

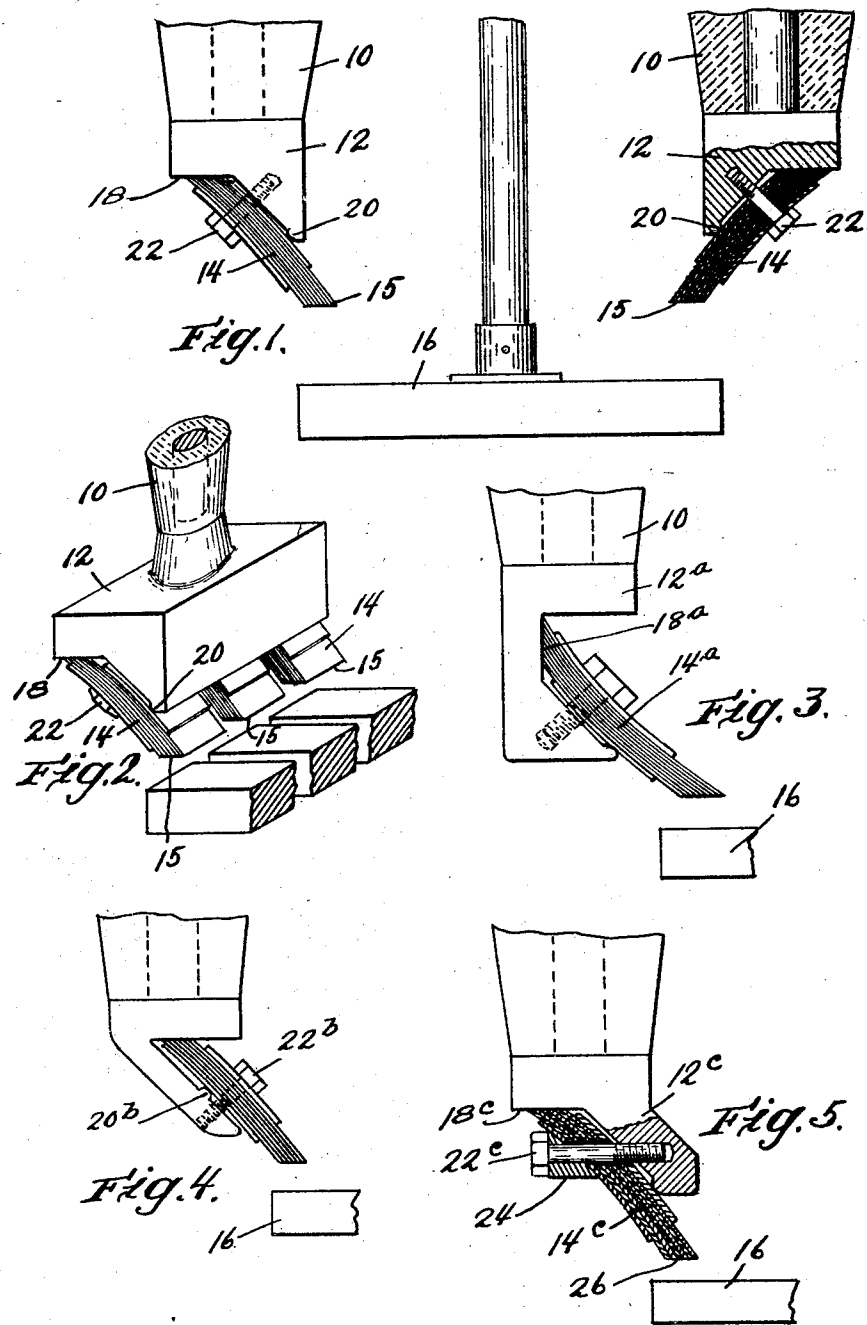
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CONTACT STRUCTURE FOR ELECTRIC SWITCHES

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CONTACT STRUCTURE FOR ELECTRIC SWITCHES

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This invention relates to electric switches of relatively high current carrying capacity, and has for one of its objects the provision of a contact structure including a brush member, the laminae of which are arranged to make independent edgewise end-contact with the brush holder, whereby to provide a low-resistance electrical connection between the brush and its holder and avoid the necessity for the soldered brush member heretofore employed.

A further object is generally to improve the construction and operation of electric switches.

Fig. 1 is a side elevation of the contact structures of an electric switch embodying the invention.

Fig. 2 is a perspective view of a switch member having a plurality of brush members carried by a common supporting block.

Fig. 3 is a detailed side elevation illustrating a modified manner of securing the brush member to its support.

Fig. 4 is a view similar to Fig. 3 but with the clamping bolt and the brush-fulcrum interchanged in position.

Fig. 5 is a view similar to Fig. 3 but illustrating a construction of brush member and support wherein the laminae of the brush member are all identical.

The invention is here shown as applied to the so-called "inverted-brush" type of switch but is not necessarily limited to such a type. In this type of switch, the stationary switch members 10 are provided with brush supporting blocks 12 to which brush members 14 are secured, and a movable switch member including the bar 16 is adapted to be raised upwardly into contact with the lower resilient ends of the brush members and thereby close the circuit through the switch.

In accordance with this invention, the brush member and its supporting block are so arranged that the upper end edge of each lamina of the brush member is pressed into independent contact with the supporting block so that the current through the switch traverses each lamina of the brush member from end to end and passes into the supporting block without traversing across the

brush member as has been the common practice, heretofore.

In carrying out this invention, the laminae of the brush member 14 are composed preferably of straight strips of resilient material, as copper. In the construction shown in Fig. 1, the resilient strips are all of equal length. The contact block 12 is provided with a horizontally and transversely arranged contact face 18 and a raised ledge 20 which is disposed below and to one side of the contact face 18 and extends transversely of the contact block and in parallel relation with said contact face, and constitutes a fulcrum for the brush member. The brush member is disposed upon the contact block 12 with the fulcrum engaging the brush member intermediate its ends. The upper end edges of the laminae of the brush member are disposed in engagement with the horizontal contact face 18 of the supporting block. The laminae are provided with apertures therein which, when the laminae are in contact with the supporting block, as illustrated, are disposed in alignment. A clamping bolt 22 is passed through said aligned apertures and is removably screw-threaded in the contact block. As shown in Fig. 1, the bolt is passed through the brush member between its point of engagement with the fulcrum 20 and the upper contact face of the brush. As thus arranged said clamping bolt is adapted to press the brush member forcibly against the fulcrum and cause it to tilt or rock and thereby force the upper contact face of the upper contact member into firm electrical contact with the contact face 18 of the supporting block, in which position each lamina is in independent contact with the supporting block. The bolt 22 cooperates with the contact face 18 of the supporting block to hold the brush member securely in position on the block. The bolt also serves to prevent relative movement between the laminae due to the angle of contact between the brush member and the supporting block. The brush member is adapted to extend a substantial distance below the support block whereby to provide a yielding section 15 to be engaged by the movable switch member.

The above construction lends itself readily to electric switches of exceedingly great current carrying capacity as a supporting block may be provided with a plurality of brush members as is illustrated in Fig. 2 in which case the fulcrum ledge 20 and also the contact face 18 is extended across the supporting block and the brush members 14 are arranged side by side along the length of the block and in engagement with the fulcrum and contact face.

The clamping bolt 22 is sufficient to maintain the alignment of the laminae of the brush member and no other means is needed to secure together the laminae of the brush member.

In Fig. 3 the brush member 14a is secured to the inner face of the supporting block 12a instead of to the outer face thereof as illustrated in Fig. 1. The contact face 18a of the supporting block is herein vertically disposed and the laminae of the brush member are of varying lengths and are assembled in a progressive manner so that the upper ends of the laminae are all disposed independently to engage the contact face 18a of the support block while the lower edges of the laminae are disposed approximately in a horizontal plane whereby to be engaged by the movable bridging member.

The construction illustrated in Fig. 4 is similar to that of Fig. 3, the principal difference being that the fulcrum 20b and clamping bolt 22b are interchanged in position over the corresponding fulcrum and bolt illustrated in Fig. 3.

While the modifications illustrated in Figs. 1, 2 and 4 show brush members composed of laminae of equal length, the bolt apertures through the laminae are disposed at varying locations therein. This construction necessitates some form of progressive dies when stamping out the laminae. Progressive dies are relatively expensive and it is therefore desirable to avoid their use.

Fig. 5 illustrates a construction wherein the laminae of the brush member are all of the same length and the bolt apertures therein are also all in the same locations in the laminae so that the laminae are identical and can be blanked out by the same die. In this figure, the clamping bolt 22c is screw-threaded in the support block 12c and is parallel to the contact face 18c of the supporting block instead of being disposed approximately perpendicularly to the brush member as in the previous modifications. The bolt apertures in the brush member 14c are adapted to be somewhat larger than the diameter of the bolt 22c so that the bolt may be passed through them in the manner illustrated in this figure. A sleeve 24 may be interposed beneath the head of the bolt 22c and the brush member and may have the inclined face 26 which is adapted to engage the brush member.

I claim:

1. A contact structure for an electric switch comprising a support, a brush-member fulcrumed intermediate its length on said support and having an edge-contact at one end with said support, and pressure-applying and brush-clamping means acting on said brush-member to hold said brush member against said fulcrum and its end in the aforesaid edge contact with said support.

2. A contact structure for an electric switch comprising a support, a brush-member fulcrumed intermediate its length on said support and having an edge-contact at one end with said support, and a pressure-applying and brush-clamping bolt passed through said brush member between the fulcrum and end-contact and connected with said support, said brush member against said fulcrum and its end in the aforesaid edge contact with said support.

3. A contact structure for electrical apparatus comprising a support, a brush-member having an edge-contact at one end with said support and a fulcrum-engagement intermediate its ends with said support, and means to apply a pressure on said brush-member to cause it to tilt about its fulcrum and urge its edge-contact against said support, said means including a bolt bearing on said brush member and connected with said support, said pressure-applying means also constituting means to clamp said brush-member in the aforesaid relation on said support.

4. A contact structure for electrical apparatus comprising a support, a laminated brush-member having an edge-contact at one end between its independent laminations and said support and a fulcrumed-engagement intermediate its ends with said support, and means to applying a pressure on said brush-member to cause it to tilt about its fulcrum and urge its edge-contact against said support, said pressure-applying means and said contact-engagement between said brush-member and support also constituting means to position said brush member on said support.

5. A contact structure for electrical apparatus comprising a support, a laminated brush-member having an edge-contact at one end with said support and a fulcrumed-engagement intermediate its ends with said support, and means to apply a pressure on said brush-member to cause it to tilt about its fulcrum and urge its laminations into independent edge-contact with said support, said means comprising a bolt passed through said brush member and connected with said support, said pressure-applying means and contact engagement between said brush member and support also constituting means to maintain the alignment of the laminae of the brush member and to clamp the brush member on said support.

6. A contact structure for an electric switch comprising a support, a brush member having a fulcrum connection intermediate its ends with said support, and also having opposed end contact faces inclined with respect to the length of the brush member, and clamping means to tilt the brush member about the fulcrum and effect the forcible engagement of one of the end contact faces of said brush member with said support and also to fix said brush member in the aforesaid relation to said support.

7. A contact structure for an electric switch comprising a support having a contact face and a fulcrum disposed in spaced relation with said contact face, a laminated brush member disposed on said fulcrum at an inclination with respect to said contact face and having an end edge-contact between the ends of its laminations and said contact face and clamping means carried by said support to force and hold said brush member against said fulcrum and contact face.

8. A contact structure for an electric switch comprising a support having a contact face and a fulcrum disposed in spaced relation with said contact face, a laminated brush member disposed on said fulcrum and having an end edge-contact between its laminations and said contact face and means to force said brush member against said fulcrum and contact face comprising a bolt passed through said brush member between said fulcrum and said end edge-contact and connected with said support.

9. A contact member comprising a brush member composed of a plurality of superimposed laminae of approximately equal lengths and all having apertures therethrough disposed in approximately the same location, a support having a contact face and a fulcrum disposed below and at one side of said contact face, on which fulcrum said brush member is disposed, and means to force said brush member against said fulcrum and the end edges of the brush laminae against said contact face including a bolt passed through the apertures in the brush laminae and connected with said support and disposed approximately parallel with said contact face.

10. A contact member for an electric switch comprising a brush member composed of a plurality of superposed laminae of approximately equal length, and each lamina having means disposed in the same location therein for maintaining a predetermined relation between the superimposed laminae, a support having a contact face and a fulcrum disposed below and at one side of said contact face, and means to clamp said brush member against said fulcrum and the end edges of the brush laminae against said contact face, said clamping means cooperating with the laminae-maintaining means to fix the

position of the brush-member on said support.

11. A contact structure for an electric switch comprising a supporting block having a relatively long and horizontally-disposed contact face, and a fulcrum disposed parallel to and below and to one side of said contact face, and a plurality of brush members disposed in spaced relation on said fulcrum and having edge contact at their ends with said contact face, and means to clamp said brush members in the aforesaid relation.

In testimony whereof, I have signed my name to this specification.

TALMA T. GREENWOOD.