(No Model.)

E. G. DEWALD.

ROLLER MILL.

No. 344,478. Patented June 29, 1886.

Fig. 1.

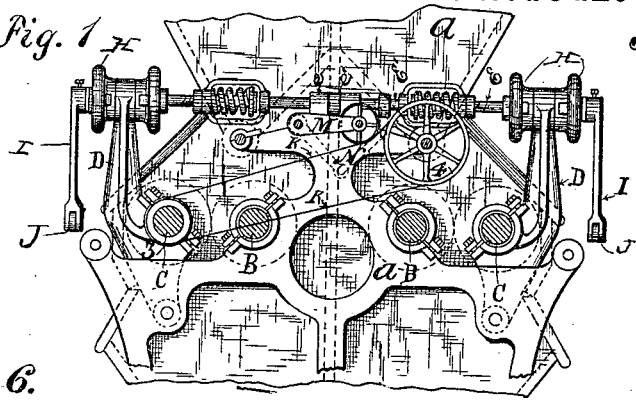


Fig. 5.

Fig. 6.

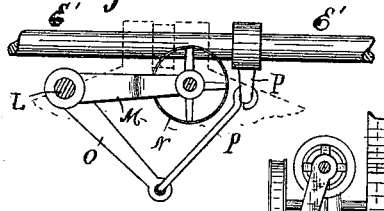


Fig. 2.

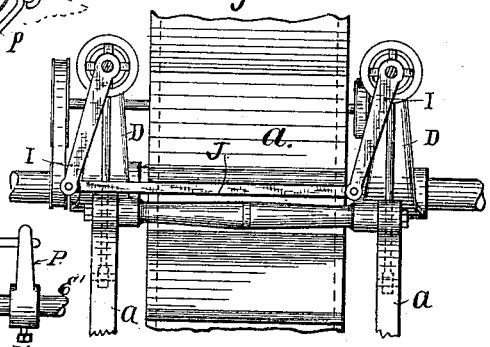


Fig. 4.

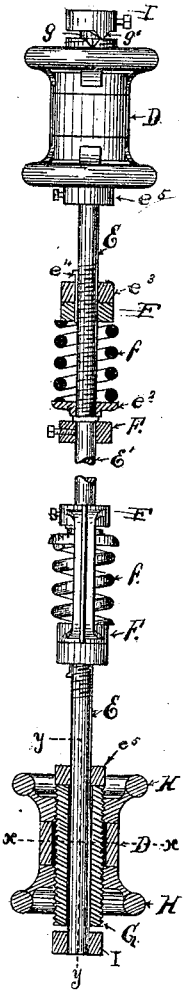


Fig. 7.

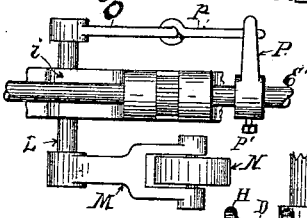


Fig. 3.

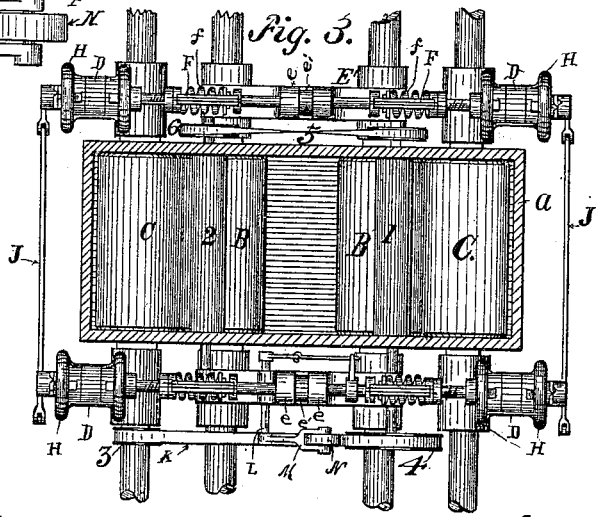
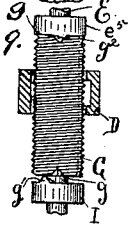


Fig. 8.

Fig. 9.



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UNITED STATES PATENT OFFICE.

EDWARD G. DEWALD, OF CINCINNATI, OHIO.

ROLLER-MILL.

SPECIFICATION forming part of Letters Patent No. 344,478, dated June 29, 1886.

Application filed January 28, 1886. Serial No. 190,030. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. DEWALD, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Roller-Mills, of which the following is a specification.

My invention relates to improvements in roller-mills for grinding grain.

Its objects are to provide a simple and reliable mechanism for throwing the grinding-rolls apart and bringing them together, and adjusting them to their working position.

Its object is also to provide a means for slackening the driving-belt of the feed-rolls simultaneously with the separation of the grinding-rolls, and throwing the feed-rolls again in motion as soon as the grinding-rolls are brought to their work.

To these ends the invention consists in the novel construction and combinations of devices for accomplishing these results, which are illustrated in the accompanying drawings.

A full description of these devices and their mode of operation will be first given, and then particularly referred to and pointed out in the claims.

In the drawings, wherein like parts are indicated by similar reference-letters wherever they occur throughout the various views, Figure 1 is a side elevation of the grinding-mill having my improvements applied to it. Fig. 2 is an end elevation of the same. Fig. 3 is a horizontal section through the frame of the mill, showing my improvements in plan view. In these views only so much of the frame-work of the machine is shown as is necessary to illustrate my improvements as applied for use. Fig. 4 is an enlarged plan view, partly in longitudinal section, of the shafts and their attachments by which the rolls are separated, brought together, and adjusted in working position. Fig. 5 is a detail view of the crank-arm and toothed cam for throwing out the swinging arms. Fig. 6 is a detail view in side elevation of the device by which the belt of the feed-rolls is tightened and slackened. Fig. 7 is a plan view of the same. Figs. 8 and 9 are detail views of the roll-separating devices, Fig. 8 being taken through line $x\,x$, and Fig. 9 through line $y\,y$, of Fig. 4, the hand-wheels being removed.

The main frame of the machine is represented by a, and may be of any approved form.

B C represent the grinding-rolls. The rolls B are mounted in fixed bearings, and the rolls C are mounted in the swinging arms D in the usual manner. Each arm D is drawn inward to force the rolls C in working position with the rolls B by means of shafts E E′. The shafts E′ (of which there are two, one on each side of the mill) have their bearings in lugs e, which project from the frame of the machine, and are held rigidly against longitudinal motion by collars e', which are secured on the shafts and between the lugs e by a set-screw, (not shown,) or in any well-known manner. To the ends of these shafts are secured housings or yokes F, which inclose the springs f, which hold the grinding-rolls up to their work with a yielding pressure. The inner ends of the shafts E pass into the housings F, and have secured upon their ends plates e^2, between which and the ends of the yokes the springs f are compressed. The pressure of the springs is regulated by nuts e^3, which are screwed on the shaft E outside of the housings. When these nuts are screwed to their places keys e^4 pass through them and the heads of the housings, which prevent either from turning independent of the shaft, while permitting endwise movement of the shafts E for the relief of the rolls. The outer ends of the shafts E have their bearings in sleeves G, which are fitted to slide in the upper ends of the swinging arms D. These sleeves are exteriorly screw-threaded to receive hand-wheels H, the bearing-surfaces of which abut against the ends of the swinging arms. By means of these hand-wheels the outer grinding-rolls are adjusted with relation to the stationary grinding-rolls. The sleeves G are longitudinally grooved to receive a feather or spline secured in the arm D, as clearly shown in Fig. 8. The ends of the sleeves G have radial grooves g in them, and there are corresponding radial projections, g', upon the adjacent ends of the bosses upon the ends of the lever-arms I, secured upon the ends of the shafts E, and also similar projections, g^2, upon the collars e^5, secured upon the shafts E, adjacent to the inner ends of the sleeves G. The positions of the projections g' and g^2 are so arranged with relation to the grooves g that

when the projections g' are thrown out of the grooves to hold the outer rolls up to their work the inner projections, g^2, will enter their grooves, and vice versa, so that the rolls will be locked in either position.

While it is desirable to use the projections upon the collars, as shown, at both ends of the sleeves G, it is evident that the projections g^2 may be omitted, and the result would be the same in kind, but not so effectually accomplished.

It will be seen from the foregoing that the sleeves G, when once set, sustain a permanent relation to the shafts E—that is, when once set in any position this position is only changed by rocking the shaft E.

It will be seen that the movable grinding-rolls C are adjusted nearer to or farther from the stationary grinding-rolls B by the hand-wheels H. Thus by loosening the inner hand-wheels and tightening up the outer ones the rolls are drawn and held nearer together, and by loosening the outer wheels and tightening up the inner ones the rolls are thrown and held farther apart.

The springs f provide for the instantaneous separation of either set of the grinding-rolls, should they be crowded by an excess of feed or should any extraneous substance get into the feed that would be liable to clog or stop the rolls. When the mill is first fitted up, the springs f are given the proper tension. Should they become weak by long use, the tension may be tightened by the nuts e^3. The tightening of the nuts will change the relative position of the rolls, which must again be set in proper relation to each other by the hand-wheels H, as above described. This specific feature of the spring and its housing does not differ from the same provision in other machines. For this reason these devices are not more specifically described herein. The lever-arms I, which are secured upon the ends of the shafts E, extend downwardly, and are slotted at the lower end to receive the ends of links J, by which the arms upon each end of the machine are coupled together. It will be seen by this arrangement that the arms may be thrown apart or brought together by the attendant from either end or side of the machine, and that the arms upon opposite ends of the machine are simultaneously thrown outward or brought back to their working position.

The two feed-rolls 1 and 2 are driven as follows: The belt K passes from a pulley, 3, which is secured upon the projecting end of the shaft of one of the movable rolls C, and over a pulley, 4, which is secured upon the projecting shaft of the feed-roll 1. Upon the opposite end of this shaft is another pulley, from which the cross-belt 5 passes over a pulley, 6, which is secured upon the shaft of feed-roll 2, as clearly shown in Fig. 3.

Referring to Figs. 6 and 7, which illustrate the device for tightening and slackening the belt K, by which the feed-rolls are driven, L is a shaft supported in bearings i, which extend out from the frame of the machine. Upon one end of this shaft is secured an arm, M, the end of which is bifurcated and provided with bosses, within which bifurcated end is journaled the belt-tightening pulley N, upon a shaft which has its bearings in the said bosses. Upon the opposite end of the shaft L is secured another arm, O, which is loosely linked to an arm, P, which is secured upon one of the shafts E. The link connecting the arms O and P is indicated by p. It will thus be seen that when the shafts E E′ are turned to throw the rolls apart the arm P will be elevated, and through the link p and arm O will rock the shaft L and throw the pulley N up, thus slackening the belt K and stopping the feed-rolls, and that when the rolls are again thrown together by rocking the shafts E E′ in the opposite direction, the pulley N will be forced down upon the belt K and put the feed-rolls again in motion. The belt-pulley can be adjusted to accommodate itself to the belt used by the set-screw p', by which the arm P is secured upon the shaft E.

It is obvious that the projections g' g^2 may be made upon the sleeves G and the counter-grooves made in the collars and bosses of the arms I, and it is also obvious that if it should be desirable to arrange the machine so that each pair of rolls might be separate and independent of the others, it is only necessary to place the lugs e farther apart, separate the shafts E′ between the lugs, and secure a collar, e', upon each of the separate ends.

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

1. The combination, substantially as specified, of the stationary and movable grinding-rolls, the swinging roll-supports D, the shafts E and E′, arranged upon each side of the mill, the devices for yieldingly connecting the shafts E and E′, the exteriorly screw-threaded sleeves G, having grooved ends, as described, the roll-adjusting hand-wheels H, the levers I, secured upon shafts E, and having projections upon their bosses corresponding to the grooves in sleeves G, and the lever-connecting links J, for the purpose set forth.

2. In a roller-mill, the combination, substantially as specified, of the stationary and movable grinding-rolls, the swinging roll-supports D, and sleeves G, passing through the same, the roller-separating shafts passing through the sleeves, and the adjusting hand-wheels H, for the purpose of setting the rolls.

3. In combination with the stationary and movable grinding-rolls, the swinging roll-supports of the roll-separating shafts, such as described, arranged upon each side of the mill, the sleeves G, having grooved ends, the arms I, secured to said shafts and having projections upon their bosses corresponding to the grooves in the sleeve ends, and the links J, connecting said arms at each end of the mill, whereby all the shafts may be rocked and all the grinding-

rolls simultaneously separated from either side or either end of the mill, substantially as hereinbefore set forth.

4. In a roller-adjusting mechanism for grinding-mills, the combination of shafts E', bearings *e*, collars *e'*, secured upon said shaft between its bearings, shafts E, housings F, disks e^2, and springs for yieldingly connecting shafts E and E', the stationary and movable rolls, the swinging roll-supports, and devices for connecting the swinging roll-supports with the shafts E, whereby on rocking the shafts the rolls are separated or forced together, substantially as specified.

5. The combination, substantially as specified, of the stationary and movable rolls, the swinging roll-supports, the sleeves G, having grooves *g*, the roll-separating shafts passing through said sleeves, the hand-wheels upon said sleeves at opposite ends of supports D, the collars e^5, having projections g^2, and arms I, secured upon the separating-shafts at opposite ends and having projections *g'*, to separate the rolls or bring them in grinding contact, substantially as hereinbefore set forth.

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