

Device for precutting the insulating covering of cable wires prior to connection to cutting/clamping contacts

The invention relates to a device for precutting the insulating covering of cable wires prior to connection to cutting/clamping contacts according to the preamble of claim 1.

From DE-A 26 10 461, connector banks with cutting/clamping contacts are known, said connector banks being formed of two contact tongues of thin spring-sheet limiting an open longitudinal slot. When pressing the cable wire into the contact slot, by the relatively sharp edges of the spring tongues, first the insulating covering of the cable wire is cut. Then, the edges penetrate by a certain extent into the material of the cable wire, in order to provide for the desired electrically conductive contact.

For pressing the insulated cable wire into the contact slot and for pulling a pressed-in cable wire out from the contact slot, a special tool is known from DE-GM 80 13 494. By the latter, however, only cable wires having a small cable cross section can be connected to cutting/clamping contacts. For connecting cable wires having a thick insulating covering if compared to the wire cross section, e.g. cable wires for power engineering or cable wires for open-air communication lines, so-called dropwire cables, up to now usually screw/clamping contacts are employed. They require baring the cable wires and, further, time-consuming screw operations.

From DE-A 32 14 896, there is, however, a cutting/clamping connection contact already known, said contact

allowing baring-free connection of wires having different outside and inside conductor diameters and different insulation materials. Such a cutting/clamping contact is employed in connector banks according to DE-A 34 15 396. When pressing cable wires having a thick insulating covering if compared to the wire cross section into those cutting/clamping contacts, there exist, however, high press-in forces which cannot always be handled with the tools known up to now.

In a device of the mentioned species known from DE-A 27 39 347 for precutting the insulating covering of cable wires prior to connection to cutting/clamping contacts, the opposed knife blades are provided at a knife being disposed firmly within the base section of the tool. A slider with a groove as counter support is mounted displaceably between the crosspieces of the base section. It is disadvantageous, here, that the insulating covering of the conductor core is pressed, when pre-cutting the cable wire, through the opposed knife blades, the cable wire being received in the groove of the slider serving as counter support.

It is disadvantageous, further, that the insulating covering is provided with two opposed cutouts only, which, then, have to be pressed-in between the legs of the cutting/clamping contact into the clamping slot. Here, it is easily possible that the cable wire is displaced axially, such that it will not be introduced into the clamping slot with the cutouts effected by the knife blades, as desired, but with its solid insulating covering.

In particular for cable wires having a thick insulating covering if compared to the wire cross section, high press-in forces are required herefor, common tools for pressing the cable wires into the cutting/clamping contacts not being able to produce such high forces.

The invention is based, therefore, on the object to provide a device of the mentioned species for precutting the insulating covering of cable wires prior to connection to cutting/clamping contacts, in particular cable wires having a thick insulating covering if compared to the wire cross section, wherein the cross section of the thick cable wire can be reduced to such an extent that it can securely be pressed into the cutting/clamping contacts under the action of low press-in forces.

The solution of this object results from the characterizing features of claim 1. The invention provides, on one hand, a base section with a cable depression for receiving the cable wires, such that these are well supported for the action of the knife blades. By the curved shape of the knife blades, longer or wider cutouts, resp., are provided in axial direction of the cable wires, such that the precut cable wires can, then, be pressed into the cutting/clamping contacts under application of low press-in forces only. As, finally, the curved knife blades are arranged at the opposed inner sides of an in cross-section U-shaped lever mounted pivotally at the base section, a true cutting procedure is performed for precutting the insulating covering, said cutting procedure leading, in contrast to the squeezing procedure according to the state of the art, to a proper and secure precutting of the cable wires. For the cable wires precut by means of the device according to the invention, it is secured that they - even if they are slightly displaced in axial direction with respect to the cutting/clamping contacts - can be pressed securely into the clamping contacts, the more as the curved cutouts of the insulating covering allow easy centration of the cable wire with respect to the cutting/clamping contact.

Further advantageous embodiments of the invention result from the subclaims. It should be noted, here, that the

device according to the invention may be mounted at connector banks themselves and may be provided as well as tool in form of a so-called fastening tool.

The solution for this object results from the characterizing features of claim 1 for the method and of claim 3 for the device. By at least partially cutting-away the insulating covering of the cable wire in the intended contact area, prior to pressing-in, the high press-in forces existing when thick cable wires are pressed into the cutting/clamping contacts, can be lowered considerably, in particular when in the contact area for the contact legs of the cutting/clamping contacts, two opposed sections are cut away from the insulating covering of the thick cable wire. This effected, according to the invention, by a precutting device having two curved knife blades. When connecting, i.e. when pressing the contact area of the cable wire designed according to the invention into the contact slot of the cutting/clamping contact, the cutting edges have to penetrate through a smaller section of insulating material, thus reducing the press-in forces considerably. Damages at the spring tongues of the connection contact will thus be eliminated.

Further advantageous embodiments of the invention result from the further subclaims. It should be noted, here, that the device according to the invention may be mounted at connector banks themselves and may be provided as well as a tool in form of a so-called fastening tool.

In the following, the invention is described in more detail based on an embodiment provided as fastening tool. There are:

Fig. 1 a view of the fastening tool from the side provided with a pull hook with a connector bank ar-

ranged below and provided with cutting/clamping contacts,

Fig. 2 a slightly scaled-down view of the fastening tool from the side provided with a precutting device,

Fig. 3 a front view of the fastening tool according to arrow X in Fig. 2,

Fig. 4 a perspective view of the fastening tool with swung-out pull hook, and

Fig. 5 a view of a two-wire cable separated by means of the pull hook.

The fastening tool consists of a shaft 14 (base section) with a handle section 15 at one end and of a guide piece 17, a lever 18 and press-in pieces 32 at the other end. All components 14, 15, 17, 18 and 32 are made as one-piece parts of plastic of sufficient stability for a tool. The curved, round handle section 15 serves for manual application of a press-in force, which can be exerted on the press-in pieces 32, in order to be able to press cable wires 20 with a thick insulating covering 21 if compared to the wire cross section of the internal conductor 22 into the cutting/clamping contacts 44 of connector banks 40. The guide piece 17 serves, here, for securing the introduction by the press-in pieces 32. The lever 18 serves for removal of overvoltage suppressor magazines (not shown) inserted into the connector bank 40.

At the shaft 14 of the fastening tool, a precutting device 11 for the thick cable wire 20 is mounted. It consists of a U-shaped lever 23 being supported at the swivel axle 27. The U-shaped lever 23 bears at the inner sides 33 of its two side faces 56, 57 one curved cutting

knife 12, 13 each. These are directed against each other, a free space of at least the diameter of the internal conductor 22 being left free, as shown in particular in Fig. 2. The open side of the U-shaped lever 23 is arranged in direction of the shaft 14, such that, in depressed condition, the lever 23 surrounds with its side faces 56, 57 the shaft 14, as shown in Fig. 3 by the solid lines. In the plastic material of the shaft 14, a guide depression 26 for receiving and supporting the cable wire 20 is provided.

Prior to pressing a cable wire 20 with a thick insulating covering 21 if compared to the wire cross section of the internal conductor 22 into the cutting/clamping connection contacts of a connector bank 40, the cable wire 20 is placed into the guide depression 26, the lever 23 being swung upwards, as shown in Fig. 3. The guide depression 26 extends in longitudinal direction of the shaft 14. By pressing the lever 23 down, the insulating covering 21 of the cable wire 20 is cut by means of the curved cutting knives 12, 13 arranged on the inner sides 33 of the side faces 56, 57 of the lever 23 at two positions in the intended contact area 37, two insulating pieces 34, 35 being cut off, as shown in Fig. 2. After swinging the lever 23 upwards once again, the cable wire 20 is removed from the guide depression 26 and is inserted with the intended contact area 37 into the cutting/clamping connection contacts 44 of the connector bank 40, the contact area 37 being pressed into the contact slot 45. Pressing-in is effected by means of the press-in pieces 32, being adapted to the shape of the cutting/clamping connection contact 44.

In the centre of the circular handle section 14, a pull hook is rotatably mounted, said hook serving with its hook-type end 36 for pulling-out and removing cable wires 20 pressed firmly into the cutting/clamping con-

nection contacts 44. a latch device 30 for the pull hook 24 is provided, consisting of two detents 29 provided at the handle section 15 and of a notch 30 in the pull hook. Thus, the pull hook 24 can accept two positions, namely the rest position shown in Fig. 1 by solid lines, for which the pull hook 24 extends parallelly to the shaft 14, and the operating position shown in Fig. 1 by broken lines and in Fig. 4., in said position the pull hook 24 being approximately angled rectangularly with respect to the shaft 14.

The handle section 15 has, further, three through-holes for the cable wires 20, to which a separating device 25 is assigned at the pull hook 25. Said separating device 25 consists of two curved cutouts 58, 59, forming a sharp prong 39 therebetween. A two-wire cable (Fig. 5) is introduced through the through-hole 19, then the pull hook 24 is swung with its sharp prong 39 into the area of this through-hole 19, such that the sharp prong 39 comes between the two cable wires 20 of the two-wire cable, such that they are separated by the sharp prong 39 into two individual cable wires 20 when pulling through the through-hole 19.



Patent claims

1. A device for precutting the insulating covering of cable wires prior to connection to cutting/clamping contacts, in particular cable wires having a thick insulating covering if compared to the wire cross section, comprising a base section, two opposed knife blades, and a counter support for the cable wires,

characterized by that the base section (14) is provided with a cable depression (26) for receiving the cable wires (20), and that the knife blades (12, 13) are arranged at the opposed inner sides (33) of an in cross-section U-shaped lever (23) mounted pivotally at the base section (14), and are of curved shape.

2. A device according to claim 1, characterized by that the distance of the two curved cutting knives (12, 13) from each other corresponds at least to the width of the diameter of the internal conductor (22) of the cable wire (20).

3. A device according to claims 1 or 2, characterized by that the base section (14) forms the shaft of a tool, the handle section (15) of which is curved and round and the free shaft end of which is provided with guide pieces (17, 32) for pressing the cable wires (20) into the cutting/clamping connection contacts (44) of connector banks (40).

4. A device according to claim 3, characterized by that at the shaft of the tool, in addition a lever (18) for removal of overvoltage suppressor magazines inserted into the connector bank (40) is arranged.



5. A device according to claims 3 or 4, characterized by that the handle section (15) of the tool is provided with several boreholes (19) and with a pull hook (24) exhibiting a separating device (25) swingable into the area of the boreholes (19), in order to be able to guide, thus, two-wire cables through the borehole (19) and to separate them by means of the separating device (25) into individual cable wires.

6. A device according to claim 5, characterized by that the pull hook (24) is provided with a notch device (30), and that the handle section (15) is provided with two latch detents (29), such that the pull hook (24) is latchable in two positions.