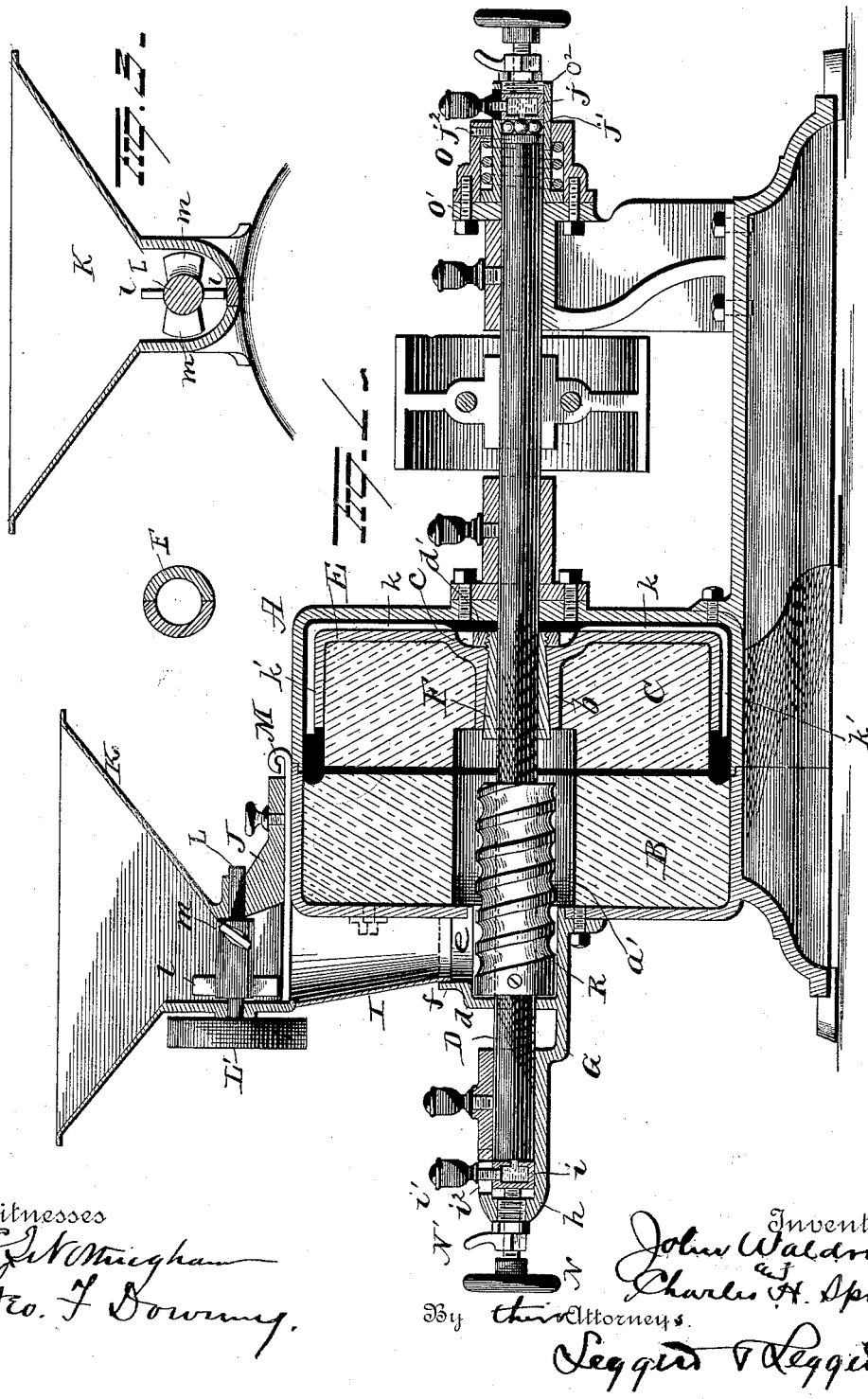
(No Model.) 2 Sheets—Sheet 1.

J. WALDRON & C. H. SPROUT.

GRINDING MILL.

No. 417,760. Patented Dec. 24, 1889.



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(No Model.) 2 Sheets—Sheet 2.

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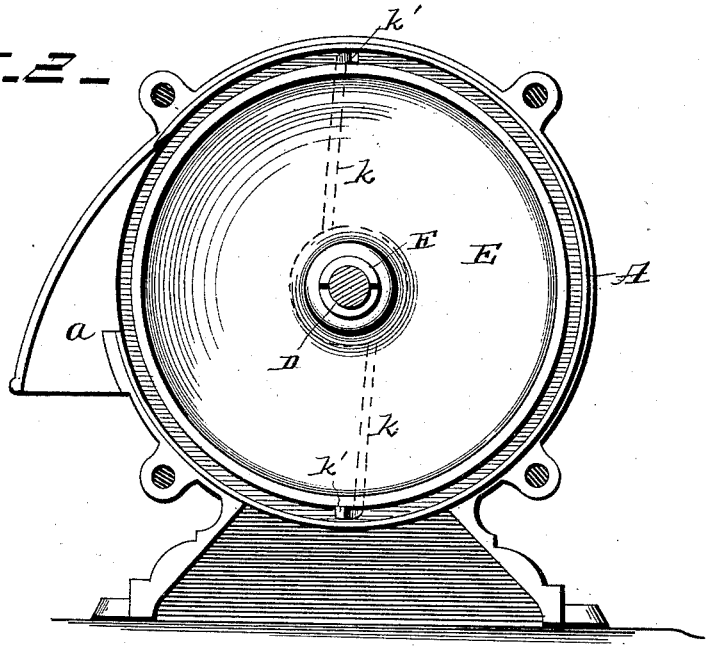
Fig. 2.



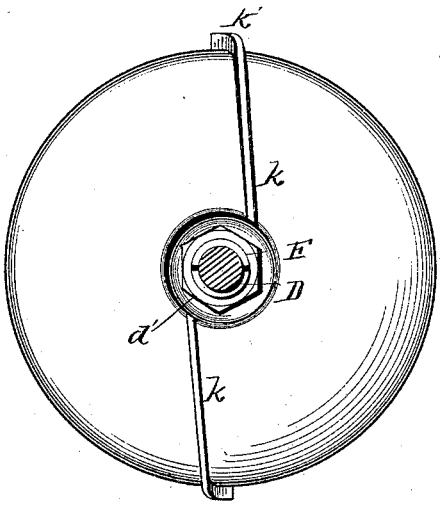


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN WALDRON AND CHARLES H. SPROUT, OF MUNCY, PENNSYLVANIA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 417,760, dated December 24, 1889.

Application filed August 16, 1889. Serial No. 320,949. (No model.)

To all whom it may concern:

Be it known that we, JOHN WALDRON and CHARLES H. SPROUT, of Muncy, in the county of Lycoming and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Mills; and we do hereby declare the following to be 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.

Our invention relates to an improvement in grinding-mills, and more particularly to that class known in the art as "vertical-disk mills."

The object of our present invention is to produce a grinding-mill in which the rotary burr may be adjusted longitudinally on the shaft and secured at any desired adjustment without liability of getting out of line with the stationary burr.

A further object is to so construct the casing of the rotary burr that material will be prevented from clogging behind the same, and any material which might find its way behind the casing may be ejected from the machine.

A further object is to provide an improved agitator or feed to prevent the material from clogging in the spout of the hopper, and also to prevent bridging of material in the hopper over the spout.

A further object is to construct the hopper in such a manner as to assist in preventing bridging of material in the hopper.

A further object is to produce a grinding-mill which shall be simple in construction, comprising a small number of parts, and effective in operation.

With these objects in view our invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of the mill. Fig. 2 is an end view of one-half of the machine. Fig. 3 is a detached view of the hopper. Fig. 4 is a detached view of the casing for holding the rotary burr or running-stone.

A represents a shell for receiving and inclosing the burrs B and C, and is provided at one side with a spout *a*. The burr B is secured within one section of the shell and provided with a central perforation *a'* for the passage of a shaft D.

Mounted upon the shaft D is a burr-casing E, having a central inwardly-projecting hub *b*. The casing E has secured within it, by means of cement or otherwise, the rotary burr or runner-stone C, the exposed surface of which is at all times parallel with the exposed face of the stationary burr.

For the purpose of preventing material finding its way behind the rotary burr-casing the casing E is provided on its outer face with two or more ribs *k*, which are tangential to the axis of the rotary burr. Ribs *k'* are located on the periphery of the casing, and are in effect continuations of the ribs *k*. By thus arranging the ribs *k k'* on the burr-casing the material which would otherwise clog the machine will be conveyed to the spout *a*.

In order to prevent the rotary burr from getting out of line with the stationary burr should any hard substance enter between the burrs, the rotary burr-casing is adjustably secured upon the shaft in the manner illustrated in Fig. 1. The internal diameter of the hub *b* is somewhat larger than that of the shaft passing through it, and at the base of the hub or in the outer face of the casing E a recess *c* is formed. Inserted into the hub from inside the casing and surrounding the shaft is a screw-threaded conical divided collar F, the smaller end of which is adapted to project into the recess *c* and receive a nut *d'*, by means of which the two parts of the collar are firmly clamped to the shaft and to the casing E. By this means the rotary burr will be securely attached to the shaft, at the same time permitting ready and accurate adjustment, and the two burrs will be maintained parallel with each other at all times.

Secured upon the shaft D, and passing loosely through the perforation in the stationary burr and into the boss *d* of a bracket G, secured to the shell A, is a worm-conveyer R, by means of which the material to be ground is conveyed between the burrs. An opening *e* is made in the top of the boss *d*

and communicates with the interior of the mill. An integral flange *f* projects upwardly from the boss *d* and around the opening *e* for the reception of the lower end of a chute I.

Secured upon the shell A, over the chute I, is a bracket J, which supports the hopper K and also forms a spout for the same. The lower portion of one side of the hopper is made vertical or practically vertical, while the remaining portion of said side, as well as the other sides, is made outwardly flaring.

A groove is made in the bracket J for the accommodation of a slide-valve M, by means of which the flow of material from the hopper may be regulated.

Journaled in the spout of the hopper is a shaft L, having radial feed-wings *l* projecting therefrom at or near one end and spiral feed and conveyer wings *m* at or near the other end of the shaft. The first-mentioned wings are located at the end of the spout nearest the vertical wall of the hopper and serve to produce a force-feed for the material, while the spiral wings are arranged in the opposite end of the spout and produce a conveyer-feed. Thus it will be seen that when the slide-valve M is partially opened the material will be first fed to the open end of the spout by the conveyer-wings and then forced through the opening by the radial feed-wings *m*. The shaft L is extended somewhat beyond the bracket J and provided with a band or driving wheel L′. The bracket G is extended outwardly from the boss *d* and provided at its free end with a head *h*, the intermediate portion forming a bearing for the shaft D. Located within the head *h* is a sliding block *i*, carrying an oil-cup *i*′, which projects upwardly through an elongated slot i^2 in the head. The end of the head *h* is provided with a screw-threaded perforation for the reception of a set-screw N, by means of which the shaft may be held at any desired longitudinal adjustment. A retaining-nut N′ is preferably placed upon the set-screw N to prevent the same from unscrewing. The opposite end of the shaft D has a bearing in a yielding sleeve O^2, located within box O, which latter is carried by a boss O′, suitably supported by the frame-work of the machine. Inserted within the bore of the box O is a small steel sliding block *j*, and against this block three (more or less) steel anti-friction balls *j*′ are placed. Another steel block or plate j^2 is placed against the balls, and the end of the shaft D inserted in the box against the latter-named plate. Thus it will be seen that the end-thrust of the shaft will be provided with an anti-friction ball-bearing. The free end of the box O is provided with a screw-threaded perforation for the reception of a set-screw P, by means of which the shaft and burr carried thereby may be adjusted.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a grinding-mill, the casing of the runner-stone or revolving burr, constructed with an elongated central hub, in combination with the shaft, a split screw-threaded tapered sleeve, and a nut for detachably securing the casing-hub to the shaft, substantially as set forth.

2. In a grinding-mill, the combination, with an outer shell, a stationary burr, and a horizontal shaft, of a casing having a central hub and external ribs, the latter being arranged tangential to the shaft, a split sleeve mounted on the shaft and forming a bearing for the hub, and a nut for securing the casing on the sleeve, substantially as set forth.

3. In a grinding-mill, the combination, with a shaft, a casing having a central hub, and a rotary burr secured within said casing, of a split sleeve mounted on the shaft and forming a bearing for the casing and a nut for securing the casing on the sleeve, substantially as set forth.

4. In a grinding-mill, the combination, with a shaft, a casing provided with a central hub, and a rotary burr rigidly secured to said casing, of a split conical sleeve mounted on the shaft and forming a bearing for the casing, substantially as set forth.

5. In a grinding-mill, the combination, with the shaft supporting the runner-stone or revolving burr and the bearing for supporting the end of the shaft, of a metal block located in the bearing-box, a screw for moving said block toward the shaft, an independent block engaging the end of the shaft, and anti-friction balls interposed between said blocks and the bearing supporting them, substantially as set forth.

6. In a grinding-mill, the combination, with a shaft mounted at one end in a box, of a longitudinally-yielding bearing mounted in said box and a hollow block located within said yielding bearing and carrying a lubricator-cup, substantially as set forth.

7. The combination, with a bearing and a shaft, of a sleeve yieldingly attached to said bearing, a hollow block located within the sleeve and carrying a lubricator-cup, a screw for moving the hollow block toward the shaft, and anti-friction balls between the block and shaft, substantially as set forth.

8. In a grinding-mill, the combination, with the grinding-burrs, of a hopper having one wall vertical at its lower end and flanging throughout the remainder of its length, a compound force and conveyer feed located in the spout of the hopper, the force-feed being located in proximity to the vertical side of the hopper, and a slide-valve for said hopper, substantially as set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

JOHN WALDRON.
CHARLES H. SPROUT.

Witnesses:
B. L. BOWMAN,
MEYLERT BRUNER.