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WIRING DEVICE WITH QUICK CONNECT TERMINALS

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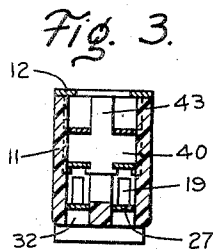
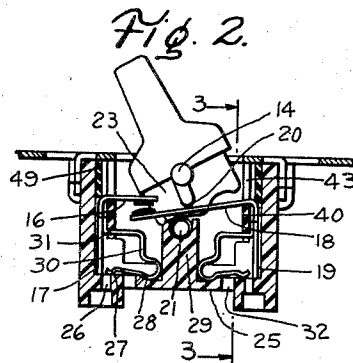
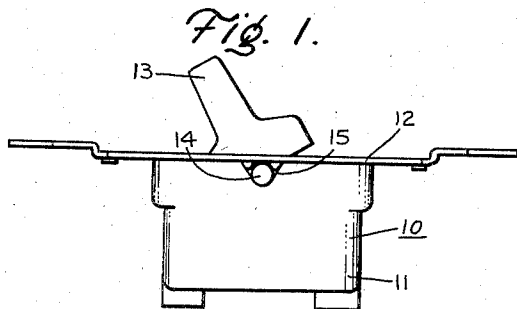


Fig. 4.

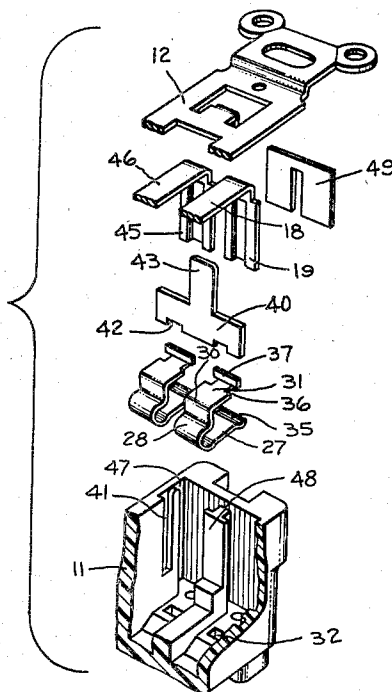
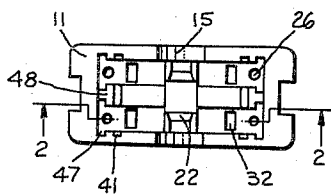


Fig. 5.



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WIRING DEVICE WITH QUICK CONNECT TERMINALS

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5 Claims. (Cl. 200—166)

The present invention relates to electrical wiring devices such as convenience outlets, switches, lamp sockets and the like, and particularly to the means for anchoring the screwless terminals firmly within these devices.

This invention is a modification of the screwless terminal means taught in my Patent No. 2,705,785, which is assigned to the same assignee as is the present invention. In my original concept of a quick connect terminal means for a bare lead wire, I mounted the terminal end of the contact of the device rigidly against one side wall of the housing, while an adjacent wall is provided with a wire-receiving opening having an edge in alignment with the terminal end of the contact. A spring locking tongue is seated on the wall containing the opening with the free end of the tongue overlying one edge of the opening, with the opposite end of the tongue bearing against a partition that is arranged substantially parallel with the terminal end of the contact. The said opposite end of the locking tongue extends upwardly at a reentrant angle as a movable offset arm, the end of which represents an anchoring strip that is firmly held in the housing. This structure is substantially as taught in my original patent.

However, there are several possible modifications that may be used for securing the anchoring strip of the locking tongue in the housing. The present invention relates to an improved anchoring means for the spring locking tongue of a wiring device that has proved very successful, especially in the design of slow make and break switches that are usable on alternating current only, where the switch housing is of minimum size leaving very little excess space within the device.

The principal object of this invention is to provide suitable mounting means for securing the anchoring strip of a spring locking tongue firmly within the housing of a wiring device.

A further object of this invention is to utilize an insulating plate member that is slideably arranged in opposed grooves in the side wall of the housing of a wiring device for firmly securing the anchoring strip of a spring locking tongue that serves as a screwless terminal means for the device.

My invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

Figure 1 is a side elevational view of a slow make and break switch embodying my invention.

Figure 2 is a cross-sectional, elevational view taken on the line 2—2 of the plan view of Figure 5.

Figure 3 is a transverse cross-sectional elevational view taken on the line 3—3 of Figure 2.

Figure 4 is an exploded view of the right-hand end of the switch base of Figure 1 showing the details of the spring locking tongue and the insulating plate member for anchoring the tongues in the housing.

Figure 5 is a plan view of the base of the switch show-

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ing the wire-receiving openings in the bottom wall of the base for cooperation with the screwless terminals.

Referring in detail to the drawing, Figure 1 shows a slow make and break switch 10 comprising a recessed base 11 of suitable molded insulating material and a steel mounting strap 12 which serves as a cover to hold the switch parts assembled within the hollow housing. A switch handle or trigger 13 is provided with a pair of trunnions 14 that are seated in open bearings 15 in the opposite side walls of the base 11 so that the trigger may pivot on the trunnions for opening and closing the switch contacts.

In Figure 2 are shown the contacts of a single pole switch. The fixed contact 16 of strip material has its terminal portion 17 arranged vertically against the side wall of the base. The movable contact 18 of similar strip material has its terminal portion 19 arranged against the opposite side wall of the base. Each trunnion 14 has a downwardly extending projection 20 for depressing the movable contact. Since I have chosen to illustrate my invention in combination with a single pole switch, only one projection 20 is shown to actuate the single movable contact 18 in Figure 2. Thus, when the trigger is moved to the left as shown in Figure 2, the contacts are opened, and they remain open until the trigger is moved to the right to close the contacts. However, in a three-way switch there would be a movable contact and a projection 20 on each side of the trigger.

A suitable detent action is provided for the switch trigger by means of a coil spring 21 that is supported between a pair of open bearings 22 arranged transversely of the base. The lower portion 23 of the trigger 13 is formed as a thin plate-like cam of inverted W-shape for cooperation with the central unsupported portion of the coil spring 21. Hence, the spring 21 acts as a detent spring which must be deflected downwardly by the trigger as the trigger is moved to its opposite position. This feature of the detent mechanism of this switch does not form part of the present invention since it is being claimed in a copending application, Serial No. 568,735, which was filed concurrently with this application and assigned to the same assignee as is this invention.

The principal feature of my invention is the method of connecting bare lead wires with the terminal ends of the contacts. In the bottom wall 25 of the base wire-receiving openings 26 are formed, each having an edge in alignment with the terminal ends 17 and 19 of the contacts. Several spring locking tongues 27 of strip material are seated within the base, each with a free end overlying one edge of the wire opening 26. The opposite or reentrant end 28 of the tongue bears against a partition 29 which includes at its top portion the open bearing 22 for one end of the coil spring 21. The reentrant end of the locking tongue then extends upwardly as a movable offset arm 30 which terminates in an anchoring strip 31 that is firmly fixed within the base. An access opening 32 is likewise formed in the bottom wall 25 of the base near each wire-receiving opening 26. This makes it possible to use a suitable tool such as a screwdriver or nail to deflect the spring locking tongue when it is necessary to remove the wire from connection with the terminal end of the contacts.

The construction of the spring locking tongue as mentioned before is generally as taught by my Patent No. 2,705,785. However, the present invention is primarily concerned with the method of securing the anchoring strips 31 of the locking tongues 27 in the housing. Looking now at Figure 4, the locking tongues 27 are clearly shown with an upwardly curved lip 35 at its free edge while the opposite end 28 of the tongue is formed at a reentrant angle with a movable offset arm 30 that terminates in the anchoring strip 31. A small notch 36 is

formed in each side edge of the anchoring strip so as to reduce its width at that section. Also, the edge 37 of the anchoring strip is turned upwardly for reasons which will become apparent hereinafter.

An insulating plate member 40 has its side edges supported in opposed grooves 41 in the base 11 so that the plate may be slid down onto the top of the unsupported anchoring strip 31. A notch 42 is formed in the lower edge of the plate 40 for cooperation with the reduced section of the anchoring strip 31 of each locking tongue. The result is that a slight pivotal movement is permitted between the anchoring strip and the plate, although the anchoring strip is prevented from moving upwardly by the fact that the plate 40 is stationary since its upper extension 43 bears against the underside of the strap or cover 12 that ultimately holds all the parts in assembled relation in the housing. The notches 36 in the anchoring strip are substantially the same width as the thickness of the plate 40 so that the notch 42 in the lower edge of the plate straddles the reduced section of the anchoring strip. The upturned edge 37 of the anchoring strip is sandwiched between one face of the plate 40 and a complementary face of the terminal end of each contact in order to make the best use of the limited space available.

Figure 4 shows a portion of the movable contact 18 while next to it is shown a portion of a through contact which merely consists of a similar terminal 45 at each end that are connected by a strap member 46. Thus two wires may be connected together by forcing them into the base of the switch to be wedged into engagement with the terminal ends 45 of the through contact by means of the spring locking tongues 27. It is necessary that the contacts of the switch be firmly held within the housing. Hence, grooves 47 are formed in the base along the opposite side walls as well as by the central partition 48 so that the terminal ends 17, 19 and 45 of the contacting members may be slid down into the base and held in place by the insulating plate 49. This plate 49 is supported in the same grooves as the contacting members and held down by the strap or cover member 12.

Having explained my invention of a novel means for supporting the anchoring strip of a spring locking tongue in a wiring device, it should be appreciated that other modifications may be made in the hold-down means such as eliminating the extension 43 on the plate member 40. A second example would be supporting a second plate member such as 49 in the grooves 41 of the base to bear down against the contacts and likewise hold the plate 40 firmly against the anchoring strips of the locking tongue. Also, it should be appreciated that other switching means may be incorporated with the novel hold-down means of my invention as well as modifications of a detent mechanism for holding the switch trigger in its extreme positions.

Modifications of this invention will occur to those skilled in this art and it is to be understood, therefore, that this invention is not limited to the particular embodiments disclosed but that it is intended to cover all modifications which are within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A wiring device comprising a recessed base and a separable cover member, a contact supported in the base, the terminal end of the contact being rigidly supported against one side wall, an adjacent wall having a wire-receiving opening with an edge in alignment with said terminal end, a spring locking tongue of strip material seated on the last-mentioned wall with a free end overlying the edge of the opening opposite the terminal of the contact, the opposite end of the locking tongue bearing against a partition within the base and formed at a reentrant angle with a movable offset arm that terminates in an unsupported anchoring strip; the invention comprising the means for securing the spring locking tongue in the base including opposed grooves in the side walls of the housing, an insulating plate member slideably arranged in the grooves and bearing down on the anchoring strip, the plate member being interengaged with the anchoring strip for holding the strip firmly in place against upward forces and forces acting perpendicularly to the plane of the plate member.

2. A wiring device as recited in claim 1 wherein the insulating plate member extends upwardly to engage the underside of the cover member so that the cover member serves as a hold-down means.

3. A wiring device comprising a recessed base and a cover member, at least one contact member supported in the base, the terminal end of the contact being rigidly supported against one side wall, an adjacent wall having a wire-receiving opening with an edge in alignment with said terminal end, a spring locking tongue of strip material seated on the last-mentioned wall with a free end overlying an edge of the opening, the opposite end of the locking tongue bearing against a partition that is generally parallel with the terminal end of the contact, while the said opposite end of the locking tongue is formed at a reentrant angle with a movable offset arm that terminates in an unsupported anchoring strip, a notch formed in each side of the anchoring strip so that the strip has a portion of reduced width, opposed grooves in the side walls of the base, and an insulating plate member slideably arranged in the grooves with a bottom edge that is notched to straddle the portion of the anchoring strip of reduced width for holding the strip firmly in place.

4. A wiring device as recited in claim 3 wherein the insulating plate member extends upwardly to engage the underside of a cover member which serves as a hold-down means.

5. A wiring device as recited in claim 4 wherein the free end of the anchoring strip is formed upwardly and sandwiched between one face of the plate member and a complementary face of the terminal end of the contact.

References Cited in the file of this patent

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