

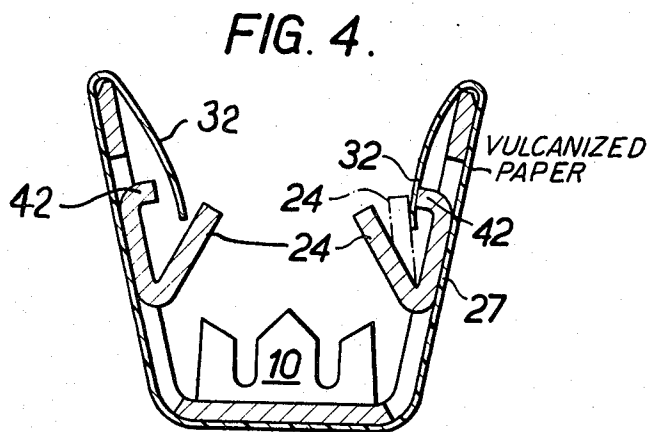
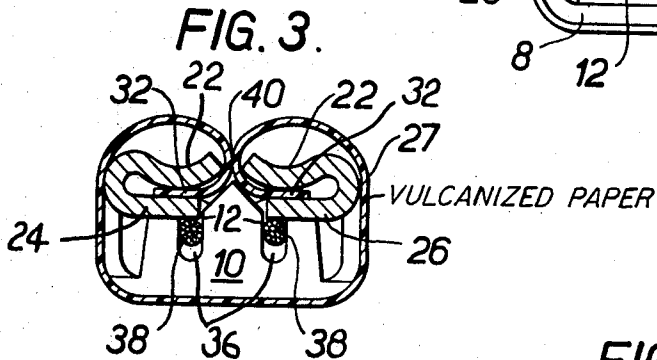
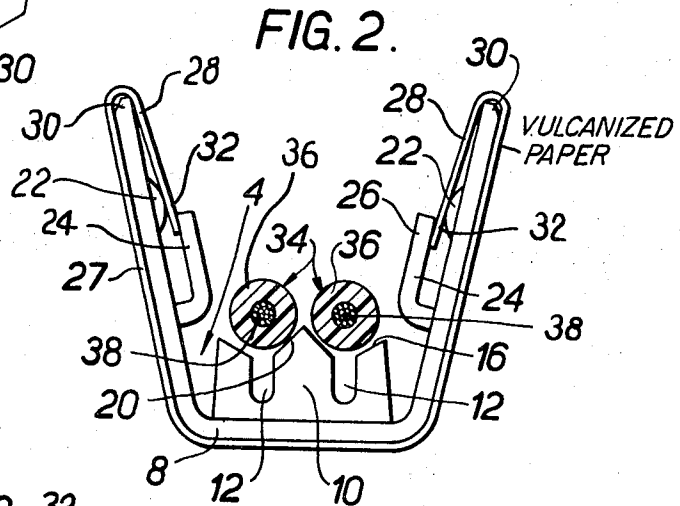
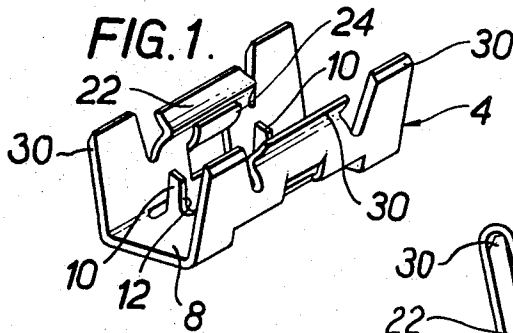
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ELECTRICAL CONNECTOR HAVING UNBONDED INSULATION THEREON

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1

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## ELECTRICAL CONNECTOR HAVING UNBONDED INSULATION THEREON

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10 Claims

### ABSTRACT OF THE DISCLOSURE

An electrical connector has a generally U-shaped configuration with insulation covering an exterior surface in an unbonded manner, the insulation being held in place on the connector via gripping means provided by the connector.

This invention relates to electrical connectors and more particularly to electrical connectors having insulation held in place thereon via gripping means provided by the connectors.

It is known to provide an essentially U-section metal ferrule for crimping to a wire, with a film of insulating material, for example polyethylene terephthalate which is bonded to the outer surface of the ferrule. A disadvantage of this unknown electrical connector is that the bonding of the film to the ferrule is unduly time-consuming.

According to the invention, an electrical connector comprises an essentially U-section metal-crimping ferrule, the outer surface of which is covered with a film of insulating material which extends into the ferrule and is gripped within the ferrule between portions of the ferrule to retain the film in position on the ferrule. The portions of the ferrule may be bent out therefrom and co-operate with one another to grip the free longitudinal marginal portions of the film, being formed for example by lugs or lugs co-operating with ribs. In the interests of economy the film may be made of vulcanized paper.

The ferrule may have internal slots into which insulated electrical wires are forced by side wall portions of the ferrule to produce electrically conductive contact between the electrically conductive core of the wires and the walls of the slots, the side wall portions co-operating with further internal portions of the ferrule to grip the longitudinal marginal parts of the film.

An object of the invention is to provide an electrical connector on which insulating means is disposed and held in position thereon by gripping means provided by the connector.

Another object is the provision of gripping means of an electrical connector which grips ends of insulation means to hold the insulation means in position along an exterior surface of the connector.

A further object is to provide gripping means of an electrical connector which hold insulation means in position on the connector as well as defining stuffing means for stuffing electrical conductors to be terminated in the connector within conductor-engaging area means of the connector.

For a better understanding of the invention, reference will now be made by way of example to the accompanying drawing, in which:

FIG. 1 is a perspective view of an essentially U-section metal crimping ferrule;

FIG. 2 is an enlarged end view of an electrical connector according to the invention and comprising the

2

ferrule shown in FIGURE 1, two insulated electrical wires in the ferrule being shown in section;

FIG. 3 is a cross-sectional view through the connector when crimped to the wires; and

FIGURE 4 is a cross-sectional view illustrating a modification of the connector.

Reference will now be made to FIGURES 1 and 2. An essentially U-section metal-crimping ferrule 4, for example of brass comprises a base 8 having struck therefrom two upstanding tongues 10. Each tongue 10 has a pair of spaced notches 12 opening into its upper (as seen in FIGURES 1 and 2) edge which has inclined portions 16 and 20 forming wire-guiding mouths. The side walls of the ferrule 4 have bent-in ribs 22 and struck-out tongues 24, the free ends 26 of which overlap the ribs 22.

As shown in FIGURE 2, the outer surface of the ferrule 4 is covered by an insulating film 27 which may, in the interests of economy, be of vulcanized paper. The film 27 has portions 28 which overlap the free longitudinal ends 30 of the ferrule 4 and extend within the ferrule and between the tongues 24 and ribs 22. The tongues 24 have been bent towards the ribs 22 to grip the free longitudinal marginal parts 32 of the film 27 between the tongues 24 and ribs 22. The film 27 is thus retained tightly wrapped about the ferrule 4.

In use, two insulated electrical wires 34 having insulation 36 and electrically conductive metal cores 38 are placed in the ferrule 4 so as to lie on the edge portions 16 and 20 of the tongues 10. A pair of connector-crimping dies (not shown) are closed about the connector to compress it to the shape illustrated in FIGURE 3, in which the side walls of the ferrule 4 have been curled over so that each rib 22 and along with ends 30 along one side of ferrule 4 drives one of the wires 34 into one of the notches 12 so that the electrically conductive core 36 of the wires 34 makes electrical contact with the walls of the notches 12.

As shown in FIG. 3, the marginal parts 32 of the film 27, which remain gripped between the tongues 24 and ribs 22, are carried down along the notches 12 and continue to hold the film 27 firmly about the ferrule 4, portions 40 of the film engaging one another centrally of the ferrule 4 and throughout its length.

According to a modification of the connector just described, the ribs 22 are replaced by inwardly bent lugs 42 (FIGURE 4), the tongues 24 being bent as indicated by broken lines in FIGURE 4 to grip the marginal parts 32 of the film 27.

A further advantage of the use of vulcanized paper as the film is that this material has little or no plastic memory so that the film tends to remain in position about the side walls of the ferrule.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiments of the invention, which are shown and described herein, are intended as merely illustrative and not as restrictive of the invention.

The invention is claimed in accordance with the following:

1. An electrical connection comprising a U-shaped metal crimping ferrule crimped about a wire electrically to connect the ferrule to the wire, an insulating film surrounding the ferrule, first and second longitudinal marginal portions of the film extending within the ferrule, a first pair of projections extending from a first wall of the ferrule and gripping the first longitudinal marginal portion between smooth surfaces of the projections of the first pair, a second pair of projections extending from a further wall of the ferrule and gripping the second mar-

3

ginal portion between smooth surfaces of the second projections, the first and second marginal portions lying in spaced substantially coplanar relationship within the ferrule.

2. A connector according to claim 1, in which the walls of the ferrule are joined by a base member presenting slots containing insulated wires, the wires being held in position in the slots by one projection of each pair, the other projection of each pair pressing on the one projection of each pair via the longitudinal marginal portion which is gripped between the projections of that pair.

3. A connector according to claim 1, in which the insulating film is made of a paper material.

4. An electrical connector comprising a generally U-shaped member having leg members connected together by a base member, a dielectric member extending along an exterior surface of said U-shaped member and having sections extending along inner surfaces of said leg members, and gripping means provided by said leg members inwardly from outer edges thereof gripping said sections thereby securing said dielectric member in position of said U-shaped member and providing an insulated connector, said gripping means defining tongue portions struck out from said leg members and being directed toward free ends of said leg members, said leg members adjacent said free ends and extending along said tongue portions providing ribs directed inwardly toward said tongue portions.

5. An electrical connector according to claim 4 wherein said base member includes upstanding tongue members having conductor-receiving slots, said leg members from upper ends of said tongue members to said free ends thereof defining stuffing means for stuffing insulated electrical conductors in said conductor-receiving slots with said slots stripping through insulation on the conductor and electrically engaging conductor means thereof.

6. An electrical connector according to claim 4 wherein said sections extend along the entire lengths of said leg members.

7. An electrical connector comprising a generally U-shaped member having leg members connected together

4

by a base member, a dielectric member extending along an exterior surface of said U-shaped member and having sections extending along inner surfaces of said leg members, and gripping means provided by said leg members inwardly from outer edges thereof gripping said sections thereby securing said dielectric member in position on said U-shaped member and providing an insulated connector, said gripping means defining tongue portions struck out from said leg members and being directed toward free ends of said leg members, and lugs struck out from said leg members and being directed inwardly toward said tongue portions.

8. An electrical connector comprising a generally U-section crimping ferrule having a pair of side walls connected together by a base member, a film of insulating material covering an outer surface of the ferrule and having portions extending along inner surfaces of the side walls, and projection means extending from each side wall and spaced inwardly from ends thereof, said projection means extending in a general direction toward the ends of the side walls and gripping said portions of said film between said projection means and said inner surfaces of said side walls.

9. A connector according to claim 8, in which the projection means comprise lugs struck out from the side walls and ribs bent out from the side walls.

10. A connector according to claim 8, in which the film is made of a paper material.

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