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R. B. BENJAMIN

ELECTRIC SWITCH

Filed May 19, 1919

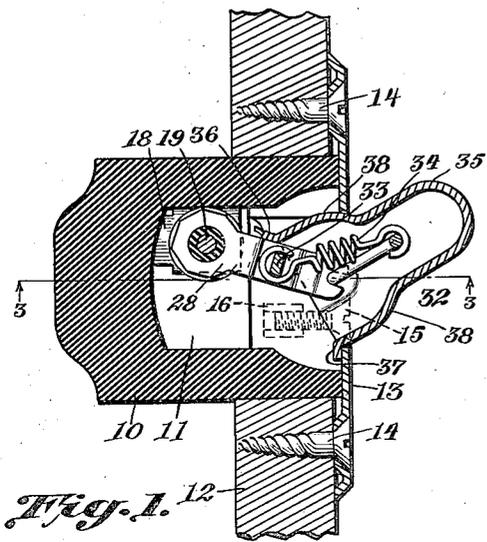


Fig. 1.

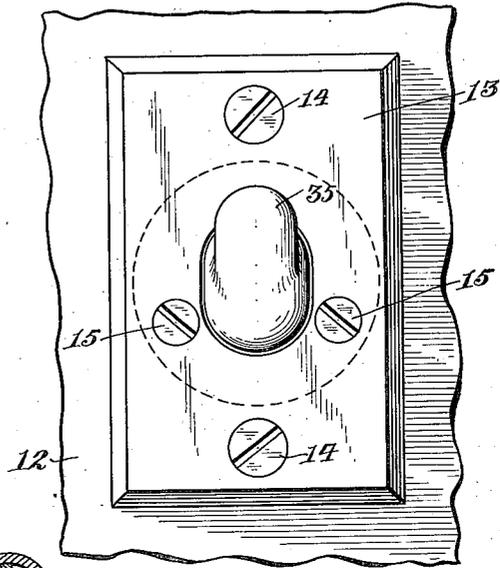


Fig. 2.

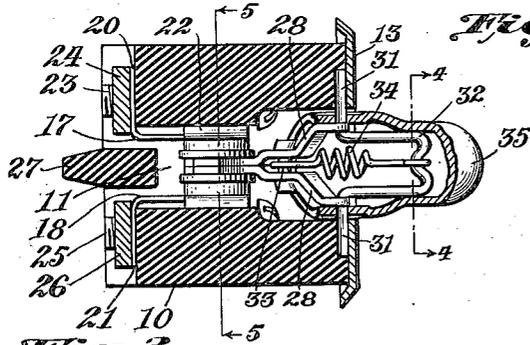


Fig. 3.

Fig. 4.

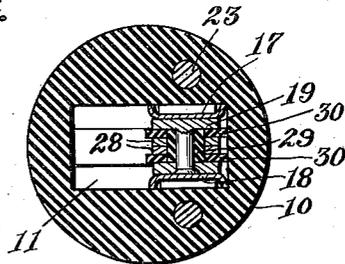


Fig. 5.

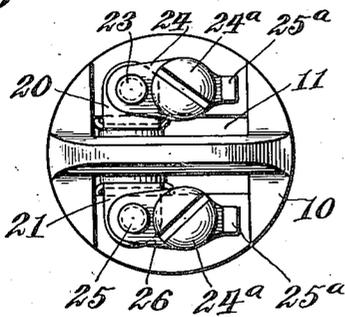


Fig. 6.

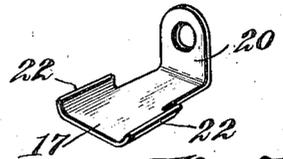


Fig. 7.

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UNITED STATES PATENT OFFICE.

REUBEN B. BENJAMIN, OF CHICAGO, ILLINOIS, ASSIGNOR TO BENJAMIN ELECTRIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTRIC SWITCH.

Application filed May 19, 1919. Serial No. 298,240.

To all whom it may concern:

Be it known that I, REUBEN B. BENJAMIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electric Switches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

The present invention relates to electric switches and more particularly to switches of simple construction which are manually operated to make and break electric circuits.

The principal object of the invention is to provide a switch of few and rugged parts which will be extremely compact.

Another object is to so construct and arrange the parts that the switch will be efficient in operation and yet cheaply and readily manufactured.

It is also desirable to provide a switch having these characteristics in which there shall be a snap action of the movable contact although certain features of the invention may be practiced without the provision of such snap action. In carrying out my invention I provide a switch which is adapted for use in many locations but in providing the same I have particularly in mind the production of a switch for use upon the dash board of an automobile.

With these general objects in view, we may now proceed to a consideration of the specific form of the invention which is presented in the following detailed description and the accompanying drawing. The scope of the invention will be particularly pointed out in the appended claims.

In said drawing, Fig. 1 is a central vertical section of a switch constructed in accordance with my invention;

Fig. 2 is a front elevation of the same;

Fig. 3 is a horizontal section taken on a plane indicated by the line 3—3 of Fig. 1;

Fig. 4 is a transverse section taken on a plane indicated by the line 4—4 of Fig. 3;

Fig. 5 is a transverse section taken on a plane indicated by the line 5—5 of Fig. 3;

Fig. 6 is a rear view of the main switch supporting member; and

Fig. 7 is a perspective view of one of the fixed contacts of the switch. Throughout these views like characters refer to like parts.

Referring to the drawing in detail, 10 designates the main supporting member of the switch parts. This member is composed of any suitable insulating material, such as one of the many insulating compounds now on the market. This member 10 is provided with a central chamber 11 which is open at its forward end. The member 10 extends through a circular aperture in the dash board or other support 12. An escutcheon plate 13 is secured to the front of the dash board by screws 14 and to the insulating member 10 by screws 15. Each screw 15 is threaded into a nut 16 which is positioned in the member 10 near the bottom of the screw hole. Preferably, this nut is placed in position at the time the member 10 is molded.

The fixed switch contacts 17 and 18 are located in the chamber 11 of the insulating member 10 and connection is established between them by a movable bridging contact 19. The fixed contacts have the shape illustrated in Fig. 7, wherein the contact 17 is shown provided with a terminal extension 20. The contact 18 is provided with a similar extension 21. The edges of the contacts 17 and 18 are curved as indicated at 22 so as to properly guide the bridging contact as it passes into engagement with them. The contact 17 is secured in place by a screw 23 which passes through openings in the member 10, extension 20, and terminal plate 24. The screw is threaded into plate 20 which thus serves as a nut. A similar screw 25 and plate 26 are used to hold the contact 18 in position. Connection may be made with the contacts 17 and 18 through the terminal plates 24 and 26. Each of these plates is provided with a binding screw 24^a which cooperates with a projection 25^a when connecting the bared end of the circuit wire. To prevent interference between the bared portions of the wires which are secured to the switch terminals, I provide an insulating barrier 27 which occupies a position between the terminals of the switch and extends outward a short distance from the main portion of the insulating member 10. This barrier is preferably composed of the same material as member 10 and is preferably integral with it.

The bridging member 19 is made up of two outer plates and an intervening riveting members, as clearly illustrated in Fig. 110

5. This bridging contact 19 is supported at the end of two arms 28. The bridging member 19 is insulated from these arms by a suitable insulating sleeve 29 and washers 30.

5 These various parts are assembled as illustrated in Fig. 5, and then the head of the rivet of the member 19 is formed so as to hold them all compactly together. The opposite end of the arms 28 are spaced apart

10 as clearly illustrated in Fig. 3. These arms are notched at their ends so as to fit over the pivotal portions 31 of the U-shaped member 32. The members 28 and 32 therefore have a common pivotal axis. These members

15 constitute links of a toggle by which a snap action is given to the movements of the bridging contact 19. The spaced arms 28 are connected by a pin or struck up portion 33 which serves as a connection for one end

20 of a coiled spring 34 whose other end is secured to the center of the toggle member 32. The pivotal extensions 31 of the member 32 rest in recesses in the face of the insulating member 10 and are held in place

25 therein by the escutcheon plate 13. In this way the insulating member 10 and escutcheon plate 13 form a support for the pivotal extensions 31.

The handle or actuating member of the

30 switch is provided by a bell-shaped or cup-shaped member 35. This member extends outward through an aperture in the escutcheon plate 13 and is pivotally mounted on the pivotal extensions 31. The open end

35 of the member 35 is toward the chamber 11 and the construction is such that the snap action mechanism including the toggle members 28 and 32 with the spring 34, are located within the chamber 11 and the interior

40 of the member 35. By this construction a very compact arrangement is provided. The upper and lower edges of the open end of the member 35 are provided with lips or

45 extensions 36 and 37 which engage the adjacent edges of the escutcheon plate 13 to limit the to and fro movements of the actuating member 35. These extensions in this way serve as stops. The member 32, which

50 consists of a bent piece of wire, is shaped so as to closely fit within the innermost portion of the bell-shaped member 35 and consequently the member 32 cannot move relative to the member 35 but must move with it.

55 In operation it will be seen that if the parts are in the position illustrated in Fig. 1, the circuit between the terminals of the switch will be closed. If then the outer end of the actuating member 35 be pushed downward,

60 the parts 32 and 35 will move about the pivots 31 and the spring 34 will be stretched. This will continue until the point of contact between the members 28 and 32 and the center, line of the spring 34 pass. When this occurs, the spring will be free to exert its pull

65 upon the arms 28 and thereby quickly throw

the bridging contact 19 to its open position. It will be apparent that an upward movement of the actuating member 35 will produce a reverse action. It will be seen that the curvature of the actuating member 35

70 at the points 38 is such that the opening through the escutcheon plate is always filled and a uniform clearance exists between these two members. It will also be seen that the lips 36 and 37 upon the actuating member 35

75 engage the arms 28 in their extreme positions and thus serve as stops to limit the movements of the bridging contact 19.

The switch parts which conduct electric current are composed of copper or other

80 good conducting material, the other switch parts, except the insulating members heretofore referred to, are also preferably composed of metal and in most cases consist of

85 punchings, as will be apparent from an inspection of the drawing. By this construction the initial cost of the switch is reduced to minimum without in any way decreasing

90 from its ruggedness or efficiency in service.

It will, of course, be understood that in

95 carrying out my invention many minor changes may be made in the structure shown and described without in any way departing from the spirit of the invention. I therefore aim to cover all such changes by the

100 terms of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In an electric switch, a supporting member, fixed and movable contacts, snap-action mechanism comprising a part terminating in pivotal extensions positioned in recesses in the face of said supporting member, an escutcheon plate secured to the face

105 of said supporting member to hold said extensions in place, and a hollow actuating member for said switch embracing and enclosing portions of said snap-action mechanism.

2. In an electric switch, a supporting

110 member, fixed and movable contacts, snap-action mechanism comprising a part terminating in pivotal extensions positioned in recesses in the face of said supporting member, an escutcheon plate secured to the

115 face of said supporting member to hold said extensions in place, and a hollow actuating member for said switch mounted to rotate about said extensions and embracing and enclosing said part of said snap-action mechanism.

3. In an electric switch, an insulating supporting member having a chamber, a bridging contact movable to and fro in said chamber, cooperating fixed contacts adjacent to

120 opposing walls of said chamber, terminal extensions for said fixed contacts extending from said chamber to the outer walls of said supporting member, and an insulating barrier between said terminal extensions pro-

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jecting outward from said supporting member.

4. A switch mechanism comprising an oscillatable switch blade, a hollow handle for actuating said switch blade, a bent wire having a U-shaped portion located in said hollow handle, and journal portions extending laterally from said U-shaped portion to the outside of said hollow handle, bearings for said journal portions, whereby said hollow handle is oscillatably mounted, and a spring connected to said U-shaped portion and said switch blade.

5. A switch mechanism comprising an oscillatable switch blade, a hollow handle for actuating said switch blade, a bent wire having a U-shaped portion located in said hollow handle, and journal portions extending laterally from said U-shaped portion to the outside of said hollow handle, bearings for said journal portions, whereby said hollow handle is oscillatably mounted, and a spring connected to said U-shaped portion and said switch blade, said switch blade being oscillatably mounted on said laterally extending journal portions.

6. A switch mechanism comprising a switch blade oscillatable back and forth, a spring oscillatable back and forth past a dead center to cause oscillation of said switch

blade, a housing for said switch mechanism and a hollow cup-like handle extending from said housing for shifting said spring back and forth, said spring extending into that part of the hollow cup-like handle outside said housing.

7. A switch mechanism comprising a switch blade oscillatable back and forth, a switch housing, a hollow cup-like handle extending from said housing for operating said switch blade, said handle being oscillatably mounted about the same axis as said switch blade, a spring connected to said switch blade on one side of said axis, and to said handle on the opposite side of said axis, said spring extending into that part of said cup-like handle outside of said housing.

8. A switch mechanism comprising a switch blade oscillatable back and forth, a spring oscillatable back and forth past a dead center to cause oscillation of said switch blade, a cover plate in front of said switch mechanism, and a hollow cup-like handle extending through said cover plate for shifting said spring back and forth, said spring extending into that part of the hollow cup-like handle in front of said cover plate.

In witness whereof, I have hereunto subscribed my name.

REUBEN B. BENJAMIN.