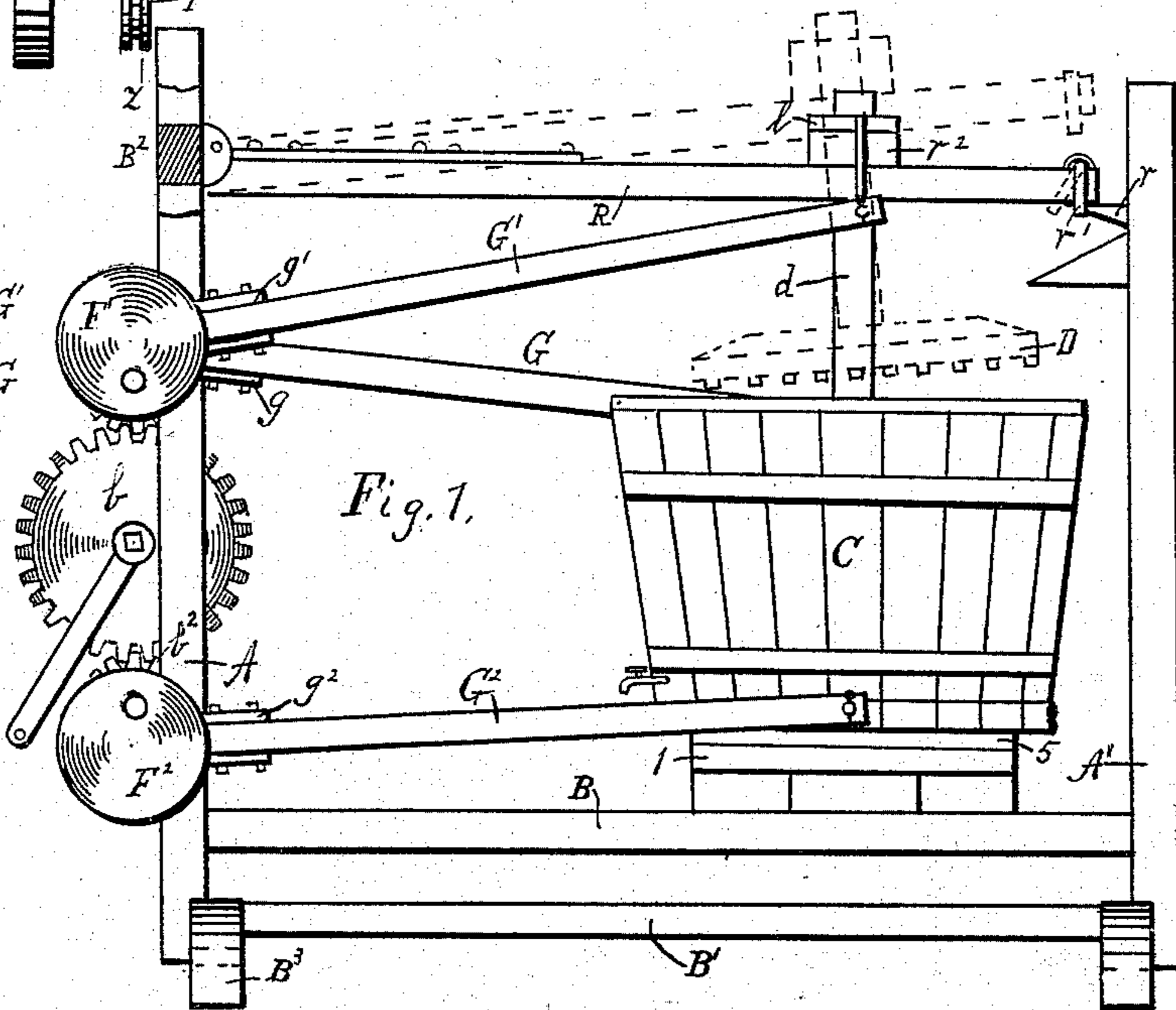
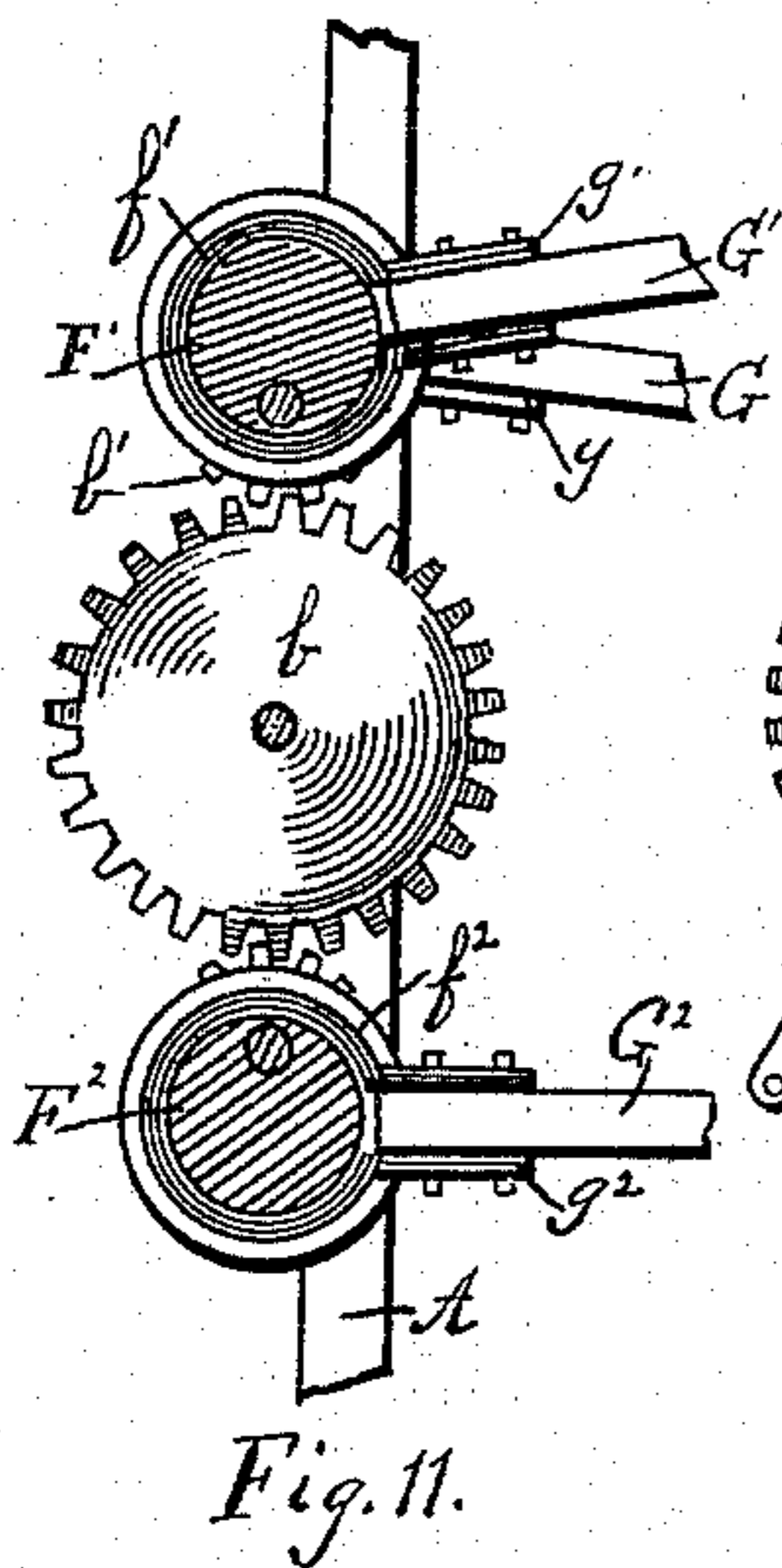
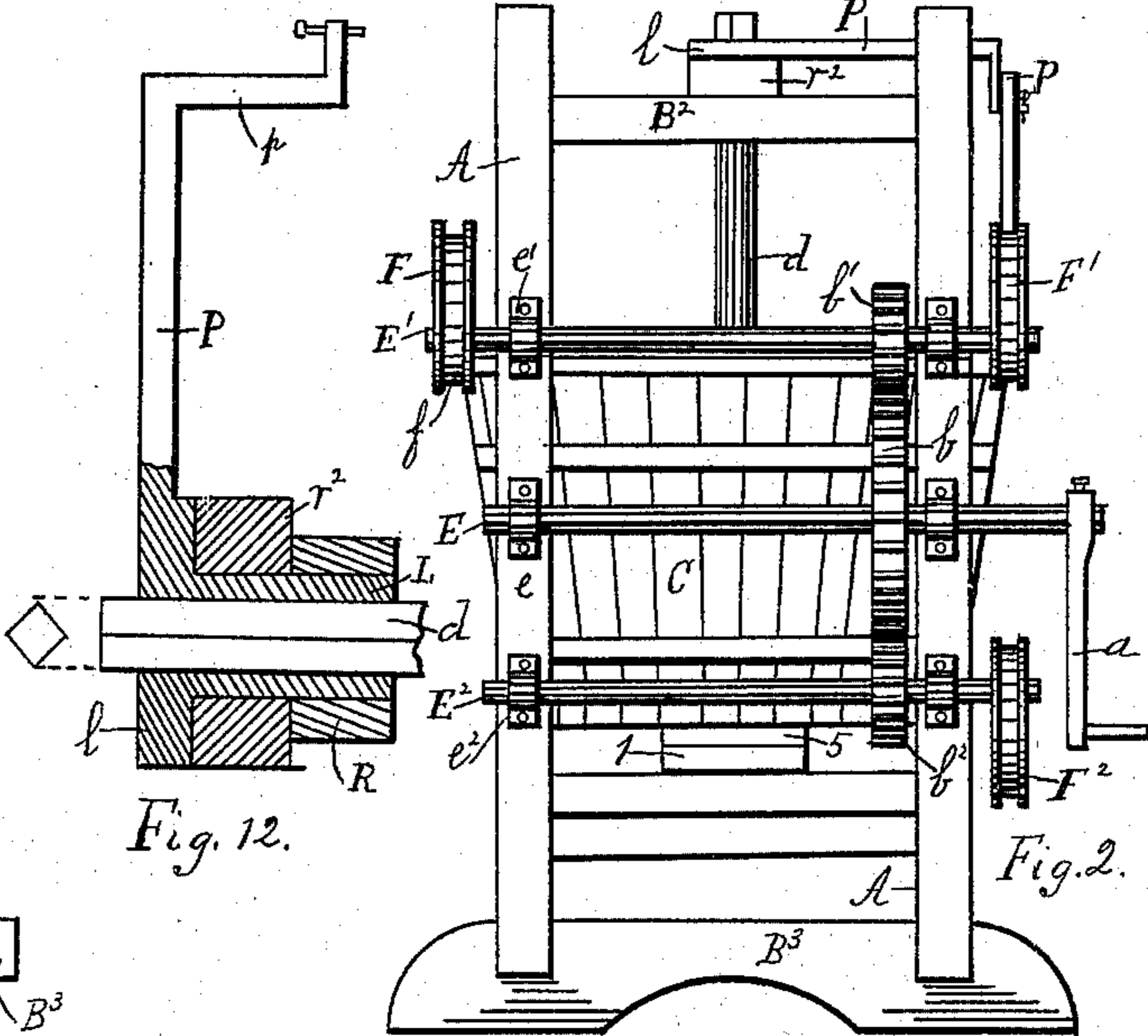
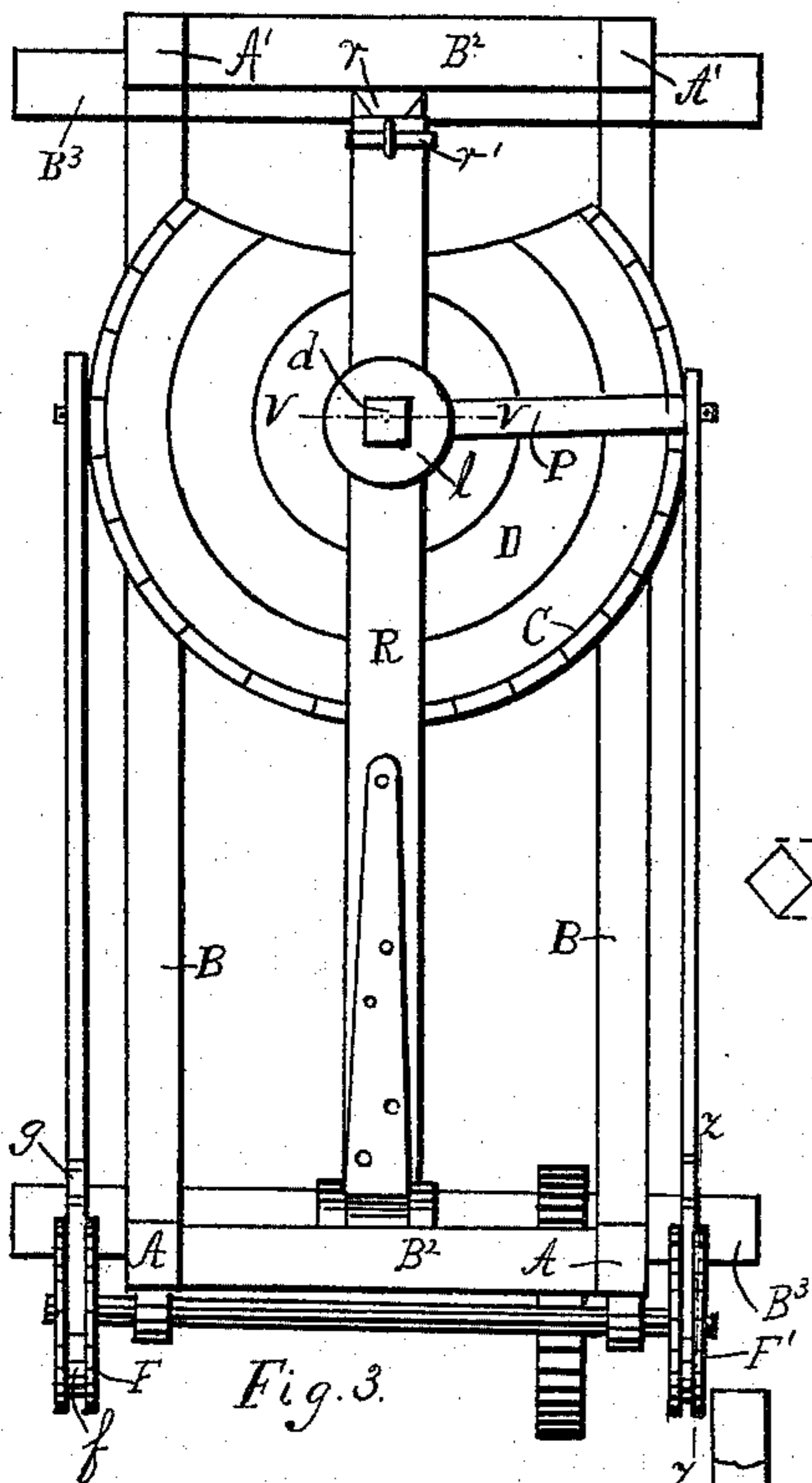


C. BOPP.  
WASHING MACHINE.

No. 535,349.

Patented Mar. 12, 1895.



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(No Model.)

3 Sheets—Sheet 2.

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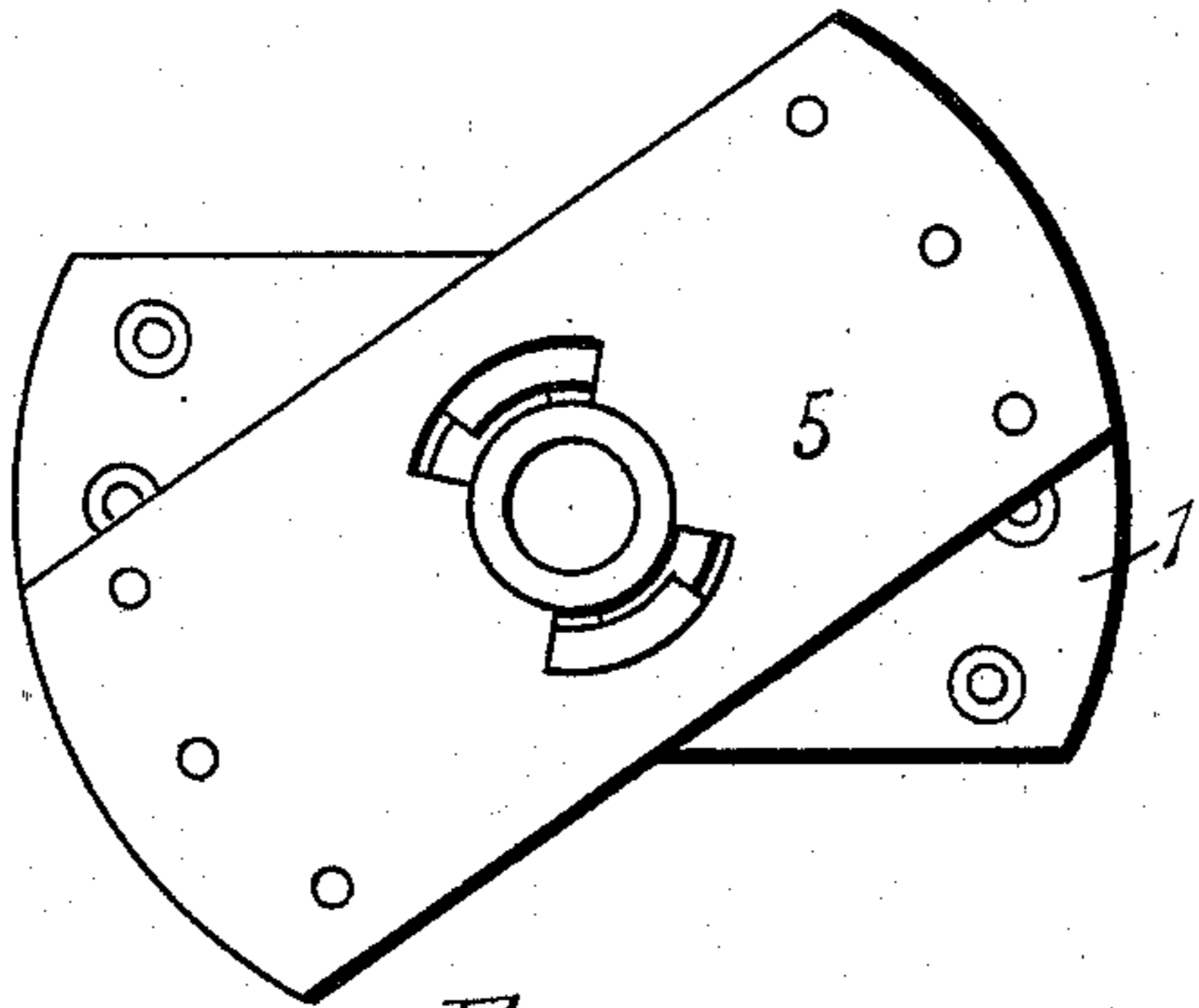


Fig. 4.

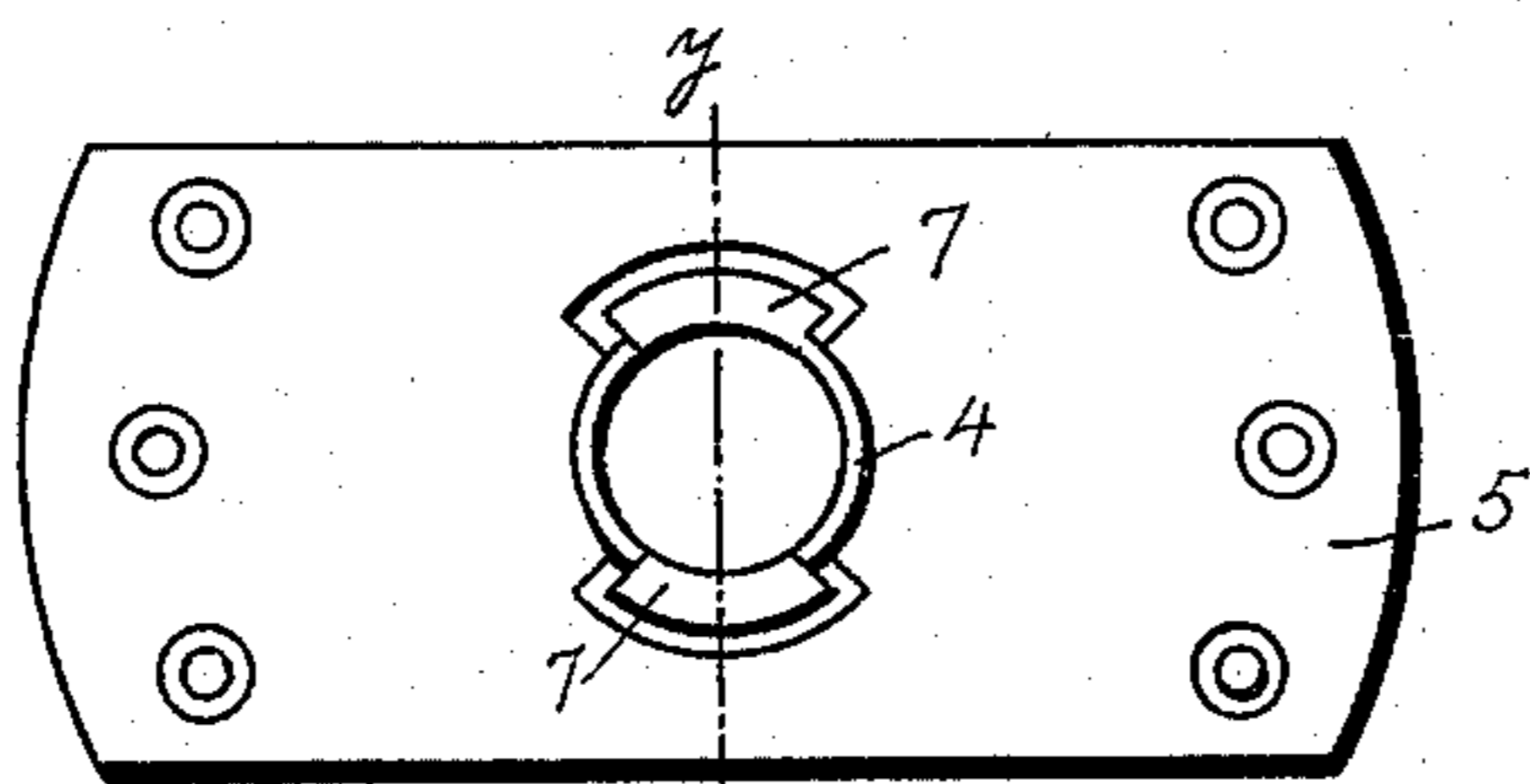


Fig. 6.



Fig. 8.

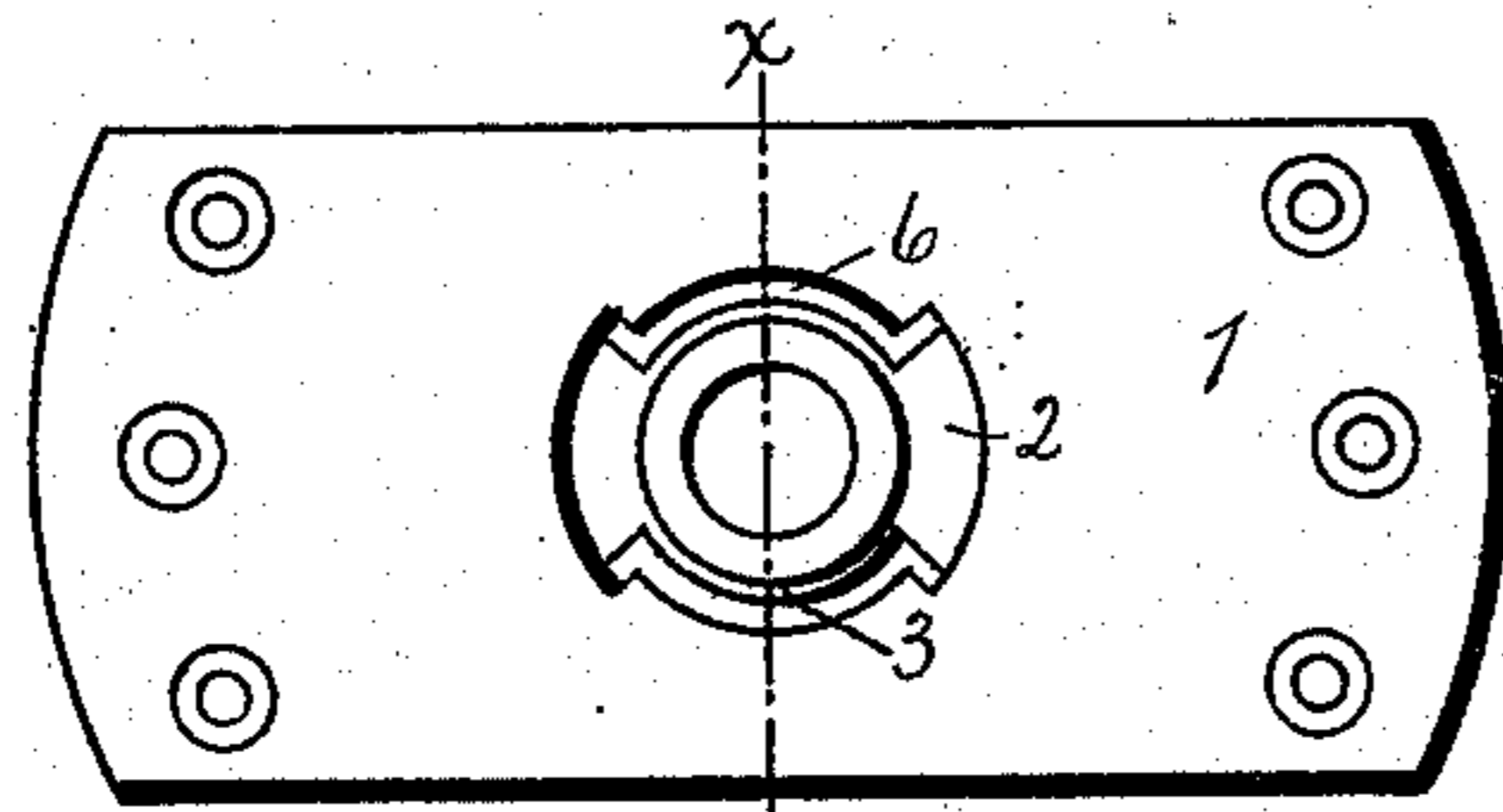


Fig. 5.

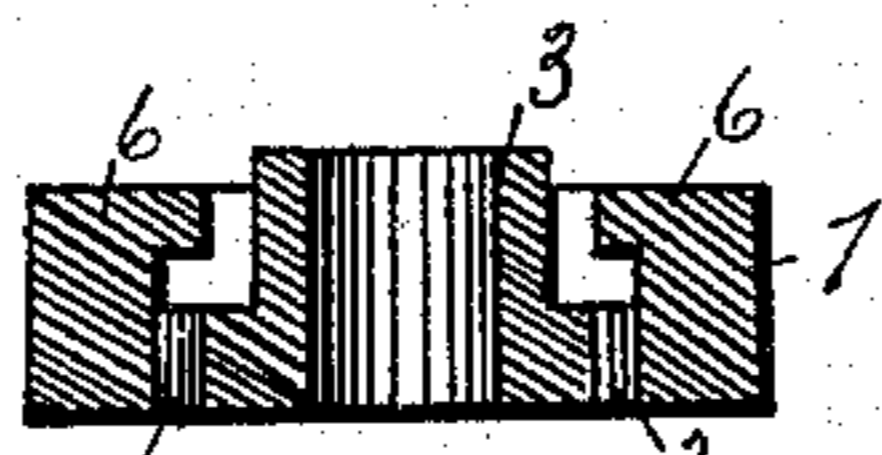


Fig. 7.

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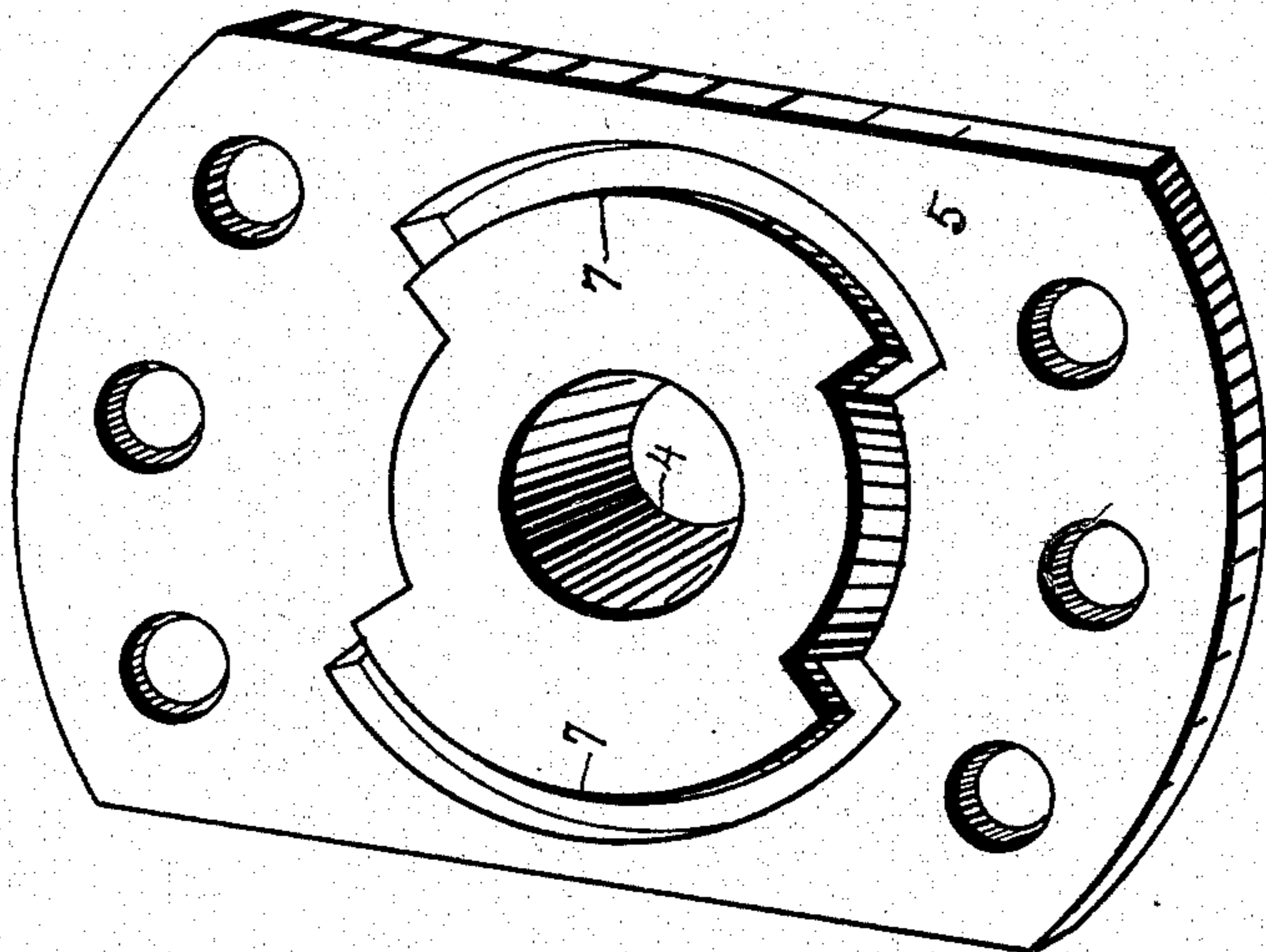


Fig. 10.

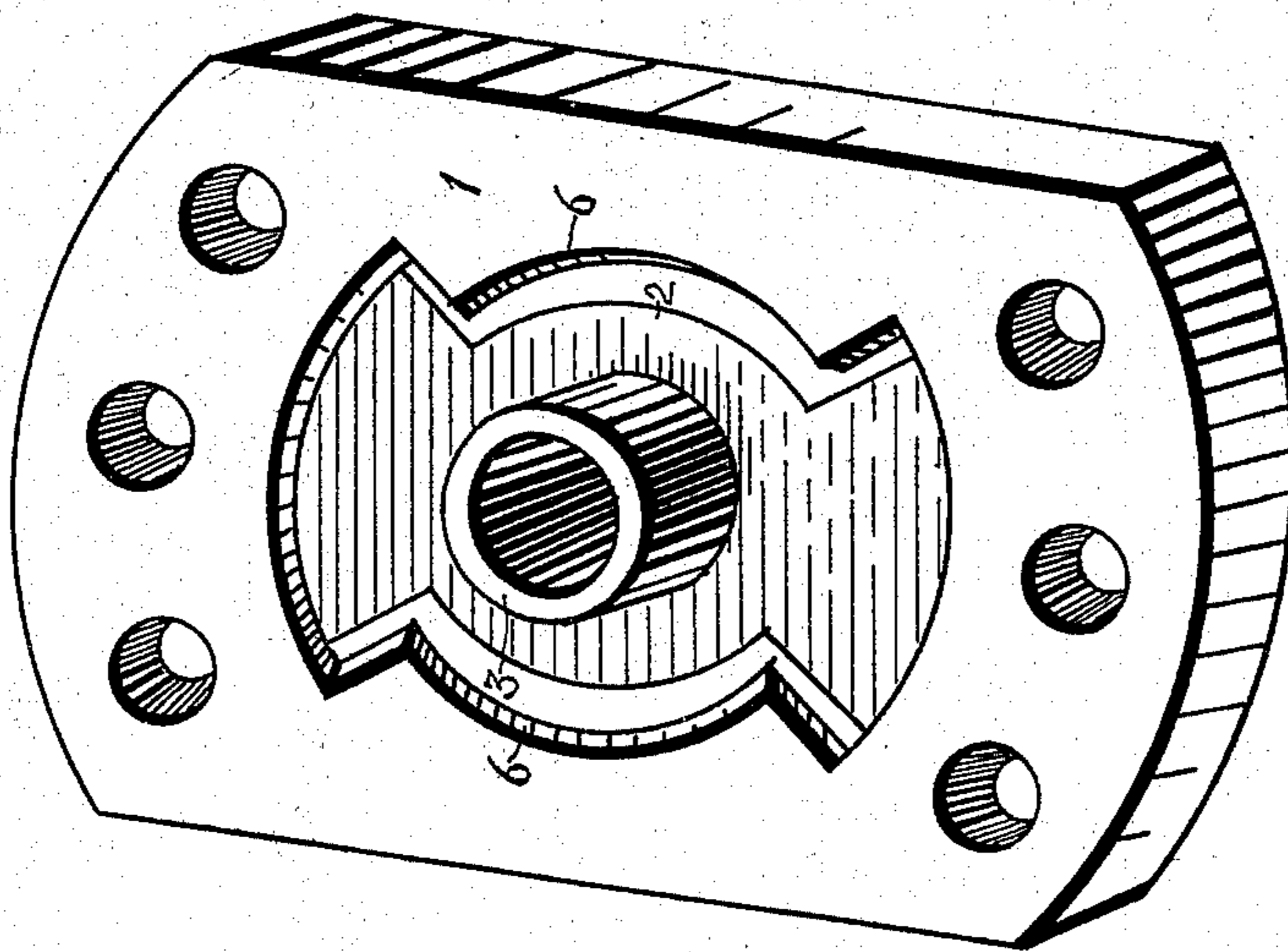


Fig. 9.

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# UNITED STATES PATENT OFFICE.

CHARLES BOPP, OF MOUNT JOY, PENNSYLVANIA.

## WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 535,349, dated March 12, 1895.

Application filed May 24, 1890. Serial No. 353,113. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES BOPP, a citizen of the United States, residing at Mount Joy, in the county of Lancaster and State of Pennsylvania, have invented certain Improvements in Washing-Machines, of which the following is a specification.

This invention relates to improvements in washing machines, and is an improvement on a machine for which Letters Patent No. 421,898 were issued to me by the United States on February 25, 1890; and it consists in the construction and combination of parts as hereinafter fully described and set forth in the claim.

In the accompanying drawings, which form a part of this specification, Figure 1 is an elevation of the right side of my washing machine. Fig. 2 is an end elevation of the same, and Fig. 3 a plan or top view. Fig. 4 is a top view of the bearing-plates showing them fitted together. Fig. 5 is a plan view of the upper face of the lower bearing-plate of the mechanism connecting the tub with the frame, and Fig. 6 a similar view of the lower face of the upper bearing plate. Fig. 7 is a vertical transverse section on the dotted line  $x-x$  of Fig. 5, showing the construction of the lower bearing-plate of said connecting mechanism, and Fig. 8 a similar section on the dotted line  $y-y$  of Fig. 6, showing the construction of the upper bearing-plate of the same mechanism. Fig. 9 is an enlarged top perspective view of the lower bearing-plate, and Fig. 10 a similar bottom perspective view of the upper bearing-plate, the two views showing the construction by which said plates are separably connected. Fig. 11 is a vertical section on the line  $z-z$ , Fig. 3, the front post A being cut away to more fully show the gearing. Fig. 12 is an enlarged vertical section on the line  $v-v$ , Fig. 3, showing the connection between the cross-bar R and shaft  $d$ .

Similar letters and figures indicate like parts throughout the several views.

Referring to the details of the drawings, A indicates the posts at the head of the frame and A' those at the foot; B, the horizontal side beams; B', the lower central horizontal beam; B<sup>2</sup>, the horizontal end beams; and B<sup>3</sup>, the bases supporting the posts.

C represents the tub; D, a rubbing disk

adapted to be rotated in the tub and adjustable automatically therein; and  $d$ , the vertical shaft of the rubber.

E, E', E<sup>2</sup> are shafts journaled in bearings  $e, e', e^2$ , attached to the outer faces of posts A, at the head of the frame. The center shaft E extends beyond the post on one side of the frame and has a crank-handle,  $a$ , attached to said extended end and a cog-wheel,  $b$ , secured thereto between the posts. Shaft E', above, and shaft E<sup>2</sup>, below shaft E are also provided with cog-wheels,  $b'$  and  $b^2$  respectively, of less diameter than the cog  $b$ , and which mesh therewith. Both shafts E' and E<sup>2</sup> extend beyond the post on the side of the frame on which the crank  $a$  is located, and have eccentrics F' F<sup>2</sup>, respectively, mounted thereon. The shaft E' also extends beyond the post on the side of the frame opposite to that on which the eccentric F' is located, and has attached to said extended end an eccentric F.

The eccentrics F, F' and F<sup>2</sup> are respectively surrounded by the loose rings  $f, f'$  and  $f^2$ , which are provided with tongues  $g, g'$  and  $g^2$ , that are secured in slots in connecting-rods G, G' and G<sup>2</sup>. Of these rods, G is pivotally attached to the top of the tub on one side and G<sup>2</sup> to the bottom on the other side, while the rod G' is attached in the same manner to the lever P, hereinafter described.

To the inner face of the end beam B<sup>2</sup>, connecting the upper ends of the posts A, there is hinged, centrally between those posts, a cross-bar R, the free end of which is detachably connected with a lip  $r$ , secured to the inner face of the end beam B<sup>2</sup> which connects the upper ends of the foot-posts A' by a hinged ring  $r'$ , shown in engagement with the lip in full lines in Fig. 1, and disengaged therefrom in dotted lines.

Above the center of the tub there is a boss,  $r^2$ , formed on the cross-bar R, which is perforated to receive the sleeve L. The sleeve L passes through the perforation in the cross-bar R and is adapted to rotate therein. It is supported by an annular flange,  $l$ , formed on the periphery of its upper end, from which the lever P projects outward, having a hanger,  $p$ , on the end thereof to which the connecting-rod G is pivotally attached. The shaft  $d$  is rectangular in cross-section and passes up through a correspondingly shaped opening

through the sleeve L. The shaft *d* of the disk D moves vertically through the opening in the sleeve L, so that the disk D can adjust itself automatically to the quantity of clothing in the tub.

The bulge of the eccentrics F and F<sup>2</sup>, located on opposite sides of the machine, are so adjusted with reference to each other that when the shafts revolve they act upon the tub in opposite directions so as to operate together to oscillate it upon its center; and the bulge of the eccentric F' is arranged to oscillate the rubbing disk in a direction opposite to the oscillations of the tub.

In the machine on which this invention is an improvement, before referred to, the cog-gearing is the same as that herein described, but is placed outside of instead of between the posts, and the shafts carrying the cog-wheels are crank-shafts, the cranks being placed between the posts. This arrangement produces a vertical movement of the ends of the connecting-rods attached to the cranks equal to twice the depth of the cranks. This, with the rotary movement of the cranks, transmits an uneven and jerky motion to the tub and rubber disk. The use of eccentrics having rings by which they are attached to the connecting-rods avoids the vertical movement of the connecting-rods caused by the cranks and gives to the tub and rubber disk a smooth and even movement, which is found to be a great improvement on the old machine, not only allowing it to be worked with less exertion and fatigue on the part of the operator, but also with less wear and strain on the machine. The present construction, likewise, permits the disk to be raised out of the tub without detaching the connecting-rod G' from the lever P, as shown by the dotted lines in Fig. 1, which was necessary in the old machine.

The mechanism by which the bottom of the tub is connected with the frame consists of two bearings, the upper one of which is secured to the tub and the lower supported by the horizontal beams B. The lower bearing 1, has an opening cut in the center and a thin plate, 2, extending lengthwise across the bottom of said opening, in the center of which there is located a hub 3, which is formed integral therewith and extends upward through a sleeve, 4, in the upper bearing 5, the top of the hub 3 being flush with the top surface of the upper bearing. On the upper sides of the lower bearing there are formed inwardly pro-

jecting lips 6, between which and the plate 2 there is left a groove or channel. The upper bearing 5 is of the same length and width as the lower bearing and has a sleeve, 4, which engages over the hub 3. On the lower end of this sleeve there are formed two lips or flanges 7, which extend outward toward the sides of said bearing 5, a sufficient space being left between the bearing 5 and the flanges 7 to receive the lips 6, of the bearing 1, the groove or channel between the lips 6 and plate 2 also being adapted to receive the lips 7.

In fitting the parts together, the upper bearing is placed transversely across the lower, the lips or flanges 7 being received in the ends of the opening in the lower bearing, and the sleeve 4 engaging the hub 3. The upper bearing is then turned, when the lips or flanges 7 engage beneath the lip 6 of the lower bearing. The two bearings are so connected with the tub and frame that the lips of the bearings remain in engagement with each other during the oscillations of the tub. When the tub is to be removed from the frame the connecting rods are detached from the tub and the latter turned so as to bring the upper bearing into a position at right angles with the lower. The inner edges of the lips 6 and the ends of the opening in the lower bearing are concave in shape to receive the sleeve 4 and flanges 7, of the upper bearing, the outer edges of which are correspondingly convex. This construction of the bearings is of great advantage, as it steadies the movement of the tub and prevents rocking of the same as it is oscillated back and forth.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a washing-machine, the combination, with the frame and an oscillating tub, of a base-plate secured to the frame and having an elongated recess therein, a hub in the center and a groove extending along the side walls of the recess, and an upper plate secured to the tub and having a sleeve constructed to fit over said hub, and elongated lateral flanges on the bottom of the upper plate, said flanges, when the parts are in their normal position, engaging said groove in the walls of the base-plate transversely of said base-plate, substantially as and for the purpose specified.

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Witnesses:

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