

(No Model.)

D. PETERS.

PUG MILL.

No. 375,568.

Patented Dec. 27, 1887.

Fig. 1.

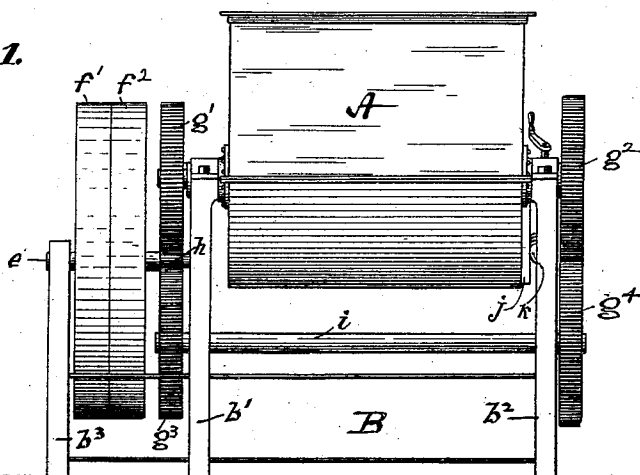
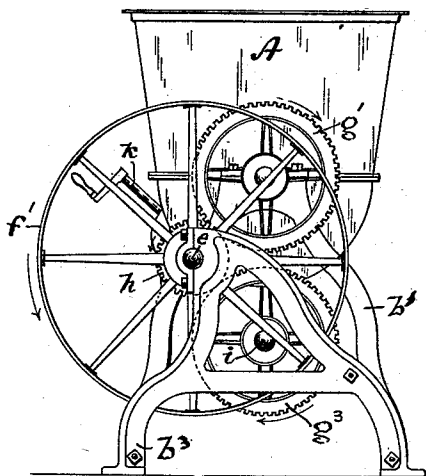


Fig. 2.

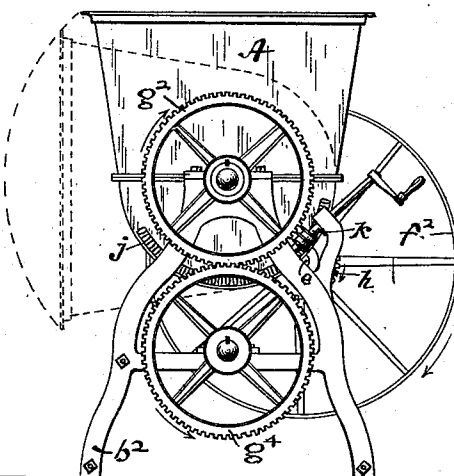


Fig. 3.

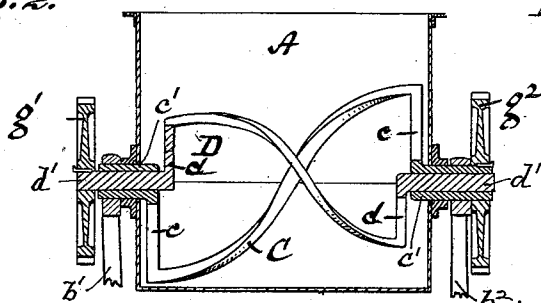


Fig. 4.

Attest.

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UNITED STATES PATENT OFFICE.

DANIEL PETERS, OF CINCINNATI, OHIO.

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SPECIFICATION forming part of Letters Patent No. 375,568, dated December 27, 1887.

Application filed March 5, 1887. Serial No. 229,747. (No model.)

To all whom it may concern:

Be it known that I, DANIEL PETERS, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Mixing-Machines, of which the following is a specification.

My invention relates to power-machines for mixing or kneading various substances of a granular or plastic nature, whether in moist or dry condition; and it consists in the construction and arrangement of the mechanism hereinafter described, embodying as its main principle of action the interrotation of two concentric spiral blades or wings in opposite directions in the mass of material, and, also, in the construction and arrangement of the containing vessel and its dumping mechanism, all as hereinafter set forth.

My invention is embodied in the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine complete; Figs. 2 and 3, opposite end elevations, respectively; and Fig. 4, a vertical axial section of the containing vessel, showing the form and relative arrangement of the mixing-blades and their mountings.

Referring now to the drawings in aid of the following description, A designates the containing vessel, preferably in the form of a rectangular hopper with semi-cylindrical bottom; and B, the supporting-frame of the hopper and the driving mechanism, said frame consisting of supporting-brackets $b' b^2 b^3$, standing upon a base or floor. The hopper A is journaled and supported in and between the standards $b' b^2$ upon the end shafts, respectively, of two spiral blades or wings, C D, mounted concentrically and rotating one within the other in opposite directions.

The construction and arrangement of the blades are as follows: One of the blades—as, for example, (the larger,) C—is held upon and between two crank-arms, $c e$, upon a short shaft, $c' c'$, extending in opposite directions through the end walls of the hopper A. The shafts $c' c'$ are arranged in a common axis extended, and the crank-arms $c e$ set diametrically opposite each other, while the outer surface of the blade rotates in close proximity to the cy-

lindrical bottom of the hopper. The smaller blade, D, is constructed and arranged in a similar manner upon crank-arms $d d'$, and its end shafts, $d' d'$, extend concentrically through the shafts $c' c'$, which are made hollow for the purpose. The hopper has its bearing upon the hollow shafts $c' c'$, and the latter are journaled in the standards $b' b^2$. At one end of the machine the shaft d' projects beyond the sleeve c' and receives a spur-gear, g' , and at the other end the sleeve c' is projected to receive a similar gear, g^2 .

The driving-power is communicated by the following mechanism. At one end of the machine a third standard or bracket, b^3 , is erected, giving bearings between and upon itself and the standard b' for a driving counter-shaft, e , carrying fast and loose pulleys $f' f^2$, and a spur-gear, h . The latter meshes with the gear g' , before described, and with a similar gear, g^3 , arranged below upon a driven counter-shaft, i , journaled in the standards $b' b^2$ below the hopper A, and carrying at its remote end a spur-gear, g^4 , meshing with the gear g^2 , before described.

It will be seen that the driving-power is first given directly through the gear g' to one of the spiral blades in one direction, and transmitted through the counter-shaft i and gears $g^3 g^4 g^2$ to the other spiral blade with an opposite rotation.

It will also be observed that by the described mounting of the hopper it can be rotated upon the shafts $c' c'$ without disturbing any of the gear-connections.

The mechanism for accomplishing the rotation of the hopper to discharge contents consists of a curved rack, j , arranged upon one end of the hopper, and a screw-shaft, k , journaled in projections of the frame and provided with an operating-handle. This arrangement is much preferable to any other in large machines, as it retains the hopper at any position without danger from overbalancing, besides requiring but little strength on the part of the operator to manipulate. The deflected position of the hopper is indicated by dotted lines in Fig. 3.

The mode of operation is as follows: Power, being applied and transmitted by the described

gearing, rotates the blades in opposite directions, one within the other. The spiral contour of the blades acts to force the material in opposite directions longitudinally in the hopper, and the blades being arranged to pass in close proximity to each other and the outer one in close proximity to the bottom, where the substance tends to concentrate by its gravity, a constant tearing and mingling action is sustained. The end supports, *c d*, also take part in this action by their opposite rotation.

The machine is found to operate efficiently with dry and granular substances of all kinds, and also with wet or moist substances of a plastic or semi-plastic nature.

In the illustration of my invention the crank-arms *c c d* are shown as set at diametrically-opposite radii; but in practice I find it desirable to carry the outer spiral around an entire circle between its crank-arms and the inner spiral a circle and a half. These proportions may of course be varied as desired.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. The improved mixing-machine, embodying, in combination, the reversible discharging-hopper *A*, fixed supporting-frame *B*, concentric spiral blades *C D*, having shafts *c d* jour-

naled one within the other and forming a pivotal support for the hopper, the gears *g' g'* at opposite ends of the blade shafts, the counter-shaft *i* and gears *g' g'* thereon, and the driving-gear *h*, arranged and operating substantially as set forth.

2. The combination of the vertical standards of the supporting-frame, the hollow end shafts of one spiral blade journaled therein, the hopper hung upon said hollow end shafts projecting through its end walls, the end shafts of a second concentric spiral blade, and the two spiral blades secured to and uniting the end shafts, respectively, and rotating one within the other, substantially as set forth.

3. The combination of the hopper having a cylindrical bottom and swung upon the shafts of the spiral blades, the spiral blades operating within the other, and the rack and screw device, arranged and operating as described, for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

DANIEL PETERS.

Witnesses:

L. M. HOSEA,
C. D. KERR.