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"A DEVICE FOR CLAMPING AN INSULATED
CABLE WIRE TO A TERMINAL ELEMENT"

The present invention relates to a device for electrically clamping or connecting an insulated cable wire to an upright terminal element the device being of particular use in the field of telecommunication, viz., for the solderless, screwless and stripless wiring of telephone equipment.

In the solderless, screwless and stripless connecting technique developed by the applicants it is possible to make electrical connections between a cable wire and a terminal element which connections are of excellent mechanical strength and permanently corrosion-resistant, wherein it is not required either to bare the cable or to provide screwed or soldered connections.

This solderless, screwless and stripless connecting technique normally employs terminal elements mounted on a carrier and having at least one longitudinal slot of a predetermined length and having a width slightly smaller than the diameter of the conductive wire. One end of the wire is urged transversely into said slot, whereby the members defining the slots and which are arranged to be resiliently deformed to a predetermined extent, are laterally displaced such that their sharp edges will sever the insulation and penetrate a predetermined extent into the material of the wire.

For performing such a connecting or clamping operation tools and devices are known which comprise a plunger and/or a slide mounted within a housing so as to be longitudinally movable against the action of a spring, the plunger and/or slide being fixedly connected at its forward end with for example, a longitudinally slotted clamping head. An insulated cable wire is loosely placed into an enlarged entry opening of the slot and after application of the clamping tool will be urged into the slot by an advance movement of the plunger of the slide

16
brought about either manually or by means of a motor. The completion of the connecting operation is indicated by the springing-back of a snap mechanism.

5 Until recently it was common practice to externally support the terminal elements at least partially by a resilient plastics material so that upon depression of the cable wires the laterally deflected lugs were sufficiently supported. However, the provision of such lateral support is expensive and, 10 above all, requires a certain space thus limiting the objective of minimizing exchange connections and or wiring standardized exchange connections with a greater number of cable wires.

15 It is therefore the object of the present invention to provide a device of the type specified above which makes it possible to make electrical clamping connections between cable wires and upright, laterally unsupported terminal elements in a reliable and simple way.

20 In accordance with the present invention a device for electrically connecting an insulated thin cable wire to an upright terminal element, comprises a plunger mounted within a housing for longitudinal movement therein and a pressure member mounted at the 25 free forward end of the plunger, and is characterized in that within the housing there is disposed a sleeve which encloses the plunger at least along a portion of its length, the sleeve having a longitudinally slotted free end portion which projects beyond the pressure 30 member, the slotted free end portion laterally supporting the legs of the terminal element when the device is in use.

To obtain a reliable positive connection between the wire material of the cable and the sharp edges of the terminal element the forward end portion of the pressure.....

member also is designed in such a manner that the side faces of two sectional elongated webs defining an obliquely extending central slot will engage at the corresponding side faces of the contact portion of the terminal element.

To this end the pressure member which is movable within the sleeve is formed with an obliquely extending slot defined between two sectional webs, said slot being adapted to locate the central longitudinally slotted contact portion of the terminal element on either side.

Because of the extremely limited available space it is very difficult to sever the free ends of the cable wires with separate tools such as scissors. Thus a significant further development of the present invention resides in that a part of the sleeve wall is designed as a cutting edge which after completion of the connecting operation will sever the cable end.

An embodiment of the device according to the present invention will now be described in detail with reference to the accompanying drawings in which:-

Figure 1 is an sectional side elevation of the clamping device;

Figure 2 is a sectional side view on the line A-A of Figure 1;

Figure 3 is a plan view of a terminal element including a connected cable wire; and

Figures 3a, 3b are respectively side views of the terminal element including a connected cable wire.

The device shown in Figures 1 and 2 comprises a stepped tapering plunger 1 the wider rear end portion of which rests against a coil spring 4 disposed within a cavity of a housing 5. The forward and central portions of the plunger 1 are guided for longitudinal movement within a sleeve 2. The forward end portion of the plunger 1 is formed with a pressure member 1a which as shown in Figure 2 has an obliquely extending longitudinal slot 1c defined by two sectional webs. The sleeve 2 is located within the housing and has a reduced portion 3 extending from the housing and it also projects beyond the front edge of the pressure member 1a as shown in Figure 1. The portion 3 is of rectangular section and a cutting edge 3a is defined at the inner end of a slot in one side of the portion 3 of the sleeve and in the opposite side of the sleeve is a longitudinal slot 3b of greater length than the slot which defines the cutting edge.

As shown by the broken line in Figure 3, the sleeve portion 3 before and during the actual clamping operation encloses a terminal element 11 having a Z-shaped cross-section. Each leg 13 of the terminal element 11 is formed with a longitudinal slot 13a having a predetermined length (cf. Figures 3a, 3b), the rounded-off bottom of the slot forming an abutment for the insulation of the cable wire when completely inserted. The central portion of the Z-shaped terminal element forms the actual contact portion 12 and includes a longitudinal slot 12a of greater length than the slots 13a and which in its lower portion 12b has a greater width for the purpose of achieving a spring action for two lugs 12c which cut into the cable.

In use, a cable wire is placed loosely into the widened entry opening of the slots 13a as shown in broken lines in Figure 3a. Then the longitudinally slotted sleeve is placed onto the terminal element such that the two projecting portions of the cable wire will slide into the longitudinal slots of the sleeve and the sleeve wall will engage directly adjacent the outer faces of the legs 13 of the terminal element when the device is advanced. The longitudinal slots formed in the sleeve are selected such that upon further advancing movement the pressure member 1a will rest in the manner shown in Figure 3 on the central portions of the cable wire and will urge the same towards the bottom of the slots 13a into the terminal element.

Further advancing movement of the housing 5 will cause further movement of the sleeve relative to the plunger 1 and the pressure member 1a so that the cutting edge 3a will become operative and will transversely sever the projecting end of the cable wire at a predetermined distance. This completes the connecting operation so that the device may be removed.

11



C L A I M S

1. A device for electrically connecting an insulated thin cable wire to an upright terminal element, comprising a plunger mounted within a housing for longitudinal movement therein and a pressure member mounted at the free forward end of the plunger, characterised in that within the housing there is disposed a sleeve which encloses the plunger at least along a portion of its length, the sleeve having a longitudinally slotted free end portion which projects beyond the pressure member, the slotted free end portion laterally supporting the legs of the terminal element when the device is in use.
2. A device according to Claim 1 characterised in that a portion of the wall of the sleeve is formed as a cutting edge.
3. A device according to Claim 1 or Claim 2 characterised in that the pressure member movable within the sleeve is formed with an obliquely extending slot defined between two sectional webs, said obliquely extending slot locating the central longitudinally slotted contact portion of the terminal element on either side.



21

4. A device according to any of the Claims 1 to 3, in combination with a terminal element, characterized in that the terminal element is of Z-shaped cross-section, both of its legs being provided each with a wider and shorter longitudinal slot and the obliquely extending
5 central portion thereof being provided with a longer, narrower longitudinal slot and that the sleeve is of rectangular cross-section and engages with two opposed inner surfaces at the corresponding outer surfaces of
10 the legs of the terminal element.

5. A device for electrically connecting an insulated cable wire to a terminal element comprising the combination and arrangement of parts substantially as hereinbefore described with reference to the
15 accompanying drawings.

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