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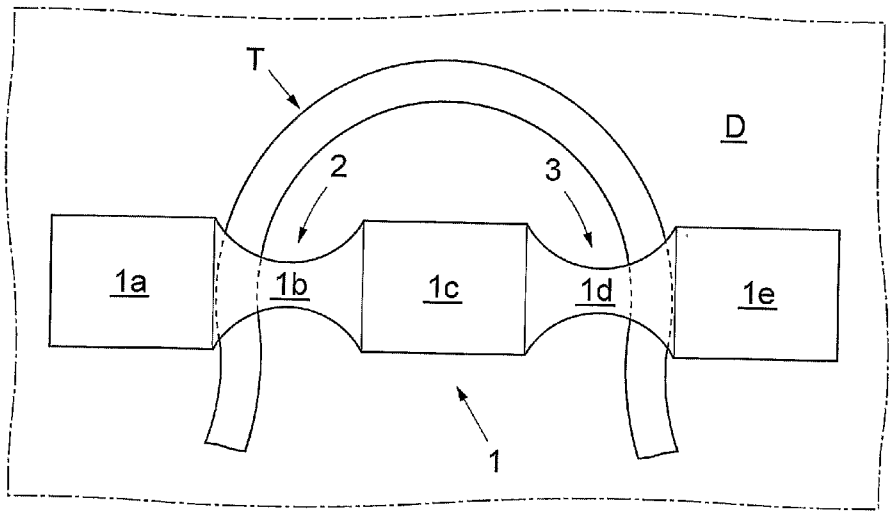
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(54) **Title:** TUBE HOLDER



(57) **Abstract:** The present invention relates to a tube holder (1) which, on a first side, comprises fastening means for fastening it to a support (D), such as a patient's cover in surgical interventions, and which, in the applied state, defines at least one opening (2, 3) for passage of a tube end. According to the invention, the tube holder (1) comprises a single band-shaped piece, and the fastening means extends only across parts (Ia, Ic, Ie) of the first side of the tube holder, so that at least part (Ib, Id) of the first side is without fastening means and is surrounded on both sides by parts that do have fastening means.

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Tube holder

Technical field

The present invention relates to a tube holder which, on a first side, comprises fastening means for fastening it to a support, such as a patient's cover in surgical interventions, and which, in the applied state, defines at least one opening for passage of a tube end.

Background art

In most surgical interventions, a plurality of tube holders are needed and are placed at a plurality of positions. At present there are two types of tube holder, a first type integrated in the patient's cover, i.e. in the surgical drape or sheet, which is placed round the operating site, and a second type comprising separate tube holders that can be fastened to the patient's cover and can be positioned free of the operating site. A known type of tube holder is composed of strip-shaped elements comprising a lower part, which can be fastened to the patient's cover at any desired position, and an upper part, which is or can be fastened to the lower part. The tubes are secured by being clamped securely between the upper part and lower part of the tube holder with the aid of velcro elements, where either the interacting hook or loop members of the velcro element are secured to the upper part, and the other members to the lower part. An example of such a tube holder is shown in US 5,082,111. Such tube holders function well, but they have the disadvantage of being relatively expensive to produce, on the one hand because they comprise several elements that have to be joined together, and on the other hand because the velcro elements themselves are relatively expensive. Moreover, the handling of such

tube holders often requires two hands to be used for applying or for adjusting the position of the tubes.

The object of the present invention is to make available a tube holder which comprises few elements, can be produced at low cost and is easy to handle.

Disclosure of the invention

According to the invention, these aims are achieved by means of a tube holder which, on a first side, comprises fastening means for fastening it to a support, such as a patient's cover in surgical interventions, and which, in the applied state, defines at least one opening for passage of a tube end, characterized in that the tube holder comprises a single band-shaped piece, and in that the fastening means extends only across parts of the first side of the tube holder, so that at least part of the first side is without fastening means and is surrounded on both sides by parts that do have fastening means, and in that, in the applied state on the support, the tube holder defines at least two openings for a tube. Such a tube holder is very simple and inexpensive to produce, since it comprises just a single band-shaped piece of material.

In a preferred embodiment, the openings for passage of a tube end are formed in those parts of the tube holder that are without fastening means.

In a first preferred variant, the tube holder is made of flexible material, for example plastic or foamed plastic. The parts of the band-shaped tube holder that are without fastening means can advantageously be narrower than the parts that are provided with fastening means.

In a second preferred variant, two separate holes extending in the longitudinal direction of the band-shaped tube holder and intended for passage of a tube end are formed in each part of the tube holder without fastening means.

In a second preferred embodiment, the tube holder is made of stiff material, and three fold lines are arranged in each part of the tube holder without fastening means and extend in the transverse direction of the band-shaped tube holder, of which two are situated adjacent to the respective parts which are provided with fastening means and which are located on both sides of the part in question, and the third is situated between these two fold lines. Moreover, a through-hole for passage of a tube end is formed on both sides of the central fold line.

Such a tube holder can be made of plastic material, for example of polyethylene.

Brief description of the drawings

The invention will now be described with reference to the attached figures, of which:

Fig. 1 shows a schematic top view of a tube holder according to a first embodiment of the invention,

Fig. 2 shows a cross-sectional view along the line II-II in Figure 1,

Fig. 3 shows a schematic top view of a tube holder according to a variant of the embodiment in Figure 1,

Figures 4 and 5 shows cross-sectional views of the tube holder in Figure 3, Fig. 4 illustrating the insertion of a tube end into the tube holder, and Fig. 5 illustrating the tube when applied,

Figures 6-8 show views, corresponding to Figures 3-5, of a tube holder according to a second embodiment of the invention, and

Fig. 9 shows a schematic top view of a tube holder according to a variant of the first embodiment of the invention.

Description of embodiments

Figure 1 shows a top view of a tube holder 1 which is fastened to a patient's cover D underneath it, for example to a surgical drape, of which part is shown in Figure 1. The tube holder 1 secures a tube or hose T, as will be described below.

The tube holder 1 comprises a band-shaped or strip-shaped piece of flexible material and, in the embodiment shown, has three parts 1a, 1c and 1e which are fastened in an expedient manner to the patient's cover D lying underneath. The parts 1b and 1d are not fastened to the patient's cover and, together with the patient's cover, they define openings 2 and 3 for passage of a tube end, which openings lie in the plane of the patient's cover D.

A tube end can be easily inserted through the openings 2 and 3 by virtue of the fact that patients' covers are always designed to be able to be draped and adapt to a patient's body. In the embodiment shown, the tube is intended to be

guided in a loop through the openings 2 and 3. The edges of the parts 1b and 1d are indented so that these parts are given an hourglass shape. This facilitates the insertion of the tube T through the openings 2 and 3 and, at the same time, the indentations show the user the location of the openings 2 and 3. Because of the flexural resistance of the tube T, the latter seeks to straighten itself from a bent to a rectilinear shape, which means that those areas of the tube T that are located in the openings 2 and 3 press with a certain force against those edges of the openings 2 and 3 that adjoin the parts 1b and 1e. It has been shown that the distance between these edges should not be greater than 13 cm, so that the generated force will be sufficient to ensure that a tube made of plastic material or rubber with a diameter of 5-15 mm and a wall thickness of 1-3 mm is held securely in place. Moreover, this distance should not be less than 5 cm, in order to ensure that the force is not so great that it makes it difficult to adjust the tube after application or places unnecessarily high demands on the material resistance of the tube holder 1 and on the strength of the attachment of parts 1a and 1e to the patient's cover. To facilitate insertion of a tube end in the openings 2 and 3, the width of these openings should be more than 1.5 times the tube diameter. During insertion or adjustment of a tube, at least after a tube loop has been formed, the tube should be moved away from the edge of the openings 2 and 3. This measure greatly reduces the tube friction against the tube holder and the patient's cover, since the contact pressure against the tube and patient's cover is small. Since the tube holder 1 uses the tube's flexural resistance to generate the frictional force that keeps a tube inserted in a loop or curve through the openings 2 and 3, the position of an applied tube can thus be easily changed by moving the tube to the side in the opening or openings before the tube is moved in its longitudinal direction, which measure drastically reduces the frictional force that seeks to counteract a movement of the tube in its longitudinal direction. Moreover, the

edges of the parts 1b and 1d of the tube holder 1 narrow towards the centre of the openings 2 and 3, so that the friction that arises is lowest if the tube, before movement in the longitudinal direction, is placed in the centre of one or both of the openings 2 and 3.

The tube holder 1 can in principle be made of any desired flexible material. Flexible material means a material that can be bent without its structure breaking up. Preferably, the tube holder 1 is made of plastic, foamed plastic or rubber-like material. An advantage of soft foamed plastic is that the friction against the tube is great, so that only a small flexural resistance of the tube is needed in order to securely hold it in place in the applied state. Other possible materials for the tube holder are paper, cloth or a nonwoven. The tube holder can also consist of different material combinations, for example a laminate of plastic and nonwoven. Moreover, the upper and lower faces of the tube holder can be coated to make them impervious to liquid, and the lower face, at least the parts without fastening means, can be coated with layers that increase the friction against a tube inserted in the openings.

In the embodiment shown in Figures 1 and 2, the tube holder 1 is connected to the patient's cover D by adhesive layers 4 on the lower faces of the parts 1a, 1c and 1e of the tube holder. The layers 4 can comprise adhesive applied directly to the tube holder, but can also comprise pieces of two-sided adhesive tape. The adhesive used can be rubber-based, acrylate-based or silicone-based. The adhesive is preferably a pressure-sensitive, acrylate-based adhesive.

The tube holder can be fastened to the patient's cover during manufacture of the latter and can thus constitute an integral part of the patient's cover. In such a design, the tube holder can be secured in any desired manner, for example by

welding, sewing or gluing. It is preferable, however, for the tube holder to constitute a part which is separate from the patient's cover and which the surgeon or operating staff can secure at any desired position on the patient's cover, the fastening means in this case being composed of adhesive. In such a design, the tube holder is expediently provided with a protective layer for the adhesive layers, a so-called release layer, for example silicone-coated paper.

In the embodiment shown in Figures 1 and 2, the tube holder 1 comprises only two openings. It is of course possible to design the tube holder with several openings, i.e. parts corresponding to the parts 1b and 1d, in order to be able to place the tube loop at different positions or to fit more than one tube loop. It is also conceivable to supply a long row of interconnected tube holders according to Figure 1 on a reel, which tube holders are delimited from one another by lines of weakening, for example perforated lines, in order to allow a user to apply any desired number of interconnected tube holders to a patient's cover by quite simply tearing off a row with the desired number of tube holders from the reel.

Figure 9 shows a variant of the first embodiment shown in Figures 1 and 2. In principle, the tube holder 1' shown in Figure 9 differs from the tube holder 1 in Figures 1 and 2 only in that the openings 2', 3' are formed at a distance from the edges of a rectangular piece of material instead of forming part of these edges, as in the design according to Figures 1 and 2. In Figure 9, the components of the tube holder 1' that correspond to similar components in the design according to Figures 1 and 2 have been given the same reference numbers as in Figure 1, with addition of a prime. The tube holder 1' thus functions in the same way as the tube holder 1 according to Figures 1 and 2.

Figures 3-5 show schematic views of a tube holder 5 according to a second embodiment of the invention. The tube holder 5 differs from the embodiment shown in Figures 1 and 2, mainly in that the openings for passage of a tube end consist of two through-holes 6, 7 formed in the band-shaped tube holder 5. The tube holder 5 shown in Figures 3-5 has two parts 5a and 5c which are fastened in an expedient manner to a patient's cover D, and a central part 5b which is not connected to the patient's cover and which is not provided with any fastening means. The holes 6, 7 are formed in the central part 5b, preferably in line with each other.

The insertion of a tube end through the holes 6, 7 is very simple. The tube end is inserted into the hole 6 for example, and the edge of the hole 6 facing towards the hole 7 is lifted with the aid of the end edge of the tube T. This lifting of the edge of the hole 6 also means that a central area of the part 5b is lifted, to form a fold or crease in the underlying patient's cover, on condition that the material of the tube holder has a certain stiffness. Thereafter, the tube end guided through the hole 6 is inserted through the at least partially lifted hole 7. When the tube has been pulled through the holes 6 and 7 to the desired extent, the patient's cover D is smoothed out. As the patient's cover is smoothed out, the tube T comes to bear against the lower edges of the holes 6 and 7 with a certain force. Some of this force will remain on account of the fact that the friction of the patient's cover against the underlying patient counteracts movement of the patient's cover, the force of gravity from hanging parts acts in the direction of smoothing, etc. The flexural resistance of the part 5b will also contribute to the lower edges of the holes 6 and 7 pressing against the tube T. The flexural resistance of the tube T also causes the tube to bear against the lower edges of the holes 6 and 7, but the small curvature that the passage of the tube through the holes 6 and 7 leads to means that the effect of

the tube's flexural resistance is negligible. The tube thus comes to bear against the lower edges of the holes 6 and 7 with a certain force. The tube holder 5, the tube T and the patient's cover D assume the positions indicated in Figure 5.

Instead of using the relatively stiff tube end to lift the edge of the hole 6, the user can move the parts 5a and 5c towards each other before inserting the tube end, as is indicated schematically in Figure 4, and can then insert the tube end through the holes 6, 7. It should be noted here that the fold in the patient's cover as shown in the figure is shown only for illustrative purposes. In actual fact, the patient on whom the cover is applied prevents a vertical folding of the cover, for which reason the illustrated fold will in reality have a horizontal extent. The materials and fastening means that are suitable for the tube holder 1 according to Figures 1 and 2 are also suitable for the tube holder 5.

The positions of the tube holder 5 and tube T shown in Figure 5 apply to tube holders whose flexural resistance is relatively low. If the flexural resistance of the part 5b of the tube holder is greater, the tube holder itself will seek to return to a straight position from the curved configurations shown in Figures 4 and 5. Thus, the upper edges of the holes 6, 7 shown in Figure 5 will also come to bear against the tube T. In the case of tube holders with a high flexural resistance, it may be expedient for the holes 6, 7 to be elongate instead of circular and to extend to the boundary with the part 5a, 5c.

For tube holders made of very soft material, such as soft foamed plastic, or readily bendable material, such as thin cloth, there is no lifting of the central area of the part 5b upon insertion of a tube end into the hole 6, and instead, during this passage of the tube T, there is a successive lifting of the tube holder part 5b within the area of the tube T as the tube end is moved towards the hole

7. For tube holders of soft foamed plastic, a simultaneous compression of the foam takes place. In such tube holders, the tube T comes to bear against the lower face of the tube holder and the top of the patient's cover D along the entire extent between the holes 6 and 7 and is maintained by the friction against the tube holder and patient's cover. In such tube holders too, the patient's cover can be folded before insertion, in which case the abovementioned bearing of the tube against the lower face of the tube holder and the top face of the patient's cover comes about after the fold in the patient's cover has been smoothed out.

It is not necessary to mark the openings 2, 3, 2', 3' through some special configuration of the edges in the tube holder 1 or of the cuts in the tube holder 1', but the edges should be able to be straight in the tube holder 1 and the cuts should be able to be straight in the tube holder 1'. Under such circumstances, however, it is expedient to mark these openings in another way, for example by markings on the top face of such tube holders or by recesses in the material which show the centre points of the openings.

Figures 6-8 show a tube holder 8 according to a third embodiment of the invention. This tube holder differs from the tube holder shown in Figures 3-5 mainly in that it is produced from a stiff material, for example a stiff plastic material, which cannot be bent without its inner structure being changed. The tube holder 8 shown in Figures 6-8 has two parts 8a and 8c which are fastened in a suitable manner to a patient's cover D, and a central part 8b which is not connected to the patient's cover and which is not provided with any fastening means. Three transverse fold lines 9, 10, 11 are also formed in the tube holder 8, of which the lines 9 and 10 extend in the boundary surface between parts 8b and 8a and parts 8b and 8c, respectively. The third fold line 11 extends in the

part 8b midway between the lines 9 and 10. To both sides of the fold line 11, through-holes 12, 13 are formed in the part 8b.

The presence of the fold lines 9-11 means that it is easy to bring the tube holder 8 to the configuration shown in Figure 7 by guiding the parts 8a and 8c towards one another and thus folding the patient's cover D. The tube end is then inserted through the openings 12 and 13, after which the patient's cover is smoothed out. As the patient's cover is smoothed out, the tube T comes to bear against the lower edges of the holes 12 and 13 with a certain force. Some of this force will remain on account of the fact that the friction of the patient cover against the underlying patient counteracts movement of the patient's cover, the force of gravity of hanging parts acts in the direction of smoothing, etc. This means that the tube comes to bear with a certain force against the lower edges of the holes 12 and 13.

It is of course possible for a tube holder made of relatively stiff paper or cardboard to be designed with fold lines so that it functions in the same way as the tube holder 8.

For the sake of clarity, it should be noted that in the embodiments described with reference to Figures 3-8 there is no complete smoothing of the patient's cover. Instead, transverse folds or creases remain in the patient's cover in the area around the parts 5b and 8b. In Figures 4, 5 and 8, the tube T inserted in the holes 6, 7 and 12, 13, respectively, is shown from above, the tube's curve lying in a vertical plane. It is of course possible to insert the tube from the side so that its curvature comes to lie in another plane, for example a horizontal plane, or to turn the tube in the holes after insertion so that its curve comes to lie in the desired plane.

The described embodiments of the tube holder can of course be modified in a number of ways within the scope of the invention. For example, the shape of the tube holder shown in the figures can be varied, for example the rectangular parts provided with fastening means can have another shape, for example triangular, semicircular, square, oval, etc. The parts without fastening means can also have another shape. In the embodiment shown in Figure 1, the centre of the parts without fastening means can be marked in some other way than through an hourglass shape, for example by means of a visual symbol arranged on the upper face of the tube holder. Several tube holders according to Figures 3 and 6 can be releasably or fixedly connected to one another in order to form a tube holder for permitting insertion of several tubes. The scope of the invention is therefore limited only by the content of the attached patent claims.

Claims

1. Tube holder (1; 5; 8) which, on a first side, comprises fastening means for fastening it to a support (D), such as a patient's cover in surgical interventions, and which, in the applied state, defines at least one opening (2, 3; 6, 7; 12, 13) for passage of a tube end, characterized in that the tube holder (1; 5, 8) comprises a single band-shaped piece, and in that the fastening means extends only across parts (1a, 1c, 1e; 5a, 5c; 8a, 8c) of the first side of the tube holder, so that at least part (1b, 1d; 5b; 8b) of the first side is without fastening means and is surrounded on both sides by parts that do have fastening means, and in that, in the applied state on the support (D), the tube holder defines at least two openings (2, 3; 6, 7; 12, 13) for a tube (T).

2. Tube holder according to Claim 1, characterized in that the openings (2, 3; 6, 7; 12, 13) for passage of a tube end are formed in those parts (1b, 1d; 5b; 8b) of the tube holder (1; 5; 8) that are without fastening means.

3. Tube holder according to Claim 2, characterized in that the tube holder (1; 5) is made of flexible material.

4. Tube holder according to Claim 3, characterized in that the tube holder (1; 5) is made of plastic.

5. Tube holder according to Claim 4, characterized in that the tube holder (1) is made of foamed plastic.

6. Tube holder according to any of Claims 3, 4 or 5, characterized in that

the parts (1b, 1d) of the band-shaped tube holder (1) that are without fastening means are narrower than the parts (1a, 1c, 1e) that are provided with fastening means.

7. Tube holder according to any of Claims 3, 4 or 5, characterized in that two separate holes (6, 7; 12, 13) extending in the longitudinal direction of the band-shaped tube holder (5; 8) and intended for passage of a tube end are formed in each part (5b; 8b) of the tube holder without fastening means.

8. Tube holder according to Claim 2, characterized in that the tube holder (8) is made of stiff material, in that three fold lines (9, 10, 11) are arranged in each part (8b) of the tube holder without fastening means and extend in the transverse direction of the band-shaped tube holder, of which two (9, 10) are situated adjacent to the respective parts (8a, 8c) which are provided with fastening means and which are located on both sides of the part (8b) in question, and the third (11) is situated between these two fold lines, and in that a through-hole (12, 13) for passage of a tube end is formed on both sides of the central fold line (11).

9. Tube holder according to Claim 8, characterized in that it (8) is made of plastic material.

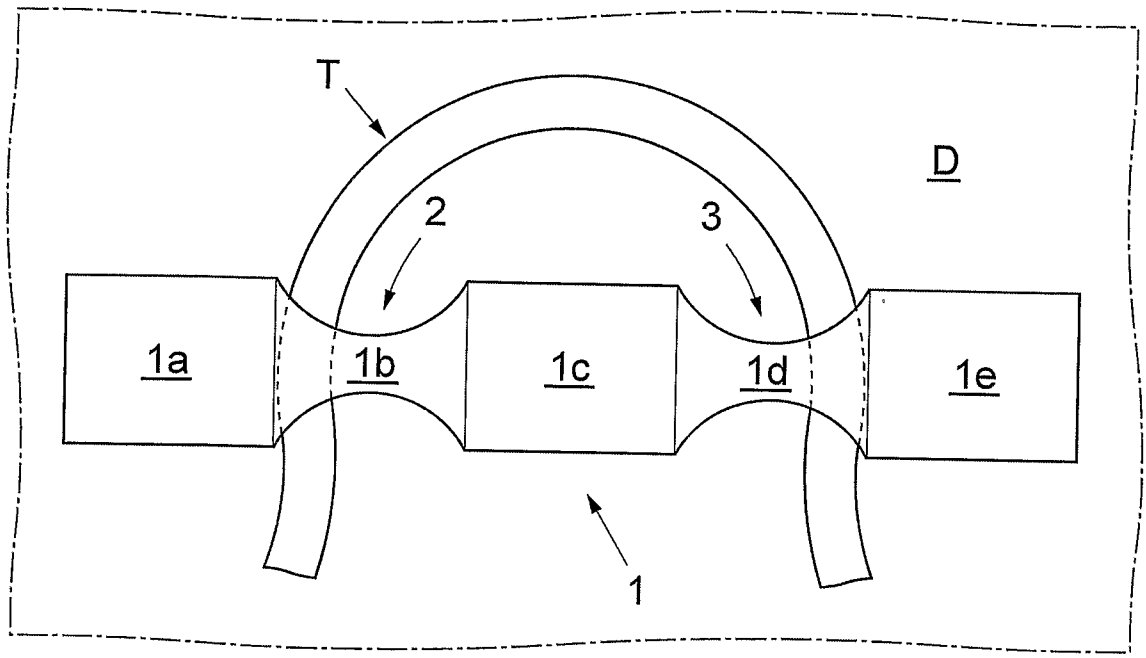


Fig.1

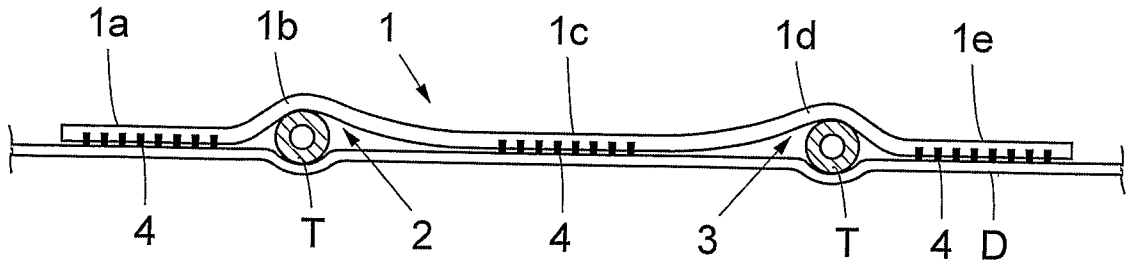


Fig.2

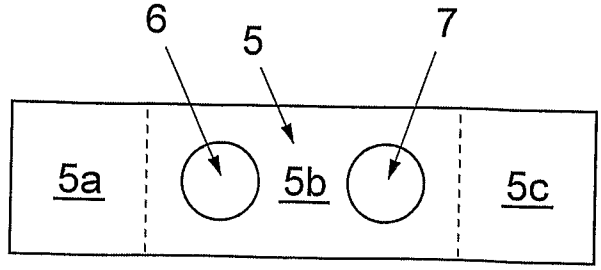


Fig.3

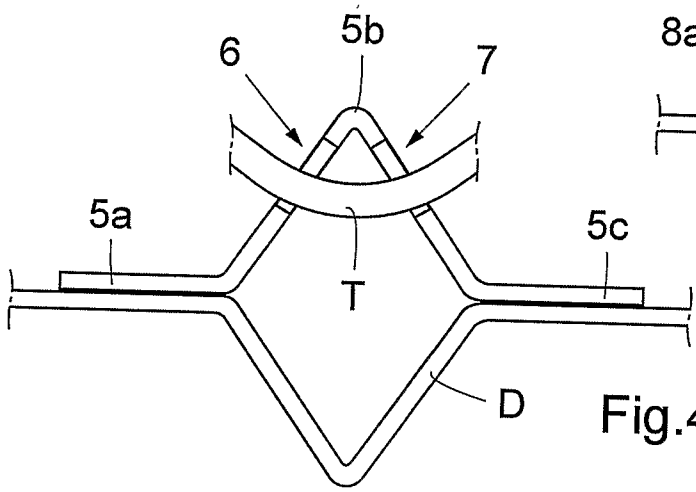


Fig.4

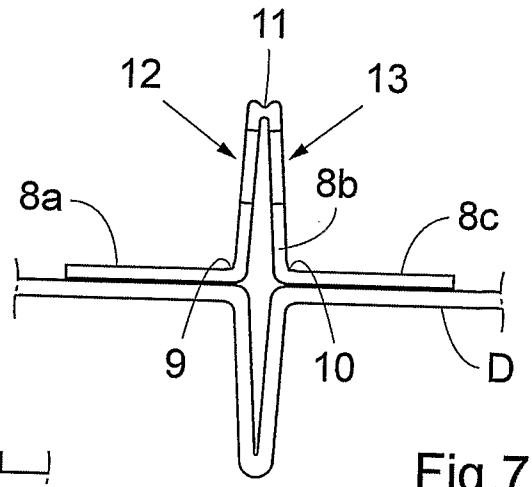


Fig.7

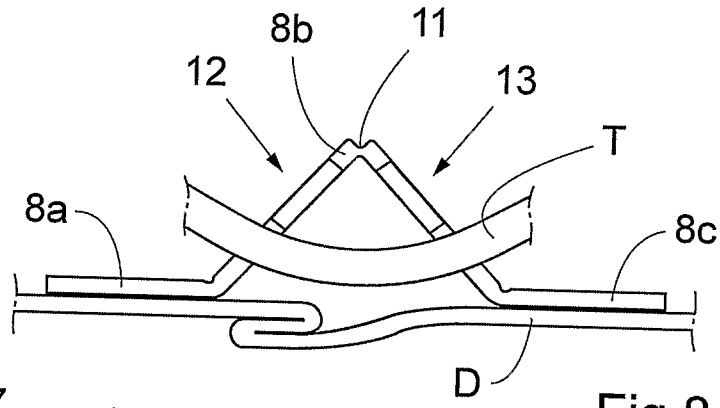


Fig.8

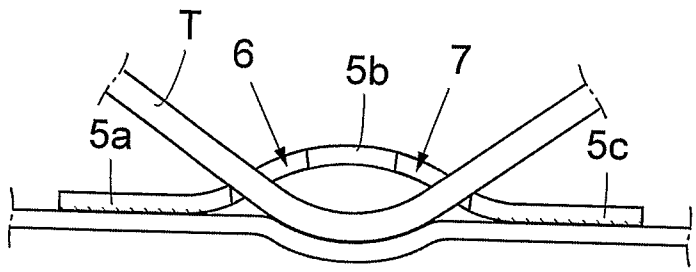


Fig.5

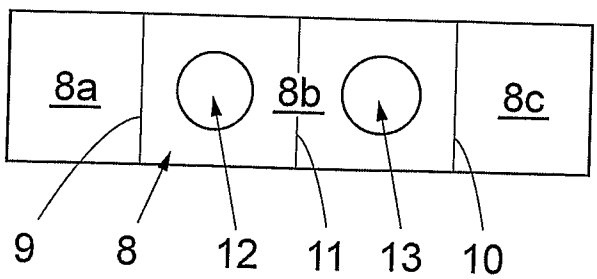


Fig.6

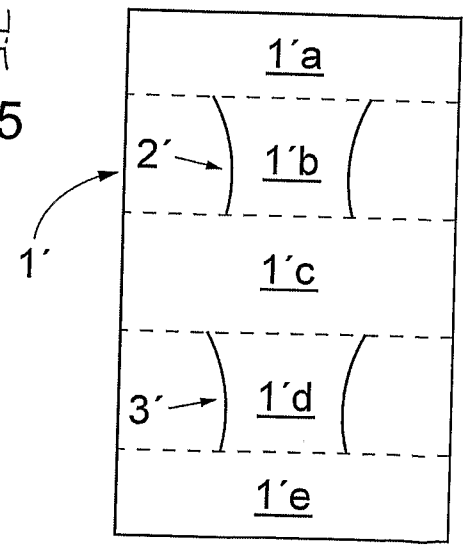


Fig.9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2006/050243

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4669458 A (ABRAHAM ET AL), 2 June 1987 (02.06.1987), figures 4,6, abstract ---	1-10
A	US 3677250 A (THOMAS), 18 July 1972 (18.07.1972), fig, abstract ---	1-10
A	US 3834380 A (BOYD), 10 Sept 1974 (10.09.1974), fig, abstract ---	1-10
A	US 5785690 A (NEWMAN ET AL), 28 July 1998 (28.07.1998), figure 2, abstract ---	1-10

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
10 October 2006	11 -10- 2006
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5082111 A (CORBITT JR ET AL), 21 January 1992 (21.01.1992), fig, abstract ---	1-10
A	EP 0720836 A2 (DOBKIN, WILLIAM R), 10 July 1996 (10.07.1996), fig, abstract ---	1-10
A	US 5292312 A (DELK ET AL), 8 March 1994 (08.03.1994), fig, abstract --- ---	1-10

International patent classification (IPC)
A61M 25/02 (2006.01)

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Cited literature, if any, will be enclosed in paper form.

US	4669458	A	02/06/1987	NONE		
US	3677250	A	18/07/1972	NONE		
US	3834380	A	10/09/1974	NONE		
US	5785690	A	28/07/1998	AU	688463 B	12/03/1998
				AU	1685095 A	25/09/1995
				CA	2183244 A	14/09/1995
				DE	69508388 D,T	18/11/1999
				DK	749335 T	05/06/2000
				EP	0749335 A,B	27/12/1996
				SE	0749335 T3	
				FI	963538 A	07/11/1996
				JP	3771257 B	26/04/2006
				JP	9509869 T	07/10/1997
				US	5468231 A	21/11/1995
				WO	9524238 A	14/09/1995
US	5082111	A	21/01/1992	NONE		
EP	0720836	A2	10/07/1996	AU	707378 B	08/07/1999
				AU	4081196 A	11/07/1996
				CA	2166428 A	06/07/1996
				JP	8322851 A	10/12/1996
				US	5643217 A	01/07/1997
				US	5735821 A	07/04/1998
US	5292312	A	08/03/1994	NONE		