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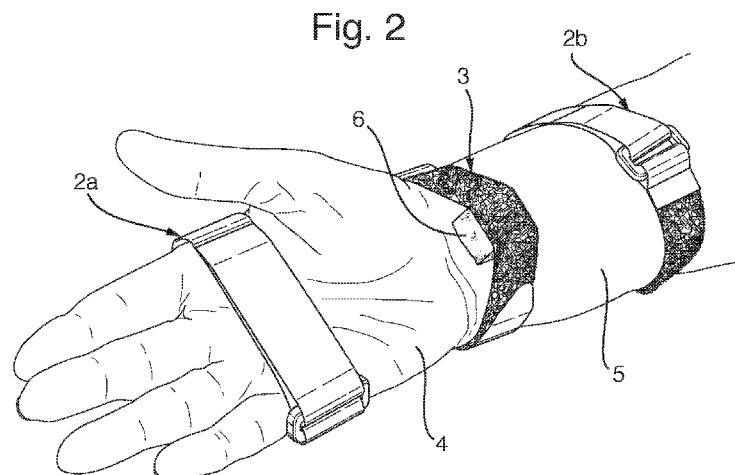
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(54) Title: SUPPORT AND COMPRESSION DEVICE FOR A HAND AND A FOREARM



(57) Abstract: A support and compression device for a hand and a forearm comprises a support device (1) which has a substantially elongate shape and fastening straps (2a, 2b) mounted spaced apart and arranged to secure the support device (1) to a hand (4) and a forearm (5) in order to support them in a given position relative to each other. The support and compression device also comprises a compression device (6) with at least two opposite, substantially parallel, sides (16a, 16b) where the first side (16a) is attached to fastening strap (3) that can be tightened around the support device (1) and the forearm (5) and apply a pressure via the compression device (6) to an area of the forearm (5). The support device has at least, one contact face (7a, 7b) that is arranged to rest against the forearm (5) and the hand (4), and the compression device (6), on its second side (16b), has at least one fluid-absorbent pad (14) and an adjacent adhesive face (13).

Support and compression device for a hand and a forearm

Field of the invention

The invention relates to equipment for applying a plaster to and exerting compression on a point on the forearm to prevent bleeding from an artery or vein after a needle, cannula or the like has been inserted and withdrawn, as described in the preamble of claim 1.

Background of the invention

The prior art includes US 5873890A, which describes a system and a method for preventing the spurting of blood from a vein or artery. The system consists of an adhesive tape comprising an air permeable non-woven material with an absorbent pad that expands on contact with fluids, and a separate armband for use with the tape, the armband including a flexible strap and a pressure box that is to exert pressure against the tape and the wound after removal of a needle, without cutting off circulation in the arm and without requiring extra assistance from a nurse.

Also included in the prior art is WO 2011073076A1, which describes a plate having a rectangular, concave shape adapted to the shape of the posterior of the forearm, wrist and hand. The plate is equipped with an attachment band at each distal end to be fastened around the arm and hand, and is anatomically shaped to exert pressure between the bones of the forearm. The invention also relates to a system for exerting compression on an artery in the forearm which has had a needle or the like inserted therein and withdrawn therefrom. The system comprises a compression unit consisting of a rectangular compression element of a transparent material and an attachment band to fasten around the previously described plate and forearm.

Summary of the invention

According to the invention there is provided a support and compression device for a forearm and a hand, comprising:

- a support device that has a substantially elongate form and where the support device has fastening straps mounted spaced apart and arranged to secure the support device to a hand and a forearm in order to support them in a given position in relation to each other;
 - a compression device with at least two opposite, substantially parallel sides, where the first side is attached to a fastening strap that can be tightened around the support device and the forearm and apply a pressure via the compression device to an area of the forearm,
- characterised in that the support device has at least one contact face that is arranged to rest against the forearm and the hand, and the compression device, on its second side, has at least one fluid-absorbent pad and an adjacent adhesive face.

In an embodiment, the at least one contact face has at least in part a soft friction material.

In an embodiment, the at least one surrounding adhesive face and the fluid-absorbent pad, together, cover a larger area than the second side.

- In an embodiment, the support device has a bent portion such that the hand is supported at a given angle relative to the forearm.

In an embodiment, the fastening straps comprise locking means of the hook and loop fastener type.

Brief description of the drawings

These and other characteristic features of the invention will be explained in more detail in the following description of a preferred embodiment, given as a non-limiting example, with reference to the attached drawings, wherein:

- Figure 1 is a perspective drawing showing the support plate secured to a hand and a forearm, and the hook and loop fastener to which the compression pad is attached.

Figure 2 is a perspective drawing showing the compression pad fastened by the hook and loop fastener around the forearm, and the hook and loop fasteners of the support plate fastened around the hand and the forearm.

Figure 3 is a bottom view of the support plate with hook and loop fasteners.

5 Figure 4 shows the support plate seen from one of its short sides.

Figure 5 shows the support plate seen from one of its long sides.

Figure 6 is a bottom view of the compression pad with hook and loop fastener.

Figure 7 is a perspective drawing showing the compression pad and the plaster with a partly removed protective film.

10 Figure 8 is a perspective drawing showing an alternative embodiment

Detailed description

Figure 1 shows the support plate 1 secured to the hand 4 and the forearm 5 of a user, seen from above. A hook and loop fastener 2a is attached to one end of the support plate 1, which hook and loop fastener 2a is wound around the user's hand 4 and tightened to press the hand 4 against the support plate 1. This way of using hook and loop fasteners to tighten around something is well known, and is described in more detail in the explanation relating to Figure 3. At the other end of the support plate 1 is attached a hook and loop fastener 2b that is wound around the user's forearm 5 and tightened to press the forearm against support plate. The hook and loop fasteners 2a, 2b do not need to be tightened very much in order to obtain the desired support effect, and they also have a hook and loop fastener band which is of a width that gives a comfortable pressure distribution on the hand 4 and the forearm 5.

When the hand 4 and the forearm 5 are strapped firmly to the support plate, the hand 4 and the forearm 5 are positioned relative to each other in a position that is controlled by the shape of the support plate 1. This position essentially entails an angle between the hand 4 and the forearm 5, where the back of the hand 4 forms an angle with the forearm 5 that is 180° or less. The support plate 1 can be adapted to form an angle that is most

advantageous for the desired purpose, for example, to insert needles into blood vessels in the forearm 5. The length of the support plate 1 is adapted such that on the majority of users it will extend along the back of the hand 4, almost up to the knuckles, and thus give maximum support whilst allowing movement of the fingers. In the opposite
5 direction, the support plate 1 extends substantially the same length from the wrist along the back of the forearm 5.

Figure 1 also shows a hook and loop fastener 3 that is not attached to the support plate 1, but that is attached to a compression pad (6, not visible in Figure 1, see Figure 2). This hook and loop fastener 3 with compression pad is fastened after the support plate 1
10 has been secured to the hand 4 and the forearm 5, and the hook and loop fastener 3 uses the same principle for attachment to the forearm 5, or at the junction between hand 4 and forearm 5, as the previously mentioned hook and loop fasteners 2a, 2b. All three hook and loop fasteners 2a, 2b, 3 are essentially of equal length, and essentially of equal width.

15 Figure 2 shows the support plate (1, not visible in Figure 2, see Figure 1) secured to the hand 4 and the forearm 5 of a user, seen from below. Because the hand 4 and the forearm 5 are positioned advantageously relative to each other, it is easy to place, for example, a needle in the forearm 5 of the user, after which the user can relax his hand 4, which will remain in position relative to the forearm 5. After a needle has been removed
20 from, for example, an artery or vein in the forearm 5, pressure must be applied to stop the bleeding, and this is often done using a compression pad 6 that is attached to a fastening strap, for example, a hook and loop fastener 3. This is a well-known procedure. The compression pressure is determined by tightening the hook and loop fastener 3; the tighter the hook and loop fastener 3, the higher the pressure from the
25 compression pad 6 on the forearm 5.

Figure 3 shows the support plate 1 from below. On each long side of the support plate 1 are two flanges 7a, 7b that are shaped such that they rest against the hand and the forearm. Mounted on top of these flanges 7a, 7b is foam rubber 8a, 8b that adapts to the contours of the hand 4 and the forearm 5 and enhances the user comfort of the support
30 plate 1, especially if it is to be strapped to the user for any length of time. The foam rubber 8a, 8b also increases the friction against the skin, with the effect that the support

plate 1 better remains in place and is not displaced during use. Instead of foam rubber 8a, 8b, there could also be used, for example, a soft plastic, a soft rubber, felt, or other suitable material.

The length of the hook and loop fasteners 2a, 2b can be essentially the same in order to simplify the production thereof, but the length may also be different to better adapt to the proportions of the circumference around a hand and a forearm. The hook and loop fastener 2b that is to be fastened around the forearm has the support plate attached essentially in the middle of its length. The hook and loop fastener 2a that is to be fastened around the hand has the support plate attached essentially 1/3 of the way along the total length of the hook and loop fastener in the direction of the ring 9a. The asymmetrical positioning makes it easier to secure the support plate to the hand because the distance from the ring 9a to the support plate 1 is shorter. In particular, it will be easier for a user himself to secure the support plate 1 to one of his hands because the ring 9a is closer to the hand that is to be immobilised.

To fasten the hook and loop fastener 2a around the hand, both ends 9a, 10a of the hook and loop fastener are passed around the hand and the end 10a is passed through the ring 9a so as to be doubled back on itself, tightened and fastened to itself by means of the hook and loop fastener principle. This method is not shown but is common in connection with the use of hook and loop fasteners for fastening around a body. The same method applies in the case of the hook and loop fastener 2b that is to be fastened around the support plate 1 and the forearm. In that case, the end 10b is passed through the ring 9b and fastened back on itself.

Figure 4 shows the support plate 1 seen from one of its short sides. The two flanges 7a, 7b have a design that allows the respective contact faces (on which the foam rubber 8a, 8b is mounted) to lie on the same plane, with the result that the support plate 1 will rest better against forearms and hands of varying size and shape. The foam rubber 8a, 8b is glued to the flanges 7a, 7b, but these parts could also be joined together by being sewn, moulded, self-adhered or in some other way fastened together. By having two narrow contact faces, the support plate 1 is prevented from resting against the hand and the forearm across the whole width of the support plate 1, and this will enhance the comfort for the user by allowing circulation of air in the space between the two flanges 7a, 7b.

The two flanges 7a, 7b do not need to lie in the same plane or be parallel, they may also slant towards each other in both the longitudinal direction and across the width of the support plate 1, to make them as agreeable as possible to use for an as large as possible user group.

- 5 The arc-shaped profile 17 of the support plate 1 also has the effect of making the support plate 1 more rigid, even though the material it is made of is not very rigid in sheet form. The material thickness can thus also be reduced in order to save weight and production costs, whilst maintaining the rigidity of the support plate 1.

Figure 5 shows the support plate 1 seen from one of its long sides, with a bend 11
10 essentially in the middle in the longitudinal direction, which means that the hand and the forearm have a desired relative position in relation to each other. This relative position is optimised with a view to, for example, insertion of needles in the forearm.

Figure 6 shows the hook and loop fastener 3 with the compression pad (6, not visible in
15 Figure 6, see Figure 7) and plaster 12 seen from below. The hook and loop fastener 3 is attached to one side of the compression pad, and on the other side a plaster 12 is attached. The function and use of the compression pad and plaster 12 are described in the explanation relating to Figure 7.

Figure 7 shows the compression pad 6 with attached plaster 12, which plaster 12
20 consists of an adhesive face 13, a fluid-absorbent pad 14 and a protective film 15. The protective film 15 protects the adhesive face 13 from dirt that reduces the adhesive power when the plaster is not in use, and prevents contaminants from reaching the fluid-absorbent pad 14 prior to use. The protective film 15 can easily be removed by gripping a tab and pulling it off the adhesive face 13, in the way plasters usually work. The
25 protective film can be in two parts (not shown in the figure) and with projecting tabs for easy removal of the protective film with the fingers. The normal procedure is to grip and remove first one part of the protective film and then place the plaster at the desired spot on the skin. Subsequently, the second part of the protective film is removed so that the whole plaster sticks to the skin and the sterile plaster has been exposed to a minimum of possible sources of infection.

The advantage of having a plaster 12 that is attached to the compression pad 6 which in turn is attached to the hook and loop fastener 3 is that it is easy to affix the plaster 12 to the desired spot on the forearm, with the result that the compression pad 6 will also be placed and exert pressure on the right spot in relation to the position of the plaster 12.

5 The compression pad 6 has two substantially parallel sides 16a and 16b, where the hook and loop fastener 3 is affixed to the first side 16a, and the plaster is affixed to the second side 16b. After the plaster 12 (together with the compression pad 6 and the hook and loop fastener 3) has been affixed at the desired spot on the forearm, the hook and loop fastener 3 is then easily fastened around the forearm and the support plate without any
10 danger of the compression pad 6 being displaced relative to the plaster 12. The hook and loop fastener 3 is subsequently tightened until a desired pressure from the hook and loop fastener 3 is exerted on the compression pad 6 and the plaster 12. The compression pad 6 and the hook and loop fastener 3 are preferably made of light materials as this will further simplify application, and ensure that the plaster does not accidentally work loose
15 from the forearm and fall off.

Because the hook and loop fastener 3, the compression pad 6 and the plaster 12 will constitute an independent, separate part, and are not a part of, for example, the support plate, this part can be manufactured and kept sterile (because of the plaster). Thus, stringent requirements as regards the manufacture and storage of the support plate with
20 associated hook and loop fasteners will not be necessary, and this will also lead to cost savings in production.

Figure 8 shows an alternative embodiment of the support and compression device, where the fastening means comprise hook and loop fasteners only. In this embodiment, the support plate 1' is attached to the distal end of the hook and loop fasteners 2a' and
25 2b'. The support plate 1' is affixed to the hand and forearm by tightening the fasteners 2a' and 2b' around the arm, and securing them by means of the hook and loop function. The compression pad 6' (not shown in figure 8) and plaster 12' is in this embodiment situated in the middle portion of the hook and loop fastener 3'. In order to ease the affixing of the hook and loop fastener 3' to the underarm, a strip of hook and loop
30 fastener 18 is attached to the support plate 1'. After the support plate 1' has been affixed to the hand and underarm, one of the distal ends of the fastener 3' is attached to the hook

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and loop fastener 18, whereby the plaster 12' is affixed to the desired point on the forearm, and the other distal end of the fastener 3' is fastened on top of the hook and loop fastener 3'.

In order to facilitate the production of the support device, a ridge 19 indicates where the
5 hook and loop fastener 18 should be placed, and this ridge may also have the shape of an arrow, indicating which way the support plate 1' should be placed on the forearm when in use (the arrow pointing in the direction of the hand). Likewise, in order to further facilitate the production of the support device, ridges 20a,b,c,d indicate where the hook and loop fasteners 2a' and 2b' should be placed on the support plate 1'.

10

Claims

1. A support and compression device for a hand and a forearm, comprising:
- a support device (1) that has a substantially elongate form, and where the support device (1) has fastening straps (2a, 2b) mounted spaced apart and arranged to secure the support device (1) to a hand (4) and a forearm (5) in order to support them in a given position in relation to each another;
 - a compression device (6) with at least two opposite, substantially parallel, sides (16a, 16b), where the first side (16a) is attached to a fastening strap (3) that can be tightened around the support device (1) and the forearm (5) and apply a pressure via the compression device (6) to an area of the forearm (5),
- characterised in that** the support device (1) has at least one contact face (7a, 7b) that is arranged to rest against the hand (4) and the forearm (5), and the compression device (6), on its second side (16b), has at least one fluid-absorbent pad (14) and an adjacent adhesive face (13).
2. A device according to claim 1, **characterised in that** the at least one contact face (7a, 7b) at least in part has a soft friction material (8a, 8b).
3. A device according to claim 1, **characterised in that** the at least one surrounding adhesive face (13) and the fluid-absorbent pad (14), together, cover a larger area than the second side (16b).
4. A device according to claim 1, **characterised in that** the support device (1) has a bent portion (11) such that the hand (4) is supported at a given angle relative to the forearm (5).

5. A device according to claim 1, **characterised in that** the fastening straps (2a, 2b, 3) comprise locking means of the hook and loop fastener type.

Fig. 1

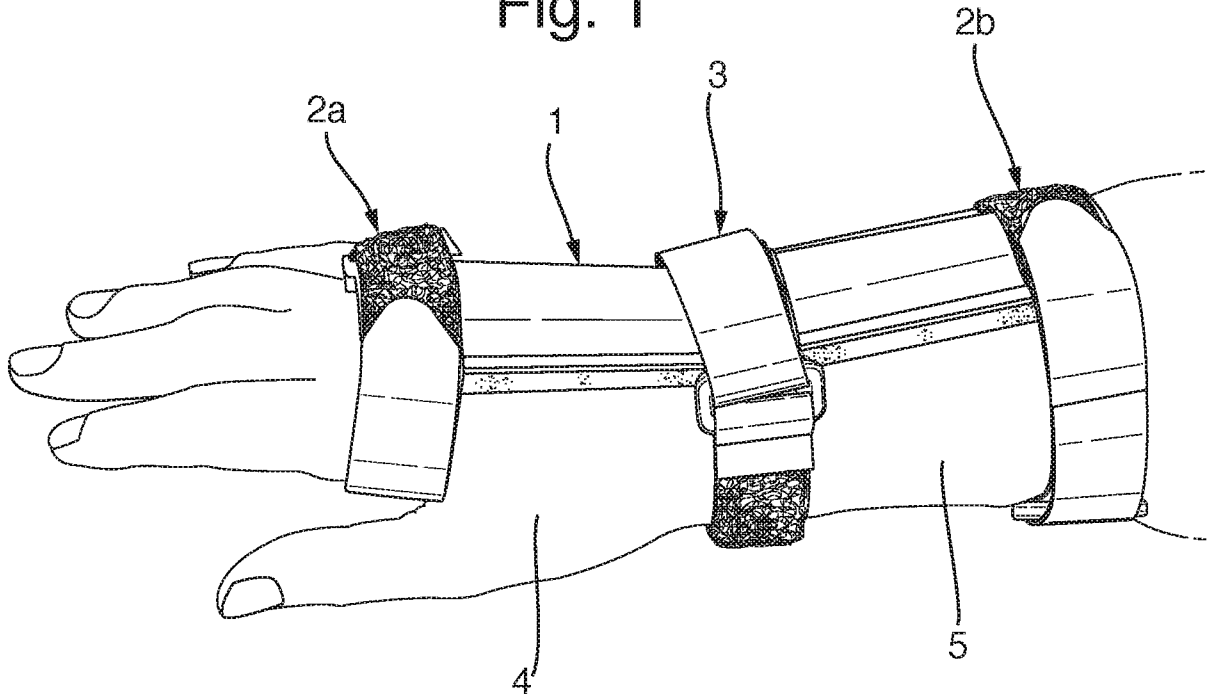


Fig. 2

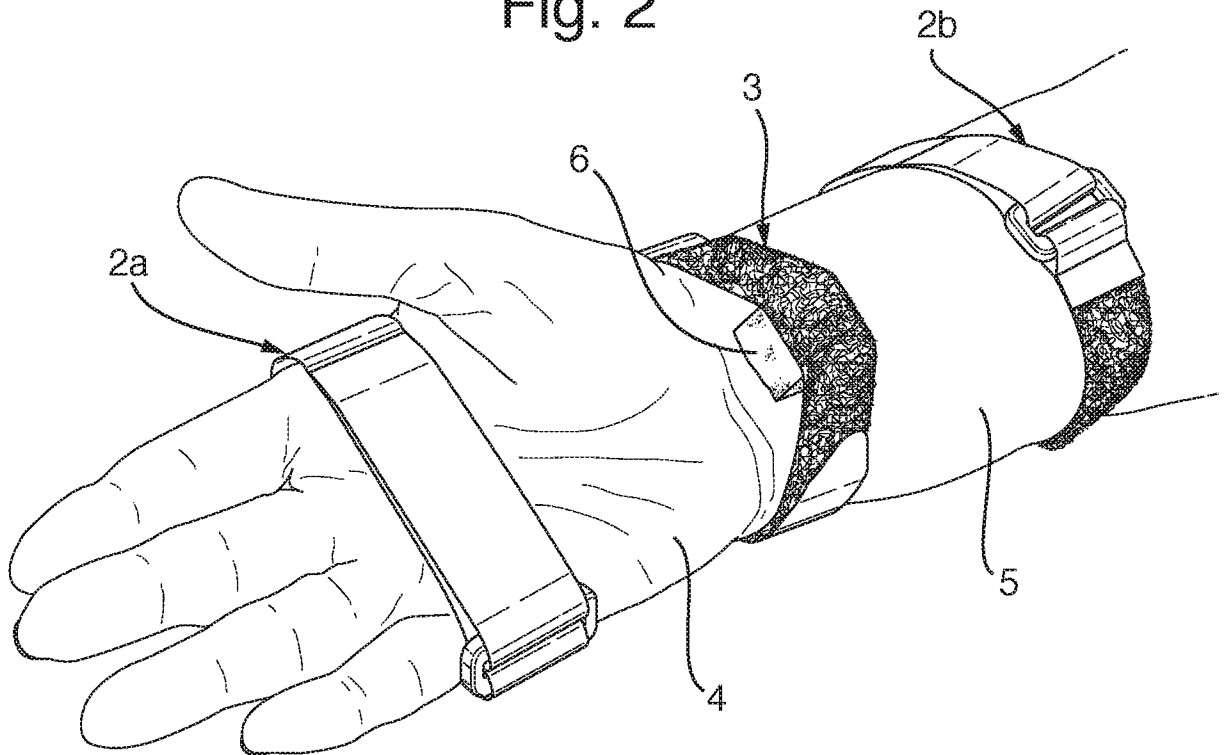


Fig. 3

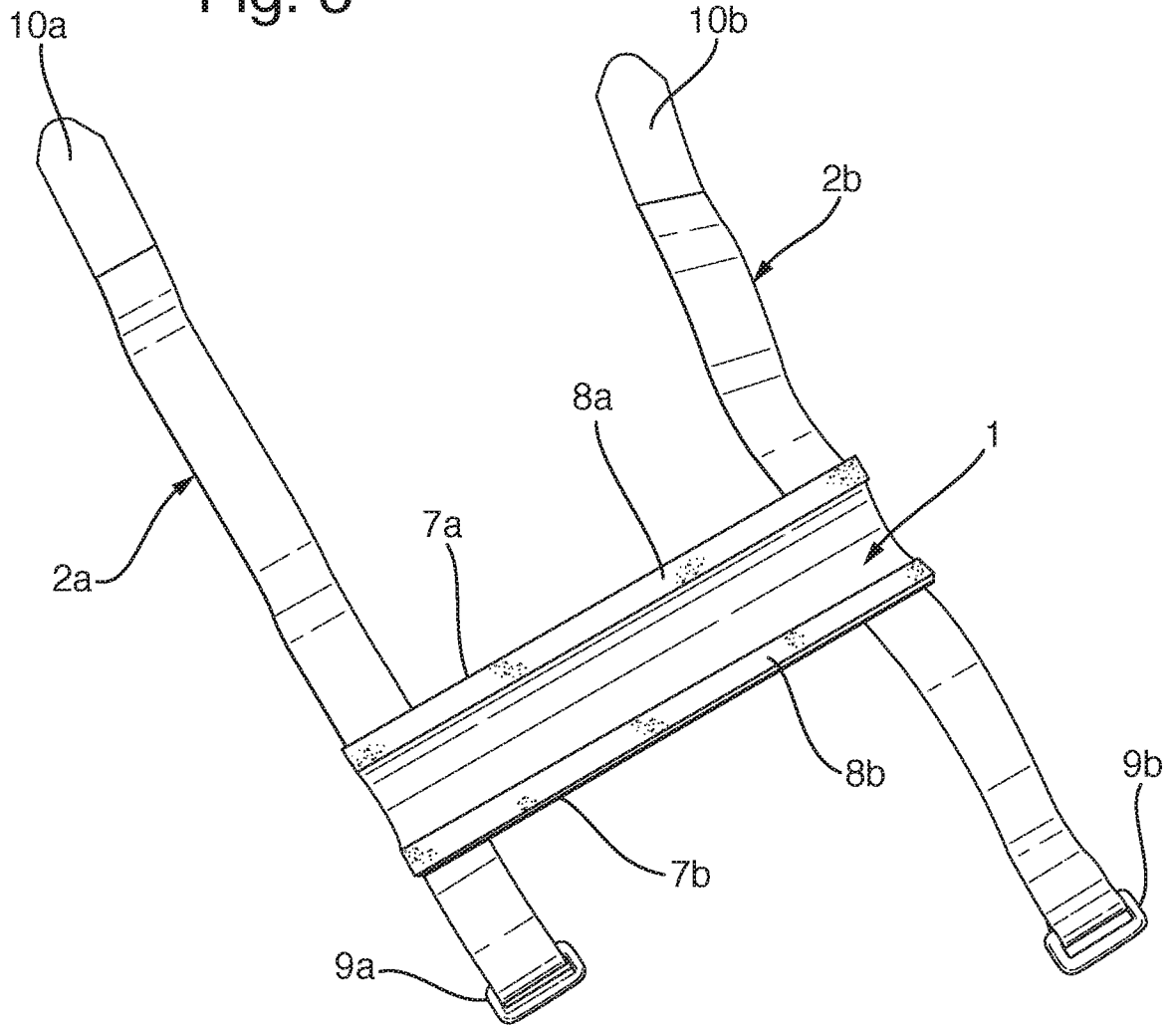


Fig. 4

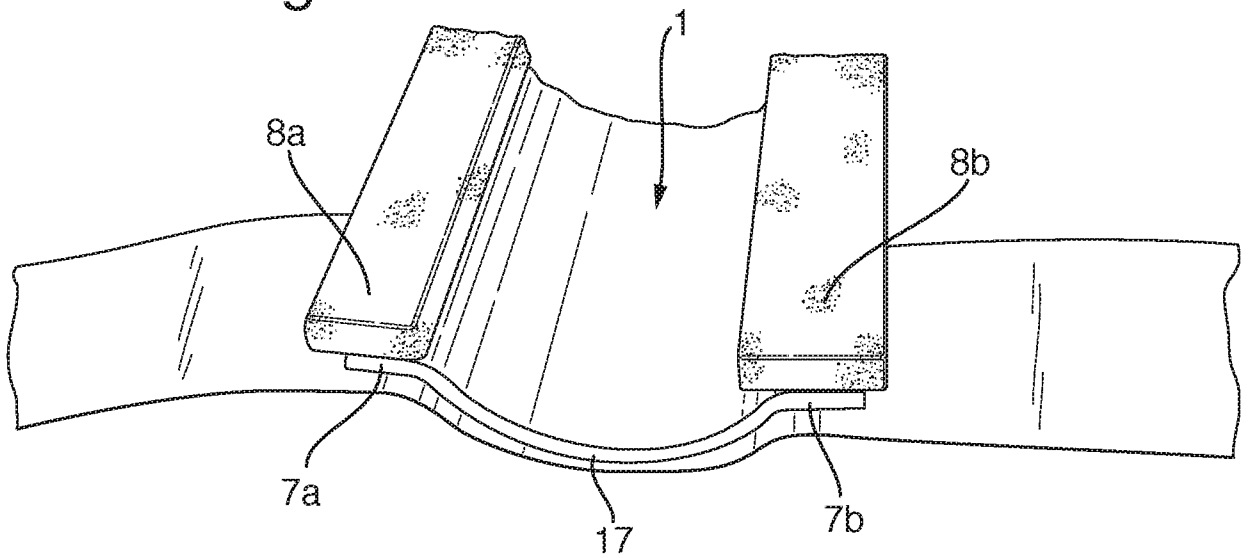


Fig. 5

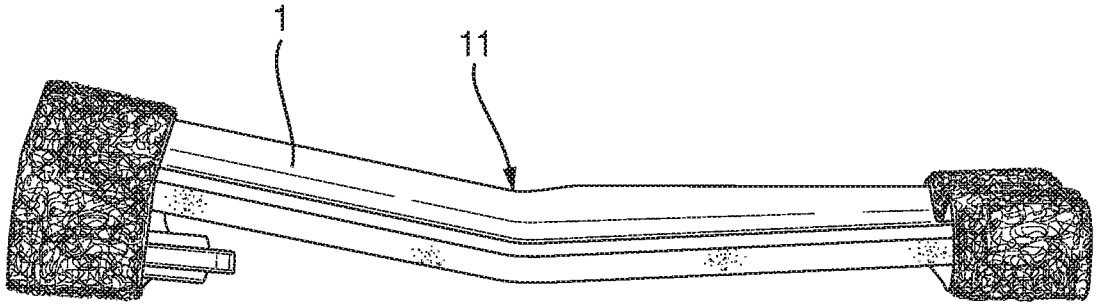


Fig. 6

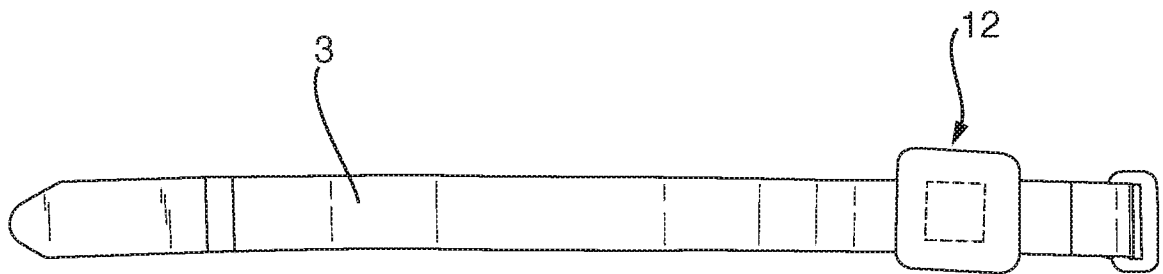


Fig. 7

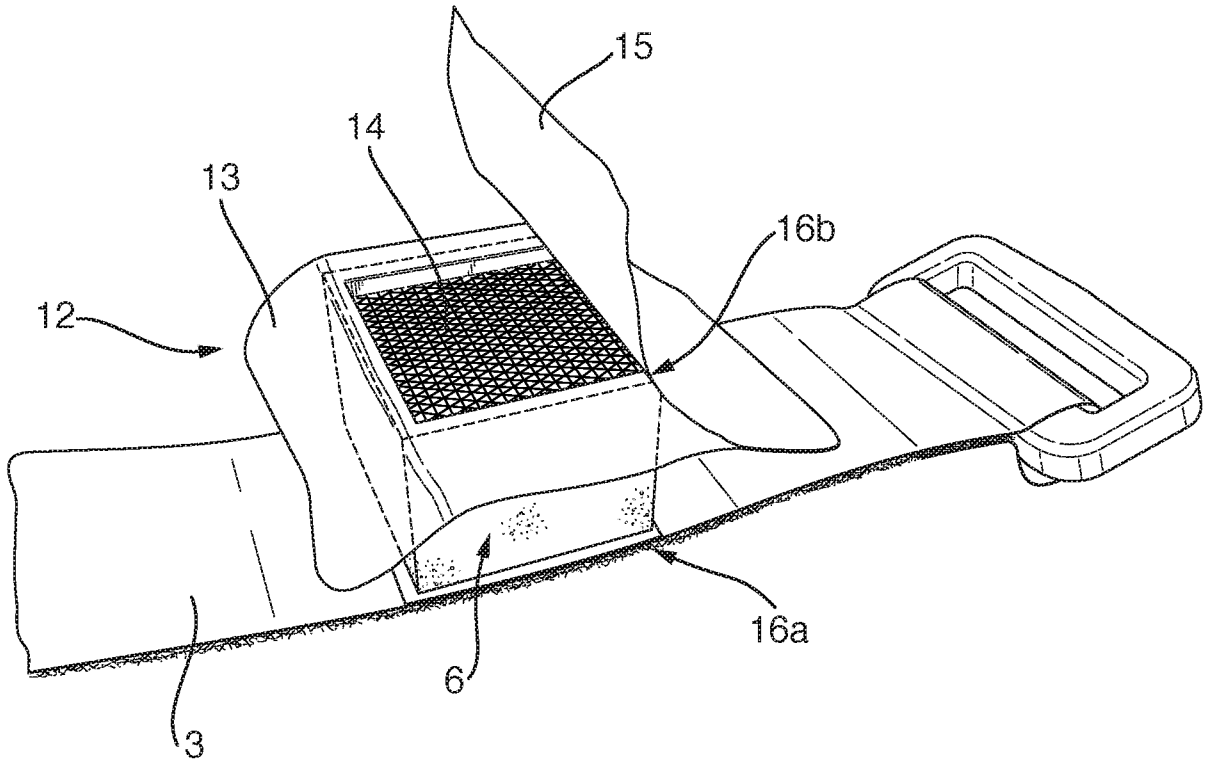
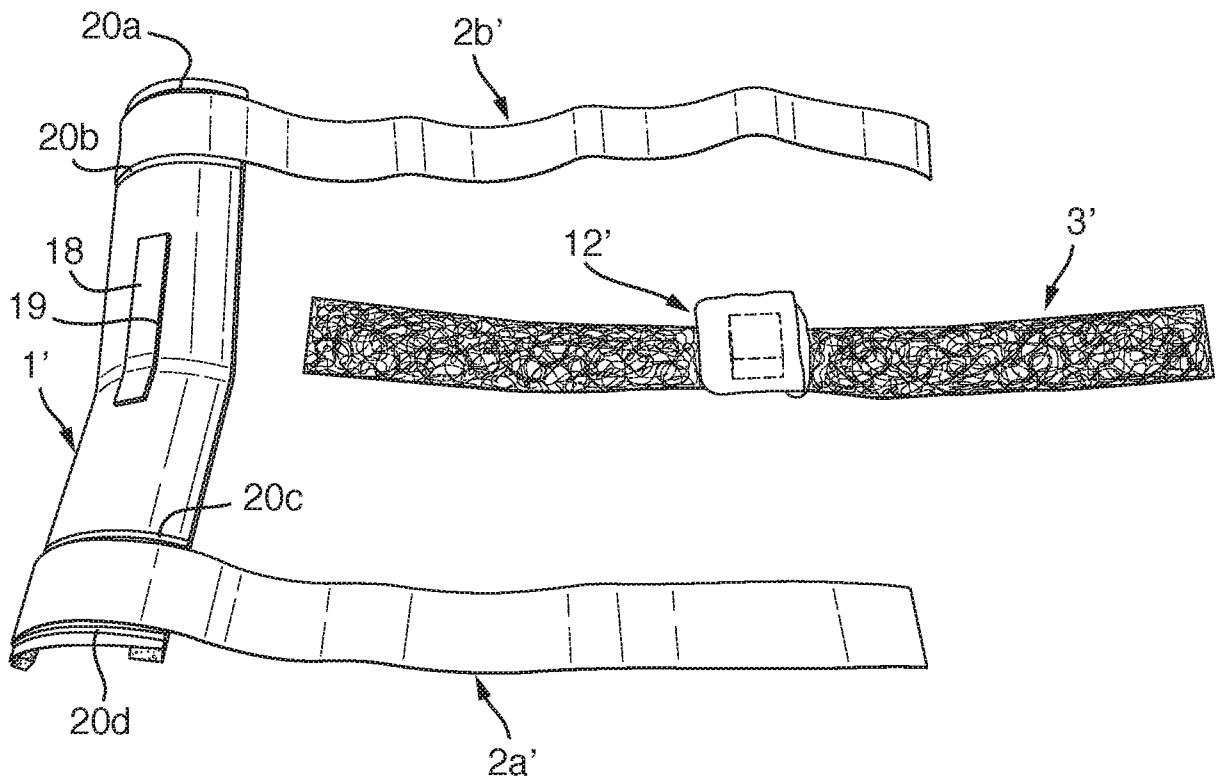


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No.
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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: A61B, A61F 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, PAJ, WPI data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9625110 A1 (RADI MEDICAL SYSTEMS ET AL), 22 August 1996 (1996-08-22); whole document --	1-5
Y	US 5873890 A (PORAT MICHAEL), 23 February 1999 (1999-02-23); whole document -- -----	1-5
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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Date of the actual completion of the international search 18-09-2014		Date of mailing of the international search report 18-09-2014
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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WO	9625110 A1	22/08/1996	AU	4734096 A	04/09/1996
US	5873890 A	23/02/1999	IL	114739 A	19/06/2005
			WO	9704821 A3	22/05/1997