The present invention has for its object to improve sliding contact electric selector switches so as to produce improved electrical contact, with a simpler construction and at lower cost compared with switches hitherto available.

According to one embodiment the moving contact device is rigid and can move in a direction at approximately right angles to the plane of the fixed contact surfaces, the moving contact being pressed against said fixed contacts by a flexible member to which it is connected in an orientable manner.

The flexible member preferably acts on a point of the moving contact located on the axis perpendicular to the contact area and passing through the center thereof.

Due to that disposition, the construction of the changeover switch is relatively simple, and much simpler than the construction of laminated brushes wherein each lamination must be formed and dimensioned in a particular manner. Besides, its construction does not necessitate precision work since even if large tolerances are allowed, the moving contact area is permanently and completely applied on the fixed contact areas.

The contact pressure is not limited by the risk of a permanent deformation of the flexible parts since they are independent and can be dimensioned in consequence, and the heating of the contacts has practically no influence on that pressure. Lastly, the moving contact may be made, entirely or in part, of a particularly suitable material such as silver or a sintered alloy.

The resilient member may, for instance, be made of a flat spring strip parallel to the plane of the contact areas, the ends thereof being fixed to a rigid support. Such a strip can be deformed by the action of the force of contact, which is perpendicular to said plane, but not by that of the force applied to the control member for securing the connection or the disconnection, which is parallel to that plane.

For enabling the orientation of the moving contact with reference to the resilient member, said moving contact may comprise a member having a cylindrical cavity in which is located a spherical member secured to the resilient member and touching the bottom of said cavity.

There is provided, preferably, a certain play between the said spherical member and the side walls of the cylindrical cavity of the moving contact, so that no mechanical rigid connection exists between the moving contact and its controlling devices.

The above described details are particularly applicable to sliding contact electric selector switches i.e. to switches in which the elementary circuits are connected to a fixed elementary track comprising a plurality of studs, while the commutation channels are connected to a directing track which is also fixed, each individual stud being selectively connectable to the directing track by a movable conducting member hereafter referred to as the bridging selector member which slides into contact with the two tracks.

The bridging selector member may comprise two moving contact members disposed as referred to above and connected together, for instance, by a flexible conductor. According to another improvement, the fixed contact studs of the elementary track mutually imbricated but electrically insulated from one another.

In the application of the invention to high-intensity current selector switches, the elementary track on one hand and the directing track on the other hand, may be disposed in two different planes between which the movable contact devices are moved.

The elementary track and the directing track are set preferably, in this case, opposite each other in two parallel planes between which the bridging selector member is moved by means of a control member.

Each moving contact may, for instance, be carried by a flexible bar, the two bars being connected together by connecting devices passing through the moving control member, preferably with a certain play.

The embodiments referred to in the preceding three paragraphs offer the additional advantage over the embodiments previously referred to that, for each bridging selector member, the contact pressure is equally distributed to both contact sections on the elementary track on one hand, and on the directing track on the other hand, and also that that pressure does not depend on any of the other members composing the apparatus (for instance members of other bridging selector members if there are several of them and members composing control devices; driving devices, positioning, assembling and fixing means), and does not set upon them.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings, which show certain embodiments thereof by way of example, and in which:

Fig. 1 represents a perspective view of a portion of a selector switch according to the invention,

Fig. 2 a sectional view of a detail of same.

Fig. 3 a side elevation corresponding to Fig. 1.

Fig. 4 a front elevation of same.

Fig. 5 a plan view of a variant of fixed studs.

Fig. 6 is a sectional view along VI—VI of Fig. 8 showing a further embodiment and Fig. 7 a half section along VII—VII of Fig. 6.

Fig. 8 a section along VIII—VIII of Fig. 6.

In the drawings, like reference numerals refer to like parts.

In the embodiment shown in Figs. 1 to 4, the selector switch comprises an elementary track comprising a plurality of fixed studs 16, which can be connected by a bridging selector member to a fixed directing track, and are distributed in an arculate path on a rigid plate 2. For the sake of simplicity the drawing represents a part only of the elementary track comprising a series of studs, and only the part of the bridging selector member cooperating with that series of studs. The directing part is not shown, but is conventional and forms no part per se of the present invention.

The bridging selector member comprises two cylindrical moving contacts 3, each one of which is connected to a flat spring blade 4 which is parallel to the plane of the contact areas of the studs 16, and has its ends fixed, through supporting legs 5, to a control member or yoke 6. This latter is fixed on a control rod 7 which passes through plate 2 concentrically to the studs 16 and can revolve around its axis but not move longitudinally.

The connection between contact 3 and blade 4 is insured by a ball 8 (Fig. 2) which is housed in a cylindrical cavity 9 of the contact body, slightly larger in diameter than the ball and which carries a bolt 10 riveted to the blade 4.

Around each contact body 3 is fitted a clip 11, and
the two clips are connected by a flexible electrical conductor 12.

In operation, the movement communicated to the moving yoke 6 by the control member is transmitted to the moving contacts 3 through the intermediary of the blades 4 and of the balls 8, the equatorial line of which touches the wall of the corresponding cylindrical cavity. The surfaces of contact of the moving elements 3, therefore, are caused to move in the plane of the contact area of the studs 1b and slidingly to cover those contact areas. The contact pressure results from the deformation of the blades 4, and it is transmitted to the contacts 3 through the balls 8 touching a point at the bottom of the cavities 9.

As the moving contacts 3 can swivel around the balls and take any position imposed upon them, the areas of the moving contacts are strongly applied, under the action of the contact pressure, on the contact areas of the tracks, even if the latter are not exactly level with the fixed plane of contact.

Consequently, the effective area of contact is maximum and constant and the pressure is distributed uniformly at all points of that contact area.

The studs 1b of the elementary track may have, instead of a circular section as in Figs. 1 to 4, such a section that they are imbricated or overlapped as shown in Fig. 5; in which case the moving contacts 3 have a diameter not exceeding the width of the central part of the stud, as shown in dotted lines in Figure 5. Due to this disposition, the displacement needed for the switching allows the effective area of contact between the fixed and moving contacts to remain practically constant, and the moving contacts have no tendency to rock when passing from one stud to another.

In the embodiment shown in Figures 6 to 8, the selector switch comprises two supports 2a and 2b united by cross members 2c and on which the directing track 1z and the elementary track comprising studs 1b are disposed in an arcuate path.

The moving support 6 is fixed to a shaft 7 pivotally mounted in bearings 29a and 29b fixed in the supports 2a and 2b, at the centre of the arcuate paths of the tracks 1a and 1b.

The bridging selector member comprises two moving cylindrical contacts 3, of which each one is carried by a flat spring bar 4 which is parallel to the plane of the contact areas of the tracks 1z and 1b. The two blades 4 are connected together by means of which are set on the ends of the blades 4 and which pass with a play through sleeves 31 fixed to the moving support 6.

As referred to in connection with the embodiments of Figs. 1 to 5, the connection between each contact 3 and the corresponding blade 4 is insured by a ball 8 housed in a cylindrical cavity 9 of the contact, slightly larger in diameter than the ball and which carries a collar 10 riveted to the blade 4. On each contact 3 is engaged a clip 11, and the two clips are connected by a flexible electric conductor 12.

In the selector switch just described, the contact pressure is equally distributed over the two sections of contact of the elementary stud 1b and the corresponding directing track 1z. The assembly formed by the two contacts 3, the blades 4 and the members 30 sets itself in its working position and is disengaged from any rigid connection with the other pieces of the switch.

It is obvious that the invention should not be considered as limited to the forms of execution described and represented, and that modifications can be made thereto without departing from the scope thereof.

It is to be understood, also, that the invention may be modified to suit the circumstances in which it is to be used.

In particular, it applies to the case when the fixed elementary studs are made of the actual conductor of a winding, as for instance the turns of winding of an adjustable potentiometer or those of a variable ratio transformer, the contact areas being rectified or not. It applies also to the case when the fixed elementary studs be replaced by a continuous surface, for instance a graphitized resistant surface as in adjustable graphitized potentiometers.

I claim:

1. An electrical selector switch comprising a continuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therewith and said contact studs each being mounted on a flexible leaf spring located parallel to the plane of the track, for applying said contact studs under sliding pressure on said tracks.

2. An electrical selector switch comprising a continuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therewith, said contact studs each being mounted on a flexible leaf spring located parallel to the plane of the track, for applying said contact studs under sliding pressure on said tracks.

3. An electrical selector switch comprising a continuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therewith, said contact studs each being mounted on a flexible leaf spring located parallel to the plane of the track, for applying said contact studs under sliding pressure on said tracks.

4. An electrical selector switch comprising a continuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therewith, said contact studs each being mounted on a flexible leaf spring located parallel to the plane of the track, for applying said contact studs under sliding pressure on said tracks.
to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therebetween, said contact studs each being mounted on a flexible leaf spring located parallel to the plane of the track, for applying said contact studs under sliding pressure on said tracks and said tracks being located in the same plane on opposite sides of said selector member, a strut at the end of each of said spring blades and connecting said blades together, a ball member located freely in said cavity in each of said contact studs, and a stem secured to said ball member and to the associated one of said spring blades.

6. An electrical selector switch comprising a discontinuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therebetween and a spring blade connected to each of said contact studs, and a strut at the end of each of said spring blades and connecting said blades together, a driving arm between said contact studs, Said struts passing freely through said driving arm, and insulation means between said struts and said driving arm.

7. An electrical selector switch comprising a discontinuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therebetween, a spring blade connected to each of said contact studs, and a strut at the end of each of said spring blades and connecting said blades together, a driving arm between said contact studs, Said struts passing freely through said driving arm, and insulation means between said struts and said driving arm.

8. An electrical selector switch comprising a discontinuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therebetween, and insulated driving arm interconnecting said contact studs, a spring blade connected to each of said contact studs, and rigid plate-like connector members between the ends of said spring blades and said driving arm.

9. An electrical selector switch comprising a discontinuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therebetween, and insulated driving arm interconnecting said contact studs, a spring blade connected to each of said contact studs, and a ball member located freely in said cavity in each of said contact studs, and a stem secured to said ball member and to the associated one of said spring blades.

10. An electrical selector switch comprising a continuous track, a discontinuous track consisting of a plurality of discrete fixed contacts, a selector member mounted for selective movement to connect said continuous track selectively to a discrete fixed contact of said discontinuous track, contact studs on said selector member, said contact studs being mechanically separate from each other, flexible mechanical connection means between said contact studs, flexible electrical connection means between said contact studs to effect only electrical connection therebetween, and insulated driving arm interconnecting said contact studs, a spring blade connected to each of said contact studs, and a ball member located freely in said cavity in each of said contact studs, and a stem secured to said ball member and to the associated one of said spring blades.
solution means between said struts and said driving arm, a ball member located freely in said cavity in each of said contact studs, a stem secured to said ball member and to the associated one of said spring blades and said discontinuous track comprising a plurality of mutually imbricated studs.

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