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MOLDED ANGLE CONNECTOR

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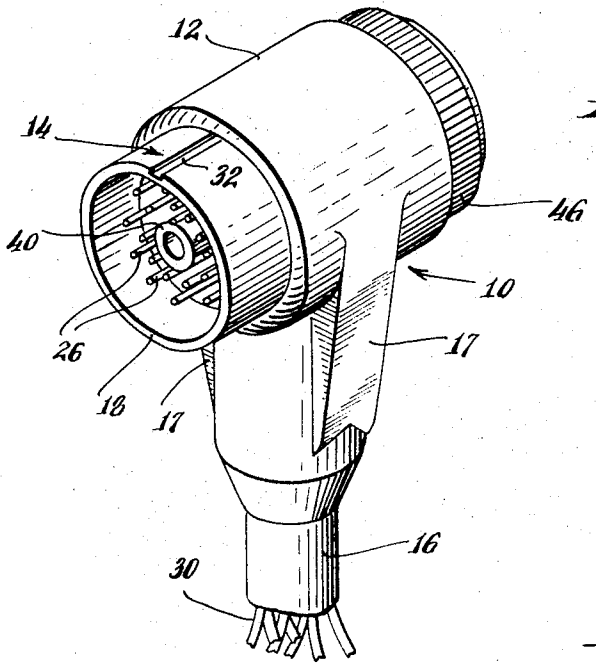


Fig. 1

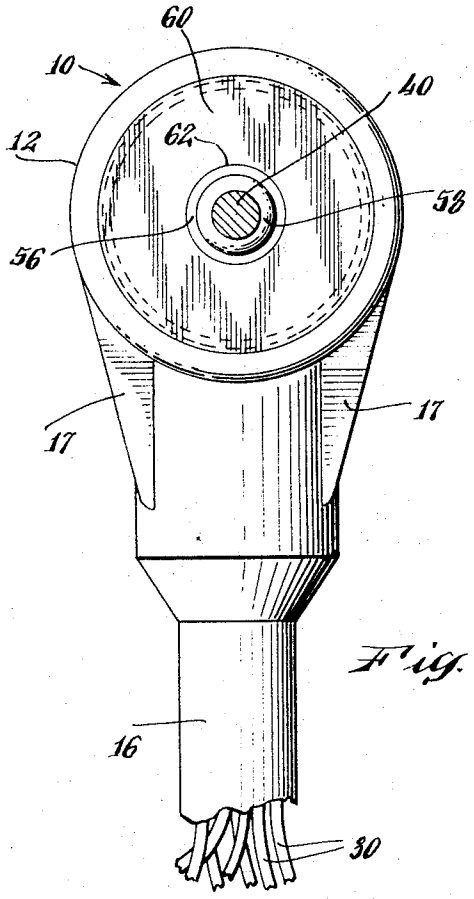
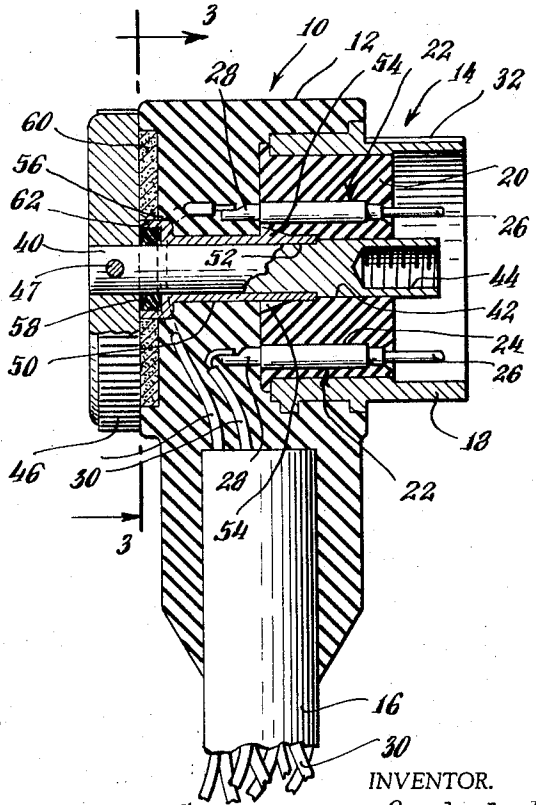


Fig. 3.

Fig. 2.



INVENTOR.

Edward Clarke Quackenbush

BY

Blair, Buckles, Cesari & St. Onge

ATTORNEYS.

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MOLDED ANGLE CONNECTOR

Edward C. Quackenbush, Woodbridge, Conn., assignor to The Whitney Blake Company, New Haven, Conn.

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ABSTRACT OF THE DISCLOSURE

The disclosed molded electrical connector comprises a core mounting plural, parallel contact members whose rearward ends are connected to conductors of a multiconductor cable arranged perpendicular to the contact members. A bearing sleeve is flared to provide a molding seal between it and an axial bore in the core in which it is inserted. An insulating disc, spaced from the contact member rearward ends, provides backing for a molded connector body encasing the connector parts and prevents protrusion of conductors through the body housing during molding. A shaft extending through the bearing sleeve has exposed threads for securing mating contact members together.

Background of the invention

The present invention relates to an improved electrical connector for multiconductor cable. My improved connector may comprise either or both male and female contact members; each contact member being electrically connected to a different conductor of a multiconductor cable. Typically, in prior art connectors of this general type the multiconductor cable runs from the connector in a direction generally parallel to the axes of the contact members. In some instances, particularly where the connector is to mate with a socket receptacle of electrical equipment, the in line physical relationship between the contact members and the multiconductor cable cannot always be accommodated because of the proximity of the other equipment. Angle connectors, wherein the multiconductor cable extends from the connector at substantially right angles to the axes of the contact members, are used in these instances.

My invention is specifically directed to angle connectors of the male and female type whose axial length is less than that of prior art angle connectors. Moreover, my invention is specifically directed to an angle connector whose parts are encased in a molded connector body. As a consequence, my connector is compact in size, rugged in construction and relatively inexpensive to manufacture. Moreover, by virtue of its molded construction, the internal connection of the individual conductors to the contact members are completely sealed from moisture, dust, and other contaminants.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objcets of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing in which:

FIGURE 1 is a perspective view of an angle electrical connector constructed according to my invention;

FIGURE 2 is a center sectional side view of the connector shown in FIGURE 1; and

FIGURE 3 is a sectional end view taken along line 3—3 of FIGURE 2.

Similar reference numerals refer to similar parts throughout the several views of the drawing.

Detailed description

Referring now to the drawings, a molded electrical connector, indicated generally at **10** in FIGURE 1, includes a molded connector housing **12** of neoprene or the like, encasing the rearward end of a connector core **14** and the terminal end portion of a multiconductor cable **16**. Ribs **17** integrally formed with the housing **12** adds rigidity to the molded assembly. As best seen in FIGURE 2, the connector core **14** consists of an outer metallic sleeve **18** surrounding a resilient insert **20**, preferably formed of neoprene. A plurality of elongated contact members **22**, mounted in the molded insert **20**, extend parallel to and symmetrically about the axis of sleeve **18**. The contact members **22**, with their body portions **24** imbedded in and bonded to the insert **20**, have forwardly extending male contact pins **26** and rearwardly extending terminal portions **28** to which are connected the ends of respective individual conductors **30** of multiconductor cable **16** with solder or by crimping. While male contact members **22** are illustrated herein, it is appreciated that they may be female contact members or a combination of male and female contact members. A keyway **32** (FIGURE 1) is formed in the outer surface sleeve **18** for engagement with a ridge in a plug receptacle or electrical connector (not shown) in order to angularly orient the connector **10** for proper mating engagement between respective contact members.

A shaft **40** extending through a central bore **42** in insert **20** is formed with an axial threaded bore **44** in its forward end portion. A knob **46** is secured by pin **47** to the rearward end of shaft **40** extending beyond connector housing **12** for rotation of the shaft to advance and secure the connector **10** into electrical mating engagement with a plug receptacle or another connector (not shown).

According to an important feature of the invention, a bearing sleeve **50** (FIGURE 2) is inserted partially through axial bore **42** of insert **20** from the rear prior to the molding of connector housing **12**. The bearing sleeve **50** receives and effectively journals the rearward portion of shaft **40**. The forward end portion of shaft **40** is of larger diameter, providing a shoulder **52** bearing against the forward end of bearing sleeve **50**. Thus, the bearing sleeve **50**, when encased in the molded connector housing **12**, serves in conjunction with knob **46** and shoulder **52** to fixedly axially position shaft **40** while still accommodating rotation thereof.

The bearing sleeve **50** is provided with a flared annular surface portion **54** which is effective upon insertion of the sleeve into bore **42** of insert **20** to compress the resilient insert material adjacent the entrant end of bore **42**, thereby providing a molding seal preventing the molding material of connector housing **12** from flowing into the insert bore **42** between the sleeve and the shaft **40**. I have found that if molding material enters the insert bore, rotational movement of shaft **40** may be impeded or the contact pins **26** fouled.

Still referring to FIGURE 2, the rearward portion of bearing sleeve **50** is enlarged in inner and outer diameters to form a cup **56** for accommodating an O-ring seal **58**. Seal **58** serves to prevent the entrance of moisture, dust, and other contaminants into the interior of the connector **10**.

A rigid insulating backing disc **60** (FIGURES 2 and 3) is placed in the mold (not shown) prior to the molding of the connector housing **12**. The core **14** with bearing sleeve **50** partially inserted through insert bore **42**, as shown in FIGURE 2, is then placed in the mold. Disc **60** is formed having a central aperture **62** to facilitate centering the disc on the cup-shaped end portion **56** of bearing sleeve **50**. The connector housing **12** is then molded. The principal function of disc **60** is to serve as a backing

member for preventing the individual conductors **30** connected to the terminal ends **28** of contact members **24** from extending rearwardly to the surface of the mold forming connector housing **12** and thus protrude from the rear surface of housing **12**. Otherwise, the primary insulation of conductors **30** would be exposed at the rear of housing **12** and thus subject to chafing, etc.

In the past, the axial length of connector housing had to necessarily be extended in order to accommodate the turn of the conductors **30** between cable **16** and the terminal ends of contact members **22** while insuring that the conductors are fully encased in the connector housing. I have found that disc **60** serves to safely pack the conductors **30** in a shorter spacing between the terminal ends **28** of contact members **22** and the rear of the connector housing **12**. Consequently the depth or axial length of the connector **10** may be significantly reduced with the inclusion of the insulating backing disc **60**. The disc **60** may be formed of any suitable insulating material such as laminated phenolic.

As an additional function, the disc **60** may serve as a bearing surface for knob **46** which is of lower coefficient of friction than the connector housing **12**. Thus, the knob **46** can be rotated with significantly greater ease if bearing on disc **60** rather than the rear surface of connector housing **12**.

It will be appreciated that the fastening provision afforded by shaft **40** and bearing sleeve **50** may be accomplished by other structure known in the art, such as clips or peripheral engaging means of the bayonet or threaded type. It is seen that the advantages afforded by the disc **60** are attained in any angle electrical connector of the type disclosed, regardless of the nature of the fastening means.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above article without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electrical connector for multiconductor cable comprising, in combination:

(A) a core having

(1) an axial bore, and

(2) mounting a plurality of mutually parallel contact members,

(a) said contact members having terminal ends connected to respective conductors of the multiconductor cable;

(B) a bearing sleeve inserted partially through said core bore;

(C) a shaft extending through said bearing sleeve and said core bore, said shaft having

(1) its exposed forward end portion threaded;

(D) an insulating backing member disposed centrally about the rearward end portion of said shaft in closely spaced relationship to the terminal ends of said contact members; and

(E) a molded connector housing encasing portions of said core, bearing sleeve and backing member, the terminal end portion of the multiconductor cable, and the conductor portions connected to said contact member terminal ends;

(1) the cable terminal end portion being arranged and supported by said housing at substantially right angles to said contact members.

2. The connector defined in claim **1** wherein

(1) said bearing sleeve is flared at a point adjacent an end of said core bore to form a molding seal therebetween.

3. The connector defined in claim **1** wherein

(1) the rearward end portion of said bearing sleeve is cup-shaped to accommodate an O-ring seal about the rearward end of said shaft.

4. The connector defined in claim **1** wherein

(1) one surface of said disc is exposed at the rear of said connector.

5. The connector defined in claim **4** which further includes

(F) a knob pinned to the rearward end of said shaft and generally in surface contact with said exposed surface of said disc.

6. The connector defined in claim **5** wherein said core further includes

(1) a resilient insert mounting said contact members,

(a) said core bore extending centrally therethrough.

7. The connector defined in claim **6** wherein

(1) said bearing sleeve is flared at a point adjacent an end of said core bore to compress the adjacent resilient insert material and form a molding seal therebetween.

8. The connector defined in claim **7** wherein

(1) the rearward end portion of said bearing sleeve is cup-shaped to accommodate an O-ring seal about the rearward end of said shaft.

9. An electrical connector for multiconductor cable comprising, in combination:

(A) a core mounting a plurality of mutually parallel contact members,

(1) said contact members having terminal ends respectively electrically connected to individual conductors of the multiconductor cable;

(B) a molded connector housing encasing a portion of said core, the terminal end portion of the multiconductor cable, and the conductors connected to said contact member terminal end,

(1) the cable terminal end portion being arranged and supported by said housing at substantially right angles to said contact members; and

(C) an insulating backing member embedded in the rearward surface of said housing in closely spaced relation to said contact member terminal ends,

(1) said backing member serving to prevent the conductor portions from being exposed at an outer surface of said connector.

10. The connector defined in claim **9** wherein

(1) said backing member is formed of a laminated phenolic material.

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RICHARD E. MOORE, *Primary Examiner.*

JOSEPH H. McGLYNN, *Assistant Examiner.*

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