

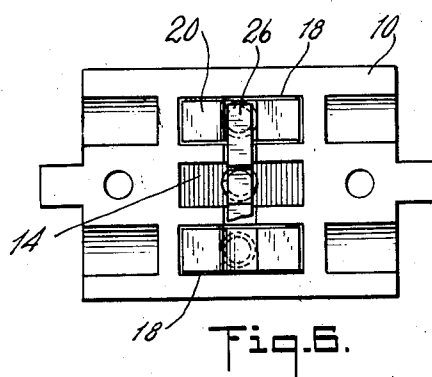
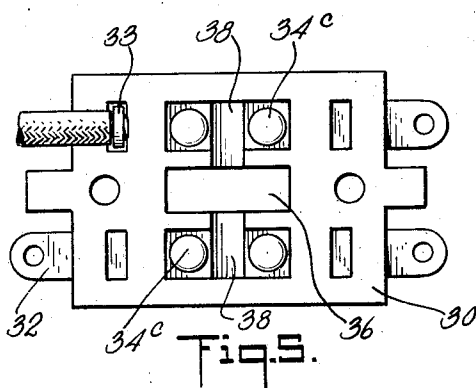
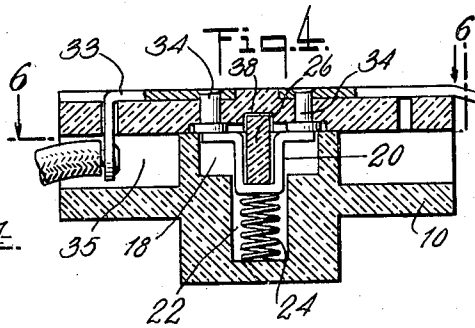
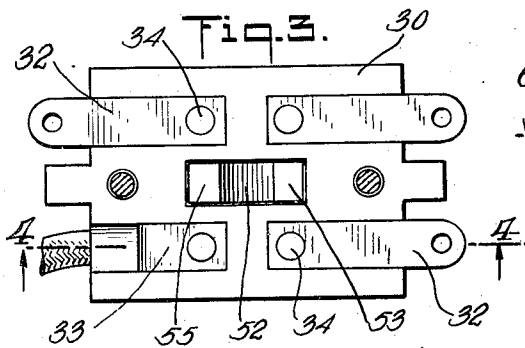
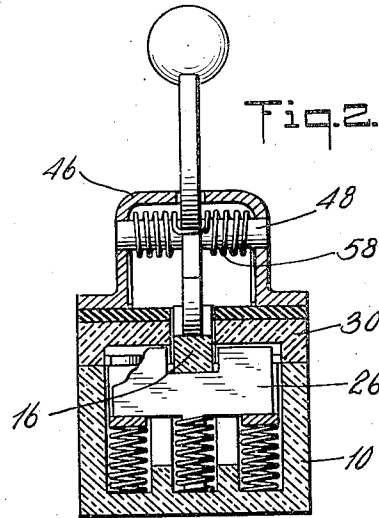
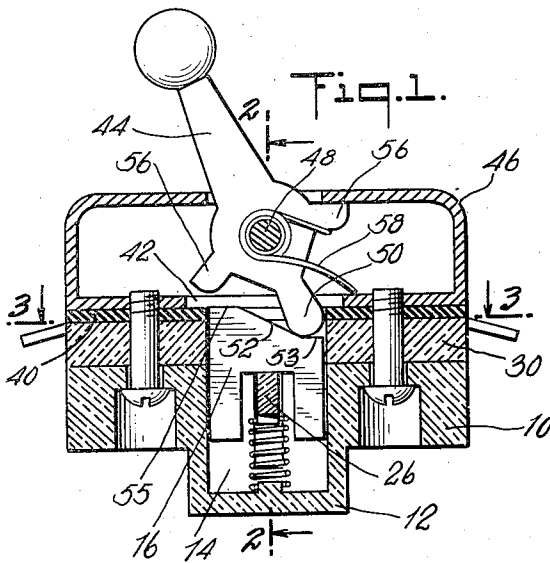
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SLOW BREAK ELECTRIC SWITCH

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SLOW BREAK ELECTRIC SWITCH

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7 Claims. (Cl. 200—163)

This invention relates to electric switches for use in alternating current circuits. More particularly the invention relates to the type of switch that provides a slow break in a plurality of lines of the circuit, simultaneously.

It is an object of the invention to provide a simplified construction of slow break electric switch of relatively large current-carrying capacity for its size.

Another object of the invention is to provide for mounting the fixed contacts in the switch, as a unit.

Another object of the invention is to provide a switch of the above type in which the parts shall be of simple construction and may be readily made of stamped or molded parts.

One important feature of the invention lies in the novel means for securing terminal members in position by employing the fixed contacts as securing devices.

Other objects and advantages of the invention will become apparent as it is described in connection with the accompanying drawing.

In the drawing—

Fig. 1 is a longitudinal elevational section view of a switch embodying the invention.

Fig. 2 is a transverse section view of the switch of Fig. 1 with the section being taken along line 2—2 of Fig. 1.

Fig. 3 is a plan view of the switch shown in Fig. 1 when the cover member and operating means are removed.

Fig. 4 is a longitudinal elevational section view of the switch shown in Fig. 1 with the cover and operating mechanism removed, the section being taken along line 4—4 of Fig. 3.

Fig. 5 is a bottom view of the contact and terminal carrying element and the parts carried thereby.

Fig. 6 is a plan view of the base of the switch shown in Fig. 1 with the movable contacts and movable contact moving element mounted therein.

Referring to the drawing, the switch is preferably provided with a rectangular base 10 of molded insulating material having a downward extension 12 running transversely and being hollowed out internally to provide a well 14 of substantially rectangular shape to guide the movement of a flat plunger 16. The well and plunger 16 are so proportioned that the side walls of the well guide the plunger in rectilinear movement into and outwardly of the base 10. The well 14 is centrally located and on either side thereof there are provided longitudinal recesses 18 for the reception of

U-shaped movable contact members 20. In the middle of each of the recesses 18 there is provided a deep cavity or well 22 for the reception of a compression spring 24 upon which the transverse or U-portion of the movable contact members seat, whereby the movable contact members are constantly urged in an upward direction. For the purpose of simultaneously moving the contact members 20, there is provided a transversely placed flat bar or slide 26, preferably stamped from sheet insulation, with end portions fitting within the U of the contact members 20. The slide-bar 26 is slotted centrally in its top edge so as to be embraced and engaged by the plunger 16 which is slotted from its bottom edge to receive the slide-bar when the plunger 16 is fitted into the well 14 of the insulating base.

Overlying the base 10 is a mounting plate or member 30 of rectangular shape and made of suitable insulating material. The top surface of said plate may be recessed for the reception of horizontal end portions of terminal strips, such as 32 or 33, which are provided for connection of circuit wires to the device. These terminals may be of any suitable or desired shape. Two forms are illustrated in the drawing—the terminals 32 being in the form of stamped strips of metal which are seated in the channels or recesses provided therefor in such manner as to extend toward the ends of the mounting member. The member 33 is like 32 except that its outer end is bent at a right angle through an opening in the mounting plate 30 to extend into a terminal cavity 35 in the end of the base. A lead wire extends into the cavity 35 and is soldered to the terminal end. In the form of the invention illustrated, the top surfaces of the terminal members are flush with the top face of the mounting plate 30 but it is not essential that this relation be preserved. The terminal members are held in position by novel means, consisting of a rivet 34 of any metal that is particularly suited for use as a switch contact, for example silver. The rivet passes through the mounting plate and through apertures provided in the inner or horizontal ends of the terminals. The heads 34c of the rivets on the underside of the mounting plate 30 form the stationary contacts of the switch and are positioned so as to be engaged by the outwardly turned ends of the movable U-shaped contact member 20, as may clearly be seen in Fig. 4.

The mounting plate 30 is provided with a longitudinal aperture 36 to receive the upper end of the plunger 16 and the lower end of an operating member, hereinafter to be described. For the

purpose of receiving the upper edge portion of the slide-bar 26, the aperture 36 is intersected centrally by transverse channels 38, formed in the lower face of the plate 30. The reception of the upper edge of the slide-bar 26 in these channels 38 provides a barrier between the fixed contacts at the moment of switch opening, tending thereby to reduce the possibility of arc-over between adjacent fixed contacts of the same polarity.

Overlying the top surface of the contact carrying plate 30 is a sheet of insulation 40 provided with a central opening 42 in register with the aperture 36 and the contact mounting plate 30. This sheet insulates the terminals from the metal cover 46 of the device.

The means for operating the switch comprises a flat punched sheet metal lever 44 mounted in a cup-shaped metal cover 46 by means of a transverse pivot pin 48. In order that movement of the operating lever shall cause the plunger to descend the top surface, the plunger is inclined, as at 52, to provide a cam action in connection with a rounded interiorly-extending end 50 of the operating lever. Flat portions 53 and 55 are provided on the top surface of the plunger 16 to define the extreme "on" and "off" positions on the plunger, when the end of the operating lever rests thereon. Laterally-extending stops 56 on the operating lever provide means for limiting the rocking movement of the lever. If desired, the operating lever may be biased into open position by means of a spring, such as 58.

From the foregoing, it may be observed that movement of the operating lever 44 from the position shown in Fig. 1 in a clockwise direction will cause the rounded end 50 of the lever to depress the plunger 16 by reason of engagement of the cam surface 52 of the plunger with the rounded end of the lever. As this plunger descends, it carries with it the slide-bar 26, which engages the movable contacts of the switch and causes them to descend and separate from the fixed contacts or rivet heads 34c. This is a slow action which in alternating current work is entirely satisfactory and in many cases superior to a quick break. Upon movement of the operating lever back to the position of Fig. 1, or upon releasing it if a return spring is provided, the contacts will be caused to resume their normal closed circuit position by reason of the biasing spring 24 pressing upon them and urging them up into engagement with the fixed contacts or rivet heads 34c. A separate spring may be provided in the well 14 to press the slide 26 upwardly.

Modifications within the scope of my invention will occur to those skilled in the art.

I claim:

1. In an electric switch for alternating currents, a recessed insulating base, movable contacts within the recessed portion of said base, a mounting plate over said base, wire terminal means on one surface of said plate, a contact element on the opposite surface and extending through said plate and affixing said terminals to the plate, a cover over said mounting plate and operating means extending through said cover for moving said movable contacts, and means extending through said base into said cover to hold said cover and base together and to hold said plate between them.

2. In an electric switch, a recessed insulating housing, movable contacts within the recessed portion of said housing, spring means tending to move said movable contacts out of said housing,

a sliding bar engaging said contacts, a plunger engaging said bar and having a cam surface, an operating lever engaging said cam surface to depress said plunger, bar and contacts, a mounting plate, conductive rivets piercing said plate and having heads forming fixed switch contacts, terminal means on the opposite side of said plate from said rivet heads and held on said plate by said rivets, a cover over said plate, and operating means carried by the cover for moving said plunger.

3. In an electric switch, a recessed insulating base, a cover therefor, means to secure said cover and base together, and fixed contact mounting means interposed and held between said cover and base comprising an insulating plate, terminal means lying on one side thereof, and members extending through said plate from the other side and securing said terminal means in place, said securing means having portions on said other side of the plate forming fixed contacts, in combination with a U-shaped movable contact within the recessed portion of said base and having end portions engaging said fixed contacts, and operating means to move said movable contact.

4. In an electric switch, a recessed insulating base, a cover therefor, means to secure said cover and base together, and fixed contact mounting means interposed and held between said cover and base comprising an insulating plate, terminal means lying on one side thereof, and members extending through said plate from the other side and securing said terminal means in place, said securing means having portions on said other side of the plate forming fixed contacts, in combination with a plurality of movable contact members within recesses in said base and engageable with said fixed contacts, and operating means for said movable contact members including a transverse bar engaging at opposite ends with said movable contact members, and a plunger separate from said bar and guided by the walls of a cavity located in the center of said base and engaging and moving said bar in one direction to cause contact separation, and a handle extending through said cover and engaging with said plunger to operate said contacts.

5. In an electric switch, an insulating base, a cover therefor, and fixed contact mounting means interposed between said cover and base comprising an insulating plate, terminal means lying on one side thereof, and members extending through said plate from the other side and securing said terminal means in place, said securing means having portions on said other side of the plate forming fixed contacts, in combination with a plurality of U-shaped movable contacts having end portions engaging fixed contacts, and operating means for said movable contacts including a transverse bar engaging at opposite ends in the bends of said movable contacts, and a plunger separate from said bar and guided by the walls of a cavity located in the center of said base and engaging and moving said bar in one direction to cause contact separation.

6. In an electric switch, a recessed insulating base, a cover therefor, and fixed contact mounting means interposed between said cover and base, comprising an insulating plate, terminal members sunk into channels in one side of said plate, rivets having heads counter-sunk in the other side of said plate providing fixed contacts, said rivets passing through said plate to secure

said terminal members in place, an insulating plate overlying said mounting plate to insulate said contacts from said cover in combination with movable contacts within said base and engageable with said fixed contacts, and operating means pivotally mounted in and extending through said cover for operating said movable contacts.

7. In an electric switch, an insulating base, a cover therefor, and fixed contact mounting means interposed between said cover and base comprising an insulating plate, terminal members sunk into channels in one side of said plate, rivets having heads counter-sunk in the other

side of said plate providing fixed contacts, said rivets passing through said plate to secure said terminal members in place, in combination with movable contacts in said base and engageable with said fixed contacts and operating means for said movable contacts, said operating means including a slide-bar of insulating material located between contacts of the same polarity, the upper edge of said bar fitting into channels in said plate to locate said bar in position to present a barrier inhibiting arc-over between said same polarity contacts.

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