

(No Model.)

W. J. BOLAND.
PULVERIZER AND PUG MILL.

No. 421,811.

Patented Feb. 18, 1890.

Fig 1

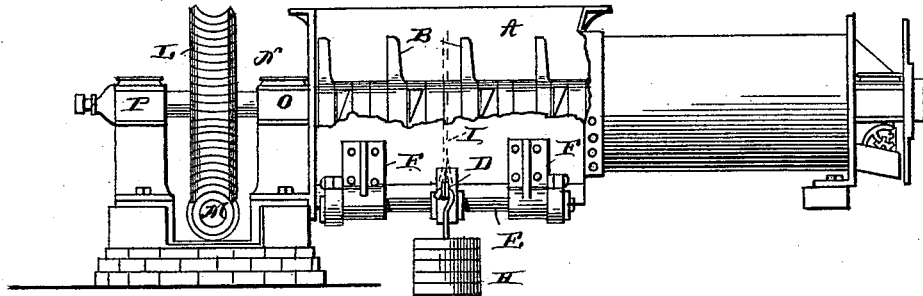
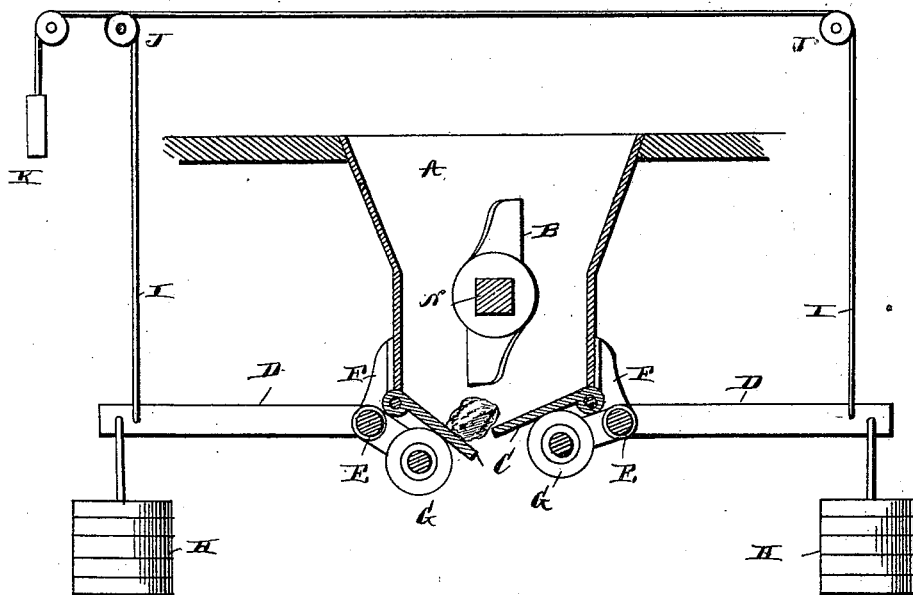


Fig 2



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM JOHN BOLAND, OF CHICAGO, ILLINOIS.

PULVERIZER AND PUG-MILL.

SPECIFICATION forming part of Letters Patent No. 421,811, dated February 18, 1890.

Application filed March 22, 1889. Serial No. 304,249. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOHN BOLAND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pug-Mills, of which the following is a specification.

My invention relates to improvements in pug-mills; and it consists in certain novel features hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side view of a pug-mill provided with my improvements, and Fig. 2 is a cross-section of the same.

My invention relates especially to the hopper, and in the drawings A designates the hopper of the pug-mill, having the longitudinal series of knives B arranged therein, of any preferred construction. The bottom of the hopper is composed of two downwardly-swinging doors C C, which are hinged at their outer edges to the lower edges of the opposite sides of the hopper, as shown most clearly in Fig. 2. The doors are held normally closed by means of the levers D, which are pivoted near their inner ends on rods E, extending longitudinally of the hopper and secured in brackets or lugs F, provided on the sides of the hopper. The inner ends of the levers project under the doors and are provided with rollers G G, which bear against the under sides of the doors and prevent undue friction between the same and the ends of the levers. Weights H are suspended on the outer ends of the levers, so as to hold the said outer ends lowered and the inner ends consequently elevated, thereby closing the doors. The levers are further provided with the cords I, which extend upward from their outer ends to pulleys J, suitably supported above the mill, and thence extend to one side and are provided with a handle K, so that the outer ends of the levers can be raised and the inner end thereof lowered, so as to open the doors and discharge the contents of the hopper when it is desired to clean the same. The knives in the hopper are caused to rotate by means of a worm gear-wheel L, mounted on the extended end of the shaft of the knives, and a worm-screw M, arranged below the shaft and meshing with the worm gear-wheel. The outer end of the shaft N

of the knives is mounted in the bearings O P, which are arranged, as shown, so that the shaft will have no outward bearing.

In practice the material is placed in the hopper in the usual manner and the knives rotated, as will be readily understood. Should the material placed in the hopper contain stones, the knives will force the same to the bottom of the hopper and the pressure thereof on the doors will cause the said doors to open and allow the stones to fall from the hopper. After the stones have passed from the hopper the weights hung on the levers will return the doors to their closed position, so as to prevent loss of the material.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that I have provided a very efficient mechanism by which the stones which may get into the hopper will be allowed to escape therefrom, and consequently the breaking of the knives will be prevented. The device requires no attention on the part of the operator and will effectually perform the work required of it. The weights on the outer ends of the levers are sufficiently heavy to hold the doors normally closed, but are also light enough to be overbalanced by the pressure put on the doors by the stones working between the same and the knives.

The device is very simple and is consequently not liable to get out of order, and its advantages are thought to be obvious.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the hopper, of the doors having their outer edges hinged to the lower edges of the sides of the hopper, and the levers fulcrumed upon the hopper and having their inner ends provided with friction-rollers bearing on the under sides of the doors and their outer ends provided with weights, as set forth.

2. The combination, with the hopper, of the downwardly-swinging doors forming the bottom of the same, the levers fulcrumed on the hopper and having their inner ends acting on the doors and their outer ends provided with weights, and the cords secured to the outer ends of the levers and extending to one side of the hopper, as set forth.

3. The combination of the hopper, the doors
hinged to the sides of the same and forming
the bottom thereof, the lugs F on the sides of
the hopper, the rods E, secured in said lugs,
5 the levers pivoted on said rods, the rollers G
on the inner ends of said levers bearing on
the under sides of the doors, and the weights
on the outer ends of the levers, as set forth.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in the
presence of two witnesses.

WILLIAM JOHN BOLAND.

Witnesses:

W. F. BERNBROCK,
HARRY L. JEWELL.