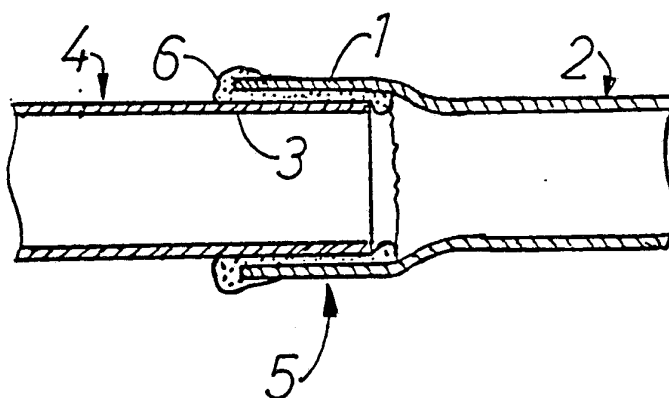




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(54) Title: A DEVICE AND A METHOD OF PROVIDING A JOINT BETWEEN TWO COMPONENTS AND THE USE OF SUCH A JOINT

**(57) Abstract**

A device and a method of providing a tensile-stress resistant as well as fluid-tight joint (5) between two components (2, 4) of the kind which are designed to be inserted one into the other, by applying an elastic material (6) on at least one of the components (2 or 4). The material is applied on the component end facing the other component and is adherent thereto. In this manner use is made of both the friction between the facing surface of the joint and of the sealing properties of the elastic material (6).

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A DEVICE AND A METHOD OF PROVIDING A JOINT BETWEEN TWO
COMPONENTS AND THE USE OF SUCH A JOINT

The present invention concerns a device and a method of providing a tensile-stress resistant as well as fluid-tight joint between two mutually insertable components, and particularly but not exclusively such components
5 as tubes, bends, jointing sleeves, connecting boxes and similar components of synthetic resins used for electrical installations in buildings.

The inventive idea stems from the problems that are encountered in connection with joining together
10 plastic tubes and boxes used in the installation of electrical wiring in buildings.

One such problem is the risk of disengagement or loosening of the joint before the installation of the electrical wiring, a problem which more often than not
15 is caused by insufficient friction between the components forming the joint.

The disengagement problems are even more serious if they arise in wiring tubing that is already covered by wall slabs or similar covering elements. The problem
20 is further aggravated in connection with tubing systems that are intended to be cast into or that already are cast into concrete and similar materials.

In an attempt to alleviate the problems outlined above the electrician usually applies tape around all
25 joints.

According to one prior-art method of providing a joint possessing improved resistance to tensile stress a metal clip is inserted in the tube having the larger cross-sectional dimensions. The metal clip is designed
30 to mechanically cut into the other tube having the lesser cross-sectional dimensions, to provide improved properties of tensile strength.

A serious drawback connected with this method is

that it causes a slit to be formed inside the joint (the tube having the larger cross-sectional dimensions takes on an oval shape) with resulting problems when the details are to be cast into concrete.

5 Because of the slit, water and concrete may leak into the tubing system proper, causing serious problems, such as obturation of the tube with the result that the electrical wires cannot be drawn inside the tube. In addition, in environments where moisture may occur
10 water may seep into the tubing system and cause short-circuiting.

 Another problem encountered in connection with this prior-art method is that during the drawing of the electrical wires they may catch in the slit found
15 inside the joint between the components.

 The metal clips are difficult to place in position and their installation is work-consuming/requires a high degree of automatisation. It is not unusual for the clips to become loose before they are put to use,
20 with the result that the intended quality of the joint cannot be obtained.

 The purpose of the present invention is to eliminate the problems and disadvantages outlined in the foregoing in a simple and efficient manner.

25 In the device for providing a both tensile-stress resistant and fluid-tight joint between two mutually insertable components this purpose is achieved in accordance with the invention in that at least one of the components is provided on its end facing the other component with an elastic material adherent to said other
30 component in such a manner that use is made both of the friction between the facing surfaces of the joint and of the sealing properties of the material.

 According to the method of providing a joint of
35 this kind the purpose is achieved in that on one of the components on the end thereof facing the second component is applied an elastic material which is adherent

to said second component, so that use is made both of the friction between the facing surfaces of the joint and of the sealing properties of the material.

The invention also concerns the use of the joint according to which at least one of the components is provided on its end facing the other component with an elastic material adherent to said other component and according to which the components involved are tubes, bends, jointing sleeves, connecting boxes and similar components of synthetic resin used to install electrical wiring in buildings.

The invention will be described in closer detail in the following with reference to the accompanying drawings illustrating some preferred embodiments of the joint and a preferred method of providing a joint of this kind. In the drawings,

Fig. 1 illustrates, in longitudinal sectional views, on the right-hand side a part of a socket of a tube, a bend, a connecting box or a similar component and on the left-hand side a part of a tube the end of which is intended for insertion into the socket,

Fig. 2 illustrates the components in accordance with Fig. 1 when fitted together to provide a tensile-stress resistant and fluid-tight joint between the components,

Fig. 3 and 4 illustrate, also in longitudinal sectional views, alternative embodiments of the socket in accordance with Figs. 1 and 2,

Fig. 5 illustrates schematically one of several possible methods of providing one of the components, in the shown example the socket, with an elastic material.

On drawing figures 1 and 2, illustrating a first embodiment of the invention, the right-hand part shows a socket 1 forming part of a component 2, such as a tube, a bend, a jointing sleeve, a connecting box or

other similar components of varying nature and dimensions, preferably made of plastics of the kind intended for use in electrical wiring installations in buildings. The left-hand side of Figs. 1 and 2 shows the end 3 of a component 4, such as a tube or similar element, the end 3 being of smaller cross-sectional dimension or diameter size and arranged for insertion into the socket 1 which has a larger cross-sectional size or diameter.

10 In order to obtain a joint which at the same time possesses tensile-stress resistance and fluid-sealing characteristics an elastic material 6 is applied in accordance with the embodiment illustrated in Figs. 1 and 2 between the two mutually insertable components 15 2 and 4. In accordance with the embodiment illustrated in Figs. 1 and 2 the elastic material 6 is applied on the component 2 on the end or socket 1 thereof facing the second component 4 for adherence to the end 3 thereof. More precisely, the elastic material 6 is applied on 20 the internal surface of the socket 1 but alternatively it may be applied on the external surface of the tube end 3.

In accordance with the embodiment illustrated in Figs. 1 and 2 the elastic material 6 is applied on the 25 socket 1 by dipping the latter into a bath of liquid or powdery starting material, such as latex. In other words, the elastic material 6 possesses the elastic properties of rubber while at the same time being soft. After the dipping operation, the component is dried 30 and/or vulcanized.

As an alternative, the elastic material may be applied by brushing or by spraying the starting material onto the components. In Fig. 5 is shown one spray-application method. In accordance with this method a nozzle 35 7 is inserted into the socket 1 and a jet of the elastic material is thereafter sprayed onto the internal faces of the socket.

Fig. 3 illustrates another embodiment according

to which two annular strands of the elastic material 6 is applied on the internal face of the socket 1, for instance with the aid of the nozzle illustrated in Fig. 5.

5 Fig. 4 shows yet another embodiment wherein the casting technique known as dual casting is used. According to this method, a ring 8 of an elastic material 6 is cast directly onto the end of the socket 1 during the very manufacture of the component 2.

10 Also in the case of the embodiments shown in Figs. 1-3 the application of the elastic material 6 could with advantage be performed during or in connection with the manufacture proper of the component to be provided with the elastic material. At the time of installation of the component by the electrician no extra work
15 therefore is required but the electrician need only push (press) one component into the other to provide the interconnection.

One of the great advantages of the invention is
20 that owing to the use of an elastic material on either one of the two components the narrow tolerances normally required in jointing operations of components of the kind concerned no longer are necessary in order to achieve satisfactory friction between the surfaces to
25 be joined together.

In addition, the finished joint not only possesses a considerably improved tensile-stress resistance compared with joints using the clip method referred to in the foregoing but also forms a considerably improved
30 seal against liquids and concrete.

A further possible alternative is to apply the elastic material 6 on either one of the components by applying thereon a suitable powder material or similar product through electrostatic charging followed by heating to melt the material, whereby an elastic surface
35 layer is formed.

Independently of the application method used the

elastic material 6 could have a colour which entirely or partly differs from the colour of the components 2 and 4. The purpose of this colour differentiation is to allow the components provided with the elastic material to be easily distinguishable from those that are not and/or allow identification of the components on the basis of dimensions, usage and so on.

The invention has been described in the foregoing with reference to components used in the installation of electrical wiring in buildings. However, the invention is equally applicable to components of different design and serving other purposes, for instance components used in tubing generally, holding gases or liquids. Consequently, the invention should not be regarded as limited to the embodiments described and shown herein but could be modified in a variety of ways within the scope of the appended claims.

CLAIMS

1. A device of providing a tensile-stress resistant as well as fluid-tight joint (5) between two mutually insertable components (2, 4), characterized in that at least one of the components is provided on
5 its end (1 or 3) facing the other component with an elastic material (6) which is adherent to said other component in such a manner that use is made both of the friction between the facing surfaces of the joint and of the sealing properties of the material.

10 2. A device as claimed in claim 1, characterized in that the components (2, 4) are formed with tubular ends (1, 3) which are mutually insertable, and in that the elastic material is applied either on the internal face of the end (1) having the larger cross-
15 sectional dimensions or on the external face of the end (3) having the smaller cross-sectional dimensions.

3. A device as claimed in claim 2, characterized in that the components (2, 4) are tubes, bends, jointing sleeves, connecting boxes and similar
20 components of synthetic resin used in electrical installations in buildings.

4. A device as claimed in any one of the preceding claims, characterized in that the elastic material (6) is soft and possesses the elastic
25 properties of rubber, e.g. latex, and in that for identification purposes it has a colour which differs partly or completely from the colour of the components (2, 4).

5. A method of providing a tensile-stress resistant
30 and fluid-tight joint (5) between two mutually insertable components (2, 4), characterized by applying on one of the components on the end thereof facing the second component, an elastic material (6)

which is adherent to said second component so that use is made both of the friction between the facing surfaces of the joint and of the sealing properties of the material.

5 6. A method as claimed in claim 5, c h a r a c -
t e r i z e d in that the application of the elastic material (6) is effected during or in connection with the manufacture of the components (2 or 4).

10 7. A method as claimed in claim 5 or 6, c h a -
r a c t e r i z e d by applying said elastic material by dipping into a bath of a liquid or powdery starting material.

15 8. A method as claimed in claim 5 or 6, c h a -
r a c t e r i z e d by applying said elastic material (6) on the components (2 or 4) by brushing or spraying the starting material thereon.

20 9. The use of a tensile-stress resistant as well as fluid-tight joint (5) between two mutually insertable components (2, 4), of which components at least one is provided on its end (1 or 3) facing the other component with an elastic material (6) which is adherent to said other component (3), said components being tubes, bends, jointing sleeves, connecting boxes and similar components of preferably rigid plastics used in electri-
25 cal installations in buildings.

FIG 1

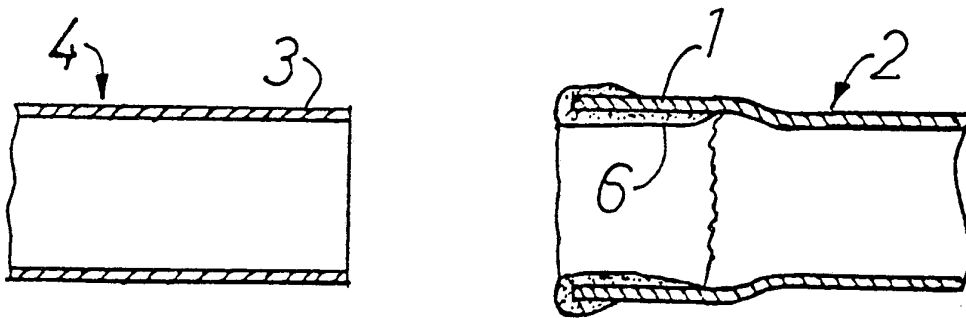


FIG 2

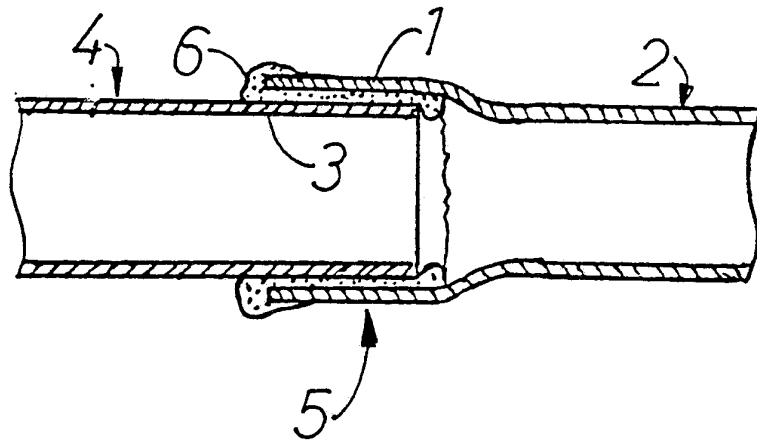


FIG 3

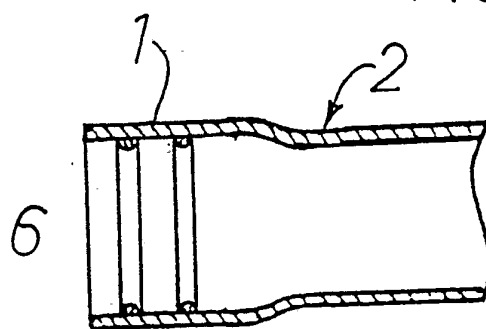


FIG 4

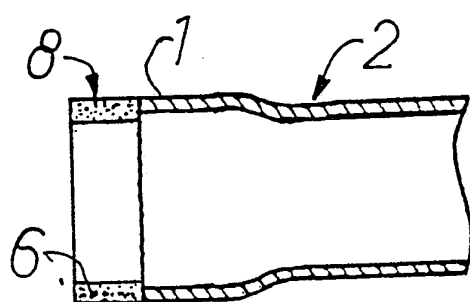
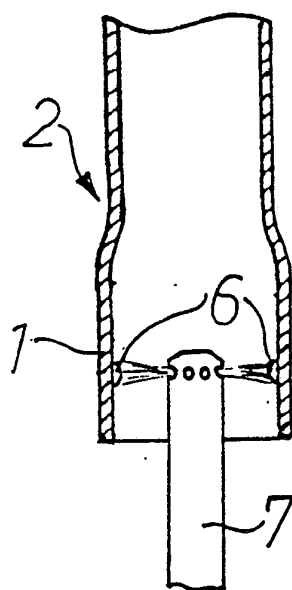
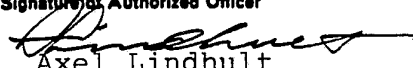


FIG 5



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE89/00469

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC ⁴		
F 16 L 21/02		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC 4	F 16 L 21/00, /02, /08, 47/06	
US Cl	285:10, 21-23, 45, 105, 230, 231, 291, 296, 304	
	321, 345, 374, 375, 379	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁸		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	SE, B, 444 357 (FORSHEDA GUMMIFABRIK AB) 7 April 1986 See figure 4 & GB, 2067124 DE, 3100192 US, 4372905 SE, 8000270 CA, 1159488	1, 2, 5, 6
X	DE, A1, 2 709 426 (MAINPLASTIK GMBH) 7 September 1978 See page 3, lines 20-31, page 4, lines 1-10, figures 1-4	1-6, 9
X	CH, A, 194 816 (KAI KNUD ANDERS FREDERIK LARSEN) 16 March 1938 See whole document	1, 2, 5, 6
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.../...		
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IV. CERTIFICATION		
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
X	GB, A, 1 046 041 (MANUFACTURE DE MACHINES DU HAUT-RHIN) 19 October 1966 See whole document	1, 2, 5