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1,451,570

F. P. GATES

ELECTRIC SWITCH

Filed Dec. 9, 1919

Fig. 1.

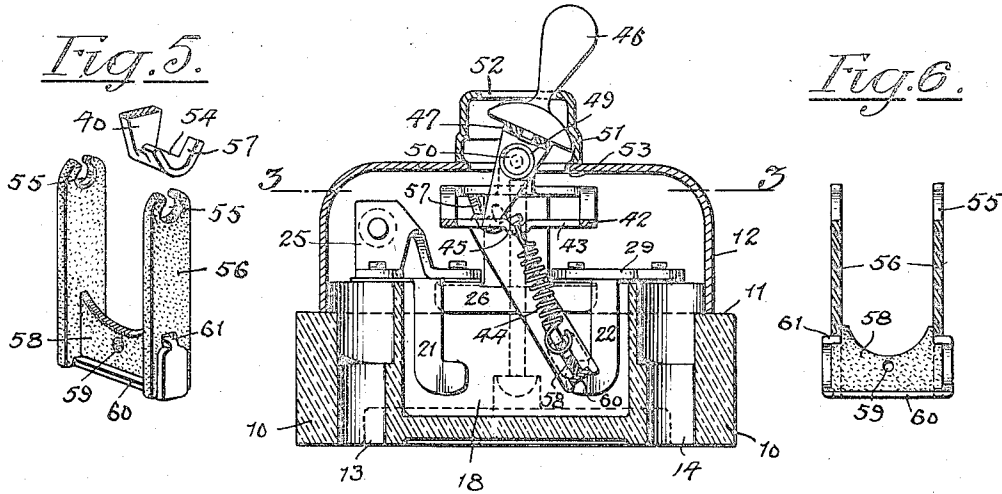


Fig. 5.

Fig. 6.

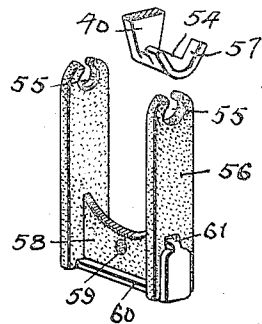
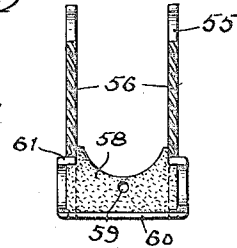


Fig. 2.

Fig. 3.

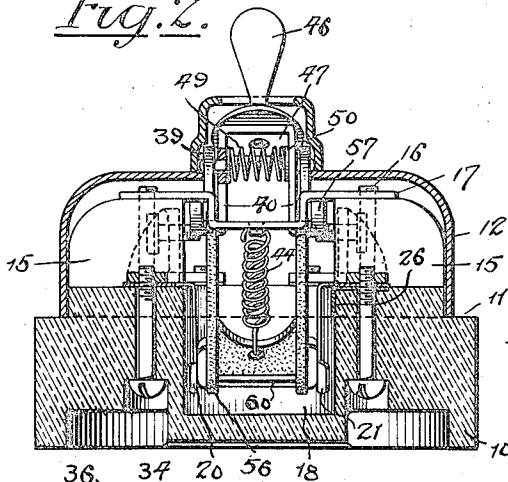
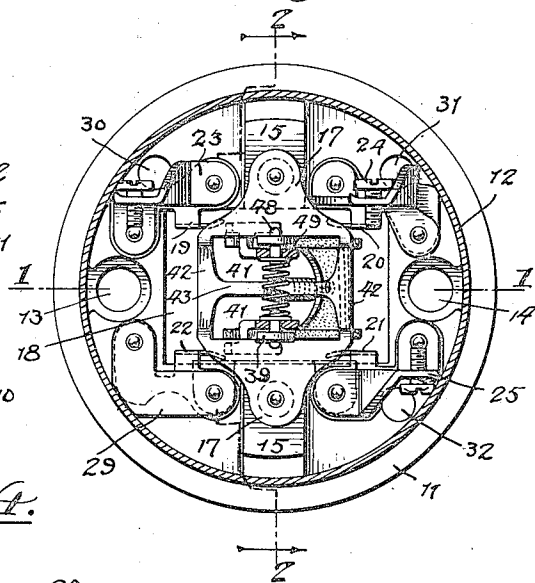
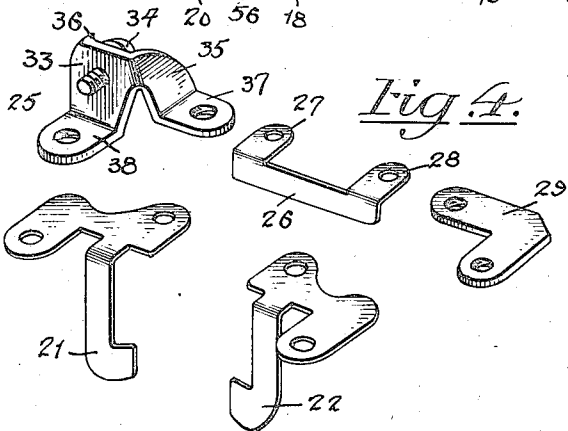


Fig. 4.

Inventor:

FREDERIC P. GATES

by his Attorneys,

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UNITED STATES PATENT OFFICE.

FREDERIC P. GATES, OF WEST HARTFORD, CONNECTICUT, ASSIGNOR TO THE ARROW ELECTRIC COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ELECTRIC SWITCH.

Application filed December 9, 1919. Serial No. 343,503.

To all whom it may concern:

Be it known that I, FREDERIC P. GATES, a citizen of the United States of America, residing at West Hartford, in the county of Hartford 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 a switch of the toggle type, the object of my invention being to provide a switch of this type having certain features of novelty hereinafter described or shown in the accompanying drawings, in which—

Fig. 1 is a vertical section on the line 1—1 Fig. 3 through a surface switch in which my invention is embodied in one form;

Fig. 2 is a section on the line 2—2 Fig. 3;

Fig. 3 is a section on the line 3—3 Fig. 1;

Fig. 4 is an exploded perspective of certain of the switch terminals;

Fig. 5 is a perspective of the oscillating switch bar; and

Fig. 6 is a vertical section therethrough.

In the surface switch illustrated, the insulating base 10 is shouldered at 11, as usual, to afford a seat for the switch cover 12, and is pierced at 13 and 14 to receive the securing screws by means of which the base is mounted on any suitable support. A barrier rib 15, in two parts, extends across the upper face of the base, and the switch frame is mounted thereon by means of screw bolts 16 passing through the base and rib and taking into the supporting arms 17 of the frame which overlie the ends of the rib. The base is centrally recessed at 18 to afford a well within which are located the switch terminals.

The well 18 is here shown of rectangular shape, and at its four corners are located the switch terminals 19, 20, 21 and 22. Three of these terminals have associated therewith binding screw wire terminals 23, 24 and 25, while the switch terminal 22 is connected to the switch terminal 21 by a bridge strap 26, the lugs 27 and 28 of which respectively underlie the binding screw terminal 25 and the clamping plate 29, by which the switch terminal 22 is held in position.

In order that the circuit wires may be led to the several binding posts, the base is apertured at 30, 31 and 32 adjacent the several

binding screw posts. Attention is drawn to the shape of these binding screw terminals. As here shown each comprises a standard 33 (Fig. 4) tapped to receive a binding screw 34. A wing piece 35 is offset at right angles to the standard 33 and forms an inclined guide which confines the bared end of the leading-in wire beneath the head of the binding screw 34. An offset corner lug 36 on the standard cooperates to this end. The lower end of the wing 35 is offset to form a foot piece 37 which extends in a direction at right angles to the foot piece 38 offset from the base of the standard 33. A very secure anchorage for the binding screw terminal is thus afforded, while the wire beards are completely housed in against accidental escape.

The switch frame is struck from sheet metal and pressed to shape. It is of skeleton type, and has apertured lugs 39 angled upwardly, in which the operating rocker 40 is journaled. Between the supporting arms 17 of the frame the skeleton body of the latter is offset and is apertured at 41 to permit the switch parts to play therein, while the side bars 42 form stops which limit the throw of the switch mechanism. A bridge 43 extending between the bars 42 supports one end of the switch spring 44 and is preferably depressed at 45 to locate the spring end in a definite position thereon.

The switch operating rocker 40 is of yoke shape, the thumb piece 46 being riveted to the cross bar 47. The legs of the rocker are apertured to accommodate bearing studs 48 pressed outward by an interposed coil spring 49 and projecting beyond the outer faces of the up-standing lugs 39 on the frame. Flanges 50 at the inner ends of the studs limit the outward movement thereof under the action of the spring 49. The cover 12 has a nipple 51 secured thereto, within which the upper end of the rocker 40 works, and through the top opening 52 in which the thumb piece 46 passes. The base of the nipple is slightly spaced from the margin of the opening in the top of the switch cover 12 to afford what is, in effect, an internal rib 53. This rib is engaged beneath the spring studs 48 when the cover is pressed down into position, and the cover is thus removably held upon the switch base.

At the lower ends of the legs of the rocker

40 are outwardly offset lugs 54 which engage in bearing notches 55 in the upper ends of the yoke shaped switch lever 56. The thickness of the legs of the switch lever is such that the notched ends thereof are confined freely between the legs of rocker 40 and the arcuate heads 57 formed at the ends of the lugs 54. The switch lever comprises side bars of insulating material, spaced at their free ends by a transverse shouldered bridge piece 58 of like material, taking into end slots in the side bars, and pierced at 59 to receive one end of the switch spring 44. The switch bar 60 overlies the bridge piece 58, and its bent around ends have lugs 61, which are engaged between the shoulders of the bridge piece 58 and the bottom of the notches in the side bars of the switch lever 36, under the pull of the switch spring 44.

The operation of the switch is readily understood. In normal position the toggle joint between the rocker 40 and the switch lever 56 lies to one side of the point 45 at which the switch spring 44 is suspended from the frame. When the thumb piece 46 is swung on its axis 48, the upper end of the switch lever is moved to the opposite side of the point of suspension of the spring 44, the spring being simultaneously tensioned by the downward displacement of the switch lever 56. As soon as the upper end of the latter passes the point 45, the spring 44 now under increased tension, exerts its effort in the opposite direction and throws the switch lever 56 across to its second position. It will be noted that in the position shown in Fig. 3 the switch bar 60 bridges the terminals 20 and 21, thus establishing the circuit between the wires led through the apertures 31 and 32. In its second position it bridges the terminals 19 and 22, now connecting therefore the wires entering the switch through the holes 30 and 32. In both positions of the switch the main 32 is thus electrically connected to the switch bar and the current is distributed by the latter to the mains 30 and 31 through the switch terminals 19 or 20.

The metal parts are all readily made from sheet metal struck to shape. The parts are readily assembled, and the throw of the switch is sufficient to break a very heavy current. Modifications in details of construction, which do not depart from what I claim as my invention, will readily occur to those skilled in the art, and certain features of construction may be embodied in switches other than surface switches, as will be readily understood.

I claim—

1. In an electric switch, an oscillating rocker, a floating switch bar member pivotally connected therewith, a switch spring, one end of which is operatively connected to said switch bar member, in combination with

a skeleton switch frame having an integral bridge piece extending at right angles to the axis of the rocker and affording a fixed support for the other end of the switch spring, a pivot joint between the rocker and switch bar member moving from one side to the other of said point of fixed support of the spring on the actuation of the rocker.

2. An electric switch comprising a skeleton switch frame having an integral bridge extending between the ends of the frame, a rocker pivoted on the frame and having legs straddling said bridge and working between the ends of the frame, a switch bar yoke pivotally connected to the rocker, a switch spring anchored at one end to the bridge, and at its other end to the switch bar yoke, and means for actuating the rocker to shift the joint between the same and the switch bar yoke from one side to the other of the anchorage of the switch spring on the bridge piece of the frame.

3. In an electric switch, a switch frame having supporting wings apertured to receive securing means, offset lugs shaped to afford a bearing, a skeleton web integral with said supporting lugs and having a bridge piece extending between the ends of the web, a rocker pivoted on said offset lugs and working within said frame between the ends of said web, a switch bar yoke pivoted on said rocker, a switch spring anchored at one end to said bridge piece of the web, and at its other end to the switch bar yoke, and means to actuate said rocker to shift the joint between the rocker and switch yoke from one side to the other of the anchorage of the switch spring on the bridge piece of the frame.

4. In an electric switch, a switch frame having supporting arms, upstanding lugs adapted to form a pivotal support for a rocker, and a depressed skeleton body extending between said supporting arms and forming a limiting stop for the rocker, together with a bridge member in said skeleton body adapted to support one end of a switch spring.

5. In an electric switch, a switch lever yoke comprising independent legs and cross piece of insulating material, and a switch spring engaging said cross piece to hold the parts assembled.

6. In an electric switch, a switch lever yoke comprising independent legs and cross piece of insulating material, and a switch spring engaging said cross piece to hold the parts assembled, together with a switch bar freely engaged and carried by said cross piece.

7. In an electric switch, a pivoted rocker yoke, a cooperating switch lever yoke, an open bearing between the ends of the rocker and switch, said switch lever comprising insulating and conducting elements freely as-

sembled in combination with a switch spring supporting said switch lever and serving not only to maintain said parts assembled, but also to maintain the joint between the switch lever and the rocker.

8. In an electric switch, a base, a switch frame mounted thereon, a cover enclosing the frame, spring studs mounted in the frame and engaging the cover to hold the latter in position on the base.

9. In an electric switch, a base, a switch frame mounted thereon, a rocker, spring studs mounted in the frame and on which said rocker is journaled, in combination with a switch cover engaged by said studs to hold the latter in position on the base.

10. In an electric switch, an insulating base having a rectangular recess, switch terminals in the corners of said recess, wire terminals associated with three of said switch terminals, and a bridge strap arranged in said recess and having at its opposite ends offset lugs adapted to overlie one of the side walls of said recess and connecting the fourth switch terminal to another switch terminal having an associated wire terminal in combination with a switch bar engaging said last-mentioned switch terminals in different positions.

11. In an electric switch, a binding screw terminal comprising a standard with offset foot piece, an inclined wire-housing wing extending substantially at right angles to said standard and having a foot piece extending at an angle to that of the standard, together with a binding screw engaged in said standard and having its head partially housed-in by said wing on the standards.

12. In an electric switch, a binding screw terminal comprising a standard with offset foot piece, an inclined wire-housing wing extending substantially at right angles to said standard and having a foot piece extending at an angle to that of the standard, together with a binding screw engaged in said standard and having its head partially housed-in by said wing on the standard, together with a switch terminal having an offset base underlying the foot pieces of the binding

screws and clamped thereby, substantially as described.

13. In an electric switch, a skeleton frame centrally apertured and having upstanding lugs from the opposite sides of said aperture, a switch lever comprising a pair of legs pivoted on said lugs and extending through the aperture in the frame, lugs offset outwardly beneath the frame at the lower ends of said legs, a switch bar yoke pivoted on said lugs, and ears on said lugs adapted to engage the lower face of the frame to limit the oscillation of the operating lever.

14. In an electric switch, a skeleton frame centrally apertured and having upstanding lugs from the opposite sides of said aperture, a switch lever comprising a pair of legs pivoted on said lugs and extending through the aperture in the frame, lugs offset outwardly beneath the frame at the lower ends of said legs, a switch bar yoke pivoted on said lugs, and ears on said lugs adapted to engage the lower face of the frame to limit the oscillation of the operating lever, said ears being spaced from the lugs of the lever and serving as retaining means to prevent the escape of the switch yoke arms from said lugs.

15. In an electric switch, a skeleton frame centrally apertured and having upstanding lugs from the opposite sides of said aperture, a switch lever comprising a pair of legs pivoted on said lugs and extending through the aperture in the frame, rounded lugs offset outwardly beneath the frame at the lower ends of said legs, a switch bar yoke pivoted on said lugs, and ears on said lugs adapted to engage the lower face of the frame to limit the oscillation of the operating lever, said switch bar yoke having open bearings engaging said lugs, together with a switch spring engaging said yoke and serving to hold said bearings in engagement with the rounded face of said lugs on the operating lever.

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

FREDERIC P. GATES.