

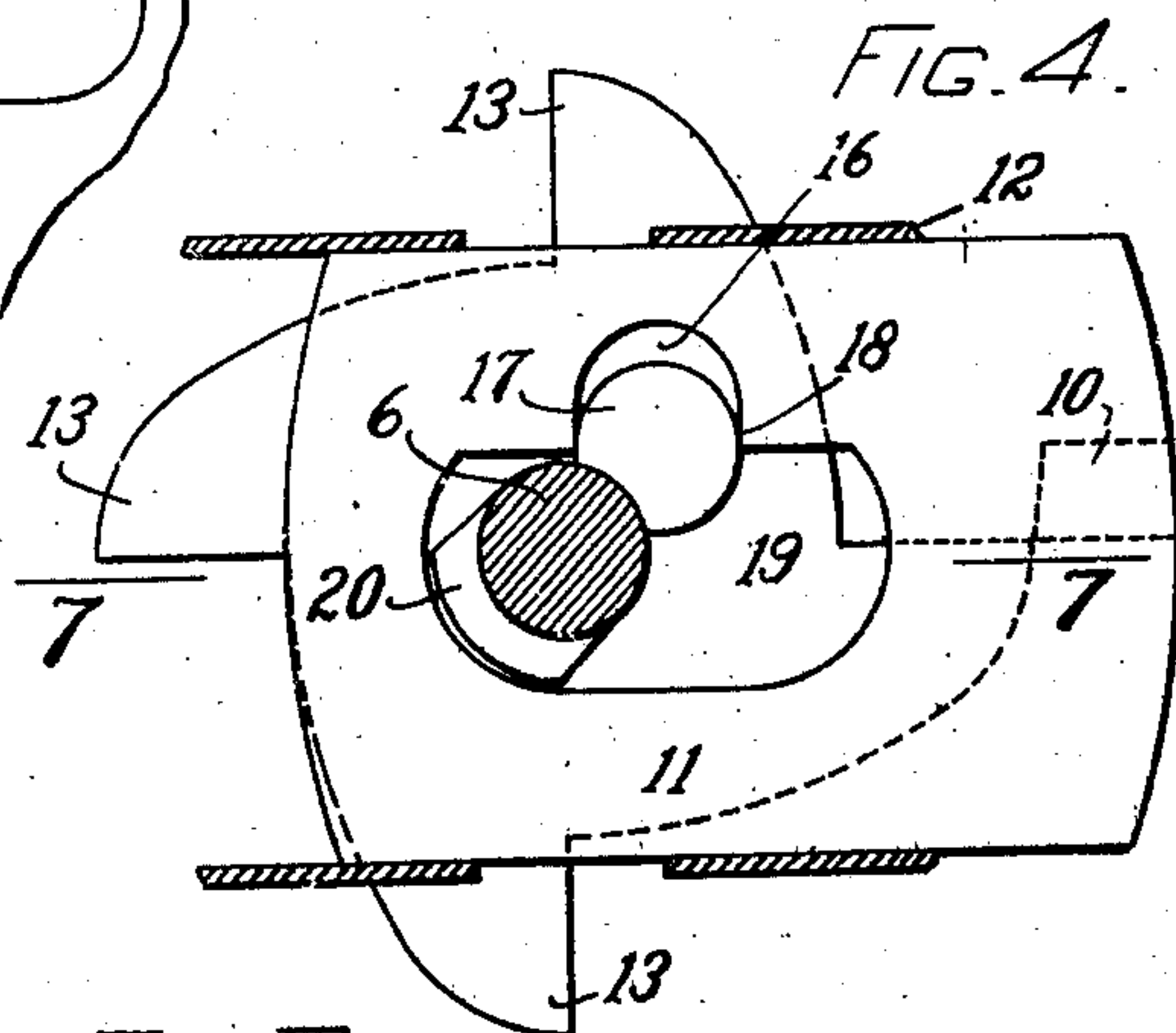
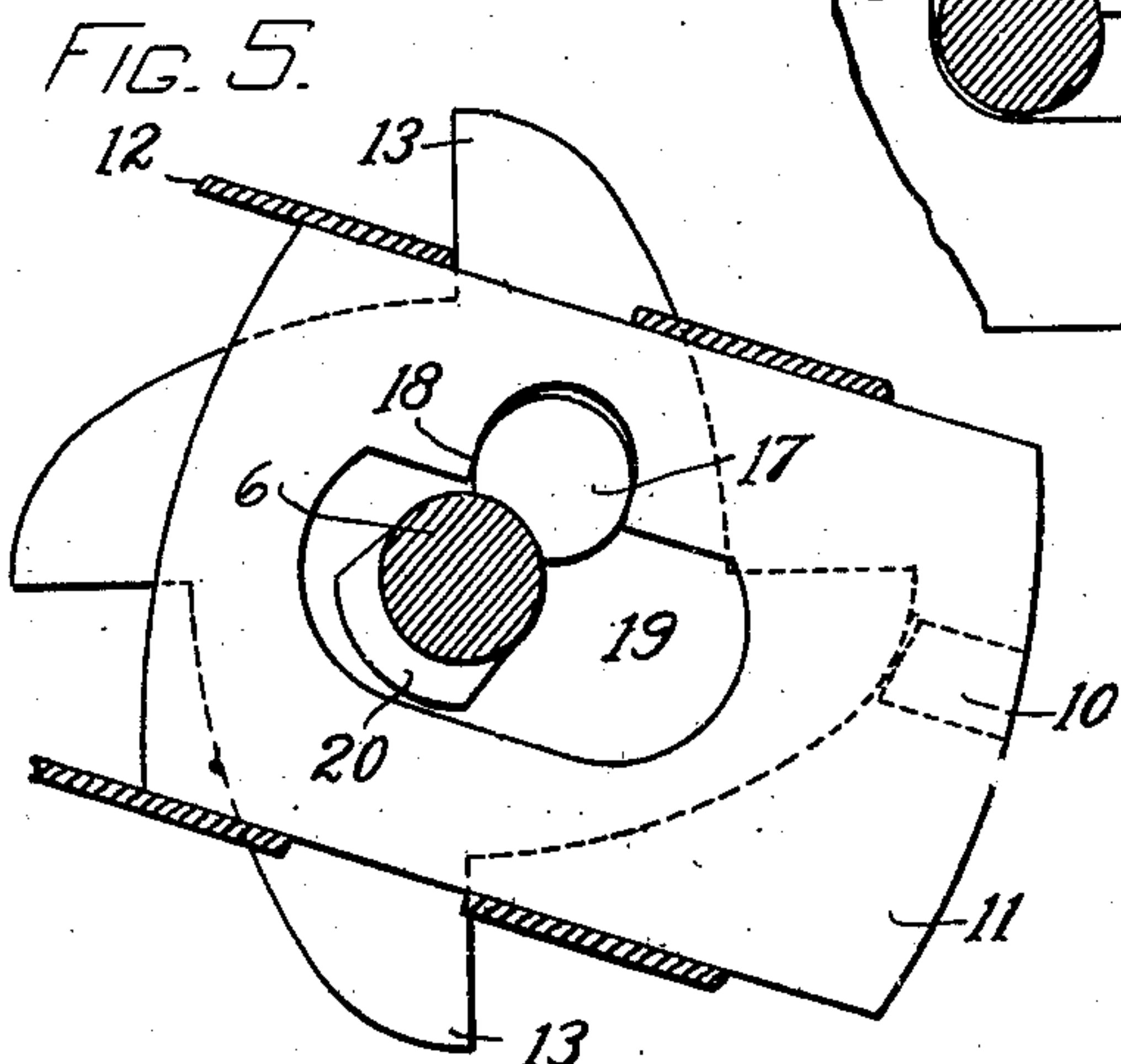
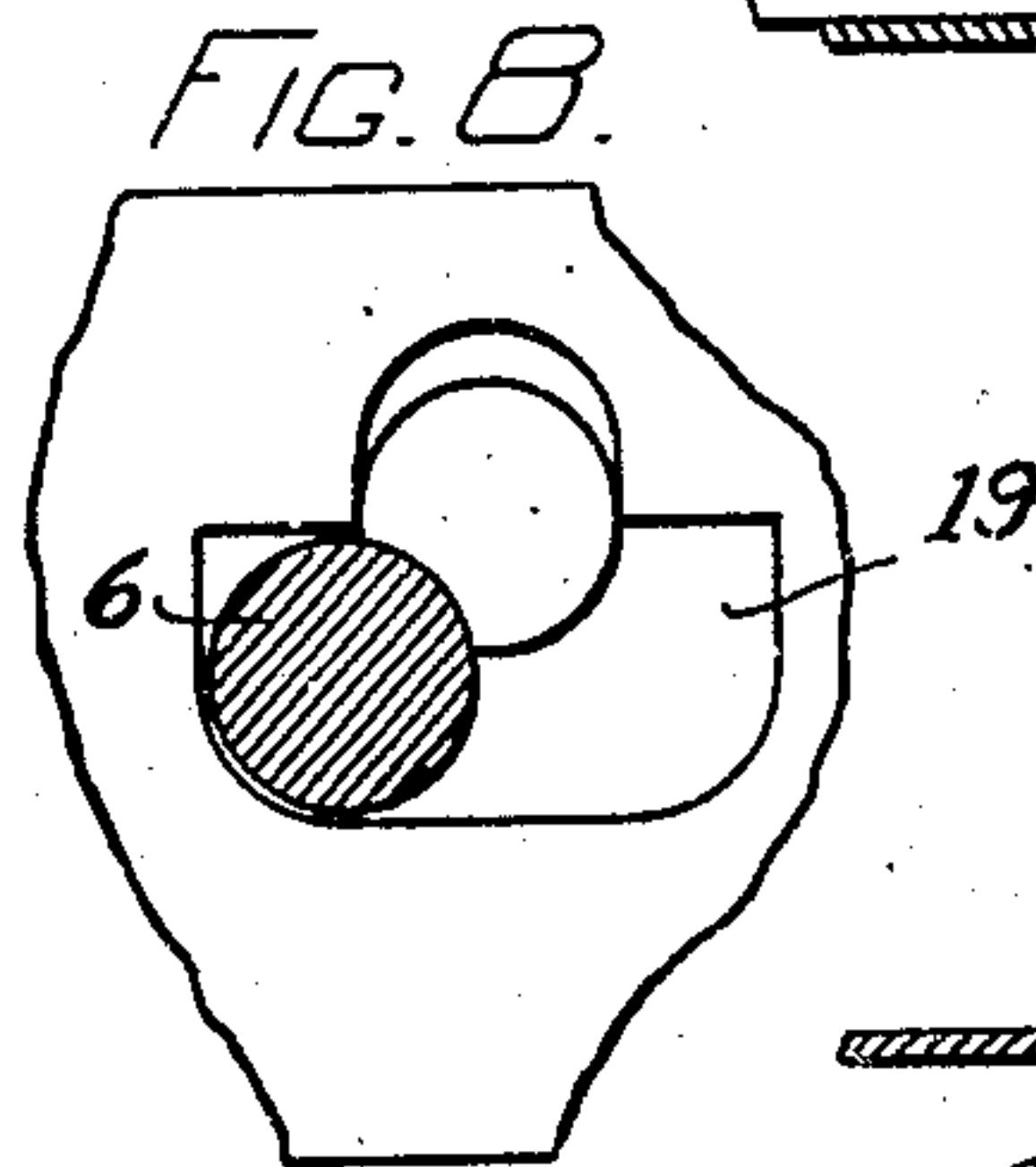
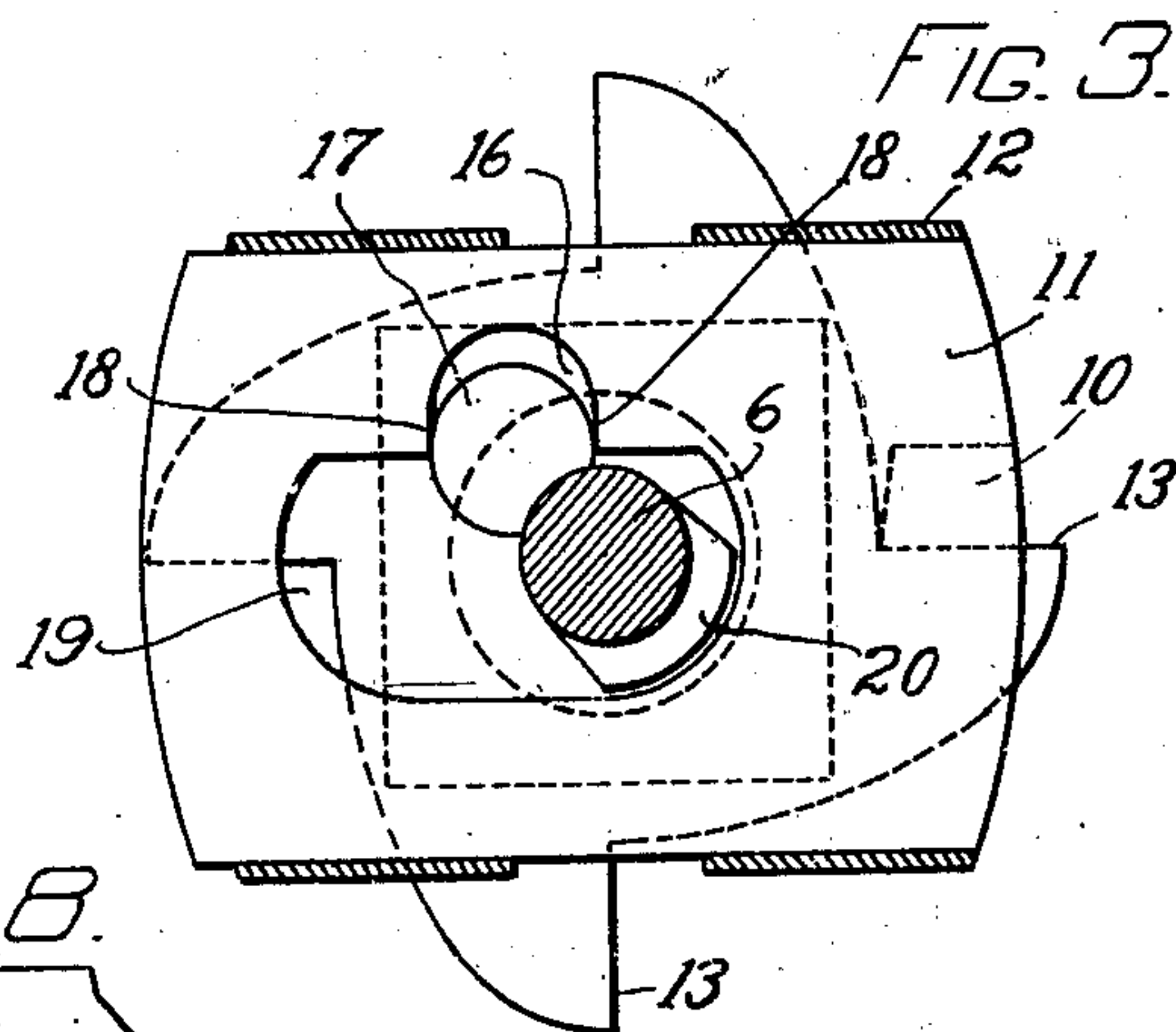
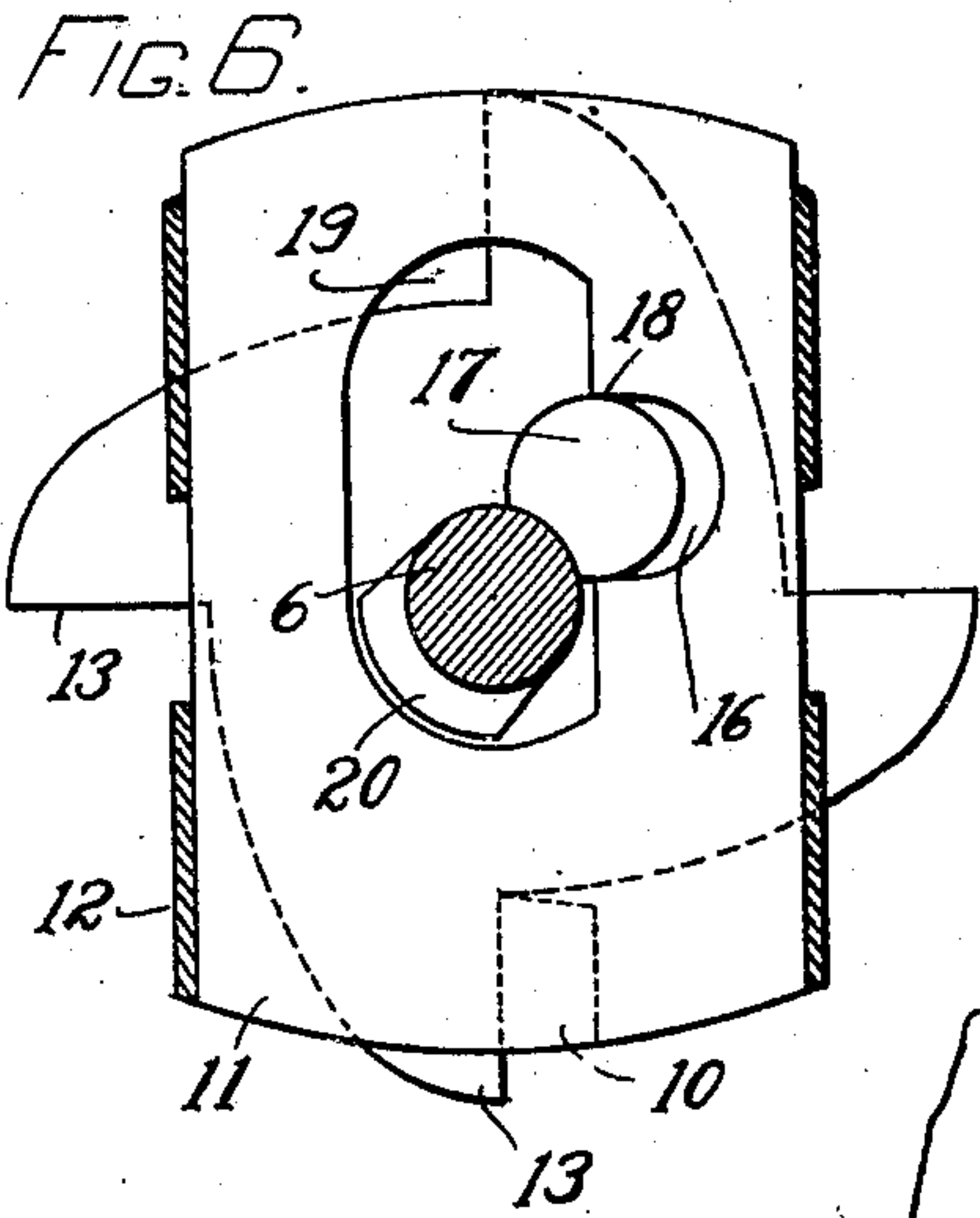
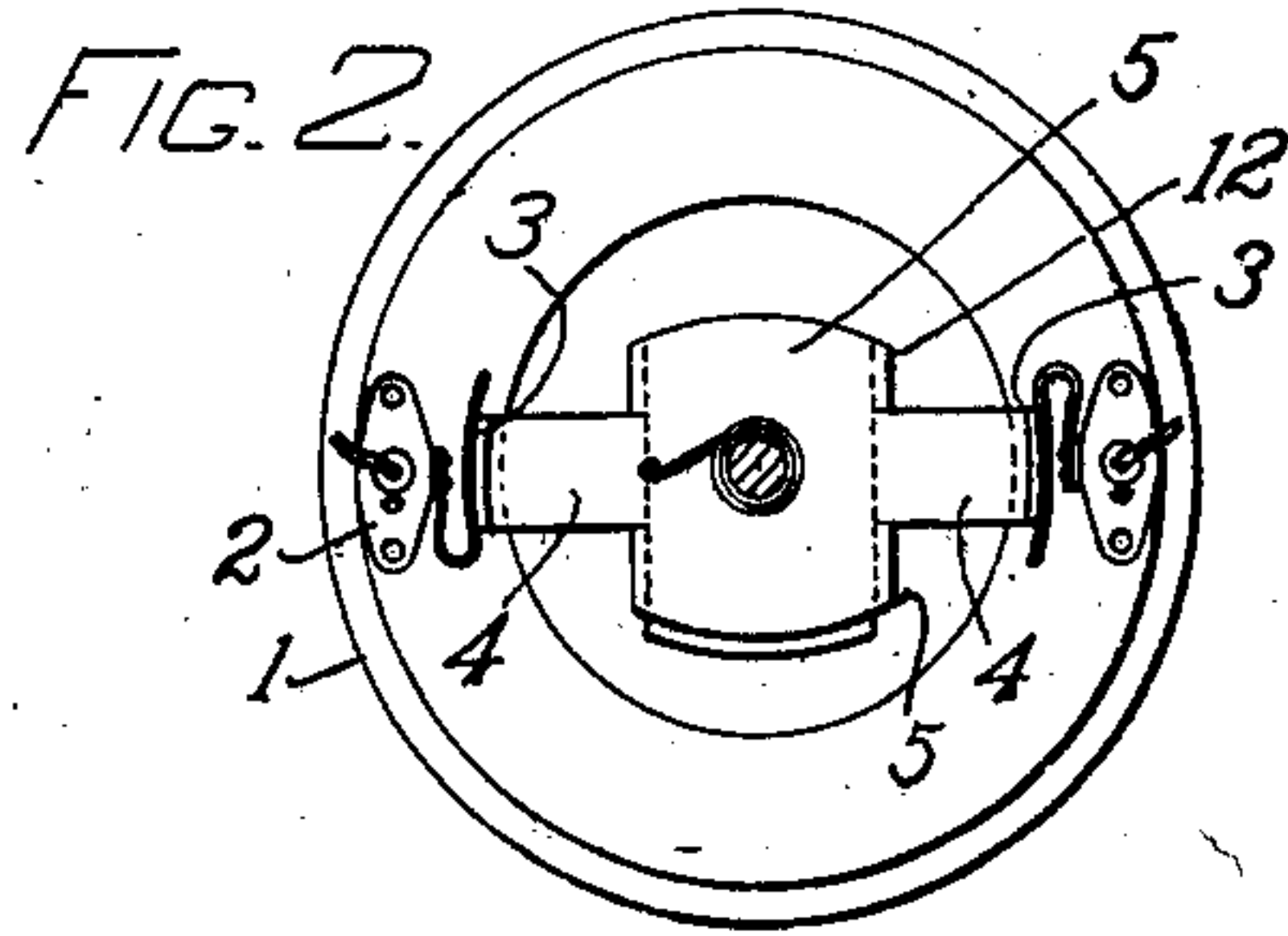
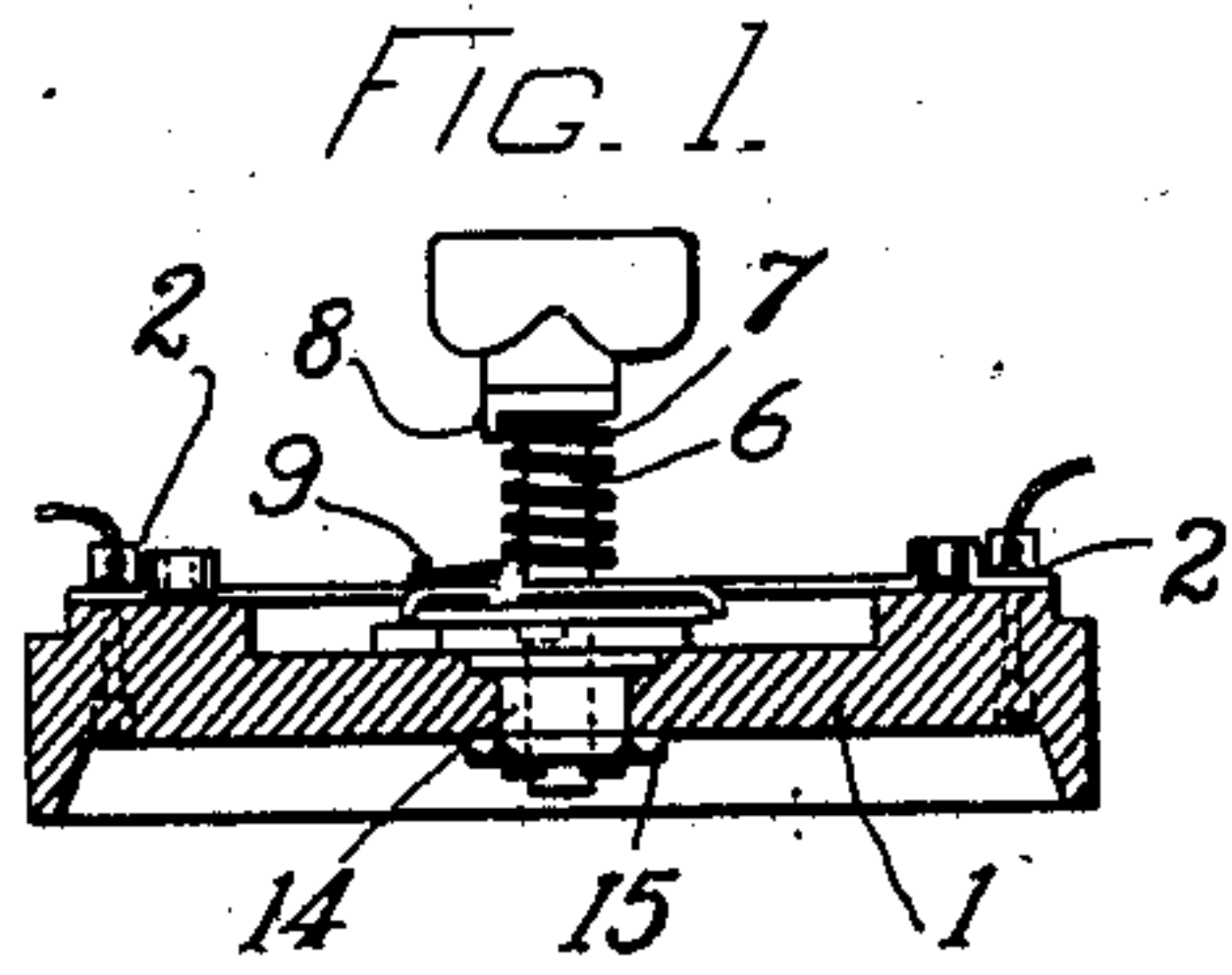
No. 754,378.

PATENTED MAR. 8, 1904.

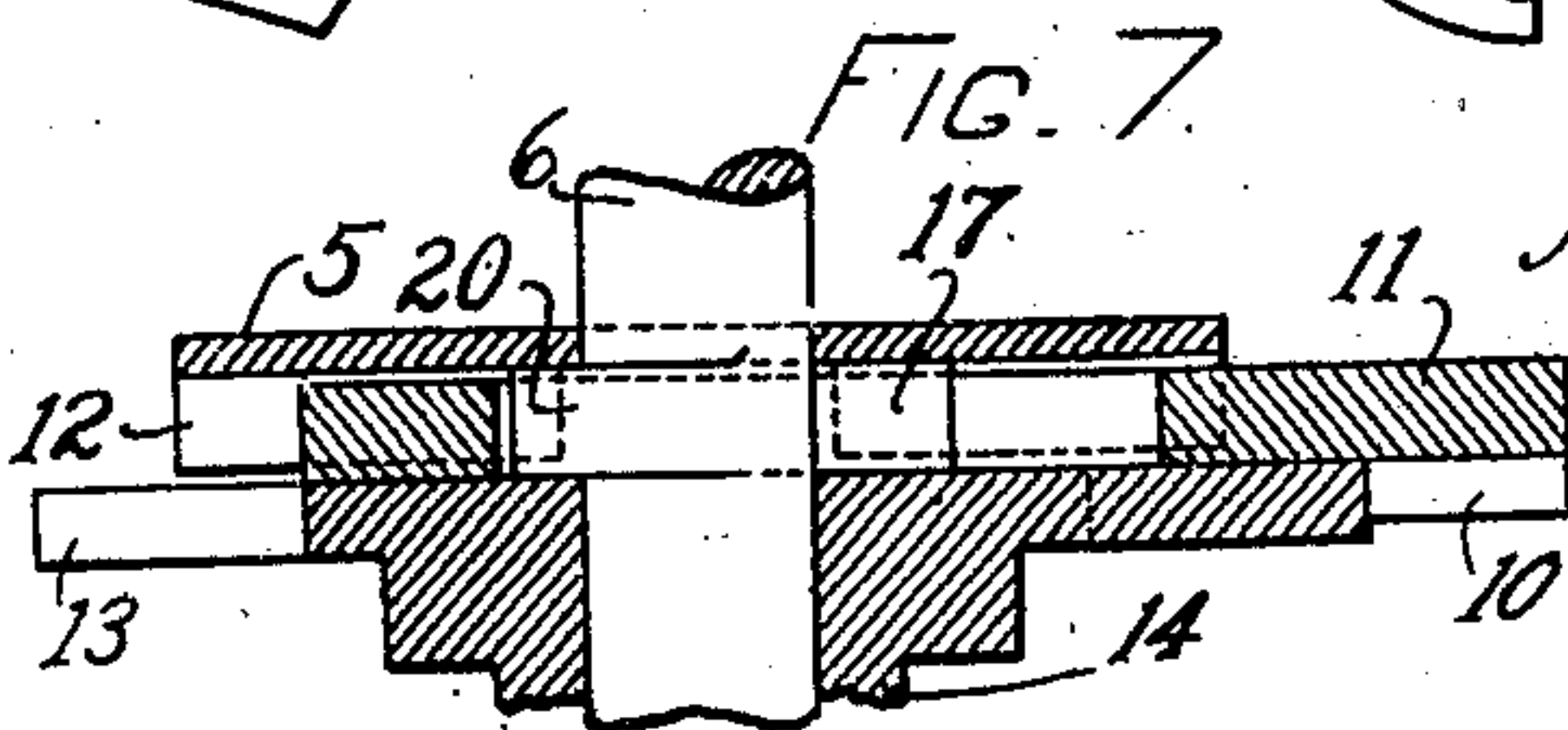
N. MARSHALL.
ELECTRIC SWITCH.

APPLICATION FILED JUNE 27, 1903.

NO MODEL.



WITNESSES
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NORMAN MARSHALL, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO
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A CORPORATION OF MAINE.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 754,378, dated March 8, 1904.

Application filed June 27, 1903. Serial No. 183,296. (No model.)

To all whom it may concern:

Be it known that I, NORMAN MARSHALL, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

The invention relates to that class of snap-switches in which the rotation of the hub or spindle tensions a spring for operating the contact or contacts and also operates a catch which holds the contacts against movement until the spring is tensioned and then releases the contacts, so that they are suddenly moved by the spring, the movement of the contacts being determined by stops engaged by the catch.

The primary object of the invention is to provide novel and improved devices for transmitting movement from the spindle to the catch which are strong and reliable when made on the small scale required, which may be readily and cheaply manufactured, and which are efficient and positive in operation. This is accomplished by providing a recess in the catch-plate having an open end at one side of the spindle and an arm projecting from the spindle into said recess, so that as the spindle turns the arm acts against one side of the recess to advance the catch until it disengages the cooperating stop and then as the catch rotates with relation to the spindle acts against the opposite side of the recess to retract the catch until the catch engages the next stop. The arm lies in the same plane with the catch-plate, and I prefer to provide the recess with straight parallel sides extending transversely to the movement of the plate and to provide a circular projecting arm which forms a crank-pin fitting this transverse slot. With this crank-and-slot connection the crank moves in the direction of movement of the catch-plate. The rotation of the catch-plate as the catch disengages the stop will result in little rearward movement of the catch-plate during the first part of its rotary movement, and therefore little clearance is required on either the stop-teeth or the catch. Consequently the teeth of the stop-ratchet and the

catch may be made with little incline and will not wear rapidly. Neither will the catch drag on the stop-tooth after the parts are somewhat worn and thus retard the quick and free movement of the contacts, as might otherwise occur. The construction is inexpensive to manufacture and occupies little space, thus enabling the parts to be strongly made on a small scale, which is an important feature in these switches where it is desirable to confine the connections within as limited a space as is practicable.

The various features of the invention will be best understood by referring to the accompanying drawings, in which a switch is shown embodying all such features.

In the drawings, Figure 1 is an elevation of a snap-switch, the insulating-base being shown in section. Fig. 2 is a plan view. Figs. 3 to 6 are enlarged views showing the construction and operation of the connections between the catch-plate and spindle. Fig. 7 is a section on line 7 7, Fig. 4; and Fig. 8 is a view of a modified construction.

As shown in the drawings, the switch is provided with an insulating-base 1, to which the stationary contacts and binding-post 2 are secured and which also supports the other parts of the switch. The movable contacts 3 are formed on the ends of arms 4, projecting from a plate 5, loosely mounted on the spindle 6 and connected therewith by a coiled spring 7. One end of the spring is connected with the spindle by engaging a lug 8 carried thereby, and the other end of the spring is connected with the switch-plate 5 by engaging a pin 9 secured thereto. When the spindle 6 is turned, the spring 7 is tensioned and by its connection with the plate 5 tends to turn said plate about the spindle. The switch-plate 5 is held from rotation until the spring 7 has been properly tensioned by means of a catch 10, formed on a catch-plate 11, which is guided between the depending edges 12 of the switch-plate 5.

The catch 10 is arranged to engage a series of teeth 13 on a stop-plate secured in the base 1, which teeth form a series of stops for cooperating with the catch. The stop-plate is pro-

vided with a depending hub 14, extending through the base 1 and engaged by a nut 15, which holds the plate in position in the base. The hub 14 also forms a supporting-bearing for the spindle 6. As the spindle 6 is turned the catch-plate 11 is advanced in its guides 12 to carry the catch 10 forward along a tooth 13 until the catch disengages the tooth, when the spring 7 suddenly rotates the switch-plate, the movement of the catch-plate with the switch-plate carrying the catch into engagement with the next tooth 13, which determines the position of the catch-plate and the connected switch-plate. The connections between the spindle 6 and the catch-plate 11, by which these movements of the catch-plate are produced, consist of a recess or slot 16, formed in the catch-plate, and an arm 17, projecting from the spindle through the open end of the slot and playing in said slot. The sides 18 of the slot in the catch-plate which are engaged by the arm 17 are parallel to each other and arranged transversely to the movement of the catch-plate in the guides 12. The arm 17, which extends into the slot 16, is in the same plane with the plate 11, and its end which engages the sides of the slot is in the form of a circle having a diameter the width of the slot and forms, therefore, a crank projecting from the spindle in the plane of the catch-plate and engaging a transverse slot in said plate. The slot 16 extends laterally from an opening or recess 19, extending lengthwise of the plate 11, so that the spindle 6, which extends up through the plate, may not interfere with the movements of the plate. The arm 17 may be of the same thickness as the catch-plate 11 or of less thickness; but it is preferred to make this arm slightly thicker than the plate 11, so that the arm will form a supporting-bearing for the switch-plate 5, and thus prevent frictional contact of the plate 5 with the catch-plate 11. With the switch-plate thus supported out of engagement with the catch-plate the catch-plate may be more easily operated and with less wear upon the parts. Instead of supporting the switch-plate on the arm 17 the plate may be supported on a flange 20, projecting from the spindle and arranged diametrically opposite the arm 17. I prefer, however, to employ both the flange and arm for this purpose, so that the plate 5 will be supported on opposite sides of the spindle. In case the spindle is provided with this supporting-flange the recess 19 is so shaped that there is always clearance between the sides of the recess and the flange, so that the flange in no wise effects the movements of the catch-plate produced by the crank-and-slot connection between the spindle and plate. The supporting-flange 20 is not essential and may be omitted, as indicated in Fig. 8. In this form the recess 19 need be of only such size as to afford clearance between the sides of the opening and the spindle 6; which may be of ad-

vantage in enabling a reduction in the size of the catch-plate.

The mode of operation will be best understood by reference to Figs. 3 to 6, inclusive. Supposing the parts to be in the position shown in Fig. 3 and the spindle 6 to be rotated, the catch 10 by its engagement with the tooth 13 will prevent rotation of the contact-plate until the catch is moved into the position shown in Fig. 4. As the spindle is turned the front side of the crank-arm 17 will act against the front side 18 of the slot 16 until the catch-plate is advanced from the position shown in Fig. 3 to the position shown in Fig. 4. When the catch-plate reaches this position, the catch 10 passes off the end of the tooth 13, and the spring 7, which has been tensioned by the rotation of the spindle, suddenly rotates the switch-plate and also the catch-plate carried with it, the spindle remaining stationary. As the catch-plate and switch-plate are rotated about the spindle the rear side of the arm 17 acts against the rear side 18 of the slot to move the catch-plate from the position of Fig. 4 to the position of Fig. 6. Owing to the crank-and-slot connection between the spindle and catch-plate, the first part of the rotation of the catch-plate will result in comparatively little rearward movement of the catch-plate, as indicated in Fig. 5. Consequently but little clearance need be formed on the catch and the tops of the teeth 13. The rearward movement of the catch-plate will continue as the plate rotates about the spindle until the catch 10 brings up against the next tooth 13, as indicated in Fig. 6, when the rotation of the catch-plate, and consequently its rearward movement produced by the crank-and-slot connection, will be arrested.

What I claim, and desire to secure by Letters Patent, is—

1. In an electric switch the combination with a spindle, contacts, and spring for moving the same, of a catch-plate provided with a transverse recess having an open end at one side of the spindle, an arm projecting from the spindle through the open end of said recess, and stops engaged by said catch-plate.

2. In an electric switch the combination with a spindle, contacts, and spring for moving the same, of a catch-plate provided with a transverse recess having an open end at one side of the spindle, an arm in the plane of the catch-plate projecting from the spindle through said open end and playing on opposite sides of said recess, and stops engaged by said catch-plate.

3. In an electric switch the combination with a spindle, contacts, and spring for moving the same, of a catch-plate provided with a slot extending transversely to its line of movement and having substantially parallel sides, an arm in the plane of the catch-plate projecting from the spindle into said slot and having a circular end playing between the sides of said slot, and stops engaged by said catch-plate.

4. In an electric switch the combination with a spindle, contacts and spring for moving the same, of a catch-plate provided with a recess, an arm in the plane of the catch-plate and of greater thickness projecting from the spindle and engaging the sides of said recess, a flange projecting from the spindle of the same thickness as the arm, and stops engaged by said catch-plate.

5. In an electric switch the combination of the switch-plate, a catch-plate sliding therein, a spindle, a spring connecting the spindle and switch-plate, a slot in the catch-plate extending transversely to its line of movement, and a crank on the spindle engaging said slot and arranged to move in the direction of movement of the catch-plate, and stops engaged by the catch-plate.

6. In an electric switch the combination of a sliding plate provided with a slot extending transversely to its line of movement and having an open end, a spindle, and a crank-arm in the plane of the plate projecting from the spindle through the open end of said slot.

7. In an electric switch the combination of a spindle provided with a projecting crank-arm, a movable plate in the plane of said arm, an opening extending lengthwise of said plate through which said spindle passes, and a slot extending transversely from said opening and engaged by said crank-arm.

8. In an electric switch the combination of a stop-plate, a switch-plate, a catch-plate carried thereby recessed to permit the play of an arm, a spindle extending through the recess in said catch-plate provided with a flange for supporting the switch-plate out of contact with the catch-plate and with an opposite projecting arm playing in said recessed catch-plate, and a spring connecting said catch-plate and spindle.

In testimony whereof I have affixed my signature in presence of two witnesses.

NORMAN MARSHALL.

Witnesses:

E. M. CARPENTER,
M. E. LYNCH.