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Applicant: **DEC Holding B.V.**  
**Ir. E.L.C. Schiffstraat 380**  
**NL-7547 RD Enschede(NL)**

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Inventor: **Pikula, Manfred**  
**Hengeveldebrink 194A**  
**NL-7544 TT Enschede(NL)**

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Representative: **Hoorweg, Petrus Nicolaas et al**  
**OCTROOBUREAU ARNOLD & SIEDSMA**  
**Sweelinckplein 1**  
**NL-2517 GK The Hague(NL)**

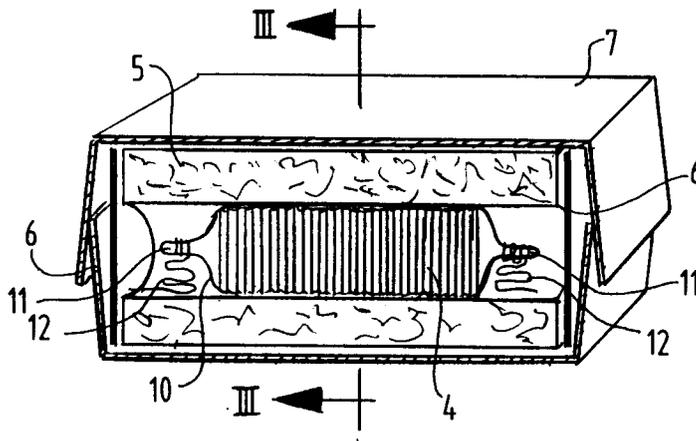
**Method for mounting and packing a tube from pliable foil material.**

A method for arranging on location a tube from pliable foil material (1) which is held in a tubular shape by one or more curved ribbings, for example in the form of a spirally wound wire (2), which tube is compressed in axial sense for transporting and storage.

Such tubes are typically manufactured from aluminium foil material which is very sensitive to deformation as a result of localized pressure. Since for transport purposes such a tube is compressed beforehand in axial sense (4) in the factory where it is

manufactured so that a small packet is obtained, this must be stretched to the normal operational length on site.

To avoid damage during stretching, the invention provides that prior to expanding, at least one annular body (10) is arranged in or round the tube such that at a determined cross-section of the tube a radial pressure is exerted on the foil material on all sides, the body is then moved along the tube in axial sense by means of a pulling element while applying a friction, in order to expand the tube.



**FIG. 2**

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The invention relates to a method for arranging on location a tube from pliable foil material which is held in a tubular shape by one or more curved ribbings, for example in the form of a spirally wound wire, which tube is compressed in axial sense for transporting and storage.

Such tubes are typically manufactured from aluminium foil material which is very sensitive to deformation as a result of localized pressure. Since for transport purposes such a tube is compressed beforehand in axial sense in the factory where it is manufactured so that a small packet is obtained, this must be stretched to the normal operational length on site. Such tubes serve for example for transporting gases, in particular hot gases, whereby the tube is usually also insulated by means of an additional, external second tube of insulating material, for example foam material or rock wool and the like. It has been usual up until now to stretch the tube manually, which always leads to damage of the tube periphery, which damage is almost impossible to repair.

The invention has for its object to improve a method of the type described in the preamble such that such damage no longer occurs. The method is distinguished in that, prior to expanding, at least one annular body is arranged in or round the tube such that at a determined cross-section of the tube a radial pressure is exerted on the foil material on all sides, and the body is then moved along the tube in axial sense while a friction is applied by means of a pulling element in order to expand the tube.

With the said method it is possible to fixedly hold one end of the tube in compressed state and to then pull the annular body through or along the tube to the other end, wherein the occurring friction force causes the tube to expand.

Since the friction force has been distributed uniformly over the periphery of the tube and an expansion force is therefore exerted over the full periphery of the tube, this expansion takes place without damage.

In the preferred embodiment the annular body is formed by a shrink foil which is arranged around the tube and which is arranged around the compressed tube by supplying heat. Arranging of the foil can take place easily because of the overdimensioning but by supplying heat the shrink foil uniformly and closely envelopes the periphery of the tube. By connecting the shrink foil to the pulling element the desired radial pressure on all sides of the foil material can thus be exerted with the pulling element.

In the particularly advantageous embodiment the shrink foil is arranged around the whole compressed tube as a sleeve. This simplifies arranging of the pulling element, since this can be fixed to

the portion of the sleeve protruding outside the compressed tube. The sleeve can moreover be provided with weak points so that, when the sleeve is simultaneously pulled to both sides, it can tear at the weak spots whereby the tube can be expanded to both sides.

The method lends itself particularly effectively for arranging the compressed tube with the annular body or the shrink foil sleeve in a second tube of insulating material prior to the expansion of the compressed tube. The second tube of insulating material can be arranged in advance on site, wherein the pulling element only needs to be pulled at both ends to uniformly expand the sleeve, and therewith the tube of foil material, in the tube of foam material or the like. In this manner an insulated tube is obtained without damage which can moreover be laid very quickly.

According to the invention it can be recommended for transport purposes to axially compress the insulated tube to and hold it at almost the same length as the compressed first tube of foil material. The obtained packet can be delivered as a unit on site and be expanded there in the sequence: insulated tube and then the tube of foil material.

Above mentioned and other features will be further elucidated in the figure description below of an embodiment. In the annexed drawing:

Fig. 1 shows a side view of a tube of foil material provided with a spirally wound reinforcing wire having around it in section an enveloping tube of insulating material,

fig. 2 shows an upright section of a packaging of a compressed tube having around it a compressed insulating tube,

fig. 3 shows a section according to the line III-III in fig. 2,

fig. 4 shows a schematic view of the method with which the tubes are expanded on location.

Designated with the numeral 1 is the tube of foil material which is made for example of aluminium material. The aluminium foil is for instance 0.2 mm thick, which makes the tube very sensitive to external forces. The tube is provided for this purpose inter alia with a spirally wound wire 2 which holds the foil material in a tubular form.

For particular purposes the tube of foil material has to be protected by a tube of insulating material 3 which is arranged therearound and which serves for instance to prevent heat loss from hot gases guided through the tube 1. This can for example be a gas for a hot air heating system.

Such assemblies are coupled to each other in the usual manner and therefore form a pipe system.

For transportation from the factory to the location where the tubes must be placed, at least the tube 1 is compressed in axial sense, which is

indicated by 4 in fig. 2. Since the foil material is easily pliable, the spirally wound wire 2 can easily be compressed into a packet of much smaller axial length.

The same can take place with the insulating jacket in the form of the tube 3, for which however much greater axial forces are necessary. For this purpose this tube 3, which is designated by 5 in fig. 2, is held fixedly at either end by a pressure plate 6 against the head ends which can be mutually joined. These plates 6 form for instance a part of a packing box 7, which can consist of any random material, for example cardboard, and be of sufficient strength to resist the compression forces on the insulating tube 5.

On site the packaging 7 is released and the tube 5 expands of itself to the tube 3 in fig. 1. This is shown in fig. 4. This insulating tube 3 can already be carried through a hole 8 in a wall 9 of a building structure, wherein the following problem occurs. The tube of foil material 1, shown in compressed state 4 in fig. 2, preserves its axial length and must be brought to the length of the outer tube 3 manually or with other materials. Great problems arise here because of the susceptibility to deforming of the foil material, whereby damage occurs.

The invention therefore proposes to arrange a sleeve of shrink foil 10 around the compressed tube 4. This shrink foil is tied together at both ends into a knot 11, to which a pulling cord 12 is arranged. By fastening the pulling cord on the one side to a fixed point 13 on the building structure and by then carrying the other opposite pulling cord 12 under a tensile force in the direction of the arrow P1, the shrink sleeve 10, which is provided beforehand with a weakened point between the knots 11, can be respectively cut through and pulled into two parts, wherein the left-hand portion in fig. 4 remains fastened to the fixed point 13 via cord 12, and the right-hand portion is pulled by the cord 12 in the direction of the arrow P1. Because of the friction forces occurring along the whole periphery of the tube 4 this is expanded without damage to the length of tube 3. A following section of insulated tube can then be arranged.

It will be apparent that the invention is not limited to tubes with insulating outer jacket. The tube of foil material 1 can also be expanded without the insulating tube 3 by means of a sleeve 10.

The sleeve 10 does not need to have the form of a closed bag, but can also consist of one single annular body provided with means for tying on a pulling cord 12. Only one annular body may therein be sufficient but it is also possible to use two bodies which are pulled to either side in accordance with the method described with reference to figure 4.

## Claims

1. Method for arranging on site a tube from pliable foil material which is held in a tubular shape by one or more curved ribbings, for example in the form of a spirally wound wire, which tube is compressed in axial sense for transport and storage **characterized in that**, prior to expanding, at least one annular body is arranged in or round the tube such that at a determined cross-section of the tube a radial pressure is exerted on the foil material on all sides, the body is then moved along the tube in axial sense by means of a pulling element while applying a friction, in order to expand the tube.
2. Method as claimed in claim 1, **characterized in that** an annular shrink foil is arranged around the compressed tube by supplying heat.
3. Method as claimed in claim 1, **characterized in that** a shrink foil is arranged as a sleeve around the whole compressed tube.
4. Method as claimed in claims 1 and 2 or 3, **characterized in that** the compressed tube with the annular body or with the shrink foil sleeve is placed prior to the expansion of the tube into a second tube of insulating material.
5. Method as claimed in claim 4, **characterized in that** for transport purposes the insulated tube is axially compressed to and held at almost the same length as the compressed first tube of foil material.
6. Method as claimed in claim 5, **characterized in that** the compressed packet with shrink foil is stored in a packaging such as a cardboard box.
7. Assembly suitable for the method as claimed in claims 1-6, consisting of an axially compressed inner tube of pliable foil material, and shrink foil arranged there-around, and a second enveloping tube of insulating material.
8. Assembly as claimed in claim 7, **characterized in that** the shrink foil is tied together at both ends into a knot, to which knot is arranged a pulling element, for example a cord.

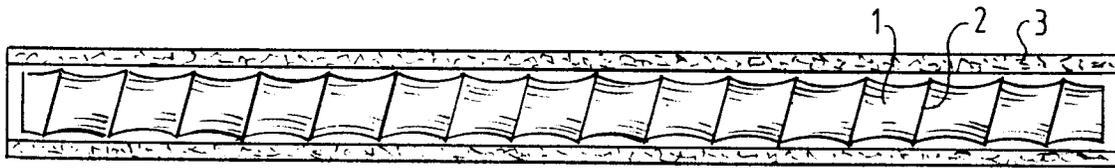


FIG. 1

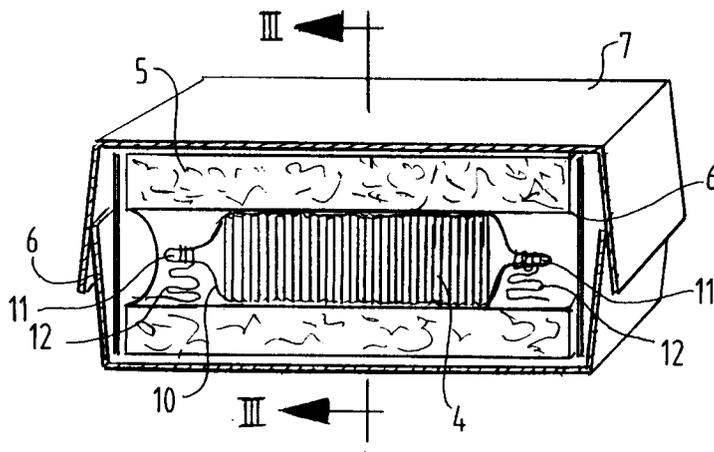


FIG. 2

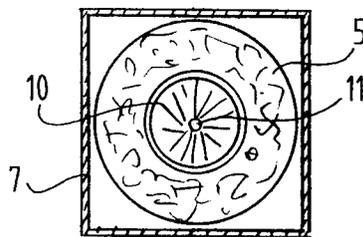


FIG. 3

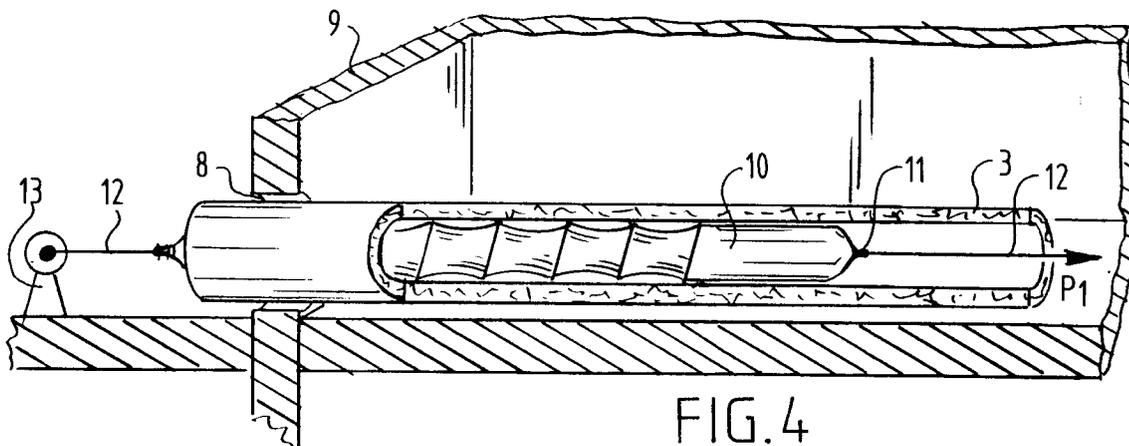


FIG. 4



EUROPEAN SEARCH  
REPORT

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.5)
X,A	FR-A-2 623 474 (SPIRAGINE) * the whole document * - - - -	1,7	B 65 D 85/08 F 16 L 55/165
A	FR-A-2 401 075 (UNION CARBIDE) - - - - -	2,3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 D F 16 L
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		23 September 91	RIS M.
<b>CATEGORY OF CITED DOCUMENTS</b> X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention		E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ..... &: member of the same patent family, corresponding document	