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SWITCH MOUNTING MEANS

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Fig. 1

Fig. 2

Fig. 3

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The present invention broadly relates to an improved electric switch arrangement and, more particularly, to a switch arrangement of the type provided with a plurality of adjacent positions where switches are arranged in a row, as such are often employed for various plural or cumulative control operations, such as program devices.

Such type of plural control operations are known to the art. In a known arrangement a plurality of push button switches actuated by individual control disks mounted upon a common shaft. Naturally, actuation of the switches can be achieved by other suitable members, as for example a switch shifter rod or a like. In switching arrangements of this type, it is customary to employ conventional microswitches, and one or more of the same such switching arrangements often possess a large number of individual switches, for example as many as fifty. It is, therefore, desirable that the individual microswitches, as requirements demand, be exchangeable, whether such be for purposes of altering their switching function or for removal of a defect.

If only a few microswitches are arranged in a row it is possible to undertake attachment thereof by means of a rod which extends through suitable securing apertures provided in the switch housing of the collective switches arranged in a row. However, even when employing only a few switches, in such a mounting arrangement there results an extremely cumbersome process for the removal and replacement of an individual switch element, since the rod must first be freed from its support member and then laterally removed, with the result that a large number of the other switches arranged in a row are also dislodged. When a larger number of switches are involved, such type mounting arrangement becomes completely impractical since the securing apertures provided in the switch housing only have a very small diameter, while sufficient for the fastening screw of an individual switch are, however, insufficient for a sturdy securing rod suitable for a longer row of switches.

The present invention is featured in the provision of an improved switching arrangement wherein there is provided for each switch a separate, rigidly secured holder member in which the switch is individually detachably mounted. Each holder member is provided with a suitable switch receiving recess in which the switch member may be detachably supported. Each holder member is further provided with resilient biased locking means for maintaining the switch member in its desired position. Removal of the switch can be achieved simply and without great effort by actuating the locking means to free the switch for removal transverse to the row of switches so arranged. Each holder member comprises a body portion provided with one or more apertures through which pierces a carrying or support rod or the like for rigidly supporting the holding members on or within a frame or other suitable support for example.

Accordingly, it is a primary object of the present invention to provide improved holder means for releasably supporting one or more switch members.

Still another important object of the present invention is the provision of an improved switch arrangement which is relatively simple in construction, easy and economical to manufacture and adapted to releasably support a plurality of switches arranged in a row such that replacement thereof may be simply undertaken.

These and still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

In the drawings:

FIGURE 1 is a fragmentary, perspective view of a switch arrangement according to the present invention provided with a row of switch members;

FIGURE 2 is an end view of the device appearing in FIGURE 1; and

FIGURE 3 is a cross-sectional view taken through an individual holder element with a switch arranged therein.

Referring now to the drawings and, more particularly to FIGURE 1, there is shown a switch arrangement designed according to the present invention which comprises a frame or support including a base plate 1 having two end walls 2, for convenience of illustration only the right-hand wall thereof is shown. There is further provided a row of microswitches 4 for example which are actuated by the control disks 10 supported on a common shaft member 11. The particular drive for the shaft member 11 and the control disks 10 is unimportant for understanding the invention, and for this reason has not been illustrated. The row of adjacent switch elements 4 and their associated control disks 10 can be continued from the left-hand side of FIGURE 1, as desired and as requirements demand. It is further also possible to provide a second parallel row of switches on the opposite side of the control disks 10. For each switch element 4 there is provided a separate holder or mounting member 6 in which the individual switch member is detachably mounted, as will be more readily understood from the description to follow in conjunction with FIGURES 2 and 3. The holder members 6 are threaded or passed onto two support rods or pipes 8 so as to abut one another, with these rods 8 extending in the direction of the serially arranged switches and rigidly preferably detachably mounted in the side walls 2 of the switching unit. The width of the holder means 6 naturally corresponds to the axial distance of the control disks 10 or the switch members 4. If necessary, between the end wall 2 and the first mounting member 6 there is mounted on the actually supporting rods 8 spacer sleeve members 12 of suitable length.

The particular shape of the holder members 6 and the switch elements 4 can best be seen by reference to FIGURES 2 and 3. The holder member 6 preferably consists of a spray die-casting of a zinc alloy and is naturally formed to accommodate the outer shape or contour of the switch housing, which in turn is generally formed from a synthetic molded piece. The holder member 6 comprises a body portion including end portions 6a and an interconnecting portion 6b and is provided with a pair of bores 14 for the support rod or pipes 8, as well as a stop shoulder 15 which cooperates with the remaining contact surfaces between the holder member 6 and the switch housing and determines the position of the switch element 4. In FIGURE 3, the outline of the switch housing within its receiving recess 6c has been shown in phantom for purpose of clarity in illustration.
As can be seen from FIGURE 2, each individual switch member 4 can be pivotally moved transverse to the row of switches in the direction of the double-headed arrow 15 in response to the holder members 6. The thus mounted switch 4 is held in its rest position by means of a displaceable locking member 16 arranged in a bore or recess 17 in the lower portion of the holder member 6. This locking member 16 is held in its operative position by means of a spring 18, with the members 16 and 18 having been omitted in FIGURE 3 for the sake of clarity. The provided control disk 19 operates through the intermediary of a roller 25 pivotally secured by a lever 24 to the switch housing, which lever in turn actuates the switch by means of a plunger 26. At the side of the switch 4 opposite the control disk 19, a plurality of switching clamps or pins 5 secured by means of a solder or plug-in type connection extend from the switch housing. In FIGURE 2 there is also shown the apertures 22 in the switch housing, which for other uses of the switch 4 permits securing of the switch by means of a screw member or the like as is known to the art.

As will be appreciated from the foregoing description, each switch member 4 can be individually removed from its associated holder member in a relatively quick and easy manner. Thus, each switch member can be easily exchanged for a different type switch or can be replaced when a defect arises. Additionally, this arrangement greatly simplifies mounting and installation of the entire switch arrangement. The holding member 6 can also be separately employed in other positions where it is desired that a quick and easy replacement of the switch is possible. For this purpose a counterbore 20 is provided which permits mounting of an individual holder member by means of a screw or other suitable fastening element.

Having thus described the invention what is desired to be secured by United States Letters Patent is:

1. A switch arrangement for a plurality of switch members arranged in at least one row, comprising:
   a support;
   a plurality of individual holder members;
   each of said individual holder members having a shaped recess therein;
   a displaceable locking means carried by each holder member and normally projecting at least partially into its shaped recess;
   a plurality of individual switch members, one switch member being provided for each holder member;
   each of said switch members having an outer shape formed to be accommodated within a holder member shaped recess;
   one of said switch members being inserted within each holder member shaped recess;
   said locking means being displaced during insertion of a switch member and thereafter serving to maintain said inserted switch member within it recess;
   each of said holder members having at least one aperture therein;
   said apertures in said holder members being axially aligned; and
   rod means extending through said axially aligned apertures and secured to said support, thereby coupling said holder members to said support.

2. A switch arrangement as defined in claim 1 wherein each holder member has a bore communicating with its shaped recess and wherein said locking means includes a displaceable locking member and resilient means disposed within said bore normally biasing said locking member toward said shaped recess.

3. A holder member for a switch comprising:
   a body portion having a shaped recess adapted to receiveably support a switch;
   said recess being shaped substantially to the outer surface shape of a switch to be inserted therein;
   said body portion having a bore communicating with said recess;
   a spring-biased locking member disposed within said bore and normally projecting at least partially into said recess;
   said locking member being displaceable during insertion of a switch into said recess and thereafter serving to retain the inserted switch within said recess;
   said body portion also having at least one aperture therein adjacent its end portion;
   said aperture being spaced away from said recess and being adapted to piercingly receive a carrying member which can mount said holder member.

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