

THE NIAGARA DIRECT AND DOUBLE ACTING PUMP.

"Machinery so simple in its details of construction, that in new mining and oil regions, where mechanic shops are not yet opened, any man of ordinary intelligence may be able to put it together and take it apart as occasion may require." Such is the aim of the manufacturer in devising the various varieties of steam pump, many of which are doubtless already familiar to our readers under the name of Niagara, and as the work of Mr. Charles B. Hardick, of No. 23 Adams street, Brooklyn, N. Y.

In the annexed engraving will be found a representation of an improved form of one of these machines, known as direct and double acting, for which is claimed many advantages which will doubtless commend it to those engaged in the multitude of industries to which the steam pump is an indispensable adjunct.

So far as is consistent with durability, we are told, the pump is cast in separate parts, so that, in case of accident or breakage, the portion immediately affected need only be replaced, the cylinders being separate from bed plate, water valve chest, discharge, and air chamber. This independence of parts is claimed to be an important item of economy in severe climates where, by the action of frost, all metal vessels are liable to fracture. The arrangement of patented water valves is such that, in case of obstructions entering the suction pipe, they may be taken out, cleaned, and repaired in very short time, access being had to them through the bonnet on the valve chest. It is only necessary to remove one nut, as the valves are simply four square pieces of metal kept in place by the bonnet. As the valves on each face present an accurately fitting surface in the seat in the chest, each of the four faces may be used; and when, in the course of years, these become worn away, hard blocks of wood, of like form, it is stated, may be employed with equal facility and reliability. The valves are made of composition, or may be faced with leather or vulcanized rubber.

In the type of pump illustrated, there are no piston rings or interior packing, hence no necessity of removal of the cylinder heads. One plunger operates both cylinders, to pack which it is only necessary to unscrew the nuts shown at the center of the water cylinder, slip the caps of the stuffing box back, insert the packing, replace the caps, and the work is done.

There is a patent steam valve which insures the starting of the pump, whenever steam is let on, without reference to the point of stroke at which the piston may be, and hence it is impossible to set the machine on the center. It can, we are informed, be run at any rate of speed, and is thus particularly useful in boiler feeding, giving a certain and steady supply of water.

For mines and quarries, the manufacturer claims the pump to have proved itself especially adapted. Should it become submerged in the mine, it will start upon turning on steam from the boiler at the top of the shaft, and work notwithstanding the condensation of steam incident to its being carried over so long a distance. It has worked, we are informed, in the mines of Pennsylvania, Colorado, etc., under from 15 to 40 feet of water. Finally it is well suited to the pumping of gritty or muddy water, and is claimed to serve thoroughly all the purposes to which steam pumps are now applied. For further information, address as above.

IMPROVED AUTOMATIC PACKING AND WEIGHING MACHINE.

The invention herewith illustrated is a machine adapted for use by spice manufacturers, in chemical works, tobacco factories, and in other establishments where powdered or granulated material is packed in paper, tin, or bottles. The apparatus is constructed entirely of iron, is simple, and does not require skilled labor to attend it.

It is claimed to insure uniformity of weights, with entire freedom from dust, and does not require the packages to be cleaned. The capacity of the machine is only limited by the number of tubes used and the speed with which it is run. Its working parts will be understood from the following description:

Through the hopper, A, run two horizontal screws, B, B, and the threaded portions of which project through the left side, and their shanks through the right side of the hopper. On the screws are placed tin forms, C, C, corresponding to the inside

of package to be filled. D is a driving shaft which imparts motion to screw shafts B, B, by gear wheels, E. On each screw shaft is placed a pair of cone friction pulleys, F, F, one of which is rigidly fixed; the other slides along the shaft on a key or feather. These pulleys are kept in contact by a lever, H, which extends through the table and has weights applied to it as shown. Connected with the lever, H, is the rod, J, running longitudinally under the table. On the other end of this rod is an adjustable nut, K. L, L is a right angled graduating lever, with fulcrum at M; one leg of this lever, extending upwards through the table, presses against the lower blocks, T, T. On the other leg slide compensating

weights, P, P, kept in position by set screws. The drawer, S, sliding under the table, catches any material that may drop from the tubes. In operation, the attendant places an empty package on form, C. The follower blocks, T, are moved up against the bottom of the package, which brings the frictional pulleys, F, in contact, thus starting the screws, B, which force the material into the package on the form, C, causing the follower block T, and lever, L, to recede. The latter is brought in contact

notably in the city of Rockford, Ill. A new watch factory is soon to be erected, the entire capital stock of which, some \$150,000, has been taken up by the citizens, and several establishments for the manufacture of farm implements are in successful operation. Emerson & Co., the largest house in this business, shipped, in 1873, nearly 200 car loads of agricultural goods, and employ some 150 workmen.

Thomas W. Bakewell.

We regret to learn of the death of Mr. Thomas W. Bakewell, an inventor and manufacturer quite widely known and a frequent correspondent of these columns.

Mr. Bakewell was of English birth, but emigrating to this country at an early age, he took up his residence in Cincinnati, Ohio. At this period steamboats were just appearing upon our Western rivers, and it was a problem to inventors to construct them to suit the requirements of shallow water and other local peculiarities, as well as to meet the demands of the large cargoes which they were required to transport. Entering with vigor into the solution of the question, Mr. Bakewell devised vessels on improved plans, which, proving successful, ultimately necessitated the erection of shops and shipyards. The increasing business soon called into existence extended facilities, and eventually added very materially to the prosperity of the city.

Mr. Bakewell did not confine his efforts, however, solely to boat building, but also erected a large manufactory, containing machinery of his own invention for spinning and weaving Kentucky hemp for making cotton bagging. The works were established in Covington, Ky., and proved highly profitable.

The subject of our sketch was well known as a finished

scholar, and an able theoretical and practical mechanic. Many very excellent papers, with reference to the use of steam and on kindred mechanical topics, have been contributed by him to our columns. He died at Pittsburgh, Pa., at the advanced age of eighty nine years.

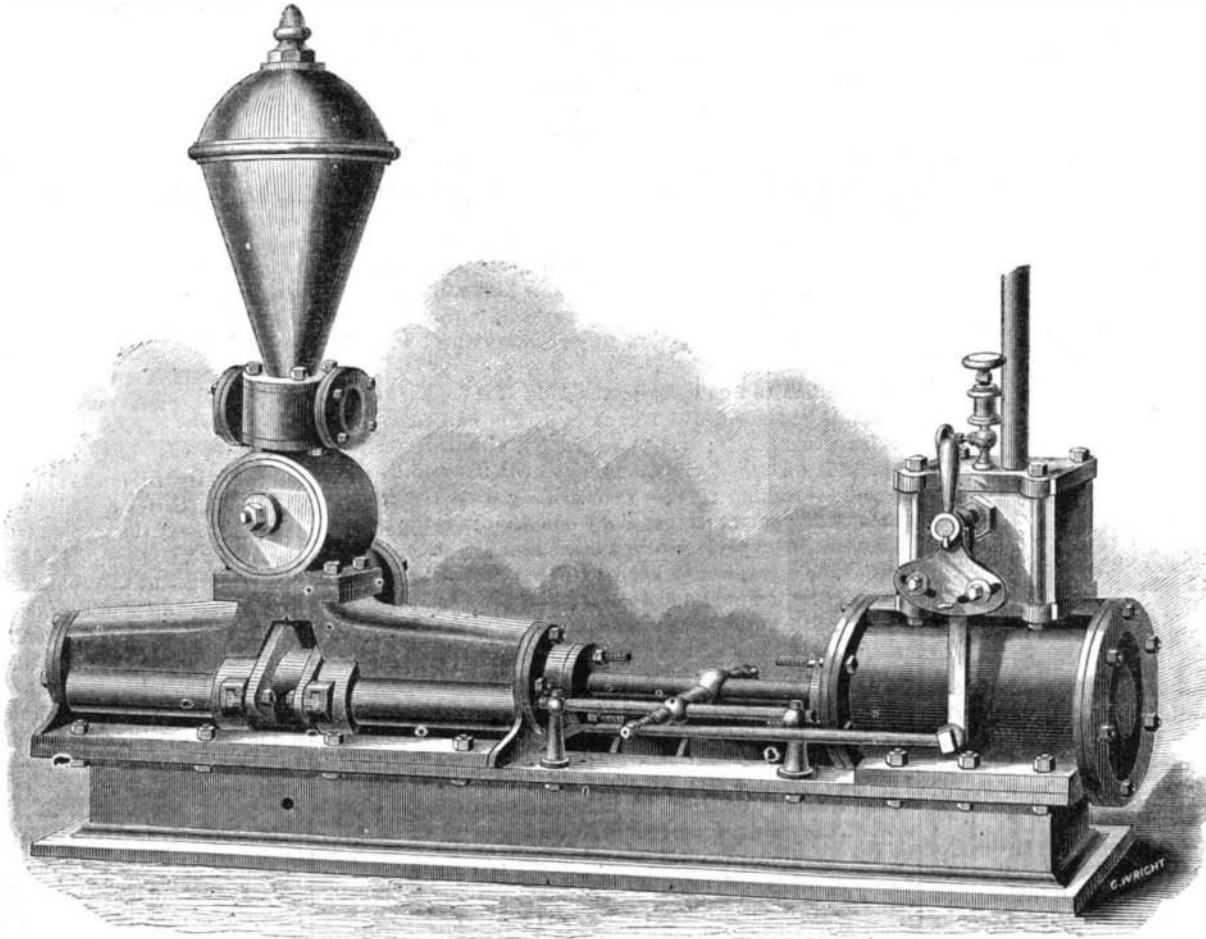
Improvement in Treating Photo-Negatives.

When, by means of a camel hair brush or other similar, iodine is applied to the image, the atoms of metallic silver which formed the picture are acted upon by the iodine, and are converted into iodide of silver. Now, as metallic silver is not soluble in a weak solution of cyanide of potassium, but as iodide of silver is soluble, it follows that the application of this menstruum will instantly convert into clear glass every portion of a negative that has been touched by the tincture of iodine. Its use, then, will be obvious. Everything in a negative not desirable to be retained can be completely removed—a tree, a house, a background, a restless baby, or any other objectionable member of a group.

Iodine dissolves freely in alcohol, ether, chloroform, sulphide of carbon, petroleum, and in solutions of the iodides. It is the latter of these that we recommend as a solvent when the solution is to be employed in acting upon a negative. Drop a crystal of iodine into a little water, and no visible change takes place, the water remaining clear as before; but on adding a crystal of iodide of potassium, it will be found that, as soon as the latter has reached the bottom of the vessel, the iodine immediately becomes affected and dissolves readily, and the solution becomes of an intensely deep red color.

We find that if the iodine solution be thickened by the addition of a small quantity of mucilage of gum arabic, say a little more in proportion than is contained in common writing ink, all tendency to spread is destroyed. The solution may be applied by means of a delicate hair pencil, and in the most minute specks, lines, or stipples; and, after the clearing up application of the cyanide, these specks and touches will be found to be clear and sharply defined, showing that no extension has taken place.—*British Journal of Photography.*

C. B. L. send us the following recipe for a cement for mending steam boilers: Mix 2 parts of finely powdered litharge with 1 part of very fine sand, and one part of quicklime which has been allowed to slack spontaneously by exposure to the air. This mixture may be kept for any length of time without injuring. In using it, a portion is mixed into paste with linseed oil, or, still better, boiled linseed oil. In this state it must be quickly applied, as it soon becomes hard.

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with the adjustable nut, K, carrying the same with it, separating the friction cone pulleys, F, and stopping the screws, B, instantly. In packing bottles, tin cans, etc., form, C, is removed and the package placed on the tubes surrounding the screws.

Patented September 9, 1873. For further particulars address Stewart, Marks, Ralph, & Co., 115 Arch Street, Philadelphia, Pa., where the machine may be seen in operation.

New Industries in Illinois.

A correspondent of *Inter Ocean* gives some interesting information regarding the pioneers of Western industries,