

No. 811,574.

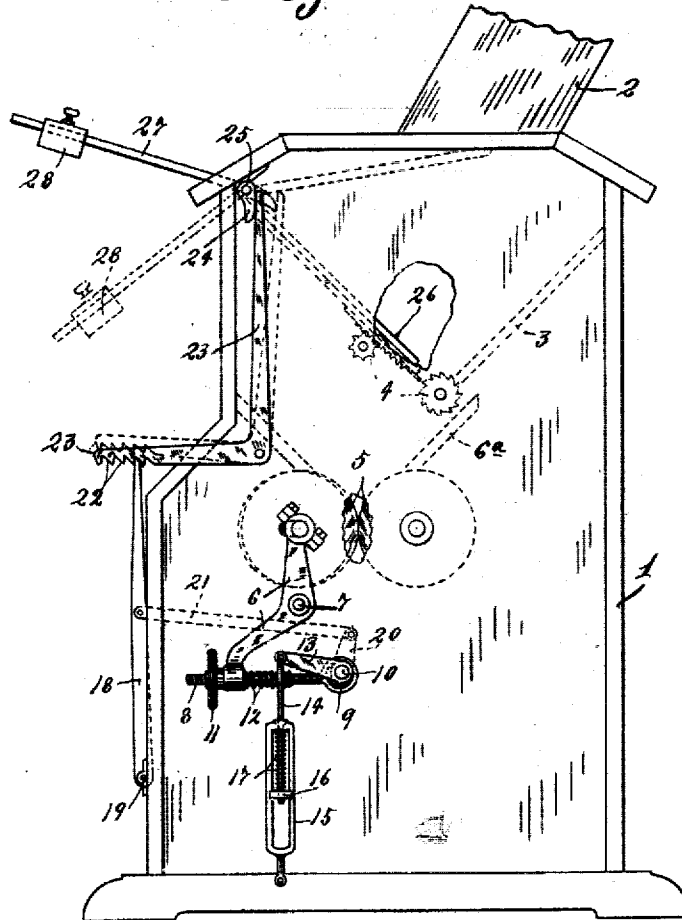
PATENTED FEB. 6, 1906.

J. M. NIKOLAI.
ROLLER MILL.

APPLICATION FILED MAR. 13, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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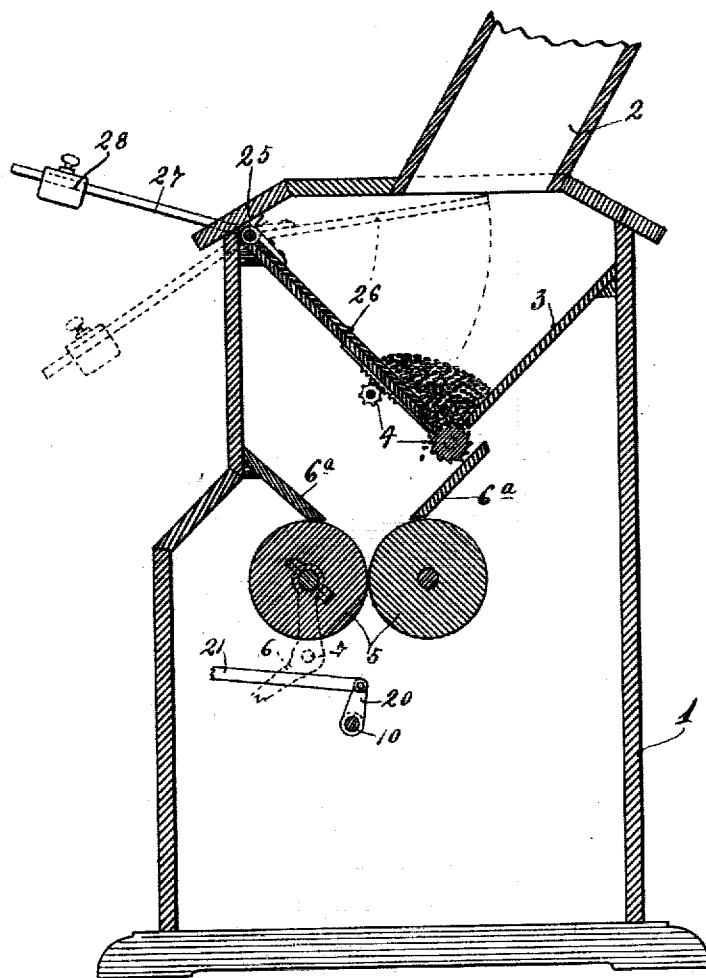
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JACOB M. NIKOLAI, OF MADISON, MINNESOTA.

ROLLER-MILL.

No. 811,574.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed March 13, 1905. Serial No. 249,760.

To all whom it may concern:

Be it known that I, JACOB M. NIKOLAI, a citizen of the United States, residing at Madison, in the county of Lac qui Parle and State of Minnesota, have invented certain new and useful Improvements in Roller-Mills; and I 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 appertains to make and use the same.

My invention relates to roller-mills, and has for its object to provide a separating-trip for the breaking-rollers adapted automatically to separate the rollers when the grain feed runs out, so as to avoid wear and tear on the rollers when running idle.

To these ends my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

My invention is illustrated in the accompanying drawings, wherein like notations refer to like parts throughout both views.

In said drawings, Figure 1 is a view in end elevation, and Fig. 2 is a vertical central section illustrating a roller-mill equipped with my invention.

The numeral 1 represents the casing; 2, the supply-chute; 3, the feed-hopper; 4, the force-feed device; 5, the pair of breaking-rollers, and 6^a the grain-guides for directing the grain from the force-feed device to the said breaking-rollers 5. According to my invention one member of the pair of breaking-rollers 5 is mounted in bearings formed in the upper end of the levers 6, which in turn are pivotally mounted on a pair of trunnions 7, secured to the casing 1, said casing being suitably slotted to permit a limited swing of the projecting trunnions of the rollers, as shown in Fig. 1, with the levers that carry the same. Threaded rods 8 work loosely through the lower ends of the levers 6 and are pivotally attached to a pair of eccentrics 9, rigidly secured to the projecting ends of a rock-shaft 10, mounted in suitable bearings fixed to the casing 1. Hand-wheels 11 have screw-threaded engagement with the free ends of the rods 8 and work against the lower ends of the lever 6. By adjusting the hand-wheel 11 the breaking-rollers 5 may be set parallel one with the other. Springs 12, secured to and encircling the rods 8, act against the lower end of the levers 6 to hold the same in engagement with the hand-wheels 11.

The springs 12 are of the requisite tension to hold the movable member of the pair of rollers in proper contact with the member of said two rollers, which revolve in fixed bearings. The said springs, however, will yield and permit separation of the rollers and permit hard or foreign matter to pass between the rollers without straining or breaking the parts. Secured to the extreme outer ends of the rock-shaft 10 is a pair of arms 13, which are connected by a pair of rod-sections 14 and 15 to fixed points of anchorage near the base of the casing 1. The rod-sections 15 have their upper portions of clevis-like form, and the rod-sections 14 work through the outer ends of the clevises and are provided with nuts 16, between which and the ends of the clevises reacts springs 17, capable of being set under tension.

The lower end of a lever 18 is pivotally mounted in a bearing 19, secured to the casing 1. The intermediate portion of the said lever 18 is connected to an arm 20, secured to the rock-shaft 10 by means of a link 21. The upper or free end of the lever 18 is held by one of the series of teeth 22, cut in the lower arm of a bell-crank latch-lever 23. By placing the upper or free end of the lever 18 into engagement with the different teeth 22 of the bell-crank 23 the distance between the breaking-rollers may be increased or decreased at will. The upper or long arm of a bell-crank latch-lever 23 is subject to a crank-arm 24 on a rock-shaft 25, which has fixed thereto a controlling plate or board 26 within the feed-hopper 3 and subject to more or less of the weight of the grain within the said feed-hopper when the mill is running under the proper supply. The said rock-shaft 25 is also provided with a long crank-arm 27, fitted with an adjustable weight 28.

With the construction and disposition of the parts the action is as follows: When the mill is started into action, the parts of the separating-trip will occupy the position shown in full lines in Fig. 1, or, otherwise stated, the lever will have its upper end engaged by one of the series of teeth in the lower arm of the bell-crank latch-lever 22, so that the latter will hold the former in said set position against the tension of the springs 17, compressed by the separating action of the two telescoping rod-sections 14 and 15. In this set position of the trip and as long as the grain-supply holds out the controlling-plate 26 will be subject to the weight of the grain

within the hopper 3 and will remain in position shown in full lines in Figs. 1 and 2 until the weight of the grain therein ceases to overcome the counterweight 28, whereupon said weight will become operative to throw said controlling-plate upward into its dotted-line position, thereby bringing its arm 24 on the shaft 25 into action on the long arm of the latch-lever 23 and rocking the same into such position as to release its lower arm from the lever 18. As soon as the lever 18 is thus released by the tripping of the latch 23 the springs 17 will become instantly operative to rock the rock-shaft 10, thereby causing the eccentric mounted thereon to pull the rods 8 toward the right and carry with them the pivoted member of the breaking-rollers, thus separating the said rollers and holding the same out of contact against the tension of the spring 17 until the tripping devices are again set in their latched position to bring the rollers into proper working relation for action on the grain.

From the foregoing it will be seen that at the very instant when the grain-supply gives out the breaking-rollers will automatically be separated, so as to keep their opposing surfaces out of contact during the time that the mill may be running idle, and thus avoiding the destructive effect on the working surfaces of the rollers which results when the same are permitted to run in direct contact with each other.

It is of course well understood that many forms of breaking-rollers have finely spirally corrugated or roughened surfaces for the proper breaking action of the grain, and when such rollers are permitted to run in direct contact with each other these raised or roughened surfaces are quickly destroyed, requiring the rolls to be redressed or new rolls to be substituted. Hence by my invention herein disclosed I greatly lengthen the life of the breaking-rollers, keeping them for a much longer time in the required condition for the best action on the grain.

It will be understood that the construction might be modified to a considerable extent without departing from the spirit of my invention. It will also be understood while this invention was especially designed to meet the conditions presented in roller-mills acting on grain that the same is capable of application wherever the corresponding functions may be desired.

From an inspection of the drawings and the construction of the parts described it must be obvious that the automatic tripping devices can be latched or locked up in their set positions, as shown in full lines in Figs. 1

and 2, before the mill is started up, and hence the controlling-plate 26 will normally be set in position to receive the weight of the grain supplied to the feed-hopper 3 when the mill is started into action.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a roller-mill, the combination with a pair of opposing rollers, of means subject to the pressure of the grain on its way to said rollers, operating automatically to separate said rollers, when the pressure of the grain becomes abnormally light, substantially as described.

2. In a roller-mill, the combination with a pair of opposing rollers, of a separating-trip operative to separate said rollers when released, of a latch normally holding said trip against movement, and a controller for said latch normally holding the same operative and arranged to cause said latch to release said trip and cause the separation of the rollers, when the grain-pressure on said controller becomes abnormally light, substantially as described.

3. In a roller-mill, the combination with a pair of opposing rollers, of a spring-pressed trip under strain to separate said rollers, a latch normally holding said trip against movement, a pivoted weighted controller-plate having an arm for action on said latch, to cause the same to release said trip, which controller-plate is interposed in a path of movement of the grain on its way to said rollers and is normally held out of action by pressure of the said grain, substantially as described.

4. In a roller-mill, the combination with a pair of opposing rollers and a hopper located above the same, of a movable support for one of said rollers, a spring-pressed crank-acting trip connected to said roller-support and operative, when released, to separate said rollers, a pivoted latch normally holding said trip against movement, and a weighted pivoted controller-plate within said hopper, normally held inoperative by the pressure of grain in said hopper, and which controller-plate is provided with an arm arranged to act on said latch and cause the latter to release said trip, and said trip to separate the rollers, when the grain-pressure on said plate is abnormally light, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JACOB M. NIKOLAI.

Witnesses:

OBERT R. NELSON,
WALTER R. HURD.