Dec. 24, 1957 K. C. ALLISON 2,817,723

ELECTRICAL SWITCH MOUNTINGS

Filed June 1, 1955

Fig. 1.

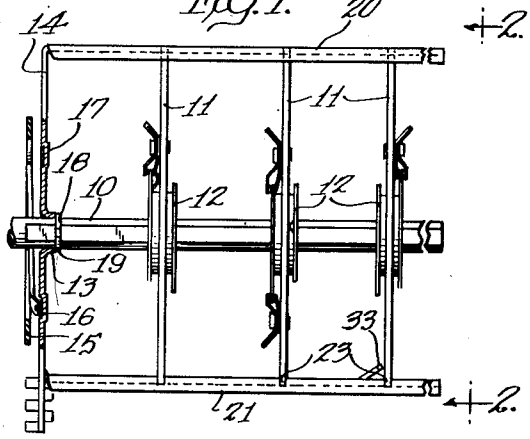


Fig. 2.

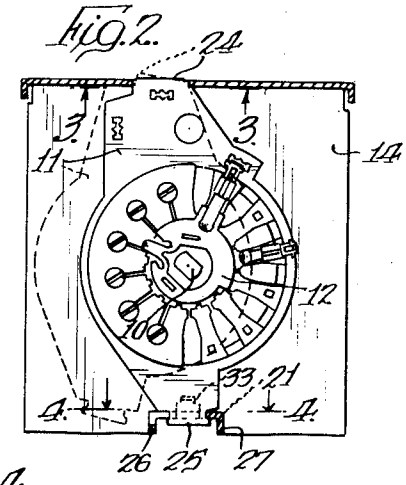


Fig. 3.

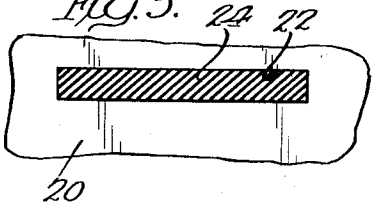


Fig. 4.

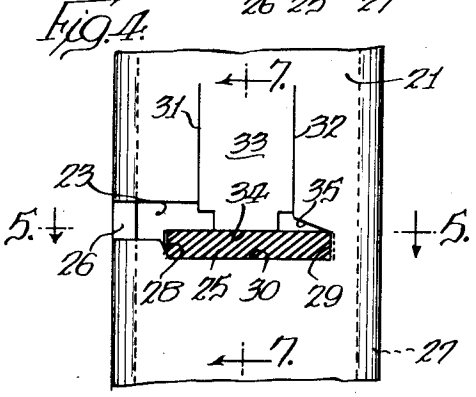


Fig. 5.

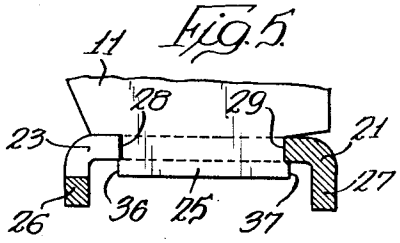


Fig. 6.

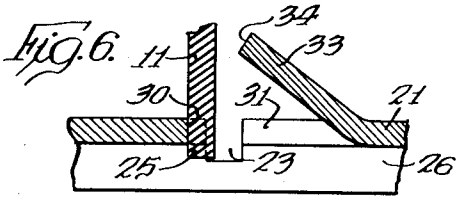


Fig. 7.

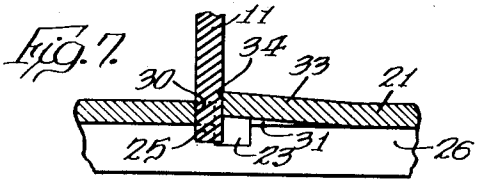
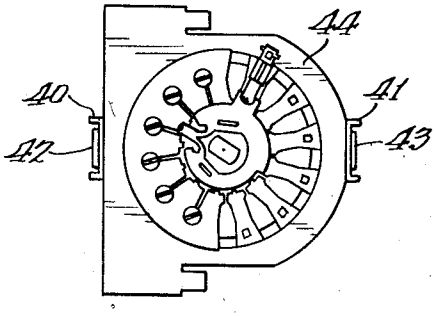


Fig. 8.



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ELECTRICAL SWITCH MOUNTINGS

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9 Claims. (Cl. 200—14)

This invention relates to an electric switching unit of the type wherein a pair of arms extending in spaced apart parallel relation from a base such as a detent plate provide means for mounting the stator plate of a rotary switch section in fixed spaced apart relation to the base along the axis of a switch operating shaft rotatably supported in said base and straddled by said arms, and more particularly a switching unit wherein two or more rotary switch sections are so supported along the axis of the switch operating shaft.

It is an object of this invention to provide such an assembly which will meet the most critical stability requirements and yet allow an individual switch section to be removed for repair or replacement without disturbing other sections of the switching unit.

Another object of this invention is to provide for mounting the stator plate of a rotary switch section in switching units having two or more rotary switch sections without the use of interconnecting means except as provided by integral parts of the stator plate and the arms of the switching unit.

In accordance with this invention the stator plate is mounted in fixed spaced apart relation to said base and any other switch sections of the switching unit through oppositely disposed slots formed in the arms of the switching unit in which opposed extensions of the stator plate are engaged.

For a more detailed explanation of the invention and for further objects and advantages thereof, reference is to be had to the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a side elevational view of a switching unit wherein the stator plates of a series of rotary switch sections are mounted between a pair of supporting arms extending from a base member in accordance with this invention.

Fig. 2 is an elevational view of the device as shown in Fig. 1 taken on line 2—2 and in the direction of the arrows, with portions in section.

Fig. 3 is a fragmentary enlarged view, partially in elevation and partially in section, taken on line 3—3 of Fig. 2.

Fig. 4 is a similar view taken on line 4—4 of Fig. 2.

Fig. 5 is an enlarged section taken on line 5—5 of Fig. 4.

Fig. 6 is a fragmentary enlarged view, partially in elevation and partially in section, showing relative position of parts prior to final arrangement as shown in Fig. 5.

Fig. 7 is a sectional view taken along line 7—7 of Fig. 4.

Fig. 8 is an elevational view of a modified design and construction of the mounting of a switching unit in accordance with the present invention.

As shown in Fig. 1, an electric switching unit embodying the features of the present invention is shown in the form of an assembly of three rotary switch sections arranged in coaxially spaced apart relation along

an operating shaft 10. It is to be understood, however, that as many switch sections may be provided as may be found necessary.

Each switch section comprises a stator plate 11 and a cooperating rotor 12, and rotative coupling of the rotor to the shaft 10 is provided through an opening in the rotor in which the shaft 10 has axially sliding fit whereby the shaft 10 may be withdrawn from and joined to said switch section through said opening in the rotor.

The shaft 10 is mounted for rotation in a bushing 13 associated with a base or detent plate 14. The outer end of the shaft 10 is provided with a knob (not shown) for turning the shaft. Fixed to the portion of the shaft 10 between the knob and the plate 14 for rotation in unison with the shaft 10 is a spring member 15 having a finger 16 which is adapted to play between projections 17 on the surface of the plate 14 facing the spring member and arranged in circumferentially spaced apart relation along a circle concentric with the axis of the shaft 10 whereby said finger 16 and the areas of the plate 14 between said projections 17 cooperate to index the shaft 10 at a plurality of positions corresponding to the working positions of the switch sections controlled by said shaft 10. The portion of the shaft 10 extending from the plate 14 in the direction of the switch sections is provided with a groove 18 for receiving a removable retainer ring 19 which engages the end of the bushing 13 to selectively lock the shaft 10 against withdrawal.

An upper horizontally extending mounting panel 20 and a lower horizontally extending bar 21 provide spaced parallel supporting arms in straddling relation to the portion of the shaft 10 extending rearwardly from the plate 14. While the such panel 20 and bar 21 form integral extensions of the plate 14 as shown in Fig. 1, it will of course be understood that they may be separately secured to the plate 14. The arms 20 and 21 are spaced apart a distance adapted to be spanned by the stator plate 11 of each of the switch sections arranged on the shaft 10, and a slot 22 formed in the panel or arm 20 and a slot 23 formed in the bar or arm 21 in transverse alignment with the slot 22 provide openings for the reception of ears 24 and 25, respectively, which form opposed extensions of the stator plate 11. The slot 22 in the arm 20, as shown in Fig. 3, is of such size and shape as to match the cross-sectional contour of the ear 24 of the stator plate 11 whereby the slot 22 and the ear 24 have snug interfitting relationship. The slot 23 in the arm 21, as shown in Fig. 4, includes an inner area occupied by the ear 25 of the stator plate 11 and a passageway which intersects the outer edge of the arm 21 to provide an entrance to said inner area of the slot 23. It will be observed that the opposite longitudinal edges of the arm 21 are preferably bent outwardly from the space between the arm 21 and the arm 20 to form reinforcing flanges 26 and 27, and as shown in Fig. 5, the passageway forming the entrance to the inner area of the slot 23 intersects the flange 26 at a distance short of the outer edge of the flange. The portion of the flange 26 thus intersected by the passageway to the slot 23 accordingly provides clearance for the portion of the ear 25 which protrudes from the outer side surface of the arm 21.

To position the ears of the stator plate in the slots, the ear 24 is first inserted in the slot 22 in the arm 20. As can be seen in Fig. 2, the stator plate 11 is revolved about the edge of the slot 22 which provides a fulcrum extending lengthwise of the shaft 10 and which is nearest to the direction from which the stator plate 11 approaches the entrance to the slot 23 in the arm 21. It will also be noted that the edge of the stator plate 11 facing the inner surface of the arm 20 leading to the

slot 22 is inclined inwardly in a direction away from the ear 24 so as to provide ample clearance for tilting the stator plate 11 as the ear 24 is initially introduced to the slot 22. During such revolution of the stator plate 11 about the edge of the slot 22, the ear 25 at the opposite side of the stator plate 11 is advanced through the passageway intersecting the edge of the arm 21 and finally into the inner area of the slot 23. When thus located in the slot 23, the ear 25 is trapped between opposed edge portions 28 and 29 of the slot which extend lengthwise of the longitudinal axis of the arm 21 and against a third edge portion 30 connecting the edge portions 28 and 29 along a line extending transversely of the arm 21.

The material of the arm 21 directly opposite the edge portion 30 of the slot 22 is slit along a pair of spaced apart lines 31 and 32 extending lengthwise of the arm 21 to define a tongue 33. An edge portion 34 is presented by the surface of the tongue facing the edge portion 30 of the slot. The tongue 33, when bent about an axis lengthwise of the edge 34 to occupy a position out of the plane of the arm 21, as shown in Fig. 6, is located to clear the path of the ear 25 into the area of the slot occupied by the ear 25 when in finally mounted position. As shown in Fig. 7, when the tongue 33 is bent toward a position in the plane of the arm 21, the edge 34 of the tongue is engageable with the ear 25 to press the latter against the edge of the slot opposite the edge 34 of the tongue, whereby the tongue 33 and the edges 28, 29 and 30 of the slot 23 cooperate to fix the ear 23 of the stator plate 11 against any movement relative to the arm in directions lengthwise and cross-wise of the arm 21. Such bending of the tongue between the positions shown in Figs. 6 and 7 is easily accomplished by the use of a conventional plier type tool. Thus the stator plate 11 is removable from and returnable to an installed position with reference to the slots 22 and 23, respectively, of the arms 20 and 21, by withdrawal of the shaft 10 from the rotor 12 of the selected switch section and manipulation of the tongue 33, as indicated, without disturbing the mounting of any of the other switch sections connected to the arms 20 and 21.

As shown in Fig. 4, the slot 22 presents an edge portion 35 opposite the edge 30, and between the tongue 33 and the edge 28 which slants toward the edge 30 in a direction inwardly of the slot whereby the edge 35 cooperates with the edge of the ear 23 during movement thereof into mounted position in the slot to urge the ear toward the edge portion 30. The edge portion 28 of the slot 22 is likewise slanted to provide a gradual restriction of the distance between the edge portions 28 and 29 of the slot in the direction of the edge 30.

The portion of the ear 23 projecting outwardly from the outer surface of the arm 21 about the slot 22 presents opposed projections 36 and 37 which have wedging engagement with the edge portions 28 and 29 of the slot whereby the ear 23 is held inwardly toward the arm 21 as the tongue 3 acts to clamp the ear 23 against the edge portions 28, 29 and 30 of the slot 22.

From the foregoing description it is apparent that the present invention provides for the mounting of the stator plates of rotary switch sections in spaced apart relation along the axis of a switch operating shaft whereby a simple and reliable assembly is obtained and wherein any individual switch section may be removed for repair or replacement without disturbing the other sections of the switching unit.

In certain types of installations, as for example as shown in Fig. 8, the switch base may take the form of a pair of arms 40 and 41, such as the arm 21 of the device shown in Fig. 2, and the stator 44 provided with opposed ears 42 and 43 similar to the ear 25 of the stator 11 shown in Fig. 2. In this modification, each of the arms 40 and 41 has a slot similar to the design of the slot provided in the arm 21 as shown in Figs. 4, 5, 6 and 7, whereby the stator 44 may have straight line movement toward and away from a mounted position in the slots of the arms 40 and 41 to accommodate certain clearance conditions unlike those which apply to an installation as depicted in Fig. 2.

Since numerous changes may be made in the above described constructions, and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In an electrical switching unit, a base, a switch operating shaft rotatably mounted therein, a pair of spaced apart parallel arms extending from said base in straddling relation to said operating shaft, a rotary switch section comprising a cooperating stator and rotor, said rotor being rotatably coupled to said shaft through an opening in which said shaft is axially slidable, and means for demountably securing said switch section in fixed spaced apart relation to said base including oppositely disposed slots formed in said arms in which opposed extensions of the stator are engaged, one of said slots having an entrance portion intersecting an edge of the arm containing said latter slot.

2. In an electrical switching unit as defined in claim 1 wherein said slot having an entrance portion intersecting an edge of the arm containing said slot is defined at one side by a bendable tongue which cooperates with an opposite edge thereof to clamp the extension of the stator plate positioned therebetween.

3. In an electrical switching unit as defined in claim 1 wherein one of said slots includes a pair of opposed edge portions extending lengthwise of the longitudinal axis of the arm containing said slot and an edge portion connecting said opposed edge portions along a line perpendicular to said axis of the arm, and the extension of the stator plate engaged in said slot has a portion projecting outwardly of the outer surface of the arm about said slot and with which outwardly projecting portion said pair of opposed edge portions of the slot have wedging engagement.

4. In an electrical switching unit as defined in claim 1 wherein each arm has a corresponding longitudinal edge thereof bent to form a reinforcing flange.

5. In an electrical switching unit as defined in claim 1 wherein each arm has a corresponding longitudinal edge thereof bent away from the space between said arms to form a reinforcing flange and wherein one of said slots has an entrance portion intersecting said reinforcing flange at a distance short of the outer edge of said flange.

6. In an electrical switching unit as defined in claim 1 wherein the material of one of said arms is slit along lines extending lengthwise of the longitudinal axis of said arm to define a bendable tongue at one side of the slot in said arm which tongue cooperates with an opposite edge of the slot to clamp the extension of the stator plate positioned therebetween.

7. In an electrical switching unit as defined in claim 1 wherein one of said slots includes a pair of opposed edge portions extending lengthwise of the longitudinal axis of the arm containing said slot and an edge portion connecting said opposed edge portions along a line perpendicular to said axis of the arm, and a bendable tongue defined by a pair of spaced apart slits formed in the material of the arm directly opposite said third edge portion cooperates with said latter edge portion to clamp the extension of the stator plate positioned therebetween.

8. In an electrical switching unit as defined in claim 1 wherein one of said slots includes a pair of opposed edge portions extending lengthwise of the longitudinal axis of the arm containing said slot and an edge portion connecting said opposed edge portions along a line perpen-

dicular to said axis of the arm, and toward which one of said opposed pair of edge portions slants in the direction of the other of said opposed pair of edge portions, and a bendable tongue defined by a pair of spaced apart slits formed in the material of the arm directly opposite said third edge portion cooperates with said latter edge portion to clamp the extension of the stator plate positioned therebetween.

9. In an electrical switching unit as defined in claim 1 wherein one of said arms constitutes a horizontal mounting panel on the side thereof facing away from the space between said arms.

References Cited in the file of this patent

UNITED STATES PATENTS

2,216,319	McGee	Oct. 1, 1940
2,292,717	Rubinstein	Aug. 11, 1942
2,453,035	Ponsy	Nov. 2, 1948