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3,484,541

ELECTRICAL CONNECTOR COVER

Filed Sept. 27, 1968

2 Sheets-Sheet 1

FIG. 1

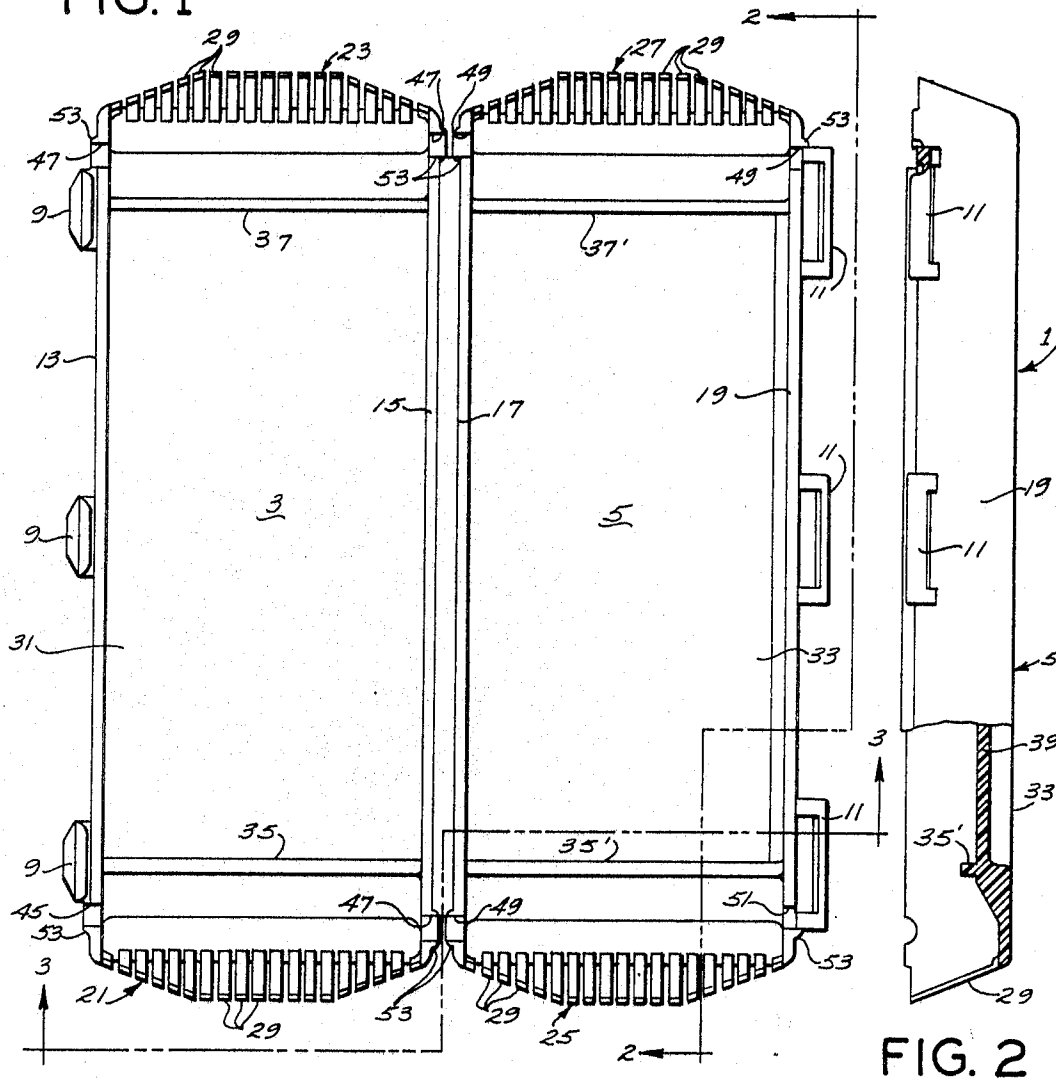


FIG. 2

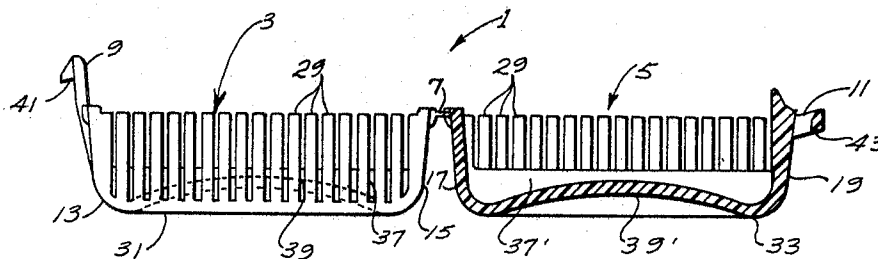


FIG. 3

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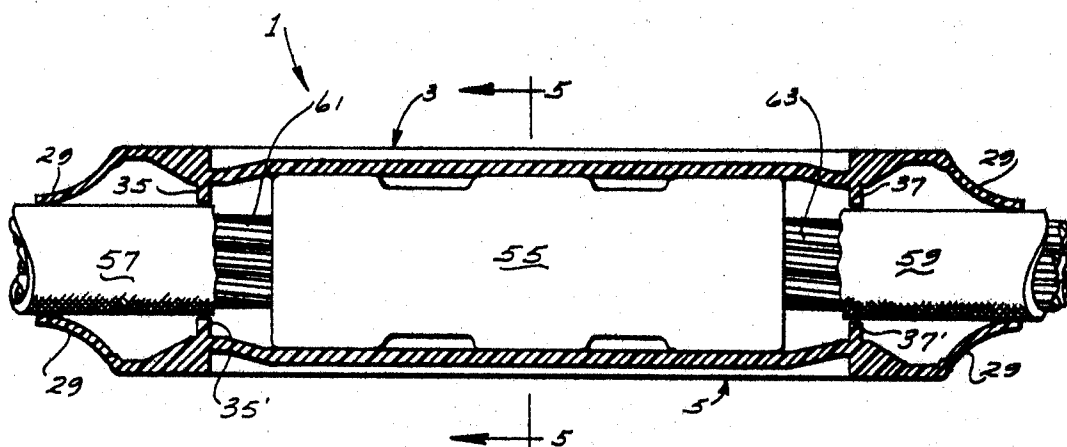


FIG. 4

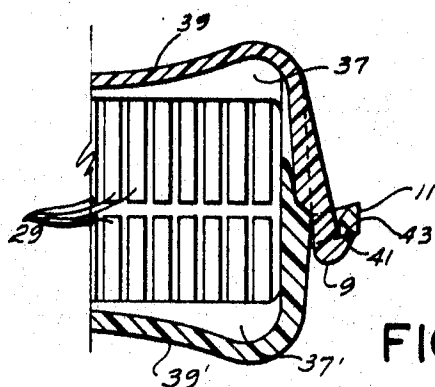


FIG. 6

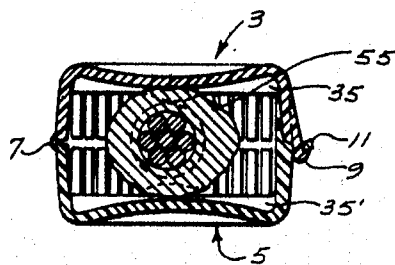


FIG. 5

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ELECTRICAL CONNECTOR COVER

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10 Claims

ABSTRACT OF THE DISCLOSURE

An insulating cover for an electrical connector. Cover halves of resilient insulating material are integrally hinged for latching together to enclose a connector. Each of the cover halves has a wall portion concave with respect to the exterior of the cover and transverse end stop ribs spaced from the ends thereof, the concave walls of the cover engaging the connector when the cover halves are latched together to impose frictional resistance against endwise or lateral shifting of the cover on the connector.

BACKGROUND OF THE INVENTION

The invention is in the field of insulating covers for electrical connectors, and relates particularly to two-section hinged covers for uninsulated crimped cable connectors.

Insulated electrical cables are conventionally connected together by crimping a crimpable connector to bared portions of the cables with a compression crimping tool. While the cables themselves may be electrically insulated other than at their ends where they are connected, usually such connectors are of bare, uninsulated metal. Thus, a shock hazard is presented where, for example, it is desired to employ such a connector to connect a tap conductor to a main line conductor to provide electrical service to a dwelling. Accordingly, it is desirable to place an insulating cover around the connector and bared margins of the conductors so that bare metal carrying high voltages is not exposed to inadvertent contact.

Although two-section hinged covers formed of a plastic insulating material have been developed, most have limited range-taking capability, i.e., they will accommodate at most only a few sizes of connectors and conductors. In addition, such covers have not provided sufficient longitudinal and lateral confinement of the connector and thereby permit the cover to slide or be pushed along the conductors until the connector abuts the end of the cover, or permit the cover to "rattle" as where it is blown about by wind. With such covers, great care must be taken to locate the connector in the center of the cover so that the cover cannot slip completely off of the connector or permit a bared portion of the connector to protrude from or be exposed at one end of the cover. Both of these conditions defeat the insulating purpose of the cover by permitting exposure of part of the uninsulated portions of the conductors or connector thereby increasing the possibility of shock hazard and the likelihood of corrosion and accidental electrical contact with external objects. In addition, prior art covers under some conditions may accumulate moisture and thereby defeat the insulating purpose of the cover and promote corrosion of the connector. Another disadvantage of some covers has been the tendency of their latches to become disengaged when the cover halves are under tension thus permitting the cover to fall off or become undesirably loose.

SUMMARY OF THE INVENTION

Among the several objects of the invention may be noted the provision of an improved insulating electrical

cover for tightly containing crimped connectors in a wide range of sizes; the provision of such a cover which snugly grips a connector to impose frictional resistance against endwise or lateral shifting of the cover on the connector; the provision of such a cover which positively limits endwise movement of the cover on a connector; the provision of such a cover which prevents latching together of the cover halves unless the cover is centered on the connector; and the provision of such a cover with latches having inclined mating surfaces for preventing disengagement under tension. Other objects and features will be in part apparent and in part pointed out hereinafter.

Briefly, a connector cover constructed in accordance with the present invention comprises a pair of engageable hinged cover halves formed of a resilient insulating material with means for latching the cover halves to define a compartment therebetween. In addition, the ends of the cover are adapted to provide openings conforming generally to the cross section of connected conductors extending through the ends. At least one cover half has a concave wall portion for engaging the connector to impose frictional resistance against endwise or lateral shifting of the cover on the connector. Each of the cover halves is elongate and is provided with a pair of end stops spaced from its ends for positively limiting endwise movement of the connector.

The concave wall of the present cover therefore securely engages the connector by flexing outwardly thereby avoiding lateral and longitudinal movement of the cover relative to the connector. Latches with inclined mating surfaces firmly lock the cover halves together, thereby eliminating inadvertent opening and dislodging of the cover.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a cover of the present invention in an open position;

FIG. 2 is a side view of the cover taken on line 2-2 of FIG. 1;

FIG. 3 is an end view of the cover taken on line 3-3 of FIG. 1;

FIG. 4 is a longitudinal section of the cover when closed with a connector therein, conductors extending through the cover ends from the connector;

FIG. 5 is a transverse section of the closed cover of FIG. 4, taken on line 5-5 of FIG. 4; and

FIG. 6 is a detail section of the latch assembly of the present cover.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and particularly to FIGS. 1-3, the present connector cover 1 is preferably formed as a unitary injection molding of a relatively flexible, resilient plastic or synthetic resin material such as polyethylene (e.g., such as obtainable under the trade designation 770M from The Dow Chemical Co.) and is comprised of first and second interengageable cover halves 3 and 5, respectively, joined together by an integral continuous flexible hinge 7. The cover 1 is adapted to be folded along the hinge 7 for engaging the cover halves 3, 5 to define a compartment interiorly therebetween for enclosing a connector. Latches constituted by a plurality of talons 9 and loop retainers 11 are formed respectively on the first and second cover halves 3, 5 for maintaining the cover closed. When closed, the cover has an elongate boxlike configuration having a generally rectangular cross section, as seen most clearly in FIGS. 4 and 5.

Each of the cover halves is generally boat-shaped with generally planar side wall portions 13, 15 and 17, 19,

respectively, and opposed end wall portions 21, 23 and 25, 27, respectively. The end walls 21, 23, 25 and 27 comprising the ends of the cover are fringed. That is, each is constituted by a plurality of resilient strips 29 extending toward the opposite cover half when the cover is closed so that the cover has ends adapted to provide openings conforming generally to the cross section of the insulated cables or conductors extending through the ends of the cover. The strips 29 thus engage the periphery of these conductors and are capable of accommodating a wide range of conductor diameters. Each of the cover halves is further constituted by a generally planar main wall surface including a longitudinal wall portion 31, 33. The longitudinal and side wall portions join in a smoothly-curved, rounded edge.

As best illustrated in FIGS. 2 and 3, the longitudinal walls 31 and 33 are provided with pairs of raised end stops comprising transverse raised ribs 35, 35' and 37, 37' spaced inwardly from the end wall portions 21, 23 and 25, 27 and extending across the width of the respective cover halves. Pairs of end stops register when the cover halves are latched. The end stops positively limit longitudinal movement of the cover relative to a connector enclosed within the compartment formed by cover 1 when it is closed. In addition, the registering end stops 37, 37' and 35, 35' interfere with a connector to prevent the cover from being closed if the connector is not placed centrally in the compartment between the end stops. Because of the deeper section of the end stops 35, 35', 37, 37' and because they have sufficient thickness so that they are relatively rigid, the end stops are stiff enough to resist being bent over by a connector if it is attempted to close the cover with the connector interfering with the registering pairs of end stops.

Each of the cover halves has a wall portion 39, 39' which is bowed laterally between the end stops 35, 37 and 35', 37', respectively. Each concave wall portion 39, 39' has longitudinal edges which curve smoothly into and join the side wall portions generally in the plane of each cover half including its respective longitudinal wall portions 31, 33. The concave wall portion of each cover half is therefore concave with respect to the exterior of the cover and these portions are in substantial registry with each other when the cover is closed thereby to engage the connector and impose frictional resistance against endwise or lateral shifting of the cover on the connector. Although each of the cover halves is shown as having a concave wall portion, it will be understood that only one cover half might be provided with a concave wall portion with some reduction of the range-taking capability of the cover with respect to the sizes of connectors with which it is to be used.

FIGS. 5 and 6 illustrate latches for the cover halves which are provided with inclined mating surfaces 41 and 43 formed respectively on the talons 9 and loop retainers 11 comprising the latches. The talons 9 ride up the inclined mating surface 43 of the loop retainers 11 when the opposing cover halves are forced apart by the engagement with a connector of the concave wall portions of the cover halves. Thus the latches are even more tightly latched for resisting disengagement under tension. Positive latching of the cover halves is therefore assured and there is avoided the possibility of separation under tension as is common with other conventional latching means. It should be noted that the pair of latches toward the ends of the cover halves are positioned in transverse alignment with the end stops 35 and 37 (see FIG. 1) to prevent latching if a connector is interposed between registering end stops.

Each of the cover halves is provided with drainage notches 45, 47 and 49, 51 adjacent an edge and disposed at the opposite ends of the cover. The notches are adapted to mate upon closing of the cover halves to form a plurality of drainage apertures. Each of the notches 45, 47 and 49, 51 is provided with a raised peripheral boss 53

for preventing water running along the surface of the cover from entering the compartment through the apertures.

Referring now to FIG. 4, there is illustrated a splice type compression connector 55 which interconnects conductors 57 and 59. As is conventional, ends 61 and 63 of conductors 57 and 59 are stripped of insulation and are inserted into the opposite ends of connector 55, the latter being formed of a malleable electrically conductive metal such as aluminum. Before compression, connector 55 has a substantially constant thickness. After conductors 57, 59 are placed in position, any conventional compression tool is fitted over connector 55 and manipulated to crimp the connector body securely to the bared ends 61 and 63 located internally thereof. During this crimping operation, portions of the connector body are upset, i.e., swaged, but other portions are not, these latter portions having substantially the same thickness as before the crimping operation. To apply cover 1 to the crimp-connected conductors 57 and 59, it is placed over the connector 55 so that the connector is between the end stops 35, 37 in either of the cover halves. The other cover half is closed over connector 55 and latched by talons 9 and loop retainers 11. The conductors 57 and 59 extend outwardly through the openings provided by the fringed end walls 21, 25 and 23, 27 formed by the resilient strips 29.

The cover may be produced in several different sizes, each accommodating a wide range of connector types and sizes. For any given cover size, the connectors with which the cover may be used must have a minimum thickness which should be greater than the distance between the innermost edges of the registered pairs of end stops 35, 35' and 37, 37'. When a connector 55 is enclosed when centrally located between the end stops 35 and 37, endwise movement of the cover is avoided because the crimped connector is of greater thickness than the opening between each pair of end stops. Therefore, when a connector 55 is disposed within the cover, the connector bears against the concave walls 39 forcing them to flex or bulge outwardly as in FIG. 4. The concave walls 39 snugly grip the connector 55 within the compartment and thereby impose frictional resistance against endwise or lateral shifting of the cover on the connector due to the wind or other causes. Furthermore, since the latches 9 and 11 are in transverse alignment with the end stops 35 and 37, the user, such as a lineman, will be unable to latch the cover halves together unless the connector 55 is within the desired zone between end stops 35 and 37. When the cover is thus correctly positioned the talons 9 and loop retainers 11 may be latched. Since the connector 55 is of greater thickness than the internal dimension of the compartment the cover halves are tensioned oppositely towards an open position. This causes the inclined mating surfaces 41, 43 of the latch talons 9 and 11 to wedge firmly together to latch the cover halves securely.

It is to be understood that the covers of the present invention are useful with many types of crimped connections as well as bolt-type connectors, and that parallel connections, such as tap connections to a main conductor as well as splice connections, are conveniently insulated by covers of this invention.

In view of the above, it will be seen that the several objects of the present invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the gist of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative.

What is claimed is:

1. An insulating cover for an electrical connector comprising a pair of interengageable cover halves formed of a resilient insulating material, means for latching said cover halves together to define a compartment interiorly

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therebetween, said cover having ends adapted to provide openings conforming generally to the cross section of conductors extending through said ends from the connector, at least one cover half having a pair of end stops spaced from its ends for limiting endwise movement of the cover on the connector, the last said cover half having a wall portion concave with respect to the exterior of the cover and extending substantially from end stop to end stop for engaging the connector to impose frictional resistance against endwise or lateral shifting of the cover on the connector.

2. A cover as in claim 1 wherein said cover halves are hinged together.

3. A cover as in claim 1 wherein each of said cover halves has end stops and has a concave wall portion extending substantially from end stop to end stop, each of said wall portions being bowed laterally relative to the length of said conductor to provide opposing concave wall portions.

4. A cover as in claim 3 wherein said cover, when said cover halves are latched together, is generally rectangular in cross section and said concave portions and ribs are in substantial registry.

5. A cover as in claim 4 wherein the ends of the cover are fringed.

6. A cover as in claim 4 wherein said latching means comprises a plurality of talons formed on one of the cover halves and a corresponding plurality of loop retainers formed on the other of said cover halves, at least one mating pair of talons and loop retainers being laterally aligned with one of said end stops.

7. A cover as in claim 1 wherein each of said end stops comprises a transverse rib spaced inwardly from an end

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of the cover half and extending across the cover half, the corresponding end stops of each of the cover halves registering when the cover halves are latched.

8. A cover as in claim 7 wherein said end stops have a thickness sufficient to be relatively rigid and the space between opposing end stops when the cover halves are latched together is less than the diameter of the connector whereby the cover halves are prevented from being latched together if the connector is interposed between the registered end stops.

9. A cover as in claim 1 wherein said latching means comprises a plurality of talons formed on one of said cover halves and a corresponding plurality of loop retainers formed on the other of said cover halves, the talons and retainers having inclined mating surfaces for preventing disengagement of the latches under tension.

10. A cover as in claim 1 wherein each of said cover halves is provided with at least one drainage notch at an edge, the notches mating when the cover halves are latched to form a drainage aperture.

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U.S. Cl. X.R.,

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