(No Model.)

H. H. COLES.

GRINDING MILL.

No. 375,533. Patented Dec. 27, 1887.

Fig. 1.

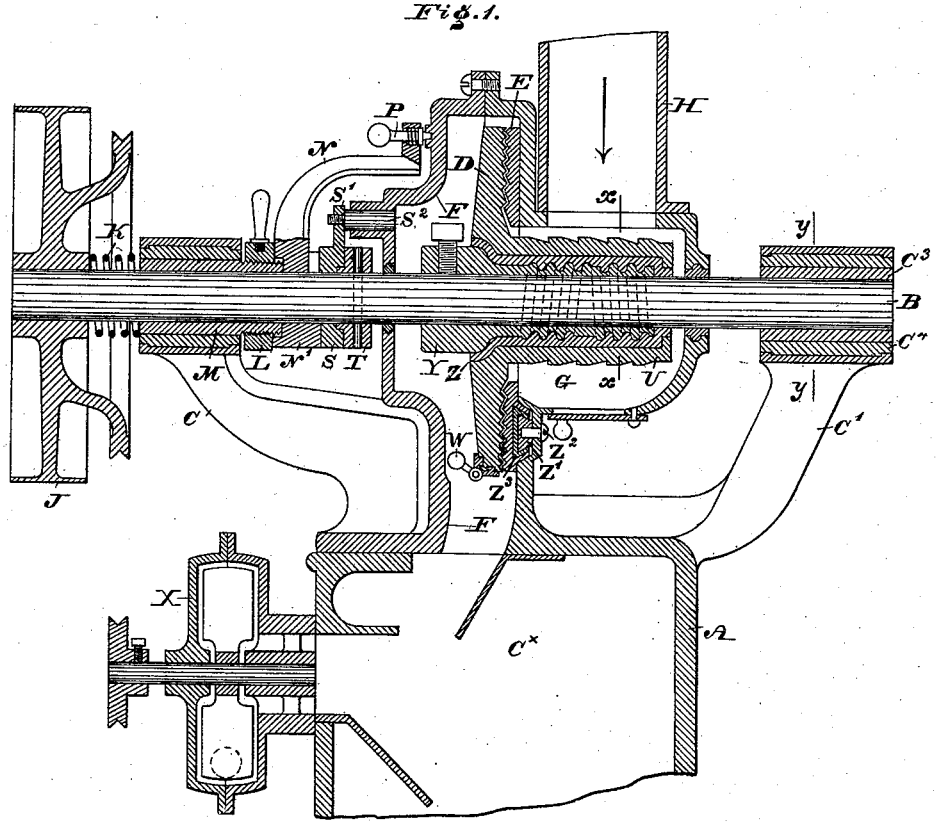


Fig. 2.

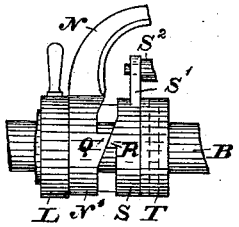


Fig. 3.

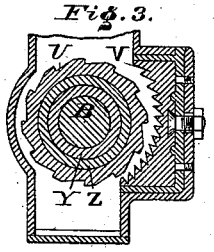
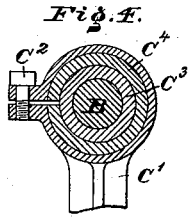


Fig. 4.



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GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 375,533, dated December 27, 1887.

Application filed September 28, 1886. Serial No. 214,727. (No model.)

To all whom it may concern:

Be it known that I, HENRI H. COLES, a citizen of the United States, residing in the city and county of Philadelphia, 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 represents a central longitudinal vertical section of a grinding-mill embodying my invention. Fig. 2 represents a side elevation of a detached part. Fig. 3 represents a transverse section in line *x x*, Fig. 1. Fig. 4 represents a transverse section in line *y y*, Fig. 1.

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

My invention relates to improvements in grinding-mills; and it consists in a mill having different parts combined and arranged, as hereinafter set forth, whereby the runner may be adjustably set in relation to the bed, so as to regulate the mill either for fine or coarse or intermediate grinding, as may be desired, and may likewise be separated from the same to remove obstructions.

It further consists in providing the runner with means, as described, for cleaning the casing of any material improperly lodged therein.

It also consists in other details of construction, fully set forth in the specification and claims.

Referring to the drawings, A represents the frame of a grinding-mill, and B the driving-shaft thereof, which is mounted in bearings C C′ of said frame.

D represents the runner, which is secured to said shaft, and E represents the bed, which is secured to the frame A, said runner and bed occupying the chamber or casing F, which is secured to or formed with the frame A, said casing being extended laterally, forming an extension-chamber, G, and having the hopper H, secured to said extension-chamber, whereby the material to be ground, after leaving the hopper, enters said extension-chamber, and is directed thence into the casing F and fed between the runner and bed.

The shaft B has a sliding motion on its bearings in the direction of its length and carries on one end a driving-pulley, J, between which and the adjacent bearing C is a coiled spring, K, the effect of which is to force the runner from the bed, and thus increase the space between them. In order to force the runner toward the bed, and thus decrease the space between them, I employ a ring, L, whose interior is threaded and engages with a threaded sleeve, M, which encircles the shaft and is secured to the frame, said ring being located between the bearing C and an arm or lever, N, whose lower portion is of the form of a boss, N′, and freely encircles the shaft B, and whose upper part is attachable to the outer wall of the casing F by means of a spring-pressed pin, P, or in lieu thereof a screw or other fastening, it being noticed that the arm is rotatable on the shaft.

The side of the boss N′ opposite to the ring L has a cam projection or spiral face, Q, which is in contact with a cam projection or spiral face, R, of a sleeve, S, which loosely encircles the shaft B. Contiguous to the sleeve S is a head or stop, T, which is firmly secured to the shaft B, so as to rotate therewith. The sleeve S is prevented from rotation by means of an arm, S′, which projects from the sleeve and is freely connected with a pin, S^2, which slides in a bearing in the wall of the casing F. It will be seen that when the ring L is turned on the sleeve M, so as to be moved in the direction toward the lever N, it is pressed against said lever and the boss N′ thereof, the sleeve S and head T, whereby the shaft B is moved in the direction from the pulley J, overcoming the spring K, and causing the runner to move toward the bed. By these provisions the mill may be nicely adjusted for coarse or fine grinding. Should, however, nails or other obstructions enter between the runner and bed, it is important to remove the same. This is accomplished by releasing the pin P and rotating the lever N, whereby the wide part of the cam of the boss N′ leaves the similar part of the cam of the sleeve S, and the spring K immediately exerts its pressure on the shaft B, quickly moving the runner from the bed and allowing the obstruction to drop out, it being collectible at the bottom of the casing F, or in the receptacle C^x for the ground material.

When the lever N is returned to its first position, the cams above stated cause the shaft to slide in such manner that the runner advances toward the bed and the grinding may be continued, it being noticed that the adjustment of the mill has not been disturbed.

The runner D has a lateral tubular extension, U, which passes through the eye of the bed and occupies the lateral extension-chamber G of the casing, said extension U having its exterior toothed. In the chamber G, at the side thereof, is a toothed concave, V, which partly encircles the extension U, and forms with the same, means for primarily cracking or breaking the material supplied to the hopper, whereby the subsequent grinding is more easily and expeditiously performed, it being noticed that the cracked or broken material is directed from the chamber G of the casing F to the eye of the bed, and thence between the runner and bed. To the periphery of the runner is pivoted a gravitating clearer, W, which rotates with the runner in the casing F and serves to remove any material collected in said casing. As the clearer projects across the bottom throat of the casing and almost reaches the opposite wall thereof, as shown in Fig. 1, when the runner is moved from the bed the clearer strikes said wall and rides upward thereon, owing to its pivotal connection with the runner. When the runner is moved toward the bed, the clearer drops to its normal position. The receptacle for the ground material is in communication with an exhaust-fan, X, whereby shells, chaff, dust, &c., may be removed from said receptacle, leaving the material clean. The runner is secured to the shaft by means of a sleeve, Y, which encircles the shaft and is fixed thereto by a bolt or screw. Interposed between the sleeve Y and the runner and its extension U is a filling of soft metal, Z, it being noticed that the exterior of the sleeve Y is corrugated in opposite directions, so that the metal which has flowed around the corrugations is firmly locked to the sleeve. The bed is secured to the frame by dovetailed lugs Z', which enter dovetailed openings in the bed, said lugs being secured to the frame by bolts or screws Z^2.

Interposed between the lugs and the openings in the beds is soft metal, as at Z^3, whereby the bed is firmly held in position, said soft metal also providing for any inequality in the casing, causing the bed to be true on its face.

The bosses of the bearings C C′ are split and have their ends connected by tightening-bolts C^2. Interposed between the shaft and bosses are sleeves C^3 and fillings C^4 of soft metal, whereby the sleeves may be removed and replaced, and provision is made to cause the shaft to rest true in its bearings regardless of any inequalities of casting.

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

1. A grinding-mill with the casing A, having bearings C C′, the shaft B, journaled in said bearings, the runner D and the pulley J, both rigidly mounted on the shaft B, the spring K, between said pulley and bearing C, the sleeve M, secured to bearing C and having an exterior screw-thread at one end, the interiorly-screw-threaded ring L, the head T, secured to said shaft B, and means, substantially as described, intermediate of said head T and ring L, for adjusting said shaft, said parts being combined and operating substantially as described.

2. In a grinding-mill, the casing A, in combination with the casing F, the bearings C C′, the shaft B, having the pulley J, runner D, and head T secured thereon, the sleeve M, screw-threaded at one end, the ring L, operating on the screw-threaded end of the sleeve M, the boss N′, with an arm, N, and the sleeve S, both boss N′ and sleeve S being loosely mounted on the shaft B, and each having a cam-face, all substantially as and for the purpose set forth.

3. In a grinding-mill, the casing A, having casing F, provided with the bed E and secured to said casing A, in combination with shaft B, having suitable bearings, the runner D, and the pivoted gravitating clearer W, the latter attached to the said runner, all substantially as and for the purpose set forth.

HENRI H. COLES.

Witnesses:
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