

No. 751,745.

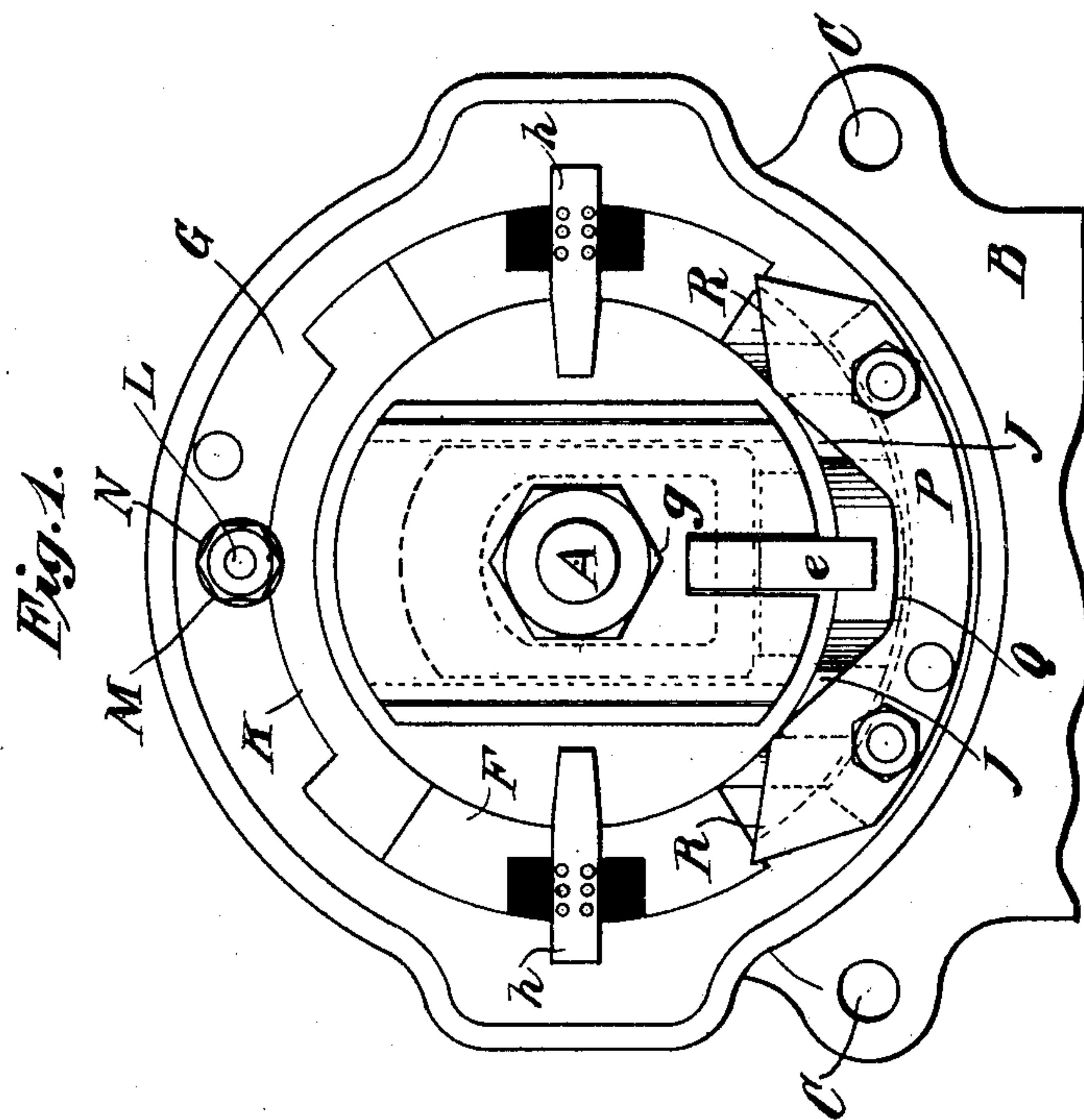
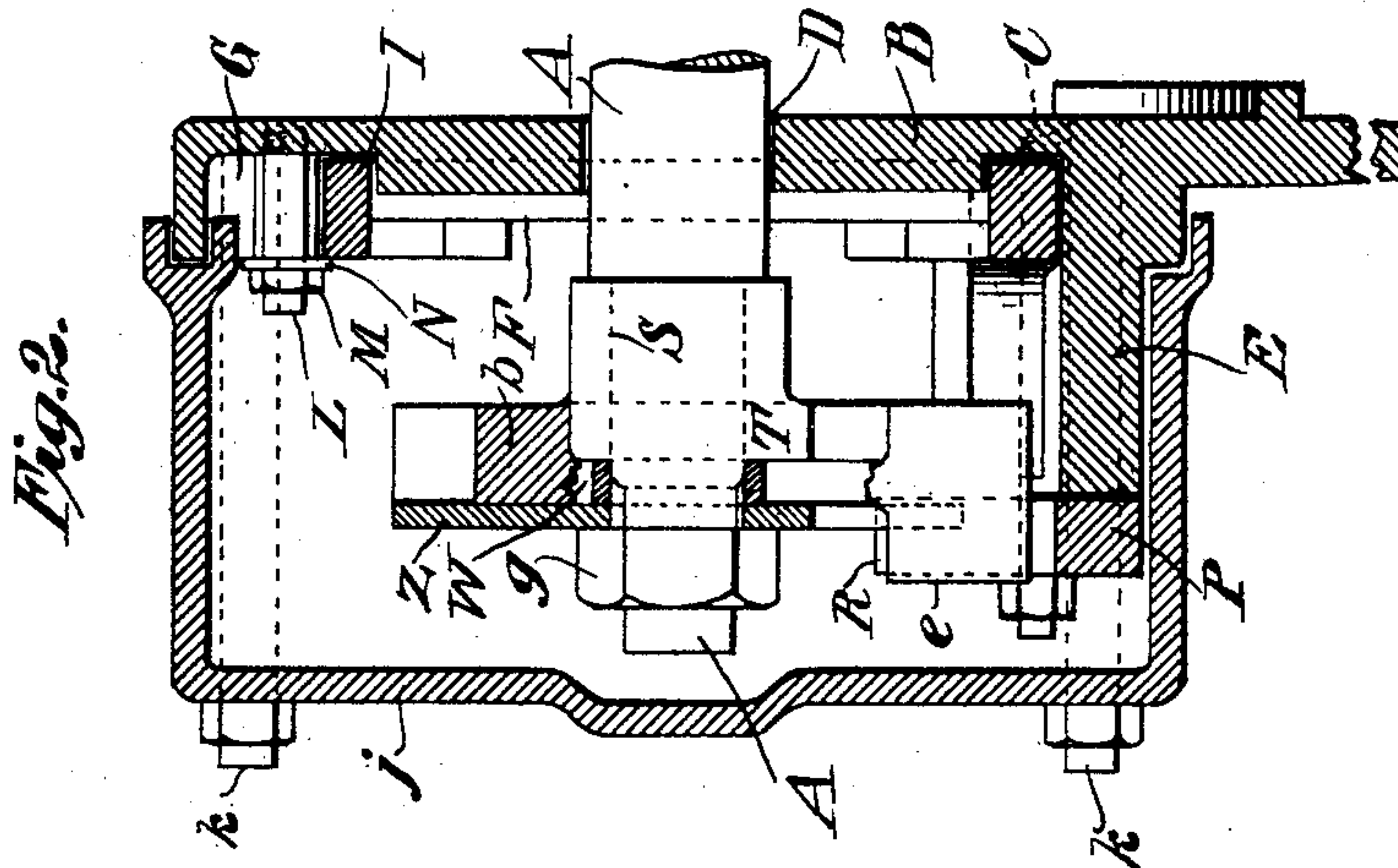
PATENTED FEB. 9, 1904.

M. MOSKOWITZ.
AUTOMATIC SWITCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses
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4 SHEETS—SHEET 2.

Fig. 3.

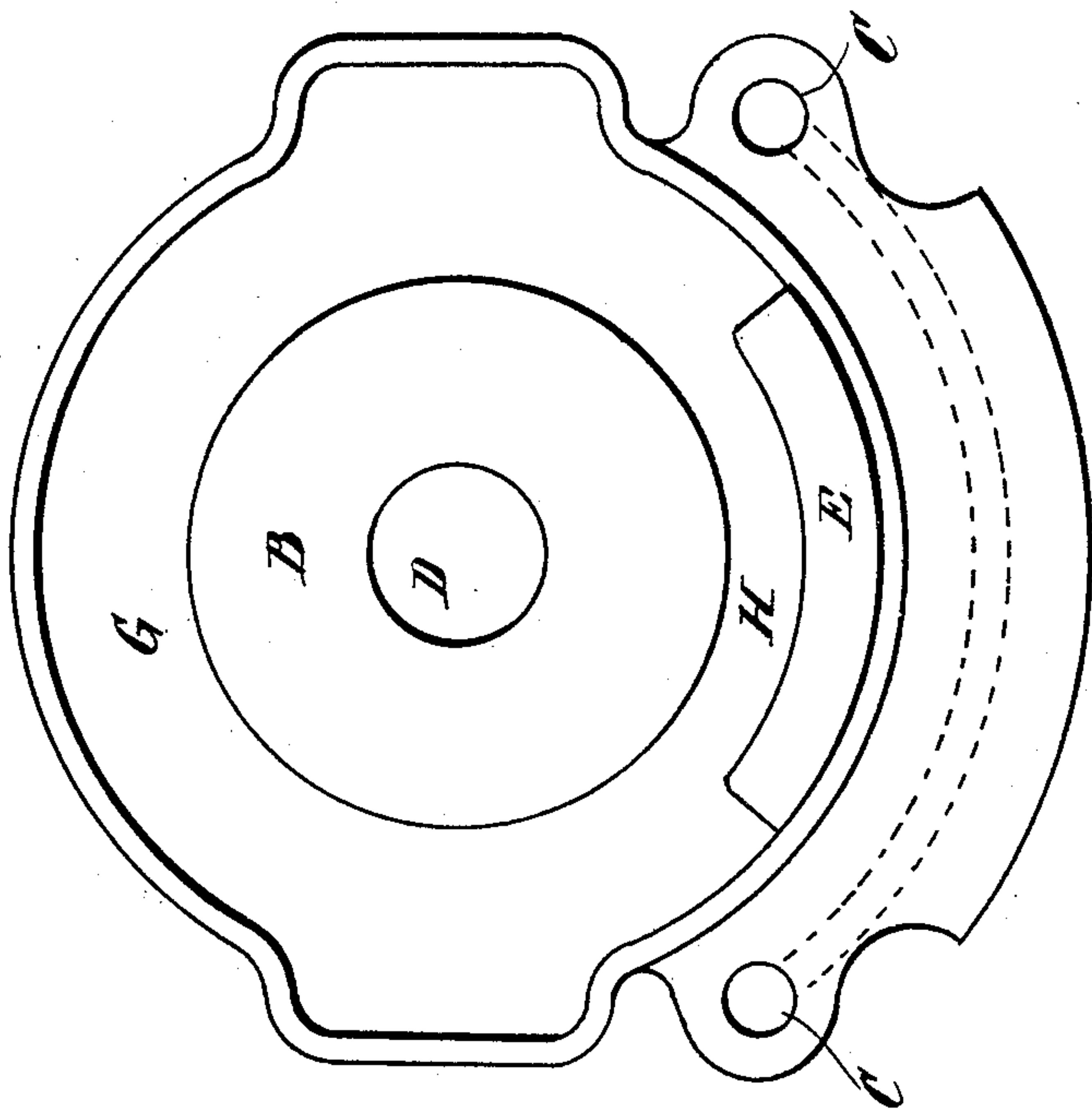
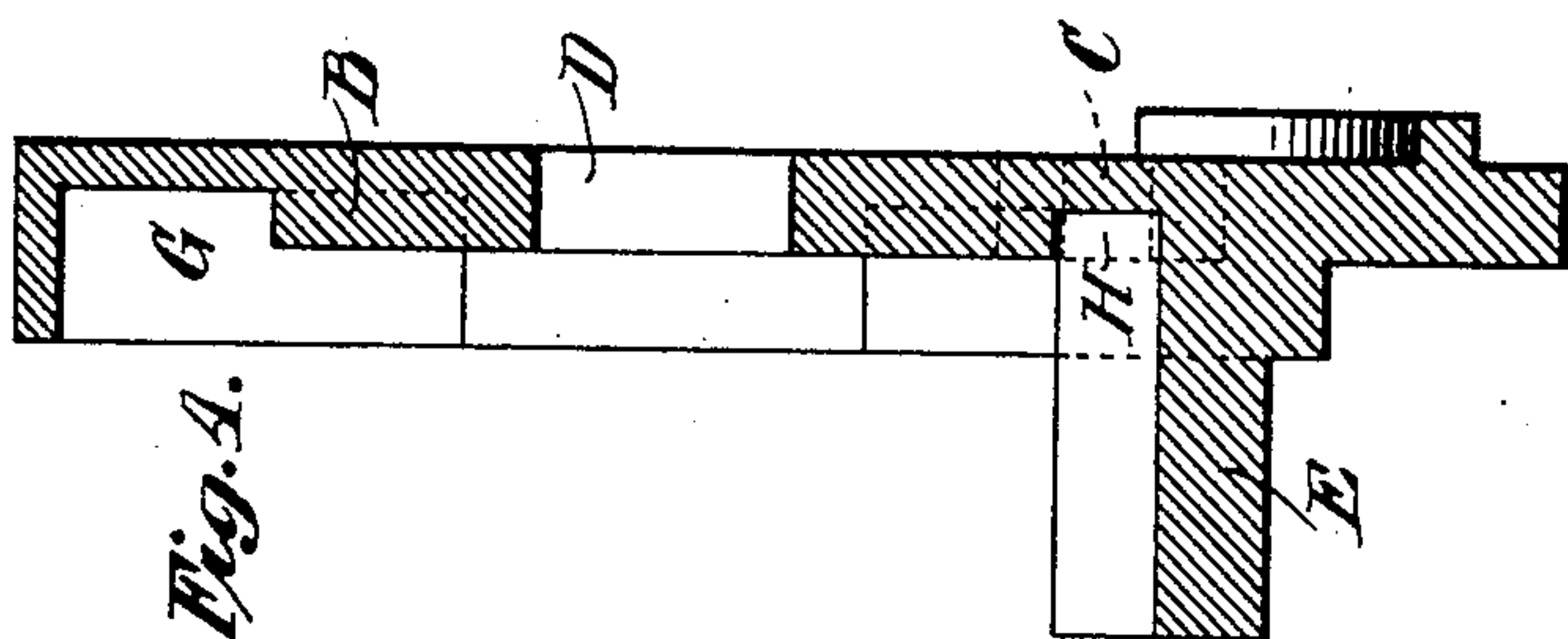


Fig. A.



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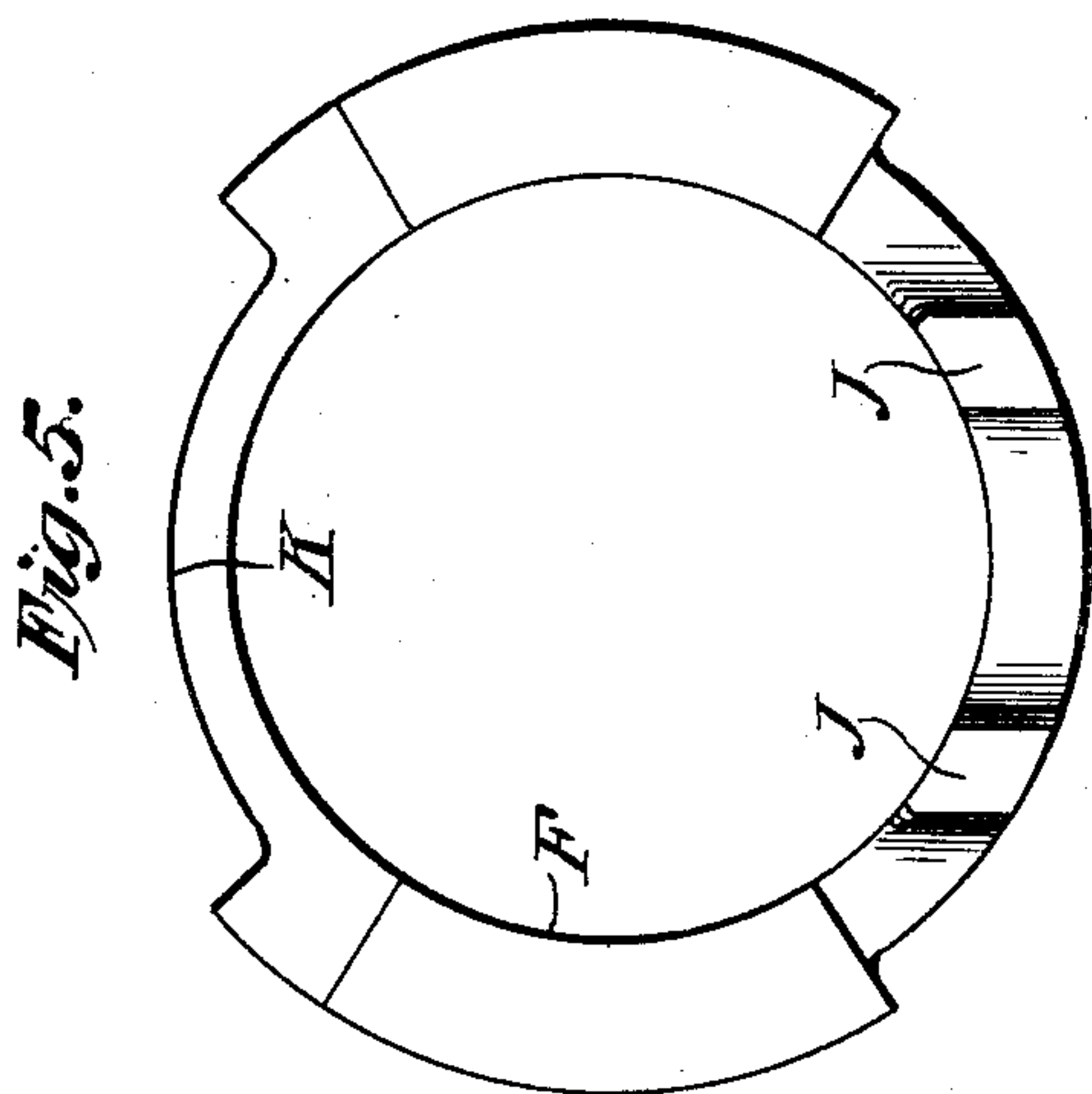
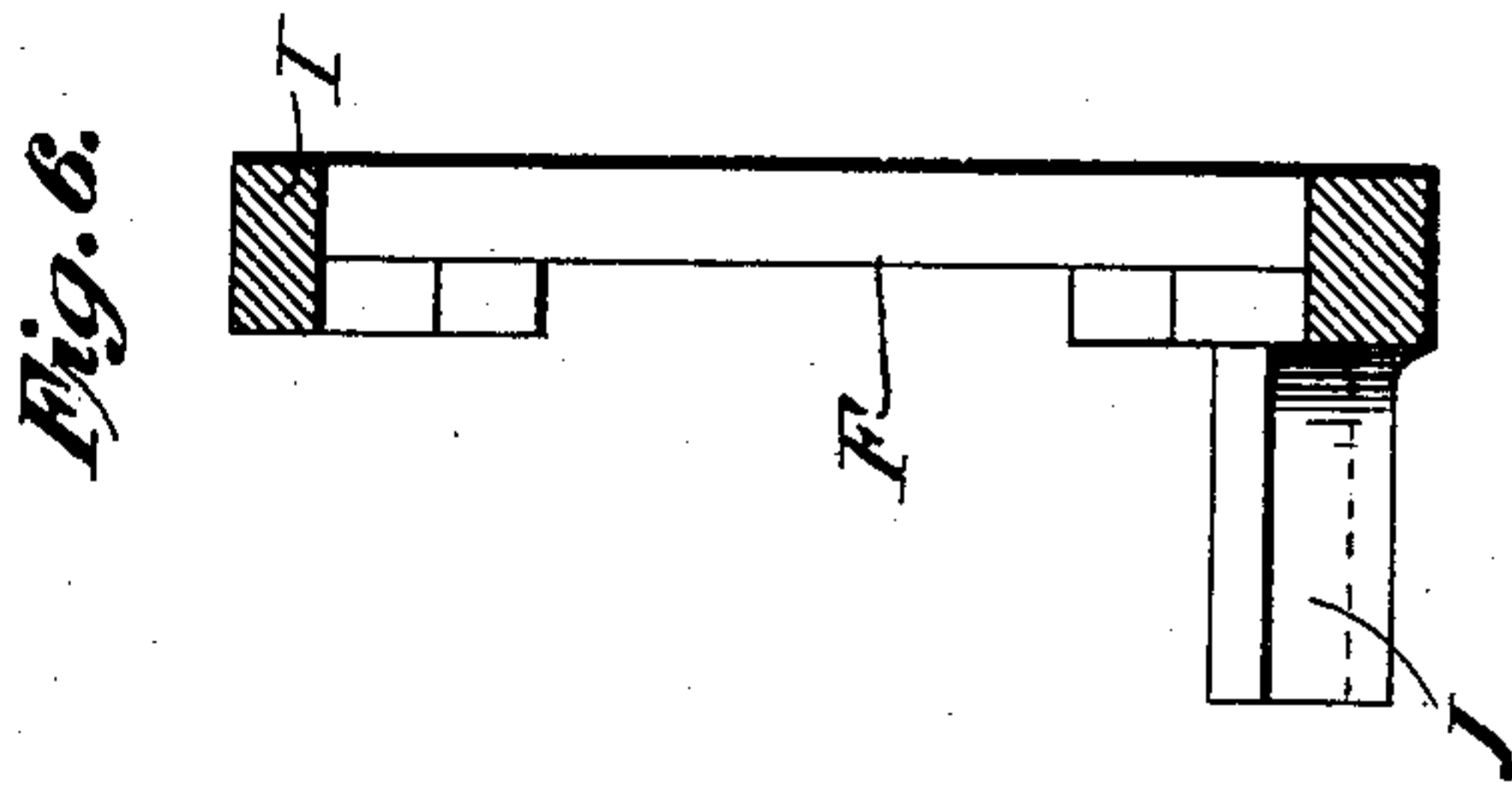
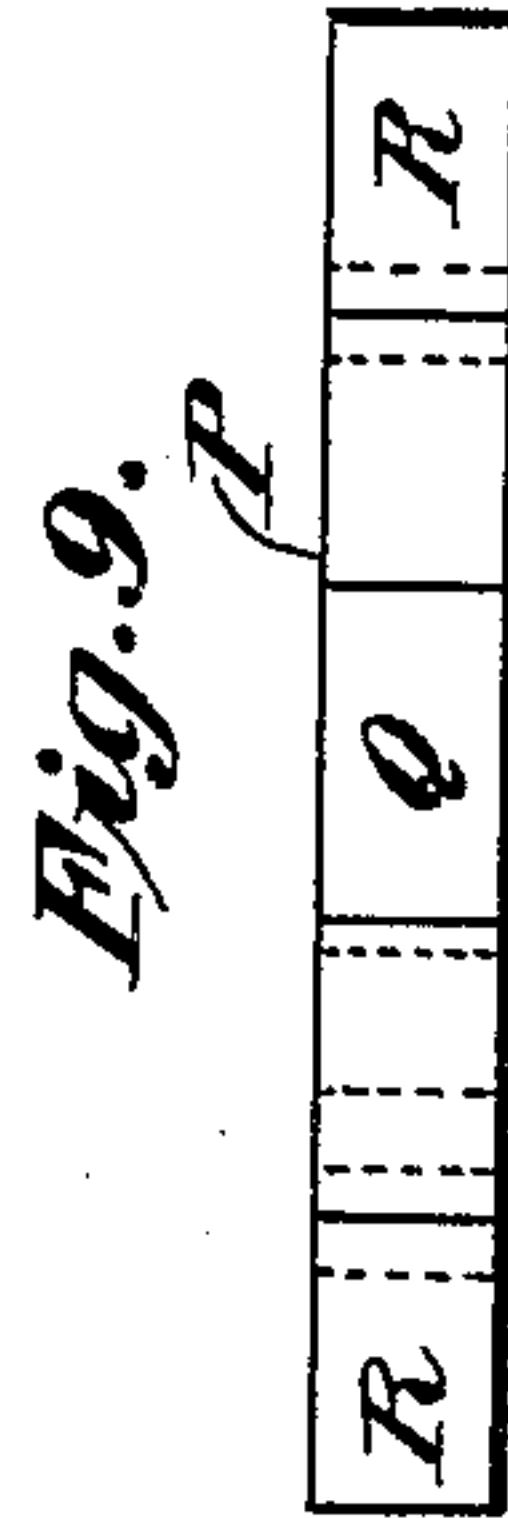
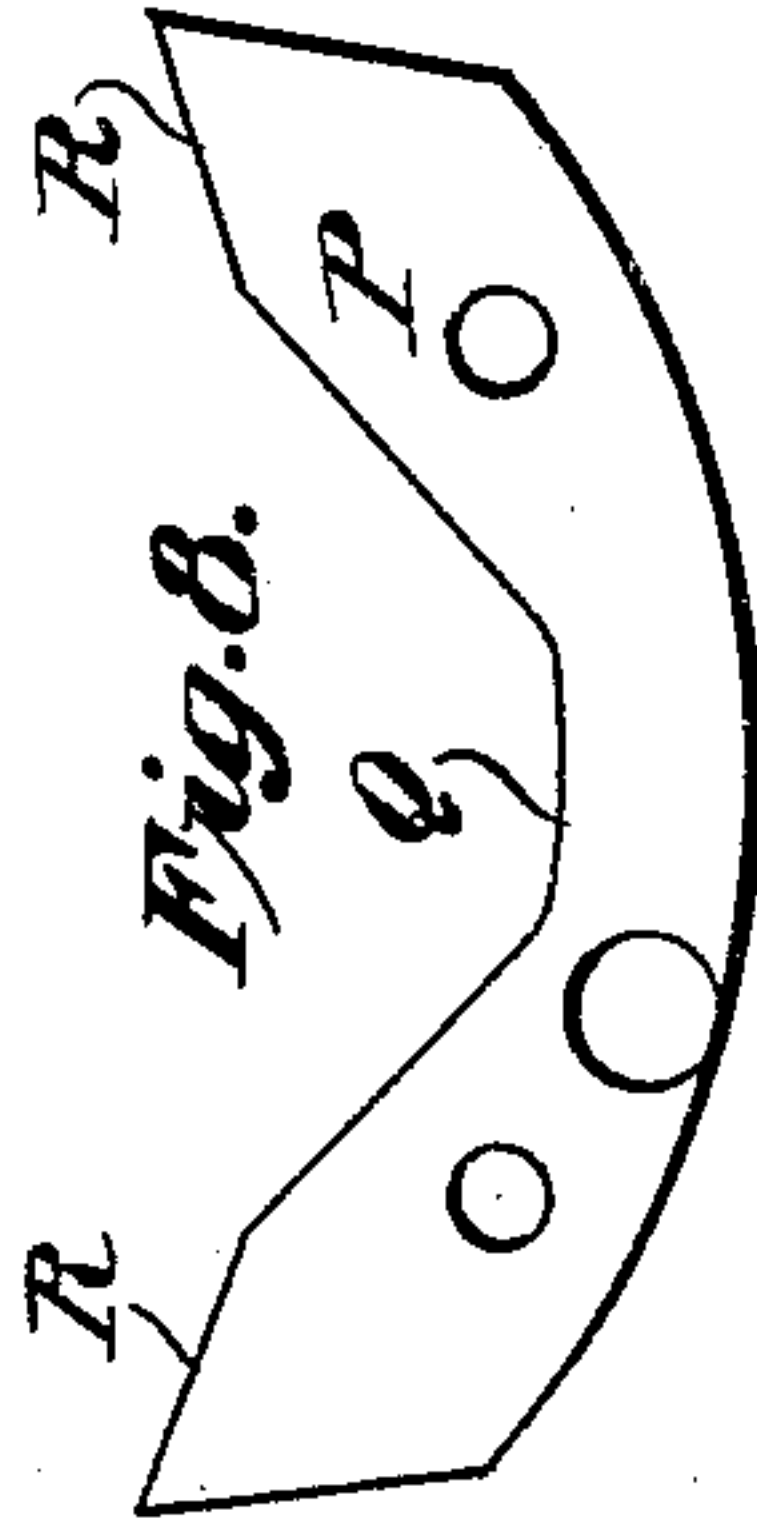
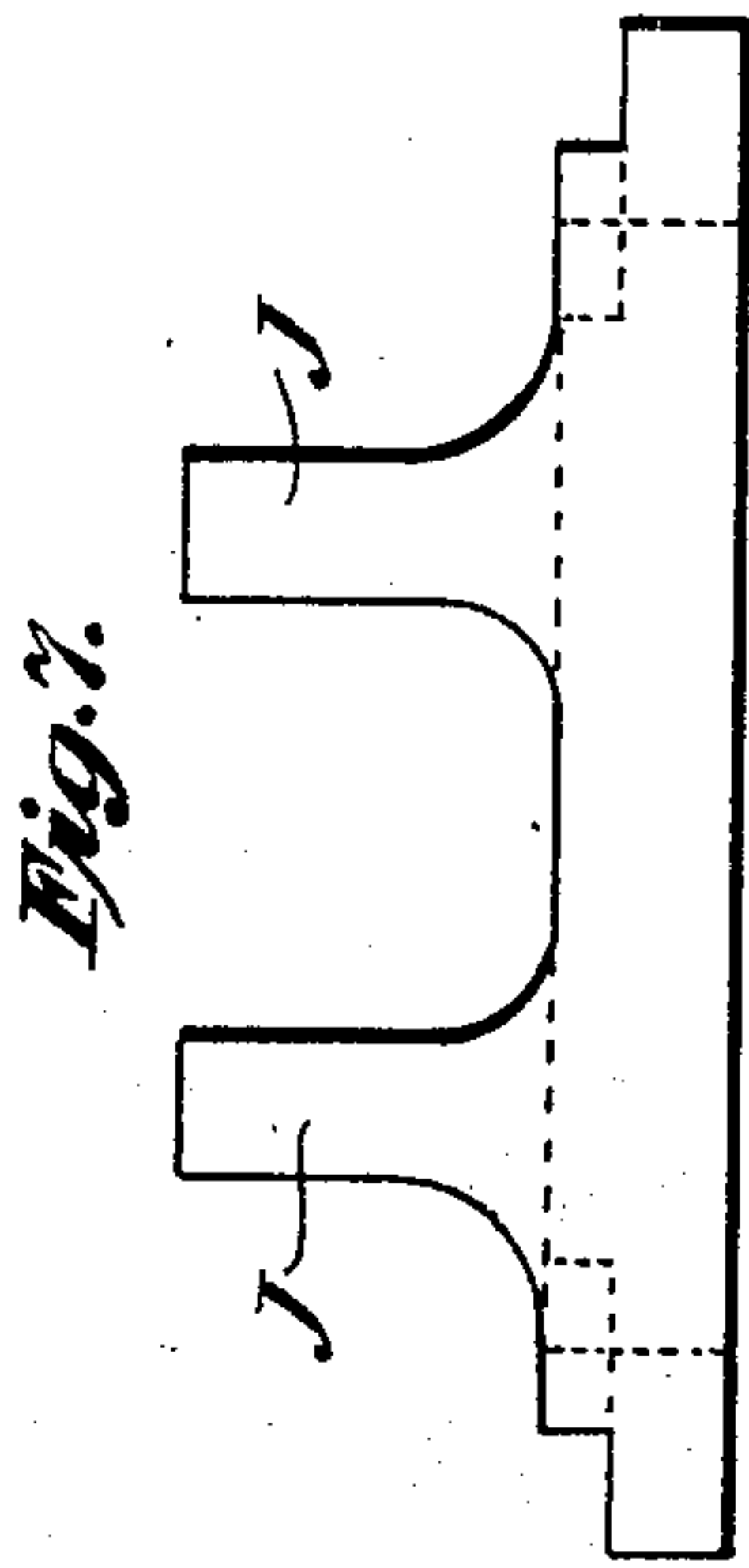
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

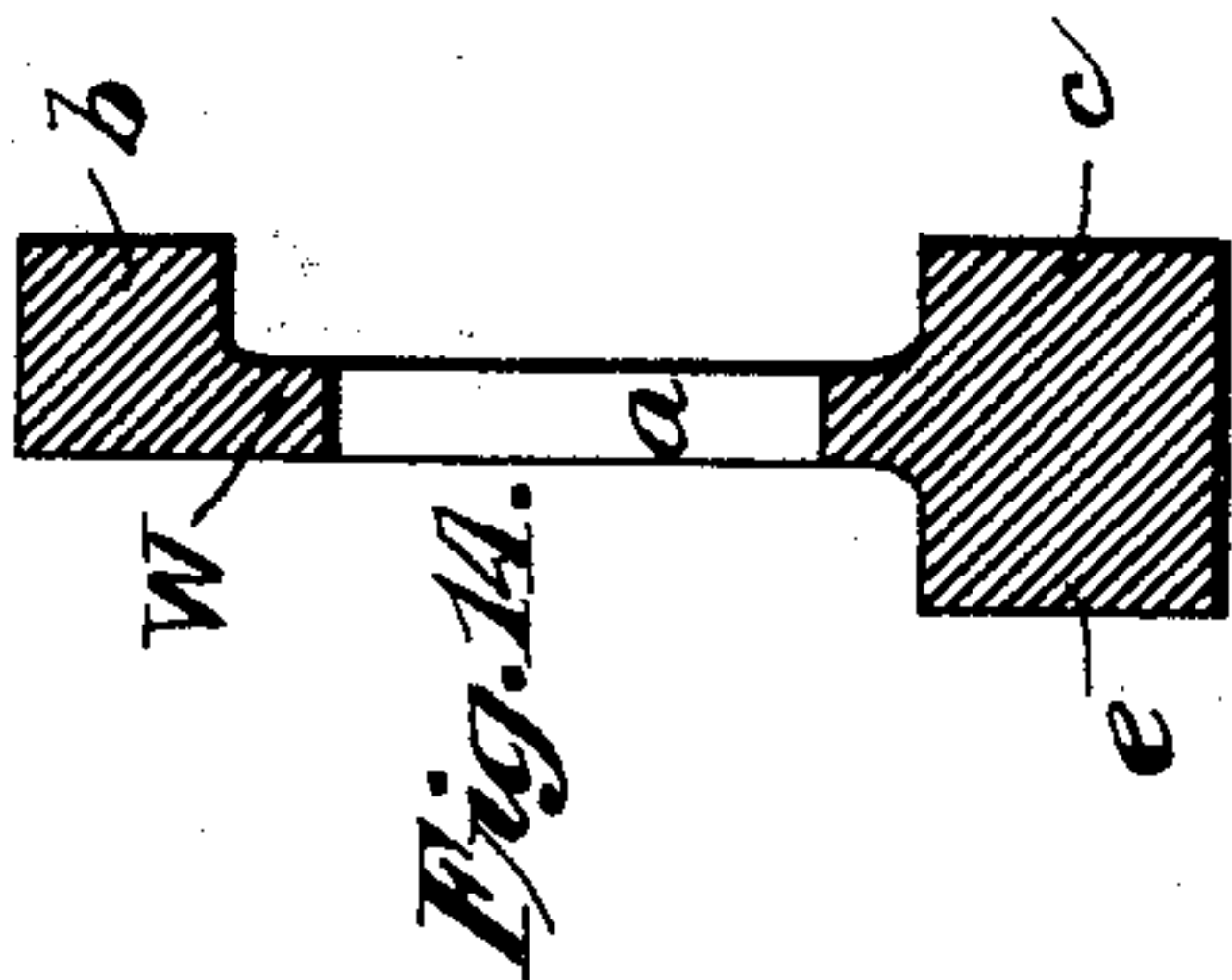


Fig. 14.

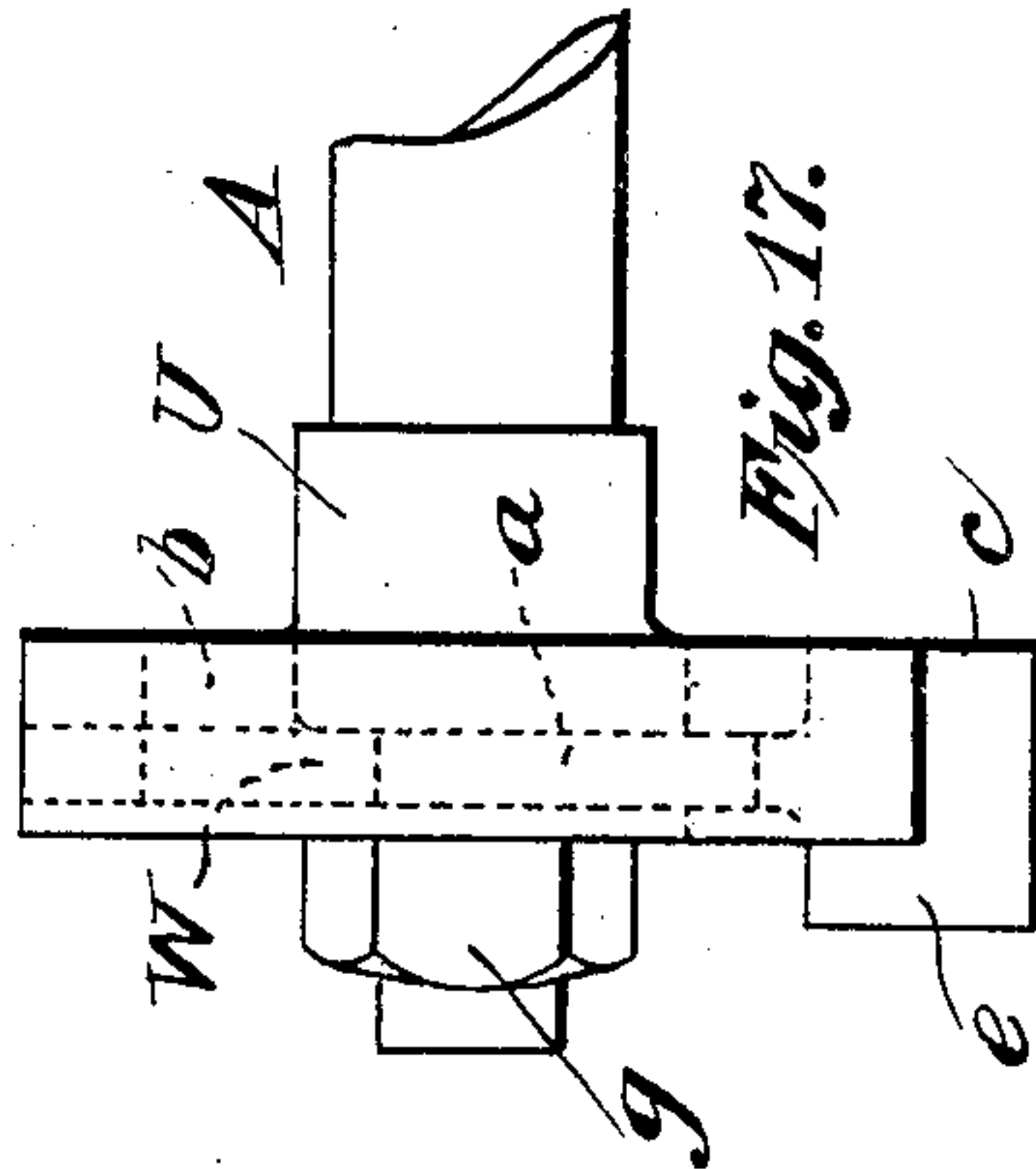


Fig. 17.

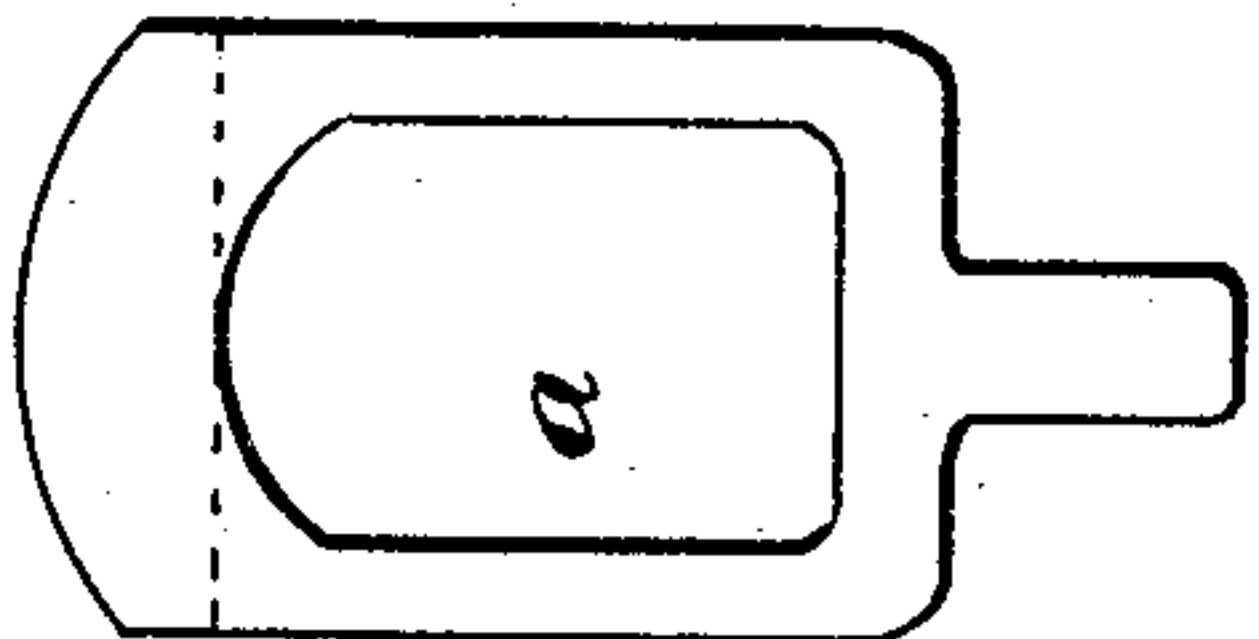


Fig. 13.

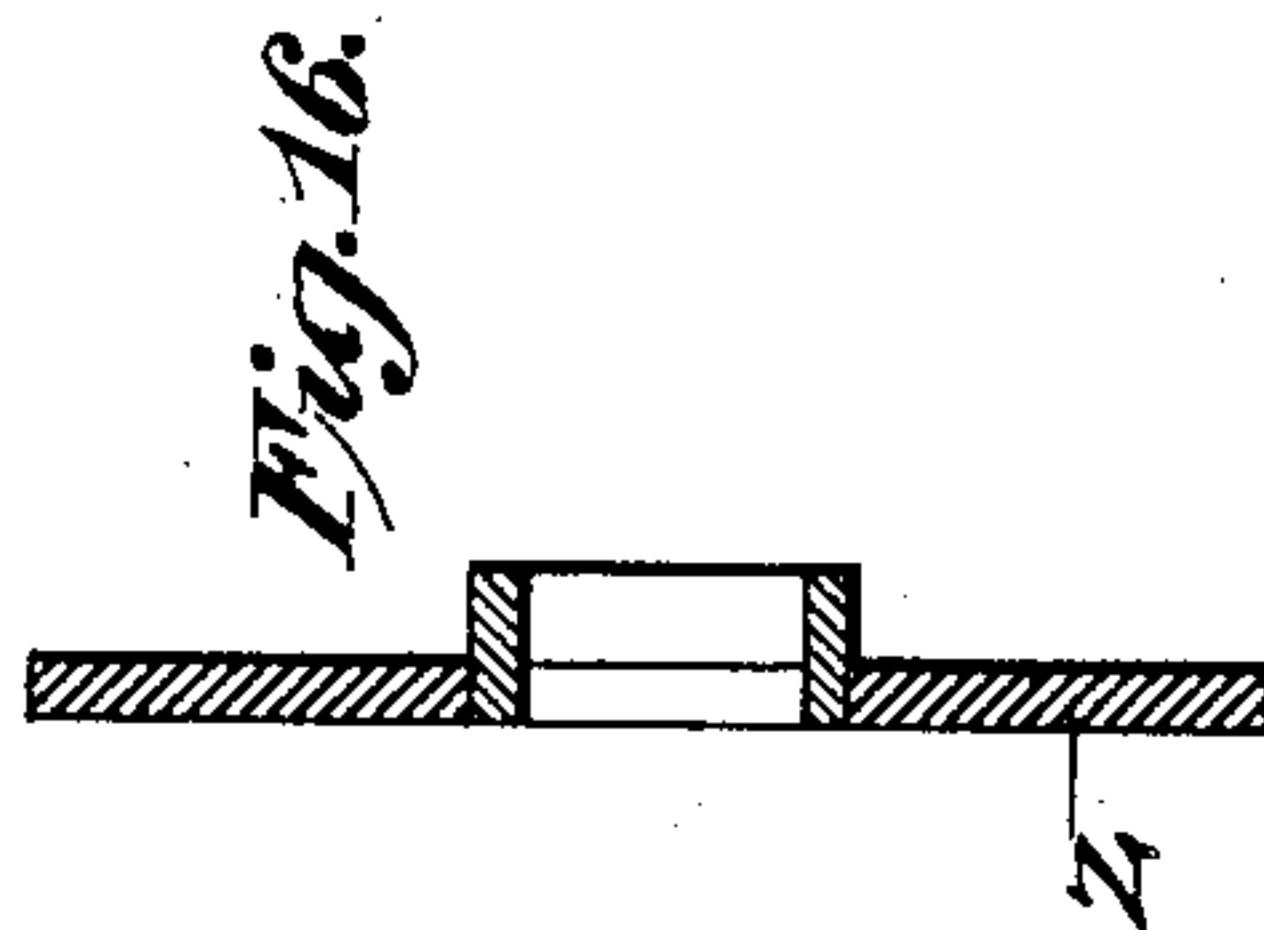


Fig. 16.

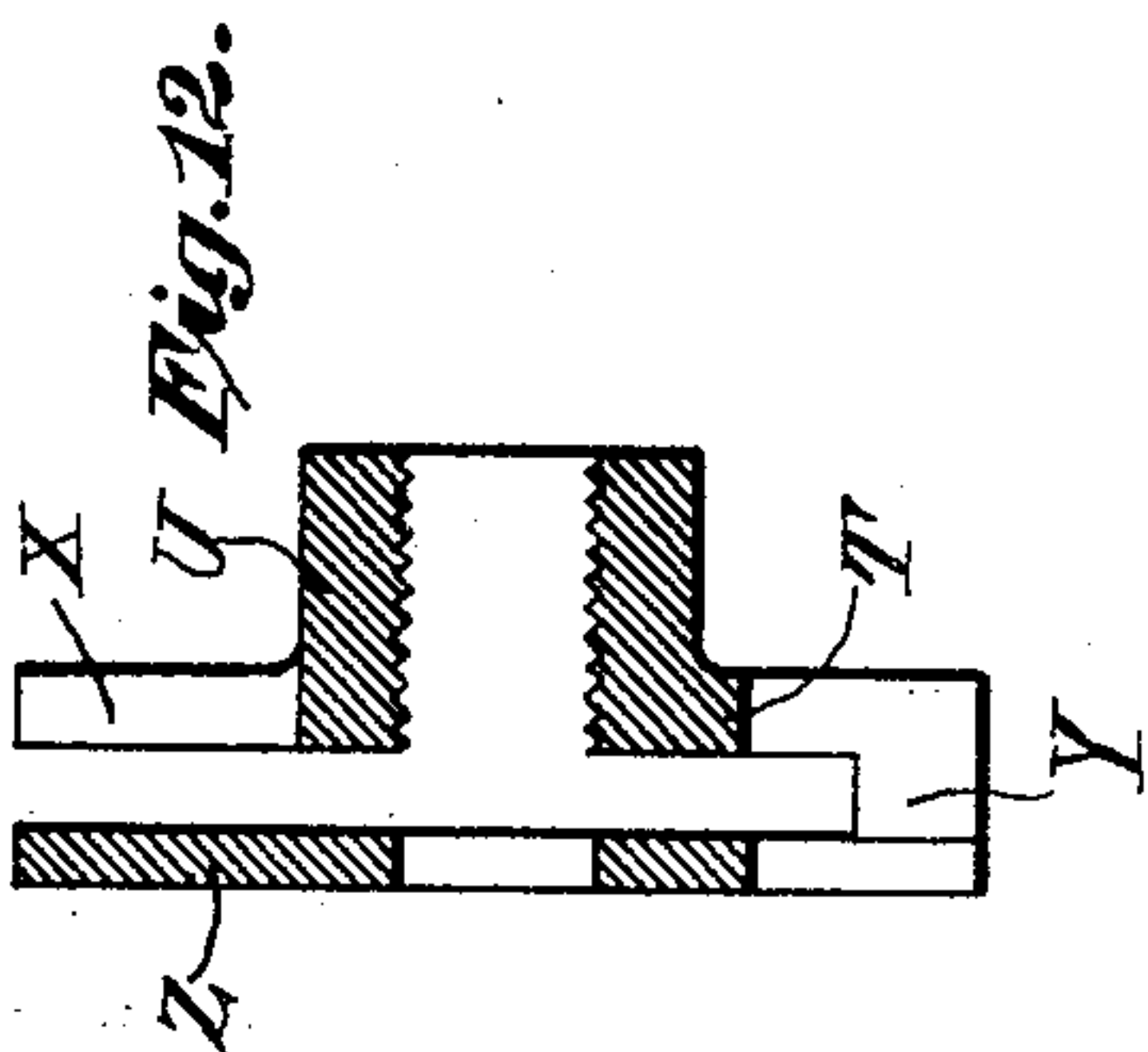


Fig. 12.

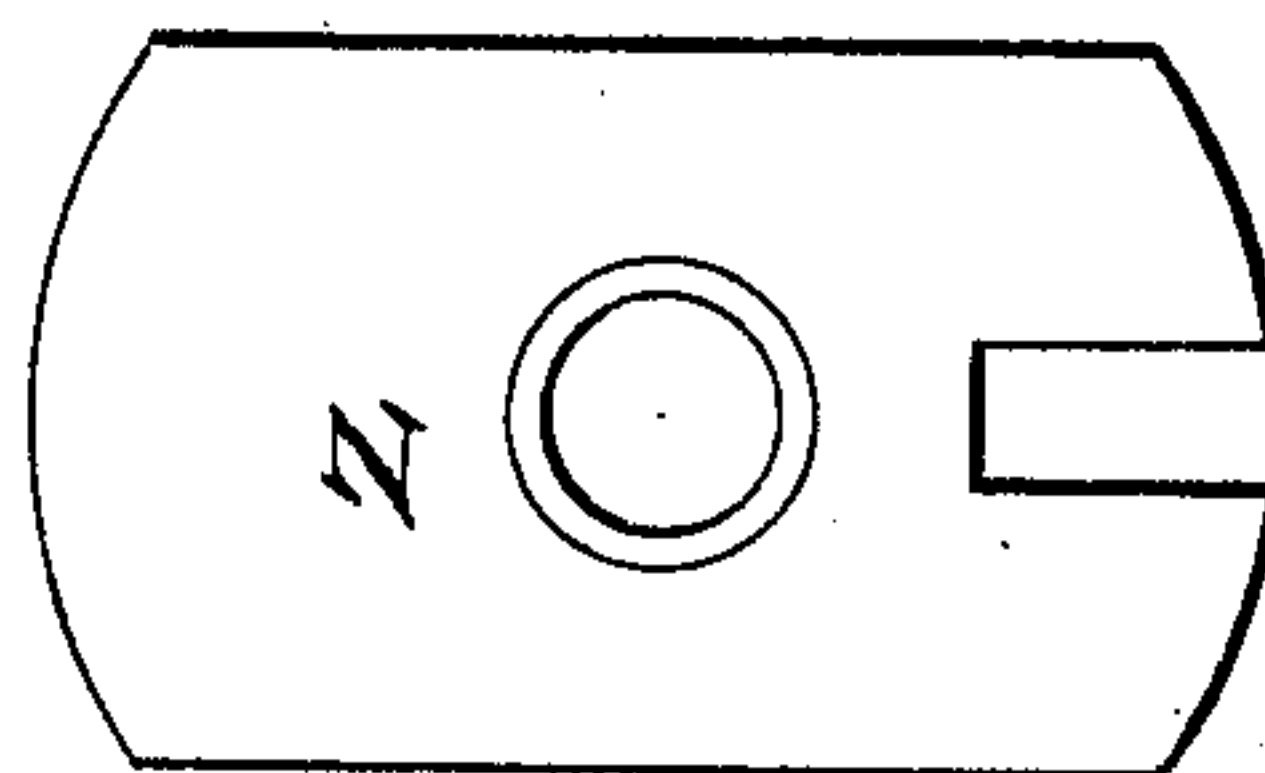


Fig. 15.

Fig. 10.

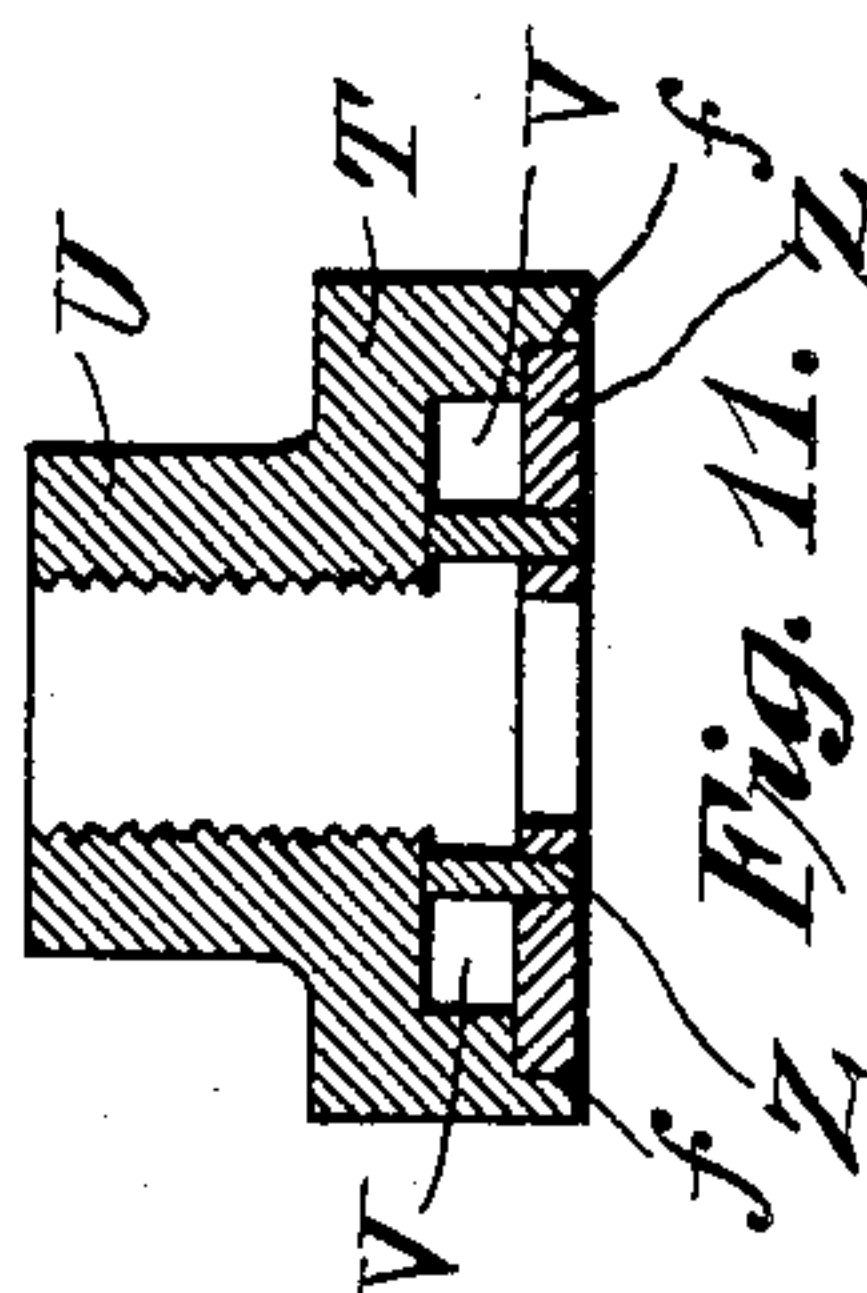
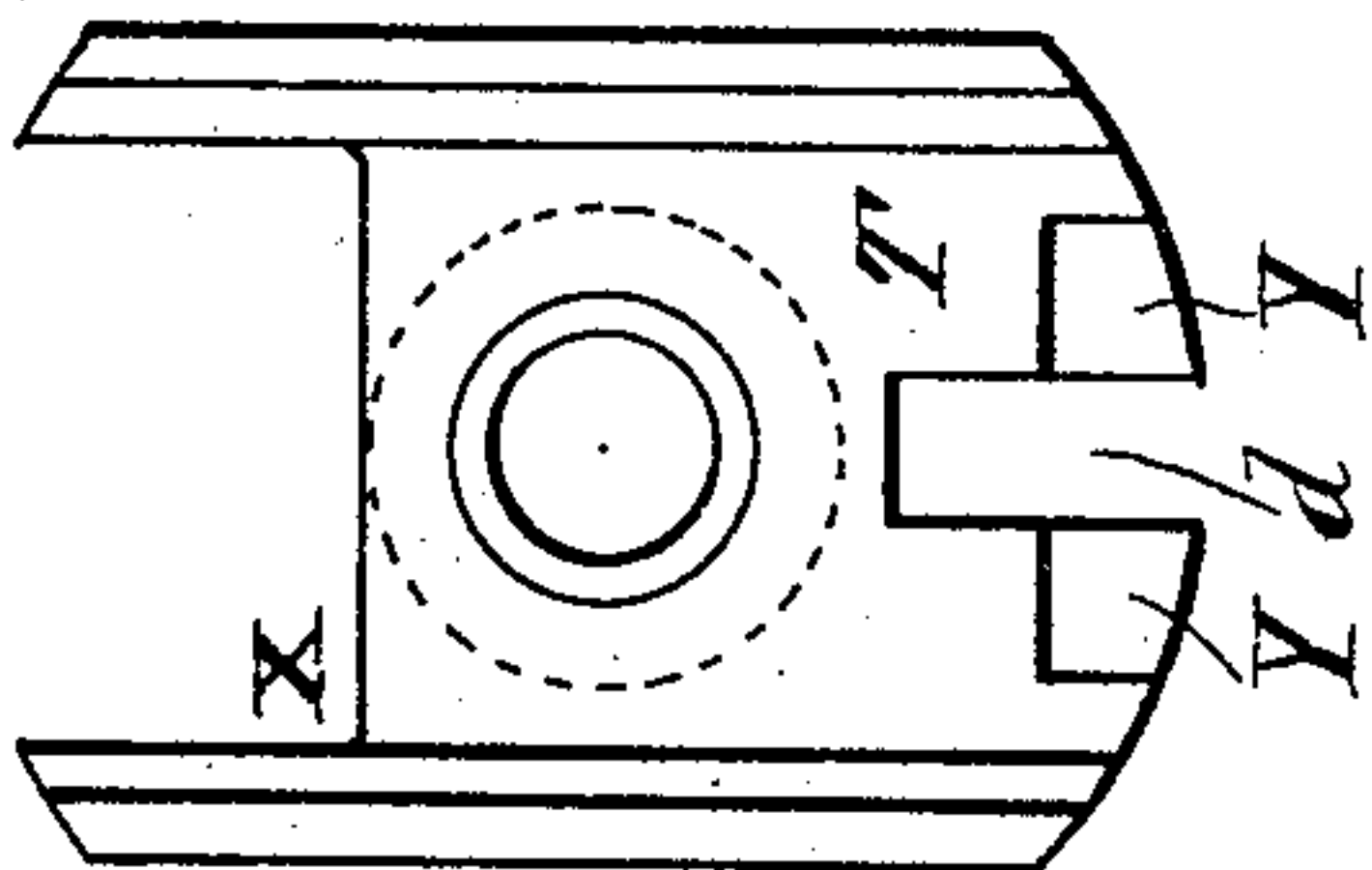


Fig. 11.

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UNITED STATES PATENT OFFICE.

MORRIS MOSKOWITZ, OF NEW YORK, N. Y., ASSIGNOR TO UNITED STATES LIGHT & HEATING COMPANY, OF NEW JERSEY.

AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 751,745, dated February 9, 1904.

Application filed April 8, 1903. Serial No. 151,628. (No model.)

To all whom it may concern:

Be it known that I, MORRIS MOSKOWITZ, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Automatic Switches, of which the following is a specification accompanied by drawings.

This invention relates to switches, but more particularly to automatic pole-changers or reversing-switches for car-lighting systems in which the generator is driven from the car-axle and is consequently subject to reversals in direction of rotation and to variations in speed. Under such conditions the connections of a generator—as, for example, the connections between the armature and the work-circuit and battery-circuit—have to be reversed when the direction of rotation of the generator is reversed.

The objects of the invention are to enable the switch to be actuated by the movement of one of the rotary parts of the apparatus with which it is employed, provision being afforded for throwing the switch in one direction and maintaining the switch in the position to which it is moved until the reversal of the rotation causes it to be again actuated and thrown in the opposite direction.

Other objects of the invention are to improve upon the construction and arrangement of switches of this character, increasing their efficiency and certainty of operation, while at the same time reducing the parts to simple and compact form, which parts are not liable to get out of order and will withstand wear and hard usage without breakage or derangement.

Further objects of the invention will hereinafter appear; and to these ends the invention consists of apparatus and devices for carrying out the above objects embodying the features of construction, combinations of elements, and arrangement of parts having the general mode of operation substantially as hereinafter fully described and claimed in this specification and shown in the accompanying drawings, in which—

Figure 1 is a front elevation of a switch embodying the invention looking at the end of a

rotary shaft in connection with which the switch is shown in this instance. Fig. 2 is a longitudinal sectional elevation of the switch, taken through the axis of the shaft. Fig. 3 is a front elevation of the stationary base-plate which is fixed to the bearing of the shaft. Fig. 4 is a transverse sectional elevation taken centrally through the base-plate. Fig. 5 is a front elevation of the movable plate to which the switch-arms are connected, said plate being adapted to be actuated in one direction or another, according to the direction of rotation of the shaft. Fig. 6 is a transverse sectional elevation of the movable switch-plate shown in Fig. 5. Fig. 7 is a top plan view of the switch-plate shown in Figs. 5 and 6. Fig. 8 is a front elevation of the guide-plate secured to the front of the apparatus. Fig. 9 is a plan view of Fig. 8. Fig. 10 is a front elevation of the holder for the sliding tongue which is adapted to actuate the movable switch-plate shown in Fig. 5. Fig. 11 is a horizontal sectional plan view of the holder shown in Fig. 10. Fig. 12 is a longitudinal vertical section taken in the direction of the axis of the shaft through the holder shown in Fig. 10. Fig. 13 is a front elevation of the sliding plate provided with a tongue, which plate slides in the holder shown in Fig. 10. Fig. 14 is a vertical section through the plate shown in Fig. 13. Fig. 15 is a front elevation of the slotted cover-plate which is arranged in front of the sliding plate shown in Fig. 14. Fig. 16 is a sectional view of the cover-plate shown in Fig. 15 on the line C D. Fig. 17 is a detail side view of the holder, sliding plate, and cover-plate assembled upon the end of a rotary shaft and secured thereon by means of a nut or other suitable means, the holder and parts combined therewith being adapted to rotate with the shaft, whereby the sliding-tongue plate is actuated in the holder by centrifugal force.

According to this invention the switch includes a rotary part carrying a retractible dog or tooth which actuates the switch-plate in one direction or another and which is subsequently retracted by centrifugal force, so as to be drawn out of engagement with the switch-plate as the speed of the rotary part

increases. When the rotary part stops and reverses its direction of rotation, the dog is again brought into play, either by gravity or by a spring, to throw the switch-plate in the other direction, and then as the speed again increases the dog is again retracted.

The switch may be used in any suitable arrangement of electric circuits, and for simplicity and to enable the device to be more readily understood no circuits are illustrated in the drawings.

Referring more particularly to the mechanical construction of the apparatus, the rotary shaft A may be any suitable shaft which rotates in opposite directions at different times—as, for instance, the armature-shaft of a generator which is connected to be driven from a car-axle. The stationary base-plate B may be of any suitable construction and is adapted to be secured to the bearing of the shaft A—as, for instance, by screws or bolts—provision being afforded for securing the base-plate, as described, by means of the bolt-holes C. The base-plate is provided with a central aperture D of slightly larger diameter than the shaft A, and an outwardly-extending portion E of the base-plate forms a seat or support for the movable switch-plate F. The base-plate B is further provided with guide-ways H and G for the rim I on the switch-plate F. In Fig. 2 the switch-plate F is shown assembled upon the base-plate, together with the remaining parts of the switch. The switch-plate F, as shown, is provided with projecting lugs or fingers J, which extend substantially the width of the seat E on the base-plate. A portion of the periphery of the switch-plate is recessed at K or otherwise constructed to afford provision for limiting the movement of the switch-plate. In this instance a stop in the form of a bolt L coöperates with the switch-plate to limit its movement, and at the same time the nut M and washer N on the bolt L serve to maintain the switch-plate in operative position upon the base-plate, while at the same time preventing free rotation of the switch-plate in either direction through a limited arc.

The guide plate or flange P (shown more particularly in Figs. 8 and 9) is secured, as shown in Figs. 1 and 2, to the outer end of the seat E on the base-plate B for a purpose hereinafter to appear. The guide P is of a peculiar construction for carrying out some of the objects of the invention, as shown, a central portion of the guide being hollowed at Q and provided with inwardly-slanting seats R at each end.

Over the reduced end S of the shaft A is arranged the socketed holder T, having a socketed boss U for the reception of the reduced end S of the shaft and, furthermore, provided with recessed slideways V for the sliding plate W. As shown in front view in Fig. 10, the holder T is recessed, as at X, at one end and

provided at the other end with bearing-lugs Y, against which the outside cover-plate Z is adapted to bear.

The sliding member or plate W, as shown, is recessed centrally, as at *a*, to pass loosely over the end of the shaft, and there is a lug *b* at one end adapted to extend into the recessed portion X of the holder to limit the movement of the sliding member or plate W transversely of the shaft A in one direction. Another lug, *c*, extends into the slotted portion *d* of the holder and limits the movement of the sliding member or plate W in the other direction. The lug *c* extends on both sides of the sliding member W, as shown, the outwardly-extending portion *e* of the lug being adapted to bear upon the portions Q and R of the guide P when the shaft is rotating slowly, so that the guide-plate P forms a cam, while the sliding member W, provided with a projecting lug *e*, forms a follower. The movement of the sliding member W transversely of the shaft A is therefore determined by the shape of the guiding-cam P when the lug *e* is bearing upon said cam.

In assembling the parts as shown in Figs. 2 and 17 the holder T is placed upon the reduced end S of the shaft A. Then the sliding member W is placed within the holder and the outer cover-plate Z is arranged outside of the sliding member W in the recessed portions *f* on the holder. A suitable nut *g* serves to secure the parts T, W, and Z tightly upon the shaft to cause them to rotate therewith, while the member W is free to slide transversely to the axis of the shaft. Any suitable contacts *h* may be provided upon the switch-plate F and suitably insulated therefrom, and the contacts with which the contact *h* is adapted to coöperate have been omitted from the drawings for the sake of simplicity, as hereinbefore stated. A suitable casing or cover *j* may be secured over the entire switch by suitable bolts *k*.

According to the construction shown and described the operation is as follows: When the shaft is rotating slowly, the lug *e* on the sliding member W will be projected beyond the holder T, as shown in Fig. 1, in position to engage one of the lugs or fingers J on the switch-plate F, so that as the shaft A rotates the switch-plate F will be moved to one side or the other, according to the direction of rotation of the shaft. As the lug *e* pushes one of the lugs or fingers in one direction or another, said lug *e* will gradually be raised out of engagement with the fingers J on the switch-plate by means of the cam-surfaces Q on the guide-plate P. As the shaft completes a revolution, the sliding member W, with lug *e*, will again move transversely across the shaft, in this instance by gravity, and the lug *e* will impinge upon the slanting seat R and then follow around a short distance on

the cam-surface Q again, clearing the second lug J. According to the construction shown the seats R form surfaces entirely independent of the movable switch mechanism, so that the shock is always taken by the guide member or cam P, thus preventing breakage or derangement of the moving parts of the switch. Furthermore, the movements of the switch-plate F are unimpeded by friction, contact, or otherwise, and the certainty of operation of the switch is increased. As the shaft speeds up, the lug *e* is withdrawn from a position to engage the lugs or fingers J on the switch-plate F by means of centrifugal action. The end of the sliding member W upon which the lug *b* is provided, as shown, is much broader and heavier than the end upon which the lug *c* is provided. In other words, there being more weight in the lug *b* or at that end of the member W than there is at the other end of the member centrifugal action will come into play to withdraw the lug *e* as the shaft speeds up.

When the shaft A is stopped and the direction of rotation is reversed, the sliding member W and lug *e* move into such position that the lug *e* will engage one of the fingers or lugs J on the switch plate or member and throw the switch in the opposite direction to which it was formerly thrown, the lug *e* at the same time being guided by the cam or guide-plate P. According to the construction shown the parts of the switch are arranged in compact form and substantially concentrically about the shaft. The switch operates quickly and efficiently and is readily taken apart and assembled, so that any part may be quickly replaced when desired.

According to this invention it will be seen that there are two concentric rotary members, one of which is adapted to actuate the other, while means are provided for moving the actuating member transversely to the axis of rotation at a predetermined speed of rotation. One of the features of the invention is the guide member for guiding the actuating member and moving it out of engagement with the switch member as the direction of rotation reverses. While any suitable means may be provided, in this instance centrifugal means are utilized for automatically retracting said actuating member at a predetermined speed of rotation.

The invention contemplates a construction in which one of the members is rotary and the other member is adapted to be actuated thereby, provision being afforded by the guide member for positively moving and guiding the actuating member at predetermined slow speeds.

Obviously some features of this invention may be used without others, and the invention may be embodied in widely-varying forms. Therefore,

Without limiting myself to the construction shown and described nor enumerating equivalents, I claim, and desire to secure by Letters Patent, the following:

1. In a switch, the combination of two concentric rotary members, one of which is adapted to actuate the other by engagement therewith, a guide member adapted to coact with the actuating member and thereby move it out of engagement with the other member as the direction of rotation reverses, and means for automatically retracting said actuating member at a predetermined speed of rotation.

2. In a switch, the combination of two concentric rotary members, one of which is adapted to actuate the other as the direction of rotation reverses, means for rotating the actuating member, a guide adapted to coact with said actuating member and thereby move it transversely to the axis of rotation, and means for automatically retracting said actuating member at a predetermined speed of rotation.

3. In a switch, the combination of a rotary actuating member, and another member arranged concentrically therewith and adapted to be actuated thereby as the direction of rotation of the actuating member is reversed, a guide adapted to coact with the actuating member and thereby move it transversely to the axis of rotation, and means for preventing said member from actuating the other member when a predetermined speed is exceeded.

4. In a switch, the combination of a rotary part provided with a member movable transversely to the axis of rotation, another part arranged concentrically with said first-named part and adapted to be actuated by the said transversely-movable member as the direction of rotation reverses, a guide for said transversely-movable member affording provision for positively moving and guiding said member transversely to the axis of rotation at predetermined slow speeds, and means for moving said member automatically transversely to the axis of rotation at a predetermined speed of rotation.

5. In a switch, the combination of a base-plate, a switch member revolubly mounted thereon and provided with outwardly-projecting fingers, a guide member on the base-plate, and a rotary part arranged concentrically with the switch member and provided with a transversely-movable tongue, whereby when the direction of rotation reverses said tongue is adapted to actuate the switch member by engagement with one of the fingers thereon, said tongue being guided by the guide member, and means for automatically retracting said tongue at a predetermined speed of rotation.

6. In a switch, the combination of a rotary member and a member adapted to be actuated by engagement with said rotary member, a guide member having a cam-surface for guid-

ing and moving the actuating member out of engagement with the other member, and means for automatically retracting said actuating member at a predetermined speed of rotation.

- 5 7. In a switch, the combination of a rotary member and a member adapted to be actuated by engagement with said rotary member, a fixed guide member for guiding and moving the actuating member out of engagement with
10 the other member, and means for automatic-

ally retracting said actuating member at a predetermined speed of rotation.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

MORRIS MOSKOWITZ.

Witnesses:

E. VAN ZANDT,
A. L. O'BRIEN.