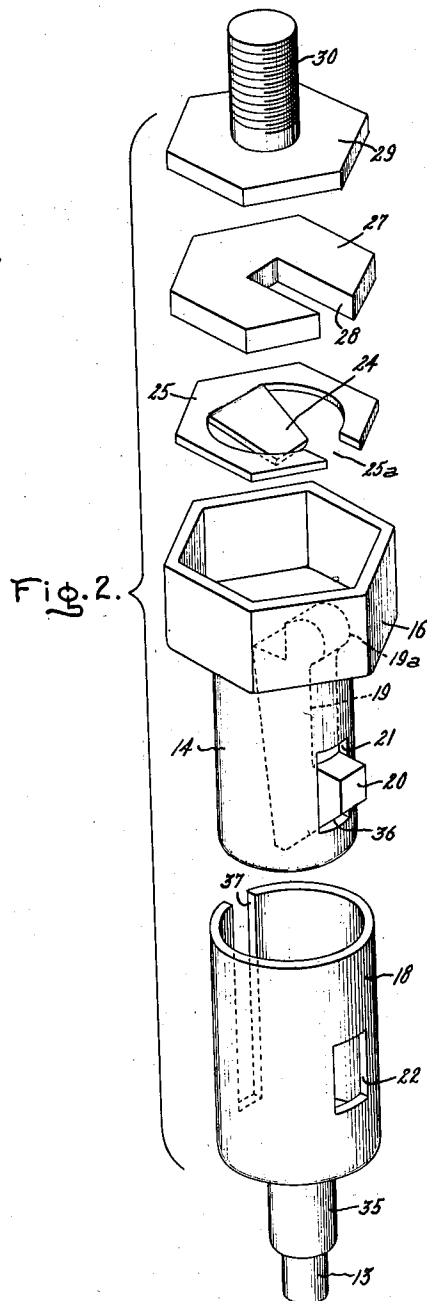
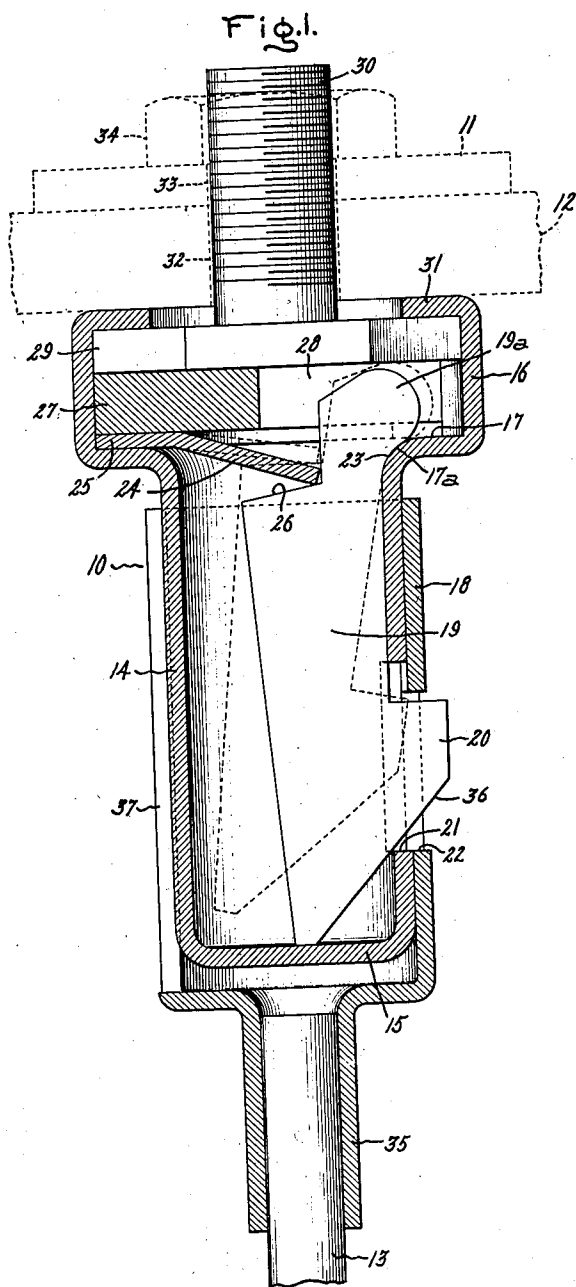


Oct. 19, 1943.

L. A. KEMPTON
CONNECTOR STRUCTURE
Filed Oct. 15, 1942

2,332,319



Inventor:
Leslie A. Kempton,
by *Harry E. Dunkham*
His Attorney.

Patented Oct. 19, 1943

2,332,319

UNITED STATES PATENT OFFICE

2,332,319

CONNECTOR STRUCTURE

Leslie A. Kempton, Chicago, Ill., assignor to Edison General Electric Appliance Company, Inc., Chicago, Ill., a corporation of New York

Application October 15, 1942, Serial No. 462,135

6 Claims. (Cl. 173-363)

This invention relates to connector structures, more particularly to connector structures for joining a pair of electrical conducting elements, and it has for its object the provision of an improved structure of this character.

While it is not limited thereto, this invention is especially useful in providing an electrical connection between a rigidly mounted device, such as a switch or other control element, and a conductor which is connected to a power source or controlled load. And it contemplates an improved connector structure for interconnecting such members which will positively lock the members together, and yet will permit their ready separation when desired; and also such a structure which has a simple and inexpensive construction.

For a more complete understanding of this invention, reference should be had to the accompanying drawing in which Fig. 1 is a vertical central sectional view illustrating connector structure arranged in accordance with this invention; and Fig. 2 is an expended view illustrating the various elements of this connector structure and the positions which these elements occupy relative to each other, the elements being shown in perspective in this view.

Referring to the drawing, this invention has been shown as applied to a connector structure 10 for interconnecting a conducting element 11 of a control switch 12, and an electrical conductor 13. Here, the conducting element 11 is rigidly mounted in the switch structure 12, while the conductor 13 is flexible and will be connected with a suitable source of power (not shown) or with a controlled load device, such as an electrical heating element of a range (also not shown).

The connector structure 10 comprises a cylindrical hollow shell 14 which has a closed lower end 15, as viewed in Fig. 1, and which at its other end is provided with an enlarged section 16. Between the large section 16 and the body of the shell 14 is a shoulder 17. The structure further comprises a second cylindrical hollow shell 18 which is arranged to be slipped over the closed end of the hollow shell 14 in telescopic relation with it, as shown in Fig. 1.

The two shell members 14 and 18 are connected respectively with the conducting elements 11 and 13, as will be pointed out in greater detail hereinafter, and when the two are fitted together they constitute the means for establishing the electrical connection between the two elements 11 and 13. Suitable means are provided for locking

the two shells 14 and 18 together in their connecting relation of Fig. 1.

This locking means comprises an elongated latch 19 which is mounted in the shell 14. This latch has a locking element 20 which is intended to be projected through a slot 21 provided for it in the shell 14, and a slot 22 provided for it in the shell 18, the two slots being in registry when the shells are in their connecting positions shown in Fig. 1. The two slots 21 and 22, as shown, are formed in the side walls of the shells between their ends.

The latch 19 is provided with a curved surface 23 between its ends which is fulcrumed upon the curved surface 17a of the shoulder 17. The latch is held against the fulcrum 17 by means of a flat spring 24 which is mounted on a disk 25 that rests upon the shoulder 17, as shown in Fig. 1. The spring 24, as shown, extends inwardly into the body portion of the shell 14, and there it engages a shoulder 26 provided on the latch at the side of the fulcrum toward or adjacent the closed end 15 of the shell so as to hold the latch on the fulcrum and to force it against the wall 15, as shown. The member 25 is in the form of a broken ring, the two ends being separated to form a space 25a between them, and the spring 24 extends radially across a diameter of the ring, as shown.

The member 25 is held in its position against the shoulder 17 by means of a washer 27. This washer 27 is provided with a slot 28 registering with the opening 25a in the ring member 25 and these openings receive the upper end 19a of the latch.

Mounted above the washer 27 is a base or support 29 of a terminal screw 35. The base 29, the washer 27, and the support 25 for the spring all are rigidly clamped and secured together by providing on the top of the enlarged section 16 an intumed flange 31 which clamps these members against the shoulder; this flange may be formed in any suitable way, as by spinning the upper part of the enlarged section 16 inwardly over the base 29. Preferably and as shown, the enlarged section 16, as well as the parts 25, 27 and 29 housed within it, will be formed as complementary non-circular elements. In the specific embodiment of the invention illustrated, all of these members are given a hexagonal shape. Because of this arrangement it is impossible for the parts to move relative to each other and thereby become displaced from their proper operative positions.

In the operation of the device, the terminal

member 30 will be inserted through an opening 32 provided for it in the switch base 12 and an opening 33 provided for it in the conducting element 11, and it will be secured to these members in electrically conducting relation with the element 11 by means of a nut 34. This nut not only secures the terminal 30 to the conducting element 11, but it also functions through the terminal to mount the terminal structure 10 upon the switch 12. The other conducting member 13 will be secured to the outer shell 18 through the medium of a tubular protuberance 35 on the shell and which receives the member, as shown; the member 13 is secured in the tube 35 in any suitable way, as by welding or swaging.

Normally, the spring 24 acts against the shoulder 26 to force the latch surface 23 against the fulcrum 17, and also to force its lower end, as viewed in Fig. 1, against the closed wall 15 of the inner shell 14. The opening 25a in the member 25 and the slot 28 in the washer 27 function to prevent side-wise or twisting movement of the latch in its shell 14. When the latch is in its position shown in Fig. 1, the slot 21 assists in preventing lateral displacement of the latch.

When it is desired to interconnect the members 11 and 13, the outer shell 18 is slipped over the closed end of the inner shell 14, and when it is moved over it, its upper edge engages the locking element 20 to force it inwardly. To facilitate this action, the latch is provided with an inclined surface 36 which extends downwardly and inwardly from the locking element 20 to the lower end of the latch, as clearly shown in Fig. 1. When the edge of the shell 18 engages the surface 36, the latch is forced inwardly in a counter-clockwise direction, and upwardly so that it assumes its dotted line position of Fig. 1; the latch thus in a sense floats upwardly and inwardly as viewed in this figure. Because of this arrangement, the latch is moved easily and smoothly by the outer cylindrical member. The upward movement of the latch is limited by the engagement of its upper end with the bottom surface of the head 29 of the terminal screw 30. Preferably, this upper end will be rounded, as shown, to minimize friction between these members when they engage.

This upward and inward movement of the latch 19, of course, stresses the spring 24, whereby it will snap the locking element 20 out through the slots 21 and 22 to its locking position of Figs. 1 and 2 when the slot 22 registers with the slot 21. When the latch is in this position, it rigidly locks the two shells 14 and 18 together. However, if it be desired to disconnect them the latching element will be pushed inwardly to release the outer shell which may then be withdrawn.

Preferably, the outer shell will be provided with a longitudinal slot 37 running from the bottom to the top thereof and in the side opposite the slot 22. This permits the sections of the cylindrical member to spring somewhat, whereby it fits the shell 14 more tightly. In other words, the inner diameter of the external shell 18 may be made substantially equal to the external diameter of the inner shell 14 whereby when the members are telescoped together, the outer member will be stressed so as to grip the inner one more firmly and thereby effect a good electrical connection between the two shells.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since

many modifications may be made, and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

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

1. Connector structure for electrically conducting members comprising, a pair of terminal members constructed and arranged to be received in telescopic relation, slots in said members that are brought into registry when one of said members is moved telescopically over one end of the other to bring the members into operative relation, a latch on said other member, a fulcrum on said other member upon which said latch is mounted for pivotal and sliding movement, and spring means carried by said other member forcing said latch toward said one end and against said fulcrum and outwardly through the slot in said second member so that when said one member is moved over the other it engages said latch to pivot and slide it on said fulcrum to move it bodily inwardly away from said one end and also back through the slot in the second member, and then releases it when said slots are brought into registry, whereupon said spring means forces it down and around said fulcrum to force it out through said slots to lock said terminal members together.

2. Connector structure for electrically conducting members comprising, a hollow terminal shell having a slot in a side wall thereof, a latch in said shell, holding means for said latch including a stop on said shell, a fulcrum in said shell upon which said latch is pivotally mounted and also slidably mounted for bodily shiftable movement toward and away from said stop and a spring in said shell engaging said latch to hold it against said fulcrum and against said stop, and the latch when held in said position having a locking part emerging from said slot, and a second terminal shell arranged to be slipped over said hollow terminal shell and when so moved engaging said latch to force it in said slot and bodily shift it away from said stop, and said second terminal shell also having therein a slot which when brought into registry with the slot in said first-mentioned shell frees said latch to permit said spring to move it out through said slots to lock said terminal shells together.

3. Connector structure for electrically conducting members comprising, a hollow terminal shell closed at one end and having a slot in a side wall thereof, an elongated latch in said shell extending from end to end thereof, a fulcrum in said shell at its other end opposite said closed end and upon which said latch pivots, a spring in said other end bearing on said latch so as to force it against the fulcrum and also against said closed end of said shell, and the latch when held in said position having a locking part emerging from said slot, and a second terminal shell arranged to be slipped over said hollow terminal shell and when so moved engaging said latch to force it in said slot and away from said wall and having therein a slot which when brought into registry with the slot in said first-mentioned shell frees said latch to permit said spring to move it out through said slots to lock said terminal shells together.

4. Connector structure for electrically conducting members comprising, a hollow terminal shell closed at one end and having a slot in a side wall thereof, an elongated latch in said shell extending from end to end thereof, a fulcrum in said

shell at its other end opposite said closed end and upon which said latch pivots, said latch having a shoulder thereon on the side of said fulcrum adjacent said closed end, a flat spring in said other end bearing on said latch so as to hold it against said fulcrum and to force it against said closed end, and the latch when held in said position having a locking part emerging from said slot, and a second terminal shell arranged to be slipped over said hollow terminal shell and when so moved engaging said latch to force it away from said wall and slot and having therein a slot which when brought into registry with the slot in said first-mentioned shell frees said latch to permit said spring to move it out through said slots to lock said terminal shells together.

5. Connector structure for electrically conducting members comprising, a hollow terminal shell closed at one end and having a slot in a side wall thereof, an elongated latch in said shell extending from end to end thereof, a fulcrum in said shell at its other end opposite said closed end and upon which said latch pivots, said latch having a shoulder thereon on the side of said fulcrum adjacent said closed end, a flat spring in said other end bearing on said latch so as to hold it against said fulcrum and to force it against said closed end, a disk holding said spring in its operative position an having an opening receiving the other end of said latch, and a washer holding said spring in its operative position and also having a slot registering with said opening and receiving said other end of said latch, and the latch when held in said position having a locking part emerging from said slot, and a second terminal shell arranged to be slipped over said hollow terminal shell and when so moved engaging said latch to force it in said slot and away from said wall and having therein a slot which when brought into registry with the slot in said hollow shell frees

said latch to permit said spring to move it out through said slots to lock said terminal shells together.

6. Connector structure for electrically conducting members comprising a first hollow shell closed at one end and having an enlarged section at the other so as to define a shoulder at said other end, and said shell also having a slot in its side wall between said ends, an elongated latch in said shell fulcrumed on said shoulder, the ends of said latch extending in opposite directions from said shoulder, a flat disk in said enlarged section resting on said shoulder and having a spring tongue extending toward said closed end and engaging a shoulder on said latch to hold said latch against said fulcrum and to force one end of the latch against said closed end, said latch having a locking element projecting through said slot when it is held by said spring against said closed end, a washer in said enlarged section resting on said spring, said washer and spring having openings therein for receiving the other end of said latch, a connector also in said enlarged section resting on said washer and closing said openings over said latch, means holding said connector, washer and disk against said shoulder, and a second hollow terminal shell constructed and arranged to be slipped over the closed end of said first hollow shell and when so slipped engaging said locking element to force said latch upwardly and inwardly to permit uninterrupted movement of said second shell on the first and said second shell also having a slot in its side wall which when registered with the slot in said first shell releases said latch to permit said locking member to be projected through said slots by said spring, whereby said shells are locked together.

LESLIE A. KEMPTON.