

May 9, 1933.

M. GUETT

1,908,603

ELECTRIC SWITCH

Filed May 31, 1929

2 Sheets-Sheet 1

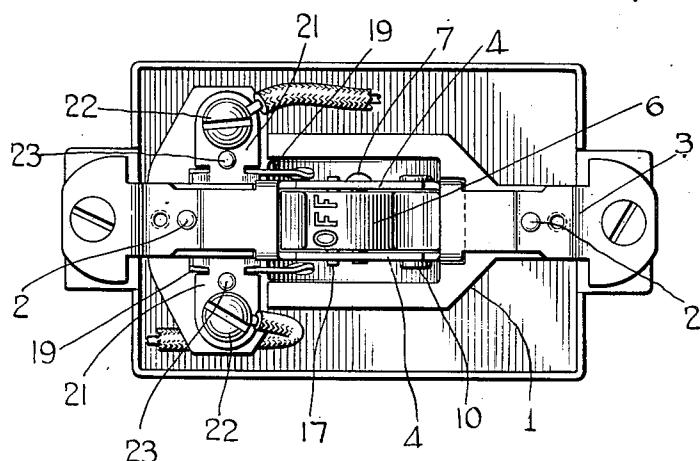
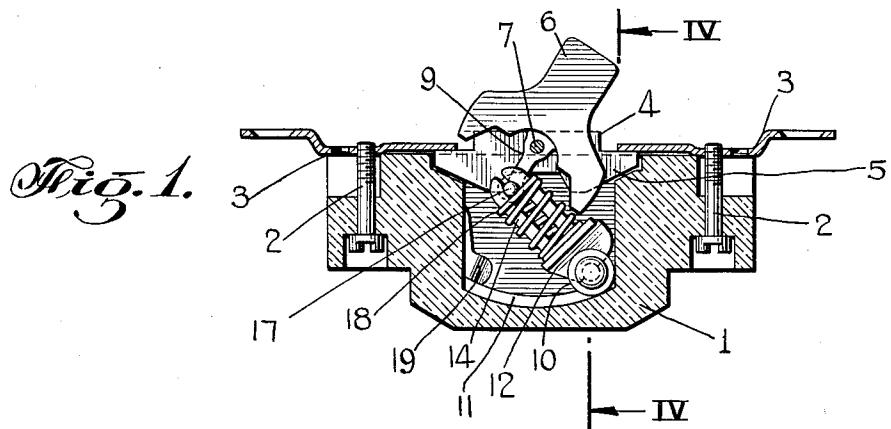
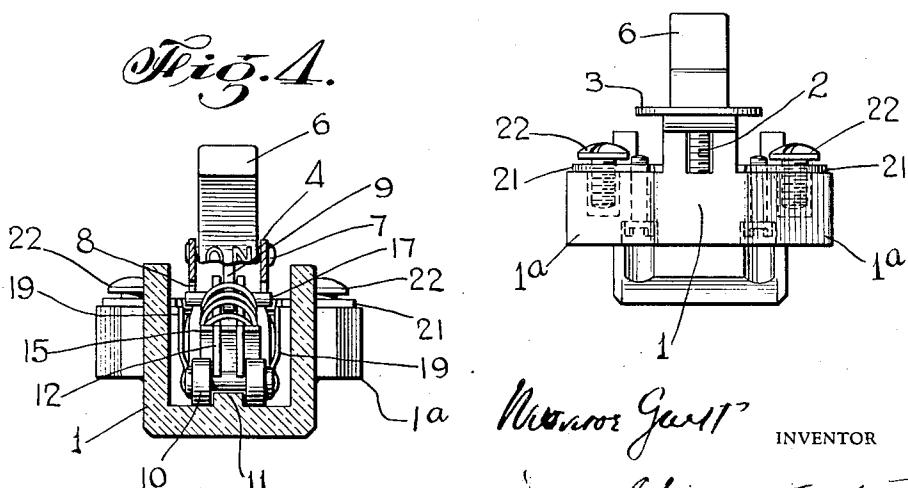


Fig. 2.

Fig. 3.



INVENTOR

ATTORNEY

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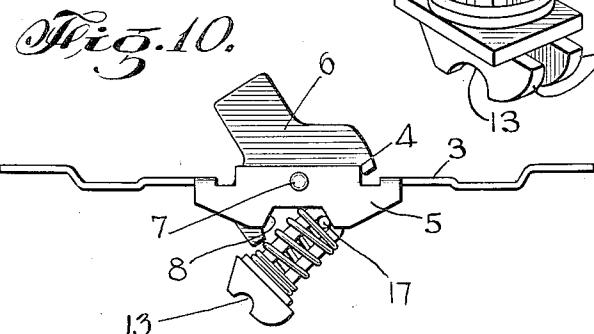
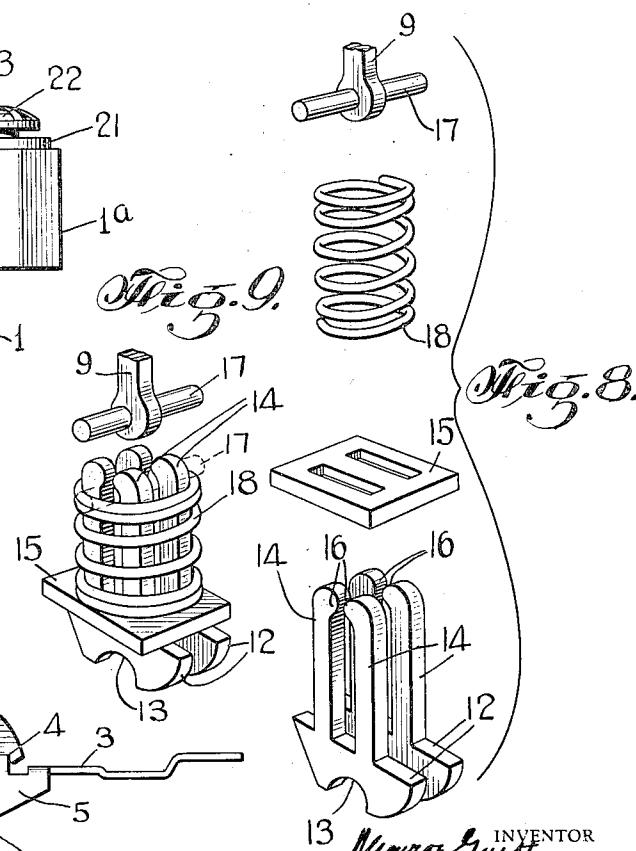
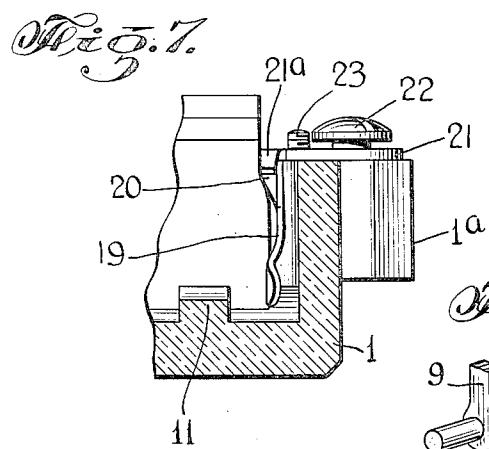
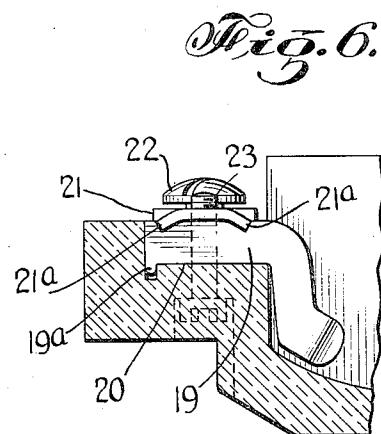
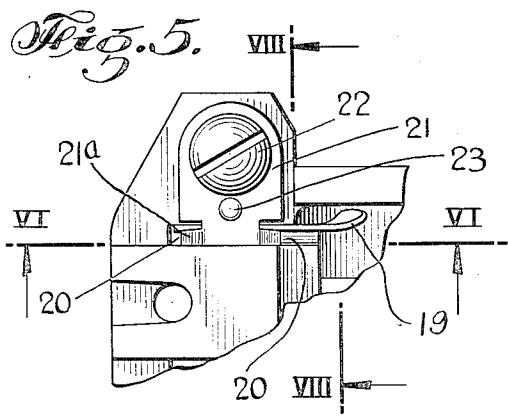
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Application filed May 31, 1929. Serial No. 367,304.

The invention relates to the construction of electric switches generally and particularly so-called toggle or lever-type switches, and its object is to reduce the manufacturing cost and improve the efficiency of that type, to which end the invention includes an improved base or block structure for such switches, an improved assembly of actuator and carrier, an improved mounting of contact leaf as well as other features in combination and severally, all hereinafter made apparent.

In the accompanying drawings, which show the form of invention at present preferred, Fig. 1 is a longitudinal section of the switch in open circuit position;

Fig. 2 a top plan of the same situated in its wall outlet receptacle;

Fig. 3 an end view;

Fig. 4 a cross section line IV—IV;

Figs. 5, 6 and 7 details of the contact leaf structure, on the lines indicated;

Fig. 8 separated perspectives of the carrier and spring;

Fig. 9 a partially assembled view of the same and

Fig. 10 a side elevation of the frame with carrier mounted on the handle.

The switch comprises an insulating chambered block of porcelain or the like, secured by screws 2 to the switch frame 3. The latter is a narrow metal strip stamped to the shape indicated, with a central opening for the handle or actuator and with ends projecting beyond the block and provided with screwholes, so that it can be secured as usual to the standard type of wall receptacle illustrated in Fig. 2. The central opening in the frame piece is flanked by out-bent flanges 4 and in-bent flanges 5. The out-bent flanges 4 carry the pivot-pin on which the actuator or switch handle 6 is fulcrumed to oscillate in the central opening, such pin being marked 7. The in-bent flanges 5 are notched to form abutments 8 for the handle which, in the case shown, is a molded piece of bakelite or the like having a metallic shank 9 molded in it and projecting inwardly therefrom, but the handle can be otherwise formed as preferred. The fulcrum pin 7, in the case shown, passes

through this shank and the free end of the shank carries a cross-pin 17 which is the pin of the toggle-joint between the handle and the carrier as presently described. This cross pin 17 moves in the notches of the flanges 5 and abuts against the shoulders thereof to limit the handle movement in each direction.

The carrier, actuated by the handle, holds the switching connector 10 which is a dumb-bell shape metallic roller, and rolls it back and forth on the floor of the chamber or cavity formed in the insulating block 1. To aid and accommodate such movement the chamber floor is curved and it is also provided with a longitudinal guide rib 11, straddled by the roller. While the carrier may be variously constructed it is composed in the case in hand, of two duplicate stampings 12, punched out of sheet insulating material and shown separate in Fig. 8. The lower ends of these stampings are shouldered and provided with notches 13 to saddle on the stem part of the roller, and their upper ends are slotted forming fingers 14. They are united and held in spaced relation by a double slotted spacer plate 15 which is pushed over the fingers and against the shoulders thus forming a three-piece carrier all of the members of which are punchings and hence economically produced.

The slot between the fingers 14 accommodates the cross pin 17, above referred to, on the end of the handle shank 9 and the free ends of the fingers are enlarged or shouldered, as indicated at 16, Figs. 8 and 9, so that the slot formed between such fingers is more or less closed at its outer end to retain the pin therein. Such pin is permanently fixed or pressed in the shank 9 and is introduced into this toggle-slot by spreading the free ends of the fingers apart, against the natural resilience of the material of which they are made as by forcing the cross pin between their shouldered ends. The natural resilience of the insulating material may be sufficient of itself to retain the pin against escape from the slot, but its retention is made more secure by the helical spring 18 which surrounds the carrier fingers. This is the snap-actuating spring, as will be recognized, which thrusts

between the shoulder of the carrier and the cross pin 17, forcing the parts to their extreme position after the handle has been used to move them past the dead center line.

5 It is made of such diameter that it confines the upper ends of the fingers, which it normally surrounds, so as to prevent their spreading, thus ensuring against escape of the pin. Fig. 9 shows the relation of these

10 parts from which it will be apparent that the parts are assembled very easily; the spring is compressed toward the spacer plate and the cross pin 17 is then pushed into the slot; release of the spring brings it back to its normal position which prevents spreading of the fingers. It is a manufacturing convenience to fix the pin permanently in the shank 9 when the latter or the handle is being made (instead of at the time of switch assembly)

15 20 and to attach the carrier to the handle in the manner indicated and then introduce both into the chamber of the block and into connection with the connector.

The action of the handle and carrier will

25 be apparent without further description, being no different from switches already known to the art—except that the handle movement is limited by the engagement of the ends of the toggle-pin 17 with the notch shoulders 8

30 of the inward flanges 5 already referred to. This affords a superior means of stopping the movement, sufficiently remote from the handle axis to avoid all strain on the latter and hence preserves it against undue wear.

35 In its closed position the roller connector 10 engages or wedges between and electrically connects the ends of two resilient contact leaves 19, each of which is connected with the circuit and set in a slot or crevice

40 45 50 formed in the block on opposite sides of the frame strip 3 and both at the same end of the connector chamber. The notch 20 appears in plan view in Fig. 5 and in end view in Fig. 7 wherein it will be seen to be V-shaped. Each leaf is a flat or substantially flat stamping of suitable shape, for example as indicated in Fig. 6. Its body part is inserted edgewise in the V-notch and is confined and fixed therein by its associated wire

55 60 65 terminal plate 21, which carries the usual binding screw 22 and is itself secured to the base by a screw 23 set in from the under side of the block. The plate overlies the V-notch thus confining the spring leaf therein in a position which is parallel to the direction of movement of the connector and the two corners of the plate are struck down forming lugs 21a which enter the notch and embrace the edge of the leaf. These lugs are slightly tapered so as to wedge the leaf flat against the wall which forms one side of the notch, thus retaining the leaf against lateral movement in the crevice as well as making a good

65 electrical contact between leaf and plate. The

free end of the leaf projects into the block chamber and has a slight set or twist inward or toward the track rib 11 as shown in Fig. 7 so that it is in the path of the roller 10. This shape can be given to the leaf by the same punching dies by which it is punched out of the sheet stock. The leaf is clamped both edgewise and sidewise in its seat and this forms a satisfactory support for it, permitting economical and rapid fabrication, since the need of any special bending operation of leaf or plate, or any riveting of the two together is thereby eliminated. The single screw 23 which secures the wire connection plate 21 to the block binds it against the contact leaf and thus secures both members in place without need of any other connection; such screw is preferably set from the bottom of the block through it might be otherwise disposed with the same function. The head of the binding screw 22 also faces outwardly. In the particular form of leaf herein shown special means are provided to keep it from displacement endwise in its notch represented by the hook 19a (Fig. 6) engaging in a small hole at one end of the notch, but it will be understood that such means are only needed when the shape selected for the leaf requires it.

It will be observed that the chambered part of the block 1 is relatively narrow and that the part which supports the leaves and wire connection means is wider, thus producing a block which is substantially T-shaped in plan view as shown in Fig. 2, and further, that the arms 1A of the T are no deeper in the direction of the depth of the switch than is needed for accommodating the screws 22 and 23, which is to say that they are shallower or of less depth than the chamber so that there is a considerable space under them. This shape affords practical advantages to the electrician in that he may lay his wire alongside of the narrow part of the base straight to the binding screws as shown at 24 in Fig. 2, or if the wire arrives from the opposite direction he can pass it under or in back of the shallow arm 1a and bend it up and over to the binding screw, as indicated at 25 in Fig. 2, having ample room within the outlet receptacle in which to do this directing and bending and without having to stuff the wires into the crevice between the block and outlet receptacle as commonly the case.

I claim:

1. In a switch of the kind described, an insulating chambered block, a carrier and a switching connector in the chamber of the block, a substantially flat or slightly bent contact leaf for engagement by said connector, said block having a slot or notch formed therein adjacent the chamber in the block, into which said leaf is inserted in an edgewise direction and wire connection means secured to said block and having a

part clamping the leaf against the side wall of said notch.

2. In a switch of the kind described, an insulating chambered block containing a carrier and switching connector and having a slot or notch formed therein, a substantially flat spring leaf located in the notch parallel with the path of movement of said connector with its free end projecting into the chamber, wire connection means secured to the block and clamping the leaf against the side wall of its notch and a binding screw on said means extending parallel with the plane of said leaf.

15 3. In a switch of the kind described, an insulating chambered block, a carrier, a switching connector moved thereby in the chamber of the block, a substantially flat contact leaf disposed parallel to the path of said connector, said block having a notch formed therein to receive said leaf, wire connection means including a plate secured over said notch and bearing on the edge of said leaf, and a binding screw in said plate.

20 4. In a switch of the kind described, the combination of an insulating chambered block containing a carrier and switching connector and having a notch, a substantially flat contact leaf seated in said notch with its free end projecting into the path of said connector and parallel therewith, and a wire connection plate bearing edgewise on said leaf and clamping the same in said notch.

25 5. In a switch, an insulating chambered block containing a carrier and a switching connector and having a V-notch adjacent the chamber thereof, a contact leaf seated edgewise in said notch and wire connection means overlying said notch and leaf and clamping the latter therein.

30 6. In a switch, an insulating chambered block containing a switching connector and having a notch formed therein, a substantially flat spring contact leaf seated in said notch parallel with the path of a connector movement and a wire-connection plate overlying the edge of said leaf and having a bent part engaging the side of said leaf.

35 7. In a switch, an insulating chambered block containing a carrier and a switching connector and having a notch formed therein, a contact leaf in the notch and a wire connection plate having one or more tapered lugs clamping said leaf against the wall forming one side of the notch.

40 8. In a switch, the combination with a centrally apertured frame, a toggle-type handle fulcrumed between flanges thereon, a carrier, a cross pin on the handle sliding back and forth in a slot in the carrier between abutment shoulders on one or both said flanges and a spring for snap-actuating the carrier thrusting against said crosspin.

45 9. In a switch, an insulating chambered block containing a switch connector which rolls on the floor of the chamber in the block, a spring contact leaf secured to the block, projecting into said chamber parallel to the rolling movement but clear from the roller track on the chamber floor, a wire-connection plate clamped against and securing said leaf to the block and a binding screw in a portion of said plate which faces outwardly from said chamber.

50 10. In a switch, an insulating chambered block containing a switch connector rolling on the chamber floor, a substantially flat spring contact leaf disposed in a plane parallel to the rolling movement, part of said leaf being within the chamber but clear of the floor thereof and part of it being seated on the rim part of said chambered block, a wire-connection plate clamping said flat leaf edgewise to the block, and a binding screw in said plate.

55 11. In a switch, an insulating chambered block having a connector rolling on the floor of the chamber and a contact leaf secured to the block and engaged by said connector, in combination with an apertured frame bar extending across the chamber opening and to which the block is secured, an actuating lever fulcrumed in the frame bar and carrying a cross-pin for operation within the chamber, and a slotted carrier for the rolling connector, the end of the slot thereof being openable to permit entrance of the cross-pin thereinto and a spring on the carrier thrusting on the cross-pin whereby said lever may serve as a holder for the carrier when introducing the latter into the chamber, the opposite end of the carrier being shaped to straddle said connector when so introduced.

60 12. In a switch, an insulating chambered block having a connector rolling on the floor of the chamber and a contact leaf secured to the block and engaged by said connector, in combination with an apertured frame bar extending across the chamber opening and to which the block is secured, an actuating lever fulcrumed in the frame bar and carrying a cross-pin to operate within the chamber, and a carrier for the connector having a toggle slot to embrace the cross-pin, said slot being openable at its end to receive the pin, a spring on the carrier tending to close the slot and thrust on the pin, whereby the lever may serve as a holder for the carrier when introducing the latter into the chamber, said carrier being shaped at its other end with a crotch or bearing in which the rolling connector may rotate.

65 13. In a switch, an insulating chambered block having a connector rolling on the floor of the chamber and a contact leaf secured to the block and engaged by said connector, in combination with an apertured frame bar extending across the chamber opening and to which the block is secured, an actuating

lever fulcrumed in the frame and carrying a cross-pin to operate inside the chamber, a connector carrier having a toggle slot to embrace the cross-pin, said slot being openable 5 at one end but normally closed against escape of the pin and shaped so as to admit the cross-pin by pressure applied to the latter, the opposite end of said carrier having a bearing for the rolling connector.

10 14. In a switch, an insulating chambered block having a connector rolling on the floor of the chamber and a contact leaf secured to the block and engaged by said connector, in combination with an apertured frame bar 15 extending across the chamber opening and to which the block is secured, an actuating lever fulcrumed in the frame bar and carrying a cross-pin to work inside the chamber, a connector carrier having a toggle slot adapted 20 to embrace the cross-pin and adapted to be forced open to admit said pin thereinto, said carrier comprising two stampings providing four fingers between pairs of which said slot is formed, and a helical spring embracing the fingers and adapted to thrust 25 against the cross-pin therein.

15. In an electric switch, the combination of a frame adapted for attachment to a wall outlet box, a one-piece chambered insulating 30 block secured thereto having lateral projections at one end of the chambered part located near the rim of the chamber and spaced from the back wall of the outlet box when in position, wire connection plates on said projections, contact members electrically connected with said plates and projecting therefrom 35 into the chamber and a switching connector operated within the chamber by an actuator fulcrumed on said frame.

40 16. In an electric switch, a frame for connection to a wall outlet box having a handle or actuator fulcrumed thereon and an insulating chambered block secured thereto, the body of said block being relatively deep 45 and narrow and one end of said block being shallow and relatively wide, constituting lateral projections with reference to the body of the block which projections are located near the rim of the chamber, a switch connector operated by said handle in the chamber in the deep and narrow part of said block 50 and wire connection plates secured on said lateral projections provided with binding screws.

55 17. In an electric switch, the combination of a frame for connection to a wall outlet box, a handle fulcrumed thereon, a one-piece insulating chambered block substantially T-shaped in plan view secured to the frame, a 60 switching connector operated by the handle in the chamber of said block, wire connection means secured to the arm portions of said T-shaped block, said arm portions constituting lateral projections located near the rim of 65 said chamber and contact leaves electrically 70 75 80 85 90 95 100 105 110 115 120 125 130

connected to said means projecting into said chamber.

18. In a switch, a substantially T-shaped one-piece block of insulating material secured to a metallic frame member and having a chamber, a switching connector moving back and forth in said chamber, the arm portions of said block projecting laterally therefrom and having front faces located adjacent the rim of said chamber, a notch formed in one or both of said arm portions, a contact leaf located in said notch and wire connection means on the front face of said arm portion confining the leaf in place thereon.

19. In a switch, an insulating chambered block containing a rolling switching connector moving adjacent the floor of the chamber in said block, a substantially flat contact leaf occupying a plane parallel with the direction of connector movement and adapted to be engaged by said connector in one position, a wire-connection plate secured on said block adjacent to the rim of the chamber therein and serving to hold said leaf in position and a binding screw in said plate with its head faced outwardly from said chamber.

In testimony whereof, I have signed this specification.

MONROE GUETT.