(No Model.)

L. ILER & W. H. PIPER.

GRINDING MILL.

No. 346,108. Patented July 27, 1886.

Fig. 1.

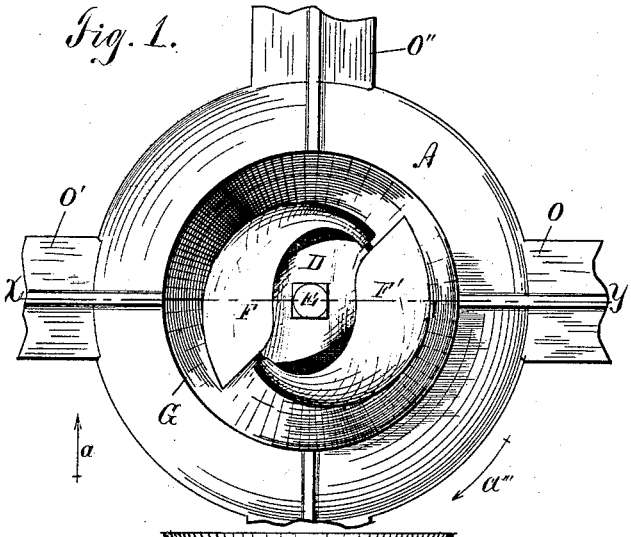


Fig. 2.

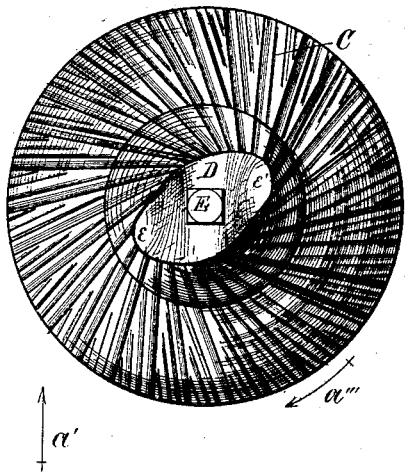


Fig. 3.

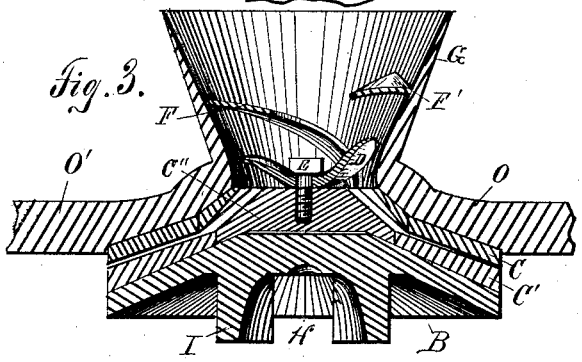
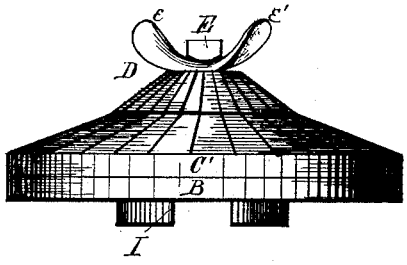


Fig. 4.



WITNESSES:

Oscar Taylor

W. B. Berlocker

INVENTORS

Leroy Iler,

William H. Piper

BY

Wilkeldeene

ATTORNEYS.

UNITED STATES PATENT OFFICE.

LEROY ILER, OF RIDOTT, AND WILLIAM H. PIPER, OF LEAF RIVER, ILL.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 346,108, dated July 27, 1886.

Application filed March 27, 1885. Serial No. 160,188. (No model.)

To all whom it may concern:

Be it known that we, LEROY ILER, a resident of Ridott, in the county of Stephenson and State of Illinois, and WILLIAM H. PIPER, a resident of Leaf River, in the county of Ogle and State of Illinois, 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 pertains to make and use the same.

Our invention relates to improvements in grinding-mills, and more particularly to improvements in force-feed devices for such mills.

The invention is fully described and explained in this specification, and shown in the accompanying drawings, in which—

Figure 1 is a plan of a mill with our force-feed device in position; Fig. 2, a plan of the lower plate or cone of the mill with the force-feed plate in position thereon; Fig. 3, a vertical section of the mill through line *x y*, Fig. 1, looking in the direction indicated by the arrow *a* in said Fig. 1; and Fig. 4, an elevation of the parts shown in plan in Fig. 2, looking in the direction indicated by the arrow *a'*.

In Fig. 1, A is the stationary portion or bed of the mill, to which is rigidly attached the shell or upper grinding-burr, C. The bed is provided with arms O O' O'', which may rest upon and be fastened to any suitable support, and a hopper, G, is formed upon or fastened to the bed A, and bears on its inner surface a series of curved and inclined retaining-plates, F F'. Below the retaining-plates is a curved force-feed plate, D, which is rigidly but removably attached by means of a bolt or screw, E, to a rotating grinding cone or plate, C' C''.

Fig. 3 shows the vertical relation of the parts above mentioned, and also a base-plate, B, to which the lower grinding-ring, C', is attached. From the lower surface of the base-plate extends a hollow slotted cylinder, H, which is adapted to receive the end of a suitable operating-shaft.

Fig. 4 further illustrates the rotating parts. The ends *e e'* of the force-feed plate D have their lower surfaces inclined to their plane of rotation, the inclination of each of said surfaces being upward and forward, (that is, in the direction of the rotation of the plate,) and these inclined surfaces may be plane or warped or of irregular curvature.

In operation the material to be ground is placed in the hopper G, and falls upon and about the plates D F F'. The plate D, with the grinding-plate C C', being rotated at a high rate of speed in the direction indicated by the arrow *a'''*, and having the foremost advancing edges of its ends *e e'* raised, tends to force downward the material over which it passes. The plates F F' prevent the escape of the material from the plate D, and as the space beneath each of said plates diminishes in height and width with the advance in the direction of rotation of the plate D they also add materially to the downward pressure upon the material to be ground, which can only escape by passing between the grinding-surfaces C C'.

The retaining-plates F F', attached to the hopper, are of such angular extent as to form together a practically continuous ring about the hopper, and are of such width or radial extent as to overlap the edges of the feed-plate attached to the rotating burr. The feed-plate thus lies completely below the retaining-plates, and the overlapping of the edges of the co-acting parts prevents the upward escape of any grain which comes within the operation of the feed-plate.

Our invention is evidently adapted to be used with mills in which both grinding-surfaces revolve, as well as in the form shown and described, and we do not, therefore, limit ourselves to either form. The form of grinding-surfaces is also immaterial, our invention being equally applicable to cone and shell, disk, and other forms of mills. The invention is, however, especially applicable to mills which are run at a high rate of speed. By its use a much greater amount of work may be done in a given time, great power being economically employed.

Material which, owing to its condition, would otherwise pass through a mill slowly or not at all, is readily ground by the use of our device, and grinding-surfaces too dull for ordinary use grind at substantially the same rate as when new, if sufficient power be used.

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

1. The combination, with the burrs of a

grinding-mill, of a spiral feed-plate rigidly connected with one of said burrs and a series of inclined retaining-plates connected with the other, said retaining-plates being above said feed-plate, and the inner edges of the retaining-plates overlapping the outer edges of the feed-plate, substantially as and for the purpose set forth.

2. The combination, with the grinding-burrs of a grinding-mill and a hopper rigidly attached to the upper of said burrs, of a spiral feed-plate rigidly fastened to the lower burr, and a series of retaining-plates attached to the inner surface of the hopper and overlapping the outer margin of the feed-plate, the combined angular extent of said retaining-plates being approximately a complete circumference, substantially as and for the purpose set forth.

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

LEROY ILER.
WILLIAM H. PIPER.

Witnesses:
J. M. ILER,
J. A. CRAIN.