(No Model.) 2 Sheets—Sheet 1.

A. R. MILLER.

PUG MILL.

No. 490,611. Patented Jan. 24, 1893.

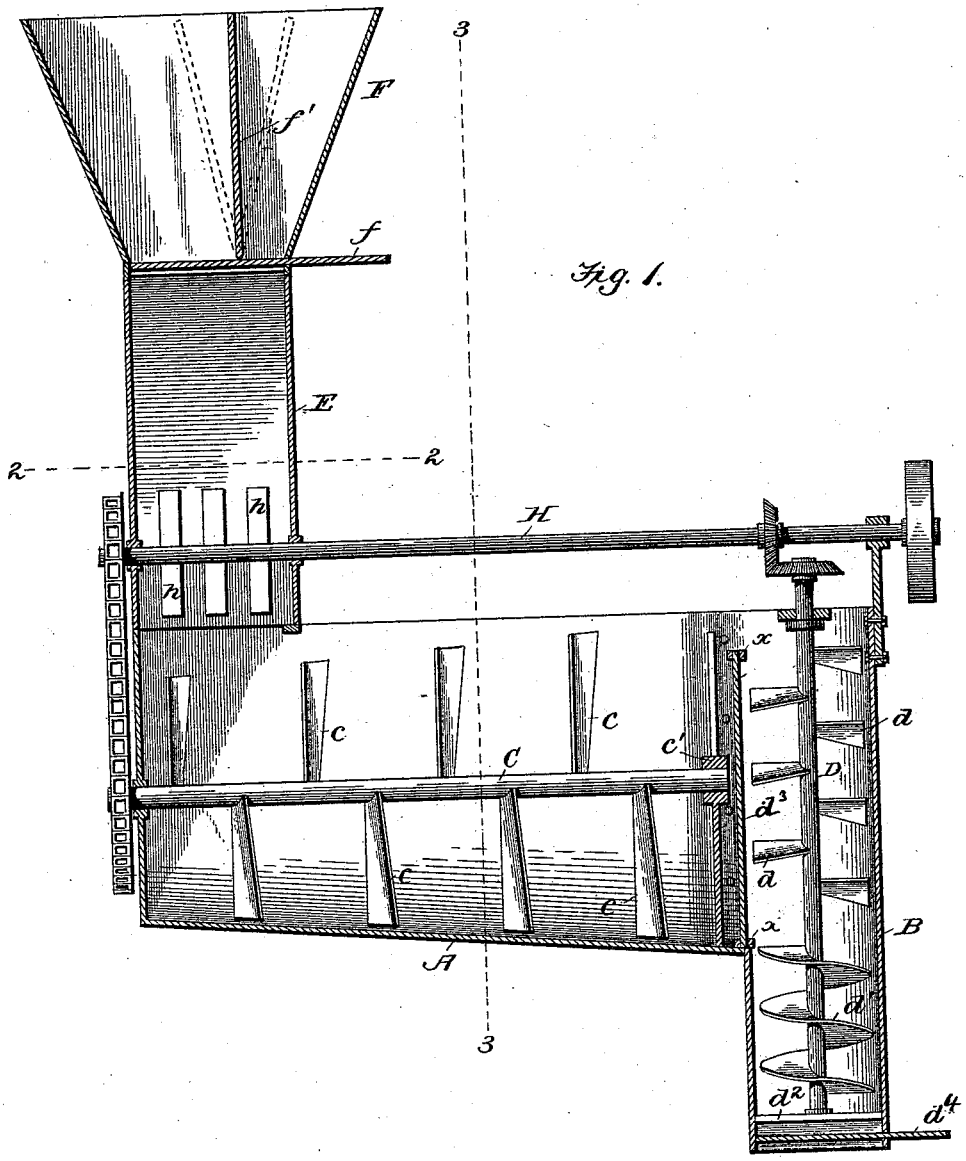

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

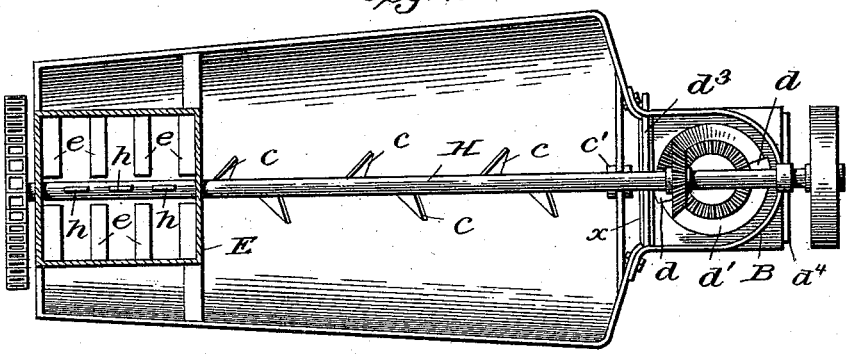


Fig. 3.

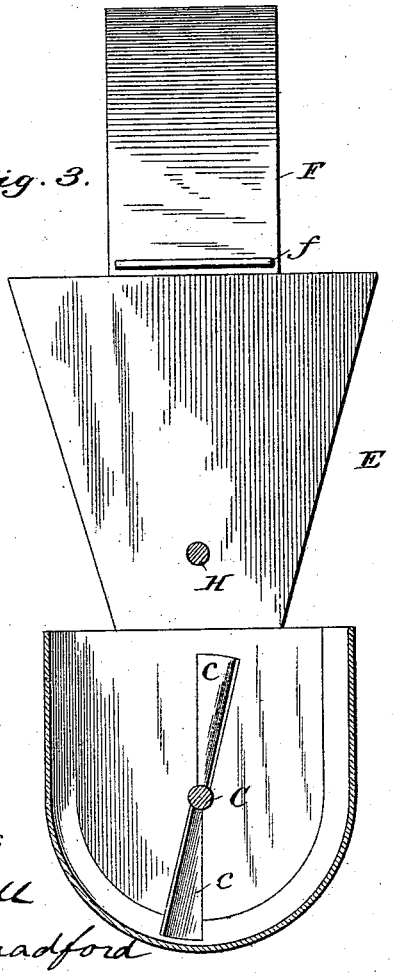
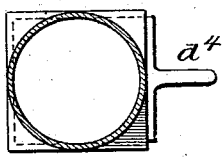


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALONZO R. MILLER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-HALF TO SCOTT NESBITT, OF SAME PLACE.

PUG-MILL.

SPECIFICATION forming part of Letters Patent No. 490,611, dated January 24, 1893.

Application filed June 18, 1892. Serial No. 437,235. (No model.)

To all whom it may concern:

Be it known that I, ALONZO R. MILLER, a citizen of the United States, residing in the city of Washington, District of Columbia, have invented certain new and useful Improvements in Pug-Mills; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in pug mills or mortar mixers, and it consists in certain novel combinations of instrumentalities hereinafter described and claimed.

In upright machines for mixing mortar and for other like work, the great weight of the material operated upon tends to drive the lower part through the discharge chute so fast that it is difficult to work with any considerable depth of the mixture and therefore it is difficult to secure the proper mixing of the ingredients in a continuously operating machine. The discharge opening must be of considerable area to prevent choking and when properly proportioned to permit a regular and free discharge of the contents at all, such contents are forced out by the column with such a rush as to immediately lower the column and leave but a small body for the blades or mixers to operate upon.

The main object of my invention is to overcome the objections to these upright machines and to secure a positive and regular discharge of the mixture from the mixing vessel.

A further object is to secure these ends by simple and inexpensive means.

In the drawings, Figure 1, is a central vertical section of a mortar mixing machine involving my invention; Fig. 2, is a horizontal section on the line 2—2 of Fig. 1, showing the operating shaft in elevation; Fig. 3, is a view, partly in section and partly in elevation looking from right to left taken on the line 3—3 of Fig. 1; Fig. 4, is a detail showing the cut-off in the discharge chute.

The machine is to be supported by suitable frame-work, or upon any suitable pedestal.

A is a tapering trough or vessel, the bottom of which is slightly inclined as shown. One end of this trough is closed by a head and at the other end is a well B preferably cylindrical in form. The well B is either permanently or detachably connected with the trough. As shown, it is made separate from the trough and then the two are bolted or riveted through flanges to secure them together when set up for use. When the trough and well are made separately they are always connected together when the machine is set up for use.

A shaft C carrying mixing blades or vanes *c* is mounted in the trough upon suitable bearings. In the form shown one end of the shaft has its bearings in the head and the other end in a cross-bar *c'*.

Within the well B is mounted a vertical shaft D carrying blades or vanes *d* opposite the end of the trough and a screw conveyer *d'* below the trough in the bottom of the well. The vertical shaft is stepped in a cross-bar d^2 and sustained at the upper end by any suitable support. Between the end of the trough and the well is a movable diaphragm or gate d^3 to provide for closing the trough until the contents are sufficiently mixed and for permitting such contents to pass forward to the well for further mixing by the horizontal blades *d* and for final expulsion through the discharge chute by the conveyer screw *d'*. The gate d^3 slides in suitable ways *x x*, as seen in Fig. 1, and in and out through one side of the well part, as shown at *z* in Fig. 2. A gate or cut-off d^4 is also arranged in the discharge channel for regulating the rate of discharge in operation and to hold the material in the apparatus until it has been brought to the proper consistency.

Above the narrow end of the trough is a hopper E having inwardly-projecting wings *e* forming a part of a diaphragm across its mouth and above and leading to the hopper E is another hopper F which I call the measuring hopper. The measuring hopper F has a cut-off or movable partition *f'* preferably hinged at the bottom edge as shown. The compartments of this hopper are of such relative size as to constitute a gage of the proper amount of each ingredient to produce mortar of ordinary character and richness. The swinging or movable partition affords a convenient means for varying the proportion of the ingredients of the mixture and thereby

making a lean, an intermediate or a rich mortar, as may be required.

H is the main driving shaft of the machine driven from any suitable source of power. This shaft carries blades *h* which at intervals register with the wings *e* and close the passage from hopper E to the trough. The driving shaft is operatively connected with the vertical shaft D and with the horizontal shaft C by suitable reducing gearing, as shown, so as to give the desired relative movement to the two shafts and their appendages.

In operation, all the gates being closed, a given quantity of sand, for example, is deposited in one compartment of the measuring hopper F and a proper relative quantity of slaked lime is deposited in the other compartment, the slide or gate is then withdrawn and the sand and lime are thereby dumped into the hopper E, and if the machine is at rest the material is supported by the wings *e* and the blades *h* at the mouth of the hopper. If the machine is in motion, or when it is put in motion, the blades *h* feed the lime and sand to the trough where it is intimately mingled and the trough filled or nearly filled, after which the gate is removed and the mixture is further kneaded by the horizontal blades *d* on the vertical shaft, and finally the gate is withdrawn and the mixture is expelled from the machine by the conveyer screw. According to ordinary methods of making mortar by hand-shoveling and mixing, the sand and lime are imperfectly mixed one part of the mass being very rich and another part lean having entirely too great a proportion of sand. With my machine, the several ingredients being always introduced in their proper proportion with each other the quality of the mortar is constant and uniform for a predetermined grade.

Having now described my invention, what I claim, is—

1. The combination of a mixing trough, a feed hopper leading to said trough, having projecting wings and a shaft having blades to register with said wings to close and open the passage from the hopper to the trough, substantially as described.

2. The combination of a mixing trough, a feed hopper leading to said trough having means for opening and closing the passage from hopper to trough, and a supplemental measuring hopper leading to the feed hopper having a movable gate at its bottom, substantially as described.

3. The combination of a mixing trough, a main feed hopper, leading to said trough having means for opening and closing the passage from hopper to trough and a supplemental measuring hopper having a gate between it and the main feed hopper, and an adjustable partition for regulating the relative quantity of the several ingredients to be introduced to the machine, substantially as described.

4. The combination of a mixing trough, mixing blades mounted to revolve in said trough, a vertical well at one end of the trough, a gate or cut-off between the trough and well and a rotatable shaft in said well carrying horizontal mixing blades and a conveyer and means for operating the mixing blades in the trough and the shaft and its appendages in the well.

5. The combination of a mixing trough having its lower side inclined, mixing blades mounted to rotate in said trough measuring and feed hoppers as described, a well adjacent to the trough, a gate between the trough and well, a shaft carrying mixers and conveyer in the well and means for operating the mixing blades and conveyer, substantially as described.

6. The combination of a mixing trough and a detachably connected well adjacent to said trough, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

ALONZO R. MILLER.

Witnesses:
JOS. H. WOOD,
CHAS. L. DUBOIS.