

[54] **ELECTRICAL TERMINAL FOR CONNECTION TO A CONDUCTOR OF A CABLE**

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339/270 R

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272 R, 272 U, 271

[56]

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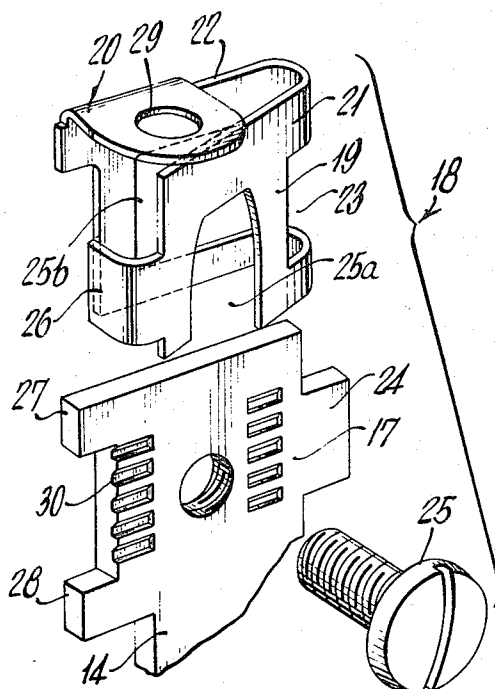
ABSTRACT

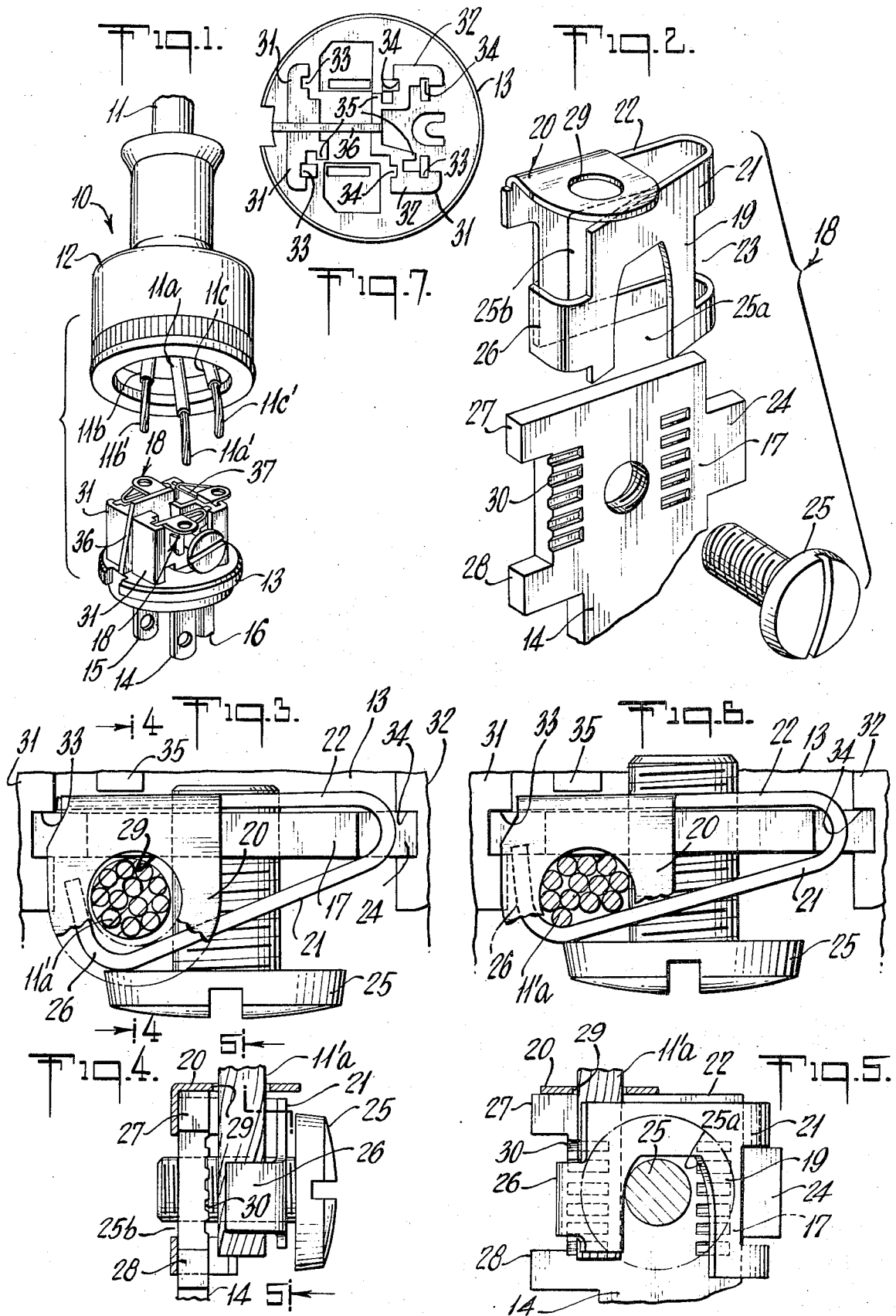
An electrical terminal connects each conductor of a multi-conductor cable to spaced contacts of an electrical connector.

The cable contains a number of conductors and the connector has a corresponding number of contacts. Each of the contacts has a terminal which is connected to one of the conductors. Each of the terminals includes a clamp and a guide which are mounted on an end of the contact. The clamp is a U-shaped member formed of sheet metal and secures a bare end of the conductor in electrical engagement with the end of the contact.

The guide is formed with the clamp and directs the bare or stripped end of the conductor into position for engagement by the clamp. A terminal screw carried by the contact urges the clamp in engagement with the bare end of the conductor. A headed end of the terminal screw is accessible from one side of the connector.

10 Claims, 7 Drawing Figures





ELECTRICAL TERMINAL FOR CONNECTION TO A CONDUCTOR OF A CABLE

The present invention relates to an improved electrical terminal for connecting a conductor of a cable to a contact element of a connector.

The present invention relates, more particularly, to an electrical terminal of the clamping type for connecting a conductor of a multi-conductor cable to a contact element of a connector.

An object of the invention is to provide a terminal which will simplify the electrical connection of a conductor to a contact element of an electrical connector. In general, the contact elements of a connector are spaced apart and have terminal ends which face in different directions. Difficulties are frequently encountered in connecting the individual conductors of a multi-conductor cable to the contact elements, particularly when heavy gauge wire is used. In addition, the customary screw type terminals require the ends of the conductors to be looped around terminal screws. This requires adroit manipulation of the conductors and damage to the conductors may result from such manipulation. A terminal embodying the present invention eliminates such problems and enables the connections to be made by an unskilled person in a simple and easy manner.

Other objects and advantages of the invention will become apparent and will be better understood from the following description and the accompanying drawing in which:

FIG. 1 is an exploded view in perspective illustrating a connector having contacts with terminals embodying the invention and a cable for connection thereto;

FIG. 2 is an exploded view in perspective illustrating parts of one of the terminals shown in FIG. 1 and which is drawn to an enlarged scale;

FIG. 3 is a fragmentary plan view in partial section of one of the terminals shown in FIGS. 1 and 2 with an end of a conductor in position for connection thereto and which is also drawn to a somewhat enlarged scale;

FIG. 4 is a side view of the terminal shown in FIG. 3 in partial section taken along line 4—4 of FIG. 3 and which is drawn to a reduced scale; 0

FIG. 5 is a front view of the terminal shown in FIG. 4 in partial section taken along line 5—5 of FIG. 4;

FIG. 6 is a plan view of the terminal shown in FIG. 3 with the parts in different positions; and

FIG. 7 is a top plan view of the connector body shown in FIG. 1 without the contacts.

Referring to the drawing in detail, there is an electrical connector 10 for connection to an end of a multi-conductor cable 11. The cable 11 contains a number of insulated conductors or wires 11a, 11b and 11c and the insulation is stripped from the ends of the conductors exposing bare ends 11a', 11b' and 11c'. A removable closure cap 12 is slidably carried by the cable 11 and protects connections made to the ends of the conductor.

A rigid insert 13 molded of a suitable insulating material such as nylon fits inside the cap 12 and supports spaced contacts 14, 15 and 16 corresponding in number to the conductors of the cable and which are connected to the respective conductors of the cable. The contacts 14, 15 and 16 extend through spaced openings in the insert 13. In the form illustrated, the lower ends

of the contacts 14 and 15 are parallel spaced blades and the lower end of the contact 16 is a U-shaped grounding prong. If desired, one of the blades of the contacts 14 and 15 may be disposed at right angles or in tandem to the other blade.

The male blades and the prong on the lower ends of the contacts 14, 15 and 16 are supported on the insert 13 in the usual positions for engagement with mating female contacts of a receptacle (not shown). In this connection, it will be understood that the male blades and the prong may be replaced by female contacts if desired.

Each of the contacts 14, 15 and 16 has an enlarged upper end 17 extending upwardly from the insert 13 and each of the ends 17 has a clamping member or terminal 18 thereon for connection to one of the conductors 11a, 11b or 11c of the cable 11.

The terminals 18 on the contacts 14, 15 and 16 are similar in construction and operation. Hence, for purpose of brevity, only one of the terminals 18 will be described in detail here. As shown best in FIG. 2, the terminal 18 mounted comprises a U-shaped clamp 19 and a guide 20 which are formed of sheet metal and may be slipped in place sideways on the end 17 of the contact.

The U-shaped clamp 19 has outwardly diverging resilient legs 21 and 22 which extend along opposite faces of the enlarged end 17 of the contact. An opening 23 at the bottom or bight connecting the legs 21 and 22 permits a projection 24 on one side of the end 17 of the contact to extend through the bight or bottom of legs. The projection together with the guide 20 positions the clamp 19 on the end 17 of the contact.

In the assembly, the outer leg 21 of the U-shaped clamp is movable into clamping engagement with the bare end 11a' of one of the conductors 11a by means of a terminal screw 25. The terminal screw 25 is threaded to the end 17 of the contact and extends through an opening 25a in the outer leg 21 of the clamp 19. A hook 26 is formed at the outer end of the movable leg 21 of the clamp 19 and fits between projections 27 and 28 on the other side of the end 17 of the contact when the screw 25 is tightened.

The guide 20 is carried by the rear leg 22 of the clamp 19 and is folded over the end 17 of the contact. The rear leg 22 is held in fixed position and the guide 20 contains an opening 29 which is aligned vertically with the space between the outer leg 21 of the clamp 19 and the opposing face of the end 17 of the contact. This directs the bare end 11a' of the conductor into position for clamping engagement between the movable leg 21 of the clamp 19 and the opposing surface of the end 17 of the contact. If desired, the surface of the end 17 of the contact may be provided with serrations 30 to obtain a better grip on the bare end 11' of the conductor.

The clamp 19 and guide 20 are held in assembled relation on the end 17 of the contact by spaced retaining members or projections 31 and 32 on the insert 13. The spaced projections 31 and 32 extend upwardly from the insert 13 and have opposing surfaces which contain slots 33 and 34. The slots 33 and 34 slidably receive the side edges of the end 17 of the contact with the clamp 19 and guide 20 thereon. Thus, the projections 31 and 32 hold the clamp 19 and guide 20 in assembled position on the end 17 of the contact. Preferably, the end 17 of the contact is constructed to make a force fit with

the slots 33 and 34 in the retaining members 31 and 32.

A lug or stop 35 extends upwardly from the insert 13 behind the rear leg 22 of the clamp 19 and holds it in a fixed position. An opening 25b in the rear leg 22 of the clamp 19 accommodates the inner end of the terminal screw 25.

A lengthwise partition 36 separates the two sets of retaining members 31 and 32 for the blade contacts 14 and 15 and a transverse or end partition 37 separates the retaining members 31 and 32 for the prong contact 16 from the other contacts.

The partitions 36 and 37 are located toward the rear of the respective sets of retaining members so that they will not interfere with the end of the terminal screw 25. As shown, the terminal screw 25 is located between the spaced retaining members 31 and 32 and its headed end is accessible from one side of the insert 13.

In connecting the conductors of the cable 11 to the respective contacts of the connector, the ends 11' of the conductors 11a, 11b and 11c are stripped of insulation for an appropriate distance to expose the bare wire. The conductors are then spread apart so that their bare ends 11' will simultaneously enter the guides 20 and are then moved vertically through the guides 20 into position for engagement between the clamps 19 and the ends 17 of the contacts. Thus, the several conductors can be inserted simultaneously and without being bent or formed into loops. When the respective terminal screws are tightened, it completes the desired connections.

It will be understood that various modifications and changes may be made by persons skilled in the art in the embodiment of the invention illustrated and described herein without departing from the substance or spirit of the invention.

We claim:

1. An electrical terminal for connecting a conductor of a multi-conductor cable to a contact of a connector which comprises: a contact having an upper end; a projection formed on and extending from one side of said upper end; means mounted on said upper end of the contact for clamping a bare end of a conductor in electrical engagement with said end of the contact; said clamping means comprising a U-shaped clamping member formed of sheet metal, said clamping member having a movable leg and a fixed leg; said legs being connected by a bight and extending transversely across opposite faces of the upper end of the contact; said bight containing an opening through which said projection on the upper end of the contact extends to hold the clamping member against; lengthwise movement relative to the contact; said movable leg having an end spaced from an opposing face of the contact; a guide carried by and extending over the upper end of the contact; said guide containing an opening aligned with the space between said end of the movable leg and the opposing face of the contact; a terminal screw threadably carried by the upper end of the contact; said terminal screw having a headed end opposing said movable leg of the clamp, said terminal screw being adapted to urge the movable leg of the clamp into engagement with a bare end of a conductor inserted through the opening in the guide into the space between the movable leg and the upper end of the contact.

2. An electrical terminal as defined in claim 1 wherein; the movable leg of the U-shaped clamping

member has a free end; said free end having a hook-shaped configuration; said hook-shaped end retaining the bare end of the conductor in the space between the movable leg and the opposing face of the contact.

3. An electrical terminal as defined in claim 1 which includes; an insert formed of insulating material; said insert supporting the contact; a pair of spaced retaining members formed on said insert; said retaining members extending along opposite side edges of the upper end of the contact and holding the U-shaped clamping member against lateral movement relative to the upper end of the contact.

4. An electrical terminal as defined in claim 1, which includes: a rigid insert of insulating material; said insert containing an opening slidably receiving a lower end of the contact and supporting the contact thereon; and a pair of spaced retaining members carried by the insert and extending along opposite side edges of the upper end of the contact with the U-shaped clamping member mounted thereon; said retaining members engaging with and holding the U-shaped clamping member against lateral movement relative to the upper end of the contact.

5. A terminal for an electrical connector which comprises: an insert formed of rigid insulating material; a contact slidably mounted on said insert in a vertical position; said contact having an exposed upper end for connection to a bare end of a conductor; a U-shaped clamp formed of sheet metal mounted on said exposed upper end of the contact; said clamp including a movable leg and a fixed leg extending transversely relative to said upper end of the contact; said movable leg defining a space extending vertically between opposing faces of said upper end of the contact and said movable leg to receive the bare end of the conductor; a guide carried by the fixed leg of the clamp and having a portion folded over the upper end of the contact; said portion containing an opening aligned with the space between the movable leg of the clamp and the opposing face of the upper end of the contact; said guide and clamp being formed in one piece with the guide directing the bare end of the conductor into the space between the movable leg of the clamp and the opposing face of the upper end of the contact; a terminal screw carried by the upper end of the contact; said terminal screw engaging with said movable leg of the clamp and urging said leg into engagement with the bare end of the conductor; and retaining means formed on the insert for holding the clamp and guide in engagement with the upper end of the contact; said retaining means comprising a pair of spaced members formed on the insert and extending along opposite sides of the upper end of the contact with the clamp and guide mounted thereon; said spaced members having opposing faces containing slots shaped to receive opposite side edges of the upper end of the contact with the guide and clamp mounted thereon.

6. In an electrical connector for a multi-conductor cable, the combination comprising: a contact having an exposed upper end; a U-shaped clamp mounted on said upper end of the contact; said U-shaped clamp being formed of resilient sheet metal and having a fixed leg and a movable leg extending transversely across opposite faces of the upper end of the contact; an end of said movable leg being spaced from an opposing face of the upper end of the contact and being movable relative thereto; said legs being connected by a curved bight ex-

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tending around the upper end of the contact at one side thereof; said bight containing an opening; a projection carried by the upper end of the contact at one side thereof and extending through said opening; a guide 5 carried by the fixed leg of the clamp and having a bent portion extending beyond the upper end of the contact; said bent portion containing an opening aligned with the space between said movable leg of the clamp and the opposing face of the contact; and means on the upper end of the contact for engaging with and moving 10 said movable leg of the clamp into engagement with a bare end of a conductor.

7. In an electrical connector, the combination as defined in claim 6 which includes: an insert of rigid insulating material; said contact being slidably supported 15 on said insert; retaining means formed on the insert for engaging with and holding the contact and clamp in assembled relation on the insert; said retaining means comprising a pair of spaced members extending along opposite side edges of the upper end of the contact with 20 the clamp mounted thereon; said members having op-

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posing faces containing slots shaped to receive the side edges of the upper end of the contact with the clamp mounted thereon.

8. In an electrical connector, the combination as defined in claim 6 wherein the guide and clamp are formed as one piece from a strip of sheet metal and the bent portion of the guide is folded over a top end of the upper end of the contact.

9. In an electrical connector, the combination as defined in claim 7 which includes a plurality of contacts and clamps mounted on said insert; each of said contacts and clamps being spaced from each other and having outer faces disposed in different positions on said insert.

10. In an electrical connector, the combination as defined in claim 7 which includes: a stop member carried by the insert; said stop member being located between the retaining members and rearwardly thereof; said stop member engaging with and holding the fixed leg of the clamp against movement.

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