Jan. 11, 1966 W. B. HARRISON, SR., ET AL 3,229,240

ELECTRIC CABLE CONNECTOR

Filed March 12, 1963

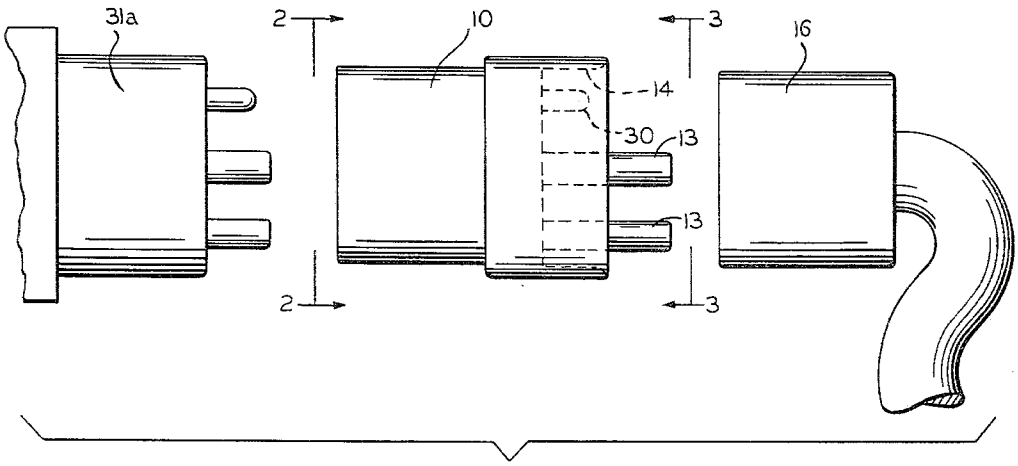



FIG. 1

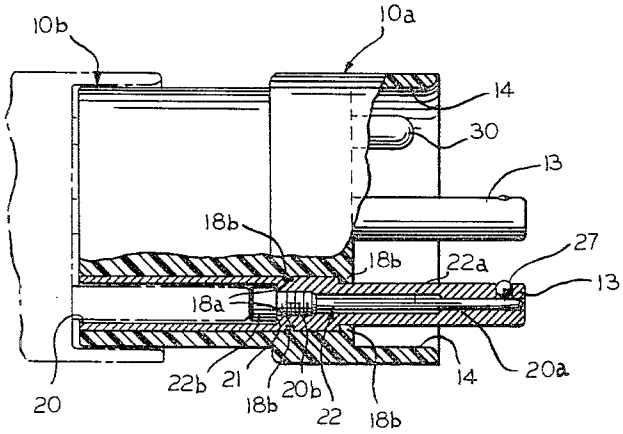



FIG. 4

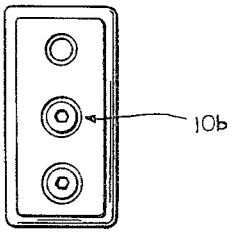



FIG. 2

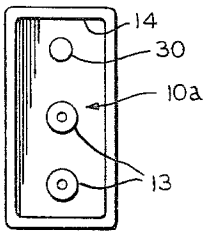



FIG. 3

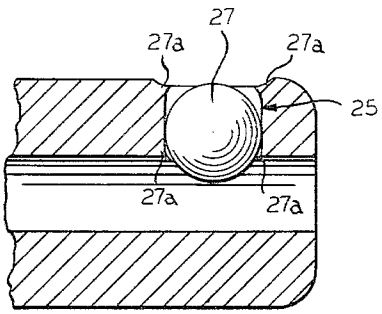



FIG. 5

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# ELECTRIC CABLE CONNECTOR

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This invention relates to electric cable connectors and more particularly to an "auxiliary electrical connector" that eliminates wear and tear and replacement of connectors that are difficult to replace.

It has always been a problem in the electrical connector field to avoid wear and tear on an electrical connector which is difficult to replace as almost invariably such a connector is located and disposed in an electrical system at a point where it receives considerable abuse and wear and tear. Therefore it is inevitable that such a connector must be replaced from time to time and it presents an inconvenience and hardship on the replacers thereof. For the purpose of this application, such a connector will be called a "critical connector."

Our invention is intended to eliminate wear and tear on a connector which is difficult to replace by shifting the wear and tear to an "auxiliary connector" which is easily replaced.

In accordance with our invention, we have provided an auxiliary electrical connector which has a means for firmly locking it to a critical connector to save wear and tear on said critical connector and means for unlocking said locking device conveniently in order that said auxiliary connector can be replaced with a minimum of inconvenience.

Although we have illustrated our auxiliary connector utilized in combination with a permanent male connector and critical female connector that is attached to a permanent lead, our invention should not be limited to this as we intend it to cover auxiliary connectors used with other types of male and female connectors.

It is therefore an object of this invention to provide an auxiliary connector which will eliminate or lessen the amount of wear and tear on a critical connector when associated therewith.

It is further an object of this invention to provide an auxiliary electrical connector which has a novel locking device that enables it to be associated with a critical connector in a locked relationship thereby eliminating or lessening the amount of wear and tear to said critical connector.

Still even further, it is an object of this invention to provide an auxiliary connector which can be associated with a critical connector to transfer the wear and tear from said critical connector by being firmly locked thereto and having the ability to be conveniently disassociated therefrom, thereby enabling it to be replaced conveniently.

Still even further, it is an object of this invention to provide an auxiliary connector having male connector portions projecting therefrom which firmly lock with a critical female connector portion that is difficult to replace and having a female connector portion on the other side thereof for connection to a male connector portion thereby eliminating or lessening the amount of wear and tear to said critical female outlet portion.

Other and further objects of this invention will become more readily apparent when taken in conjunction with the description and drawing wherein:

FIG. 1 is a side elevational view of our invention shown in disassembled relationship with a permanent male connector portion on one side thereof and a critical female connector portion permanently attached to a cable on the other side thereof;



FIG. 2 is a view taken on a plane passing through the line 2—2 and looking in the direction of the arrows in FIG. 1;

FIG. 3 is a view taken along the line 3—3 in FIG. 1 and looking in the direction of the arrows;

FIG. 4 is a partial half sectional view of our invention illustrated in FIG. 1; and

FIG. 5 is an enlarged view of a portion of our invention illustrated in FIG. 4.

Referring more in detail to the drawing, our auxiliary electrical connector is illustrated generally as a device having an outer body **10** which can be molded into different shapes but is preferably illustrated as rectangular. The body **10** is made of a molded insulating material such as rubber, and has a male connector portion **10***a* and a female connector portion **10***b*. The male connector portion **10***a* has a plurality of conductors **13** projecting therefrom and has a cavity portion **14** formed therein which is shaped to receive a connector such as the critical female connector portion **16**.

The conductors **13** extend from the end of the female connector portion **10***b* of the auxiliary connector and project outward of the end of the male connector portion **10***a*. The conductors are hollow and have a cylindrical portion **20** at one end sized to receive the conductor portions of a male connector such as the permanent male connector **31***a*. There are shoulder portions **21** intermediate the ends of the conductor portions **13**. And tapered bores **20***a* lead from the shoulder portions **21** to the other ends of the conductors **13** which are part of the male connector portion **10***a*. Indentations **18***a* in the conductor portions **13** enable the conductor portions to be positioned and retained in the body **10** of our auxiliary connector. Retaining means such as the projections **18***b* are disposed to be received by the indentations **18***a* when the conductor members **13** are properly positioned in the body **10** of the auxiliary connector. The tapered hollow portion **20***a* is threaded at **20***b* and it communicates with an opening **25** on the side thereof as illustrated in FIGS. 4 and 5. The opening **25** is cylindrical in shape and converging portions **27***a* at each end thereof to retain a spherical bearing **27** are disposed therein. A tapered pin means **22**, having a tapered pin member **22***a* that is integrally attached to a screw means **22***b*, is disposed in the conductor portions **13** as illustrated in FIG. 4. It will be seen that the screw means **22***b* has a head that is retained by the shoulder **21** and the screw means is sized to threadedly engage the threaded means **20***b* of the tapered hollow portion **20***a*, as illustrated in FIG. 4. And when the screw means **22***b* has its head resting against the shoulder **21**, the tapered pin **22***a* forces the bearing **27** to have a portion thereof projecting outward of the conductor portions **13**. With this type of structure, the bearing means **27** is forced against a critical female connector's inside surface to form a locking relationship. It should be realized, that although the opening **25** is cylindrical and has the converging portions **27***a* at each end thereof to retain the bearing **27**, different arrangements are contemplated in accordance with the shape of the bearing means **27** which can also be altered. Also the screw means **22***b* is made with any well known head which can be caused to turn because of its being able to be engaged by a screw driver or the like and access thereto is gained by inserting a tool through the portions **20**. The conductor portions **30** are provided as grounding means and also for the purpose of positioning the auxiliary connector properly for an aligning connection with the other connectors.

It will therefore be seen that when our auxiliary connector is intended for use, the male connector portion

10*a* is associated with the critical female socket **16** so that the conductor members **13** protruding therefrom are received therein. Then the tapered pin means **22** are inserted into the hollow openings through the cylindrical portions **20** until they are in alignment with the tapered hollow portion **20***a*. A tool can be used to cause the screw means **22***b* to threadedly engage the threaded means **20***b* until the head of the screw means **22***b* is in contact with the shoulder portion **21**. With this action, the tapered pin means **22** is forced downward through the tapered hollow portion **20***a* until the tapered pin **22***a* causes the bearing means **27** to project outward therefrom and into contact with the inner walls of the critical female connector **16** to create a locking relationship therewith. The auxiliary connector being locked into association with the critical female connector **16**, then has the female connector portions **10***b* thereof associated with the permanent male connector **31***a* by having the conductors thereof inserted therein.

It is manifest that the critical female connector portion **16** does not receive the wear and tear that it would have received had the auxiliary connector not been used. Instead of this, the female connector portions of the auxiliary connector receive the wear and tear and abuse that would have before been borne by the critical female connector member **16**. Therefore when it is discovered that the female connector portions are worn, the auxiliary connector can be replaced conveniently by disassembling it from the circuit. When this is desired the auxiliary connector is conveniently disassociated from the permanent male connector portion **31***a* and the tapered pin means **22** is disassembled by unscrewing it thereby unlocking the auxiliary connector from the critical female socket portion **16**. Then a new auxiliary connector can be assembled into the arrangement and in the same manner as before thereby extending the life of the critical female connector and obviating the necessity for replacing it with a great amount of inconvenience to the replacers thereof.

Although we have shown a specific construction of our device, we are fully cognizant of the fact that many changes in the shape and contour may be made without affecting its operativeness, and we reserve the rights to make such changes, as we may deem convenient without



departing from the spirit of our invention, or the scope of the claims.

We claim:

**1.** An auxiliary electrical connector to increase the usable life of a critical female connector comprising:

a male connector portion including at least one male prong, said male prong having a hollow portion extending lengthwise therewithin;

a side opening included in said one male prong and communicating with said hollow portion;

a bearing member restricted in said side opening, said side opening being dimensioned to permit said bearing member to protrude out therefrom into the hollow portion of said male prong when in a first operative position and to protrude out therefrom into the outside of said male prong when in a second operative position, said one male prong being insertable into said critical female connector when said bearing member is in said first operative position; and

a tapered pin removably inserted into said hollow portion of said one male prong, said tapered pin controlling the force applied by said bearing member against the inside of said critical female connector when said bearing member is in said second operative position.

**2.** An auxiliary electrical connector, as defined in claim **1**, wherein said hollow portion of said one male prong is tapered to receive said tapered pin, the positioning of said tapered pin within said tapered hollow portion controlling the force applied by said bearing means against the inside of said critical female connector.


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