

May 16, 1939.

W. H. FRANK ET AL

2,158,657

SWITCHING APPARATUS

Filed Sept. 14, 1936

5 Sheets-Sheet 1

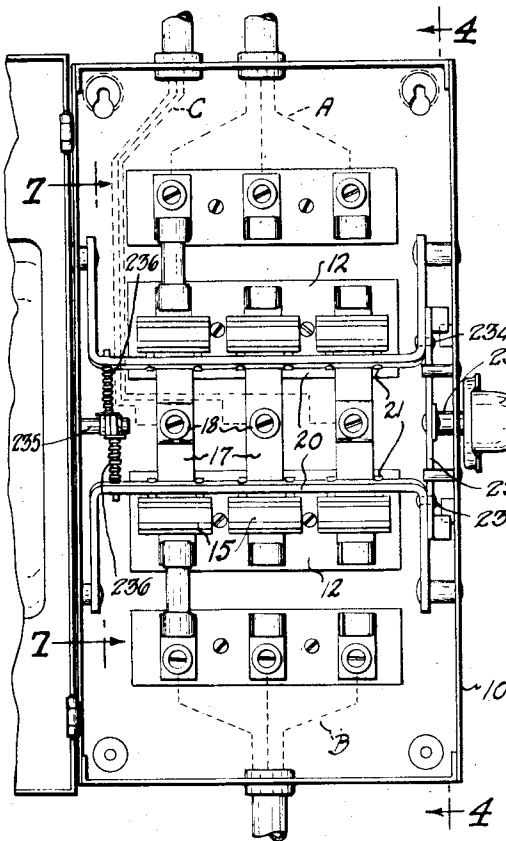


Fig. 1

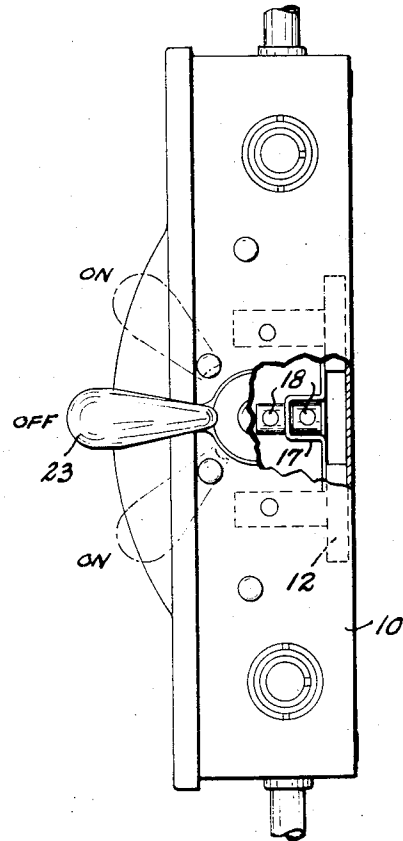


Fig. 2

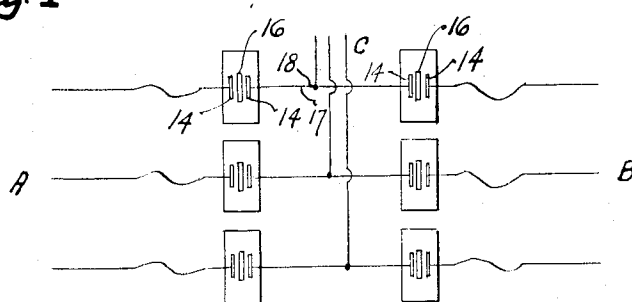


Fig. 3

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5 Sheets-Sheet 2

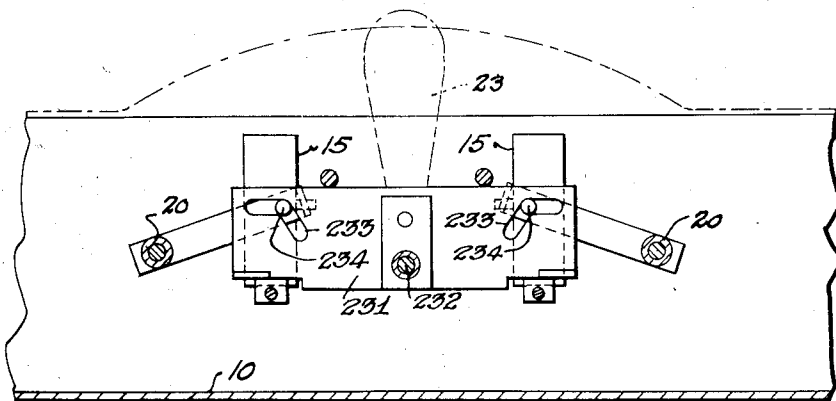


Fig. 4

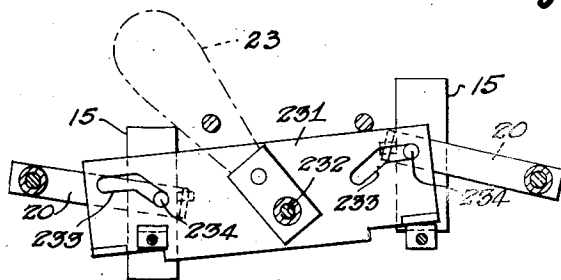


Fig. 5

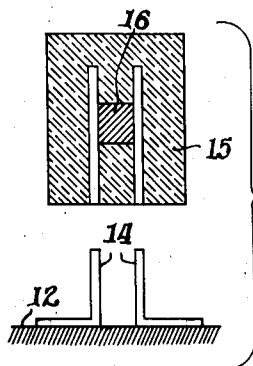


Fig. 19.

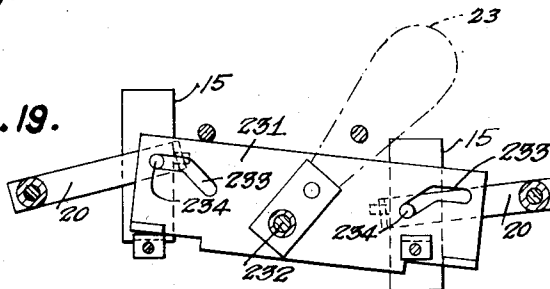


Fig. 6

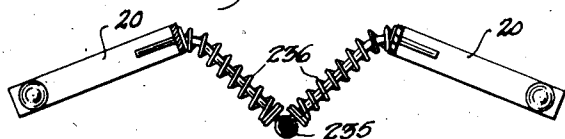


Fig. 7

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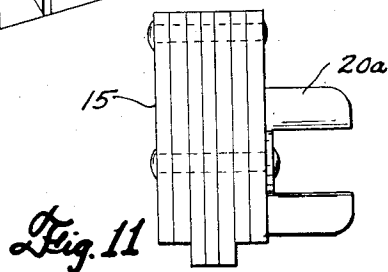
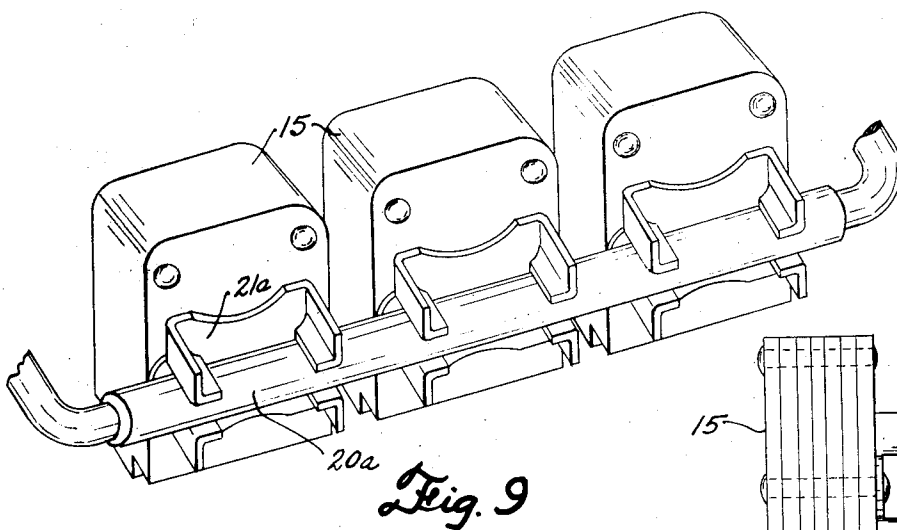
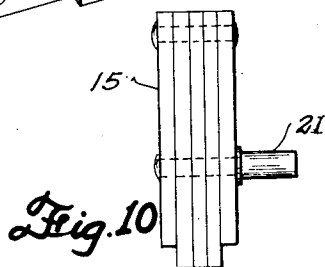
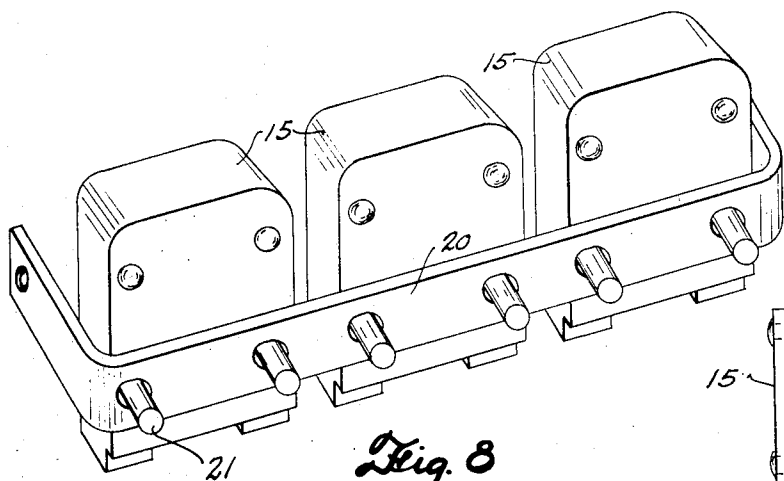
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SWITCHING APPARATUS

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5 Sheets-Sheet 3



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SWITCHING APPARATUS

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5 Sheets-Sheet 4

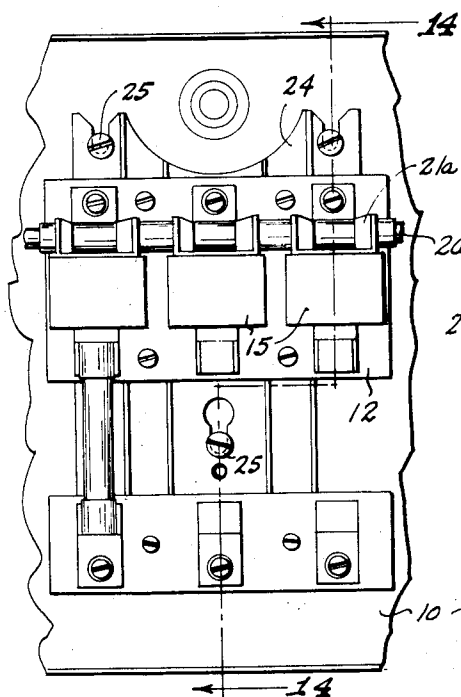


Fig. 12

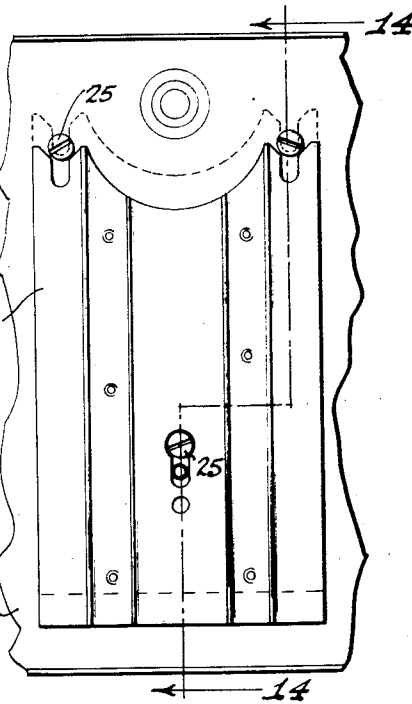


Fig. 13

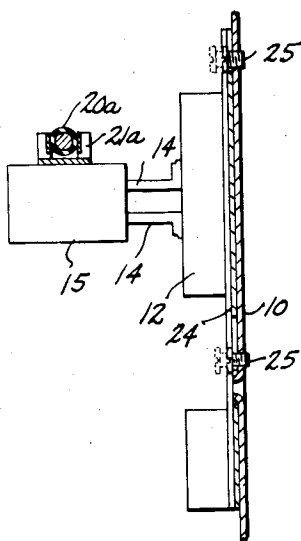


Fig. 14C

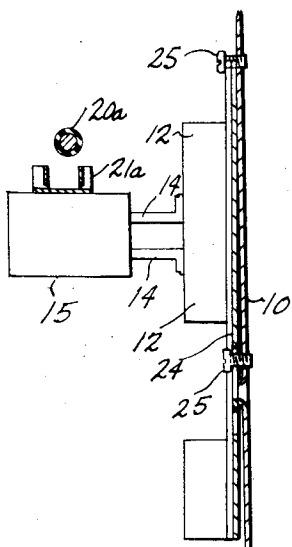


Fig. 14B

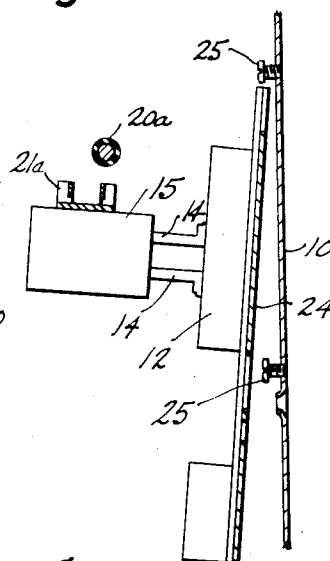


Fig. 14A

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5 Sheets-Sheet 5

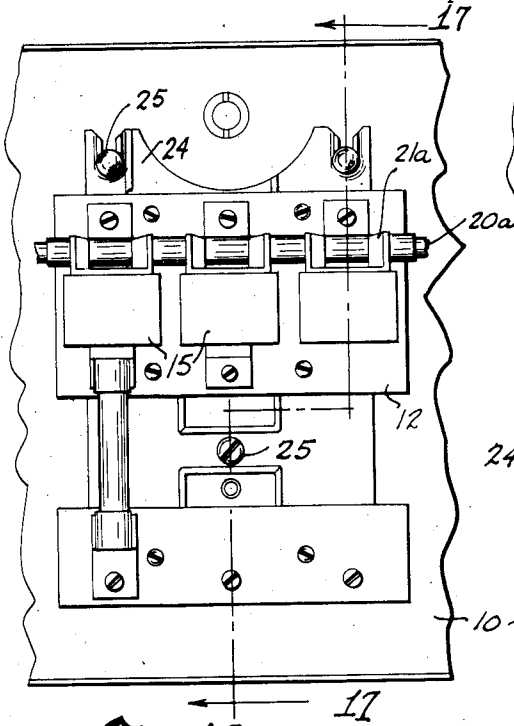


Fig. 15

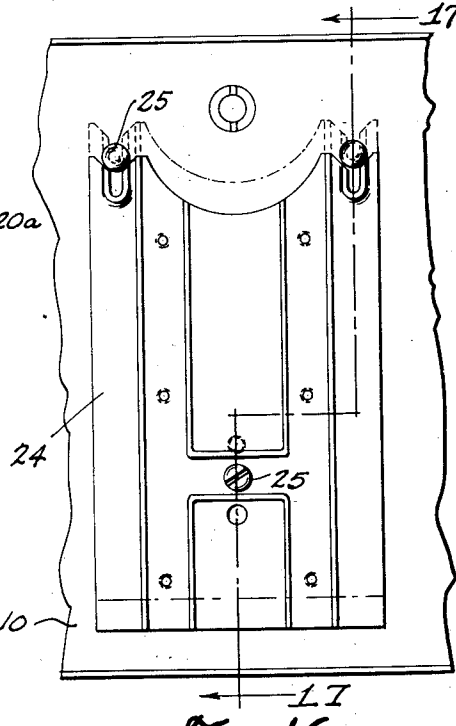


Fig. 16

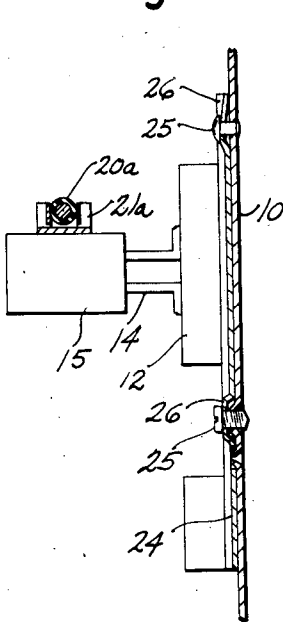


Fig. 17B

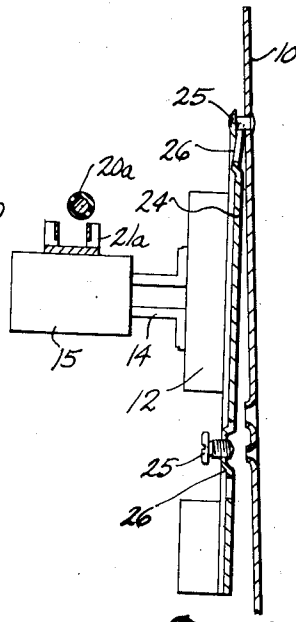


Fig. 17A

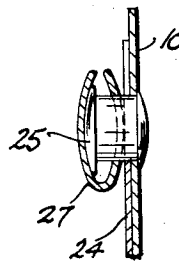


Fig. 18A

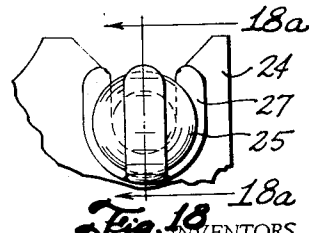


Fig. 18

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UNITED STATES PATENT OFFICE

2,158,657

SWITCHING APPARATUS

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Joseph A. Messing, Detroit, Mich.

Application September 14, 1936, Serial No. 100,771

2 Claims. (Cl. 200—50)

This application discloses a switch which includes a box, switching elements therein, each comprising stationary contacts and movable contacts adapted to connect the stationary contacts, operating mechanism to move the movable contacts to or from the stationary contacts, and an actuating handle for the operating mechanism.

The stationary contacts are sets of pistons mounted on a base secured to the box; in each set, one is connected to line and the other is connected to load.

The movable contacts are mounted in and form part of cell-like housings or heads of insulation; these are moved to and from the stationary contacts by operating bars actuated by handles, which are on the sides of the boxes though they might well be on the fronts of the boxes.

The stationary contact bases are mounted on the backs of the boxes.

The stationary contacts are connected to terminals of conductors entering the boxes through walls of the boxes.

For an understanding of the design and construction of the switches hereof, reference should be had to the appended drawings. In these drawings which show details of a double throw switch,

Fig. 1 shows the double throw switch in front view.

Fig. 2 is a right side view of Fig. 1.

Fig. 3 is a wiring diagram of the double throw switch.

Fig. 4 is a side view of the mechanism per se of the double throw switch with the handle thereof in neutral position and is a section on line 4—4 of Fig. 1.

Fig. 5 is a side view of the mechanism per se of the double throw switch with the handle thereof thrown to the left to throw the left hand heads into "on" position and the right hand heads into "off" position.

Fig. 6 is a side view of the mechanism per se of the double throw switch with the handle thereof thrown to the right to throw the right hand heads into "on" position and the left hand heads into "off" position.

Fig. 7 shows parts of the mechanism per se and is a section on line 7—7 of Fig. 1.

Figs. 8 and 9 show two different arrangements for connecting the operating bars of the switch to the movable heads of the switch.

Figs. 10 and 11 are side views of the heads per se of Figs. 8 and 9.

Fig. 12 shows one arrangement for mounting parts in the switch box.

Fig. 13 shows the mounting plates per se of Fig. 12.

Figs. 14a, 14b, and 14c are sections on line 14—14 of Figs. 12 and 13 and illustrate sequentially the various steps in mounting the parts in the box.

Fig. 15 shows another arrangement for mounting parts in the switch box.

Fig. 16 shows the mounting plates per se of Fig. 15.

Figs. 17a and 17b are sections on line 17—17 of Figs. 15 and 16 and illustrate sequentially the various steps in mounting the parts in the box.

Fig. 18 shows an arrangement for holding the mounting bolts of the mounting plates, alternative to that of Figs. 12—17.

Fig. 18a is a section on line 18a—18a of Fig. 18.

Fig. 19 is a cross section view of a movable head of the switch.

Specific description of parts—double throw switch (Figures 1—18a)

This switch comprises a sheet metal box 10 on whose back wall are secured insulation bases 12 supporting the stationary piston contacts 14 over which are telescoped the movable contact heads 15, these having therein movable contacts 16 which bridge the stationary contacts to establish circuits through them.

Because this is a double throw switch there are two sets of stationary contacts and two heads for each conductor line A—B; one stationary contact of one set in a line is connected to the adjacent stationary contact of the other set of that line through a connecting strap 17 having binding posts 18 thereon to which are connected conductors C.

The heads may be reciprocated towards and away from the back of the box by means of operating bars 20, Fig. 8, or 20a, Fig. 9, connected to interlocking lugs 21—21a thereof, in the manner illustrated in these figures, and these operating bars may be manipulated by the operating mechanism shown in Figs. 4 to 7 which is so constructed that one head of each line may be moved to the stationary contacts associated therewith to connect the group of conductors C to the group of conductors A and disconnect them from the group B, or vice versa, or to disconnect the group C from both groups A and B.

The operating mechanism may be actuated by an exposed handle 22 mounted on a side of the box as illustrated. This handle 22 is riveted to a plate 231 journaled on a fixed pin 232 and having slots 233 receiving pins 234 fixed on the operating

bars 20 which are connected to a fixed pin 235 by snap action compression springs 236. Rocking of the handle in either direction causes the plate 231 to rock on its pivot and the pin and slot engagements 233—234 cause the two sets of heads 15 to move in opposite directions from their neutral position, Fig. 4, with a snap action provided by the springs 236.

It will be observed that the handle may be thrown into any one of the three positions illustrated in Fig. 2 to connect the conductors C to either conductor group A or B or to neither of these conductor groups, with a suitable snap action on make and break.

The stationary contacts 14 and their heads 15 may be mounted in the switch box 10 in accordance with the manner shown in Figs. 12—18a. Referring to the drawings, it will be seen that Figs. 12—14a show the bases 12 secured to a mounting plate 24 removably fastened onto the back of the box by heads of screws 25, two of which pass through edge slots of the plate 24 and one of which passes through a keyhole slot of the plate. After the operating mechanism of the switch is disposed in the box, a subassembly consisting of a mounting plate 24, the bases 12, already secured thereto, the contacts 14, already secured to the bases, and the heads 15, positioned on the contacts 14, may be mounted by slipping the edge slots of the mounting plate 24 under the heads of screws 25 and the keyhole slot over the head of a screw 25 and then adjusting the parts from the position of Fig. 13 to that of Fig. 12 and then tightening up the screws 25. The operative connection between the heads 15 and the operating bars 20a will be established by this action merely by the interlocking of the back lugs 21—21a of the heads to the operating bars, as illustrated, before the screws 25 are tightened up.

Figs. 15—18a show a construction similar to that of Figs. 12—14a but differing in that pins or rivets 25 are used in place of some of the screws 25. To provide spring seats for these pins or rivets the mounting plate may be deformed as shown best in Fig. 17a or spring washers 27 as shown in Fig. 18a may be provided.

The mounting arrangements herein disclosed

permit easy assembly of the switch parts in the box and also permit easy removal and replacement of these parts when desired.

Now having described the switches hereof, reference will be had to the claims which follow for a determination of the protection sought to be obtained by this application.

We claim:

1. In a switch, a box, an operating bail traversing the sides of the box and journaled therein, and parallel to the back thereof, and a unitary contact set comprising a base, a prong secured to the base and projecting forwardly from it, a housing of insulation having a cell provided with an open end in which is disposed the forward free end of the prong, the housing containing a prong engaging contact, and means on the housing for detachably interlocking it to the bail, the means and the bail being so constructed and arranged that they can be associated for interlocking the housing and the bail by movement of the housing towards the bail in a single direction parallel to the box back, and means for securing the base to the box back.

2. In a switch, a box, an operating bail traversing the sides of the box and journaled therein, and parallel to the back thereof, and a unitary contact set comprising a base, a prong secured to the base and projecting forwardly from it, a housing of insulation having a cell provided with an open end in which is disposed the forward free end of the prong, the housing containing a prong engaging contact, and means on the housing for detachably interlocking it to the bail, the box having means thereon for securing the base to the box back, the base having end slots receiving the last mentioned means, all the parts being so constructed and related that the housing and base may be assembled relatively as a sub-assembly, and such sub-assembly may be assembled as a unit with respect to the bail and box back by movement of the sub-assembly, in one movement and in a direction parallel to the box back and towards the bail and base securing means.

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