(No Model.) 4 Sheets—Sheet 1.

D. W. MARMON & J. WARRINGTON.

ROLLER MILL.

No. 305,320. Patented Sept. 16, 1884.

Fig. 1.

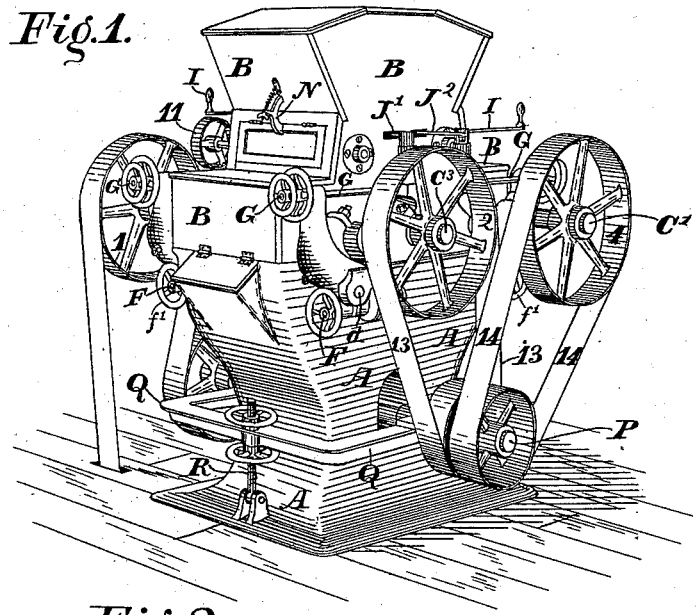
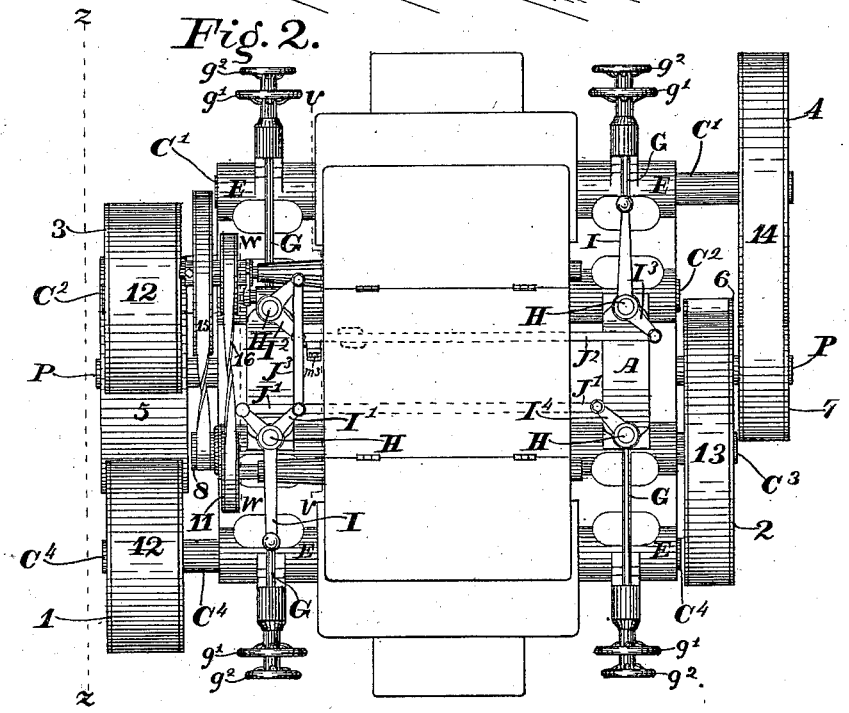


Fig. 2.



WITNESSES.

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C. Bradford.

ATTORNEY.

(No Model.) 4 Sheets—Sheet 2.

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Fig. 4.

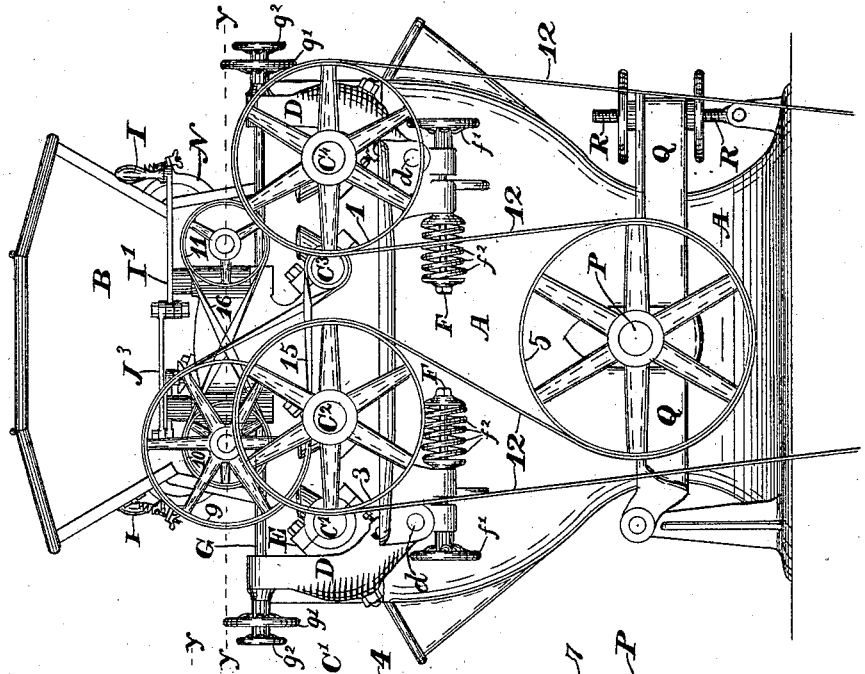

Fig. 3.

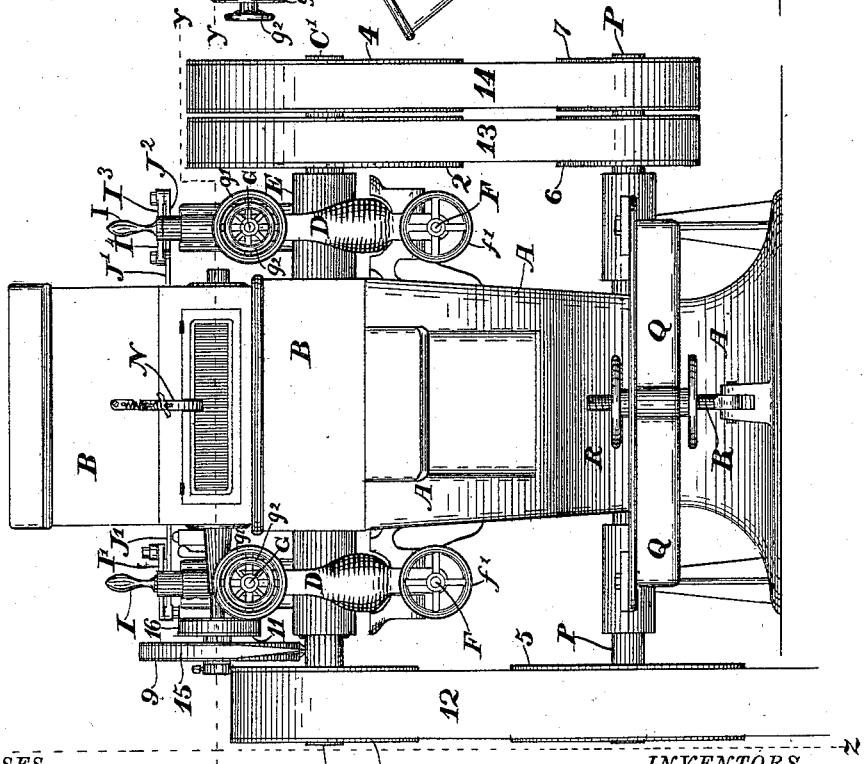

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Fig. 5

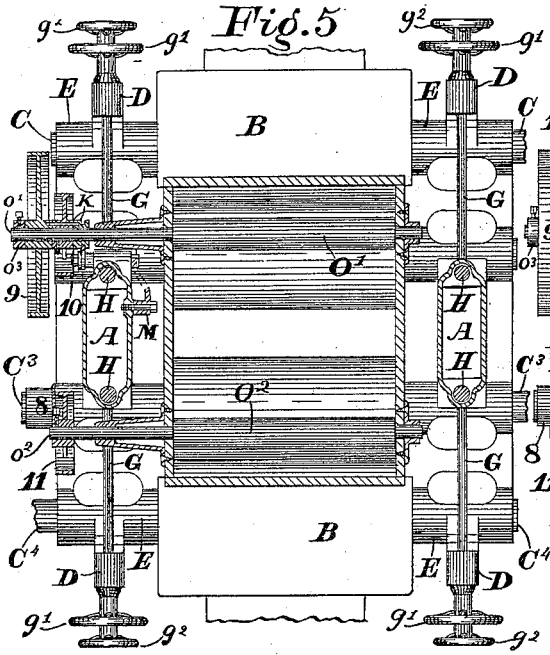

Fig. 15.

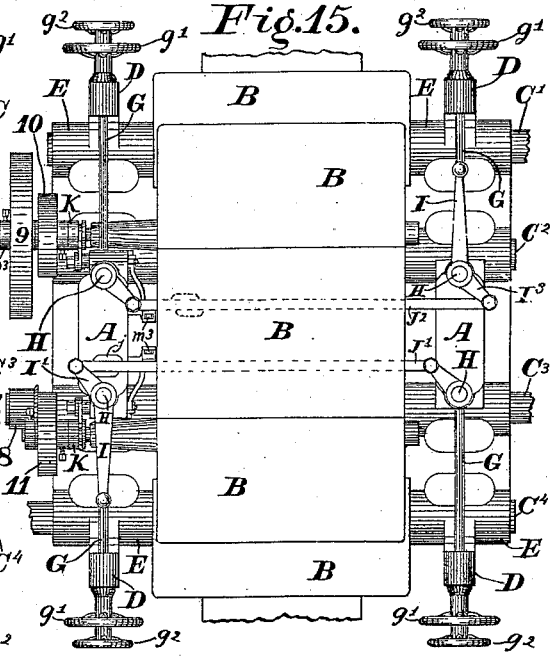

Fig. 6.

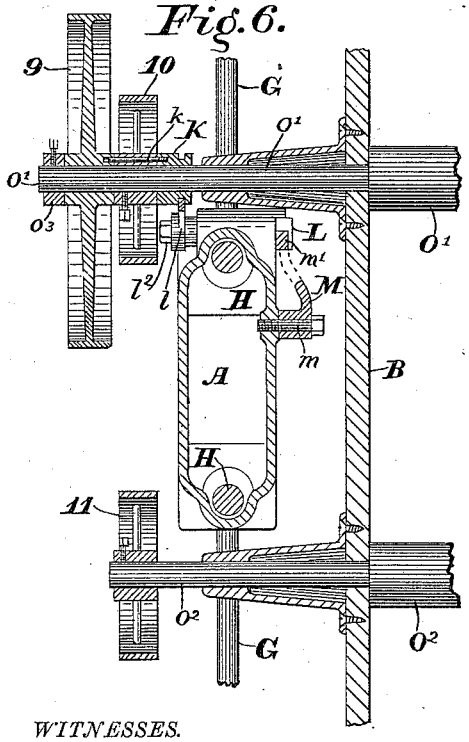

Fig. 14.

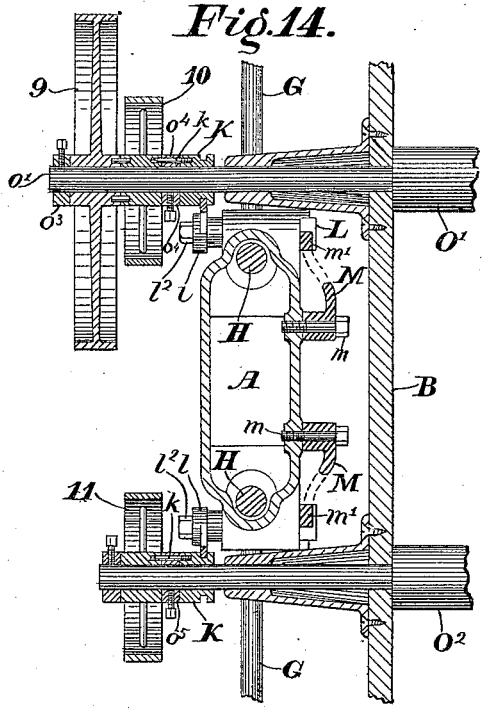

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Fig. 9.

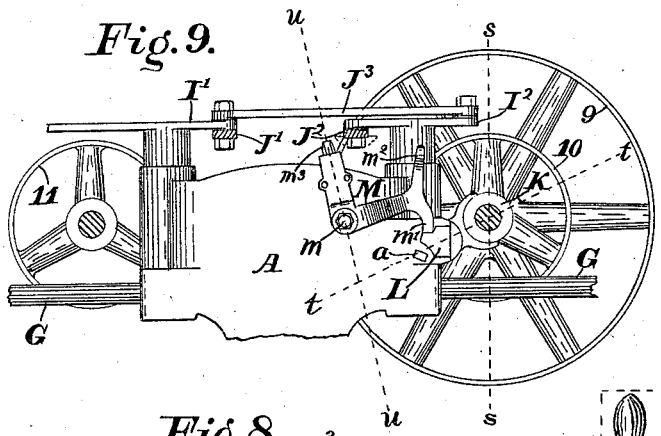


Fig. 10.

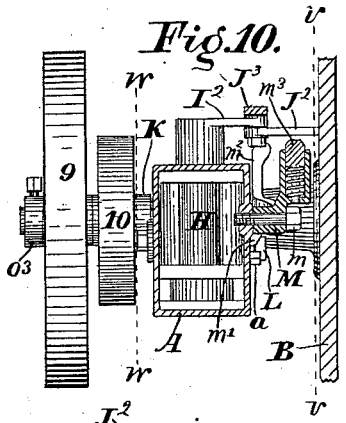


Fig. 8.

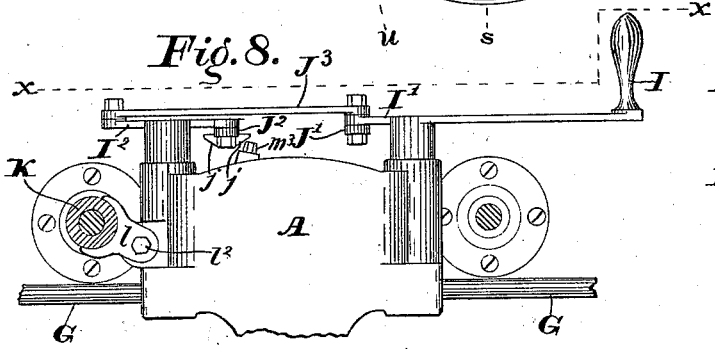


Fig. 11.

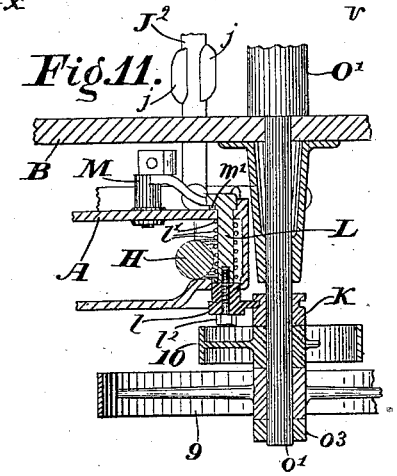


Fig. 7.

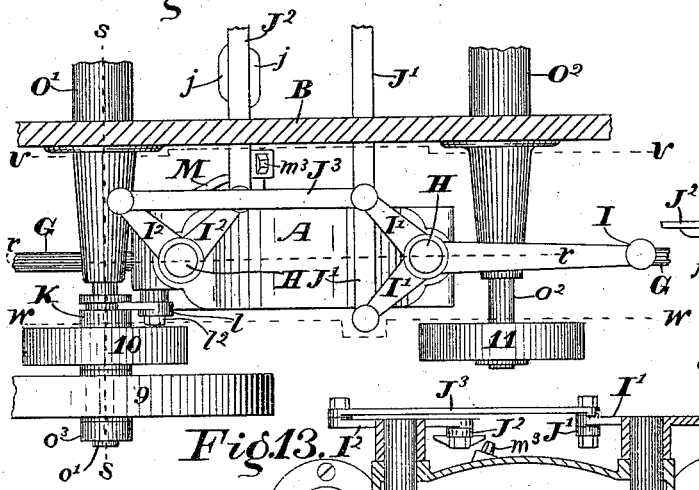


Fig. 12.

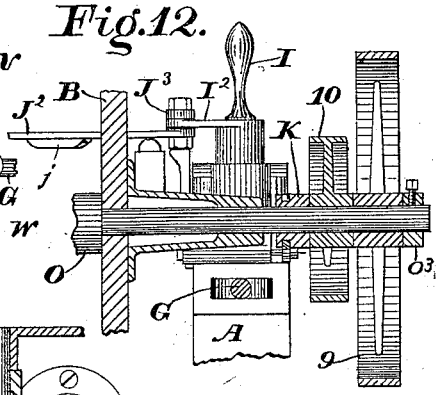
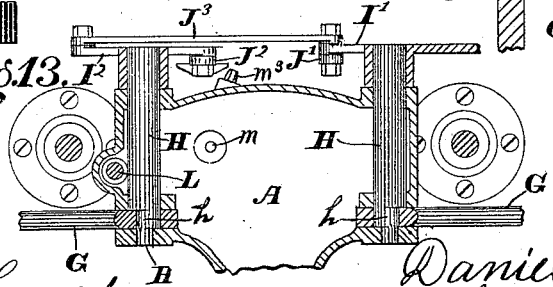


Fig. 13.



WITNESSES.

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UNITED STATES PATENT OFFICE.

DANIEL W. MARMON AND JESSE WARRINGTON, OF INDIANAPOLIS, IND., ASSIGNORS TO THE NORDYKE & MARMON COMPANY, OF SAME PLACE.

ROLLER-MILL.

SPECIFICATION forming part of Letters Patent No. 305,320, dated September 16, 1884.

Application filed December 26, 1882. (No model.)

To all whom it may concern:

Be it known that we, DANIEL W. MARMON and JESSE WARRINGTON, of the city of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Roller-Mills, of which the following is a specification.

Our said invention principally consists in certain improved mechanism for stopping and starting the feed-rolls of that class of machinery for the reduction of grain known as "roller-mills."

It further consists in devices connecting said mechanism to that by which the grinding-rolls are thrown into or out of grinding relation, so that both operations may be effected simultaneously, and also in certain details of construction and arrangements of parts incident to such operations, as will be hereinafter more particularly described and claimed.

We show and describe in this application a complete double mill for the purpose of illustrating fully the manner in which our invention is generally used. We also show and describe the construction when the mill is converted from a double to two single mills. We further describe at length many of the parts of the mill that relate only remotely to our present invention, in order that the operation of the mill may be clearly understood without referring to other sources of information. We do not desire to be understood, however, as claiming any of the said general features in this application, but only such as are clearly comprehended by our statement of invention and claims, all other matters being illustrative merely.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a perspective view of a machine embodying our invention; Fig. 2, a top or plan view of the same; Fig. 3, a front elevation thereof; Fig. 4, an end elevation, as seen from the dotted line *z z* at the left of Figs. 2 and 3; Fig. 5, a horizontal sectional view, looking downwardly from the dotted line *y y* in Figs. 3 and 4; Fig. 6, a portion of Fig. 5 on an enlarged scale; Fig. 7, a top plan of the mechanism embodying this present invention and adjacent parts, on an enlarged scale, as seen when looking downwardly from the dotted line *x x* in Fig. 8; Fig. 8, an elevation of most of said mechanism and the supporting frame-work, as seen from the dotted line *w w* in Figs. 2, 7, and 10; Fig. 9, an elevation of the parts shown in Figs. 7 and 8, as seen from the dotted line *v v* in Figs. 2, 7, and 10; Fig. 10, a sectional view, looking toward the right from the dotted line *u u* in Fig. 9; Fig. 11, a sectional view, looking upwardly from the dotted line *t t* in Fig. 9; Fig. 12, a view looking toward the left from the dotted line *s s* in Fig. 9; Fig. 13, a vertical sectional view, looking upwardly from the dotted line *r r*, in Fig. 7; Fig. 14, a view similar to Fig. 6, but illustrating an alternate construction; and Fig. 15, a top plan of the construction shown in Fig. 14.

In said drawings, the portions marked A represent the castings which form the supporting frame-work of the mill; B, the hopper and other covering portions; C' C^2 C^3 C^4, the shafts of the grinding-rolls; D, swinging arms, in which one of each pair of rolls is mounted; E, adjustable boxes, preferably mounted on said arms; F, tempering-rods for adjusting the maximum force of the grinding-pressure; G, distance or adjusting rods for regulating the position of the arms; H, short vertical shafts having an eccentric formation at one point, to which point said rods G are attached; I' I^2 I^3 I^4, levers attached to said several vertical shafts, respectively, whereby the same are operated; J' J^2 J^3, connecting bars or rods, by means of which a simultaneous motion is imparted to said several shafts; K, a sliding collar, which, with its pin *k*, forms a clutch for the wheel 9; L, a sliding rod by which said collar is operated; M, a cam which operates said rod; N, the feed-gates; O' O^2, the feed-rolls; P, the counter-shaft; Q, a yoke or frame which sustains said counter-shaft, and R a screw device for adjusting the position of said yoke.

The frame-work A and hopper B are of a well-known form, and serve the ordinary purposes of such parts.

The roll-shafts C' C^2 C^3 C^4 are the ordinary

grinding-roll shafts, and bear the usual belt-pulleys, 1 2 3 4.

The arms D are swinging arms located at each end of the machine, to which the boxes for the movable rolls are attached, and by which said rolls are rendered adjustable toward or from their fellows, and are mounted upon pins *d*.

The journal-boxes E are seated on the arms D, and should be vertically adjustable thereon, in order that the roll-shafts may be brought into a horizontal plane should they, by wear or otherwise, be caused to vary therefrom.

The tempering-rods F hold the lower ends of the arms D inwardly against the fixed stops formed by the pivots *d* with such force as is needed for a grinding-pressure. Said force may be varied, as desired, by turning the hand-nuts f' on said rods, and thus increasing or relaxing the compression of the spring f^2. The pin *d*, being above the rod F, acts as a fulcrum, and the spring f^2 thus serves to pull the upper end of the arms D outwardly, and thus hold the grinding-rolls apart.

The adjusting-rods G are for the purpose of moving the upper ends of the arms D back and forth, and thus bringing the individual rolls of the pair nearer to or farther from each other. Each is pivoted at the inner end to the eccentrically-formed portion of the corresponding vertical shaft H, and is preferably provided at its outer end with a hand-nut, g', and a hand-nut, g^2. The arms D are adjusted inward or back by turning the hand-nut on the rod G, and the rolls supported by said arms are thus positioned nearer to or farther from their fellows.

The vertical shafts H are set in bearings in the upper portion of the frame-work A. Each has an eccentric portion, *h*, to which a rod, G, is attached, so that when said shafts are turned said rods will be drawn back and forth.

The levers $I' I^2 I^3 I^4$ are mounted on the vertical shafts H, and serve to operate said shafts. One or more of these levers should be provided with a handle, I, for the convenience of the operator.

The connecting-bars $J' J^2 J^3$ connect the above-mentioned levers together and cause them and the shafts H to move simultaneously, and thus part both movable grinding-rolls from their fellows at once. The bar J^2 is provided with downward-projecting lugs *j*, which engage with the latch m^3, and thus operate the cam M, as will be presently described. To permit these lugs to pass easily over the latch m^3, should the latter be somewhat out of position, they are beveled on the outer side, as shown most plainly in Fig. 8. When it is desired to run the machine as two single mills, the bar J^3 is removed and that portion of this mechanism upon either side of the mill can then be operated independently of that upon the other. When the mill is intended originally to be used as two single mills, the levers and bars are preferably constructed and arranged as shown in Fig. 15.

The above-described mechanism, consisting of the rods G, vertical shafts H, levers $I' I^2 I^3 I^4$, and connecting-bars $J' J^2 J^3$, is essentially the same as that shown and described in the Letters Patent No. 266,490, granted October 24, 1882, upon our application, to the Nordyke & Marmon Company, as assignee, and we regard the changed forms shown herein simply as improvements upon or alternate constructions of the said mechanism and fully covered by said Letters Patent.

The sliding collar K is mounted on the feed-roll shaft that the pulleys 9 and 10 are on, and revolves therewith. It is provided with a pin, *k*, which passes through the hub of the wheel 10, and may enter a hole formed to receive it in the hub of the wheel 9, (see especially Fig. 6,) or be withdrawn therefrom. As the wheel 9 is loose on the shaft, when the pin *k* is withdrawn from engagement therewith it revolves loosely on the shaft, and said shaft, the wheels 10 and 11, and consequently the feed-rolls $O' O^2$ are permitted to remain motionless, thus stopping the feed without shutting the gates, stopping the mill, or throwing off the belts.

The sliding rod L is for the purpose of moving the sliding collar K back and forth as it is desired to disengage or engage the wheel 9. It is provided with a forked head, *l*, which engages with a groove in said collar K, (see especially Figs. 6, 7, and 11,) and is thus enabled to operate said collar in the desired manner. The other end of this rod is also extended into a head the internal surface of which is beveled or wedge-shaped, and is thus adapted to be operated upon by the cam M, as will be presently described. Said rod is drawn back by said cam and forced forward by the coiled spring l', (see Fig. 11,) which surrounds it. Said rod, including both heads, is preferably constructed in two parts, as shown, which are connected together by the machine-screw l^2. As is shown most plainly in Fig. 11, these heads limit the movement of the rod, one in one direction and the other in the other, and thus insure accuracy in the operation of the sliding collar and pin forming the clutch.

The cam M is pivoted by a bolt, *m*, to the upper portion of the frame A. It has a beveled or wedge-shaped point, m', which is adapted to pass behind the corresponding portion of the head of the sliding rod L, (see Figs. 6, 9, 10, and 11,) until it strikes the stop *a* on the frame A, and thus through said rod to withdraw the clutch K *k* from engagement with the wheel 9, and thus permit the latter to revolve loosely on the shaft and the latter to stop. This cam device is operated either by its handle m^2 by hand or through the latch-like portion m^3 by the projections *j* on the bar J^2. As will be discovered on an examination of the drawings, (especially Fig. 7,) when the

handle I is moved and the levers and bars thus operated the projections *j* will, during the movement of the bar J^2, engage with the latch m^3, and, during its further movement, force the cam device over far enough to force its point *m'* down behind the head of the rod L, and thus operate the clutch, as before described. During the return travel of the bar J^2 the operation just described is reversed, and the spring *l'* forces the clutch back into engagement. To allow of the necessary endwise movement of the latch m^3 to permit it to engage with the lugs *j*, should it be out of exact position, it is spring-mounted in a barrel, as shown in Fig. 10. By means of the mechanism just described the feed is stopped simultaneously with the parting of the feed-rolls, without changing the position of any portion of the feeding mechanism. There is a considerable movement of the mechanism which parts the grinding-rolls before there is any engagement between it and the mechanism which stops the feed-rolls, and therefore the feed is stopped as the final result of the operation, while it is started as the first result of the reverse operation. This keeps the rolls always supplied with material while in grinding relation, which is a most important result. When it is desired to stop the feed without parting the grinding-rolls, it can be easily done by moving the cam device by means of its handle m^2.

The feed-gates N bear only the same relation to the other devices herein shown that any other suitable feed-gates would. Being no part of this invention, they will not be herein described.

The feed-rolls O' O^2 in themselves are the ordinary feed-rolls, and are mounted on shafts *o'* o^2. The shaft *o'* bears the pulleys 9 and 10, the pulley 9 being loose thereon, as previously described, and being held in place by the pulley 10 and the collar o^3. The shaft o^2 bears the pulley 11, which, in the construction herein most fully illustrated, is fast thereto, as usual.

In the construction illustrated in Figs. 14 and 15, wherein the mill is converted into two single mills, the devices are constructed so that either feed-roll may be stopped at will independently of the other, instead of both at once. The pulleys 9 and 10 are both loose on the shaft *o'*, but are connected to each other so as to revolve together. A collar, o^4, bears the same relation to the clutch mechanism as the hub of the pulley 10 does in the double mill, the clutch and clutch-operating devices being the same, as well as the collar o^3. As will be seen, the effect of releasing the clutch on these wheels is to allow the shaft *o'* and roll O' to remain idle, while the rotation of the shaft o^2 and the roll O^2 is uninterrupted. On the shaft o^2 the pulley 11 and collar o^5 are in the same relation to the clutch mechanism that the pulley 9 and the hub of the pulley 10 are in in the double mill previously described. Thus, it will be seen, by simply duplicating the clutch mechanism, adding a small collar to each shaft, and dispensing with the bar J^3, the double mill is converted into two single mills, each of which can be separately operated.

The counter-shaft P, its yoke Q, and the adjusting-screw R form no part of this present invention, and will not therefore be described in this application.

The several pulleys and belts operate as follows: The main belt 12 drives the pulleys 1, 3, and 5, and thus the rolls C' and C^3 in one direction and the counter-shaft M in the other direction. The counter-shaft, through the pulleys 6 and 7 and belts 13 and 14, running therefrom to the pulleys 2 and 4, drives the rolls C^2 and C^4 in the opposite direction to that in which the rolls C' and C^3 are driven. The roll C^3 has on its shaft the small pulley 8, which, through the belt 15, drives the pulley 9, one of the feed-rolls, C', and the pulley 10 on the same shaft therewith, and this pulley 10, through the belt 16, drives the pulley 11 and the other feed-roll, O^2.

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

1. The combination, in a roller-mill, of its feed-roll, a pulley loosely mounted on the shaft of said roll for driving the same, a hub or collar fixedly mounted on said shaft alongside said pulley, and a clutch on the opposite side of said hub or collar from said pulley, having pin *k*, adapted to extend through said hub or collar and engage with said pulley, substantially as described, and for the purposes specified.

2. In a roller-mill, the combination of the feed-roll, the pulley for driving the same, and the clutch composed of a sliding collar, a fixed collar or hub, and a pin, *k*, attached to said sliding collar and extending through the fixed collar or hub to engage with the hub of said pulley, substantially as set forth.

3. The combination of the feed-roll shaft, the pulley 9, the clutch, the sliding rod L, and the cam M, said rod being parallel with said shaft, and adapted to operate said clutch when moved longitudinally, and said cam being adapted to so move said rod, substantially as set forth.

4. In a roller-mill, the combination of a feed-roll shaft, a pulley loosely mounted thereon, a clutch adapted to cause said pulley to revolve said shaft, a sliding rod, a cam, grinding-roll-adjusting mechanism, and a means of engagement between said cam and said mechanism, whereby the grinding-rolls can be parted from or thrown into grinding relation, and said clutch thrown out of or into engagement with said pulley.

5. The combination of the feed-roll shaft, the pulley 9, the clutch, the sliding rod L, the cam M, the rod J^2, adapted to engage with and operate said cam, and a handle, I, substantially as set forth.

6. The combination of the feed-roll shaft,

the pulley thereon, a driving-belt running to said pulley, whereby the same is driven, a clutch which being engaged causes said feed-roll shaft to revolve with said pulley, and being disengaged permits it to remain idle, a second pulley on said feed-roll shaft, a second feed-roll shaft, a pulley thereon, and a belt connecting said two pulleys, substantially as described, and for the purposes specified.

In witness whereof we have hereunto set our hands and seals, at Indianapolis, Indiana, this 22d day of December, A. D. 1882.

DANIEL W. MARMON. [L. S.]
JESSE WARRINGTON. [L. S.]

In presence of—
C. BRADFORD,
E. W. BRADFORD.