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GANG SWITCH STRUCTURE WITH STRUT SCREW

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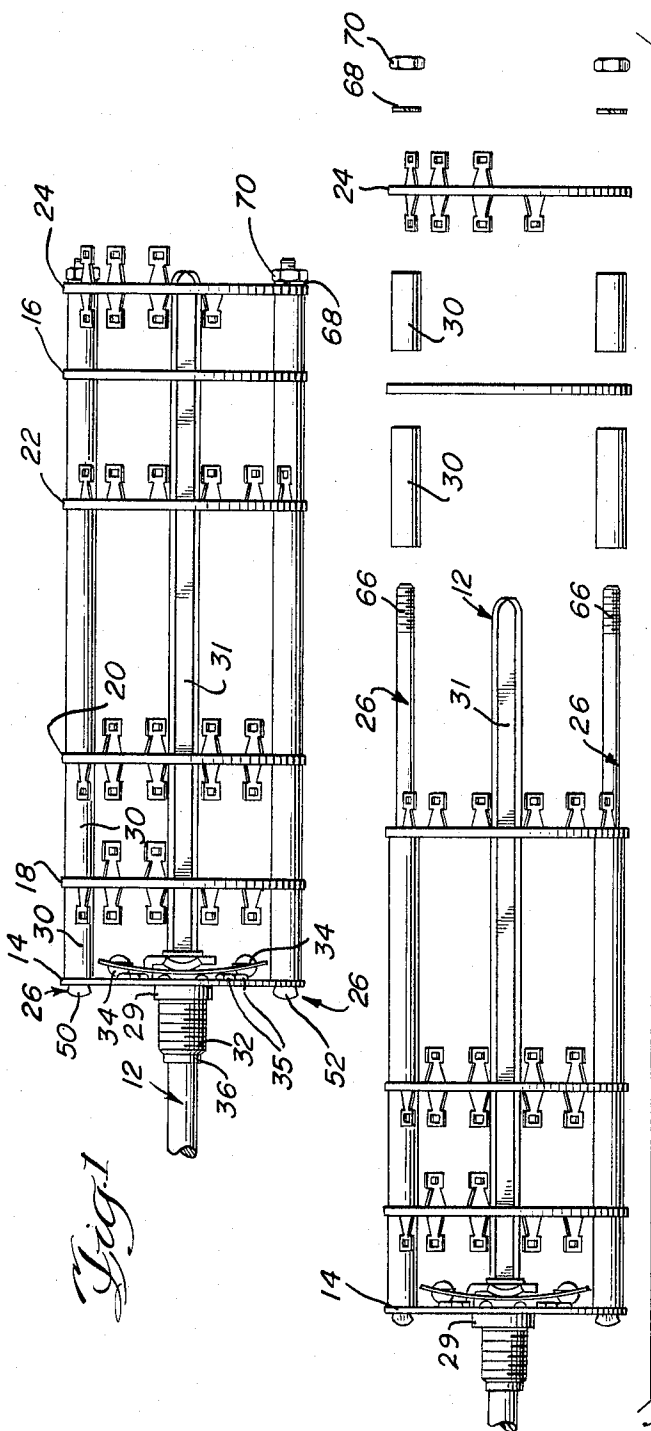


Fig. 2

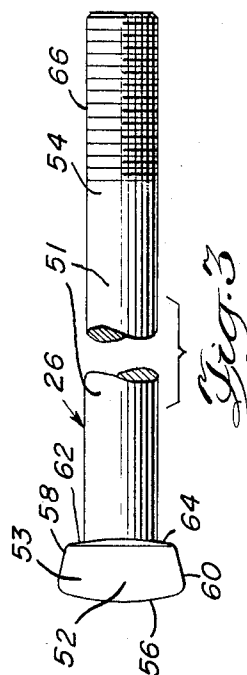
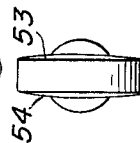


Fig. 3

Fig. 4



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GANG SWITCH STRUCTURE WITH STRUT SCREW
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This invention relates to a multiple section rotary switch and more particularly to a fastening means for the sections of such a switch and to a method of manufacturing same.

Heretofore, multiple section rotary switches have been made up to meet each customer's specified requirement of one, two or more multi-switch units designed to meet the particular switching problem. A manufacturer of multiple section switches is required to maintain large stocks of various switch parts some of which are individually tailored to the customer's particular requirements. In assembling the tailored switch plates as part of a multiple section switch, it has been a problem to stock the proper lengths of screws required to hold the one or more switch plates with the variable spacings between the plates to the mounting frame of the switch. The almost infinite range of spacings between switch sections and the large variations in the possible number of switch sections to make up a switch requires stocking many dozens of different length screws to meet the need.

As one way of solving the problem, manufacturers have tried threading long lengths of rod which are cut to the individual required lengths at the time an order is filled. Nuts are threaded on the opposite ends of the rod to hold the switch assembled. The two principal problems with this method lie in the fact that in cutting the rod to length, threads were damaged and repairs to the thread had to be made before the switch could be assembled. The method was also expensive in that threading long lengths of rod wherein only small sections of threads are needed adds needless cost. The use of two nuts on the screw is also more expensive than one nut on a headed screw.

Another problem with the system of using nuts on both ends of the screw lies in the fact that on the knob or actuator end of the switch, the nut or end of the screw often extended axially into an interfering position either with respect to the knob or with respect to a frame upon which the switch is to be mounted; that is, the overhang was too great and either the knob could not turn past the interfering projection or the switch rocked on the ends of the screws and projected excessively into the frame cavity.

It is therefore a principal object of this invention to overcome the above noted disadvantages and to provide an improved strut screw for multiple section rotary switches.

It is another important object of the invention to provide an improved strut screw having parts that will not extend into interfering relationship with operative parts of the switch.

It is still another object of the invention to provide an improved method of stocking strut screws so as to reduce inventory costs resulting therefrom.

It is still another object of this invention to provide an improved method of manufacturing a strut screw.

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A further object of this invention is to provide an improved method of assembling a multiple section switch using the improved strut screws.

A still further object of this invention is to provide an improved headed strut screw.

Yet a further object of this invention is to provide an improved strut screw that is not only economical to manufacture and use but also is more efficient in use and simpler to make and assemble.

These and other objects and advantages of this invention will be apparent to those skilled in the art to which this invention appertains, as will be more clearly seen from the description and as will be pointed out herein-after.

Referring to the drawing:

FIGURE 1 is an elevational view of a multiple section rotary switch incorporating the invention;

FIGURE 2 is another elevational view of the multiple section rotary switch of FIGURE 1 with parts exploded and showing the invention;

FIGURE 3 is an elevational view of a strut screw; and FIGURE 4 is an end view of the strut screw of FIGURE 3.

While an illustrative embodiment of the invention is shown in the drawing and will be described in detail herein, the invention is susceptible of embodiment in many different forms and it should be understood that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring to the drawing wherein similar reference numerals refer to similar parts throughout the several views, a multiple section rotary switch 10 is shown as having an actuator shaft 12, mounting plates 14 and 16, switch wafers or sections 18, 20, 22 and 24, all fastened together by means of a pair of substantially identical strut screws 26. The front plate 14 is of generally circular configuration with mounting ears extending transversely therefrom, through which the strut screws pass. The front plate 14 could have the strut screws extend through openings that lie within the circular circumference of the plate without departing from the invention. The front plate 14 and the various switch sections 18, 20, 22 and 24 are spaced apart by means of sleeve type spacers 30 which surround the strut screws 26 and abut against the opposite faces of the various switch sections that are being spaced apart. The lengths of the spacers 30 can vary between wide limits, the only requirement being to properly space and position the sections relative to each other and relative to the front plate. The shaft 12 has flats 31 formed on opposite sides thereof for indexing the rotor parts of each switch. A threaded bushing 32 is fastened to the front mounting plate 14 and has one end portion of the shaft 12 rotatably disposed in said bushing. The bushing 32 has a shoulder portion 29 abutting against the front plate 14, which shoulder forms an abutment against which a panel would bear when the switch is mounted to a panel.

A plate 33 is fixed on said shaft 12 and is adapted to resiliently hold a pair of balls 34 between detents 35 formed transversely from the plane of the front plate 14. A slip ring 36 is seated in a groove in the end por-

tion of the shaft 12 and bears against the end of bushing 32 to position the shaft relative to the front plate 14 for rotation about the axis of the shaft between the predetermined rest positions created by the detents 35. The bushing 32 can be used as a mounting member for securing the switch 10 to a panel, a frame or a housing.

In ordering multiple position switches the customers' requirements vary widely so that one or more switch sections such as 18, 20, 22 or 24 may be specified. In addition, the spacers 30 between the switch plates may be specified as of different length so as to provide a larger or smaller spacing between the switch plates. As a result of the different requirements a stock of large numbers of fastening screws has heretofore been required.

The present invention eliminates the necessity for stocking large inventories of different size screws. Blank rods of steel, brass or other suitable material can be stocked at relatively low cost and in a relatively small area. The blanks can be straight sections or can be coiled for storage. When a customer's switch requirements are received, the appropriate length of strut screw is readily ascertainable. A blank rod is cut to the appropriate length, a head is coined or formed on one end and a short length of thread is applied to the other end portion. Two such screws are made and are assembled with the switch sections and mounting plate to complete a multiple section rotary switch 10.

As an alternative it has been found advantageous to stock the rods in some selected lengths with a short stretch of thread formed on one end. When a length requirement is received, the length is measured from the prethreaded end, the rod is cut and a head is coined on the cut rod ready for use. This speeds up the finishing of strut screws and makes it possible to take advantage of the cost and time savings of prethreading large numbers of rods at one time.

Referring specifically to FIGURES 3 and 4, the strut screw 26 is shown and has a body portion 51 made from a rod having a relatively standard diameter of a type and size that has been established by specifications in the trade. On the one end portion a flat head 52 is formed by means of a coining method whereby the one end of the blank rod is positioned in a shaped die which is then struck by a mating tool to form the flat head 52 thereon. The head 52 has substantially parallel oppositely disposed faces 53, 54 which lie in planes spaced apart a distance less than a diameter of the body portion of the rod. The head 52 has an arcuately curved edge 56 which curves into diverging side edges 58 and 60. A pair of shoulders 62, 64 are formed between the edges 58, 60 and the body 51 of the rod forming the screw. The other end portion 54 of the rod has a thread 66 formed therein as by cutting or embossing or the like and extending for a relatively short axial distance in from the end of the rod. The shorter the thread the cheaper the cost of producing the strut screw.

The strut screw 26 is inserted through an aperture in the plate 14, spacer 30, switch section 18, spacer 30, etc., until the threaded end 66 projects a short distance beyond the last section 24 of the switch. A washer 68 and a nut 70 are threaded on the short extended and threaded portion of the strut screw. Tightening the nut 70 will draw the parts of the multiple section switch together into a finished arrangement.

The heads 52 of the strut screws 26 have the shoulders 62, 64 bearing against the surrounding edges of the apertures in the plate 14 which shoulders have a tendency to bite into the surface of the plate 14 thereby substantially preventing turning of the screw 26 with the nut. The shape of the screw head 52 is such that pliers can be used to assemble the screw and nut on the switch. The head 52 can be better gripped for holding the screw while the nut 70 is applied, making for a quicker and

more efficient assembly. The curved edge 56 of the head 52 of the screw 26 is relatively close to the body of the screw so that when the screws are assembled with a switch the screw heads 52 will not interfere with the edge of a knob or with other mounting hardware when the switch is attached to a frame or panel.

Using the invention it can readily be seen that a large stock of different length strut screws is not necessary. It is only required that an inventory be maintained of standard diameter stock rods which can be readily cut and formed to the desired length as needed, thereby reducing the cost of producing multiple section rotary switches. In addition, the invention makes it possible to reduce the space and money required for stocking large numbers of different sized screws. The coining or forming of the screw heads 53 as well as the forming of the short length of threads on the screws makes the screws stronger in tension than heretofore.

It can readily be seen that an improved method of assembling a gang switch results from the invention; namely, when a customer's requirement with respect to a switch becomes known, the basic components of the switch are assembled on shaft 12 and the length of the screws 26 are determined. The stock rods are then cut to length, headed, threaded and inserted through the appropriate apertures in the switch sections and spacers whereupon bolting of the screws to the components of the switch produces an improved assembly of a multiple section rotary switch.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. A multiple section switch having a front plate, at least one switch plate lying in a plane substantially parallel to said front plate, switch actuator means rotatably carried by the front plate and passing through the center of said switch plate and being operatively connected thereto in combination with fastening means passing through said front plate and said switch plate for securing said plates together in a spaced apart relationship, said fastening means comprising an elongate body member, a head on one end of said body member, said head being flattened on two sides so as to provide two substantially parallel plane surfaces thereon, a pair of shoulders formed by said head and projecting beyond the sides of said body member, and threads formed in a short section of the other end portion of said fastening means for receiving a nut in threaded relation therewith for securing the switch plate to the front plate.

2. A multiple section switch having a front plate, at least one switch plate lying in a plane substantially parallel to said front plate, switch actuator means carried by the front plate and passing through the center of said switch plate, spacer means between said switch plate and said front plate, means passing through said front plate and said switch plate for securing said plates together, said means comprising an elongate body member, a head on one end of said member, said head having a pair of substantially parallel faces and a pair of abutting shoulders formed thereon, said shoulders engaging with said front plate and means on the other end portion of said first named means fastening said plates together on said multiple section switch.

3. A strut screw comprising a rod shaped body member, a head on one end portion of said body member and a plurality of threads on the other end portion thereof, said head being flattened on two opposite sides so as to lie in planes spaced inwardly from the planes lying tangent to the opposite sides of said body member, and two other sides of said head lying perpendicular to

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said first named sides extending outwardly beyond the sides of the body member to form a pair of shoulders facing down the sides of said body member.

4. A screw comprising a cylindrical body member, a head on one end portion of said body member and a plurality of threads on the other end portion thereof, said head comprising a pair of flattened substantially parallel side faces and a pair of shoulders between said faces radially extending beyond the sides of said body member, said shoulders being adapted to engage with the edge portions around an aperture in a support member.

5. A screw comprising an elongated body member, a head on one end portion of said body member, said head comprising a pair of flattened spaced apart side faces,

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and a pair of shoulders between said faces radially extending beyond the sides of said body member.

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