

April 17, 1956

C. H. STEVENS, JR

2,742,622

CABLE CONNECTOR

Filed April 2, 1953

Fig. 1.

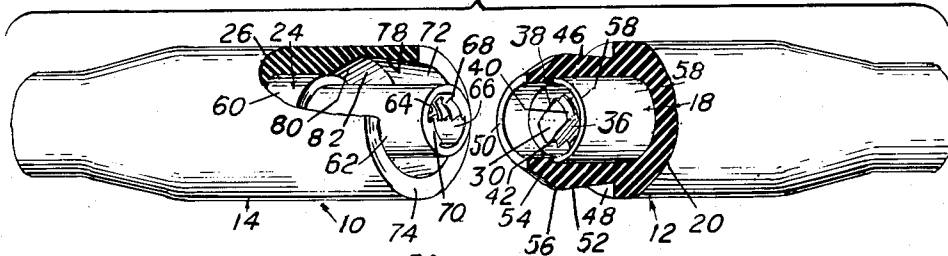


Fig. 2.

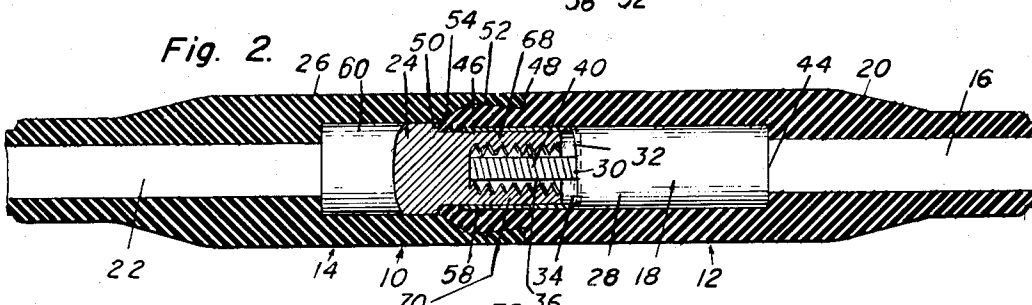


Fig. 3.

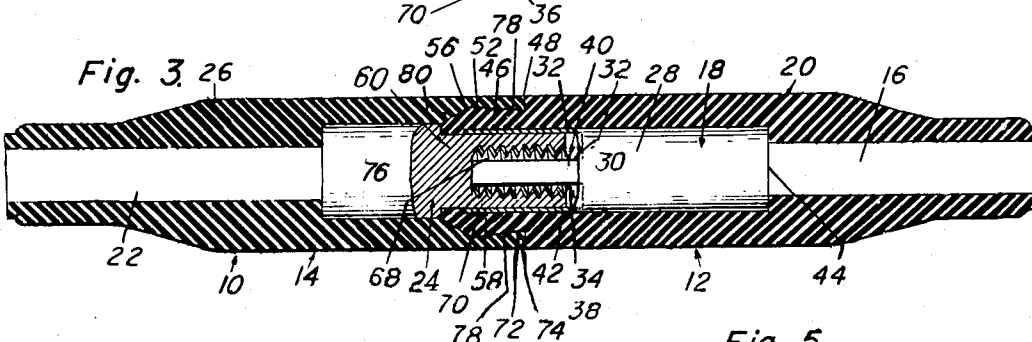


Fig. 4.

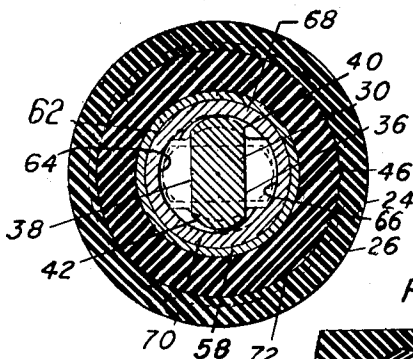


Fig. 6.

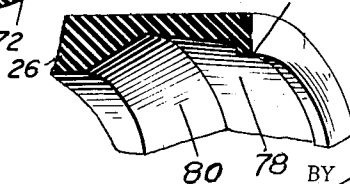
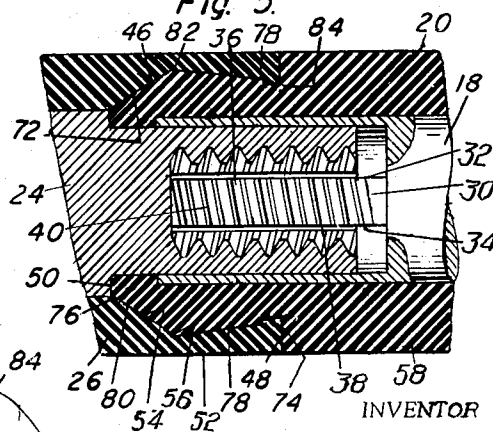


Fig. 5.



INVENTOR
Charles H. Stevens Jr.

BY *Shenmark and Mattare*

ATTORNEYS

1

2,742,622

CABLE CONNECTOR

Charles H. Stevens, Jr., Cornwall Bridge, Conn., assignor, by mesne assignments, to Whitney Blake Company, New Haven, Conn., a corporation of Connecticut

Application April 2, 1953, Serial No. 346,504

8 Claims. (Cl. 339—60)

The present invention relates to improvements in cable connectors.

An object of the present invention is to provide a new cable connector construction embodying electrically non-conductive sleeves molded about the actual cable connectors which non-conductive sleeves are in the form of male and female elements so as to have overlapping portions which when the coupling is being effected, provides an initial seal which protects the atmosphere, which might be explosive in nature in some circumstances, from exposure to any arcing which might occur between the coupling elements.

Another object of the present invention is to provide an improved arrangement wherein the non-conductive sleeves are of preselected form and are in such a relationship to the electrical coupling elements that when the coupling is effected the female member has an end surface which is abutted against a cooperative shoulder on the male element to provide a tight seal.

Various other objects and advantages will become apparent from the detailed description to follow. The best forms in which I have contemplated applying my invention include the provision of male and female electrical coupling elements which can be of a conventional form such as shown in the accompanying drawings. The electrical coupling elements are electrically connected to their respective cables and the female coupling element is provided with a recess, opposite wall portions of which are threaded while the remaining wall portions are of a diameter equal to the outside diameter of the threaded wall portions. The male coupling element has opposed wall portions threaded to correspond with the female threaded wall portions while the remaining opposing wall portions of the male coupling element are sufficiently closely spaced as to permit insertion of the male element into the female element without threading or rotary movement, coupling being completed by the threading or rotary movement at the end of the inserting movement. The foregoing means are embedded in molded male and female elements which are of sleeve-like form. The male element has a reduced diameter end portion provided with a pair of beveled surfaces outwardly of a shoulder and merging at a ridge. The end portion of the male element extends outwardly of the male coupling element carried thereby. The female element has an enlarged recess formation therein, the inner end of which is an annular shoulder, the longitudinal wall of the recess being comprised of a pair of beveled surfaces merging at a valley. The end of the female member presents an annular planar face constituting a shoulder adapted to abut the shoulder of the male element. The female element in one embodiment is formed with an inwardly extending lip or annulus at the mouth of the recess therein adapted to tightly and sealingly encircle the male element adjacent the shoulder. The configuration of the recess substantially corresponds with that of the reduced diameter end portion so that the two elements can be co-operatively interengaged in a resiliently tight sealing relationship.

2

In the drawings:

Fig. 1 is a perspective view of the separated male and female cable connectors;

Fig. 2 is a longitudinal sectional view through a first form of cable connector showing the coupling elements inserted one into the other ready for relative rotation for completion of the coupling;

Fig. 3 is a vertical longitudinal sectional view through the same embodiment but wherein the coupling elements have been rotated relative to one another to complete the coupling action, one flat unthreaded side face of the male member being in elevation;

Fig. 4 is a transverse sectional view through Fig. 3, along the plane of line 4—4, showing the cooperation between the coupling elements;

Fig. 5 is an enlarged detail sectional view of a modified coupling connection showing the lip formation of the female element; and

Fig. 6 is a detail perspective view, part broken away showing the lip on the female element of Fig. 5.

Referring more particularly to the drawings wherein like numerals designate like parts throughout, it will be seen that the cable connector 10 of the present invention is comprised of male and female sections 12 and 14 respectively. The male section 12 includes the cable 16, male electrical coupling element 18, and electrically non-conductive male element 20 of molded sleeve-like form. The female section 14 includes its cable 22, electrical female coupling element 24 and electrically non-conductive female element 26 of molded sleeve-like form.

The male electrical coupling element 18 is formed of any suitable electrically conductive metal and includes a cylindrical portion 28, and a reduced diameter portion at 30. The latter portion is cut away at 32 and 34 to provide an extension having flat faces 36 and 38 joined by cylindrical threaded faces 40 and 42. The cylindrical portion 28 has the cable 16 connected thereto as at 44. The whole assembly of male coupling element and cable is embedded in the molded electrically non-conductive male element 20 which may be made of rubber, polyethylene or other suitable insulative plastic.

The male element 20 has a reduced diameter end portion 46 extending from the shoulder 48 and terminating in the flat annular surface at 50. The exterior wall of the portion 46 is comprised of a pair of beveled surfaces 52 and 54 merging at the ridge 56. The male coupling element 18 as seen best in Fig. 1, includes a cylindrical wall portion 58 which encircles the extension 30 but the end face 50 of the male element is outwardly of the entire coupling element 18.

The female coupling element 24 includes a cylindrical portion 60 and a slightly reduced diameter portion 62 having a recess therein, best shown in Figs. 1 and 4, which is of generally cylindrical shape having smooth opposed wall portions 64 and 66 and opposed threaded wall portions 68 and 70, the diameter at the smooth wall portion being equal to the outside diameter at the threaded wall portion, and the width of the non-threaded portion being at least equal to the width of the male extension as defined by the flat wall portions 36 and 38. The assembly of female coupling element and cable is embedded in the electrically non-conductive female element 26 which is of molded sleeve-like form and of material like that of the male element. The female element 26 is formed with a recess 72 extending from the end shoulder 74 to the inner shoulder 76 and having its wall comprised of a pair of beveled surfaces 78 and 80 merging at the valley 82. The overall configuration of the recess substantially conforms with the exterior configuration of the male element and the space between the shoulder 74 and valley 82 of the female element is substantially equal to the space between the ridge 56 and shoulder 48

3

so that the two elements can be closely cooperatively associated.

Having reference now to Figs. 5 and 6, it will be seen that the difference exists in the provision of the annular lip 84 at the mouth of the female element 26. The lip 84 is adapted to tightly sealingly engage over the male element adjacent the shoulder 48.

In effecting coupling with either of the above described modifications, the male element is inserted into the female element, is by relative longitudinal movement to the dotted line position of Fig. 4 and is then given a quarter turn to the full line position of Fig. 4. The beveled surfaces will now be intimately contacted and the non-conductive sleeve-like portions will have been overlapped so as to prevent exposed arcing at the time the coupling elements are close enough to arc. Next, the male element with the male coupling element therein is rotated to the full line positions of Figures 3 and 4 so that the threaded surfaces coact to give a slight relative longitudinal movement of the male and female elements whereby the abutting shoulders 48 and 74 are more tightly associated to complete the protected coupling.

As this invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, since the scope of the invention is defined by the appended claims rather than by the description preceding them, and all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents, are therefore intended to be embraced by those claims.

I claim:

1. A cable connector comprising male and female elements of molded, electrically non-conductive material having electrical conductors embedded therein, said elements having electrically conductive coupling elements disposed in recesses in their terminal portions and connected with the conductors of the respective elements, said male element having a shoulder and a reduced diameter end portion comprised of two beveled exterior surface portions merging at a ridge spaced from said shoulder, the end portion of said female member having a shoulder and an enlarged diameter recess therein defined by a pair of beveled surface portions merging at a valley, said reduced diameter end portion of the male member being adapted to cooperate with said enlarged diameter recess in the female member to provide a seal impervious to moisture and preventing arcing.

2. A cable connector comprising male and female elements of molded, electrically non-conductive material having electrical conductors embedded therein, said elements having electrically conductive coupling elements disposed in recesses in their terminal portions and connected with the conductors of the respective elements, said male element having a shoulder and a reduced diameter end portion comprised of two beveled exterior surface portions merging at a ridge spaced from said shoulder, the end portion of said female member having a shoulder and an enlarged diameter recess therein defined by a pair of beveled surface portions merging at a valley, one of said elements having an annular lip formed at the end portion thereof and adapted to be cooperatively engaged against the other of said elements, said reduced diameter end portion of the male member being adapted to cooperate with said enlarged diameter recess in the female member to provide a seal impervious to moisture and preventing arcing.

3. A cable connector comprising male and female elements of molded, electrically non-conductive material having electrical conductors embedded therein, said elements having electrically conductive coupling elements disposed in recesses in their terminal portions and connected with the conductors of the respective elements, said male element having a shoulder and a reduced diameter

4

end portion comprised of two beveled exterior surface portions merging at a ridge spaced from said shoulder, the end portion of said female member having a shoulder and an enlarged diameter recess therein defined by a pair of beveled surface portions merging at a valley, said female element having an inwardly extending annular lip on the wall of the recess in the end portion thereof, the end portion of said female element positioned over the reduced diameter end portion of the male element in tight engagement therewith, with the shoulders of the female and male elements in abutting relationship, and the inwardly extending annular lip tightly engaging the male element adjacent its shoulder to provide a seal impervious to moisture and preventing arcing.

4. A cable connector comprising male and female elements of molded, electrically non-conductive material having electrical conductors embedded therein, said elements having electrically conductive coupling elements disposed in recesses in their terminal portions and connected with the conductors of the respective elements, said male element having a shoulder and a reduced diameter end portion comprised of two beveled exterior surface portions merging at a ridge spaced from said shoulder, the end portion of said female member having a shoulder and an enlarged diameter recess therein defined by a pair of beveled surface portions merging at a valley, said reduced diameter end portion of the male member being adapted to cooperate with said enlarged diameter recess in the female member to provide a seal impervious to moisture and preventing arcing, the distance between the end of the female element and said valley being approximately equal to the distance between the shoulder and ridge on the reduced diameter end portion of the male element.

5. A cable connector comprising male and female elements of molded, electrically non-conductive material having electrical conductors embedded therein, said elements having electrically conductive coupling elements disposed in recesses in their terminal portions and connected with the conductors of the respective elements, said coupling elements being of the type that provides for initial relative longitudinal movement and subsequent relatively rotary movement of the coupling elements to effect coupling thereof, said male element having a shoulder and a reduced diameter end portion comprised of two beveled exterior surface portions merging at a ridge evenly spaced from said shoulder, the end portion of said female member having a shoulder and an enlarged diameter recess therein defined by a pair of beveled surface portions merging at a valley spaced evenly from the end of said female element, the spacings referred to on the male and female elements being approximately equal, said reduced diameter end portion of the male member being cooperatively engageable with the enlarged recess of the female member by relative longitudinal movement of said coupling elements and rotary movement of said coupling elements effecting tight contact between the male and female elements.

6. A cable connector in accordance with claim 5 wherein said female element is formed with an inwardly extending lip at the mouth of the recess therein adapted to tightly encircle the male element adjacent its shoulder.

7. A cable connector comprising male and female elements of molded, electrically non-conductive material having electrical conductors embedded therein, said elements having electrically conductive coupling elements disposed in recesses in their terminal portions and connected with the conductors of the respective elements, said coupling elements being of the type that provides for initial relative longitudinal movement and subsequent relative rotary movement of the coupling elements to effect coupling thereof, said male element having a shoulder and a reduced diameter end portion comprised of two beveled exterior surface portions merging at a ridge

5

evenly spaced from said shoulder, the end portion of said female member having a shoulder and an enlarged diameter recess therein defined by a pair of beveled surface portions merging at a valley spaced evenly from the end of said female element, the spacings referred to on the male and female elements being approximately equal, said reduced diameter end portion of the male member being cooperatively engageable with the enlarged recess of the female member by relative longitudinal movement of said coupling elements and rotary movement of said coupling elements effecting tight contact between the male and female elements, said coupling elements having cooperating thread portions, the male coupling element having a straight cylindrical axial chamber therein with the threaded portion of the male coupling element forming a reduced axial extension of said element from the bottom of said chamber, said reduced extension carrying interrupted screw threads and encircled by the wall of the cylindrical chamber, the threaded portion of the female coupling element forming a slightly reduced diameter extension of a cylindrical portion and having an axial recess therein and adapted to enter and snugly fit in said chamber, with the recess having smooth op-

6

posed wall portions and opposed threaded portions, said female coupling element being positioned centrally of the enlarged diameter recess and radially spaced therefrom, and when said cooperating threaded portions are engaged relative rotary movement thereof effects a relative longitudinal movement of the coupling elements whereby the shoulder of the female element is urged against the shoulder of the male element in abutting relationship effecting a tight contact therebetween.

8. A cable connector in accordance with claim 7 wherein said female element is formed with an inwardly extending lip at the mouth of the recess therein adapted to tightly encircle the male element adjacent its shoulder.

References Cited in the file of this patent

UNITED STATES PATENTS

2,037,630	Hudson	Apr. 14, 1936
2,379,424	Clinkscale et al.	July 3, 1945
2,466,997	Morris	Apr. 2, 1949

FOREIGN PATENTS

128,212	Austria	May 10, 1932
---------	---------	--------------