COMPOSITE SLIDING SWITCH HOUSING
Filed July 6, 1964, Ser. No. 380,325
Claims priority, application Netherlands, Aug. 7, 1963, 296,393
3 Claims. (Cl. 200—16)

The invention relates to a sliding switch of the type disclosed in co pending application, Serial No. 105,430, now Patent No. 3,157,751 granted November 17, 1964, in the name of P. J. Van Den Berk and assigned to the assignee of this application. The switch according to said co pending application comprises a frame member having an upper and lower fillet or rail in which contact plates having an integral resilient tongue or contact is embedded. A central passage in the frame contains the sliding element of the switch.

In the sliding switch described in the co pending application noted above, the contact springs are embedded in the material of the unpartite frame of thermo-plastic synthetic substance. The contact springs are previously disposed in the mould required for the manufacture of the frame of the switch and the thermo-plastic material is injected under pressure around the springs. Thus separate fastening means for the springs such as clamps are not required. A portion of each contact spring must, of course, remain free of insulating material and for this purpose the accuracy of the fit of the contact springs in the relevant recesses of the mould has to satisfy severe requirements. The invention has for its object to provide a structure in which the contact springs can be assembled after the frame is manufactured while the requirement for accuracy of the frame manufacturing mould are at a minimum.

In accordance with the invention, the insulating frame is formed in two mated halves to be joined in a direction normal to the surfaces of the enclosed strip-shaped slide element. One of these halves is provided with elevations or studs projecting in the said normal direction. Said elevations fitting intimately in recesses or bores in the other half, while each contact plate has at least two portions fitting around an extension or elevation or between two extensions or elevations, the arrangement being such that the contact plates are enclosed between the two halves of the frame and is secured against displacement.

The above and other features, objects and advantages of the present invention will be fully understood from the following description considered in connection with the accompanying illustrative drawings of a presently preferred embodiment.

The invention will be described more fully with reference to the accompanying drawing, in which a presently preferred embodiment is shown.

FIG. 1 shows an embodiment of the sliding switch according to the invention in a side elevation and FIG. 2 shows bottom elevation respectively. Both FIGS. 1 and 2 are partly in section.

FIG. 3 shows the same switch in a front view and FIG. 4 shows a portion of one half of the frame in a perspective view. The sliding switch shown comprises a generally box-shaped frame of thermo-plastic insulating synthetic substance, for example nylon, consisting of two halves 1 and 3 (FIG. 2) joined in a manner to be described hereinafter. A strip-shaped slide contact 5 is moulded inside the frame so as to be replaceable in the longitudinal direction. The slide 5 is provided on either one or both sides, with rows of conductors 7, which are applied to the surface of the slide for example by a suitable printing process. The frame 1, 3 consists of essentially of two fillets or rails 9 and 11, arranged along the narrow longitudinal edges of the strip-shaped slide 5 (see FIG. 3), which form grooves 13 and 15 for guiding the slide 5. The rails 9 and 11 are interconnected by side pieces 17 and 19, of the frame halves which are continuous in this case. Between rails 9 and 11, within the frame 1, 3 there are fastened metal contact plates or members 21 and 23. The manner of fastening the contacts will be described more fully hereinafter. Each of these contact members has a mainly strip-shaped contact spring contact spring or tongue 25 and 27 respectively punched therefrom. Each of the springs co-operates in known manner with the conductors 7 on the contact slide 5. It will be apparent from FIGS. 1 and 3 that the springs 25 and 27 are arranged approximately parallel with the surface of the slide 5 and at right angles to the longitudinal direction of the latter. This arrangement has the advantage that each contact member and associated spring occupies a minimum of space in the longitudinal direction of the frame. At each side of the springs 25 and 27 there are two narrow metal strip 29 and 31 respectively extending approximately parallel to the contact spring. Said strips are joined near both of the rails 9 and 11 of the frame for supporting the relevant contact spring in either an upright or inverted position and at one or both sides of the slide 5. That is, the spring 27 may be alternately upright and inverted and the springs 25 at the other side of the frame (FIG. 3) are also alternately upright and inverted corresponding to springs 27 or differing from the alternate arrangement of the opposite springs.

Each of these contact plates 21 and 23 (see FIG. 1) comprises, apart from the contact springs 25 and 27 respectively, and the two parallel metal strips 29 and 31 respectively, two soldering tags 28 and 35 respectively, which are punched from one piece of suitable electrically conductive material.

The two halves 1 and 3 of the frame are preferably of identical shape and broadly speaking they are each U-shaped (see FIG. 4) having an approximately rectangular cross section. Each of the two uprights being formed by a row of elevations 37, extending at right angles to the bottom or sides 17 and 19 and alternating with recesses. Each of the elevations 37 is provided with a preferably cylindrical prolongation or stud 39. Each of these studs fits intimately into a bore 41 in the bottom of a recess provided between each pair of adjacent elevations. The two halves 1 and 3 of the frame are joined together by inserting the studs 39 of one half into the bores 41 of the other half of the frame. Thus the two halves of the frame can be joined only in the correct mutual positions and are at the same time secured to each other so rigidly that, in general, further fastening means such as glue are not required. However, if desired, the ends of the cylindrical studs 39 projecting from the frame may be deformed by means of a suitable hot tool so that a broad head is formed, which prevents the two halves of the frame from being accidentally separated from each other. A particularly advantageous frame is obtained, if the elevations 37 are arranged stepwise, as shown in FIG. 4, and the elevations of one limb are the reflections of the elevations 37 along the opposite limb of the frame-half concerned. The arrangement is such that each pair of joined ends of the two U or gutter-shaped frame halves 1 and 3 constitutes a completely closed rail 9 and/or 11, the guide grooves 13 and 15 for the contact slide 5 being formed between frame halves (see FIGS. 2 and 3).
As is shown in FIG. 1, each of the contact plates 21 and 23 is provided with two openings 43, in which the cylindrical studs 39 fit, preferably with a small amount of play. The width of each of the contact plates 21 and 23, at the location of the openings 43, is preferably at least as wide as the recess between each pair of adjacent elevations 37, while each contact plate is also shaped such that it fits between each pair of opposite elevations 37 of each half of the frame. As will be apparent from FIG. 1, it is thus possible to arrange the contact plates at their places prior to the assembly of the two halves 1 and 3 of the frame. After the disposition of all contact plates it is easy to join the two halves of the frame without the contact members shifting or falling out of the frame. After the two halves of the frame have been joined, the contact plates are completely enclosed between said halves (see also FIG. 3) and any troublesome shift of the contact springs 25 and 27 inside the frame 1, 3 is precluded. It is not absolutely necessary for the contact plates to fit accurately and to be clamped rigidly between the two halves of the frame; a small amount of play is not troublesome and it has the advantage that, when connecting wires are soldered to the soldering tags 33 and 35, the plates can move and the heat of the soldering bit is dispersed over a larger area of the thermoplastic material of the frame. It is advantageous in this respect that the plate openings 41 are offset relative to one another in the manner shown in FIG. 1 (in the longitudinal direction of the frame 1, 3), since even when the contact plates are arranged fairly loosely between the halves 1, 3, the potential turning of these members, about their longitudinal axes, is restricted to a harmless minimum. As a matter of course, the elevations 37 of each of the two halves of the frame must also be relatively offset in the longitudinal direction of the frame.

As stated above, the two halves 1 and 3 of the frame have an identical shape. This is not essential, since it is possible, for example, to provide on only one of the two halves of the frame cylindrical studs 39 and on the other half only the associated bores 41, or studs may be provided along one limb of each gutter-shaped frame portion and bores may be provided in the other limb. In principle, it is also possible to construct the halves of the frame without cylindrical studs 39, so that only the elevations 37 of the two halves of the frame interengage each other. In this case it is, however, advisable to secure the two halves to each other with the aid of glue, by means of suitable clamps, or with the aid of pins, which are taken through apertures in the elevations, said apertures lying in a plane one behind the other in the direction of length of the frame. Since each contact plate fits between each pair of adjacent elevations 37, the contact plates are secured against displacement.

While I have shown and described the preferred embodiment of my invention, it will be understood that the latter may be embodied otherwise than as herein specifically illustrated or described and that in the illustrated embodiment certain changes in the details of construction and in the arrangement of parts may be made without departing from the underlying idea or principle of the invention within the scope of the appended claims.

What is claimed is:

1. In a sliding switch having a frame member defining a longitudinal passage receiving and guiding a slide member and a plurality of contact plates supported in said frame member and having a spring contact portion with a said frame member and soldering tags extending to the exterior of said frame member, the improvement comprising a pair of generally U shaped matched frame halves, the limbs of said frame-halves comprising a plurality of discrete elevations defining a longitudinal recess and a plurality of lateral recesses, the elevations of one frame half fitting intimately within the lateral recesses of the opposite frame half, means for securing said frame-halves together, said contact plates being secured in said frame member between said interfitting lateral recesses and elevations, said contact plates having soldering tags extending to the outside of said frame member.

2. In a sliding switch according to claim 1 wherein said means for securing said frame-halves together comprises a stud projecting axially from each said elevation and a bore in the bottom of each said lateral recess, said bore being sized to provide an interference fit with a stud and said contact plates having apertures therethrough for receiving said studs.

3. In a sliding switch according to claim 2 wherein said elevations have a stepwise configuration extending in the longitudinal direction of said frame-halves and a lateral projection integral with each said elevation, said lateral projection defining a guide surface within said passage for guiding said slide.

References Cited by the Examiner

UNITED STATES PATENTS

2,119,921 6/1938 Levy 46--25
2,319,914 5/1943 Blanding 46--25
2,672,562 3/1954 Ewin 200--11 X
2,885,822 5/1959 Ononian 46--24 X
2,896,045 7/1959 Bruniardi 200--166
3,157,751 11/1964 Van Den Berk 200--16

KATHLEEN H. CLAFFY, Primary Examiner.
J. R. SCOTT, Assistant Examiner,