

Nov. 18, 1924.

1,516,440

G. A. JOHNSON

ELECTRIC SWITCH

Filed Aug. 9, 1922

Fig. 1.

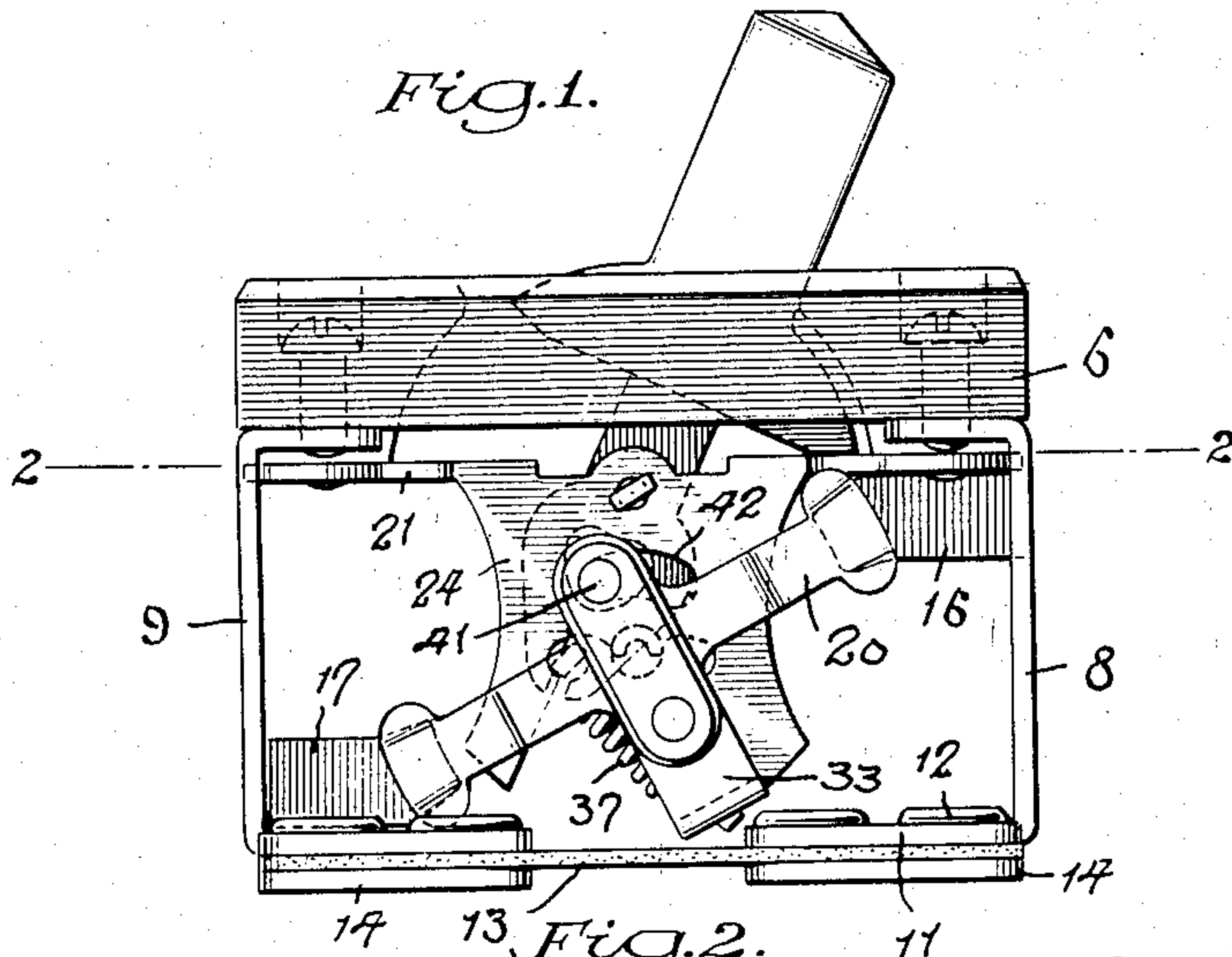


Fig. 2.

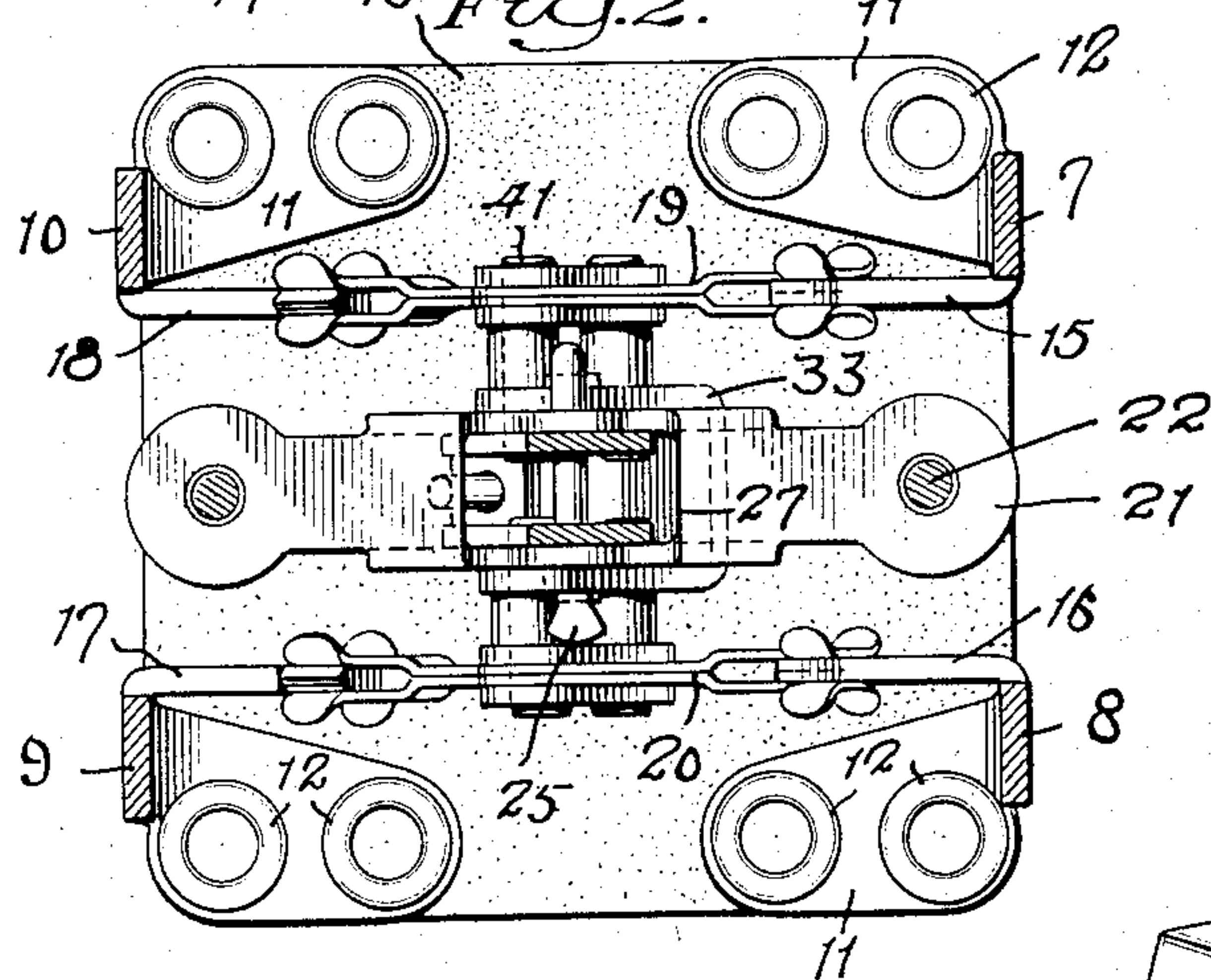


Fig. 3.

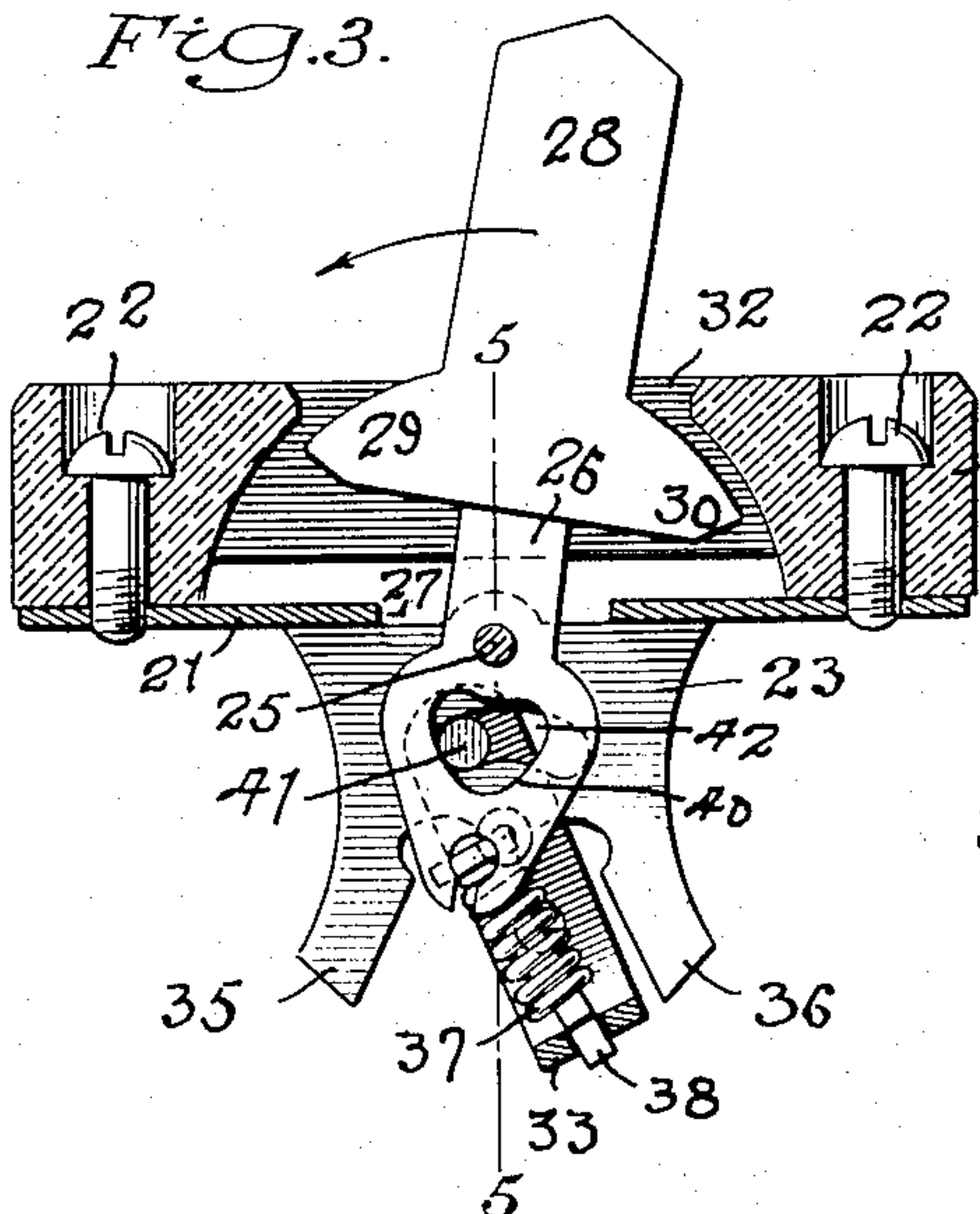


Fig. 4.

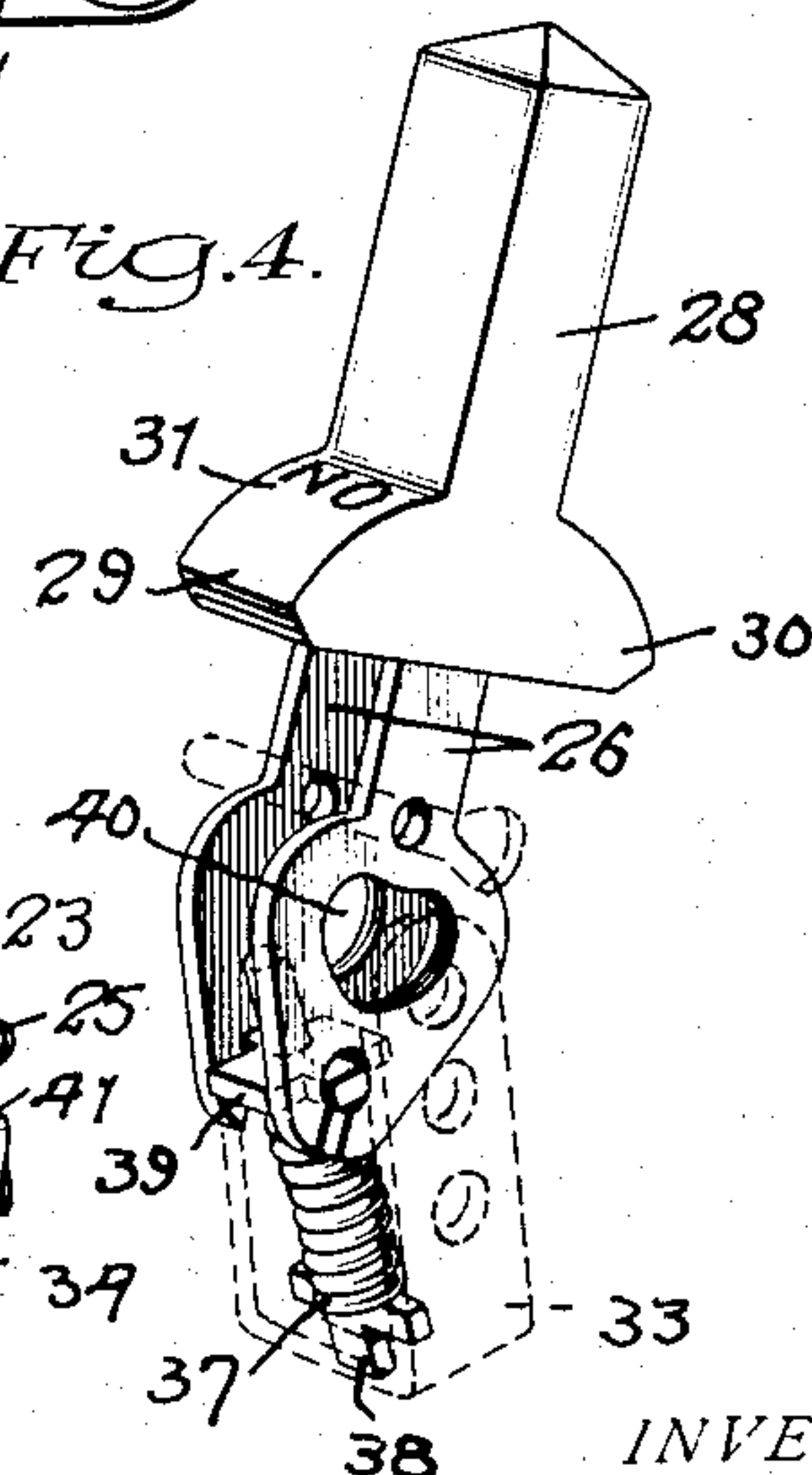
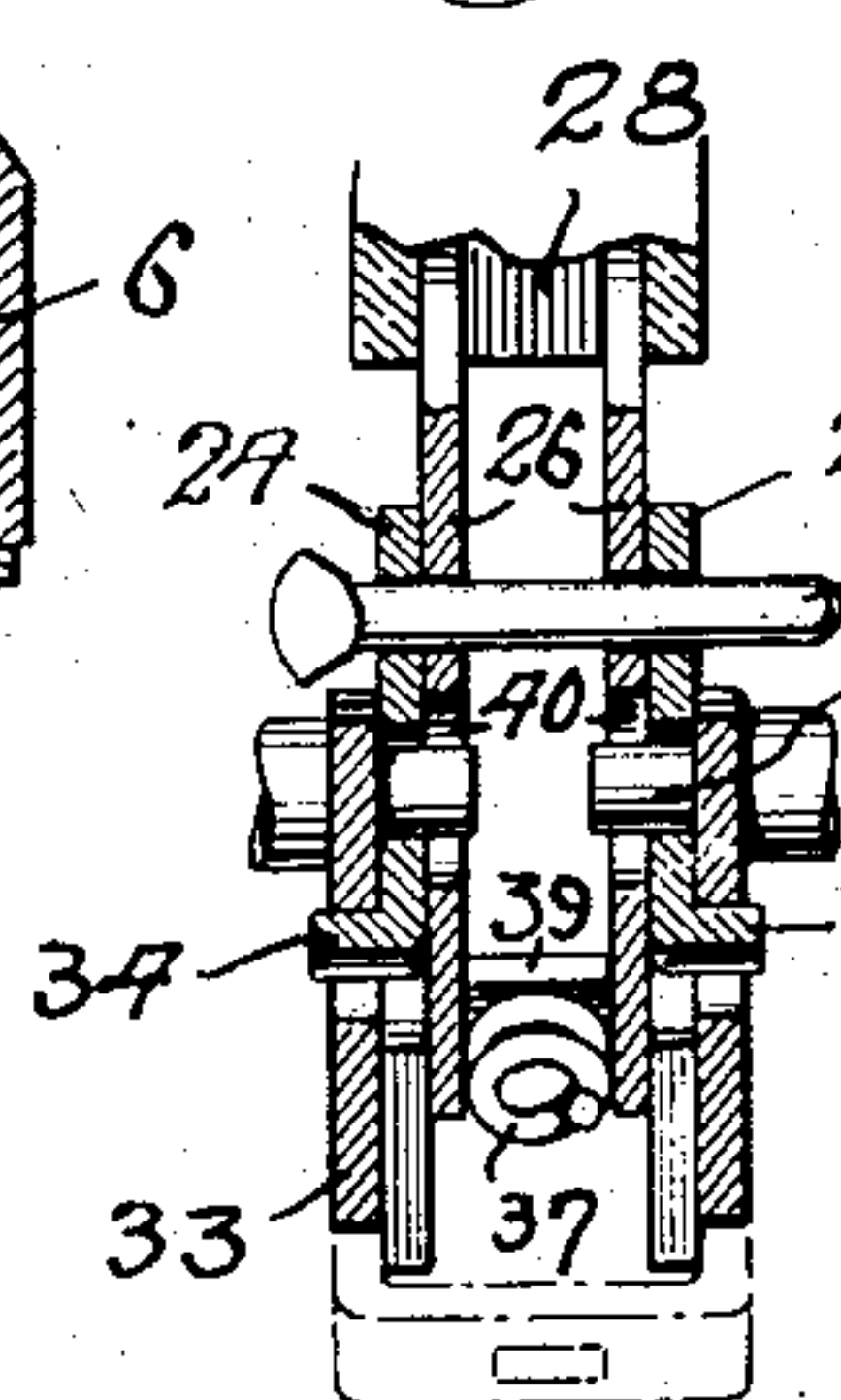


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE A. JOHNSON, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE BRYANT ELECTRIC COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ELECTRIC SWITCH.

Application Made August 9, 1922. Serial No. 580,673.

To all whom it may concern:

Be it known that I, GEORGE A. JOHNSON, a citizen of the United States of America, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to electric switches, and particularly to switches of the toggle mechanism type. The object of my invention is to provide a mechanism of improved construction, having certain features of novelty of construction and affording a positive throw of the switch blade when the operating lever is actuated.

In the accompanying drawings—

Fig. 1 is a side elevation of a switch showing the mechanism in which my invention is embodied in one form;

Fig. 2 is a section on the line 2—2, Fig. 1;

Fig. 3 is a central longitudinal section through the actuating mechanism and switch base;

Fig. 4 is a perspective of the switch operating lever; and

Fig. 5 is a section on the line 5—5, Fig. 3.

While the invention is illustrated in a double pole switch of the panel-board type, it will be recognized that the mechanism, to which the invention is particularly directed, may be embodied in a single or double pole switch of any appropriate type, such for instance as a surface or a flush switch. As here shown, the switch comprises an insulating block 6 of generally rectangular shape, from the corners of which depend the supporting straps 7, 8, 9 and 10, each having an offset foot piece 11 secured by rivets 12 to a spacer sheet 13 of insulating material. Beneath the latter, and also engaged by the rivets 12, are contact plates 14 adapted to rest upon the conductor bars of a panel board to which they are secured by screws passing through the hollow rivets 12. Each of the straps 7 to 10 is also provided with offset contact wings 15, 16, 17 and 18 respectively, with which cooperate the switch blades 19 and 20.

The switch blades are operated by a toggle mechanism supported upon a frame comprising a bridge member 21 secured beneath the insulating block 6 by screws 22, and having offset from its opposite sides a pair of frame plates 23 and 24. Rocking

upon the pin 25, which traverses the upper portion of the frame plates 23 and 24, is the two-legged switch operating lever 26, which passes up through a central aperture 27 in the frame and carries at its outer end a thumb piece 28 of insulating material. The lower portion of the thumb piece is laterally extended to form shoulders 29 and 30 upon the outer faces of which are legends 31 (Fig. 4), one or the other of which is exposed at the slot 32 in the block 6, through which the operating lever passes. The ends of the shoulders 29 and 30 are suitably shaped to properly limit the throw of the switch lever by their impingement against the upper face of the bridge member 21 of the frame at the opposite extremes of the lever movement.

Cooperating with the lever is a switch bar yoke 33, which straddles the side plates 23 and 24 of the frame, and is journaled upon lugs 34 struck outwardly from the side plates. The latter are cut away at their lower margins to afford two pairs of stops 35 and 36, between which the cross bar of the switch yoke travels, and by which the angular throw of the yoke is limited.

The spring 37 for imparting snap motion to the switch bar yoke, is mounted upon the guide pin 38, one end of which passes through the cross bar of the yoke 33, while its opposite end bears against an abutment 39 resting against the lower ends of the lugs of the switch lever 26. The throw of the switch bar from one side to the other of its arc of travel, is occasioned, as in the usual type of toggle switch construction, by shifting of the abutment 39 for the switch spring across the axis of oscillation of the switch bar yoke by the movement of the actuating lever 26.

In order to insure the initiation of the throw of the yoke, regardless of the frictional drag which may be imposed thereon by the engagement of the blades 19 and 20 with the fixed contacts 15, 16, 17 and 18 of the switch, I provide a positive kick-off engagement between the switch bar yoke and the operating lever. For this purpose the legs of the lever 26 are provided with bays apertured in register at 40, while the sides of the yoke 33 are extended substantially above its pivoting axis 34 and provided with studs 41 which pass through arcuate slots 42 in the frame plates 23 and 24, and are engaged

with lost motion between the side margins of the holes 40 in the legs of the operating lever. This lost motion connection permits the operating lever to shift the spring abutment 39 toward the axis of oscillation of the switch bar yoke, the lugs 41 of the latter being then picked up by the sides of the hole 40 in the lever 26, thus establishing a positive connection between the lever and the yoke which causes the latter to positively rock on its axis in the direction of its movement under the throw of the switch spring 37 after the abutment 39 has crossed the axis 34 on which the yoke is pivoted. This positive connection between the parts is of special advantage in assuring the opening of the switch, since in some cases the frictional engagement between the blade 20 and the co-operating fixed contacts of the switch is so great as to exceed the biasing effort of the switch spring. In such case the throw of the operating lever in the direction to open the switch would fail to cause an interruption of the circuit were it not for the positive lost-motion, kick-off connection afforded in the present construction.

In the construction shown, the lugs 41 of the switch bar yoke are inward extensions of the studs, by means of which the switch bars are mounted on the yoke. This particular construction is not essential, however.

As above stated, the invention is not limited to any particular type of switch construction, and moreover, the details of shape and arrangement of the parts may be variously modified without departing from what I claim as my invention.

I claim—

1. In an electric switch having a toggle spring mechanism, a switch frame comprising a plate, a pivoted switch-operating lever lying on one side of said plate, a switch bar

carrier lying on the other side of said plate, said plate being apertured by a slot, a stud projecting through said slot from the switch bar carrier, and a lost-motion connection between said stud and the operating lever serving to initiate the throw of the carrier in the direction of the toggle action, together with a switch blade mounted on said carrier, said stud forming portion of the blade mounting.

2. In an electric switch, a slotted switch frame plate, a pivoted switch-operating lever arranged on one side of said frame plate and being apertured in register with said slot, a switch bar pivoted on a fixed axis and arranged on the opposite side of said plate and having a stud projecting through the slot in the frame into the aperture in the operating lever, and a spring operated toggle connection between the operating lever and switch bar.

3. In an electric switch, a switch frame plate, a pivoted switch operating lever arranged on one side of said frame plate, a pivoted switch bar arranged on the opposite side of said frame plate, a spring operated toggle connection between the switch operating lever and the switch bar, in combination with a stud carried by one of said members, the other member and the switch frame plate being transversely apertured in register to permit said stud to pass through the frame plate into lost motion engagement with the slotted member, the slot in said slotted member being of such dimensions that its engagement with the stud occurs substantially coincident with the shifting of the toggle joint from one side to the other of the axis of oscillation of the switch bar.

In testimony whereof I have signed my name to this specification.

GEORGE A. JOHNSON.