

No. 850,506.

PATENTED APR. 16, 1907.

C. J. TOERRING.
ELECTRIC SWITCH.
APPLICATION FILED NOV. 24, 1905.

Fig. 1.

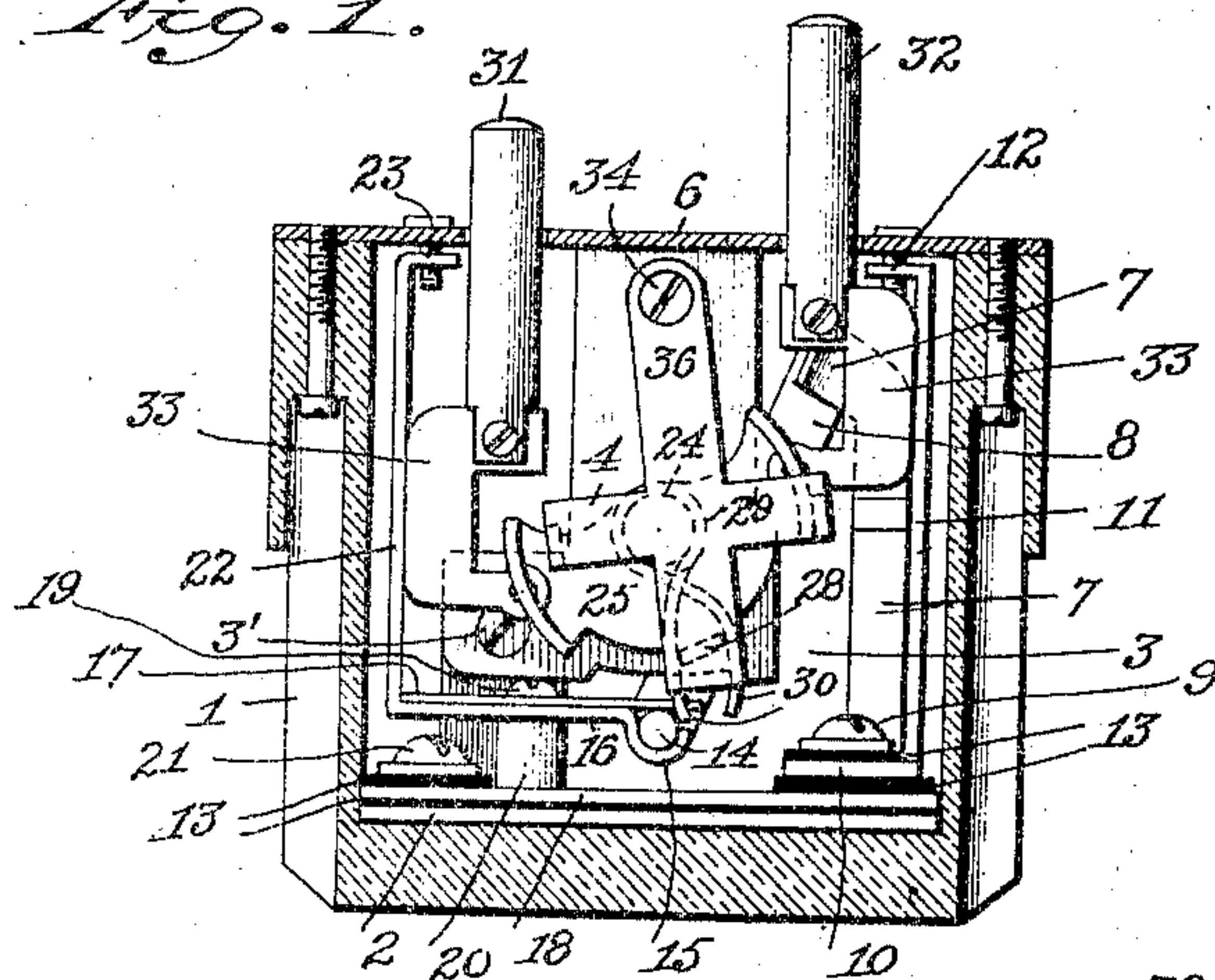


Fig. 4.

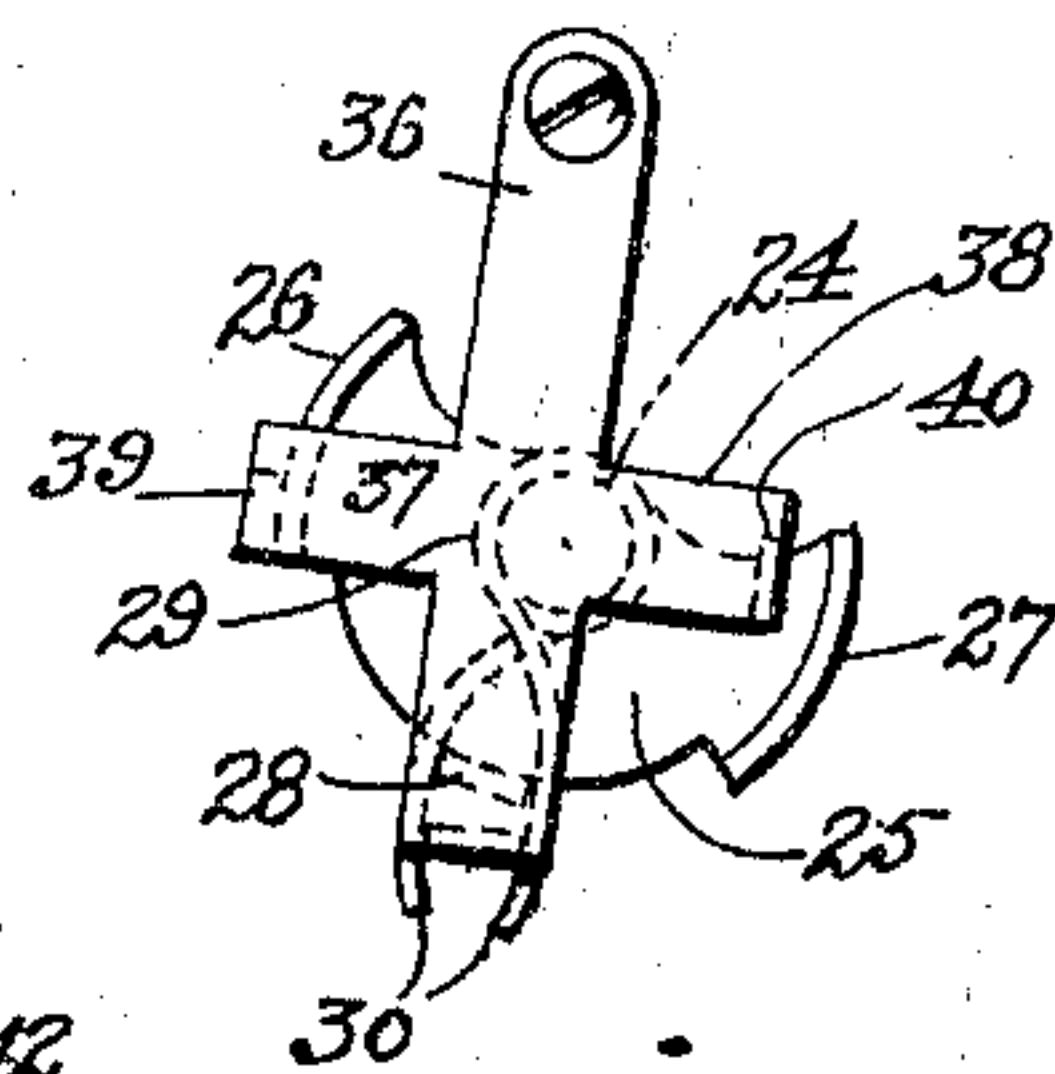


Fig. 2.

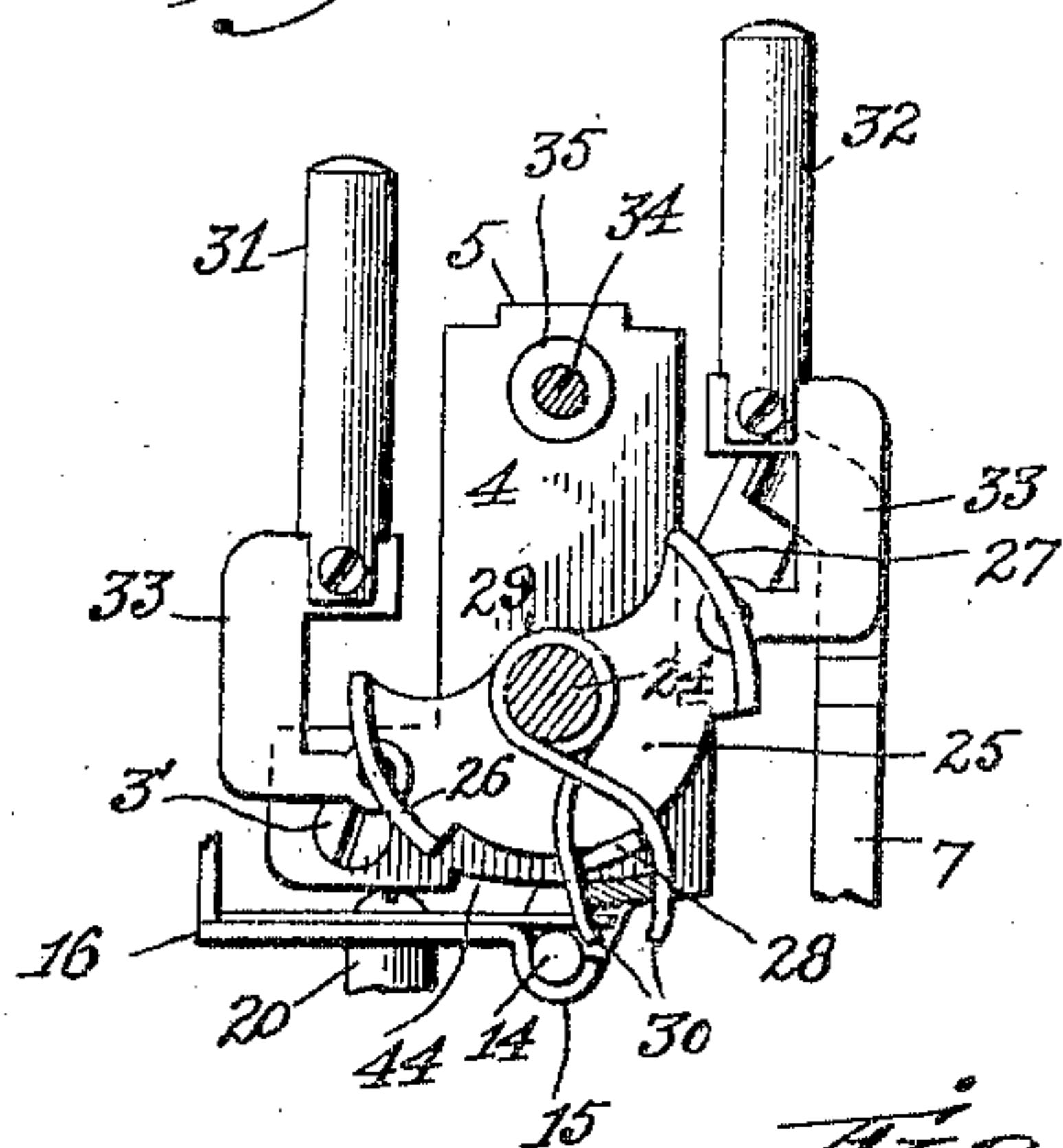


Fig. 6.

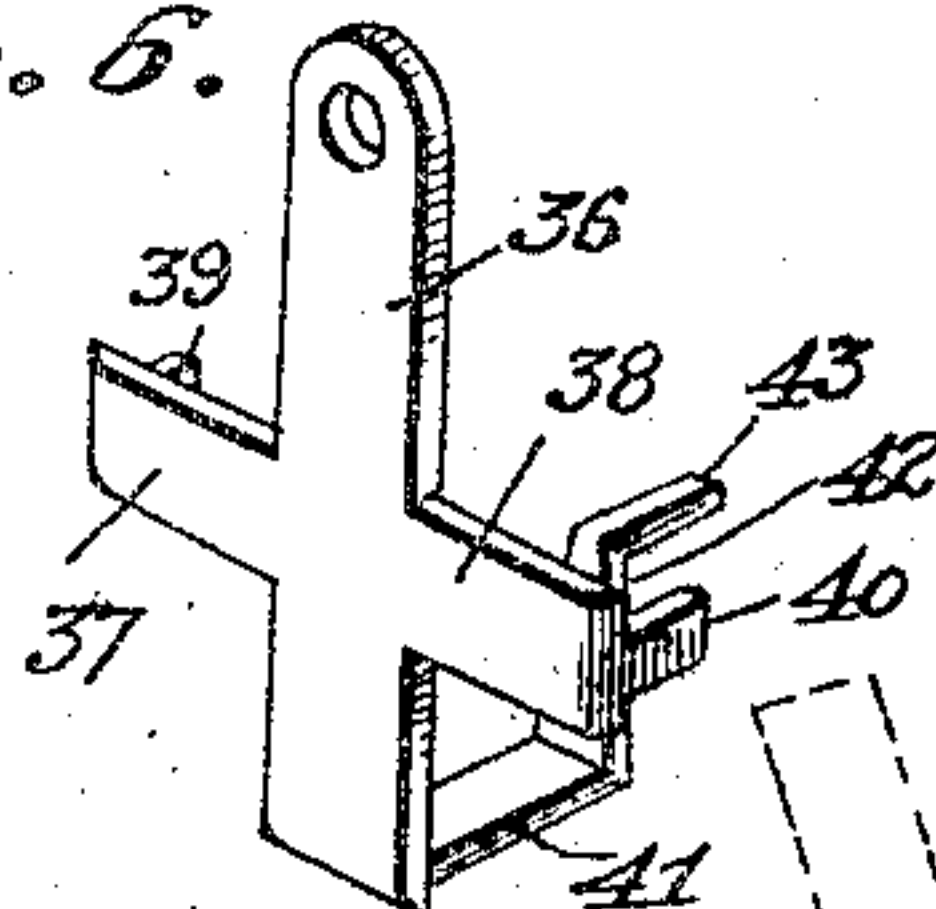


Fig. 5.

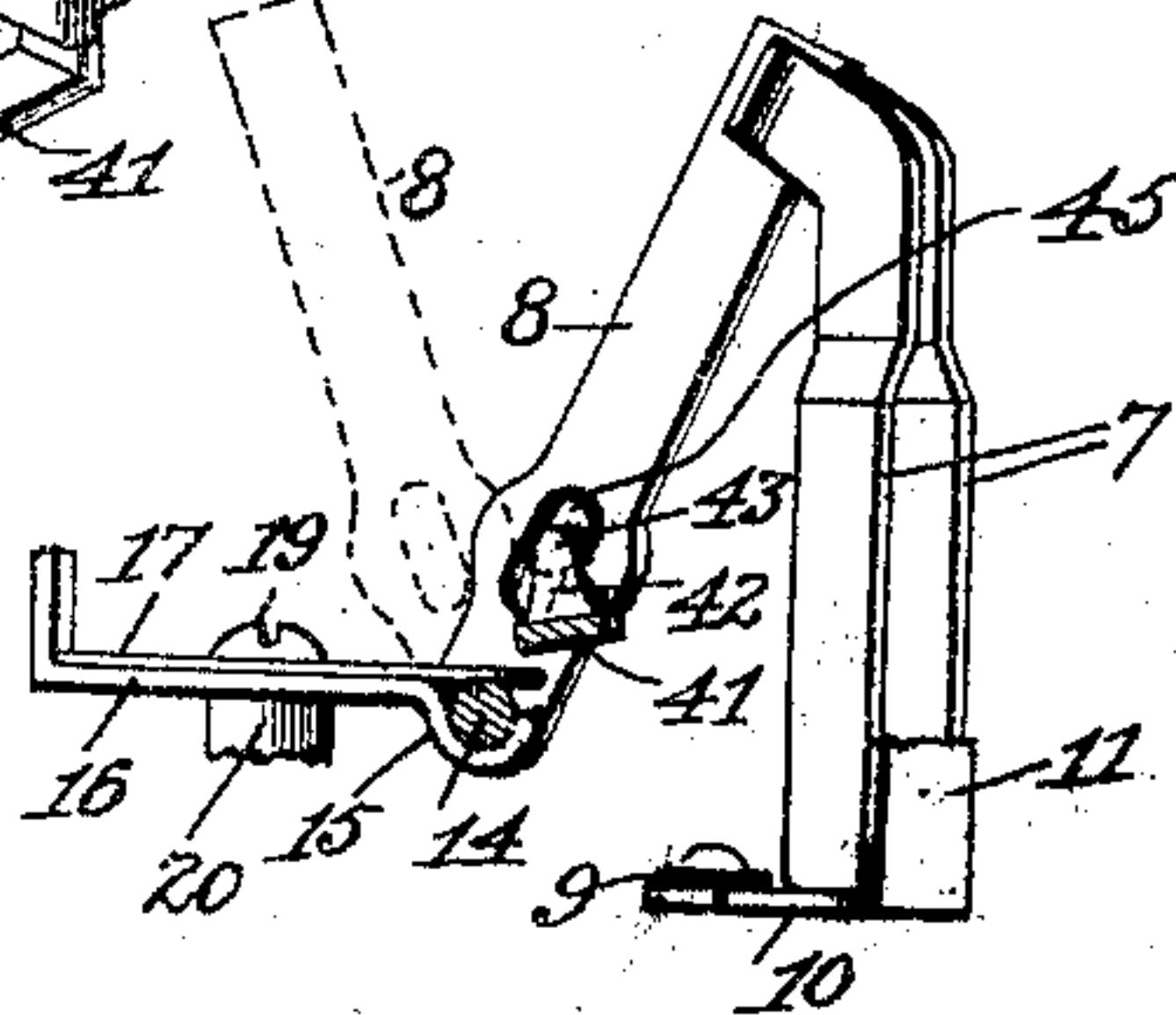


Fig. 7.

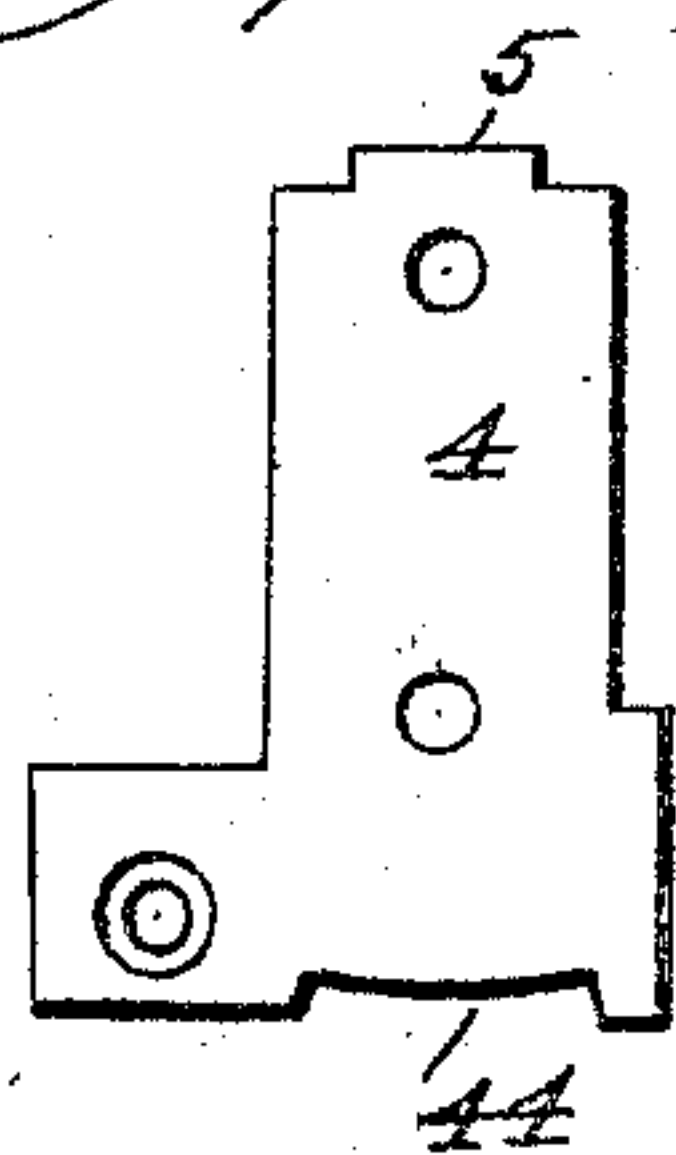


Fig. 3.

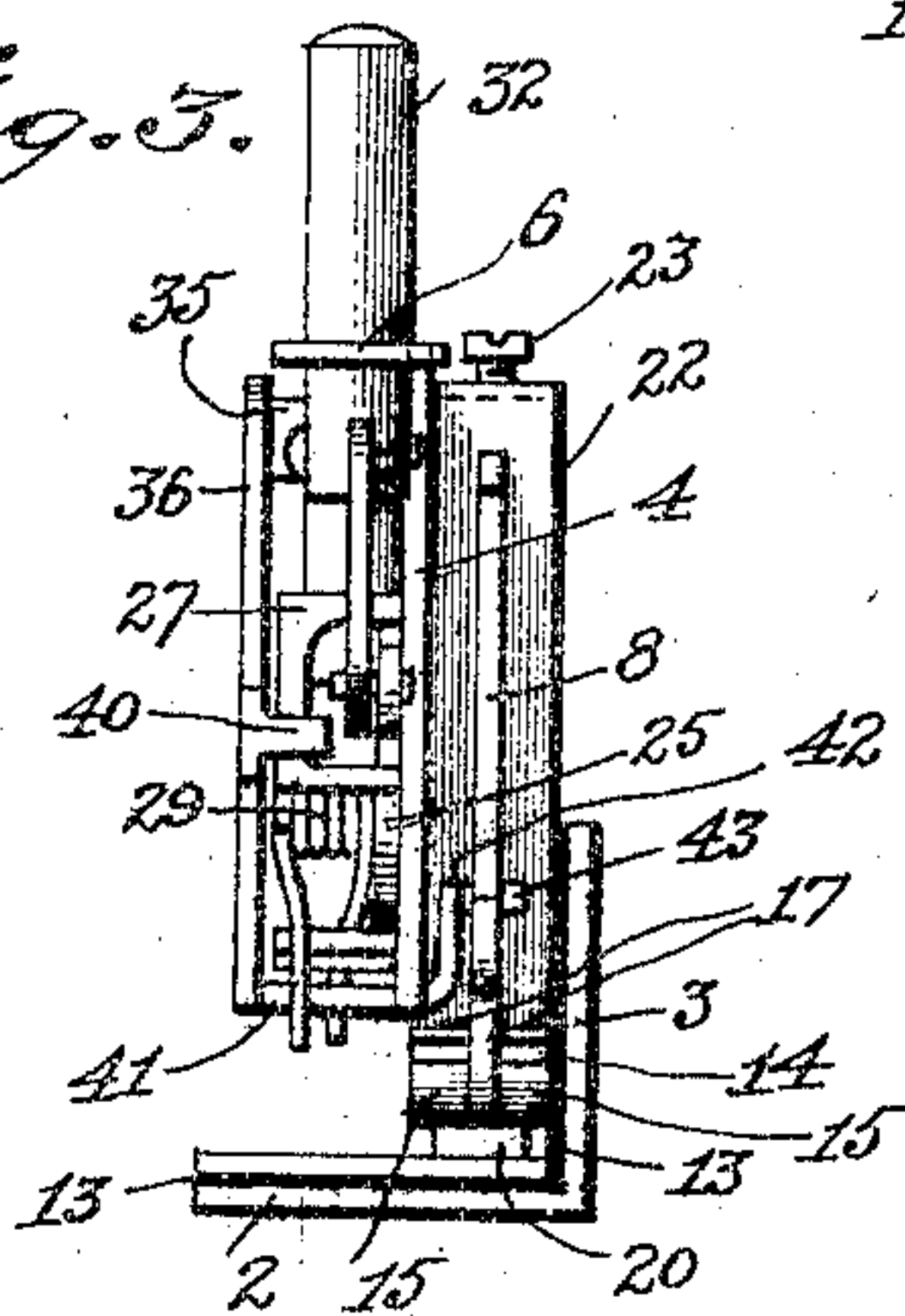
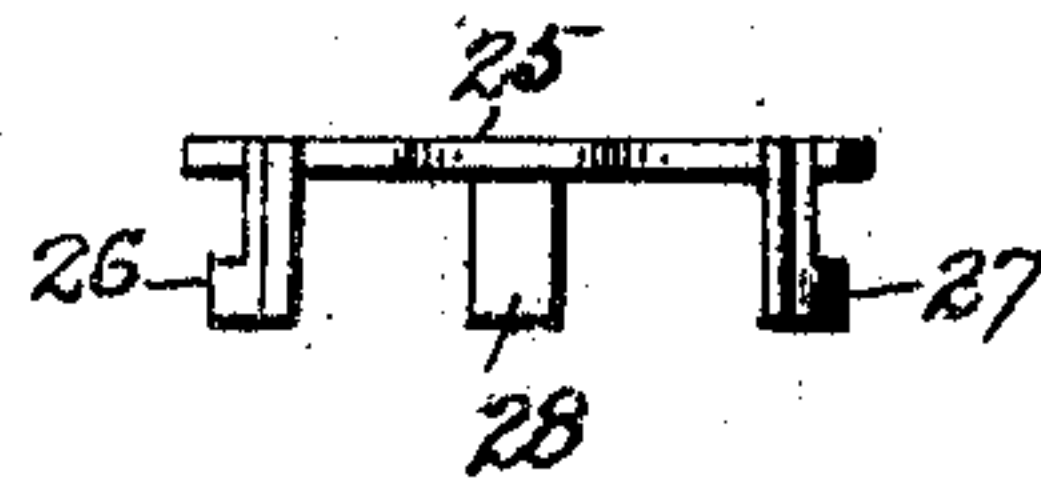


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHRISTIAN J. TOERRING, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC SWITCH.

No. 850,506.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed November 24, 1905. Serial No. 288,948.

To all whom it may concern:

Be it known that I, CHRISTIAN J. TOERRING, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

This invention has reference to improvements in electric switches of the two-button snap type.

The object of the present invention is to simplify the construction of this type of switches and to reduce the number of parts to a minimum.

The invention is directed especially to the switch-operating mechanism, which consists, essentially, of a latch operated by push-buttons and connected by a spring put under tension by the movement of the latch, with a swinging scape-lever, which latter in turn controls the movement of the switch-arm, the construction being such that the latch holds the scape-lever against movement until the spring is put under tension and then very suddenly releases it to throw the switch into or out of operation.

The improved switch construction also provides for a long throw of the switch-arm, so as to obviate any liability of forming an arc when the circuit is broken by opening the switch.

In the accompanying drawings, Figure 1 is a side elevation of the improved switch with the casing and top plate shown in section. Fig. 2 is a similar elevation with some parts removed and others shown in section. Fig. 3 is an end elevation of the switch removed from its casing. Fig. 4 is a detail view of the latch and scape-lever cooperating therewith. Fig. 5 is a detail perspective view of the fixed and movable contact members of the switch. Fig. 6 is a perspective view of the scape-lever, and Figs. 7 and 8 are detail views.

Referring to the drawings, there is shown a porcelain or other insulating casing 1 for the various parts of the switch, and this casing may be shaped as shown or may be otherwise shaped as needed. Secured within the casing at the bottom thereof is a base-plate 2, turned up at one edge 3, and secured by a screw 3' or otherwise to but spaced from this upturned edge 3 there is an upright plate 4, having its upper end formed with a tongue 5, lodged in another plate 6, secured to and extending across the top of the casing. The

several parts thus far described constitute the framework for supporting the switch members and the several operating parts therefor.

The switch proper, which is of the jack-knife type, is composed of two fixed spring-blades 7 and a pivoted switch arm or jack 8. The two blades 7 are joined at the lower ends and are there secured to the base 2 by a screw 9, passing through a lug 10, formed on the lower end of an upright 11. The latter terminates at the upper end in a binding-post 12 near the top of the casing 1. The screw 9 is insulated from the lug 10 and the latter is insulated from the supporting framework by mica or other insulation 13. The upper ends of the spring-blades 7 may be in contact, or nearly so, and have their free ends slightly flaring to receive the movable member or switch-arm 8, as is usual in this type of switch. The switch-arm 8 has its lower end provided with trunnions 14, journaled in saddle-bearings 15, formed on one end of a bar 16, the end of the bar being split and bent into proper shape to straddle the switch-arm 8 and receive the trunnions 14. These trunnions 14 are held in their seats by a spring-plate 17, fast on the upper side of the bar 16, and also split to straddle the arm 8 and bear upon the trunnions 14.

The bar 16 is secured to a plate 18 by a screw or rivet 19, but is separated from said plate 18 by a spacing-sleeve 20, surrounding the screw, and the said plate 18 is secured to the base-plate 2 by the screw 9 and another screw 21, but is insulated from said base-plate by mica or other insulation 13, as shown. The end of the bar 16 remote from the bearings 15 is formed into an upright 22, terminating in a binding-post 23 near the top of the casing 1.

The two binding-posts 12 and 23 are designed to receive the terminals of the circuit in which the switch is to be included, and the course of the current will be from the binding-post 12, through the upright 11 to the blades 7, thence to the switch-arm 8, through the bar 16 and upright 22 out through the binding-post 23. Good contact is maintained between the switch-arm 8 and bar 16 by virtue of the spring 17, which, bearing upon the trunnions 14, will hold the latter firmly in their seats and will insure good rubbing contact between the moving parts.

The switch-arm and its cooperating members are all located on one side of the plate 4,

while the means for operating the switch-arm 8 are located on the opposite side of the plate 4, and these operating means I will now describe.

5 Projecting from the plate 4 on the side opposite the switch-arm is a stud 24, upon which an approximately semicircular plate 25, forming the latch, is axially mounted. At equal distances on opposite sides of the
10 axis this latch-plate is formed with two laterally-projecting lugs or pallets 26 27, and midway between these two pallets 26 27 on the rim of the plate 25 there is a lug 28. Surrounding the stud 24 are several convo-
15 lutions of a helical spring 29, and the ends of this spring cross each other and straddle the lug 28 of the latch 25. The two pallets 26 and 27 are curved on an arc struck from the axial center of the latch 25 and are slotted,
20 as shown in Figs. 3 and 8, for a purpose that will presently appear. The latch 25 is rocked on its axis by means of push-buttons 31 32, passing through guiding-holes in the plate 6, and these push-buttons are pivotally
25 connected to the latch by means of U-shaped links 33, each of the latter having one of its legs entering the slot formed in the pallet 26 or 27 and pivotally secured to the plate 25 of the latch.

30 Pivotally secured to the plate 4, near the upper end thereof, by a screw or stud 34, but removed a short distance therefrom by a spacing-sleeve 35, is a pendent scape-lever 36, having about midway of its length two
35 laterally and oppositely extending arms 37 38, terminating in fingers 39 40, respectively, projecting toward the plate 4 at right angles to the said arms 37 38. At the lower end the lever 36 has a lateral extension 41 parallel
40 with and extending for a distance in the same direction as the fingers 39 40, and it is then bent upwardly parallel with the main stem of the lever 36, as shown at 42, and finally terminates in a tooth 43, parallel with
45 the part 41 and directed away from the main stem of the lever 36. This scape-lever 36 is mounted to swing over and close to the free end of the stud 24, thus confining the spring 29 thereon, while the arms 37 and 38
50 are of such length that when the lever is swung in one direction—say to the position shown in Fig. 1—the finger 40 will be outside the pallet 27 and the finger 39 will be inside the pallet 26, while when the lever 36 is swung
55 in the other direction—say to the position shown in Fig. 4—the finger 39 will be outside the pallet 26 and the finger 40 will be inside the pallet 27. The extension 41 passes under and to the other side of the plate 4 through a
60 recess 44 in the lower edge of the latter. The length of this recess determines the extent of travel of the lever 36 around its pivot 34, the end walls of said recess being on the path of the extension 41.

65 The upwardly-bent portion 42 of the ex-

tension 41 is located between the switch-arm 8 and the plate 4, and the tooth 43 enters a slot 45, formed in the switch-arm 8 above the trunnions 14. To prevent electrical contact
70 between the stud and the slot, either the former is made of insulating material or the latter is lined with insulating material, or any other means for insulating the parts may be employed. When the lever 36 is
75 swung around its pivot, the switch-arm 8 will be moved thereby to a corresponding extent, the parts being so arranged that when the lever 36 is moved to the right, Fig. 1, the switch-arm 8 will be forced between
80 the blades 7, and when the lever 36 is moved to the left the switch-arm will be carried around its bearings to a point remote from the blades, as indicated in dotted lines, Fig. 5. The spring-blades 7 are located near one
85 end of the casing 1, and the trunnions 14 of the switch-arm are located at a point about midway of the length of the casing. Therefore the switch-arm when in the "open" position will be near the end of the casing re-
90 mote from the spring-blades 7. Thus the two members of the switch when the circuit is broken are separated to such an extent as to preclude the formation and maintenance of an arc with any current that the switch
95 would be called upon to carry.

The two ends 30 of the spring 29, beside straddling the lug 28 of the latch, also straddle the extension 41 of the lever 36, which extension 41 is normally beneath the said
100 lug 28.

Assuming the parts to be in the position shown in Fig. 1, where the switch is indicated as closed, and it is desired to open the switch, the operator presses the button 32. This
105 moves the latch 25 around its pivot, causing the lug 28 to engage that spring end 30 which is in its path and carry said spring end with it away from the other spring end 30, which latter is prevented from following by its engagement with the extension 41 of the
110 lever 36. The said lever 36 is prevented from moving under the stress of the spring exerted through the spring end 30 back of and bearing against the extension 41 by the pallet 27, which in this position is in the path
115 of the finger 40. As the latch continues its movement the spring is put under greater and greater tension until finally the pallet 27 clears the finger 40, and the spring, now wound up to nearly its full extent, suddenly
120 throws the lever 36 to the left, as viewed in Fig. 4 until stopped by the engagement of the extensions 41 with the left end of the recess 44 in the plate 4. While the pallet 27 was being moved downward past the inner
125 face of the finger 40 the pallet 28 was being moved upward and out of the path of the finger 39, the push-button 31 being at the same time pushed outward through the plate 6. The switch is now open and the push-button
130

32 has been pushed into the casing to its fullest extent. The spring end 30 in the path of the lug 28 during the described movement is in this position still under tension, since this lug has a greater range of travel than the extension 41. When the push-button 32 is released, the spring will return the latch 25 backward for a limited distance until the lug 28 and the lever extension 41 coincide and the two ends 30 of the spring 29 bear against both the lug 28 and extension 41 equally on both sides. This return movement of the latch 25 has brought the pallet 26 into the path of the finger 39, and the switch is therefore locked in the open position. If it be now desired to close the switch, the push-button 31 is pressed inward and the cycle of operation is repeated, but in the reversed direction.

It will be understood that the base-plate 2, with its upturned edge 3 and the plate 18, may all be omitted, and the parts supported thereby may be connected directly to the casing 1, as is common in porcelain-incased switches.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a two-button snap electric switch, a rocking pallet-latch operated by push-buttons and mounted upon a fixed stud, a spring carried by said stud and arranged to

be tensioned by said latch, a swinging scape-lever movable across the end of the stud and controlled by the latch and moved by the spring when released by the latch, in combination with fixed blades connected to one circuit-terminal and a pivoted switch-arm connected to the other terminal, the said switch-arm being connected to the scape-lever at a point near its pivot whereby the free or contact end of the switch-arm has a long range of movement, substantially as described.

2. An electric switch comprising a fixed member connected to one circuit-terminal and a movable member or pivoted switch-arm connected to the other circuit-terminal, in combination with a swinging scape-lever connected to the switch-arm near its pivot, a rocking latch controlling the scape-lever and itself connected to operating push-buttons, and a spring tensioned by the movement of the latch and operating through the scape-lever to throw the switch-arm when the said scape-lever is released by the latch, substantially as described.

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

CHRISTIAN J. TOERRING.

Witnesses:

MARY E. INMAN,
ALBERT FLAVIN.