May 14, 1940. L. H. MARSHALL 2,200,993

QUICK-DETACHABLE ELECTRICAL CONNECTION

Filed Sept. 20, 1938

Fig. 1.

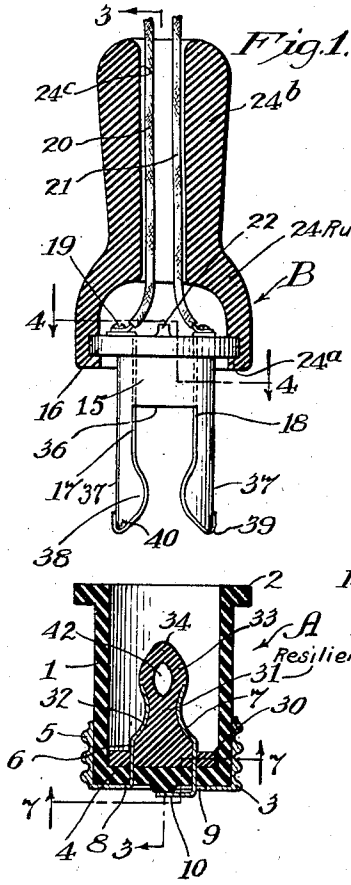


Fig. 2.

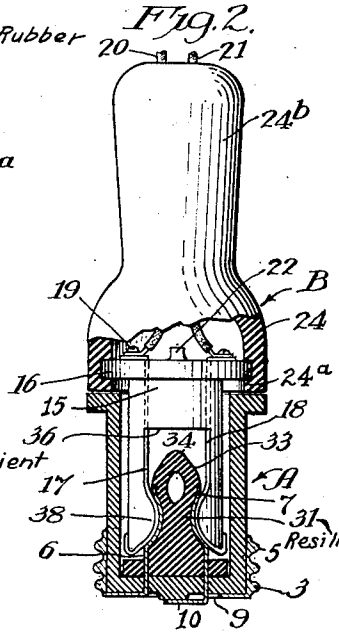


Fig. 3.

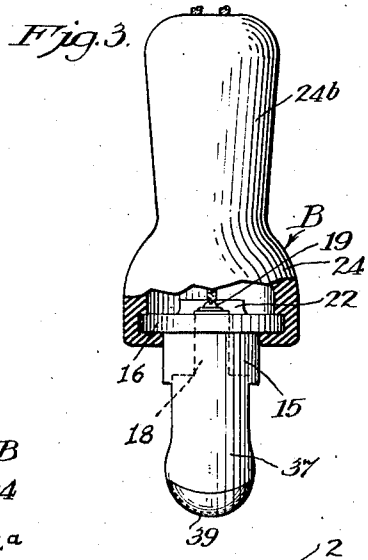


Fig. 4.

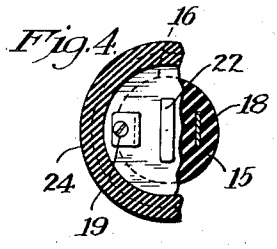


Fig. 6.

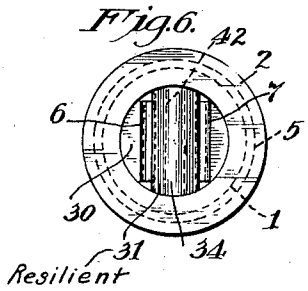


Fig. 7.

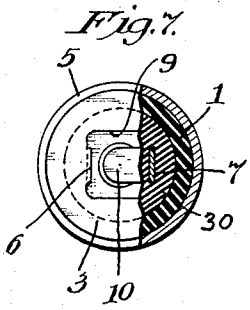
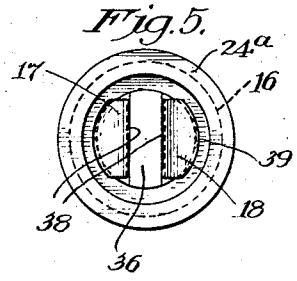


Fig. 5.



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QUICK-DETACHABLE ELECTRICAL CONNECTION

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Application September 20, 1938, Serial No. 230,769

4 Claims. (Cl. 173—343)

This invention is a quick-detachable electrical connection; and has for an object to provide guided alinement of separable parts of the connection so that they may be engaged without close attention on the part of the user.

It is a further object of the invention to provide an illuminated connection whereby it may be readily found in the dark.

It is a still further object of the invention to provide a connection which while it may be readily disconnected by a positive pull, is securely held against accidental disengagement responsive to gravity or slight jerk or strain. The connection is thus particularly applicable to ceiling use where the weight of its displaceable part may tend to disengage the connection.

It is a still further object of the invention to provide a connection of simple construction and which may be manufactured without complicated mechanical operations, thereby providing an economical device.

In general, it is the object of the invention to provide an inexpensive connection of general utility and safety, making it practical for all quick-detachable electrical connections and particularly recommending itself to insurance underwriters.

Further objects of the invention will be readily understood from the following description of the accompanying drawing, in which:

Fig. 1 shows the connection, partially in axial section, with its cooperating parts disengaged.

Fig. 2 shows the connection, partially in axial section, with its cooperating parts engaged.

Fig. 3 shows the connection, partially in axial section on the line 3—3 of Fig. 1.

Fig. 4 is a transverse section on the line 4—4 of Fig. 1.

Fig. 5 is a forward end view of the displaceable part of the connection.

Fig. 6 is a front end view of the stationary part of the connection.

Fig. 7 is a transverse section on the line 7—7 of Fig. 1.

The quick detachable connection comprises cooperating parts A—B one of which may be stationary, and the other of which is adapted for quick-detachable engagement with the stationary part. Wiring leads to the parts A—B respectively, and engagement the the parts A—B makes electrical contact between the two set of wiring.

The part A forms a socket adapted for reception of a plug which is formed by the part B, and a tongue is provided in the socket A and is adapted for quick-detachable engagement by a pronged end of the plug B.

Referring to the socket A, it comprises an annular shell 1 of electrical insulating material, preferably Bakelite or the like, forming a cylindrical socket which is preferably flanged at its open outer end as shown at 2. The socket A is preferably adapted for stationary mounting, with suitable wiring electrically connected to the socket. This stationary mounting may be of any desired type, and is illustrated as a usual threaded plug and socket. As an instance of this arrangement a cap 3 of electrical conducting material such as brass, is mounted on the closed base 4 of the shell 1, with the periphery of the cap forming a thread 5 which is adapted to be screwed into a usual threaded electric socket (not shown).

Strips 6—7 of electrical conducting material such as copper, extend through the base 4 in transversely spaced relation at opposite sides of and parallel to a diameter of the shell 1; and the rear end of the strip 6 is electrically connected to the cap 3 as shown at 8, while the strip 7 projects through an opening 9 in the base of the cap 3 and forms an electrical contact 10 at the rear of the base 4. When the socket A is screwed into a usual electric socket, electrical contact for the strip 6 is thus made via the periphery of the electric socket and the cooperating threaded cap 3, and electrical contact for the strip 7 is made via a usual contact in the electric socket and which is engaged by the cooperating contact 10.

Referring to the plug B, it comprises a cylindrical projection 15 adapted for free sliding reception in the socket A and preferably flanged at its outer end as shown at 16. The plug B is connected to suitable wiring and its projection 15 is adapted to be inserted in the socket A for making a quick-detachable electrical connection.

As an instance of this arrangement, the projection 15 is of electrical insulating material, preferably Bakelite or the like; and strips 17—18 which are of electrical conducting material such as copper, extend through the projection 15 in transversely spaced relation at opposite sides of and parallel to a diameter of this cylindrical projection. The rear ends of the strips 17—18 seat against the rear end of the projection 15; and by usual retaining means which are shown as screws 19, wiring 20—21 may be connected to the respective strips 17—18. The rear end of the projection 15 preferably has a projecting ridge 22 between the screw-connections 19, to prevent a short-circuit between said screw-connections.

The connections 19 may be enclosed within a casing 24 which preferably forms a handle for the plug B; and this casing may be of resilient material such as rubber, with a flanged open end 24a adapted to grip the flange 16, and with the casing forming an elongated handle 24b having a bore 24c through which the wiring 20—21 projects.

When the plug B is inserted in the socket A, the conductor strips 17—18 respectively engage the conductor strips 6—7 and thus complete an electrical circuit; and the engagement is such as to provide positive contact, securely held against accidental disengagement but adapted for ready disengagement when a positive pull is exerted on the plug B.

For this purpose, a cylindrical base 30 is preferably mounted in the socket A on the base 4, and has a tongue 31 projecting into the socket and extending diametrically across the same, with the strips 6—7 projecting through the base 30 at either side of the tongue. The respective faces of the tongue are grooved transversely of the socket A as shown at 32, and beyond said grooves toward the open outer end of the socket the tongue 31 is wedge-shaped in cross section as shown at 33, so that the tongue has a tapering outer edge 34 extending diametrically across the socket A and spaced inwardly an appreciable distance from the open outer end of the socket.

The strips 6—7 snugly engage the respective faces of the tongue 31, conforming to the contour of the grooves 32 and preferably terminating at the base of the wedge-shaped portion 33, short of the outer edge 34 of the tongue.

The forward end of the projection 15 has a groove 36 extending diametrically across the projection and thereby forming prongs 37 adapted for reception over the respective faces of the tongue 31. At their forward end portions the inner faces of the prongs 37 have ridges 38 extending transversely of the projection 15 and conforming in cross-section to the grooves 32; and at the extreme forward ends of the prongs 37 the surfaces of the ridges 38 merge into the outer cylindrical surface of the projection 15 so as to form lips 39 which have rounded ends as shown at Fig. 3, and which in cross-section are wedge-shaped so as to form tapering edges 40. Rearwardly from the ridges 38 and toward the inner end of the groove 36, the inner proximate faces of the prongs 37 are transversely spaced, so that when the prongs are received over the tongue 31 the inner end of the groove 36 clears the wedge-shaped portion 33 of the tongue.

The strips 17—18, project into the groove 36 so as to snugly engage the inner proximate faces of the prongs 37, with said strips conforming to the contour of the ridges 38 and then bent around the tapering edges 40 of the lips 39.

When the projection 15 is inserted in the socket A, it is turned until the prongs 37 are in position for reception over the respective faces of the tongue 31; and as the projection 15 is then pushed into the socket until further movement is arrested by the flange 24a engaging the cooperating flange 2, the lips 39 move inwardly over the outer edge 34 of the tongue and thence along the tapering surfaces of the wedge-shaped portion 33, until the ridges 38 seat in the grooves 32. This relative movement is permitted by cross-sectional compression of the tongue 31 to permit its wedge-shaped portion passing through the restricted space between the ridges 38; and compression of the tongue is relieved when the ridges 38 have seated in the grooves 32, so as to maintain tight seating of the ridges in the grooves.

To permit this compression and subsequent expansion of the tongue 31, it is of resilient material such as rubber; and in order that the tongue may be of durable composition but still have sufficient resiliency, it may have a bore 42 in its wedge-shaped portion 33 and extending diametrically across the socket A in the direction of the tongue.

When the ridges 38 have entered the grooves 32, the resilient expansion of the tongue tightly seats the ridges in the grooves and thus tightly engages the overlapping strips 16—17 and 17—18, thereby making tight electrical contact and positively holding the same against accidental disengagement. However, a positive pull on the plug B causes the ridges 38 to transversely compress the tongue 31 so as to permit ready withdrawal of the projection 15 from the socket A, thereby disengaging the electrical contact between the strips 6—17 and 7—18.

When inserting the projection 15 in the socket A, initial engagement is readily made since the cylindrical projection will enter the cylindrical socket irrespective of the relative positions to which the projection and socket may be turned; and after initial engagement has once been made, abutment of the rounded lips 39 against the diametrically extending edge 34 (as the projection 15 is pushed into the socket) automatically turns the projection until its groove 36 is properly alined for reception over the cooperating tongue 31.

The quick-detachable connection may thus be made without close attention on the part of the user, since the projection 15 may be readily initially inserted in the socket A; and turning the projection 15 as it is then pushed into the socket readily alines the cooperating groove and tongue. For further convenience in readily locating the socket A in the dark, its flange 2 may be coated with any usual self-illuminating medium such as radium paint.

The invention thus provides a quick-detachable electrical connection which may be readily engaged and which is positively held against accidental disengagement, but which may be readily disengaged by a positive pull.

I claim:

1. In a quick-detachable electrical connection, a cylindrical socket having an open end, a cylindrical plug adapted for initial reception in the socket irrespective of the relative positions to which the plug and socket may be turned, means at the rim of the open end of the socket rendering it visible in the dark, a transverse tongue in the socket in spaced relation from its open end, said tongue being of resilient material, electrical contacts at the respective faces of the tongue, the plug having a pronged end, the ends of the prongs being rounded so that their abutment against the tongue tends to turn the plug for reception of its pronged end over the tongue, electrical contacts at the inner faces of the prongs cooperating respectively with the electrical contacts of the tongue, and cooperating ridges and grooves on the cooperating electrical contacts, the resiliency of the tongue permitting its compression for slidably overlapping the cooperating electrical contacts so as to engage the ridges in the cooperating grooves, and the resiliency of the tongue yieldably maintaining engagement of the ridges in the grooves for releasably securing

the cooperating electrical contacts against disengagement.

2. In a quick-detachable electrical connection, a cylindrical socket having an open end, a cylindrical plug adapted for initial reception in the socket irrespective of the relative positions to which the plug and socket may be turned, electrical contact means extending across the socket in spaced relation from its open end, the plug having a pronged end forming electrical contact means, and cams at the ends of the prongs for rotating the plug relative to the socket through engagement of the cams with the first mentioned electrical contact means so as to position the prongs for straddling and electrically contacting said first mentioned electrical contact means.

3. In a quick-detachable electrical connection, a cylindrical socket open at one end, a tongue extending transversely across the socket substantially the full diameter of the bore of the socket, electrical contact means at the tongue, a cylindrical plug having a diametrical recess in one end so that said end of the cylindrical plug forms a pair of prongs, electrical contact means at the prongs, the cylindrical plug being of a diameter adapting it for substantially snug reception in the cylindrical socket, and cams at the ends of the prongs for rotating the plug relative to the socket through engagement of the cams with the transversely extending tongue so as to position the prongs for straddling the transversely extending tongue with the electrical contact means at the prongs engaging the electrical contact means at the tongue.

4. In a quick-detachable electrical connection, a cylindrical socket open at one end, a tongue extending transversely across the socket substantially the full diameter of the bore of the socket, said tongue terminating in spaced relation from the outer end of the socket, electrical contact means at the tongue, a cylindrical plug having a diametrical recess in one end so that said end of the cylindrical plug forms a pair of prongs, and electrical contact means at the prongs, the cylindrical plug being of a diameter adapting it for substantially snug reception in the cylindrical socket with the pronged end of the plug initially received in the socket irrespective of the relative position to which the plug and socket may be turned and with the plug adapted to then be turned for positioning its pronged end for straddling the tongue with the electrical contact means at the prongs engaging the electrical contact means at the tongues.

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