Oct. 14, 1924. 1,511,809

M. GUETT

SNAP SWITCH

Filed April 21, 1922

Fig. 1,

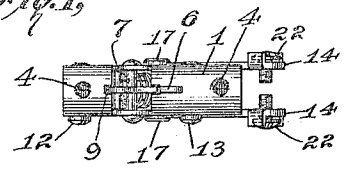


Fig. 2,

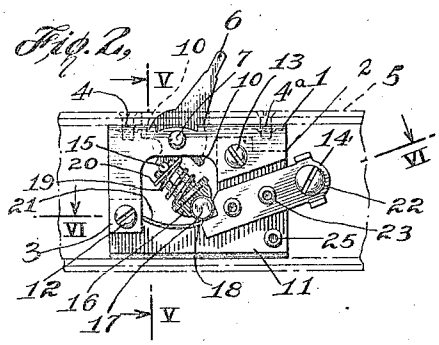


Fig. 3,

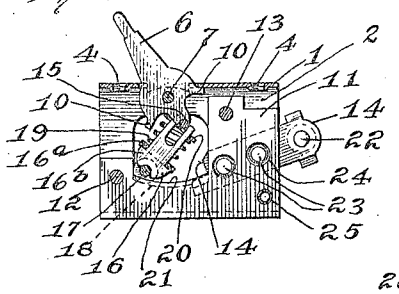


Fig. 4,

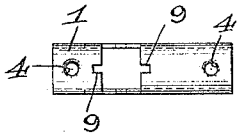


Fig. 8,

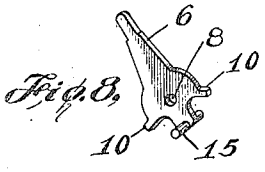


Fig. 5,

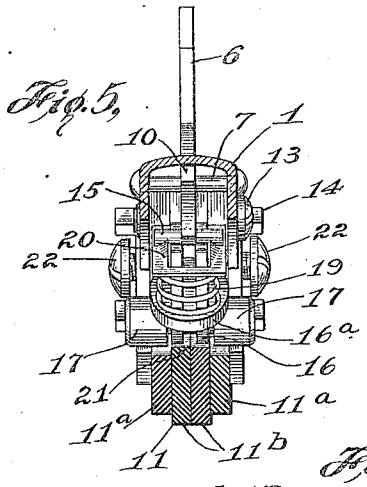


Fig. 6,

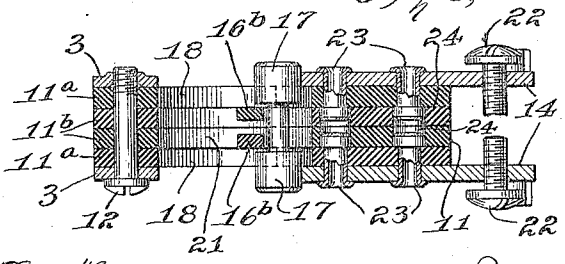


Fig. 7,

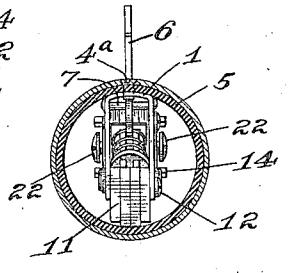


Fig. 10,

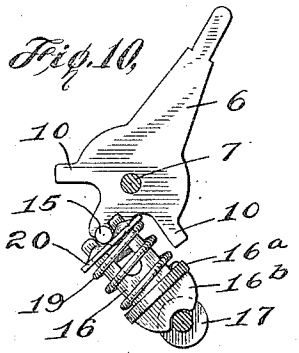
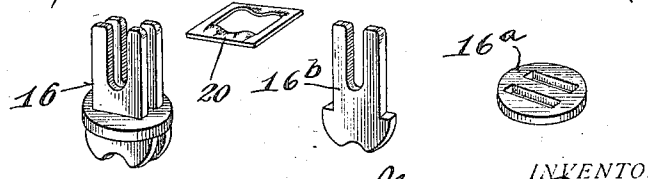


Fig. 9,



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UNITED STATES PATENT OFFICE.

MONROE GUETT, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE HART & HEGEMAN MANUFACTURING COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SNAP SWITCH.

Application filed April 21, 1922. Serial No. 555,906.

To all whom it may concern:

Be it known that I, MONROE GUETT, a citizen of the United States, residing in Hartford, Connecticut, U. S. A., have invented the following described Improvements in Snap Switches.

The objects of this invention are to provide a compact and rugged snap switch structure specially suited to be housed in the handles of electric sweepers and in other cavities of small compass and adapted to be the least subjected to impairment by the effect of heat when mounted in the handles of electric flat-irons, cooking utensils etc., and also designed for easy wiring and to be made at low cost of production.

In the drawings;—

Fig. 1 is a top plan of the preferred form of the invention, the switch being closed.

Fig. 2, is a side elevation of Fig. 1

Fig. 3 a longitudinal section of Fig. 2

Fig. 4, a plan of the metal frame, detached

Fig. 5, a section on V—V of Fig. 2

Fig. 6, a section on VI—VI of Fig. 2

Fig. 7, an end elevation of the switch.

Fig. 8, is a detail view of the operating lever

Fig. 9, the insulating body of the switch member and its component parts.

Fig. 10, a detail of the switch member.

The form of the invention illustrated in the foregoing figures, and at present preferred, comprises a main metal frame part bent up out of sheet metal so as to form an attachment base 1 and two side plates in the form of pairs of two opposite legs marked 2 and 3 respectively. The attachment base is provided with two screwholes 4, or equivalent means arranged along the center line of the base whereby it can be secured to a supporting member 5 (Fig. 7) or to whatever supporting means is available. Fig. 7 illustrates the switch as secured by screws 4^a to the interior of the handle of a sweeper, shown in section. The attachment base is preferably slightly rounded or transversely curved, instead of being flat, so that it will conform to the supporting surface of the part 5, which is concaved. This switch is by preference operated by a lever or so-called toggle handle 6 which is mounted in an opening cut in the base and fulcrumed on a rivet 7 upset in holes in the side plates of the frame. This lever 6 is stamped out of sheet metal in about the shape shown in Fig. 8 and may be provided with a round terminal or tip at its outer end, if desired, and as customary in this class of switch, but not shown in the drawing. The fulcrum rivet passes through the hole 8 of this stamping and the latter is kept central on the rivet by its engagement with one or both the notches 9 cut in the base part 1. The arms 10 on the lever 6 serve as stops engaging the under side of the base part 1 to limit the lever movement in both directions.

The legs 2 and 3 of the metal frame embrace and hold a flat frame piece 11 of insulating material, being attached thereto by the two screws 12 and 13 and the two terminal plates 14 which are to be bridged or connected by the closing of the switch are mounted on opposite sides of the piece, being secured thereto by means which keep them electrically isolated as will be understood and as will be more fully described below. The inner end of the operating lever 6 projects into a space provided between the attachment base 1 and the insulating frame piece 11 and is there provided with a cross-pin 15 by which it engages and supports one end of the switch member proper, which latter is confined to said space. This member comprises an insulating body 16 double-forked at one end to receive the cross-pin 15 and the end of the lever 6 and is notched at its other end to engage a transverse metal roller 17 which is adapted to roll on track surfaces 18 provided on the insulating frame piece 11. A spring 19 surrounding the body 16 of the switch member and interposed between a thrust washer 16^a thereon adjacent the roller and another washer 20 adjacent the cross-pin 15, exerts its thrust in a direction to press the switch member and the roller toward the tracks 18 and to press the cross-pin 15 in the opposite direction so that the lever is pressed to the limit of its movement. This spring pressure provides the snap action for the switch, for it will be seen that if the handle lever 6 is turned on its pivot 7, its cross-pin 15 and the contiguous end of the switch member and its spring will be thereby moved or turned toward the line of centers of the fulcrum 7 and the roller 17, compressing the spring until the cross-pin 15 passes that line, whereupon the spring throws the lever the rest of the

way and simultaneously pushes the roller along the track to the opposite end thereof. The same action obviously obtains in both directions of lever movement and the two positions of the parts are shown in Figs. 2 and 3. It will be noted that the principal function served by the handle lever is to carry the end of the switch spring into a position in which it can push the roller 17 to the other end of its path, and it is to be observed that this same function might easily be performed by other means than a lever type of operating handle as herein shown. The metal roller 17 is the conducting connector element of the switch, forming the electrical path between the terminal plates 14 when in one of its positions. It is a rigid element formed of dumb-bell shape so that it can straddle the central ridge 21 of the insulating frame piece 11 with its enlarged circular ends held thereby so that they can move or roll on the tracks 18 without endwise displacement therefrom.

The middle part of reduced diameter forms the bearing connection for the notched end of the spring-pressed insulating body 16 of the tumbling switch member which thus presses against the connector at its center. The roller connector 17 is limited in its movement in one direction by encountering the frame legs 3 and in the other by engagement with the edges of the two plates 14, which edges form rigid abutments to receive the impact from both ends of the connector. The electrical connection between the two rigid plates 14 is thus established by the contact therewith of a connector element which is itself rigid and pressed into engagement therewith by the spring. As the spring is centrally applied to the connector it is apparent that both of its ends are pressed against the plates 14 with substantially equal force. The terminal plates 14 are desirably notched or crotched at their inner ends and set on the insulation block 11 so that the roller ends of the connector element will ride into the crotches, slightly separating from the insulating track at the end of the stroke, and so that they will thereafter be pressed into the crotches and thus each acquire a bearing at two points on each terminal plate.

The terminal plates 14 are made as reverse duplicates of each other and each is extended beyond the same end of the insulating piece 11 and there provided with a wire-clamping means such as the binding screws 22, by which the circuit wires are connected to the switch as will be understood. Both these wire connection means 22, are thus located at the same end of the switch structure which simplifies the wiring process and moreover, the terminal plates are preferably set at an inclination so that said connection means thus become situated at about the middle of the depth of the switch and are thereby about equidistant from the surrounding surfaces of the chamber, usually small, in which the switch is contained. The body 16 of the switching member is made of assembled flat stampings of sheet fibre or other insulating material as indicated in Fig. 9, being constituted of two identical forked stampings 16^b pushed through the spaced slots in the washer 16^a thus forming a body with notches at one end to bear on the roller and fork slots at the other to form the sliding connection with the operating lever or member 6. It is desirable that the tracks 18 formed on the insulating frame piece 11, shall be slightly curved and exactly alike on both sides and this result is easily obtained by making the piece 11 of several assembled layers of sheet insulation, such as canvas impregnated with bakelite, stamping or cutting each layer to the desired contour and then assembling them in the desired position. In this way the piece 11 is made of two outside layers 11^a cut in the same die so as to be identical in contour and shaped to form the two curved tracks 18 for the ends of the roller 17, and two identical inner layers 11^b which are deeper than the layers 11^a so as to form the central ridge between the tracks. These several layers are held together by a rivet at one corner and by the screws 12 and 13 which fasten them to the metal frame part, thus producing the equivalent of a one-piece block but with greater accuracy and uniformity of shape and surface, and providing the further advantage that the terminal plates 14 can be directly and accurately riveted to the outside layers 11^a, as by the rivets 23. This eliminates the need of insulating bushings and washers which would be necessary if a one-piece block were used, in order to keep the two plates electrically isolated from each other. The heads of the rivets 23 are accommodated in registering holes 24 punched in the inner layers 11^b so that they do not interfere with the continuous flat surface contact of the outside layers upon the inner layers.

I claim:

1. A snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form a narrow attachment base with opposite side portions, an insulating frame piece comprising longitudinal layers and connected to said side portions and therewith forming a narrow frame structure of greater length than depth and of greater depth than thickness, a connector element disposed transversely of said structure and mounted for snap movement longitudinally of said structure, and terminal contact members mounted on the outside layers on opposite longitudinal sides of said insulating frame piece by transverse rivets whose heads are received in recesses in intermediate lay-

ers, said contact members conjointly serving to limit the movement of said connector in one direction.

2. A snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form a narrow attachment base with opposite side portions, a laminated insulating frame piece connected to said side portions and therewith forming a narrow frame structure of greater length than depth and of greater depth than thickness, a rigid connector element disposed transversely of said structure and mounted for snap movement longitudinally of said structure, and terminal plates mounted on the outside layers on opposite longitudinal sides of said insulating frame piece by transversely alined rivets, whose spaced heads are received in alined holes in intermediate layers, said plates forming non-yielding contacts conjointly sustaining the impact of said connector.

3. In a snap switch, frame structure including an insulating frame piece having longitudinal layers, a terminal plate riveted to an outside layer, the rivet head being received in a recess in an adjoining layer, a snap switch element adapted to coact with said terminal plate, and means for operating it mounted in said frame structure.

4. A snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form a narrow attachment base with opposite side portions, an insulating frame piece comprising longitudinal layers and connected to said side portions and therewith forming a narrow frame structure of greater length than depth and of greater depth than thickness, an operating lever fulcrumed in said metal part to swing in the plane of said frame structure, a switching member mounted for movement in the same plane and including a connector element extending crosswise of said plane across identical transversely alined tracks formed in the outside layers and two terminal plates respectively mounted on the opposite outside layers beyond said tracks, one on each side of the same end of said insulating frame piece, the inner end of said plates forming fixed electric contacts for parts of said connector beyond said tracks.

5. A snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form a narrow attachment base with opposite side portions, an insulating frame piece comprising longitudinal layers and connected to said side portions and therewith forming a narrow frame structure of greater length than depth and of greater depth than thickness, a rigid connector element disposed crosswise of the plane of said structure and mounted for snap movement longitudinally of said structure, the two outside layers having identical tracks on which said rigid connector element moves and two flat terminal plates mounted on opposite sides of said insulating frame piece adjacent one end of said tracks.

6. A snap switch comprising a frame structure of greater length than depth and of greater width than thickness and including an insulating frame piece having longitudinal layers, the edge of each outside layer forming a track, a snap action switch member adapted to move on said tracks, terminal plates mounted on said frame piece in the path of said switch member, and switch operating means mounted on said frame structure.

7. A snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form a narrow attachment base with opposite side portions, a flat insulating frame piece connected to said side portions and therewith forming a narrow frame structure of greater length than depth and of greater depth than thickness, a connector disposed transversely of said structure and mounted for snap movement longitudinally thereof, and terminal plates mounted on the opposite longitudinal sides of said insulating frame piece and forming electric contacts for said connector, said frame piece being constituted of united layers of sheet material and said terminal plates being riveted to the outer layers only.

8. In a snap switch, a frame structure of greater length than depth and of greater width than thickness and including a laminated insulating frame piece, the edge of one of the layers of said frame piece forming a track and a snap-action switch member adapted to move on said track.

9. In a snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form a narrow attachment base with opposite side portions, a laminated insulating frame piece connected to said side portions and therewith forming a narrow frame structure, the edge of one of the layers of said piece forming a track, the edge of another layer forming a guide ridge therefor and a switching member adapted to move on said track.

10. A snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form an attachment base with opposite side portions, a laminated insulating frame piece between said portions, fastening means holding the layers of said insulating frame piece together and to said side portions, a connector element, means for imparting snap movement to said connector and a fixed contact mounted on the insulating frame piece and engaged by said connector.

11. A snap switch comprising a frame part formed of a flat metal blank bent longitudinally to form a narrow attachment base

with opposite side portions, a laminated insulating frame piece connected to said side portions and therewith forming a narrow frame structure of greater length than depth and of greater depth than thickness, a connector element disposed transversely of said structure, means for imparting snap movement to said connector longitudinally of said structure, and a terminal plate mounted on an outside layer of said insulating frame piece.

12. A snap switch comprising a sheet metal frame bent longitudinally to form an attachment base with opposite side portions, an insulating frame piece comprising a plurality of layers connected to said side portions and therewith forming an intermediate space, a switch member mounted in said space, means for imparting snap movement to said member and terminal plates mounted each on one of the outside layers of said piece, the ends of said plates extending to the edge of said space and engaged by said switch member.

13. A snap switch comprising a sheet metal frame bent longitudinally to form a narrow attachment base with opposite side portions, an insulating frame piece comprising a plurality of layers connected to said portions and therewith forming a narrow frame structure of greater length than depth and of greater depth than width, a dumbell switch connector mounted for snap movement in said frame structure, tracks on the outside layers on which the heads of the dumbell move, a ridge formed by an intermediate insulating layer between said tracks and extending above them and straddled by said dumbell, and terminal plates adjacent the track ends adapted to be bridged by said dumbell.

In testimony whereof, I have signed this specification.

MONROE GUETT.

In the presence of—
A. J. BENNETT,
G. R. COOK.