

(No Model.)

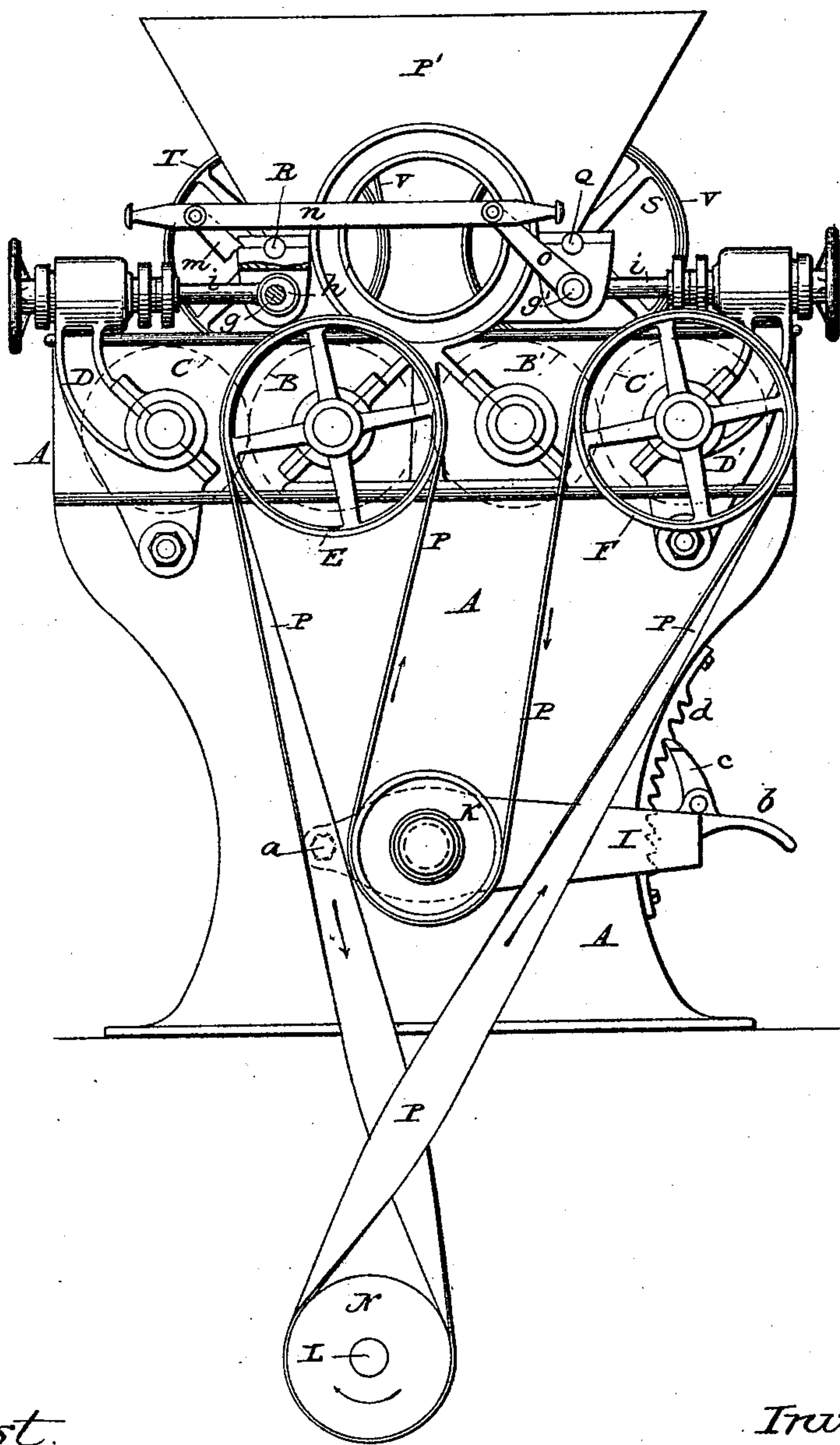
3 Sheets—Sheet 1.

W. D. GRAY.
ROLLER GRINDING MILL.

No. 436,234.

Patented Sept. 9, 1890.

Fig. 1.



Attest.

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(No Model.)

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Fig. 2.

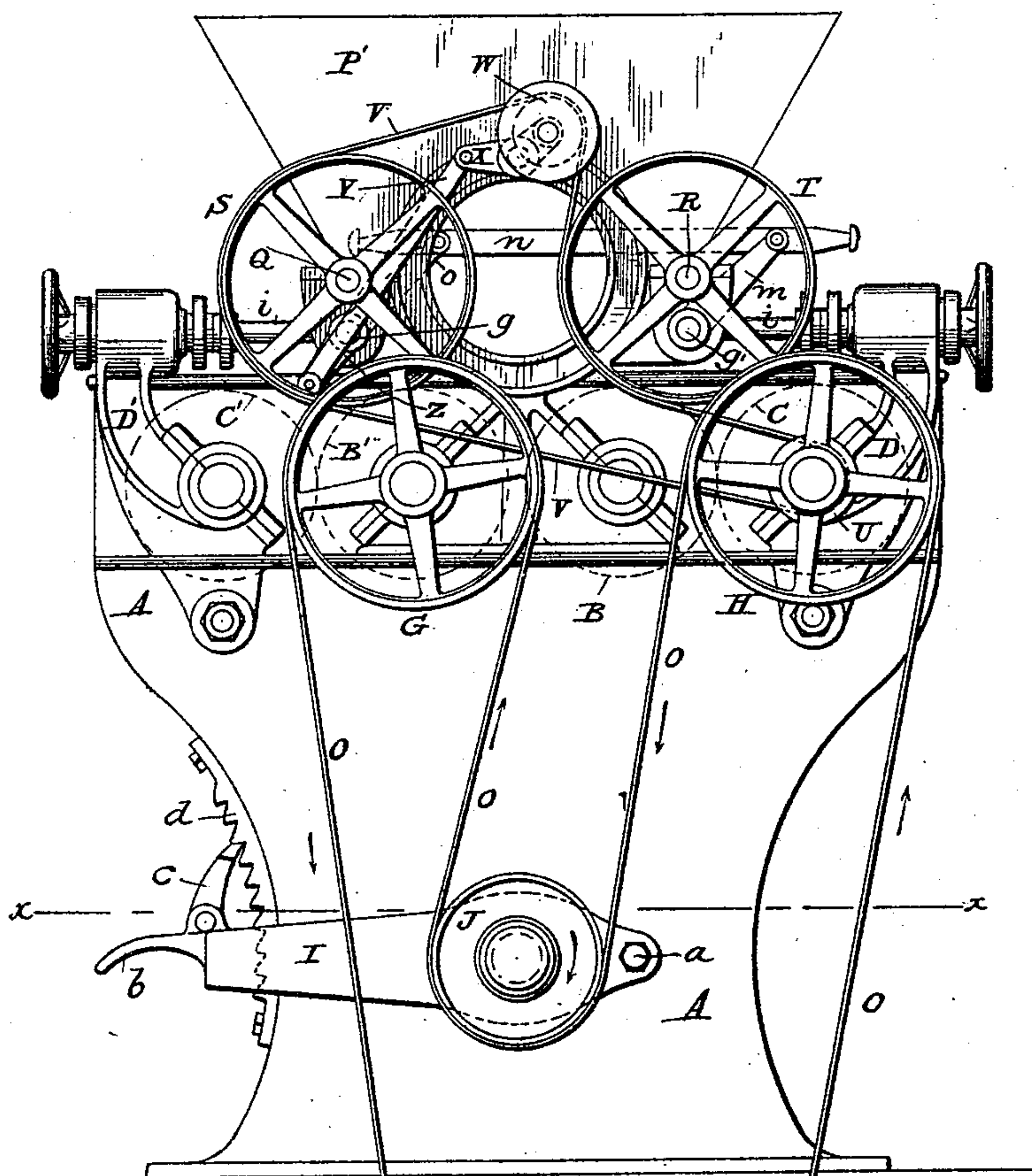


Fig. 3.

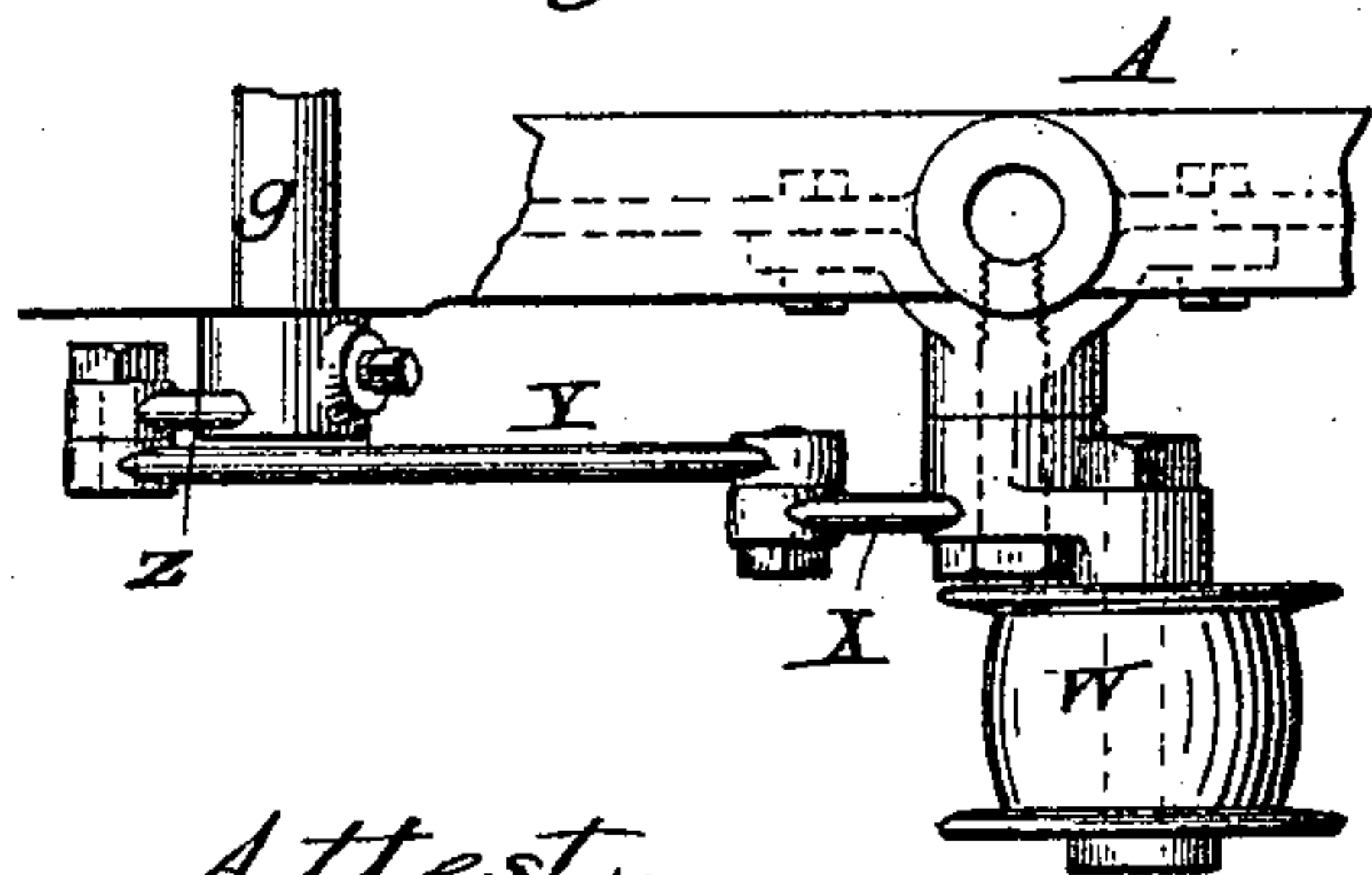
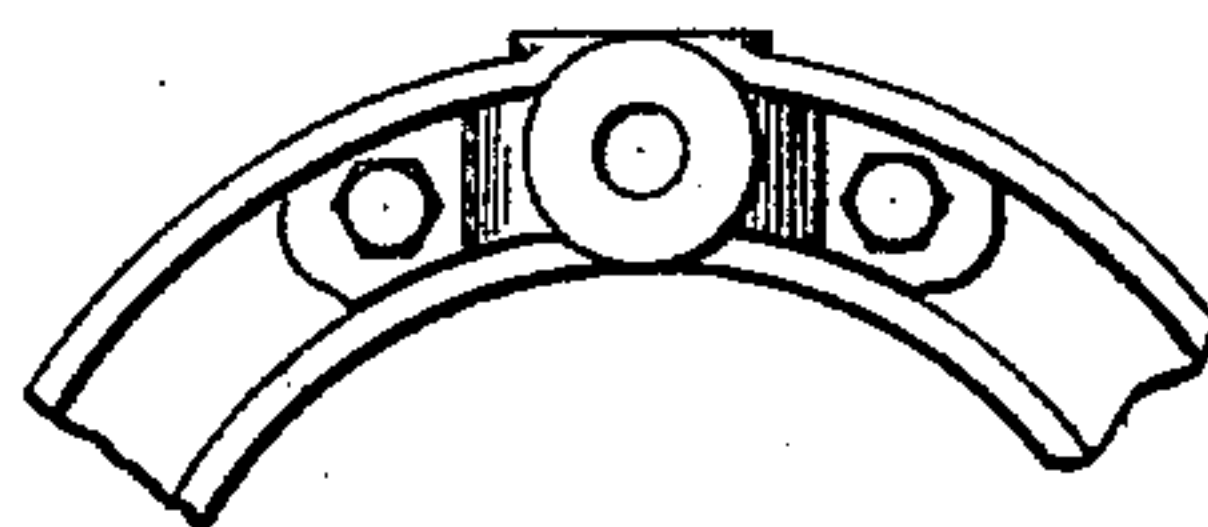


Fig. 4.



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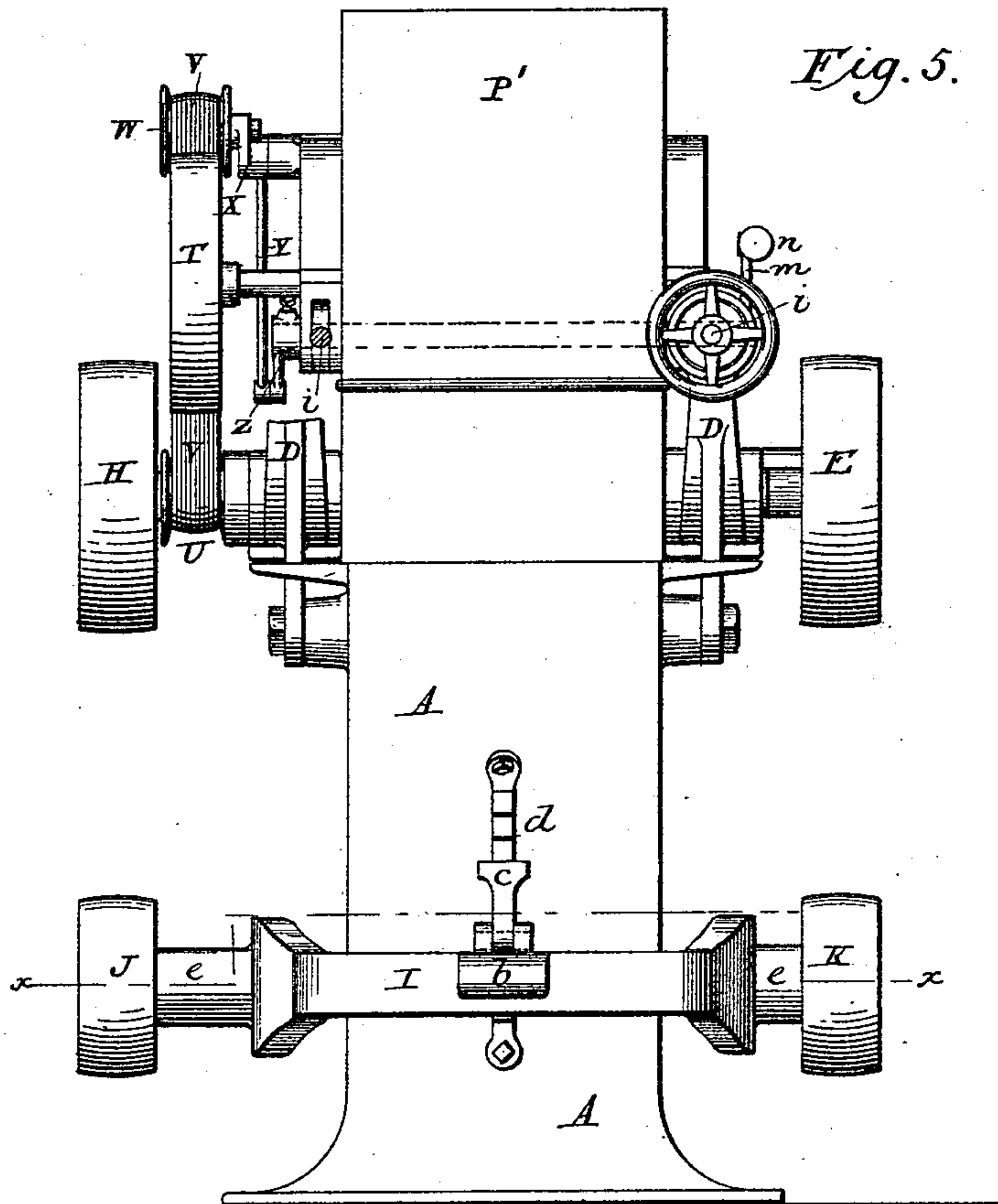
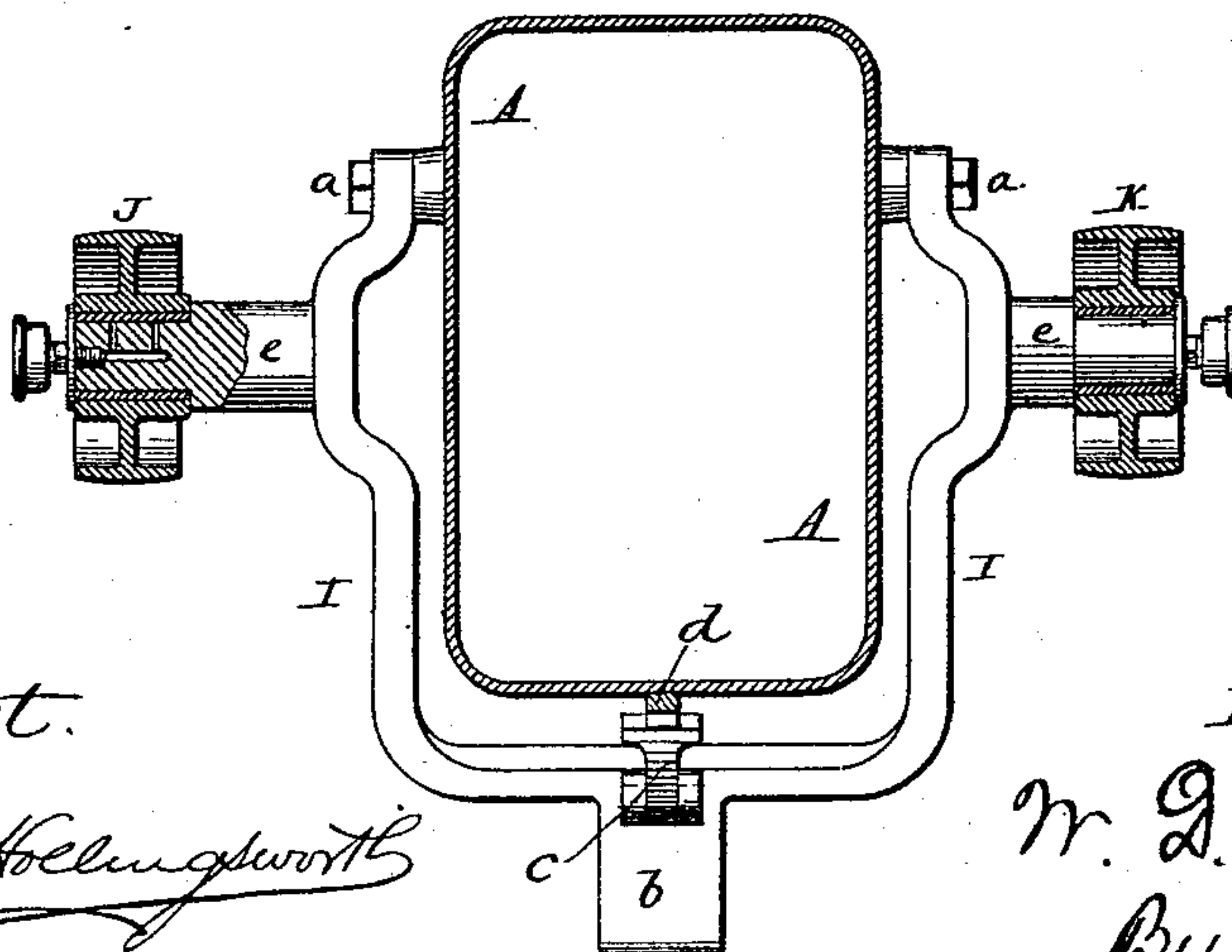


Fig. 6
on line x-x



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UNITED STATES PATENT OFFICE.

WILLIAM D. GRAY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO E. P. ALLIS & CO.; MARGARET W. ALLIS, WILLIAM W. ALLIS, EDWARD P. ALLIS, JR., CHARLES ALLIS, AND EDWIN REYNOLDS, ALL OF SAME PLACE, EXECUTORS OF EDWARD P. ALLIS, DECEASED, SOLE MEMBER OF THE FIRM OF EDWARD P. ALLIS & CO.

ROLLER GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 436,234, dated September 9, 1890.

Application filed December 16, 1885. Serial No. 185,840. (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.

The present invention relates more particularly to improvements in what are commonly known as "double-roller mills"—that is to
10 say, mills embracing two pairs of grinding-rolls and two feed-rolls, by means of which the material is delivered to the respective grinding-rolls.

The invention has reference to improved
15 means for guiding and tightening the belts for transmitting motion to the grinding-rolls and to improved means for driving the feed-rolls connected with the mechanism for spreading and closing the grinding-rolls, so
20 that the grinding and feed rolls will be thrown into and out of action simultaneously.

Referring to the drawings, Figure 1 represents a side elevation of a mill having my improvements embodied therein. Fig. 2 is an
25 elevation of the same viewed from the opposite side. Fig. 3 is a top plan view of a portion of the main frame and the devices for adjusting the tension of the belt which operates the feed-rolls. Fig. 4 is a side elevation
30 of that portion of the frame to which the lever carrying the tightener or idler-pulley is attached. Fig. 5 is a front elevation of the mill. Fig. 6 is a horizontal section on the line
35 xx of the preceding figure, looking in a downward direction.

A represents the frame or body of the mill, which may be of any ordinary or appropriate form; B B', two grinding-rolls mounted in stationary bearings at the top of the frame;
40 and C C', two grinding-rolls mounted in swinging arms D D', to admit of their being moved to and from the respective stationary rolls with which they co-operate. The rolls B and C' are provided, respectively, on the left-hand
45 side of the machine with driving-pulleys E and F. The rolls B' and C are provided on

the opposite or right-hand side of the machine with driving-pulleys G and H. Astride of the frame near its base there is a horizontal U-shaped frame I, having its two arms pivoted
50 at a to the main frame. The front of this frame is formed with a foot-piece b , or otherwise formed to admit of its being readily depressed by the attendant, and is provided with a pawl or locking device c , adapted to
55 engage a notched plate d on the front of the main frame. On each side the frame I, commonly denominated the "tightener-frame," is formed with a projecting journal e . On the
60 respective journals there are mounted the tightener pulleys or idlers J and K, which are in the same vertical planes with the roller-pulleys above them.

In applying the driving-belts to my machine I locate at any suitable point beneath the
65 main frame a horizontal driving-shaft L, provided with two driving-pulleys M and N, beneath the respective idlers. On the right side of the machine I pass a driving-belt O
70 beneath the driving-pulley M, thence upward over the pulleys H and G, and downward between the said pulleys and around the idler J. On the opposite side of the machine I pass a
75 belt P around the driving-pulley N, and crossing it above said pulley pass it over the pulleys F and E and downward between said pulleys around the idler K. The belts thus
80 applied serve to transmit motion from the pulleys of the driving-shaft directly to the pulleys of the respective roll-shafts, driving the companion pulleys inward toward each
85 other. The relative surface speeds of the rolls may be modified by changing the size of the respective driving-pulleys, or of the pulleys on the roll-shafts, as preferred. As
90 the idlers or tighteners for both belts are mounted directly on the tightener-frame, the depression of the latter will effect the simultaneous and uniform tightening of the two
belts.

I am aware that a tightener-frame pivoted to the base of the main frame has been pro-

vided with boxes containing a counter-shaft which extended through the machine from one side to the other, and which carried upon its ends idlers or tightener-pulleys for two
 5 driving-belts. It is to be observed that in the present construction the counter-shaft is dispensed with and the idlers carried by journals forming a part of the tightener-frame. This construction is not only cheaper than that
 10 before referred to, but is advantageous in that it avoids the necessity of forming a trunk or opening through the frame for the passage of the shaft, and in that it avoids the many objections incident to the extension of a shaft
 15 through the interior of a frame. I prefer to cast the tightener-frame I complete in one piece with the journals *e* thereon, but it will be manifest to the skilled mechanic that the journals may be bolted or otherwise attached
 20 thereto.

At its top the mill is provided with the usual double hopper *P'* and with two feed-rolls *Q* and *R*, by which the material is delivered from the throats of the hopper to the
 25 rolls beneath. The feed-rolls are provided, respectively, with driving-pulleys *S* and *T*, and one of the grinding-rolls is provided with a small pulley *U*. A single driving-belt *V* is extended around the driving-pulleys *S* and
 30 *T*. Between the latter it is also passed over the idler or tightener pulley *W*, mounted on an angular lever *X*, which is pivoted to the main frame and connected at its opposite end by a pitman *Y* to a crank *Z* on a rock-shaft
 35 *g*, by which the adjustment of the movable grinding-rolls is effected. The rock-shaft may be connected with the movable rolls by any of the various mechanisms at present known in the art. In the drawings the shaft
 40 is provided with eccentrics *h*, engaging rods *i*, which are in turn connected with the swinging supports *D* of the roll *C'*, the arrangement being such that when the shaft is turned in the proper direction to effect the separation
 45 of the rolls *B'* and *C'* it will lower the pulley *W*, and thus slacken the feed-driving belt *V*, so that the feed-rolls may cease their motion.

The rock-shaft is in the present instance provided with a crank-arm *m*, connected by a bar *n* to a crank-arm *o* on a second rock-
 50 shaft *g'*, which is connected by eccentrics and rods, such as before described, to the support of the grinding-roll *C'*.

It is to be understood that the device for adjusting the grinding-rolls forms no part
 55 of the present invention.

Having thus described my invention, what I claim is—

1. The combination, in a roller-mill, of the main frame, the grinding-rolls provided with
 60 pulleys on the two sides of the frame, the tightener-pulleys located on opposite sides of the said frame, and a rigid connection between said pulleys constructed to sustain the same, said connection pivoted to the main
 65 frame to move up and down, and arranged wholly on the outside of the said frame, whereby the tightener-pulleys are compelled to move in unison and the main frame may be constructed with an unbroken base.
 70

2. The combination, with the main frame, of the tightener-frame carrying the tightener-pulleys, said frame pivoted to the main frame to move up and down, and provided with a foot-piece for depressing it, and the pawl and
 75 teeth to secure the tightener-frame in different relations to the main frame, as described.

3. The combination, in a grinding-mill, of the grinding-roll and its pulley, the two feed-rolls and their pulleys, the driving-belt *V*,
 80 the tightener-pulley *W*, the elbow-lever *X*, pivoted to the main frame and carrying the tightener-pulley, the grinding-roll-adjusting shaft *g*, the crank thereon, and the pitman connecting said crank with the elbow-lever
 85 *X*, substantially as described.

In testimony whereof I hereunto set my hand this 7th day of December, 1885, in the presence of two attesting witnesses.

WILLIAM D. GRAY.

Witnesses:

JOHN I. MARSHALL,
 R. BIRKHOLZ.