditions required could be thus obtained.

A is the cylinder or pump proper; B is the surrounding air chamber, while C and G are two similar buckets or boxes, worked alternately by means of the racks and pinion, J F and K; the pinion, K, being reciprocated by power applied to the lever, L. The connection between the boxes C and G, and their respective racks above is made by the rods, F and J, which latter are half round, so that when fitted together for use their flat sides work in tight contact each with the other, and the exterior or cylindrical sides of both are packed by one set of packing in a single stuffing box, as shown.

D and H are annular or ring valves, which cover series of ample holes in their respective boxes, C and G; E and I are metallic hooks which serve to prevent the possibility of the valves becoming far separated from their seats, however quickly the pump may be worked. M is the point to which the discharge pipe or hose is attached, and the air is compelled to remain in the air chamber by the insertion of a pipe at M, reaching down nearly to the bottom of B, and by receiving the fluid only through this tube. Further information may be obtained by addressing Burnap & Bristol, 36 Liberty street, Albany, N. Y.

Protection of Telegraph Cables.

The accident to the cables connecting Great Britain with France and Belgium, detailed on page 213, this Vol., by the dragging of a ships' anchors across them in a gale, resulted in a total suspension of all telegraphic communication between the British Islands and the Continent for fifteen days, making thereby quite a serious derangement of the ordinary course of many kinds of business. It appears highly desirable, if practicable, to make provision for withstanding any strain which might be thrown upon these important cables by such contingencies. As the anchors of a ship under such circumstances continue their hold upon the earth, itself almost sufficient to hold the vessel, it would appear that a degree of strength sufficient for this purpose might be afforded by some practicable means. In this instance the cables actually employed—hemp cords, protected by a coating merely of stout wires—sufficed each to hold the ship from half an hour to an hour; and a correspondent of the London *Engineer* proposes to make an addition of one or more heavy chains to lay alongside, or near each cable, the combined strength of which would probably hold any vessel which might ever chance to seize it. That paper, which, by the way, is better illustrated and printed than edited, objects that such a line would afford so capital an anchorage that captains could not resist the temptation to anchor on it, and thus the conducting cord would be continually disturbed and abraded. But when we consider the extreme difficulty, in fact, the impossibility, of a vessel ever again recovering an anchor which might once become hooked around such a group of heavy cords, the conclusion is unavoidable that except under very extraordinary emergencies, navigators, wreckers, and every one else, would avoid the cord as if it were infected with the "seven years' itch;" and we conside th idea quite a valuable one. The chain—for one would probably be sufficient—secured at its outer end by a heavy anchor, would be exposed to no wear of importance, and might be galvanized so as to quite effectually preserve it. It would only require to be laid in comparatively shallow water.

For lines of such extreme importance and cost, for example, as the great transatlantic one, such a chain, or a score, if of advantage, should be provided for each end wherever it approaches shallow water. The line, as shown in our diagram of March 14, (page 516,) is intended to keep northward of the great fishing banks on approaching the coast of Newfoundland; and finally, to enter a deep and obscure bay, both of which circumstances will diminish the chances, but will not absolutely prevent the possibility of disturbance by anchors. As intimated in our description of that date, the slender mid-ocean cable will be replaced by a strong one at both ends of the line; but the great amount of money thus "sunk to the bottom of the sea,"—a term once expressing a most hopelessly lost investment—makes it important to attend to every possible precaution against losing either end of the great metallic nerve, so expensively constructed and located.