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(54) Accident prevention glove and method for manufacturing it

(57) An accident prevention leather glove (10), comprising portions provided with cut resistant features at predefined parts of the hand which need to be protected, wherein said cut resistant portions are made of composite material consisting of a leather layer (14) and a cut resistant fibre layer (15) permanently coupled together by glueing and heat pressing.

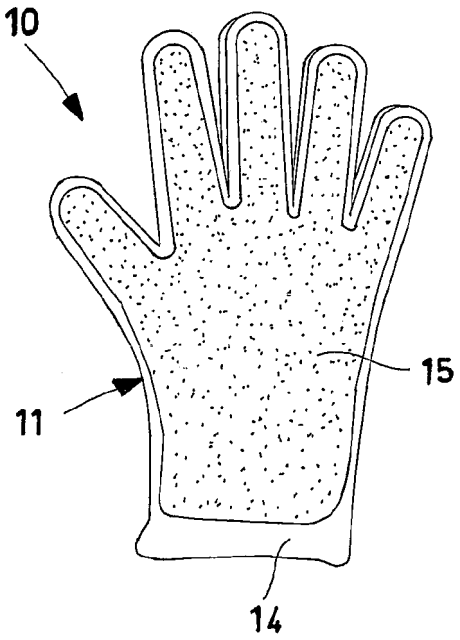

Fig.2a

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Description

[0001] The present invention refers to an accident prevention glove, in particular for cut resistant protection, and to a method for manufacturing it. The invention also refers to a material that is suitable for being used for making such a glove.

[0002] In various work fields, for example in the field of construction work, mechanical work and, in general, in the maintenance of objects and machinery, it is required (also by accident prevention standards in force) to guarantee a suitable protection for the hands of the workers against the danger of accidental injuries due to cutting tools and/or objects.

[0003] For this purpose leather gloves are used having great thickness so as to provide a certain amount of resistance. The great thickness of the leather necessary for providing the required resistance however jeopardises the sense of touch of the worker.

[0004] Leather gloves are also used having a smaller thickness, inside which an "inner glove" is inserted made from fibre with high toughness and cut resistance. The inner glove is fixed to the leather glove through sewing at the tips of the fingers and at the hem of the wrist of the glove, or by sewing the entire perimeter of the inner glove to the outer leather glove. According to the specific use for which they are intended, the gloves can be provided with a sleeve for protecting the end portion of the forearm of the worker.

[0005] Also the gloves provided with the inner glove that is sewn to the outer leather glove, in any case, have drawbacks, both due to the fact that the two layers are physically separated from one another and can therefore compromise the comfort and sensitivity of the worker wearing them, and to the fact that such a configuration can, over time, make the glove subject to possible detachment of the inner glove from the outer leather glove through breaking of the stitching.

[0006] Moreover, sewing operations required to sew the inner glove, correctly and in a durable manner, to the outer leather glove can be particularly complex or not completely reliable since such seams are present in areas, such as the finger tips or the perimeter of the glove, which are not easy to be manufactured.

[0007] The general purpose of the present invention is to avoid the aforementioned drawbacks by providing an accident prevention glove that is provided with high cut resistant performance, while having optimal features in terms of comfort and touching sensitivity which can be compared to those of a normal single layer leather glove.

[0008] The purpose of the present invention is also that of making such a glove, with such high cut resistant and comfort and touching sensitivity features, considerably easy to manufacture.

[0009] In view of such purposes, according to the invention, an accident prevention leather glove has been conceived, comprising portions provided with cut resistant features at predefined parts of the hand which need to be protected, characterised in that said cut resistant portions are made of composite material consisting of a leather layer and of a resistant fibre layer that are permanently coupled together by glueing and heat pressing.

[0010] According to the invention, a method has also been devised for manufacturing accident prevention gloves having cut resistant features, comprising the steps of: supplying leather patches and portions made of cut resistant fibre shaped according to the extension and the position which said portions have to assume in the glove, sprinkling powder glue onto the leather patches at their portions which have to be covered with said cut resistant fibre portions, placing the portions made of cut resistant fibre onto the leather patches at said portions covered with glue, subjecting the assembly of the two layers of leather and cut resistant material to heat pressing in order to permanently join the two layers into a unique layer of composite material, cutting said layer made of composite material, along the edge of the portions covered with cut resistant material, in order to obtain elements that are suitable for being assembled together so as to form the glove, and finally joining said elements together by sewing. According to the invention, also a composite material has been made for manufacturing accident prevention gloves with cut resistant protection, having leather features on one face that is intended to be outside the glove and cut resistant fabric features on the face intended to be inside the glove, the composite material being made by permanently coupling one leather layer and one cut resistant fibre layer to one another.

[0011] In order to clarify the description of the innovative principles of the present invention together with its advantages with respect to the prior art we shall now describe, with the aid of the attached drawings, a possible embodiment applying such principles. In the drawings:

Figures 1a and 1b represent the palm and the back of an accident prevention glove according to the invention, respectively, seen externally.

Figures 2a and 2b represent a view of the inner surface of the palm of Figure 1a and of the back of Figure 1b.

Figures 3a and 3b represent the palm and the back of an accident prevention glove equipped with a sleeve for protecting the forearm, respectively, seen externally in an analogous manner as Figures 1a and 1b.

Figures 4a and 4b represent a view of the inner surface of the palm of Figure 3a and of the back of Figure 3b.

Figures 5a, 5b and 5c schematically represent some component elements of a glove according to the invention and their assembly.

Figures 1a and 1b show, seen from outside, an accident prevention glove (for the right hand), which is provided with a palm portion 11, with a back portion 12 and with a plurality of fingers 13. Concerning the fingers, of course, each glove can be configured in

a different manner (for example with 3 fingers, 4 fingers or 5 fingers) according to the specific requirements required by the user.

[0012] According to the invention, the glove 10 comprises (as clearly visible in the view of its inner parts illustrated in Figures 2a and 2b) a leather layer 14 on which a layer 15 with high cut resistance is applied, permanently coupled with it, on the face facing towards the inside of the glove. The cut resistant layer 15 can cover the entire leather surface or it can be arranged only at some portions of the hand (palm, back, fingers) that require being protected.

[0013] The cut resistant layer 15 is advantageously made up of fabric (which may or may not be of the knitted type) in fibre having great toughness and cut resistance, such as polyester, nylon, Dyneema®, etc., with a thickness comprised between 0.5 and 0.8 mm, preferably equal to 0.7 mm.

[0014] The leather layer 14 has a small thickness, comprised between 0.8 and 1.5 mm and preferably between 1.0 and 1.2 mm, so as to ensure that the glove has, also when there is the cut resistant layer, great workability and touching sensitivity features.

[0015] According to the invention, the cut resistant layer 15 is joined to the leather layer 14 through heat pressing with the interposition of powder glue, as shall be described in greater detail in the following.

[0016] Figures 3a, 3b, 4a and 4b show an accident prevention glove (for the left hand), that is also provided with a sleeve 16 for protecting the forearm of the user. Apart from this, the structure of the glove with the cut resistant layer 15, permanently coupled with the leather layer 14, is analogous to the one illustrated in Figures 1a, 1b, 2a and 2b.

[0017] We shall now describe, with reference to Figures 5a, 5b and 5c, a method for manufacturing a glove according to the invention.

[0018] Firstly, portions of cut resistant fabric 15 are provided (Figure 5a), which are shaped according to the extension and the position that they have to assume in the glove, for example a portion 17' intended to constitute protection for the back of the hand and for some of the fingers and a portion 17" intended to constitute protection for the thumb.

[0019] Leather patches 18', 18" are then provided having a surface extension that is sufficient for containing corresponding portions 19', 19" for making the back and the fingers and, respectively, the thumb. The outline of such portions 19', 19" which shall be obtained by the leather patches 18', 18" is shown by broken lines in Figure 5b.

[0020] Of course, the leather patches shall be checked in advance by means of known quality controls in accordance with the various performance classes provided by the standards of the various countries for accident prevention clothing.

[0021] Once the portions of cut resistant fabric 17', 17" and the leather patches 18', 18" have been provided, powder glue is sprinkled on the latter at the portions 19', 19", the corresponding portions of cut resistant fabric 17', 17" are rested thereon, after which the assembly of the two layers (leather and cut resistant fabric) undergoes heat pressing between a pair of plates at a temperature comprised between 40°C and 70°C, preferably around 60°C, for a time of around 10-15 seconds and with a pressure that is comprised between 1 and 3 N/cm^2. In particular, the temperature of the plates and the duration of the pressing step are selected with values that are sufficient to allow the complete melting of the powder glue, so that the glue acts completely and uniformly at the interface between the leather layer and the layer made of cut resistant fabric so as to allow them to adhere in a perfect manner. In such a way, in practice, a unique layer made of composite material is obtained having the features of leather on one face (the one that is intended to be outside the glove) and the features of the cut resistant fabric on the other face (the one that is intended to be inside the glove), keeping the transpiration features proper to leather.

[0022] It has been found to be advantageous to use powder glue of the polyester type on a polycaprolactone (PCL) base, having a low melting point (around 60°C).

[0023] Once the leather has been permanently joined to the cut resistant fabric, the coupled material thus obtained is cut, through shearing or die-cutting, along the outline of said portions 19', 19" in order to obtain elements 20', 20" (Figure 5c) with shapes and sizes that are suitable for being assembled so as to form the glove.

[0024] An analogous process to the one described above can be carried out for making further protected portions (not illustrated in Figure 5, for example a palm portion) intended to be part of the finished glove.

[0025] At this point, the elements 20', 20", etc., possibly together with leather elements without cut resistant covering intended to form portions of the glove at areas of the hand for which it is not required a specific cut resistant protection, are joined to one another through known sewing methods to manufacture the complete glove.

[0026] Advantageously, in the cutting step of the elements 20', 20" a slightly wider surface with respect to the cut resistant fabric 15 can be provided for the leather layer 14 so as to obtain a peripheral edge 21 made of sole leather, which is suitable for facilitating the sewing of the various elements to manufacture the finished glove.

[0027] At this stage it should be clear how the glove according to the invention (and, more specifically, the material obtained by means of the manufacturing process according to the invention) makes it possible to provide an accident prevention glove that combines handiness and touching sensitivity with a high level of cut resistance.

[0028] Of course, the description above of an embodiment applying the innovative principles of the present invention is shown as an example of such innovative prin-

ciples and should not therefore be taken to limit the scope of protection claimed herein.

[0029] For example, the cut resistant layer can be also provided at the possible sleeve for protecting the forearm.

Claims

1. Accident prevention leather glove, comprising portions provided with cut resistant features at predefined parts of the hand which need to be protected, **characterized in that** said cut resistant portions are made of composite material consisting of a leather layer (14) and of a cut resistant fiber layer (15) permanently coupled together by glueing and heat pressing.

2. Accident prevention glove according to claim 1, **characterized in that** the leather layer (14) of said composite material is directed towards the outside of the glove and the cut resistant fiber layer (15) is directed towards the inside.

3. Accident prevention glove according to claim 1, **characterized in that** it consists of a plurality of elements (20', 20") made of said composite material, corresponding to various parts of the hand, joined together by sewing.

4. Accident prevention glove according to claim 3, **characterized in that** said elements (20', 20") made of composite material have peripheral edges (21) made of sole leather, whereon the sewing is made.

5. Accident prevention glove according to claim 3, **characterized in that** it also comprises, in addition to said elements (20', 20") made of composite material, elements made of sole leather at areas of the hand where a cut resistant protection is not required.

6. Method for manufacturing accident prevention gloves having cut resistant features comprising the steps of:

   - supplying leather patches (18', 18") and portions (17', 17") made of cut resistant fiber shaped according to the extension and the position, which said portions (17', 17'') have to assume in the glove;
   - sprinkling powder glue onto the leather patches (18', 18") at their portions (19', 19") which have to be covered with said cut resistant fiber portions (17', 17");
   - placing the portions (17', 17") made of cut resistant fiber onto the leather patches (18', 18") at said portions (19', 19") covered with glue;
   - subjecting the assembly of the two layers of leather and cut resistant material to heat pressing in order to permanently join the two layers into a unique layer of composite material;
   - cutting said layer made of composite material along the edge of the portions (19', 19") covered with cut resistant material, in order to obtain elements (20', 20") suitable for being assembled together so as to form the glove;
   - joining together said elements (20', 20") by sewing.

7. Method according to claim 6, **characterized in that** said elements (20', 20") made of composite material are also joined by sewing with elements made of sole leather at areas of the hand where a cut resistant protection is not required.

8. Method according to claim 6, **characterized in that** the sewing is carried out at peripheral edges (21) made of sole leather of the elements (20', 20") made of composite material, obtained by cutting the layer of composite material along an edge slightly wider than the cut resistant material.

9. Method according to claim 6, **characterized in that** the heat pressing is carried out at a temperature comprised between 40°C and 70°C, preferably around 60°C.

10. Method according to claim 6, **characterized in that** the heat pressing is carried out for a period of about 10-15 seconds.

11. Method according to claim 6, **characterized in that** the heat pressing is carried out with a pressure comprised between 1 and 3 N/cm^2.

12. Method according to claim 6, **characterized in that** the thickness of the leather patches (18', 18") is comprised between 0,8 and 1,5 mm and preferably between 1,0 and 1,2 mm.

13. Method according to claim 6, **characterized in that** the portions (17', 17") made of cut resistant fiber have a thickness comprised between 0,5 and 0,8 mm, preferably equal to 0,7 mm.

14. Composite material for manufacturing accident prevention gloves with cut resistant protection, having leather features on one face intended to be outside the glove and cut resistant fabric features on the face intended to be inside the glove, the composite material being made by permanently coupling one leather layer and one cut resistant fiber layer.

15. Composite material according to claim 14, **characterized in that** the coupling between the leather layer and the cut resistant fiber layer is made by glueing of the cut resistant fiber layer onto the leather layer,

followed by heat pressing of the assembly of the two glued layers.

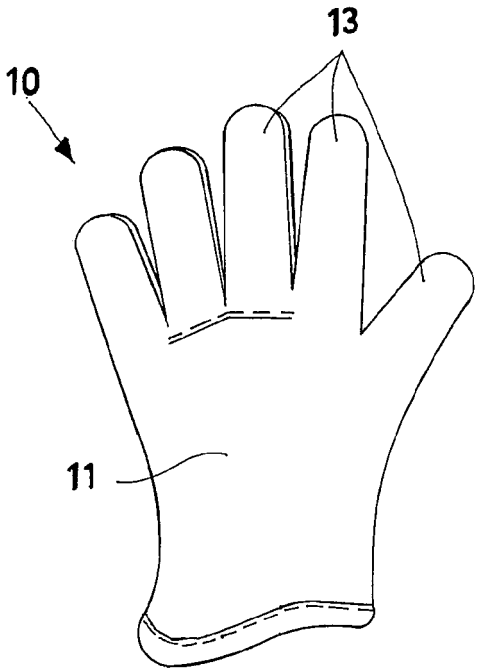


Fig.1a

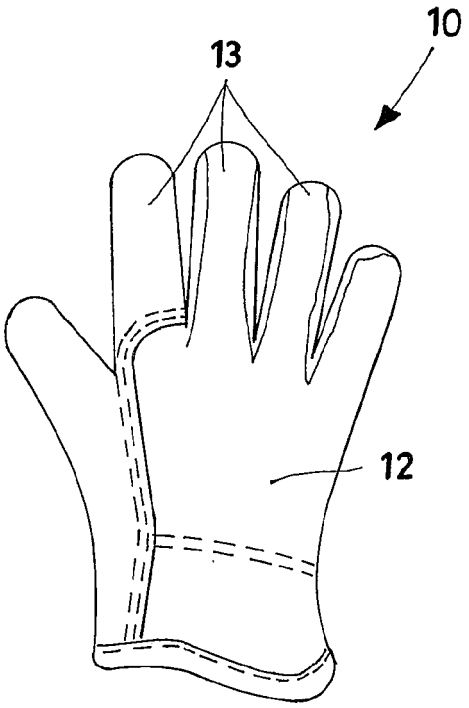


Fig.1b

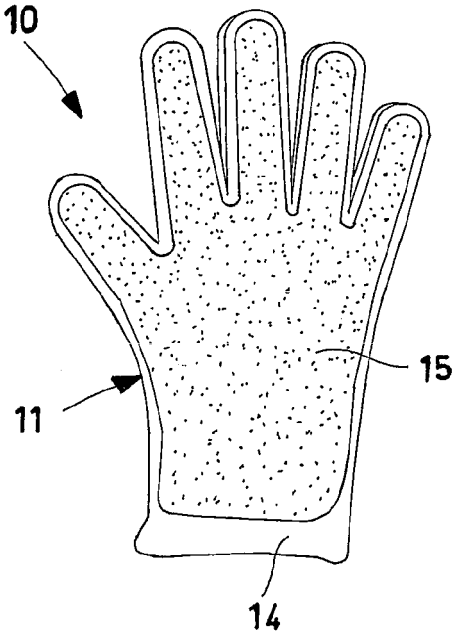


Fig.2a

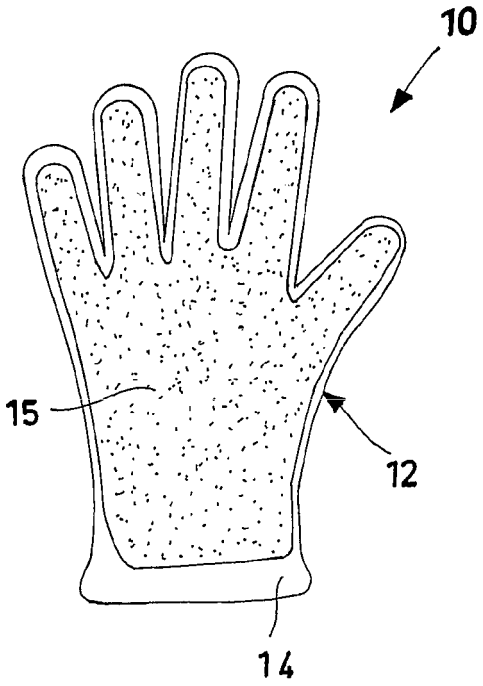


Fig.2b

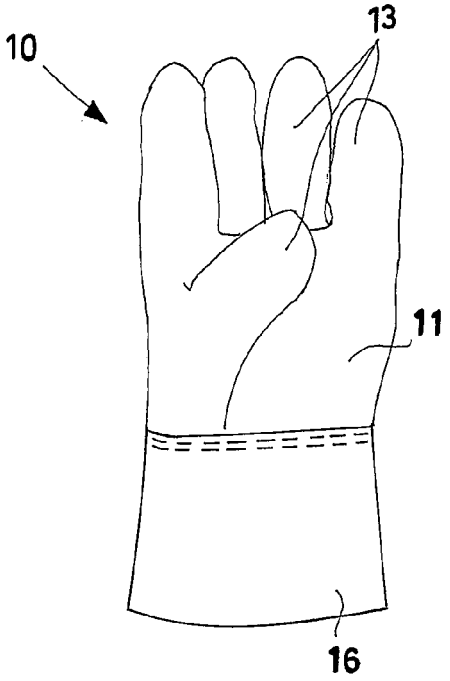


Fig.3a

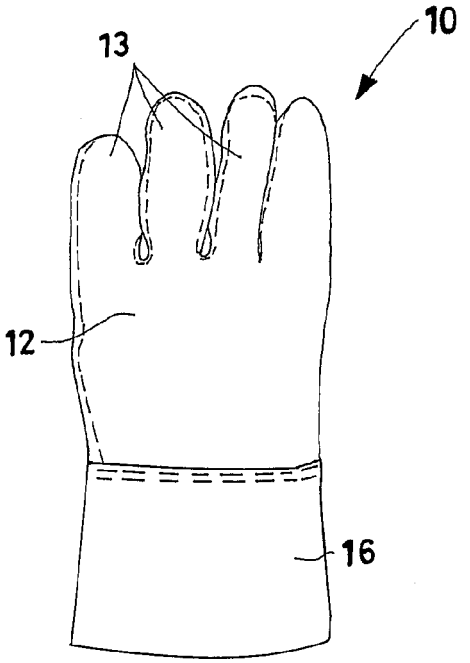


Fig.3b

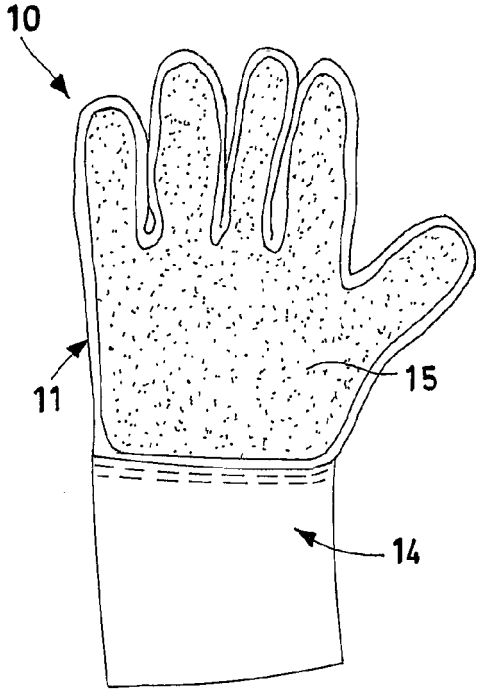


Fig.4a

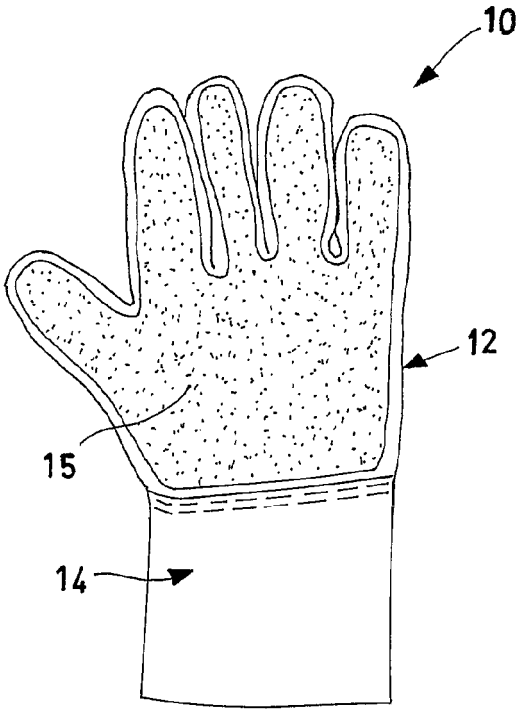
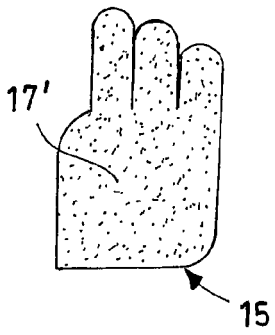
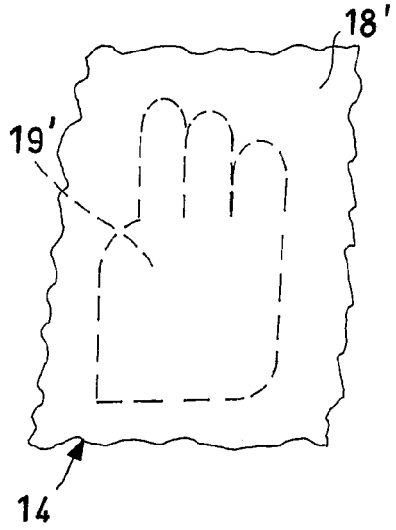


Fig.4b





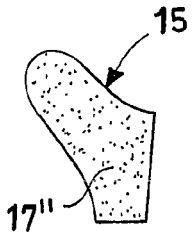


Fig.5a

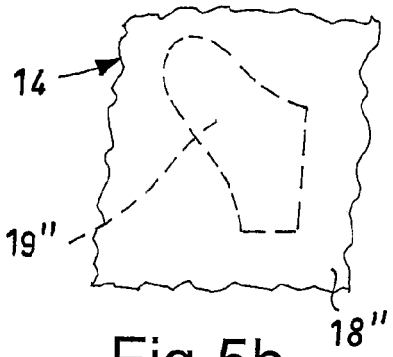
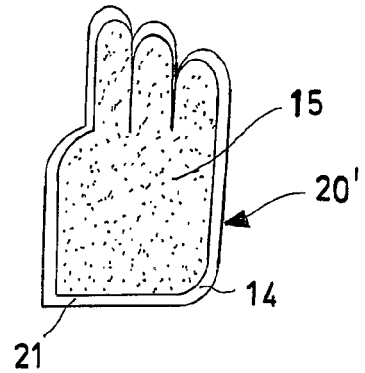


Fig.5b



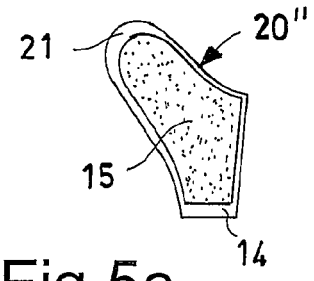


Fig.5c

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EUROPEAN SEARCH REPORT

Application Number
EP 13 19 8375

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 7 007 308 B1 (HOWLAND CHARLES A [US] ET AL) 7 March 2006 (2006-03-07) * column 6, line 63 - column 7, line 12; claims 8-15; figures 5-8 * * column 5, line 40 *	1-3,5,14 6	INV. A41D19/015
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 March 2014	D'Souza, Jennifer

CATEGORY OF CITED DOCUMENTS

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27-03-2014

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