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W. O. BECK

1,880,676

CIRCUIT CONTROLLING DEVICE

Filed Jan. 22, 1931

FIG. 1

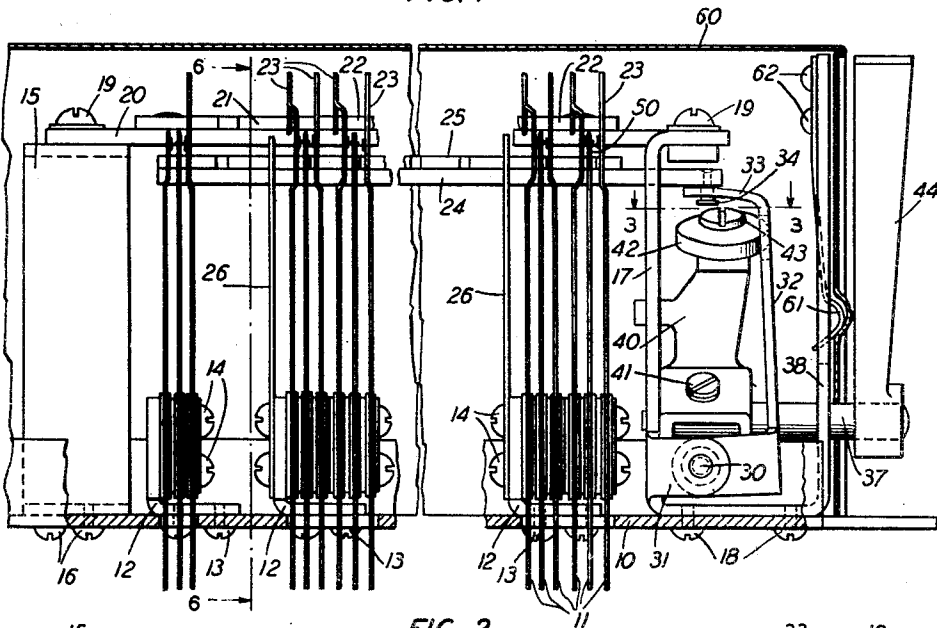


FIG. 2

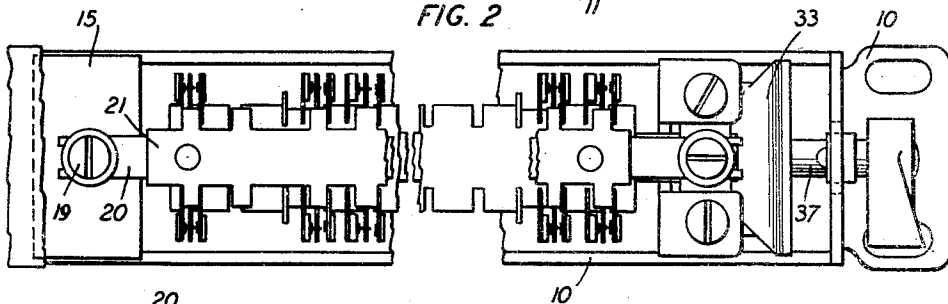


FIG. 6

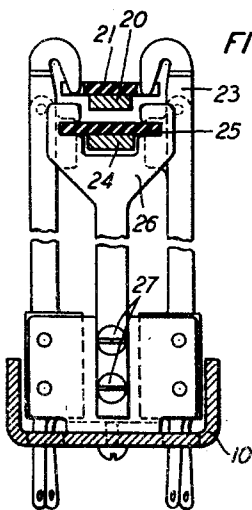


FIG. 3

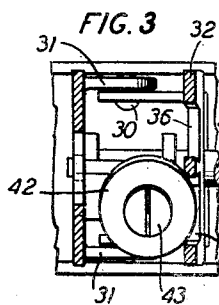


FIG. 4

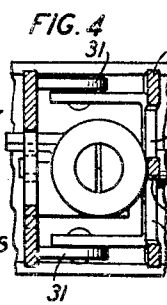
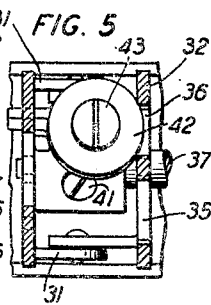


FIG. 5



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CIRCUIT CONTROLLING DEVICE

Application filed January 22, 1931. Serial No. 510,397.

This invention relates to circuit controlling devices and particularly to switching devices of the multi-contact type adapted to control a large number of independent electric circuits.

Multi-contact switches find extensive use in connection with telephone exchange systems and are usually employed in conjunction with associated telephone apparatus as change-over switches, operating to substitute one group of circuits for another group when the latter has become inoperative, or for some reason is to be put out of service temporarily. Regardless of what precautions are taken to render such switches dust-proof, it has been found that dirt will tend to accumulate on the spring contacts to such an extent as to result in faulty contact and a consequent disruption of telephone service.

It is therefore, the object of this invention to provide a simple, compact and economical switch structure which reduces to a minimum the undesirable effects caused by the accumulation of dirt on the switch contacts.

This object is attained in accordance with a feature of the invention by the provision of a novel type of operating mechanism which cooperates with a contact controlling draw-bar to effect a wiping engagement of the contacts when the operating mechanism is actuated.

The invention will be readily understood from the following detailed description made with reference to the accompanying drawing in which,

Fig. 1 is a fragmentary side elevation of a multi-contact switch constructed in accordance with this invention;

Fig. 2 is a top plan view of the switch;

Figs. 3, 4 and 5 are views of the operating mechanism in its normal, intermediate and operating positions respectively, and are taken along the line 3—3 of Fig. 1 looking in the direction of the arrows; and

Fig. 6 is a section taken along the line 6—6 of Fig. 1 looking in the direction of the arrows.

A channel-shaped apparatus mounting strip 10 serves as a mounting for the several groups of contact spring units, such as 11,

each such unit being provided with an L-shaped bracket 12 which is secured to the strip 10 by means of suitable screws 13, the spring assembly, consisting of alternate contact springs and insulating separators, being secured to the bracket 12 by means of screws 14.

At one end of the strip 10, or if the strip is employed to accommodate other equipment such as relays, at an intermediate point thereon, a U-shaped support 15 is secured by means of screws 16. At the other end a corresponding spider-like bracket 17 is mounted by means of screws 18.

Bridging the support 15 and bracket 17 and made fast thereto by screws 19 is a metal bar 20 upon which is mounted an insulating strip 21 which is provided at intervals throughout its length with spacing projections 22 which serve to maintain the passive or substantially stationary contact springs 23 in predetermined spaced relation.

Immediately below the bridging member 20 and in alignment therewith, an operating draw-bar consisting of a metal reinforcing strip 24 and an insulating notched bar 25 is located and is supported near each of its ends by bifurcated spring members 26, clearly shown in Fig. 6. Each of the spring members 26, which are secured to the L-shaped bracket 12 by means of screws 27 is cut away to provide a seat upon which the insulating bar 25 rests, as shown in Fig. 6. The supporting springs 26 carry the draw-bar and permit it to move longitudinally when actuated, as will presently appear.

The active or movable springs 50 are adapted to be engaged by the projections on the slotted insulating bar 25 so as to be moved into engagement with their associated passive springs 23 when the draw-bar is actuated.

Pivotaly mounted at 30 on oppositely disposed projections 31 of the bracket 17 is a hinge-like member 32 which is provided with a flange 33 to which one end of the operating bar 24 is secured by means of a rivet or screw 34.

The hinge-like member 32 is provided with

two apertures or slots 35 and 36 (Figs. 3, 4 and 5) the latter being laterally smaller than the former. The purpose of these slots will appear from a later description.

A shaft 37 passes through suitable holes in the upright portion 38 of bracket 17 and in bracket 32, terminating in the other upright portion of bracket 17. An operating member 40 is adjustably mounted on shaft 37 midway between the hinge 32 on bracket 17 by means of set screw 41. A roller 42, rotatably mounted on the upper end of element 40 by means of screw 43 is adapted to fit into the slots 35 and 36 in hinge 32. A lever 44 is mounted on the outer end of shaft 37, by means of which the shaft may be rotated to effect the actuation of the contact springs as will appear from the following description.

As seen in Fig. 3, when the switch is in its normal position, a portion of the roller 42 is located in slot 35 of the hinge member 32. In this position the contact springs assume a position as shown in Fig. 1. To operate the switch the lever 44 is rotated with the shaft 37, causing the member 40 to experience a corresponding movement. In order to move member 40 it is necessary for the roller 42 to disengage itself from the slot 35 and in so doing, it rides over the surface of the portion 46 intermediate the two slots 35 and 36 thereby acting as a cam to cause the hinge-like member 32 to pivot about the point 30, pulling the draw-bar 24 with it. The longitudinal movement of draw-bar 24 is in excess of the movement actually required to effect engagement of the contact springs in order to permit the roller 42 to drop into the smaller slot 36 to lock the switch in its operating position. When the roller 42 passes over the surface of 46, the hinge 32 moves forward under the tension of the contact springs until the roller is seated in the slot 36. Since the slot 36 is smaller than slot 35, the roller 42 does not allow the hinge 32 to move backwards to the full extent that it moves forward, but maintains it in such a position as to keep the contact springs in engagement.

It will be observed that the movement of the handle or lever 44 from its normal to its operative position results in a to and fro or longitudinal oscillating movement of the draw-bar 24. This movement causes the active contact springs such as 50 to engage their associated passive contact springs 23 with a wiping action which tends to clean the contacting surfaces and insure perfect electrical contact.

As an added precaution against dust and as a general protective agency, a cover 60 is provided which encloses the entire equipment and is removably secured to the switch frame by means of spring 61 which is made

fast to the upright bracket 38 by means of screws 62.

What is claimed is:

1. In a circuit controlling device, a plurality of active and passive contacts, a longitudinally movable draw-bar operatively associated with said active contacts, a manually operated lever, and means intermediate to said draw-bar and said lever and responsive to a single actuation of said lever for reciprocally moving said draw-bar and effecting a wiping engagement of said active and passive contacts.

2. In a circuit controlling device, a plurality of active and passive contacts, a longitudinally movable draw-bar for effecting engagement of said active and passive contacts, and means for actuating said draw-bar comprising a rotatable lever, and cooperating camming elements secured to said lever and said draw-bar for causing said draw-bar to move in a reciprocating manner upon a single actuation of said rotatable lever.

3. In a circuit controlling device, a plurality of active and passive contacts, a draw-bar having normal, intermediate and operating positions and having a predetermined maximum longitudinal travel, the intermediate position corresponding to the maximum longitudinal travel thereof, and means for causing said draw-bar to pass progressively from its normal position through its intermediate position to its operating position to effect a wiping engagement of said contacts.

4. In a circuit controlling device, a plurality of active and passive contacts, a longitudinally movable draw-bar operatively associated with said active contacts and having normal, intermediate and operating positions, a manually operated lever, a hinge-like member secured at one end to said draw-bar and provided with slots of different dimensions and a cam normally resting in one of the slots in said hinge-like member to maintain said draw-bar in its normal position and adapted to pass therefrom to another of said slots upon the actuation of said lever to cause said draw-bar to pass through its intermediate position to its operating position in a reciprocating manner and effect a wiping engagement of said active and passive contacts.

5. In a circuit controlling device, a plurality of spring contacts, a draw-bar for said contacts having normal, intermediate and operating positions and movable longitudinally through different distances from normal to assume said positions and having its intermediate position occurring at its maximum longitudinal movement from normal, and means for causing said draw-bar to pass through its intermediate position to its operating position in sequence to effect a wiping engagement of said contacts.

6. In a circuit controlling device, a plurality of spring contacts, a draw-bar for said contacts having normal, intermediate and operating positions and movable longitudinally through different distances from normal to assume said positions having its intermediate position occurring at its maximum longitudinal movement from normal, and means for moving said draw-bar through its several positions to cause engagement of said contacts prior to the arrival of said draw-bar at its intermediate position and maintain them in engagement during the passing of said draw-bar through its intermediate position and in its operating position to effect a wiping engagement of said contacts.

In witness whereof, I hereunto subscribe my name this 9th day of January, 1931.

WILLIAM O. BECK.