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(71) Applicant: **Cresto AB**
302 60 Halmstad (SE)

(72) Inventor: **MAGNUSSON, Jonny**
257 31 RYDEBÄCK (SE)

(74) Representative: **Östergren, Markus**
Awapatent AB
Box 11394
404 28 Göteborg (SE)

(54) **SAFETY HARNESS WITH LUMINESCENT CONNECTOR**

(57) A safety harness (1) for fall protection is disclosed. The safety harness (1) comprises a strap assembly (2) adapted to pass around a body of a person wearing the safety harness (1), at least one front connector (5) attached to the strap assembly (2) so as to be located in front of the person and at least one back connector (6) attached to the strap assembly (2) so as to be located behind the person. The front and back connectors (5, 6) allow the person to be lifted, and wherein at least one of the front and back connectors (5, 6) is a luminescent connector.

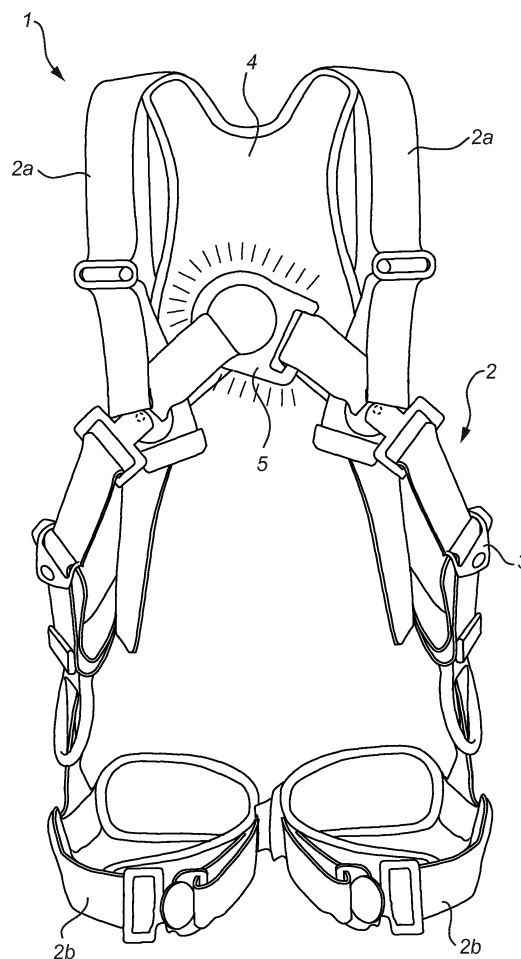


Fig. 1a

Description

TECHNICAL FIELD

[0001] The present invention relates to a safety harness to be used in fall protection systems for people working at heights.

BACKGROUND

[0002] There are a wide range of occupations in which workers must be protected from falls from heights, some examples of such occupations being roofers, window cleaners and engineers working on oil rigs and wind turbines. Fall protection systems typically include a safety harness such as the one disclosed in EP 1803487 B1. This safety harness comprises belts for supporting the body of a person wearing the safety harness and an attachment point to which a securely anchored rope can be attached.

[0003] A worker who has fallen and lies on the ground or hangs suspended in the safety harness may have sustained injuries, and it is for this and other reasons important that the worker is rescued as quickly as possible. Developing safety harnesses that facilitate the rescue of fallen workers remains an important area where further efforts are warranted. A particular challenge here is to come up with designs that facilitate rescue operations in dark or low-light conditions.

SUMMARY

[0004] In view of the foregoing, and according to a first aspect, there is provided a safety harness for fall protection. The safety harness comprises a strap assembly adapted to pass around a body of a person wearing the safety harness, at least one front connector attached to the strap assembly so as to be located in front of a person wearing the safety harness and at least one back connector attached to the strap assembly so as to be located behind a person wearing the safety harness. The front and back connectors are adapted to allow a person wearing the safety harness to be lifted, and at least one of the front and back connectors is a luminescent connector.

[0005] The front and back connectors are typically adapted to be connected to a respective safety wire which is securely anchored and intended to prevent the worker wearing the safety harness from falling or to arrest a fall. The front and back connectors may also be used for connecting a wire that helps to position the worker while hanging. In the event of a fall, rescue equipment, such as a wire, cable, rope or similar, can be connected to the front connector and/or the back connector so that the worker can be brought to safety. The risk of connecting the rescue equipment incorrectly to the safety harness when the rescue operation is undertaken in dark or low-light conditions is reduced by virtue of at least one of the front and back connectors being luminescent. Incorrectly

connected rescue equipment may result in the worker being severely injured, even fatally so if for example the worker must be lifted by a helicopter. The provision of a luminescent connector is thus a simple and economical way of substantially reducing the risk of injury during stressful situations in which mistakes are easily made.

[0006] According to an example embodiment, the luminescent connector comprises a reflective coating and a luminescent coating covering the reflective coating. The reflective coating may help to improve the visibility of the luminescent connector, especially if some of the luminescent coating is scratched off so that the reflective coating is exposed.

[0007] According to an example embodiment, the luminescent connector comprises a luminescent coating and a translucent protective coating covering the luminescent coating. The translucent protective coating helps to protect the luminescent coating from wear and environmental degradation.

[0008] According to an example embodiment, the luminescent connector is a fluorescent connector. A large number of fluorescent materials are inexpensive and readily commercially available. Other types of luminescent connectors are of course conceivable. The luminescent connector may for example be a phosphorescent connector.

[0009] According to an example embodiment, the luminescent connector is ring-shaped. By the luminous connector being "ring-shaped" is here meant that its general shape is similar to that of a ring. It should be noted that such a luminous connector may have more than one inner opening, or loop. Furthermore, although the general shape of the luminous connector may be circular, this is not necessary. The general shape can be that of an ellipse or a polygon, for instance. A D-ring is ring-shaped in the sense the term is used in this text. Ring-shaped connectors are versatile in that they allow for easy and quick connection with many common types of rescue equipment, such as rescue wires provided with hooks.

[0010] According to an example embodiment, the front and back connectors are luminescent connectors. This makes all of the front and back connectors easier to locate in dark or low-light conditions.

[0011] According to an example embodiment, the strap assembly comprises two shoulder straps arranged to pass over a respective shoulder of a person wearing the safety harness and two leg straps arranged to encircle a respective leg of a person wearing the safety harness. Such strap assemblies provide much support for the body and help to distribute fall arrest forces over a large portion of a wearer's body in the event of a fall.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The present invention will be described in more detail with reference to the appended drawings in which:

Figure 1 a shows a schematic front side view of an

example of a safety harness,

Figure 1b shows a schematic back side view of the safety harness in Figure 1, and

Figures 2 to 4 show schematic cross sectional front views of different examples of luminescent connectors.

DESCRIPTION OF THE DRAWINGS

[0013] The following description is provided for illustrative purposes only, and the present invention should not be construed as being limited to the examples set forth herein.

[0014] Figures 1 a and 1 b show a full-body safety harness 1 intended for fall protection system such as fall arrest systems and fall restraint systems. The safety harness 1 has a strap assembly 2 which comprises several interconnected straps, alternatively referred to as belts or strings, made of a durable and strong material, for example polyester. How to arrange the straps to achieve a high level of wearer comfort and mobility and to make the safety harness 1 meet the specific needs of workers in different industries is considered to be known by a person skilled in the art. This will therefore not be discussed in detail herein. In short, however, it may be noted that in this example the strap assembly 2 includes two shoulder straps 2a and two leg straps 2b. Each shoulder strap 2a extends from the chest, over a shoulder and to the back of a person wearing the safety harness 1, and the leg straps 2b fit around a respective thigh. The straps are interconnected via buckles 3, some of which allow for adjusting the strap lengths so that the safety harness 1 can be made to fit tightly around the body of a user. Attached to the shoulder straps 2a is a pad 4 for supporting the back of a person wearing the safety harness 1.

[0015] One front connector 5 and one back connector 6 are attached to the strap assembly 2. There may be two or more front connectors 5 and/or two or more back connectors 6 in another example, something which may make the safety harness 1 more versatile and better adapted to meet a variety of different application-specific requirements. The front connector 5 and the back connector 6 are luminous connectors (which will be further described below with reference to Figures 2 and 3). Another example of a safety harness 1 may have only one luminous connector, in which case either the front connector 5 or the back connector 6 is a luminous connector.

[0016] The front connector 5 is attached to straps on the front side of the safety harness 1, approximately in level with the chest of a wearer standing upright. The back connector 6 is attached to straps on the back side of the safety harness 1, approximately in level with the upper portion of the back of a wearer standing upright. In this example both of the front and back connectors 5, 6 are D-rings. In other examples, the front and back connectors 5, 6 may or may not be D-rings, and it may or may not be the case that the front and back connectors 5, 6 have the same shape. The front and back connectors

5, 6 in the illustrated example are attached to the strap assembly 2 by straps passing through their inner openings.

[0017] Figure 2 shows a luminous connector 10 which is similar to the front and back connectors 5, 6 in Figures 1 a and 1 b. However, the luminous connector 10 is not a D-ring but a circular ring with one inner opening. The luminous connector 10 has a body 11 that is covered by a luminous coating 12 arranged directly on the body 11. The luminescent coating 12 covers the entire body 11. Differently stated, the body 11 of the luminescent connector 10 in this example is a solid torus the outer surface of which is completely covered by the luminescent coating 12. The body 10 can be made of a metal, such as steel. The luminous coating 12 can be a layer of a fluorescent or phosphorescent material, such as a layer of a fluorescent polyvinyl chloride (PVC) or some other fluorescent plastic material. The luminescent coating 12 may be applied to the body 11 using for example a moulding process.

[0018] Figure 3 shows a luminous connector 10' which is similar to the luminous connector 10 in Figure 2 except for a reflective coating 13 arranged between the body 11 and the luminous coating 12 as seen in the radial direction. The reflective coating 13 can for example be a layer of white paint.

[0019] Figure 4 shows a luminous connector 10" which is similar to the luminous connectors 10 in Figure 2 except for a translucent protective coating 14 that covers the luminous coating 12. The translucent protective coating 14 can for example be made of a clear plastic material. The translucent protective coating 14 may comprise a wavelength converting material adapted to wavelength convert at least some of the light emitted by the luminescent coating 12 to a different wavelength, in the visible or non-visible spectrum, something which may make the luminescent connector 10" easier to locate during rescue operations. The wavelength converting material may for example be phosphor or a quantum dot material. It should be noted that the luminescent connector 10" may also comprise a reflective coating 13 arranged between the body 11 and the luminous coating 12.

[0020] The person skilled in the art realizes that the present invention by no means is limited to the above-described examples and that many modifications and variations are possible within the scope of the appended claims. For example, the present invention may be a chest harness or a body belt rather than a full-body harness like the one described above.

[0021] In the claims, any reference signs placed between parentheses shall not be construed as limiting to the claim. The word "comprising" does not exclude the presence of other elements than those listed in the claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements.

Claims

1. Safety harness (1) for fall protection, comprising
a strap assembly (2) adapted to pass around a body
of a person wearing the safety harness (1), 5
at least one front connector (5) attached to the strap
assembly (2) so as to be located in front of said per-
son and
at least one back connector (6) attached to the strap
assembly (2) so as to be located behind said person, 10
wherein the front and back connectors (5, 6) are
adapted to allow said person to be lifted, and wherein
at least one of the front and back connectors (5, 6)
is a luminescent connector (10; 10'; 10"). 15
2. The safety harness (1) according to claim 1, wherein
the luminescent connector (10') comprises
a reflective coating (13) and
a luminescent coating (12) covering the reflective 20
coating (13). 20
3. The safety harness (1) according to claim 1 or 2,
wherein the luminescent connector (10") comprises
a luminescent coating (12) and
a translucent protective coating (14) covering the lu- 25
minescent coating (12). 25
4. The safety harness (1) according to any of the pre-
ceding claims, wherein the luminescent connector
(10; 10'; 10") is a fluorescent connector. 30
5. The safety harness (1) according to any of the pre-
ceding claims, wherein the luminescent connector
(10; 10'; 10") is ring-shaped. 35
6. The safety harness (1) according to any of the pre-
ceding claims, wherein the front and back connec-
tors (5, 6) are luminescent connectors (10; 10'; 10").
7. The safety harness (1) according to any of the pre- 40
ceding claims, wherein the strap assembly (2) com-
prises
two shoulder straps (2a) arranged to pass over a
respective shoulder of said person and
two leg straps (2b) arranged to encircle a respective 45
leg of said person.

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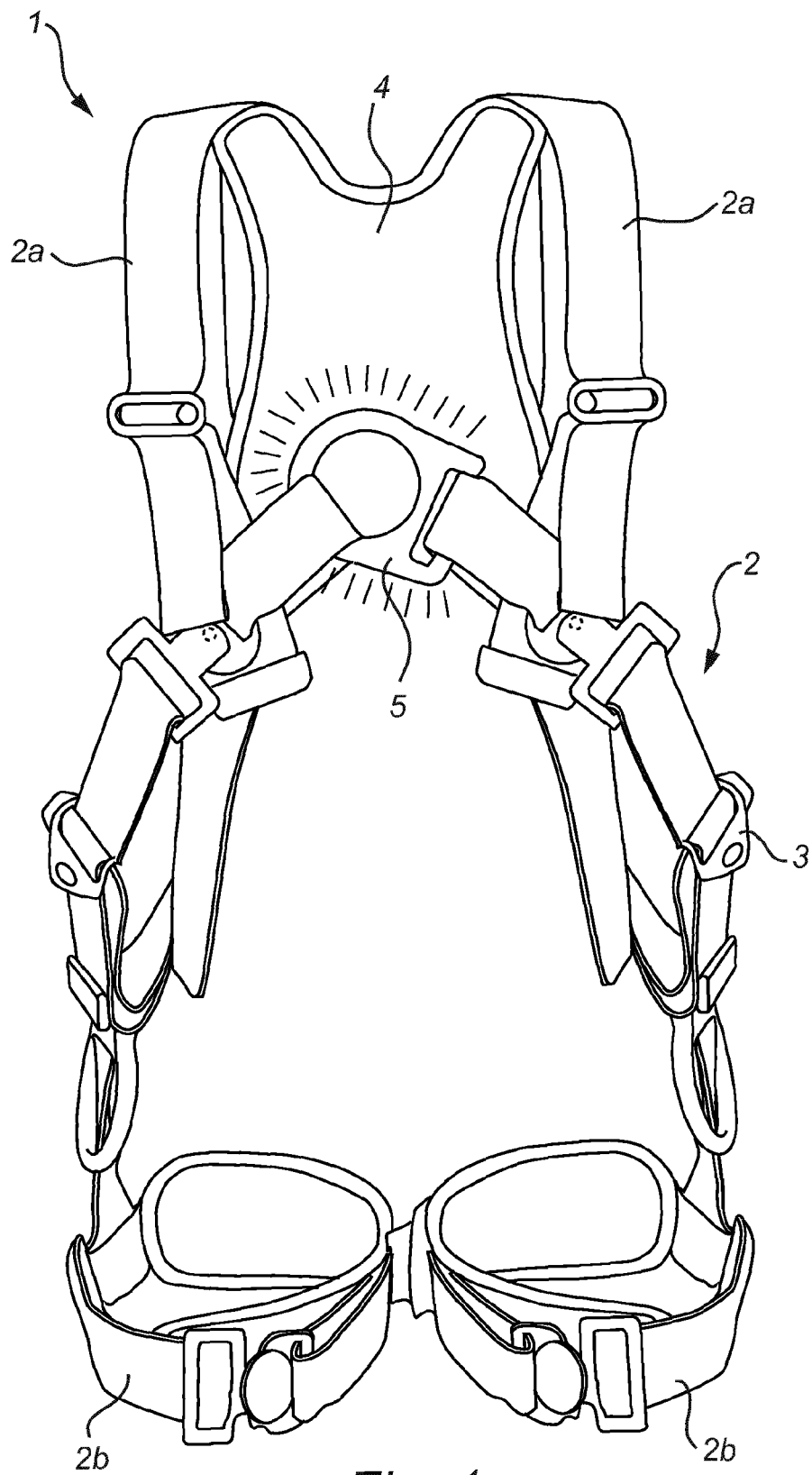


Fig. 1a

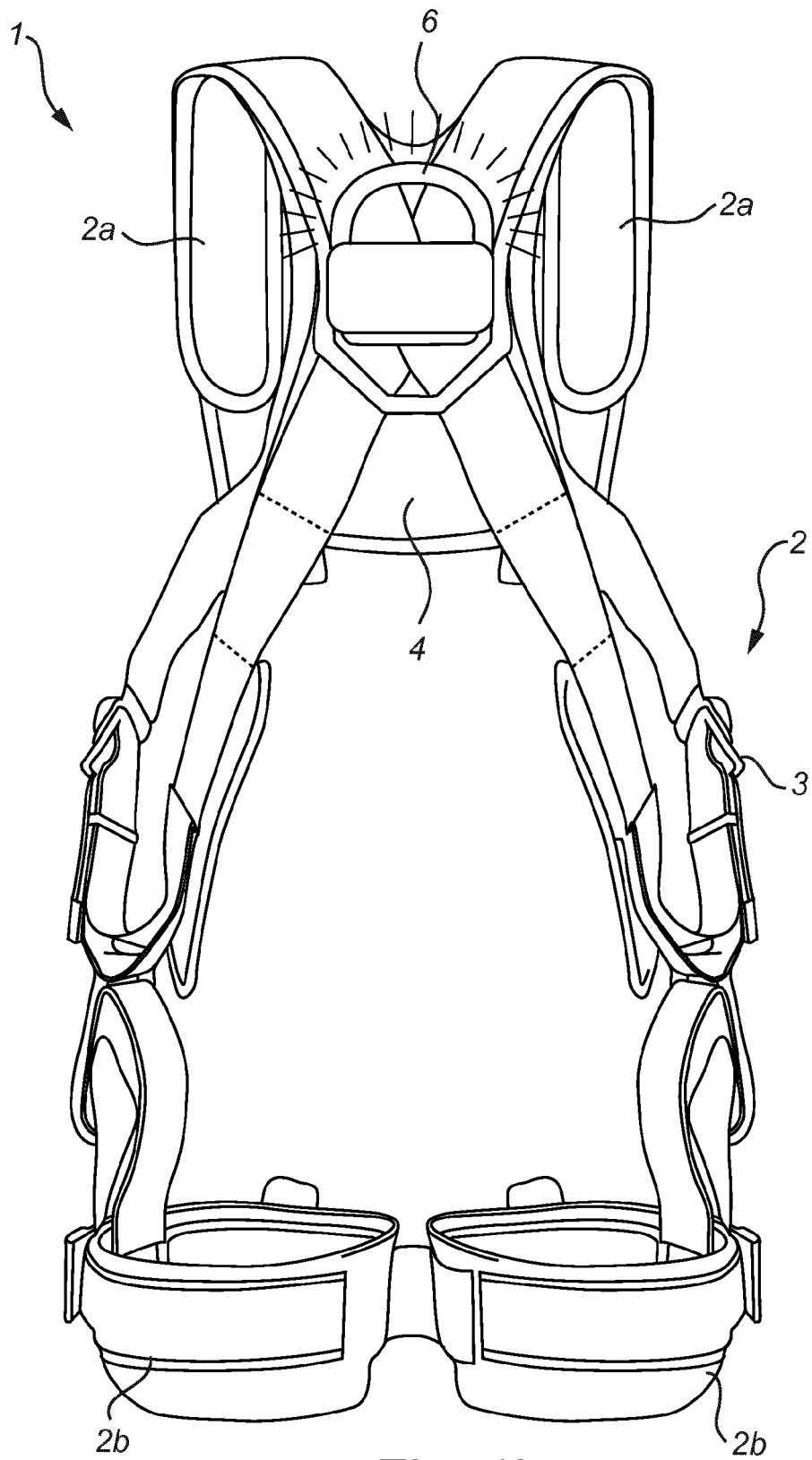


Fig. 1b

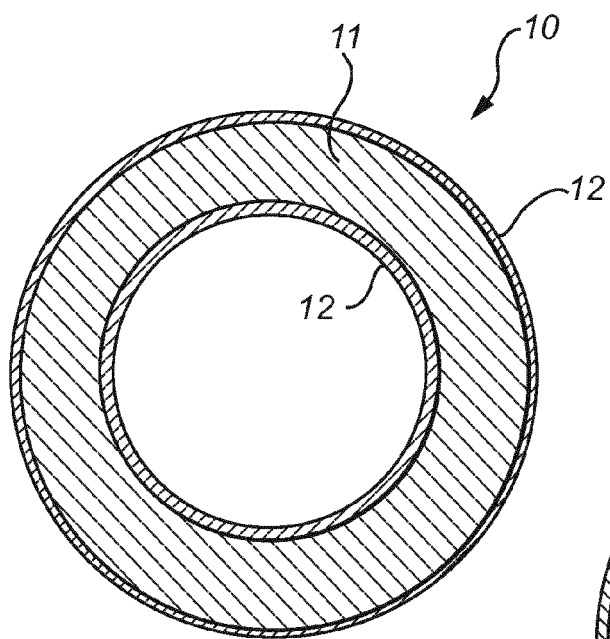


Fig. 2

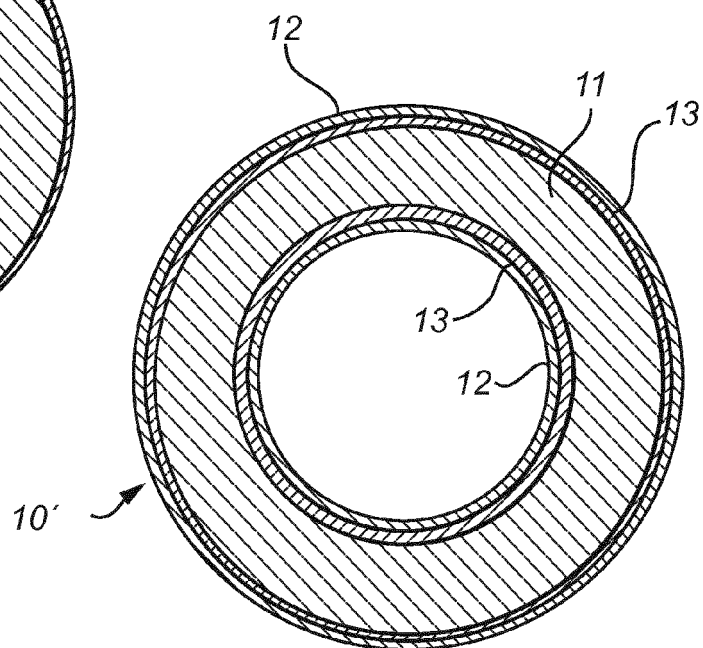


Fig. 3

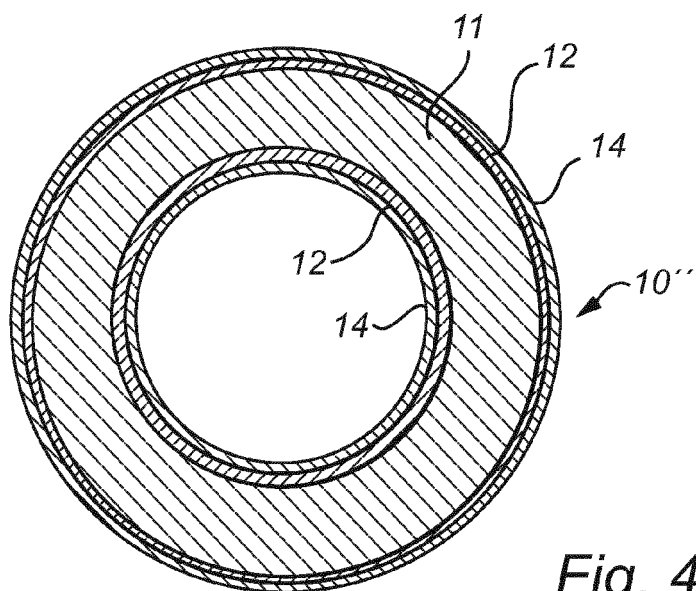


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1803487 B1 [0002]