(No Model.)

W. D. GRAY.

ROLLER GRINDING MILL.

No. 339,162. Patented Apr. 6, 1886.

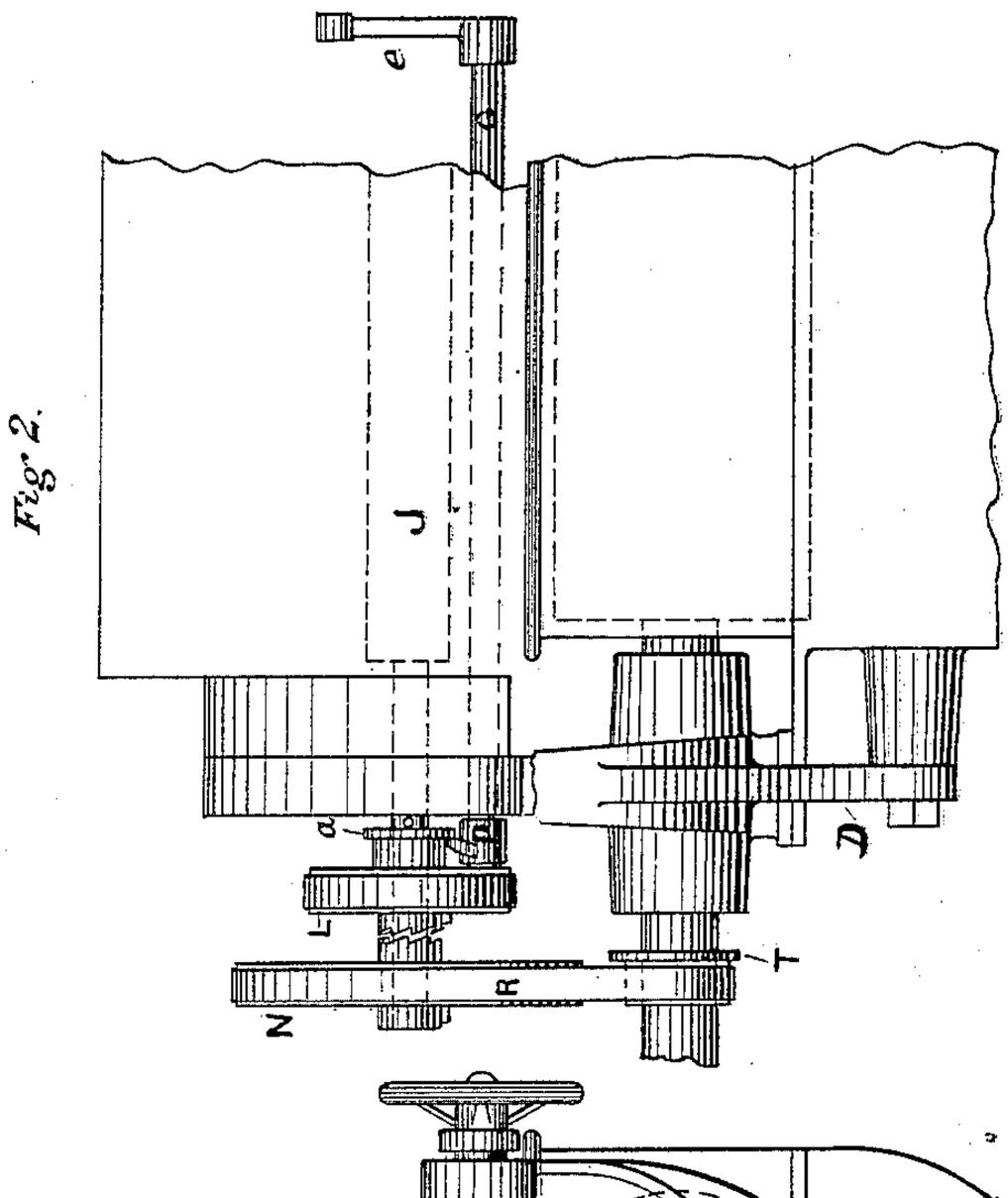

Fig. 1.

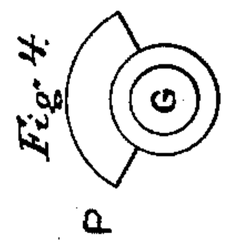

Fig. 4.

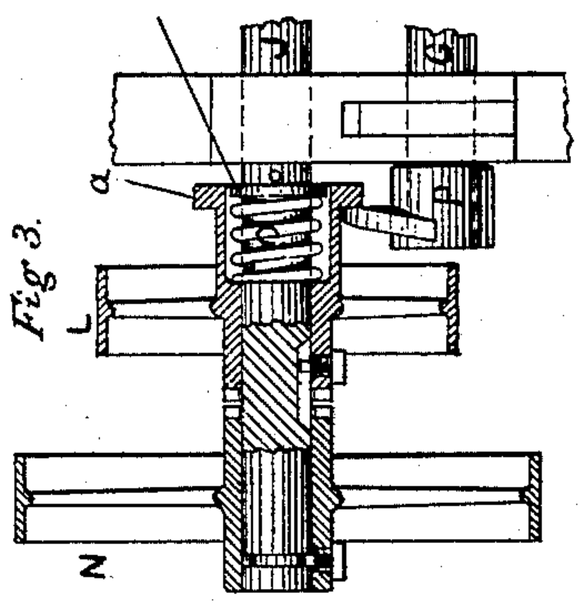

Fig 3.

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UNITED STATES PATENT OFFICE.

WILLIAM D. GRAY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO E. P. ALLIS & CO., OF SAME PLACE.

ROLLER GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 339,162, dated April 6, 1886.

Application filed July 19, 1884. Serial No. 138,208. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. GRAY, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain Improvements in Roller Grinding-Mills, of which the following is a specification.

This invention consists in a peculiar construction and arrangement of mechanism whereby the separation of the grinding-rolls is caused to effect also the stoppage of the feed-roll, and the closing of the grinding-rolls is caused, on the other hand, to start the feed-roll.

I have represented in the accompanying drawings a mill similar in its general construction and mode of operation to those represented in various Letters Patent of the United States hitherto granted to me, with the exception of the present improvements, which are embodied therein. For the purpose of illustration I have selected a mill containing two pair of grinding-rolls and two feed-rolls, commonly designated in the art as a "double roller-mill," the second feed-roll being driven from the first in an ordinary manner, forming no part of my invention. When applied to single mills, the same construction will be retained in every particular as far as the first pair of rolls is concerned, but those additional parts which have special reference to a second pair of rolls will of course be omitted.

Referring to the accompanying drawings, Figure 1 represents an elevation of a double roller-mill having my improvements embodied therein, looking against the ends of the rolls. Fig. 2 is an elevation of the upper part of one side of the mill, looking in the direction indicated by the arrow in Fig. 1. Fig. 3 is a vertical section through one side of the mill on the line *x x*. Fig. 4 is a side elevation of the hub by which the feed-roll is disconnected.

A represents the frame or base portion of the machine, B B′ the two grinding-rolls mounted in fixed bearings thereon, and C C′ the cooperating rolls mounted in supports D, which may be pivoted at their lower ends, as shown, or otherwise arranged to permit the rolls C C′ to be moved quickly to and from their companions, in order that they may be thrown into and out of position for grinding. The movable supports D of each roll are connected adjustably to rods E, which latter have their opposite ends mounted on eccentrics F on a cross-shaft, G, arranged to rock in fixed bearings on the frame. The two rock-shafts are provided with crank-arms *e*, pivoted to a horizontal bar, H, by means of which the operator is enabled to adjust the two movable rolls simultaneously.

The machine is provided, as usual, at the top with a hopper, I, having two throats or outlets to deliver the material to the grinding-rolls. Beneath each of these throats there is a horizontal feed-roll, J and J′, to effect the delivery of the material therefrom in a downward direction to the grinding-rolls thereunder. The two feed-rolls are provided on their ends with driving-pulleys K and L, connected by a cross-belt, M, whereby motion is communicated from one roll to the other.

All of the parts above described, with the exception of the pulley L, are constructed and arranged to operate in the ordinary manner, and are not claimed as of the present invention. The driving-pulley L of the feed-roll J is mounted on its shaft or journal in such manner as to slide laterally thereon while compelled to rotate therewith. This connection may be effected by means of a screw and slot, as represented in Fig. 3, by a spline, or by other equivalent mechanism familiar to the skilled mechanic. The feed-roll has its shaft or journal provided at the outer end with a second pulley, N, which revolves freely thereon, but which is fixed against side motion, a connection between the two being made by a screw and groove, as in Fig. 3. The hub of the pulley N and the outer end of the hub of the pulley L are toothed or serrated to engage each other, so that they form jointly a clutch by which motion may be communicated from the pulley N to the feed-roll. A spiral spring, O, is applied around the shaft of the feed-roll and inclosed within a hollow hub of the pulley L, bearing at one end against the hub and at the opposite end against a collar on the shaft, as plainly represented in Fig. 3, whereby it is caused to hold the clutch devices normally in engagement.

The hub of the sliding pulley L is provided at the inner end with a circumferential flange, *a*, with which there engages a spiral flange or rib formed on a hub, P, which is secured firmly to the end of one of the rock-shafts G, by which the eccentrics are caused to adjust the grinding-roll, as before explained. When the rock-shaft is turned to effect the separation of the rolls, its flanged hub moves the clutch-pulley L inward out of engagement with the driving-pulley N, thereby causing the feed-roll to stop at the same time that the grinding-rolls are separated. As the second feed-roll is driven from the first, its stoppage occurs at the same time.

From the foregoing it will be readily understood that the movement of the bar H in one direction has the effect of spreading or separating the grinding-rolls to stop the grinding action, and at the same time the effect of stopping the feed-rolls. On the contrary, the movement of the bar H in the opposite direction will have the effect of starting both of the feed-rolls and of bringing both pairs of grinding-rolls to their operative position. Motion is communicated to the pulley N by means of a belt, R, passing thence to a pulley, T, which in this instance is applied to one of the grinding-rolls, but which may be applied to any other suitable rotating part of the mill.

While I have described herein a mill having two pairs of rolls, it will be understood that the devices are applicable in like manner to single mills, the bar H and all the devices on one side of the mill being omitted and the adjustment of the parts effected by operating the arm *e*, which may be prolonged, if desired, beyond the length shown in the drawings, although such prolongation is usually unnecessary.

I am aware that various mechanisms have been devised for the purpose of effecting simultaneously the stoppage of the feed-rolls and the separation of the grinding-rolls, and the present invention is consequently restricted to the peculiar construction and arrangement of the parts herein shown and claimed.

Having thus described my invention, what I claim is—

1. In a roller grinding-mill, the combination of the hopper, the stationary and movable grinding-rolls, the feed-roll, the grinding-roll-adjusting shaft provided with a spiral flange, P, and a driving-clutch on the feed-roll shaft engaged directly by the spiral flange, whereby the rotation of the shaft G in the proper direction is caused to effect the disengagement of the clutch.

2. In a roller-mill, the combination of a hopper, a feed-roll, a movable and a stationary grinding-roll, supports D for the movable roll, the rock-shaft G, devices, substantially as shown, connecting said shaft with the movable roll-supports, the spiral flange P, applied to said shaft, the driving pulley and clutch mounted on the feed-roll shaft, the clutch being in direct engagement with the flange P, and the spring to throw the clutch into engagement, whereby the operation of the rock-shaft to adjust the grinding-roll is caused to effect the stopping and starting of the feed-roll.

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