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MOLDED INSULATOR AND SHELL THEREFOR RELEASABLY ATTACHABLE TO AN ELECTRICAL CONTACT, AND ACCOMPANYING FLASH SHIELD

Filed Dec. 19, 1968

Fig 1

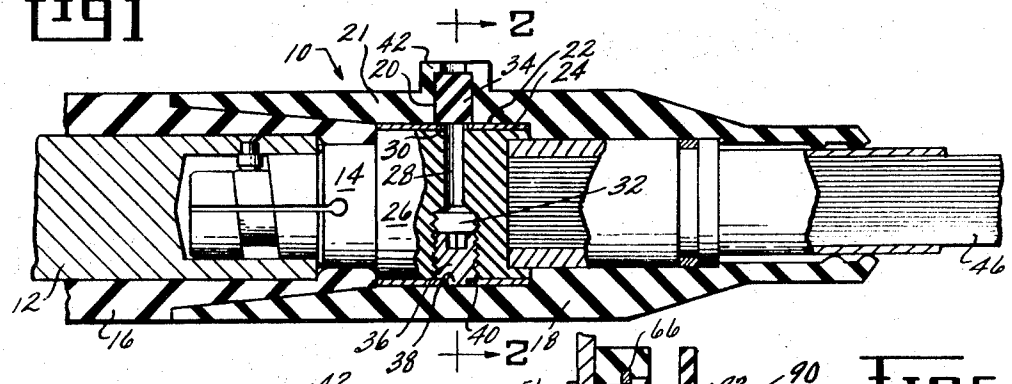


Fig 2

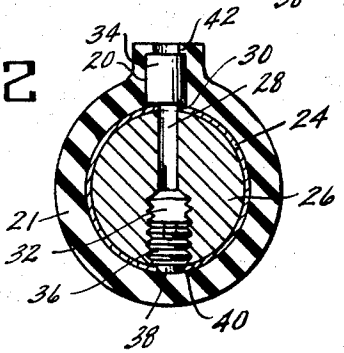


Fig 5

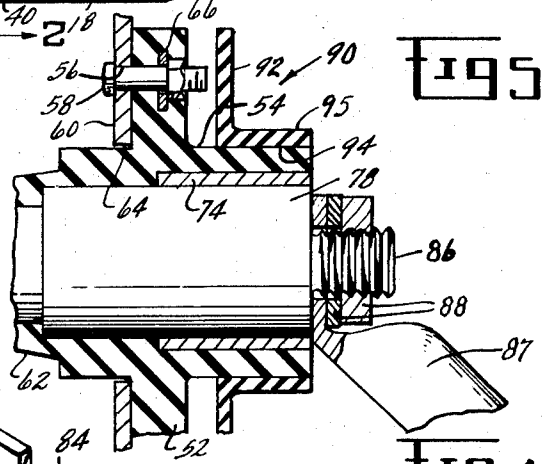


Fig 3

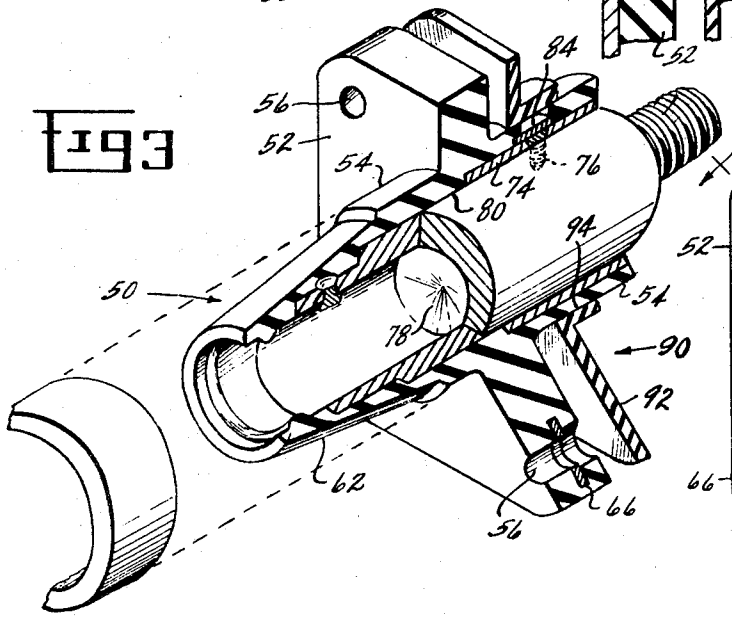
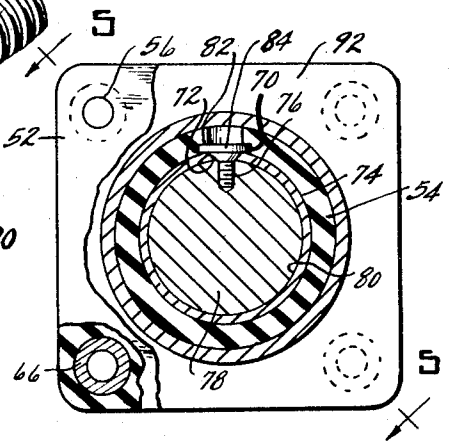


Fig 4



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MOLDED INSULATOR AND SHELL THEREFOR, RELEASABLY ATTACHABLE TO AN ELECTRICAL CONTACT, AND ACCOMPANYING FLASH SHIELD

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U.S. Cl. 339—94 8 Claims

ABSTRACT OF THE DISCLOSURE

The combination of a releasably attachable insulating molded insulator for an electrical conductor with an electrical contact comprising, in one form of the invention, a forceably removable plug mounted in a recess formed within the marginal wall of the sleeve for particular insulating of the contact upon attaching the sleeves thereto, a dog-point screw element having an extension on its outer end engaging a corresponding aperture in a metal ring molded to the inner wall of the insulator and which dog-point screw element is threadedly mounted in a radially extending cavity aligned with the plug disposed in the recess provided in the opposing wall of the insulator, whereby with omission of the plug form its recess, the contact is releasably attachable to the insulator before insulating same in such insulator by the plug. In another form of the invention embodied in a receptacle or sleeve coupled with a mounting flange, a screw is provided for disposition in such a recess, said screw extending into a ring molded to the receptacle or sleeve and into the contact thereby attaching the latter to the former, an insulating disc insertable in the recess above the head of the screw, and a flash shield coupled to the insulator for preventing arcing between the electrical contact and the mounting screws in the mounting flange. The shield is mounted about the receptacle or sleeve over an opening leading to the recess, thus, also functioning as a seal and insulator at the recess.

BACKGROUND OF THE INVENTION

Field of the invention

The field of art to which the invention is most likely to pertain is generally located in the class of devices related to electrical connectors. Class 339, Electrical Connectors, United State Patent Office Classification, appears to be the general area of art in which the claimed subject matter of the type involved here has been classified in the past.

Description of the prior art

Electrical connectors and their insulating bodies and the like, of the type involved here are disclosed in the following U.S. Letters Patent: Nos. 1,704,849 and 3,396,360.

SUMMARY

This invention relates to electrical connectors and their mating insulators and contacts, and particularly, relates to structure releasably attaching an electrical contact to a molded receptacle body thereabout and to a protective covering referred to as a flash shield for preventing arcing between the electrical contact and screws and/or nuts provided for a mounting flange molded with the insulator body and for covering a recess provided for releasably attaching contact to insulator.

An object of this invention is to provide for a simple yet highly efficient means by which an electrical contact is releasably attached to an insulator body therabouts and by which release, one from the other when one or

the other is damaged or for some other reason necessitating replacement of one or the other, is expeditiously obtained.

A still further object of the invention is to provide for an integrated mounting means or flange for an insulator.

Another object of the invention is to provide for protective means for a receptacle or sleeve whereby arcing is prevented or eliminated between an electrical contact and flanged mounting screws on the receptacle sleeve in which the connector is attached or otherwise fitted.

A further object of the invention is to provide a less expensive commercial connector.

A further object of this invention is to provide for a simple yet sturdy and long-lasting connector whereby the above objects are achieved, without the necessity of an otherwise complicated connector to achieve purposes which in the art has shown not to have been done heretofore.

These and other objects and advantages of the invention will become more apparent upon a thorough reading of the following description, the appended claims thereto and the accompanying drawing comprising one sheet.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a cross-sectional view of an electrical connector embodying the invention.

FIG. 2 is a view taken on line 2—2 of FIG. 1.

FIG. 3 is a perspective view, partly broken away, of another embodiment of the invention.

FIG. 4 is an elevational view of the flash shield and connector shown in FIG. 3.

FIG. 5 is a view taken on line 5—5 of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing in which reference characters refer to corresponding numerals recited hereinafter, reference character **10** (FIGS. 1, 2) refers generally to a device embodying the invention. Device **10** comprises a pair of electrical contacts **12, 14** mounted in their respective insulators or sleeves **16, 18**, and which are coupled or joined together in any suitable fashion generally known in the art and trade, an example of such coupling or joining being shown in U.S. Letters Patent Nos. 2,952,830 and 2,477,818. No further description as to such a coupling connection will be undertaken here, as same is not required for an understanding of the instant invention described herein.

In the formation of insulator or sleeve **18**, a recess **20** is molded in its wall **21** (FIG. 2), radially extending between its periphery and a central bore **22** formed therein. A metallic ring **24**, preferably of aluminum material, is bonded or otherwise secured, in conventional fashion, to the inner face of wall **21** forming central bore **22** of sleeve **18**. Contact **14** includes a body portion **26** slip-fitted in metallic ring **24**, upon assembly. Body portion **26** is provided with a diametrically formed bore **28** which is aligned with an aperture **30** of metallic ring **24** which in turn is aligned with recess **20** molded in sleeve **18**. A radially disposed enlarged threaded cavity **32** extends from the end of bore **28** opposing the end of bore **28** communicating with aperture **30** and recess **20**, and terminates at the peripheral wall of body portion **26**.

Before inserting a tightly fitting insulating plug **34** in recess **20**, preferably of rubber material, in the assembly of contact **14** to sleeve **18**, a means such as a dog-point screw element **36** is threaded into cavity **32** of body portion **26** previous to such assembly, and sufficiently backscrewed thereinto by means of an Allen-type screw wrench, or other type of wrench suited to fit the screw element, inserted through bore **28**, so that an extension **38** integrally formed therewith clears metallic ring **24** during

such assembly. After body portion **26** is slip-fitted to metallic ring **24** already secured in central bore **22** of sleeve **18**, the Allen wrench applied to element **36** rotates the latter radially outwardly so that extension **38** engages a coresponding second aperture **40** in ring **24**, thereby preventing relative axial or rotational movement between contact **14** and sleeve **18**, thus securely attaching the contact to the sleeve. Thereafter, plug **34** in inserted and mounted in recess **20**. As a result, both an insulating and fluid-tight condition is advantageously achieved at recess **20**, i.e., elimination of electrical discharge through recess **20** and prevention of fluid such as water seeping through recess **20** to contact **14**.

An annular lip **42** is mounted about recess **20** and is integrally formed of or molded in sleeve **18** during formation thereof. Lip means **42** prevents dislodgment of plug **34** from its functional position in recess **20**. Lip **42** provides the advantage of deliberate forceable entry and removal of plug **34** in the assembly and disassembly of device **10**. Thus, it is practically impossible for an electrical technician to be exposed to electrical discharge through recess **20** during electrical use of device **10**. On the other hand, ready disassembly in the event same is necessary is readily accomplished.

The assembly of device **10** should now be apparent from the above description. Molding of insulator or sleeve **18** is carried out in a conventional fashion of molding such elements, i.e., by making a mold therefor and applying customary molding techniques. After slipping cable **46** through the sleeve **18**, it is suitably attached to contact **14**, such as by soldering, and with bore **28** and dog-point screw element **36** threaded wholly into cavity **32** of body portion **26**, contact **14** is then retracted back into sleeve **18** until bore **28** aligns itself with aperture **30** and recess **20** and cavity **32** with aperture **40** of ring **22**. Dog-point screw element **36** is then screwed outwardly so that extension **38** engages aperture **40** in ring **24**, thereby providing for a releasably attachable connection between contact **14** and sleeve **18**. Plug **34** is thereafter forceably inserted through annular lip **42**, thereby completely insulating contact **14** at recess **20**. Consequently, in the event one or the other contact or sleeve is damaged or for some other reason required to be removed, rather than to replace an entire device, only the contact or sleeve is necessary to be replaced. Costs and downtime are reduced and no less efficient or unsafe condition arises which would otherwise demand installment of a different and entirely assembled insulator.

Turning to the embodiment illustrated in FIGS. 3–5, an insulator shell **50** is provided with an integrally formed mounting flange **52**, preferably rectangularly shaped in its extremities, molded at a right angle to the axis of shell **50** and mounted along a central portion of its major wall **54**. A plurality of holes **56** are included in flange **52**, each of which is disposed preferably immediately adjacent a corner of flange **52**. Corresponding nuts and screws **58** are utilized in holes **56** for mounting shell **50** upon the rear of a wall panel **60**, or the like, of a metallic junction box, with the male portion **62** of shell **50** projecting through an opening **64** provided in panel **60** and towards the front thereof so as to be in position for connection to associated insulator and contact members (not shown). As shown in FIG. 5, screws and nuts **58** securely attach shell **50** to panel **60**. Stiffeners **66** (FIG. 3) may be provided in flange **52** and about holes **56** for providing a degree of rigidity against which the tightness of screws and nuts **58** may react, if desired.

Rearwardly of flange **52** along the central portion of major wall **54**, a recess **70** (FIG. 4) is radially incorporated within molded shell **50**. Recess **70** is positioned in major wall **54** in alignment with a counter-sunk aperture **72** contained in a metallic ring **74** bonded or otherwise secured, preferably flushed as shown in FIGS. 3 and 5, to the inner face of major wall **54**, in a similar manner as is ring **24** with sleeve **18**. A screw **76** is disposed in

aperture **72** via recess **70**, with its body threaded into an electrical contact **78** fitted in bore **80** of the inner face of major wall **54** or of ring **74**, thereby releasably attaching together contact **78** and shell **50**.

Lip means **82** are formed over and about recess **70** so as to retain an insulating disc or plug **84** upon screw **76**, thereby providing for an insulating and fluid-tight condition at recess **70** of shell **50** for contact **78**, for the same reasons as stated above in regard to plug **34** and recess **20**.

In actual past practice, in different types of insulators and shells for an electrical connector arcing under heavy voltages has in many instances occurred between metallic surfaces, such as, for example, the rear of mounting screws and nuts and some exposed portion of the contact of the electrical connector. For example, as illustrated in FIG. 5, in past usage, a threaded rear **86** of an electrical contact such as **78** is exposed for connection of a copper terminal **87** thereto by means of a washer and nut means **88**. Terminal **87** is connected to a house line, and with voltages running into hundreds of volts or higher, arcing could occur between terminal **87**, means **88** and means **58**. Consequently, to avoid establishing such a dangerous condition, a flash shield **90** is coupled to shell **50** in cooperative relationship with flange **52** whereby arcing or flashing due to such voltage is eliminated. Flash shield **90** comprises a flat molded insulating membrane **92**, preferably of rubber material, and a central opening **94** for frictional mounting of the shield about major wall **54**. The areal dimensions of membrane **92** are at least co-extensive with those of flange **52**, so that upon cooperative relationship with flange **52**, the rear of metallic screws and nuts **58** is insulating from rear **86**, terminal **87** and means **88**, thus, shielding not only screws and nuts **58**, but also panel **60** from possible arcing from the area of exposed rear **86**. Membrane **92** is of such thickness as to completely cover recess **70**, and preferably includes the form of a flanged element **95** of sufficient width (as clearly shown in FIG. 5) to cover recess **70** rather than to include an unnecessary degree of additional material included as part of a uniform depth of material co-extensive with its areal dimensions. Thus, membrane **92** also functions as a seal and insulator over recess **70**. This is extremely advantageous when omission of plug or disc **84**, due to human failings or otherwise, would expose metallic screw **76** to the exterior of wall **54**.

Pursuant to the requirements of the patent statutes, the principle of this invention has been explained and exemplified in a manner so that it can be readily practiced by those skilled in the art to which it pertains, or with which it is most nearly connected, such exemplification including what is presently considered to represent the best embodiment of the invention. However, it should be clearly understood that the above description and illustrations are not intended to unduly limit the scope of the appended claims, but that therefrom the invention may be practiced otherwise than as specifically described and exemplified herein, by those skilled in the art, and having the benefit of this disclosure.

Therefore, what I claim as patentably novel is:

1. In an insulator and contact assembly for an electrical connector device, such assembly including an insulator, a contact, and a metallic ring bonded to said insulator and slip-fitted about said contact, the improvement comprising

a recess radially formed within the wall of the insulator,

insulating plug means disposed in said recess for establishing an electrical insulating and fluid-tight condition,

lip means mounted about said recess for preventing dislodgment of said plug means, and

means contained within the exterior limits of the wall of said insulator below said recess and plug, for attaching said contact to said insulator,

the attachment of said means made operable by omission of said plug from said recess.

2. The improvement of claim 1 in which said attaching means comprises

a diametrically formed bore in said contact,

a first aperture in said ring between said bore and recess,

a second aperture in said ring at the end of the bore opposite said first aperture, and

retractable means in said bore and having means for engaging said ring via said second aperture whereby said insulator and contact are releasably attached.

3. The improvement of claim 2 in which said retractable means comprises a threaded cavity and dog-point screw element threaded therein.

4. The improvement of claim 2 in which said engaging means comprises an extension radially extendable for secure engagement to said ring.

5. The improvement of claim 2 in which said rectractable means comprises a threaded cavity, dog-point screw element threaded in said cavity, and an extension mounted on said screw element for radial movement into secure engagement with said ring via said second aperture.

6. The improvement of claim 1 including a flange integrally molded to said insulator for mounting said assembly to a wall panel or the like.

7. The improvement of claim 1 incluing a mounting flange integrally molded to said insulator and a flash shield coupled to said insulator rearwardly of said flange and in cooperative relationship therewith for preventing arcing between an exposed portion of the contact and metallic means supporting said flange in an operable position for use of said assembly.

8. The improvement of claim 7 in which said flash shield covers said recess for additional protection against electrical discharge from said contact through said recess.

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ERNEST R. PURSER, Primary Examiner

U.S. Cl. X.R.

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