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3,309,645

MULTIPLE CONNECTOR

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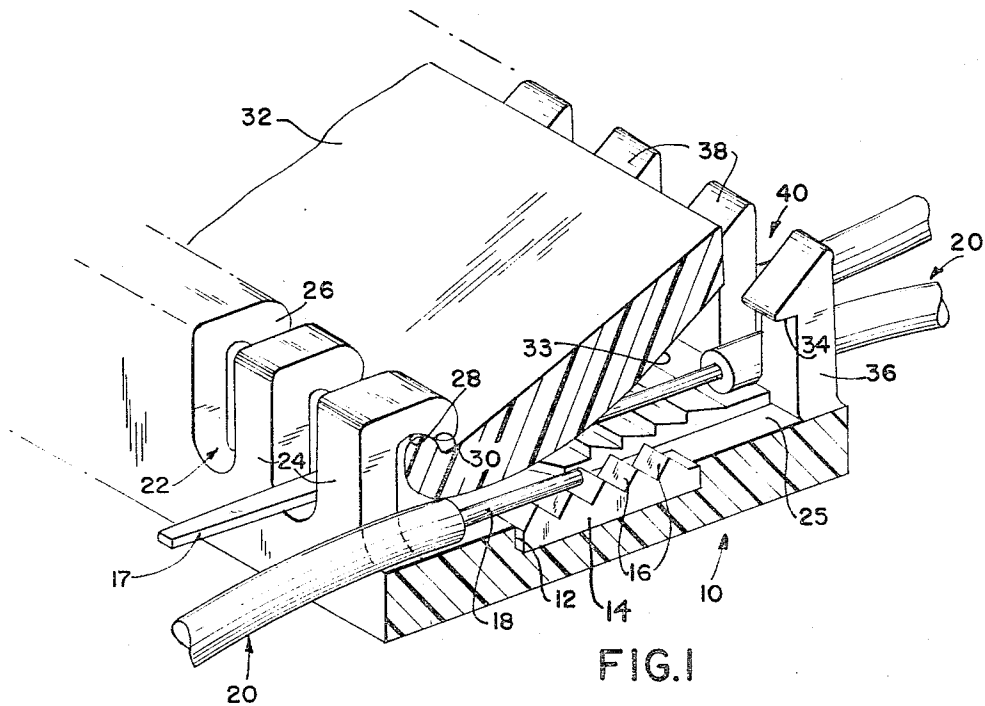


FIG. 1

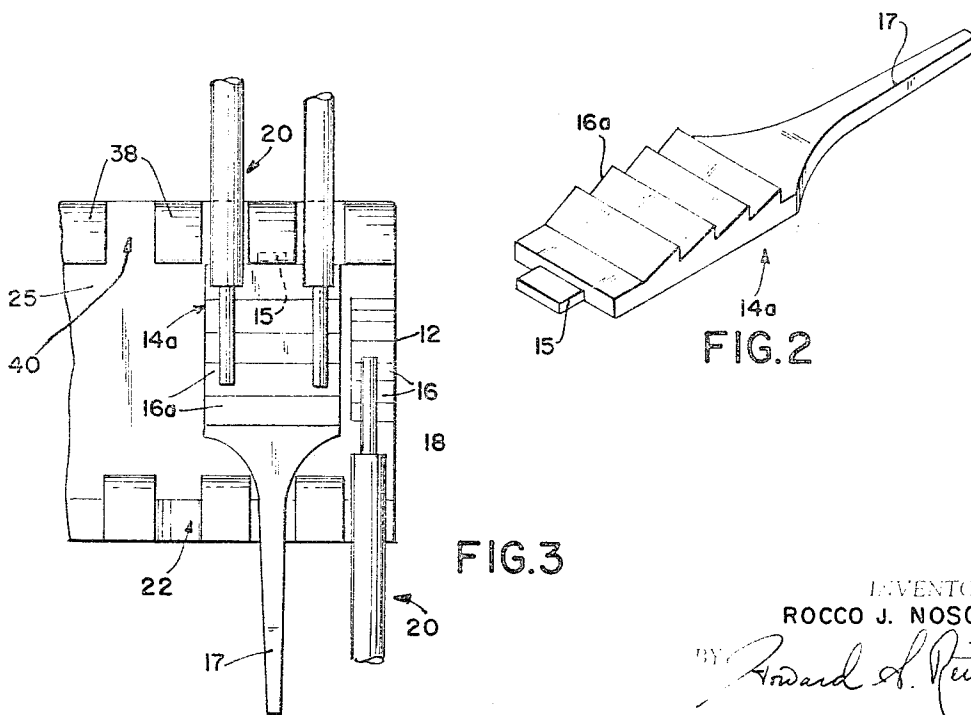


FIG. 2

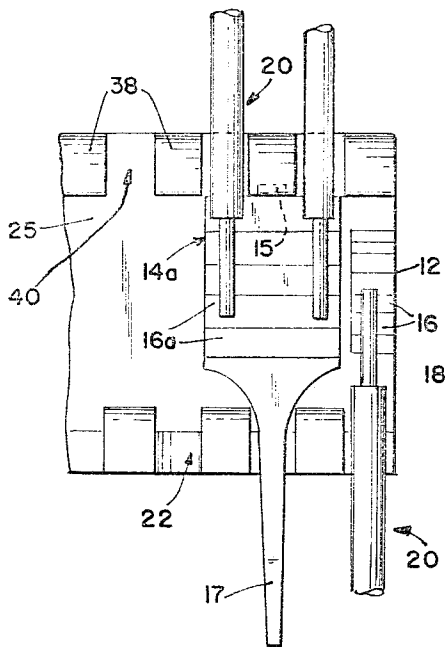


FIG. 3

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MULTIPLE CONNECTOR

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This invention relates to a multiple connector, and more particularly to an insulation piercing connector for establishing multiple electrical connections simultaneously.

One object of the invention is to provide a quick acting insulation gripping and electrical contacting means for terminating a plurality of insulated wires.

Other objects are to provide such a connector which will simultaneously pierce the insulation coating of a plurality of wires, which will physically support small diameter wires, which will supply an electrical contact therefor, which can be easily and quickly opened to replace or change electrical connections; and to provide a connector structurally formed entirely of insulation material except for the electrical contact means.

These and other objects and features of this invention will become more apparent by reference to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a hinged multiple connector, with one end shown in section, opened to receive a plurality of wires;

FIG. 2 is a perspective view of one form of individual contact element adapted for use in the connector of FIG. 1; and

FIG. 3 is a top plan view of the connector of FIG. 2 with the hinged lid removed for clarity.

Referring now more in detail to the drawings, reference numeral 10 designates generally a plastic insulating base having a floor surface 25 and an opening 12 for receiving a metal contact insert 14 or 14a which is provided with teeth or edges 16 or 16a adapted to pierce the insulation 20 of a wire lead 18 to establish electrical contact therewith.

The base 10 is further provided along one edge with a series of openings 22 between which are positioned upright portions 24 having extensions 26 formed on the undersides thereof; extensions 26 define bearing grooves 28 for receiving the bearing portion 30 of the lid 32.

The edge of the base 10 opposite uprights 24 is provided with latches 34 which are formed on upright portions 36 for retaining the lid 32 in closed position.

The upper surface of the latch is tapered to form a cam surface 38, to permit deflection of uprights 36 when lid 32 is pressed downward so that the lid may snap underneath the latch 34. The upright post 36 is made sufficiently resilient to accomplish this snap action.

Between upright portions 36, slots or openings 40 may be provided for extending wire leads 18 therethrough, if desired. Each lead may be individually terminated with its own metal contact insert, or a plurality of leads may be connected to a common insert if desired. Alternatively a combination of individual and multiple leads may be so connected as shown in FIGURE 3.

Contact insert elements 14a may be seen to include a projecting tongue or tab portion 17 to which external conductors may be connected for providing auxiliary connections to the connector. Positioning of the contacts within the connector is aided by positioning the tongue 17 in an opening 22, and may be further aided by the provision of a locating tab 15 at the opposite end of the insert adapted to be received in an appropriately located recess on the base 10.

In operation, the lid 32 may be removed from the

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base and the insulated wires positioned in their respective slots. The bearing 30 of the lid 32 is then inserted in bearing seat 28 and the lid snapped shut beneath latches 34 to grip the conductors between the lid surface 33 and floor 25. Gripping in this manner may cause the teeth 16 of the insert to pierce the insulation of unstripped wires, or to firmly engage the bared ends of the wires as shown, so as to thereby establish the desired contact and connection.

The hinge action makes possible control of motion and forces so as to limit penetration of the leads, thereby preventing damage to fine wires.

The flat underside surface of the lid grips the wire insulation ahead of the weakened pierced areas to provide firmer support and to relieve stresses on those areas. Each groove may accommodate two wires if a common electrical contact is desired.

The hinged lever design of the connector of this invention makes possible a quick-acting means for terminating a plurality of insulating wires which may be of particularly fine diameter. The design further provides an insulating support for the wires ahead of the piercing means in order to eliminate any pull on the weakened pierced areas. The snap action feature described in detail above makes the connection operation automatic, yet renders the finished connection easy to open, if desired.

The invention has thus been described but it is desired to be understood that it is not confined to the particular forms or usages shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of the invention; therefore, the right is broadly claimed to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which objects of this invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to obtain these objects and accomplish these results.

I claim:

1. An electrical connector for a plurality of electrical conductors, comprising:
 - a base element of dielectric material having a base surface portion;
 - a lid element of dielectric material hingedly coupled to said base element for permitting pivotal motion of said lid element toward and away from said base surface portion;
 - a plurality of electrical contact elements mounted to said base surface portion in opposed relation to said lid element;
 - a first plurality of integral upright projections on said base element extending substantially uprightly from said base surface portion in parallel spaced-apart relationship and forming a separable hinged coupling between said base element and said lid element;
 - a second plurality of spaced-apart integral projections on said base element, extending uprightly from said base surface portion in substantially parallel spaced-apart relation to said first plurality of integral projections, and having resilient detent means thereon for releasably securing said lid element in engagement with said contact element to grip a conductor therebetween;
 - said first plurality of integral projections together defining a plurality of conductor-receiving grooves between adjacent projections for receiving conductors therein;
 - said second plurality of integral projections together defining a plurality of conductor-receiving grooves

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between adjacent projections for receiving conductors therein;

each of said electrical contact elements being positioned between said first and second pluralities of integral projections, in substantial alignment with a plurality of said conductor-receiving grooves;

a conductor-engaging surface portion on each contact element formed of a plurality of substantially parallel transversely disposed edge portions which together define a surface area having a transverse width sufficient to engage two conductors positioned in adjacent conductor-receiving grooves in side by side relationship;

whereby a plurality of conductors disposed in said receiving grooves may be clamped in intimate engagement with said contact elements by pivoting said lid element into engagement with said detent means.

2. The electrical connector of claim 1 wherein said contact elements each include an integral projecting tang

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at one end thereof, positionable in said conductor receiving grooves so as to extend beyond said base element for permitting external electrical connections to be made thereto, and a detent portion at another end thereof, adapted to engage said base portion for positioning said contact element relative thereto.

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