2 Sheets—Sheet 1.

C. C. PHILLIPS.

Vertical Grinding-Mill.

No. 200,567. Patented Feb. 19, 1878.

Fig. 2.

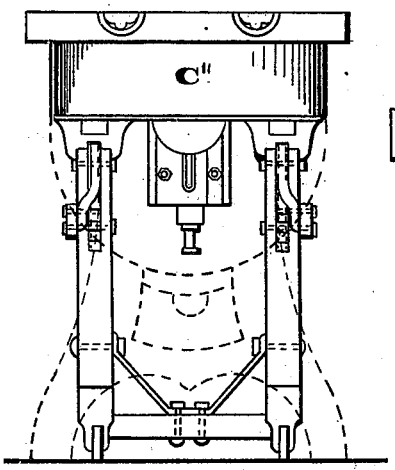


Fig. 3.

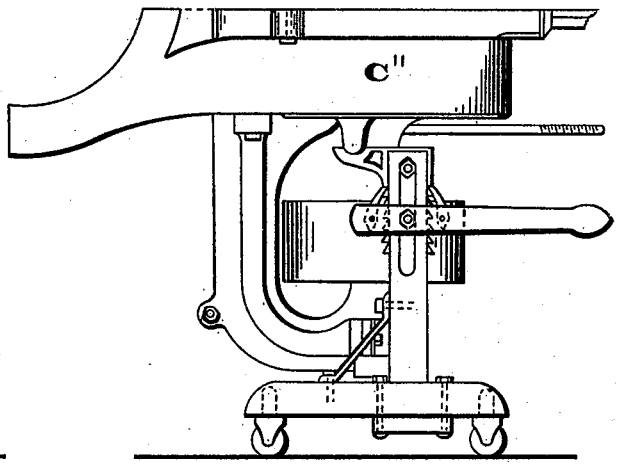
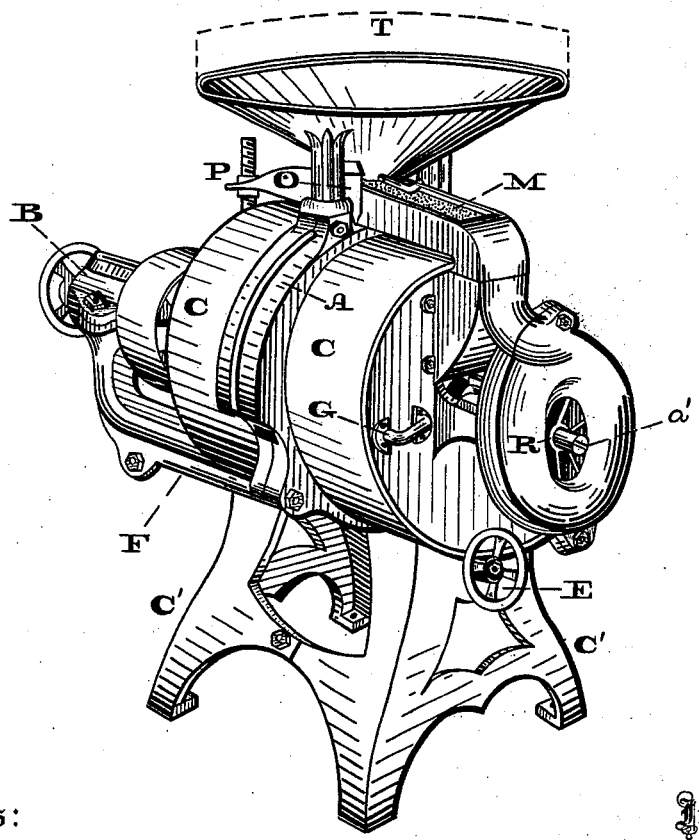


Fig. 1.



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C. C. PHILLIPS.
Vertical Grinding-Mill.

2 Sheets—Sheet 2.

No. 200,567. Patented Feb. 19, 1878.

Fig. 6.

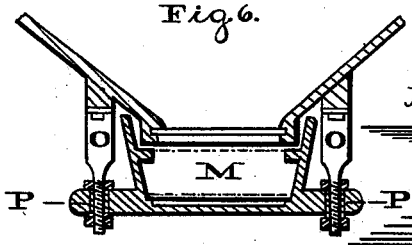


Fig. 7.

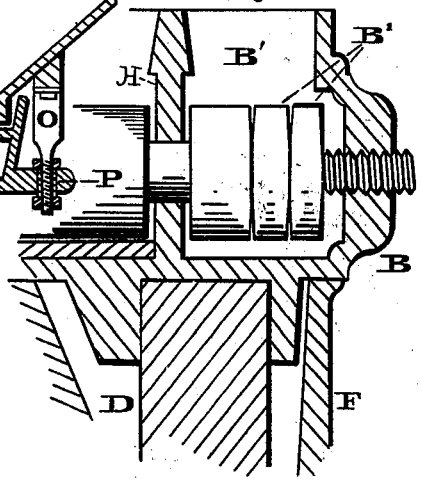


Fig. 8.

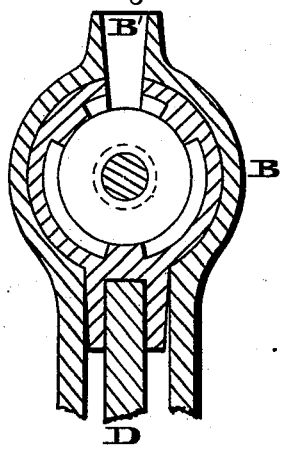


Fig. 4.

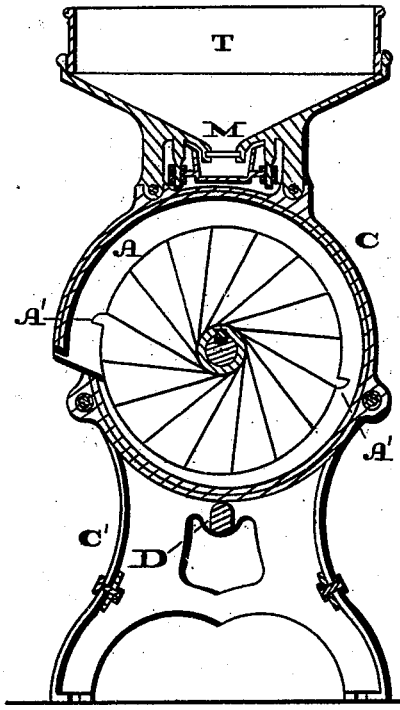
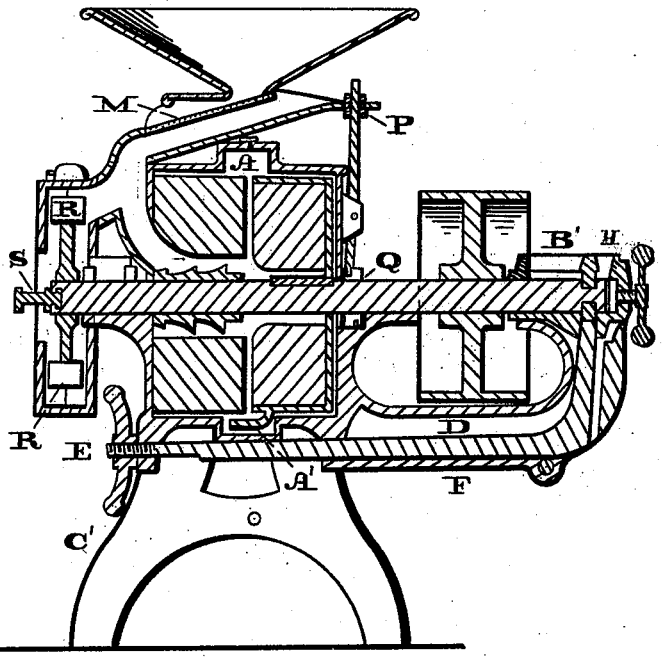


Fig. 5.



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UNITED STATES PATENT OFFICE.

CALVIN C. PHILLIPS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN VERTICAL GRINDING-MILLS.

Specification forming part of Letters Patent No. **200,567**, dated February 19, 1878; application filed March 13, 1877.

To all whom it may concern:

Be it known that I, CALVIN C. PHILLIPS, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Grinding-Mills, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a perspective view of the mill embodying my invention. Figs. 2 and 3 are views of the trunnion-jack for separating the parts of the mill. Fig. 4 is a transverse vertical section thereof. Fig. 5 is a longitudinal vertical section thereof. Figs. 6, 7, and 8 are enlarged sectional views of detached parts.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of a scroll discharge extending wholly or partially around the stones or grinders, for affording unobstructed passage for ground material as soon as liberated by the grinders, and also acting as a suction-fan for drawing air through the eye of the stone.

It also consists of a clearing-piece (one or more) attached to and projecting beyond the periphery of the stone or grinding-burrs, said piece playing in the scroll for drawing cool air into and expelling heated air from the stone.

It also consists of a bridge-tree box having a partition, forming an oil receptacle or chamber, in which the end of the shaft within said box is continuously more or less submerged.

It also consists of adjusting the stones by means of an arm connected to the movable bridge-tree box, supported on a bracket which bears and incloses the arm.

It also consists of a fan for forcing a current of air up and through the feed-spout and shoe against the grain on its way from the hopper to the stone, thus finally cleaning the grain, said fan being fitted on and operated directly by the runner-shaft.

It also consists of elastic bushing interposed between the points of connection of the shoe and the suspension-pieces thereof.

It also consists of elastic bushing interposed between the points of connection of the shoe and the operating-arms thereof. By these means the shoe will possess great freedom, and move with ease and without binding.

Referring to the drawings, C C represent two parts of the case, which is supported on a two-part frame, C′ C′, cast therewith or secured thereto. A represents a scroll made of two parts, cast with or bolted to the parts C C of the case, and it occupies a position between said parts, so as to extend wholly or partially around the stones or grinders, the joints of the two parts overlapping, so that when they are brought together said parts, the bolt-openings, &c., register and occupy the same positions, and subsequent shifting of the parts is prevented.

The horizontally-arranged shaft which carries the runner is journaled at one end in a partition, H, of a bridge-tree box, B, supported on a bracket, F, of the frame-work, and to said box is connected an arm, D, which has a sliding motion, and passes through the bracket F, the end of said arm opposite to the box engaging with a screw wheel or nut, E, so that the box and shaft may be moved, and the stones consequently adjusted. The box forms a receptacle for oil or lubricant, within which the end of the shaft will be continuously more or less submerged, the box being open, or having an opening, as at B^1, for introduction of the oil. Between the outer end of the shaft and a set-screw fitted to the box may be placed buttons B^2, for steadying the shaft in its motions, and receiving the pressure of the stones.

On the outer face of the parts C of the case there are trunnions G, whereby attachment may be had with a trunnion-jack, (shown in Figs. 2 and 3,) in order to take the mill apart for purposes of dressing, repairs, &c., and replacing.

M represents a screen secured to the shoe, which is located beneath the hopper, and suspended therefrom by means of spring-pieces O. Elastic bushings P are interposed between said pieces O and the points of connection with the shoe, so that the shoe may be moved with ease and without binding. Elastic bushing is also interposed between the shoe and its operating-arm for the same purpose. An oscillating arm is connected to the shoe, and it works in the cam-groove of a wheel, Q, secured to the main shaft, whereby reciprocating motions will be readily imparted to the shoe.

On the end of the shaft opposite to the box B there is a fan, R, whose case communicates

with the feed-spout, so that air will be forced up and through said spout and the shoe against the grain on its way from the hopper to the stone, thus finally cleaning the grain, the mill running at high rate of speed sufficient to create the current therefor.

On the end of the shaft, adjacent to the fan, there is a slot for the reception of a crank or wrist pin, S, which is thus adjustable in the slot, whereby a greater or less throw may be imparted to the shaker or bolt, as desired or necessary. This crank-pin is shown on the runner-shaft, Fig. 5, and the slot will be perceived, as at *a'*, at the end of said shaft, Fig. 1.

From the periphery of the runner there projects a clearing piece or pieces, A', which also projects laterally, so as to lap over the bed-stone to the extent of the width of the scroll A.

It will be seen that the scroll A provides an unobstructed passage for the ground material as soon as liberated by the grinders, and discharges the material uniformly and more perfectly than if two or more spouts are employed.

Moreover, the scroll acts as a suction-fan, so as to draw cool air through the eye of the stone and convey heat from the stone, these operations being assisted by the clearing piece or pieces A'. The overlap of these pieces increases the surfaces thereof, and thus creates a heavy current of air within the scroll.

The box B, as an oil-reservoir, prevents the heating of the shaft, said heating being a serious objection in grinding-mills, and it is so located as to have lateral and longitudinal bearings, thereby receiving the pressure of the stones during operation.

The conical hopper will have a removable cylindrical extension-band, as at T, to increase the capacity thereof.

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

1. The casing formed with the scroll A intermediate of the parts C C, and extending wholly or partially around the stones or grinders, substantially as and for the purpose set forth.

2. The combination, with the stones or grinders, of an encircling scroll, A, and one or more clearers acting as fans, substantially as and for the purpose set forth.

3. The bridge-tree box B, with the partition H, forming an oil-receptacle, in combination with the runner-shaft journaled to said partition, substantially as and for the purpose set forth.

4. The bridge-tree box B, in combination with the bracket F, supporting the box and receiving the adjusting-arm D, substantially as and for the purpose set forth.

5. The combination, with the sections of the case A, of the trunnions G on the outer faces thereof, substantially as and for the purpose set forth.

6. The fan-case communicating with the feed-spout and shoe, in combination with the fan fitted on and operated directly by the runner-shaft, substantially as and for the purpose set forth.

7. The elastic bushing P, in combination with the shoe and connected suspension-pieces O, substantially as and for the purpose set forth.

8. The elastic bushing P, in combination with the shoe and operating-arm, substantially as and for the purpose set forth.

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Witnesses:
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