

(No Model.)

W. D. GRAY.
ROLLER GRINDING MILL.

No. 339,164.

Patented Apr. 6, 1886.

Fig. 1.

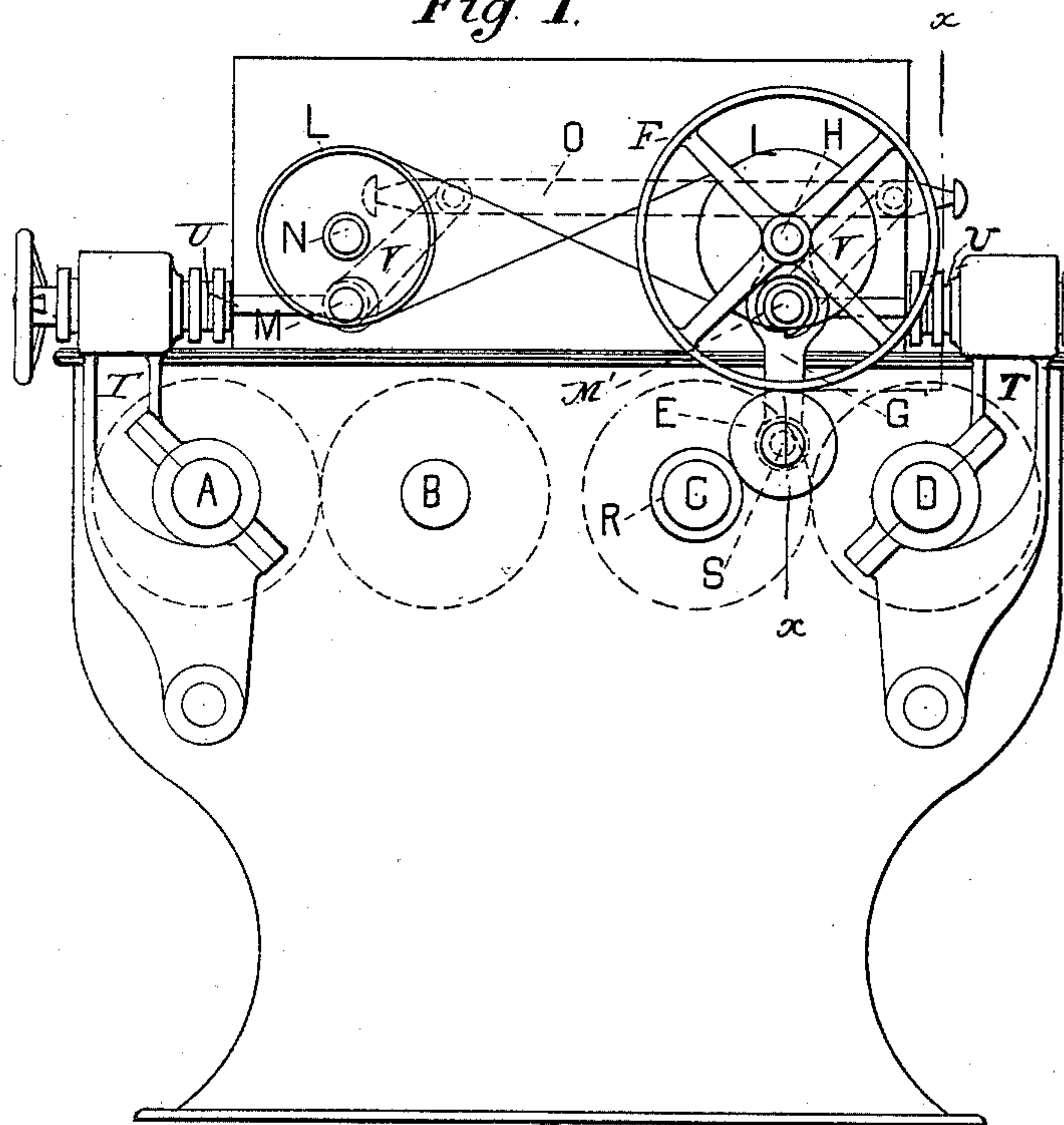


Fig. 2.

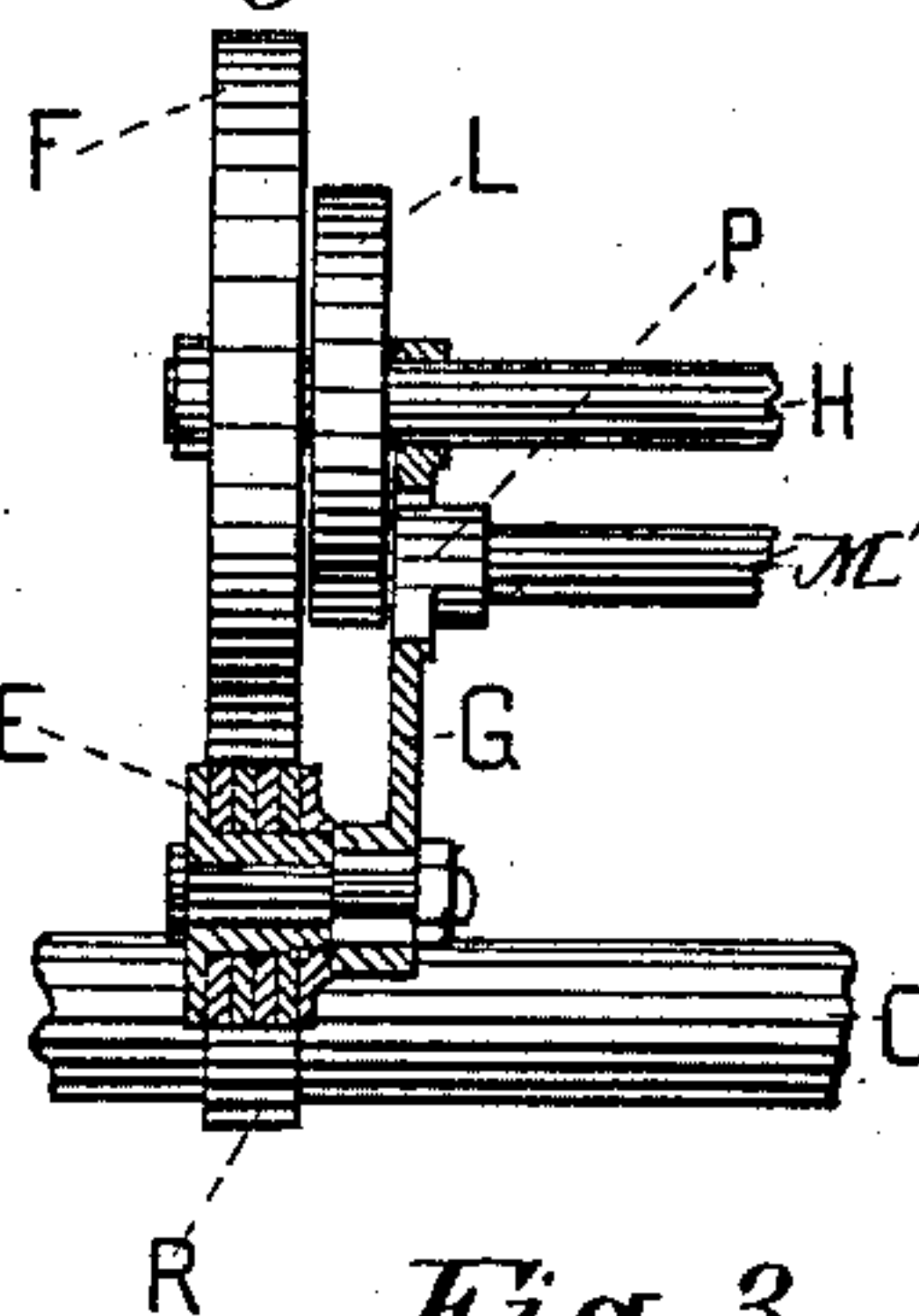


Fig. 3.

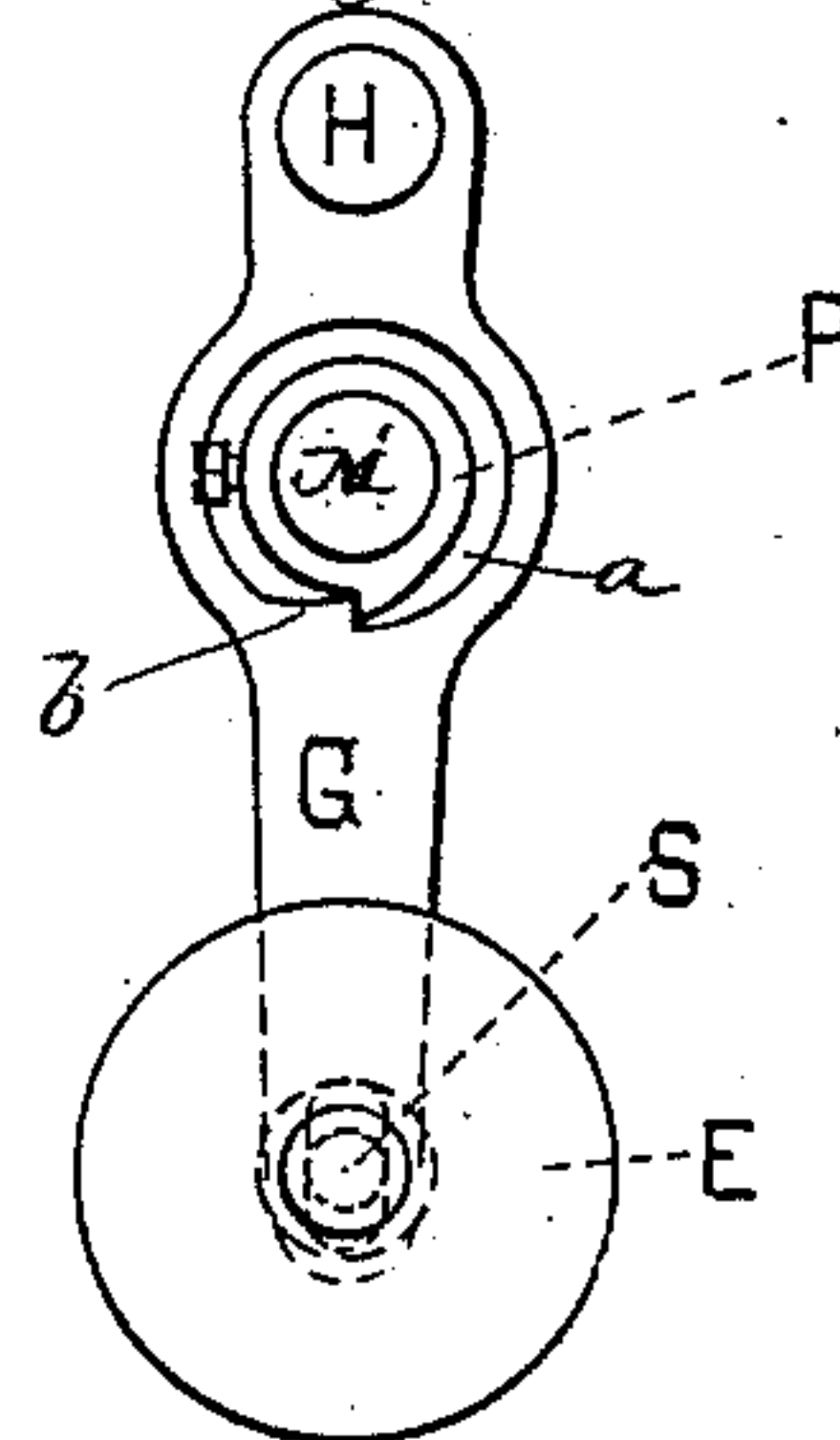


Fig. 4.

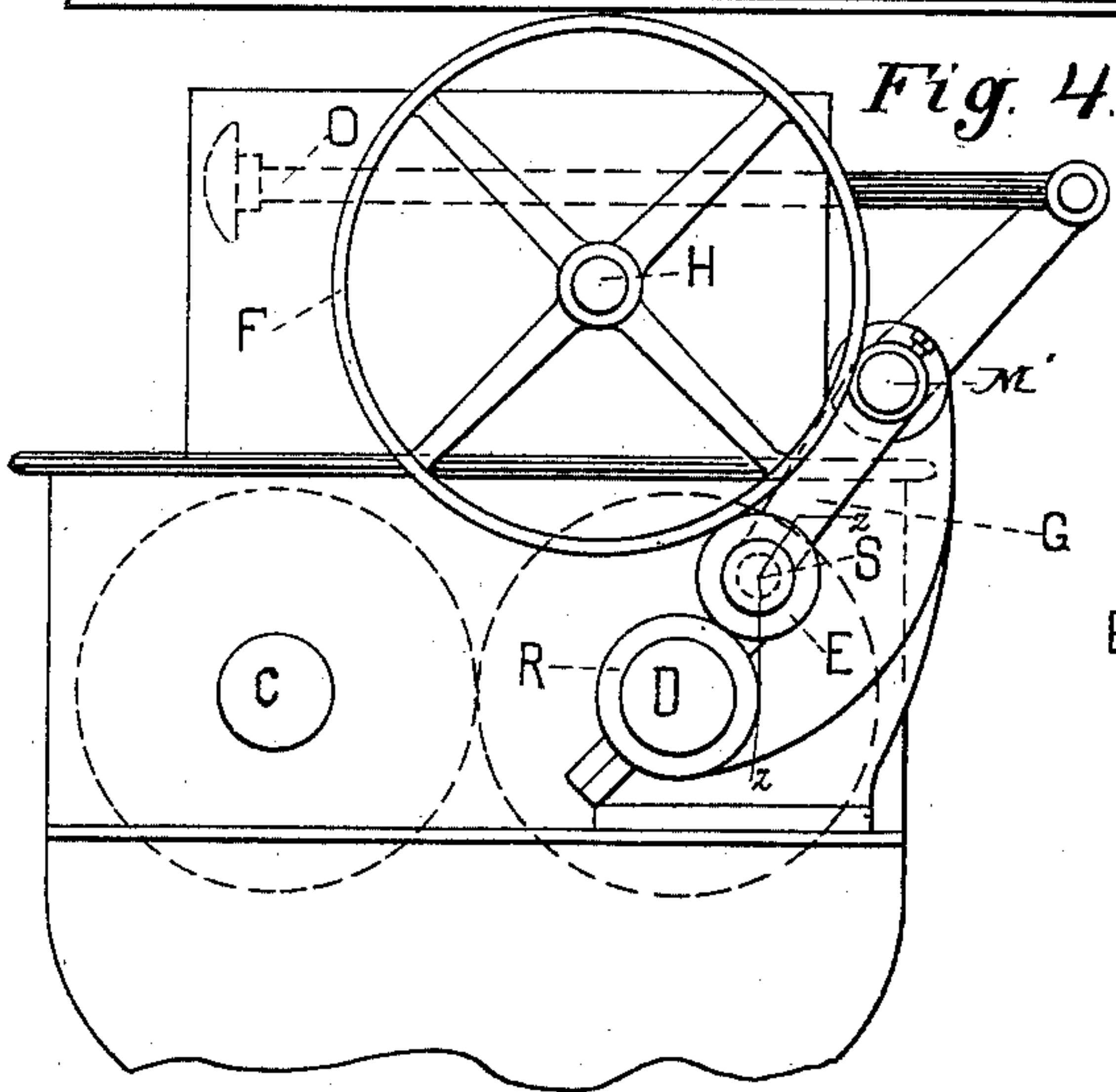
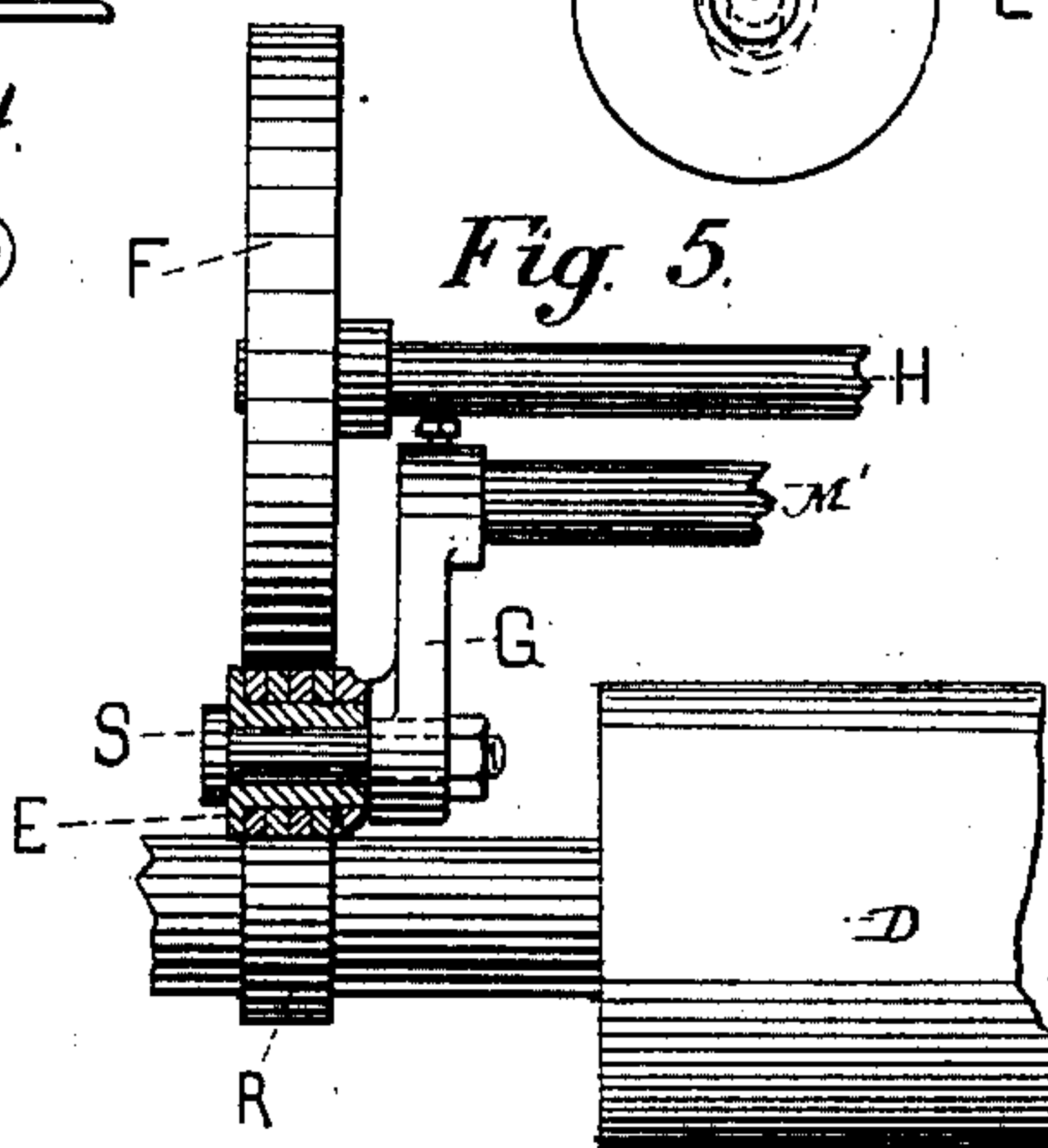


Fig. 5.



Witnesses.

W. H. Shipley
Newton Wyckoff.

Inventor.

W. D. Gray.
By O. T. Dodge atty.

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. 339,164, dated April 6, 1886.

Application filed July 25, 1884. Serial No. 138,782. (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
5 Improvements in Roller Grinding - Mills, of which the following is a specification.

This invention relates to an improved construction and arrangement of mechanism whereby the act of separating the grinding-
10 rolls is also caused to stop the feed-roll, to the end that the feed devices may remain inoperative whenever the grinding-rolls are out of an operative position.

To this end it consists, essentially, in the
15 combination of a pulley on the feed-roll shaft, a pulley on one of the grinding-rolls, an intermediate driving-pulley, and a supporting-arm for the intermediate pulley, connected directly with and operated by a rock-shaft
20 which effects the adjustment of the movable grinding-roll.

My invention is applicable to those mills which contain but a single pair of grinding-rolls. It is also applicable to those mills
25 which contain two pairs of grinding-rolls, commonly known as "four-roller mills," the second feed-roll being in the latter case driven from the first, as in other mills at present known in the art. This connection between
30 the first and the second feed-rolls is not claimed as a part of the present invention.

Referring to the drawings, Figure 1 represents a side elevation of a four-roller mill provided with my improvements. Fig. 2 is a vertical
35 section on the line *x x* of Fig. 1. Fig. 3 is a side view on an enlarged scale, showing the intermediate driving-pulley and its connections. Fig. 4 is a side elevation of a single mill, or mill with one pair of grinding-rolls,
40 provided with my improvements. Fig. 5 is a section of the same on the line *z z*.

Referring to Figs. 1, 2, and 3, A B and C D represent the two pairs of grinding-rolls, the inner rolls, B and C, being mounted in fixed
45 boxes, while the outer rolls will be arranged in movable boxes or supports to admit of their being moved to and from their companions.

The construction of the frame and the devices for supporting and moving the rolls
50 constitute no part of the present invention. I propose to make use of either of the various

constructions at present known in the art to this end. In the present instance I have represented the movable rolls as being mounted in arms T, the lower ends of which are pivoted, and the
55 upper ends of which are connected by rods U to eccentrics mounted on horizontal cross-shafts M M'. There are two of these shafts, mounted on opposite sides of the frame, one for each of the movable rolls. They are pro-
60 vided at one end with cranked arms V, connected by means of a horizontal bar, O, which serves to operate the two shafts simultaneously, and thus to throw the two movable grinding-rolls into or out of action at the same
65 time. On the top of the machine I mount a feed-hopper containing two feed-rolls, H and N, one for each pair of rolls. These rolls will be connected by pulleys and cross-belts on their ends, as shown, or otherwise connected. 70

The various parts above referred to are well known in the art, and are not claimed as of the present invention.

In applying my improvement I provide the feed-roll H with a driving-pulley, F, and provide one of the grinding-rolls with a smooth
75 pulley or collar, R. On or around the journal of the feed-roll H, I mount a swinging arm, G, the lower end of which is provided with a journal carrying a friction-wheel, E, of wood,
80 rubber, leather, or other suitable material, which remains constantly in contact with the pulley F, and which may by the swinging motion of the arm G be also thrown into contact with the pulley R, so as to communicate motion
85 from said pulley through the pulley F to the feed-roll. The swinging arm is provided, as shown in Figs. 1 and 3, with an opening, *a*, having a lip or shoulder, *b*. The end of the rock-shaft M' by which the grinding-rolls are separated is extended into this opening in the swing-
90 ing arm and provided with a hub or collar, P, having on one side a lip or projection to engage the shoulder, *b*, as plainly represented in Fig. 3. As a result of this arrangement it follows that when the bar O is moved to the right and the shaft M' turned to the right for the purpose of bringing the grinding-rolls together in an operative position the hub of said shaft swings the arm G inward, so as to
100 force the pulley E into contact with the driving-pulley R. Thus the feed-rolls are set in

motion at the same time that the grinding-rolls are brought in an operative position. A reverse movement of the parts to effect the separation of the grinding-rolls causes the release of the arm G, permitting the pulley E to swing out of contact with the pulley R, so that the movement of the feed-rolls may cease.

Referring now to the arrangement recommended for mills having one pair of rolls, C represents the stationary, and D the movable, roll mounted and arranged as in the preceding instance.

H represents the feed-roll; M', the eccentric shaft by which the movable roll is adjusted; G, the swinging arm, applied in this instance directly to the rock-shaft, and E the intermediate pulley mounted, as before, on the end of the arm and arranged to communicate motion from the pulley on the grinding-rolls to the pulley of the feed-roll. This arrangement differs from that first described mainly in that the arm G is secured firmly and directly to the rock-shaft M', so as to turn therewith, instead of being mounted on a separate pivot.

It will be noted that in each case the arm is actuated directly from the rock-shaft, and provided with the pulley E, to communicate motion from the grinding-roll to the feed-roll. While I prefer to retain the details of construction herein shown, it is manifest that the form and arrangement of the parts may be modified to adapt the same for application to different mills without changing the mode of action or passing beyond the limits of my invention.

The arms supported as in Figs. 1, 2, and 3 may be applied to mills having but one pair of rolls, and the arms sustained as in Figs. 4 and 5 may in like manner be applied to mills having two pair of rolls.

I do not claim, broadly, herein the combination of a pulley which transmits motion

from a driving-pulley on the grinding-roll to a pulley on the feed-roll with the roll-adjusting mechanism, as this combination, broadly considered, constitutes the subject-matter of a separate application, No. 135,794, filed June 23, 1885.

The present invention is restricted to the combination in which motion is transmitted from a rock-shaft directly to a moving arm by which the intermediate pulley is carried.

Having thus described my invention, what I claim is--

1. In a grinding-mill, the combination of a hopper, the feed-roll, two grinding-rolls, one of which is movable, a pulley attached to one of the grinding-rolls, a pulley attached to the feed-roll, an intermediate friction-pulley to transmit motion directly from the roll-pulley to the feed-roll pulley, a movable arm supporting said intermediate pulley, a rock-shaft acting directly on said arm to adjust the same, and devices, substantially as described, connecting said shaft with the movable grinding-roll, whereby the adjustment of the grinding-roll is caused to stop or start the feed-roll.

2. In a grinding-mill, the combination of a hopper, a feed-roll, two grinding-rolls, one of which is movable, a rock-shaft connected by means substantially as described with the movable roll, pulleys applied to the feed-roll and grinding-roll, respectively, an intermediate friction-pulley, and a pivoted supporting-arm for said pulley connected with and operated directly from the rock-shaft, substantially as described.

In testimony whereof I hereunto set my hand, this 7th day of July, 1884, in the presence of two attesting witnesses.

WILLIAM D. GRAY.

Witnesses:

RICHARD HOPPIN,
EDWARD BAXTER.