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 (71) Applicant: **Nexans**
75008 Paris (FR)

(72) Inventors:
 • **Haidar, Ahmad**
I-60022 Castelfidardo (IT)
 • **Kostus, Stephane**
F-08350 Donchery (FR)
 • **Ranieri, Domenico**
I-20037 Paderno Dugnano (Milano) (IT)
 (74) Representative: **Feray, Valérie et al**
Cabinet FERAY/LENNE
44/52, Rue de la Justice
75020 Paris (FR)

(54) **Insulating container for a branch junction for electrical cables, and method of making a branch junction**

(57) The present invention deals with an insulating container (10) for a branch junction for electrical cables, characterized in that it comprises:

- ?? a longitudinally elongate body comprising:
- a longitudinal cavity (12),
 - an open first end for insertion of a

branch means (24) for the electrical contact between said longitudinal cavity (12) and one phase conductor (32) of a main electrical cable (30), said contact means (24) comprising pressure members (16) for coming into electrical contact with the transmissive part of said phase conductor (32).

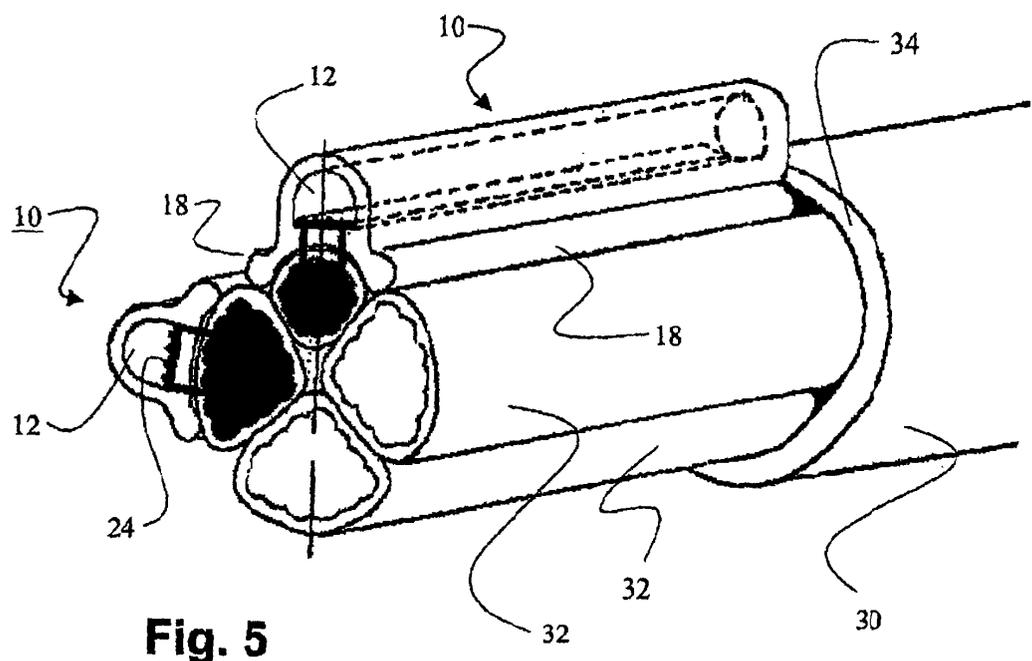


Fig. 5

EP 1 202 420 A1

Description

[0001] The present invention relates to electrical cables and particularly to branch junctions for electrical cables. Still more particularly it relates to a special insulating container used for making branch junctions for electrical cables.

[0002] As is known, there are many cases in which it is necessary to connect the phase conductors of a main cable with the phase conductors of a branch cable. A typical case is when it is necessary to carry electrical power to a building (or group of buildings) by tapping it off from a main cable.

[0003] Currently known solutions for making such branch junctions are complicated, dangerous, lengthy, inconvenient and unsafe from the point of view of protecting the environment. In practice it is necessary to interrupt the flow of electrical power in the main cable, remove the outer insulating sheath and manually strip a certain length of the cables (or phase conductors) from which the branches are to be taken. The stripped lengths are connected to the respective branches using clamp-type devices. The insulation of the main cable is renewed with insulating resin and/or tapes at the point where the insulating sheath has been removed.

[0004] Another problem with this known solution is the impossibility of checking the junction for efficiency once the insulating resin and/or tape has been applied. Indeed, if there is partial or total inefficiency of the junction the only option is to cut the length of main cable where the junction was made and make a new junction with a different device.

[0005] In light of the problems of the prior art, the main object of the present invention is to provide an insulating container for making a branch junction for electrical cables that is practical and safe, both for an operator preparing the junction by hand and for the environment.

[0006] Another object of the present invention is to provide an insulating container for making a branch junction for electrical cables that will enable such junctions to be made without interrupting the flow of electrical power in the main cable.

[0007] It is another object of the present invention to indicate a method of making a branch junction for electrical cables that is practical and safe, both for an operator preparing the junction by hand and for the environment.

[0008] It is another object of the present invention to indicate a method for making a branch junction for electrical cables without interrupting the flow of electrical power in the main cable.

[0009] These and other objects are achieved by means of an insulating container for a branch junction for electrical cables, **characterized in that** it comprises:

?? a longitudinally elongate body comprising:

- a longitudinal cavity,

- an open first end for insertion of a branch

?? means for the electrical contact between said longitudinal cavity and one phase conductor of a main electrical cable, said contact means comprising pressure members for coming into electrical contact with the transmissive part of said phase conductor.

[0010] The present invention also proposes a method of making a branch junction between at least one phase conductor of a main electrical cable and at least one corresponding branch, the method being **characterized in that** it comprises the following steps:

?? providing at least one corresponding insulating container which in turn comprises:

- a longitudinally elongate body comprising a longitudinal cavity and an open first end for insertion of a branch
- means for the electrical contact between said longitudinal cavity and the phase conductor, said contact means comprising pressure members for coming into electrical contact with the transmissive part of said phase conductor,

?? inserting one end of the branch into the longitudinal cavity

?? pressing the insulating container with the inserted branch onto the corresponding phase conductor of the main cable.

[0011] There now follows a detailed description of the invention, given purely by way of non-limiting example, which should be read with reference to the accompanying sheets of illustrative drawings, in which:

?? Fig. 1 shows an end view of a first embodiment of the insulating container according to the present invention;

?? Fig. 2 is similar to Fig. 1 but shows a branch cable inserted into the insulating container;

?? Fig. 3 is a view in longitudinal section through the container seen in Fig. 1;

?? Fig. 4 shows the contact means before they are bent into a "U"; and

?? Fig. 5 shows a second embodiment of the container of the invention in a fitted configuration.

[0012] With reference to the various figures, the container 10 of the invention comprises a longitudinally elongate body defining a cavity 12 that is essentially circular or in the shape of a tunnel, that is closed above by a curved vault-like surface. The elongate body preferably comprises two lower extremities or stabilizing edges 18 which may be of different shapes, such as for example the essentially circular shape seen in Fig. 5 or the

straight shape seen in Figs. 1 and 2. The container of the invention is preferably made of a resilient, elastic material impervious to moisture, such as rubber. With this material the outer lower surface of the elongate body can adapt to the curvature of the phase conductors of the main cable, as will become clear in the course of the description.

[0013] The elongate body of the container 10 of the invention has a first end, or end of insertion of the branch, that is open; the other end 22 (second end) is however closed. As shown in Fig. 3, at the closed end 22 both the inside cross section of the elongate body and the outside cross section become smaller. The outside cross section of the end 22 is preferably essentially circular and does not have the lower extremities 18.

[0014] The container 10 of the invention also includes means 24 for making the electrical contact between a branch 36 and a phase conductor 32 of a main cable 30. In the preferred embodiment illustrated, the means 24 of electrical contact comprise a contact surface 14 and a pair of toothed plates 16 with a plurality of teeth 16'. The contact means 24 are preferably made from a single long metal plate. Before using the contact means 24 in the container 10, the toothed plates are bent through 90° with respect to the contact surface 14. The contact surface need not be continuous but could also comprise only surface portions (as in Fig. 4) in such a way as to connect the toothed plates 16 together. This solution has a number of advantages such as the use of less metallic material and the greater lightness and flexibility of the assembled container 10.

[0015] To assemble the contact means 24 with the elongate body, the contact means are first bent into an upside-down U, inserted into the cavity 12 and pressed down so that the teeth 16' penetrate through the bottom of the elongate body and protrude down to a certain length. There are preferably holes (not shown) for this purpose in the bottom of the elongate body in which to insert the teeth 16'. In order to attach the contact means 24 securely to the elongate body, at least one pair of teeth (16'a) can simply be bent around to secure it much like a staple. Preferably two (16'a, 16'b) or three pairs of teeth are bent around.

[0016] With reference to Figs. 2 and 5 the use of the container 10 of the invention will now be described, i.e. the method of making a branch junction for electrical cables. A suitable length of sheath 34 is first removed from the main cable 30. This exposes the phase conductors 32 of the main cable 30. For each phase conductor 32 of the main cable 30 from which a branch is required, a completely assembled container 10 (with toothed plates inserted and protruding) is prepared. One end (with no insulating sheath) of each branch 36 is inserted into the cavity 12 of a corresponding container 10 as far as the closed end 22.

[0017] In order to establish the contact between the phase conductor 32 of the main cable 30 and the branch 36, the container 10 is simply pushed toward the phase

conductor 32 so that the metal teeth 16 penetrate the sheath of the phase conductor 32 and come into contact with this phase conductor. The pressure can be applied by hand or by using a throttling strap or sleeve placed around the junction. In this way it is possible to make simultaneous contact between more than one branch and more than one corresponding phase conductor of the main cable.

[0018] A sealant (such as silicone) may conveniently be used to prevent the ingress of dust and/or moisture through the holes made by the teeth 16.

[0019] For secure attachment of the containers to the main cable, clasps should preferably be used. These clasps (not illustrated because not the subject of the present invention) attach to the main cable and enable the branch cable to be clasped at two points to keep it parallel to the main cable. The terminal end 22 of the elongate body of the container 10 which is of a slightly larger circular cross section to that of the branch is ideal for fitting the abovementioned clasps.

[0020] In light of the above detailed description and accompanying drawings, the advantages obtained by the present invention in terms of practicality, convenience of use, safety and low cost will be obvious.

[0021] It will be obvious that, in light of the above description, those skilled in the art will realize that numerous variants, modifications, adaptations and substitutions of parts with other functionally equivalent parts are possible. All these variants, modifications, adaptations and substitutions are however to be considered as coming within the scope of protection defined solely by the accompanying claims.

35 Claims

1. Insulating container (10) for a branch junction for electrical cables,
characterized in that it comprises:

?? a longitudinally elongate body comprising:

- a longitudinal cavity (12),
- an open first end for insertion of a branch

?? means (24) for the electrical contact between said longitudinal cavity (12) and one phase conductor (32) of a main electrical cable (30), said contact means (24) comprising pressure members (16) for coming into electrical contact with the transmissive part of said phase conductor (32).

2. Insulating container (10) according to claim 1, **characterized in that** said pressure members (16) comprise teeth (16').

3. Insulating container (10) according to claim 2, **char-**

acterized in that said teeth (16') comprise a first series of in-line teeth (16') and a second series of in-line teeth (16'), the two series of teeth being parallel.

4. Insulating container (10) according to anyone of claims 1 to 3, **characterized in that** said contact means (24) comprise an internal contact surface (14).

5. Insulating container (10) according to anyone of claims 1 to 4, **characterized in that** it comprises means (16'a, 16'b) for fixing said contact means (24) to the elongate body of the container (10).

6. Insulating container (10) according to claim 5, **characterized in that** the means (16'a, 16'b) for fixing said contact means (24) to the elongate body of the container (10) comprise at least one pair of teeth (16'a, 16'b) that can be bent over each other like a staple.

7. Insulating container (10) according to anyone of claims 1 to 6, **characterized in that** it comprises a second closed end (22) at the opposite end from the open end.

8. Insulating container (10) according to claim 7, **characterized in that** said closed end (22) has a smaller external cross section than the elongate body.

9. Insulating container (10) according to anyone of claims 1 to 8, **characterized in that** it comprises two stabilizing projecting edges (18).

10. Insulating container (10) according to anyone of claims 1 to 9, **characterized in that** it comprises a resilient elastic material such as rubber.

11. Method of making a branch junction between at least one phase conductor (32) of a main electrical cable (30) and at least one corresponding branch (36), the method being **characterized in that** it comprises the following steps:

?? providing at least one corresponding insulating container (10) which in turn comprises:

- a longitudinally elongate body comprising a longitudinal cavity (12) and an open first end for insertion of a branch,
- means (24) for the electrical contact between said longitudinal cavity (12) and the phase conductor (32), said contact means (24) comprising pressure members (16) for coming into electrical contact with the transmissive part of said phase conductor (32)

?? inserting one end of the branch (36) into the longitudinal cavity (12)

?? pressing the insulating container (10) with the inserted branch (36) onto the corresponding phase conductor (32) of the main cable (30).

12. Method according to claim 11, **characterized in that** the step of pressing the insulating container (10) onto the corresponding phase conductor (32) involves pressing with the aid of a throttling sleeve means.

13. Method according to anyone of claims 11 or 12, **characterized in that** it comprises the further step of claspings the insulating container (10) to the main cable (30).

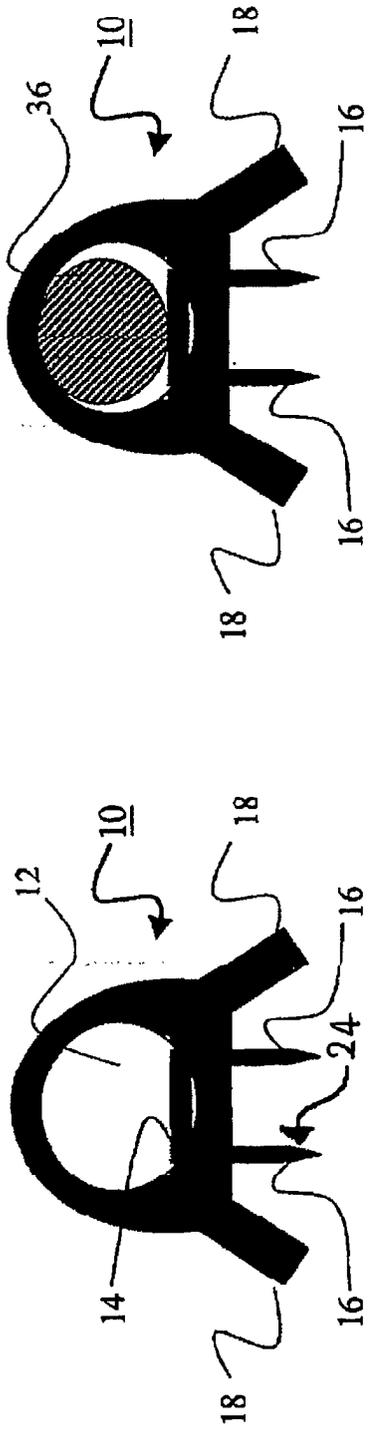


Fig. 2

Fig. 1

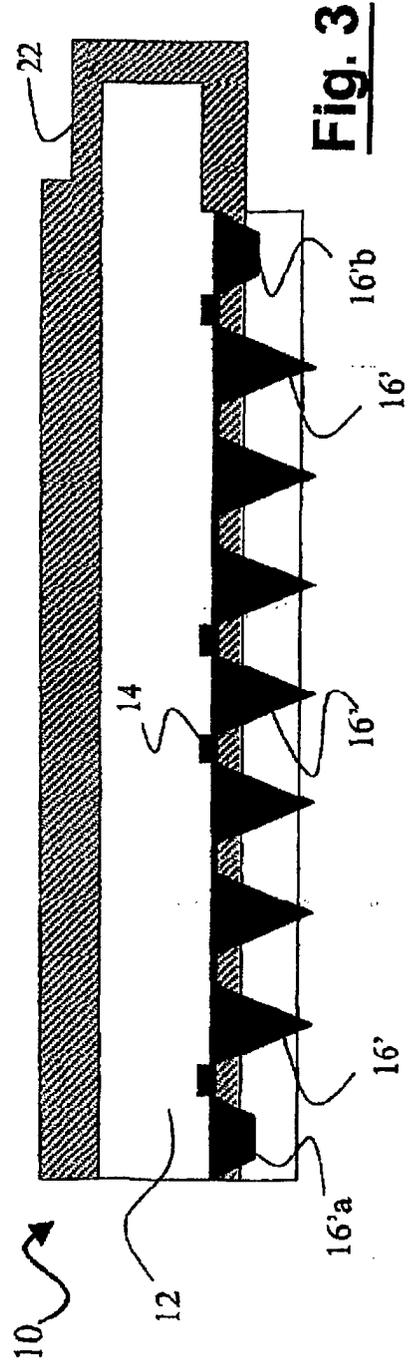


Fig. 3

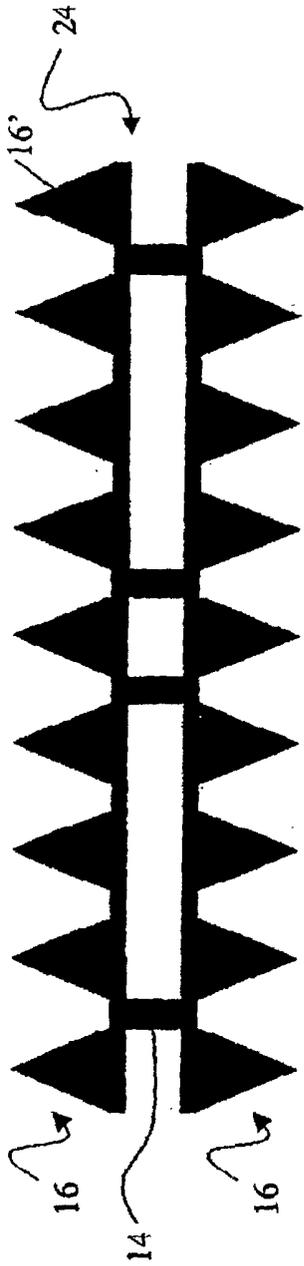


Fig. 4

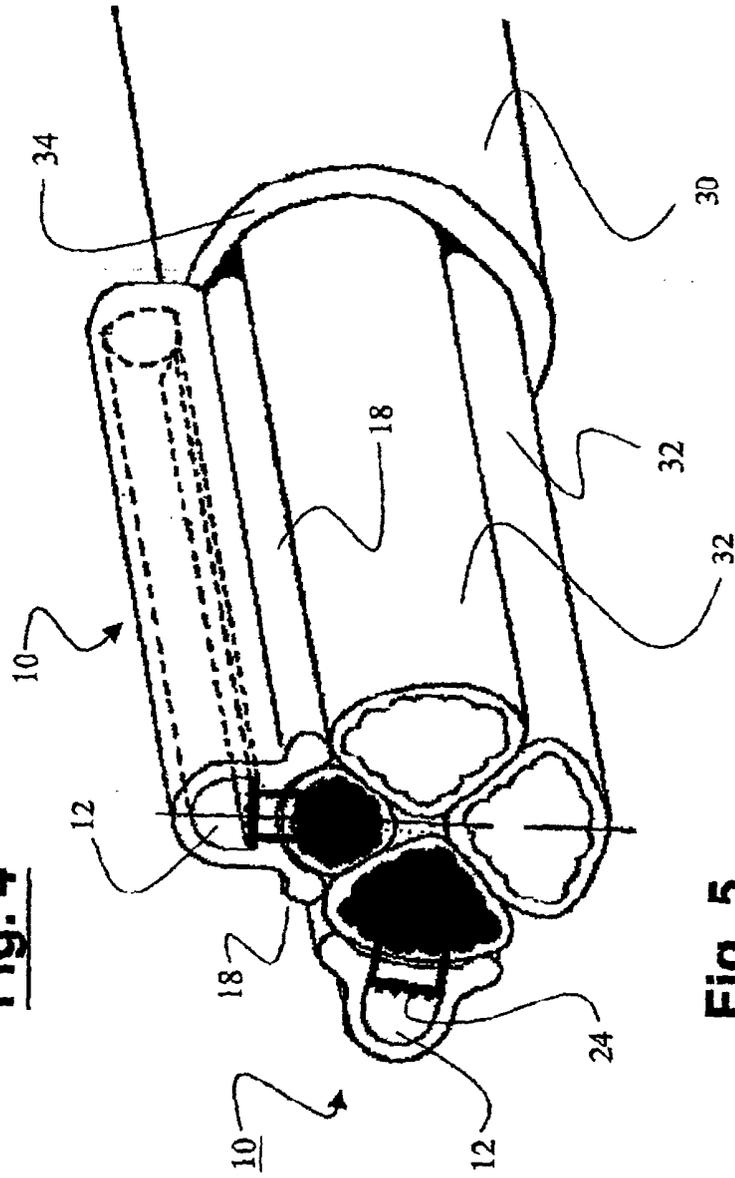


Fig. 5



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 40 2745

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 928 044 A (CIT ALCATEL) 7 July 1999 (1999-07-07) * the whole document *	1,2,4,5, 7,10,11	H02G15/117 H01R4/24 H01R9/03
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H02G H01R
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 31 January 2002	Examiner Moueza, A
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 01 40 2745

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