(No Model.)

T. O. PERRY.

GRINDING MILL.

No. 420,464. Patented Feb. 4, 1890.

Fig. 1.

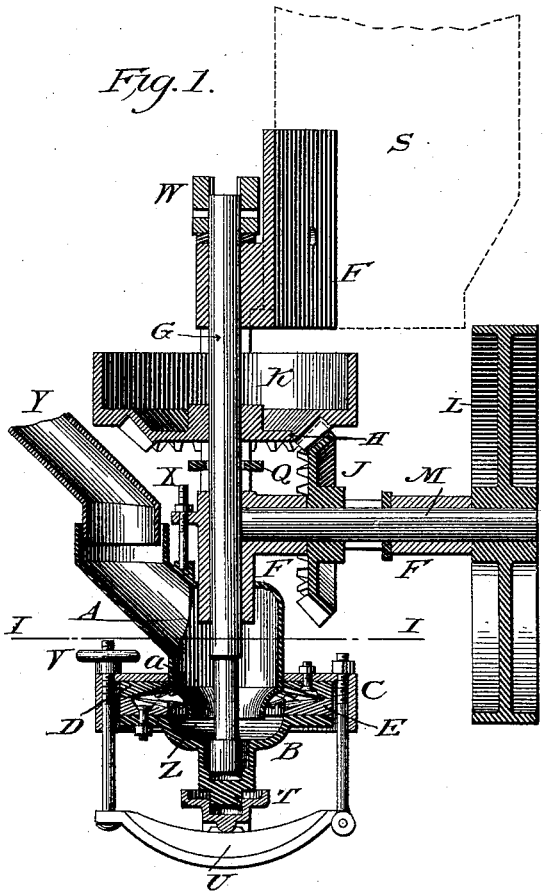


Fig. 2.

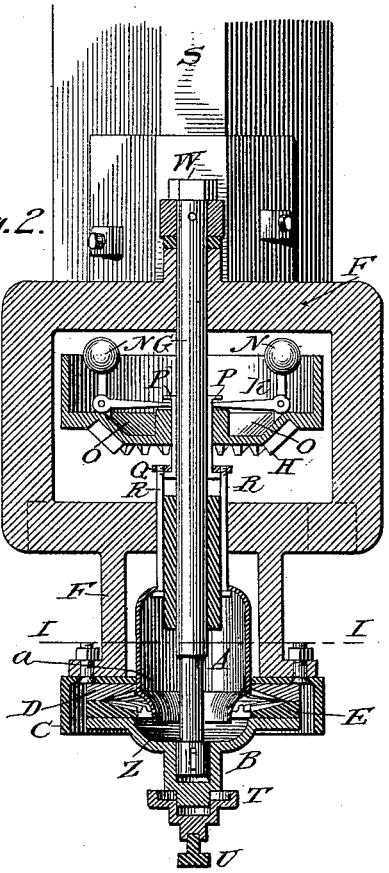


Fig. 4.

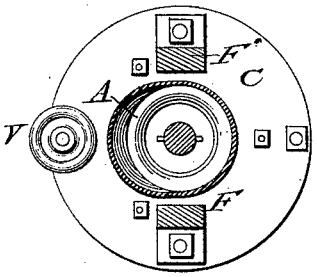
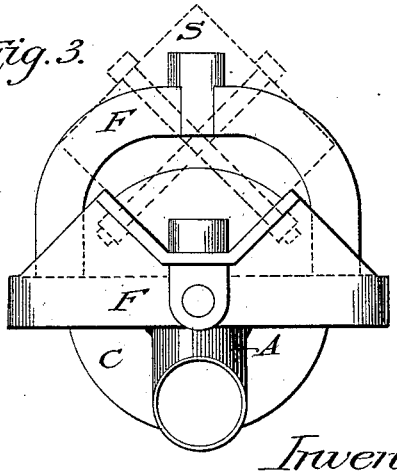


Fig. 3.



Witnesses.

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Albert E. Horst

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UNITED STATES PATENT OFFICE.

THOMAS O. PERRY, OF CHICAGO, ILLINOIS.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 420,464, dated February 4, 1890.

Application filed May 20, 1889. Serial No. 311,500. (No model.)

To all whom it may concern:

Be it known that I, THOMAS O. PERRY, a citizen of the United States, residing at No. 285 Claremont avenue, Chicago, in the county of Cook and State of Illinois, have invented a new and useful Grinding-Mill, of which the following is a specification.

My invention relates to improvements in grinding-mills in which grain is ground between the faces of two horizontal disks or grinding-rings having vertical axes, one disk revolving beneath the other; and the objects of my improvements are, first, to provide a centrifugal feeding device which shall regulate automatically the supply of grain to the rings to suit variations of driving-power and consequent changes in speed of revolution, and, second, to provide for supporting the grinding-mill without obstructing the space underneath. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of the grinding-mill, taken in a plane containing the axes of the vertical and horizontal driving-shafts. Fig. 2 is a sectional elevation taken in a plane containing the axis of the vertical shaft and at right angles to the plane of Fig. 1. Fig. 3 is a plan of the supporting-frame. Fig. 4 is a sectional plan of the part of grinding-mill below the dotted line I, Fig. 1.

Similar letters refer to similar parts throughout the several views.

F represents the frame containing the bearings for driving-shafts G and M.

C is a circular shield bolted to frame F and inclosing the grinding-rings D and E. The upper grinding-ring D is bolted to the shield C, and the lower grinding-ring is bolted to a circular plate B, which is caused to rotate by means of the vertical shaft G, driven by suitable connections with a motor.

The shaft G may connect, by means of a clutch or coupling W, directly with the vertical shaft of a wind-motor, or it may be driven by means of a belt and horizontal pulley K, attached to the shaft; or shaft G may be driven by means of a belt on the pulley L, or by other connection with the horizontal shaft M, communicating motion through the bevel-gears J and H. The horizontal pulley K and bevel-gear H are shown as cast in one piece keyed to shaft G. The plate B is driven by means of a key passing through a slot in the foot of shaft G, and is supported by a step-box T, on which it revolves. The step-box T rides on a yoke U, suspended from the shield C by two bolts, one of which is provided with a hand-screw V, by means of which the lower grinding-ring may be adjusted to grind coarse or fine.

Grain is led to the interior of the grinding-rings by means of an inclined spout A, the lower end of which surrounds the shaft G, and, extending down through both grinding-rings, reaches into a central depression Z in the plate B far enough so that when the lower ring is without motion, or is revolving slowly, no grain will get in between the grinding-surfaces of the rings; but a certain speed of revolution is required to throw the grain up out of the depression Z by centrifugal force into the teeth of the rings. The speed required will depend on the depth of the depression Z and the distance the spout A reaches down into it below the grinding-surfaces of the rings.

The spout A may be rigidly attached to or form a part of the shield C, or it may be a separate part made vertically adjustable by means of a nut X on a stud attached to the spout and passing up through an ear projecting from the frame F. Where the spout passes through the upper grinding-ring D, it is preferably made with shoulders *a*, which nearly fill the circular opening through the ring, and from there downward is contracted in diameter, so as to leave between the opening through the lower grinding-ring E and the lower end of the spout an annular space for the exit of grain from the depression Z into the teeth of the rings D and E. It will be seen that by depressing the spout thus constructed the grain may be shut off from the rings close to the teeth while the spout is full of grain, thus leaving the least possible amount to be ground out and stopping the grinding almost instantly after the depression of the spout. The ground grain is delivered at the periphery of the rings, being thrown against the inside of the shield C, whence it drops directly down. To receive the ground grain, the mouth of a bag may be tied around the outside of the shield, or a bin

of any size may be placed underneath the shield, as there is no supporting-base in the way.

The frame F is sustained from above, being bolted to a timber S, suspended from any suitable support, as a ceiling or roof of a building, so as to leave the space beneath the grinding-mill unobstructed. In case the grinding-mill is driven by wind-power this arrangement is especially convenient, as the same timber or mast S may support a wind-motor at its upper end.

The spout A, extending down below the teeth of the grinding-rings into the depression Z, constitutes, even when rigidly attached to or forming a part of the shield C, an automatic centrifugal feeding device, which will control the supply of grain to the grinding-rings, increasing the supply as the speed of revolution increases, reducing the supply as the speed decreases, and shutting off the grain from the rings entirely when the lower ring ceases to rotate, so that at the commencement of motion there will be no resistance to rotation caused by grain left or prematurely lodged in the teeth of the grinding-rings.

By making the spout A a separate piece from the shield C and giving it a vertical adjustment by means of the nut X the speed of rotation necessary to commence grinding, as well as the amount of grain fed to the rings with any given speed, can be changed, as the flow of grain will be more or less obstructed, according as the spout A is depressed or elevated. Grain may be conveyed from a bin to the spout A by means of a chute Y, whose lower end telescopes into the upper end of spout A, so as not to interfere with the vertical movement of the latter. The supply of grain to the rings may be further automatically regulated, if need be, by means of centrifugal balls N acting to elevate the spout A, so that the flow of grain will be less and less obstructed as the speed of rotation increases. The balls N form the upper extremity of bent levers, which are fulcrumed at their elbows on the rim of the bevel-gear H. The horizontal arms of the bent levers O engage with two rods P, which pass loosely through slots in the hub of the bevel-gear H, close along the shaft G, and are bent out at their lower ends, so as to catch under a ring Q, surrounding the shaft G, with an annular space between the shaft and ring, through which the rods P pass, and within which they revolve with the shaft G. The ring Q does not revolve, but is connected with the spout A by means of the two rods R, which are free to move vertically through holes in the frame F. The nut X being removed, the spout A will drop of its own weight, so as to absolutely stop the flow of grain into the grinding-rings; but when the speed of revolution becomes sufficiently rapid the centrifugal force of the balls N will lift the spout A, so as to leave a passage more or less free for grain to enter the grinding-rings. The rapidity of revolution required to lift the spout A may be regulated by adding to or taking from the weight of the spout.

What I claim, and desire to secure by Letters Patent, is—

1. In a grinding-mill, the combination of the casing provided with a feed-spout extending downward centrally from the top of said casing and a stationary grinding-ring secured thereto, with a revolving plate provided with a central depression and a grinding-ring secured thereto, said depression being directly underneath and surrounding the lower end of said feed-spout, substantially as and for the purpose herein set forth.

2. In a grinding-mill, in combination, the casing provided with a central feed-spout, a stationary grinding-ring secured thereto, a revolving plate provided with a central depression, and a grinding-ring secured thereto, said central feed-spout extending down into said depression below the teeth of the revolving grinding-ring, substantially as and for the purpose herein specified.

3. In a grinding-mill, the combination of the casing provided with a central circular opening, a stationary grinding-ring secured thereto, a revolving plate provided with a central depression, and a grinding-ring secured thereto, said depression being directly underneath said central opening, with an adjustable circular feed-spout entering said opening and extending down into said depression, and provided with an adjusting-nut X, substantially as and for the purpose herein set forth.

4. In a grinding-mill, the combination of the casing provided with a central circular opening, a stationary grinding-ring secured thereto, a revolving plate provided with a central depression, and a grinding-ring secured thereto, said depression being directly underneath said central opening, with an adjustable circular feed-spout entering said opening and provided with a shoulder *a*, whereby by lowering the feed-spout the supply of material is cut entirely off, substantially as described.

THOMAS O. PERRY.

Witnesses:
ALBERT E. WOOD,
WM. G. DEALE.