DEAN BROTHERS' STEAM PUMP.

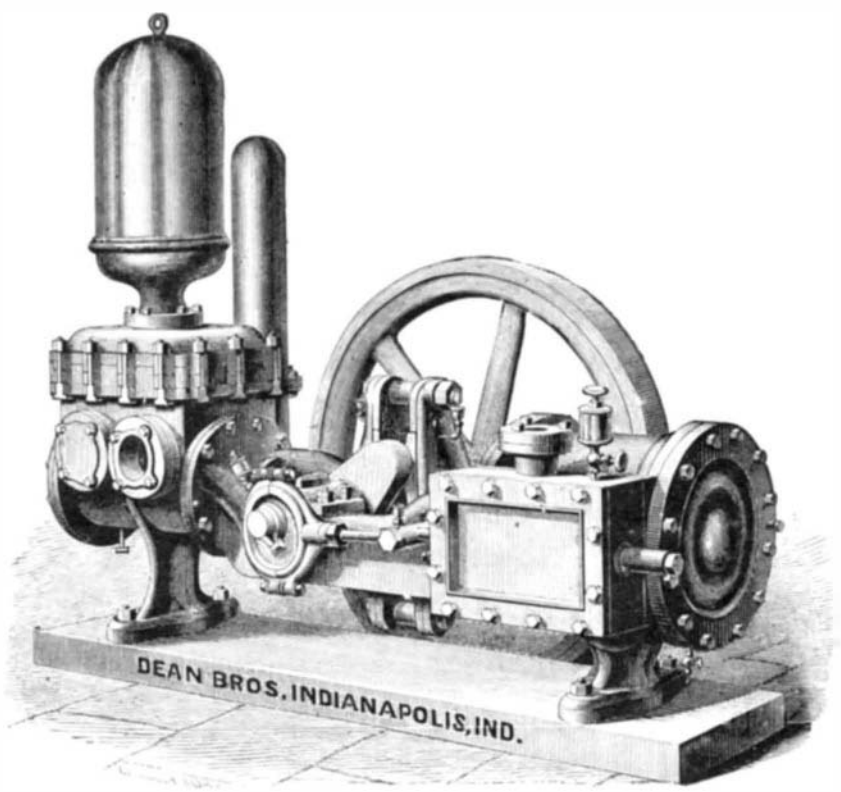
The accompanying engraving represents a large sized steam pump, such as is generally used in distilleries, blast furnaces, rolling mills, and extensive manufacturing concerns requiring a copious supply of water. They are made by Dean Brothers, of Indianapolis, Ind., in several sizes, with steam cylinders from three inches to thirty-four inches diameter, and pump cylinders from two inches to twenty inches diameter. The crank shaft is supported by a frame which joins the steam and pump cylinders, and the fly-wheel and rotating parts are balanced so as to run rapidly without shaking. The steam cylinder is provided with a simple, flat, three-port slide valve, which is worked directly by an eccentric on the crank shaft, as in the ordinary slide valve engine. The pump has ample water passages and large valve area, which prevents thumping when run at a high speed. The piston rods are made of steel, and the valve seats of gun metal, and both steam and water cylinders are fitted with adjustable packing. All of the parts are made interchangeable, so that any piece can be replaced without especial fitting.

We are informed that these pumps are made in the most careful manner, and no expense is spared to make them perfect in workmanship. The piston rod of the steam cylinder and pump are rigidly connected together by the link, which holds them as one piece, ss that the power of the steam cylinder is imparted directly to the pump, while the crank, which plays on the slot of the link, governs the motion of the pistons, causing them and the other reciprocating parts of the pump to be stopped and reversed gradually, and not by sudden jerks, and also reversed with great exactness at the proper place, so as to obviate much clearance in the steam cylinder. It is evident that the pump cannot make the slightest variation in the length of the stroke. The crank motion approaches very near to the theoretically correct motion that should be imparted to a pump piston, namely, a uniformly accelerative motion from the beginning to the center of the stroke, and a uniformly retard motion from center to the end of stroke. The crank should be adopted in the construction of all pumps where regularity of flow is required.

Steam pumps of this style are made for feeding boilers and for special purposes, such as brewery air pumps, ammonia pumps for ice machines, combined air pumps and condensers; they are also manufactured for water works, single and duplex condensing and non-condensing.

We name below a few places that are using Dean's duplex engines for water works purposes. The engines furnish the entire water supply for fire, domestic, and manufacturing purposes, having a capacity in millions of gallons per day of 24 hours, as follows:

Union City, Ind., 1; Brazil, Ind., 1; Attica, Ind., ½; Marion, Ind., 1½; Michigan City State Prison, Ind., ½; Indianapolis Stock Yards, 1; Charleston, Ill., 1; Peoria, Ill., 2½ and one of 4; Alton, Ill., 2; Nashville, Tenn., two of 5; Indiana Hospital for Insane, 1.



DEAN BROTHERS' STEAM PUMP.

RECENT MECHANICAL INVENTIONS.

A machine for nailing the irons upon trunks and packing boxes, which punches the holes in the irons, drives the nails, and clinches them, has been patented by Mr. Robert M. Bidelman, of Adrian, Mich. The machine will work on boxes or trunks of any size or shape.

Mr. George S. Darling, of Chicago, Ill., has patented several important improvements in sewing machines which relate to the shuttle and shuttle carrier, the take-up, tension check, and shuttle motion. The patent is assigned to the Wilson Sewing Machine Company, and the improved machine was recently illustrated and described in this journal.

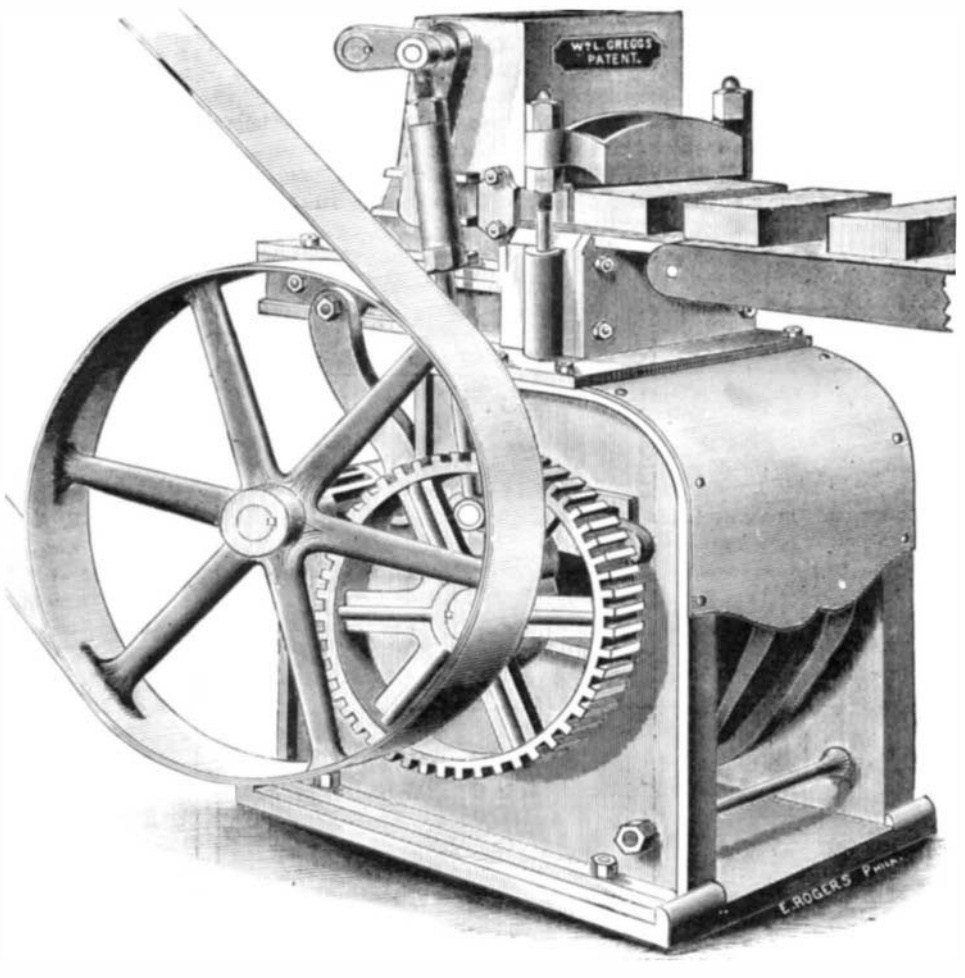
An improved garden roller, in which the handle-counterpoising weights are formed in circular plates, which also serve as ornamental heads for the roller and as dirt protectors, has been patented by Mr. Joseph W Hobson, of New York city.

Mr. Joseph B. Underwood, of Fayetteville, N. C., has devised an attachment for a sewing machine treadle, which is connected with the chair in which the operator is seated, so that the chair is partly sustained by the attachment, and the weight of the body, being slightly rocked or shifted from one point to another, assists in driving the machine.

An improved portable burglar alarm, patented by Mr. J. D. William, of Rising Sun, Ind., may be carried in the pocket or valise, and is readily applied to doors or windows. It consists of a small case containing alarm mechanism which is set off by cords connected with the doors or windows.

A novel rowing apparatus has been patented by Mr. G. H. Felt, of Brooklyn, Mich. The object of the invention is to enable the rower to sit facing the bow of the boat instead of the stern, while the motions are the same as in ordinary rowing.

Messrs. Benjamin A. Dobson and James Macqueen, of Bolton, England, have patented an improvement in spinning and doubling machinery. The invention consists in a combination of devices for controlling the rising of the copping-faller after the yarn is wound on the cop, to prevent snarling or cutting.



GREGG'S BRICK MAKING AND REPRESSING MACHINE.

BRICK MAKING BY MACHINERY.

The day of old-fashioned hand-made brick is fast passing away, and in this, as in many other industries, machine work is taking the place of hand work. The introduction of machinery for making brick has been attended with the opposition that usually accompanies an innovation on hand work; but gradually, as the machines have become more and more perfect, and the product in both quality and quantity is found to surpass the hand-made article, the opposition dies out.

It is stated on good authority that the manufacture of bricks employs more capital than any other business in the United States.

In making bricks by machinery, and especially face or front bricks, as ordinarily practiced, it has been practically impossible to supply an equal amount of clay to each of the mould boxes. This results in inequality in size and density in the bricks. When but one pressure is imparted to the clay, as in previous methods of manufacture, the bricks are often defective in strength, especially at the corners and edges, and are therefore unsuitable for use as first quality front or face bricks. These serious objections have been overcome by Gregg's brick machine, which is shown in the accompanying engraving.

In these machines the heavy developing pressures take place while the mould table is at rest, thus requiring but a nominal amount of power to operate them, and avoiding undue strain, wear and tear, and breakage.

Brick machines may properly be classified under three heads—dry clay machines, slush machines, and crude or moist clay machines. From the peculiar construction of dry clay machines, where filler boxes or graduating measures are used to fill the mould boxes, the clay must be dried and granulated to fill with any degree of regularity into the filler boxes, and thence into the moulds. And when moulds are grouped together it becomes a physical impossibility by the dry clay system to fill them alike, hence those deficient in clay will but partially develop the bricks; this added to the fact that the cohesive quality of the clay is destroyed by extracting the moisture before moulding prevents complete vitrification in the process of burning, and the result is that bricks made from dry clay disintegrate by the action of the elements.

In the manufacture of slush brick the other extreme is met. To facilitate moulding in the hand way a large proportion of water is added, and the bricks being so soft must be spread upon floors to dry. The slow outdoor process of drying, or evaporation, is one of the most favorable processes for the hand brick maker, but it requires the continuous insurance of favorable atmospheric influences, and a continuity of fair weather, which practically can never be relied on.

Clay, to be made into bricks by hand moulding, must of necessity be so wet that at least 25 per cent of water must be evaporated before it is safe to burn, so that in fact, in works producing 30,000 bricks per day, upwards of twenty-three tons of water have to be evaporated therefrom every twenty-four hours. The labor of handling this enormous amount of water is an expensive item, and the bricks are rendered porous by the operation.

The Gregg brick machine occupies a medium position between dry clay and slush machines, and it effects a great saving, as the machine receives the crude clay and works it to advantage in so stiff a state that it does not contain more than one eighth as much of water as the hand-made article, and yet all of its cohesive qualities are retained. In the burning process, the fusion being complete, the bond between the particles is perfect and the bricks are less porous, consequently stronger and absorb less moisture.

The following is a statement of hydraulic tests, showing the superiority in strength of the Gregg brick over hand-made brick:

1st. Hand-made brick, front, whole, crushed, 42,000 lbs.; half, 40,000 lbs.; quarter, 30,000 lbs.

2d. Machine-made, front, whole, 60,000 lbs.; half, 57,000 lbs.; quarter, 55,000 lbs.

3d. Hand-made brick, hard, whole, crushed, 49,000 lbs.; half, 32,000 lbs.; quarter, 12,500 lbs.

4th. Machine-made, hard, whole, 55,000 lbs. half, 55,000 lbs.; quarter, 45,000 lbs.

The same tests were applied by direction of the Supervising Architect of the United States at the Treasury Department, with the same results—the Gregg brick were ordered to be used in the government work.

The general agents for the Gregg brick machines are the Gregg Brick Company, whose offices are located at 95 and 97 Liberty street, New York, and at 402 Walnut street, Philadelphia.

Cement for Uniting Metal to Glass.

The following recipe is from the *Monthly Magazine of Pharmacy:* Take 1 lb. shellac dissolved in a pint of strong methylated spirit, to which is to be added 0·05 part of solution of India rubber in carbon bisulphide: or take 2 ounces of a thick solution of glue, and mix with 1 ounce of linseed oil varnish, or 3-4ths of an ounce of Venice turpentine; boil together, and agitate. The pieces cemented should be fastened for 50 or 60 hours to get fixed.