

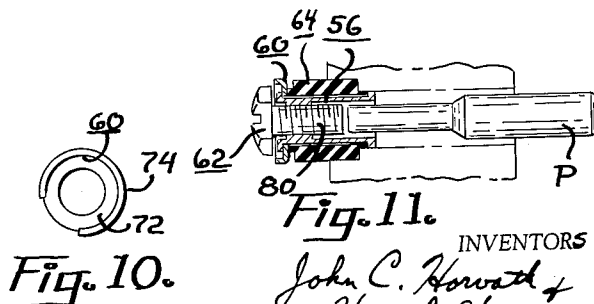
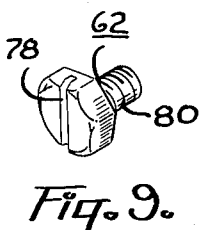
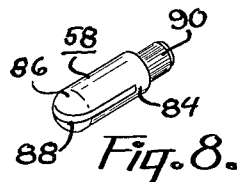
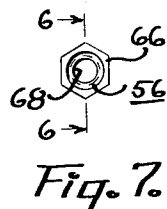
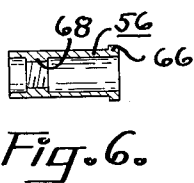
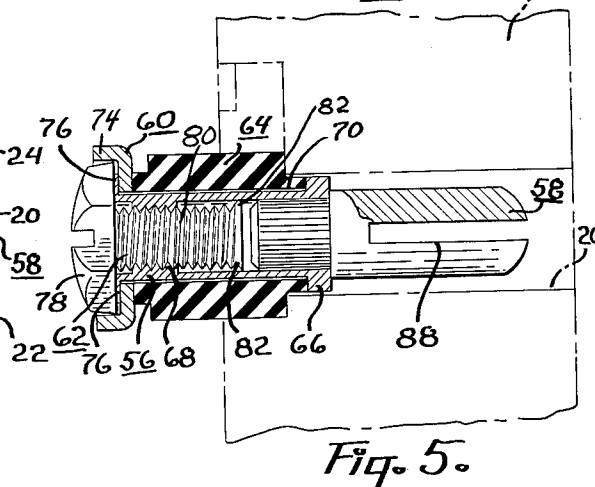
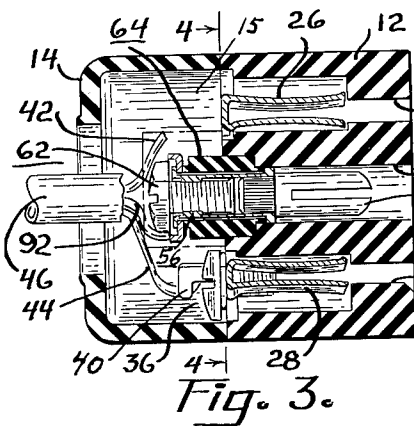
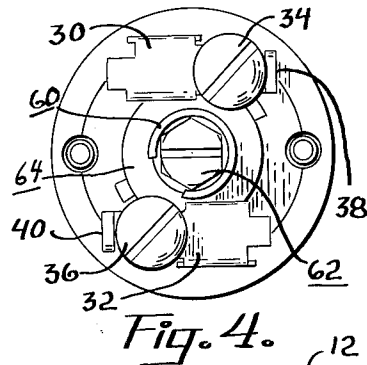
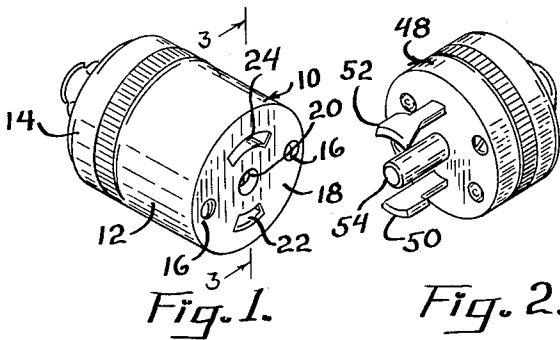
Sept. 21, 1965

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3,208,035

THREE-WIRE ELECTRICAL CORD CONNECTOR

Filed April 19, 1963



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3,208,035 THREE-WIRE ELECTRICAL CORD CONNECTOR

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Filed Apr. 19, 1963, Ser. No. 274,211
4 Claims. (Cl. 339—220)

This invention relates to three-wire cord connectors, and particularly the type employing a central contact on each of the two usual connector components.

In three-wire electrical cord connectors it is known to employ a central blade contact on one of the connector components and a cooperating central receptacle contact on the other connector component. It is also known to employ a central blade contact on the connector body and house it in a central passage in the connector body. In this type of arrangement, a terminal for the cord wired to the connector body is usually disposed on the interior of the connector body in electrical contact with the central blade contact. Frequently in three-wire connectors of this type, the central contacts are grounding contacts which are wired to a grounding wire of the electrical cord. Normally the terminals for the central contacts include selectively operated grounding binding screws. It is, of course, imperative that the connection between the grounding wire of a cord connected to the connector components and the terminals of the central contacts be made, otherwise the safety provided by grounding will not be afforded. It is well known that it is desirable to prevent the inadvertent falling out of the grounding terminal binding screws from their associated contact terminals. It is particularly difficult to provide a grounding terminal binding screw for the blade contact on the connector body that is free of such inadvertent separation.

It is an object of this invention to provide an improved three-wire connector body wherein the central blade contact mounted thereon is constructed so as to provide a terminal binding screw that is irremovably mounted, and therefore, which cannot become inadvertently disconnected.

It is a further object to provide an improved connector body as set forth in the preceding paragraph which is constructed to permit easy and economical assembly.

The above and other objects of this invention will become apparent from a consideration of the following description and claims taken with the accompanying drawing, wherein:

FIG. 1 is a perspective view of a connector body incorporating the invention;

FIG. 2 is a perspective view of a connector cap designed to cooperate with the FIG. 1 connector body;

FIG. 3 is a longitudinal sectional view taken substantially on line 3—3 of FIG. 1 and on a larger scale;

FIG. 4 is a sectional view taken substantially on line 4—4 of FIG. 3;

FIG. 5 is an enlarged view of a portion of FIG. 4 showing the details of the blade contact-terminal assembly construction and associated parts;

FIG. 6 is a sectional view on line 6—6 of FIG. 7 of an element, viz., a tapped bushing, forming a part of the

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blade contact-terminal assembly in its original condition prior to assembly;

FIG. 7 is an end view looking from the right of FIG. 6 thereof;

FIG. 8 is a perspective view of the blade contact forming a part of the blade contact-terminal assembly;

FIG. 9 is a perspective view of a binding screw forming a part of the blade contact-terminal assembly in its original condition;

FIG. 10 is a plan view of a terminal washer forming a part of the blade contact-terminal assembly, and

FIG. 11 is a somewhat schematic view showing the manner in which the free end of the terminal binding screw is upset to render it irremovable relative to its associated tapped bushing.

The invention is particularly well suited for incorporation in three-wire cord connectors of the miniature type. However, it is not limited to such an application. In such application, the connector usually comprises a connector body, illustrated by itself in FIG. 1, and a connector cap, illustrated by itself in FIG. 2, which are constructed and arranged to be selectively detachably connected and interlocked. The connector body 10 comprises a housing of rigid electrical insulation material for all of the electrical elements comprising a main part 12 and a cover part 14, which are secured together by tie bolts 16 in any convenient manner and form an internal chamber 15. The circular flat face 18 of the connector body part 12 includes a pair of openings to permit access to the heads of tie bolts 16; a central open end of passageway 20, and a pair of radially spaced arcuate slot openings 22, 24, the latter of which is larger than the former. Passageway 20 and openings 22, 24 communicate with chamber 15.

Interiorly of the connector body housing there are disposed current carrying receptacle contacts 26, 28, forming a part of contact-terminal members 30, 32, respectively (see FIG. 4) the members including terminal binding screws 34, 36 and strain relief ears 38, 40, respectively, which are disposed in chamber 15. Current-carrying wires 42, 44 forming a part of the three-wire cord 46 are arranged to extend through an opening in cover part 14 and be connected to the binding screws 34 and 36, respectively, in any conventional manner, as by being directed around their associated strain-relieving ears and then wrapped around the binding screws. The preceding type of wiring provides electrical current to the receptacle contacts 26 and 28 in a generally known manner.

The connector cap 48 is illustrated in FIG. 2 and includes a pair of male contact blades 50, 52 of the interlocking type which are constructed and arranged to have current carrying wires of a cord wired to them and be inserted into the slot openings 24 and 22, respectively, and engage receptacle contacts 26 and 28 in the connector body to make electrical contact therewith. Relative turning of the cap and connector body results in interlocking in a generally known manner.

The connector body 10 also includes a centrally mounted male blade contact disposed in its passageway 20 that is constructed and arranged to be selectively engaged by a centrally mounted tubular receptacle contact 54 carried by the connector cap and projecting from the face thereof in a manner similar to that of the male

contact blades 50, 52. Interiorly of the connector cap, the tubular contact 54 has terminal means formed which is arranged to have a third wire, which may be a grounding wire, of the cord connected to the connector cap wired to it. The tubular contact 54 is arranged to be inserted into the passageway 20 in the connector body and to engage and surround the blade contact mounted therein.

The construction of the blade contact and terminal means associated with it forms an important part of the invention, and therefore, will be described in great detail. Essentially, the blade contact and terminal means comprises an assembly of economical parts which are constructed and readily assembled in a particular manner to provide a terminal binding screw associated with the blade contact which is irremovably mounted.

The blade contact-terminal assembly comprises a tapped bushing 56 which is shown in its original condition in FIGS. 6 and 7 and in its fully assembled condition in FIGS. 3, 4 and 5. The blade contact-terminal assembly also includes a blade contact member 58, shown by itself in FIG. 8; a terminal washer 60, shown by itself in FIG. 10, and a terminal binding screw 62 shown in the original condition by itself in FIG. 9. The referred-to elements of the blade contact-terminal assembly may be formed as a subassembly and the unit mounted on the connector body housing part 12. This may be accomplished by assembling these elements on a block 64 of electrical insulation material which, in turn, is assembled to the connector body part 12, which is also made of electrical insulation material. The manner of assembly of the block 64 to the body part 12 forms no particular part of this invention, but it is effected by associating contact-terminal members 30, 32 in a particular manner to anchor these elements together.

To assemble the blade contact-terminal assembly, the tapped bushing 56 (see FIGS. 6 and 7), which initially comprises a metallic tubular member having an annular radially outwardly extending flange 66 formed at one axial end and an intermediate internally extending flange 68 tapped at its central opening formed near but spaced from the other axial end, is inserted through a central circular passage 70 formed in the insulating block 64 from the right end thereof with relation to FIG. 5 until its flange 66 abuts the right end of block 64. These parts are dimensioned so that the left end of the bushing 56 projects beyond the left end of the block 64 at this time in assembly. The terminal washer 60 (see FIG. 10) which comprises a flat, ring-like portion 72 having a short peripheral flange 74 formed around most of its periphery, is slipped onto the free end of the bushing 56 and the latter is spun over so as to be deformed into its final condition illustrated in FIGS. 3 and 5, wherein it has a radially outwardly extending flange 76 formed at its end opposite the flange 66. Flange 76 abuts the left end of block 64. At this point in assembly, the bushing 56 and terminal washer 60 are assembled to the insulating block 64 by the cooperative action of flanges 66 and 76 on the ends of the block.

The terminal binding screw 62 is shown in its initial condition in FIG. 9, and it initially comprises the usual hexagonal head 78 and threaded shank 80 of uniform diameter. Terminal binding screw 62 is threadedly inserted into the threaded flange 68 of the bushing 56. This point in assembly is somewhat schematically illustrated in FIG. 11, wherein the shank 80 of the terminal binding screw is illustrated as being uniformly cylindrical and threaded. In order to render the binding screw 62 irremovable relative to the bushing 56, a punch P is inserted, as shown schematically in FIG. 11, through the right end of the bushing 56, and the free end of the binding screw shank 80 is deformed to form a radially outwardly extending flange-like upset 82, as can be clearly seen in FIG. 5. The diametral relationship of the upset 82 and the threaded flange 68 on the bushing 56 is such that after

it has been formed by the punch P it is not possible by normal turning of the binding screw 62 to remove the screw from the bushing 56 because of interference between the upset 82 and the right side of bushing flange 68. Therefore, the screw is irremovably mounted and cannot be inadvertently disconnected and lost.

After the terminal binding screw 62 has been assembled to the bushing 56 in the foregoing manner, the blade contact member 58, which is illustrated by itself in FIG. 8, is then secured to the bushing 56. The blade contact member 58 comprises a cylindrical portion 84 having a rounded end 86 and a slot 88 extending a substantial distance therethrough to permit some radial flexure in operation. Contact member 58 also includes a mounting portion of reduced diameter 90 having a plurality of axial splines formed thereon. The diametral relationship of the mounting portion 90 of the contact member 58 and the bushing 56 is such that the contact member can be forcibly inserted into the bushing and the splines will form an effective force fit mechanical connection therebetween to prevent removal of the contact member in normal usage.

When the blade contact-terminal assembly has been fully assembled on the insulation block 64, and in turn fully assembled in the connector body housing, the central wire 92 of the cord 46, which extends into chamber 15, may be wrapped around the binding screw 62 under its head and forcibly squeezed between the terminal washer 60 and the head 78.

In view of the foregoing it will be apparent that applicants have achieved the objects of their invention and that they have provided an improved central blade contact-terminal construction which permits the capturing of a terminal binding screw on the central blade contact, which has never been accomplished in prior art devices, because of the inherent difficulty of capturing a screw on the blade contacts heretofore employed, which were integrally formed with their terminal means and precluded the use of an upsetting tool to form an upset on the terminal screw to capture it. Certain aspects of our invention are not limited to the particular details of construction of the example illustrated, and we contemplate that various and other modifications and applications will occur to those skilled in the art. It is, therefore, our intention that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of our invention.

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

1. An electrical connector comprising: a housing of insulation material; a contact mounted thereon; a terminal including a terminal binding screw for electrically connecting a wire to said contact; electrical conducting support means carried by said housing and threadedly supporting said terminal screw; said contact being separate from but rigidly secured to said support means; said terminal binding screw being irremovably mounted on said support means; said contact, support means and binding screw being aligned with said contact and said binding screw at opposite ends of said support means; and said support means comprising a tubular bushing having a pair of radially outwardly extending retaining flanges and an intermediate radially inwardly extending flange centrally open and threaded for receiving said terminal binding screw.

2. The connector defined in claim 1 wherein said contact includes a splined mounting portion that is disposed in and rigidly attached to said bushing.

3. An electrical connector comprising: a housing of insulation material; a chamber formed in the interior of the housing; a passageway in said housing communicating with said chamber and the exterior of said housing; a tubular bushing supported in said housing and extending partially into said chamber and partially into said passageway, and including an intermediate radially inwardly

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extending flange having a central threaded opening; a contact separate from said bushing, disposed in said passageway and including a mounting portion rigidly secured to said bushing; and a terminal binding screw having a head accessible from said chamber and a shank threadedly received in the threaded opening of said bushing flange; said screw including a radially outwardly extending flange-like upset formed at the free end of its shank of a greater diameter than that of the threaded opening in said bushing which is disposed in said bushing on the passageway side of said flange, whereby said screw is irremovably mounted on said bushing.

4. The connector defined in claim 3 wherein said mounting portion includes splines and is force fit into said bushing.

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