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(72) Inventor: **Zaggl, Alexander**

83620 Feldkirchen-Westerham (DE)

(74) Representative: **Prinz & Partner**

Patentanwälte

Rundfunkplatz 2

80335 München (DE)

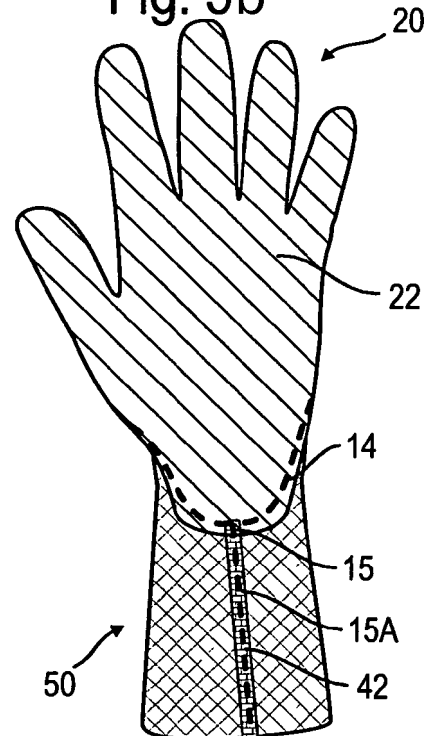
(71) Applicant: **W.L.GORE & ASSOCIATES GMBH**

85639 Putzbrunn (DE)

(54) **Breathable Glove**

(57) A glove (20) comprises a palm panel (10) and a back hand panel (12), the palm panel (10) and the back hand panel (12) being joined by at least one seam (14, 15) to form the glove (20) having a palm side and a back hand side. The glove (20) is further provided with a coating (22) on one side of the glove (20) which extends partially onto the other side of the glove (20) forming a first sealing means to seal the seam (14, 15) over at least a portion of the length thereof, wherein a second sealing means (42) is provided which seals the seam over at least a portion of its length which is not sealed by the coating.

Fig. 5b



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Description

[0001] The invention relates to a glove comprising a palm panel and a back hand panel, the palm panel and the back hand panel being joined by at least one seam to form the glove having a palm side and a back hand side, the glove being provided with a coating on one side of the glove which extends partially onto the other side of the glove forming a first sealing means to seal the seam over at least a portion of the length thereof.

[0002] Gloves formed from a palm panel and a back hand panel are widely known. An example is shown in Figure 1, in which Figure 1a shows a palm panel 10 and a back hand panel 12 for a glove for a left hand. The two panels 10, 12 are joined by a seam 14 (see Figure 1b) which extends along the outer edge of both panels from a starting point S all along the outer edges of a wrist portion 16 of the panels 10, 12, along the fingers 18 and again along wrist portion 16 to an end point E (or in the opposite direction). The edges of wrist portion 16 which are opposite to fingers 18 are not provided with a seam so that a hand of a user can be slipped into the glove.

[0003] It is to be understood that the term "seam" is used as a generic designation for the connection between two elements. The seam can be formed as a stitched seam which allows to mechanically connect the edges of the palm panel and the back hand panel to each other. However, other techniques can be used as well, e.g. an adhesive which is applied to one of the panels or to both of them, and which connects the edges such that a glove is formed, or a welded connection. The seam can be waterproof, but does not necessarily have to be waterproof.

[0004] Palm panel 10 and back hand panel 12 are congruent. In other words, they have the same shape. This results in seam 14 defining the separation between a palm side of the glove and a back hand side.

[0005] The two panels 10, 12 connected to each other form a glove 20 which can be provided with a coating 22 on one of its sides, which in the example of Figure 1 is the palm side of the glove. Coating 22 can be a dip coating which is applied to glove 20 by placing glove 20 on a hand form and dipping the hand form with the glove into a liquid coating material, possibly repeatedly until a coating with a desired thickness has accumulated on the palm side of the glove.

[0006] If the material used for back hand panel 12 is breathable, for example formed from PTFE or ePTFE, humidity emitted by the hand of a person using the glove can be transported to the outside, resulting in a good wearing comfort.

[0007] As can be seen in Figure 1b, coating 22 does not only completely cover palm panel 10 but also seam 14 as it slightly extends onto the back hand side as well. Assuming that the breathable material used for back hand panel 12 is also waterproof, a waterproof glove is formed in this way in which seam 14 is sealed in a waterproof manner by coating 22 to the extent the seam is

covered by the coating.

[0008] For a couple of reasons, the wrist portion 16 of the glove is typically not dipped into the coating material. The consequence from this is that each glove has a certain point P as from which onwards seam 14 is no longer sealed by the material which forms coating 22. Looking at Figure 1c, coating 22 can be seen which extends onto the back hand side of glove 20 in the region of the fingers, thereby reliably sealing seam 14 in this region. Towards wrist portion 16 however, coating 22 "retracts" from the back hand side of the glove onto the palm side such that at point P, the boundary of coating 22 "crosses" seam 14, resulting in the portion of the seam extending between the rearward end of wrist portion 16 and point P not being sealed. This seam portion is here designated with reference numeral 14A. It can be seen in Figure 1c that the overall waterproof characteristics of the glove are affected thereby as there is a risk that water penetrates through seam portion 14A if this portion of seam 14 is subjected to water.

[0009] It is of course possible to dip the glove deeper into the liquid coating material so as to "move" point P further towards the rear end of wrist portion 16. The result of this approach is shown in Figure 1d. It can be seen that coating 22 extends farther onto the back hand side and the back hand panel 12 of the glove (please see in particular the extent to which the back hand side of fingers 18 is provided with coating 22), resulting in point P being closer to the rear end of wrist portion 16 as compared to the glove shown in Figure 1c. However, the breathing capacity of back hand panel 12 is somewhat reduced as the surface available for transporting humidity is smaller as compared to the glove shown in Figure 1c. Further, a rather large amount of coating material is wasted in particular on the back hand side of fingers 18 of glove 20 as it does not improve the waterproof characteristics of the glove; the material of back hand panel 12 already is waterproof. Still further, the whole glove suffers in elasticity, flexibility and conformability due to the increased coating area that eliminates easiness of stretch and therefore can restrict the hand while moving. Especially the coated wrist area results in difficulties to easily enter the hand into the glove.

[0010] It is the object of the invention to improve a coated glove such that a better waterproofness is achieved without affecting the breathing qualities of the glove.

[0011] In order to achieve this object, the invention provides a glove as defined above, wherein a second sealing means is provided which seals the seam over at least a portion of its length which is not sealed by the coating. The invention is based on the recognition that the properties of the glove can be significantly improved if two different types of sealing means are combined. The coating is being used for sealing the seam over the majority of its length, in particular along a palm portion of the glove and along a finger portion. The second sealing means is then used for sealing the seam in those portions which are not covered by the coating.

[0012] According to a preferred embodiment of the invention, the coating is provided on the palm side of the glove extending partially onto the back hand panel. The coating can therefore serve two purposes, namely for sealing the palm panel and at the same time acting as a mechanical reinforcement on that side of the glove which is typically subjected to the majority of wear.

[0013] Preferably, the back hand panel comprises a waterproof, breathable material. In combination with a coating on the palm side, a glove is achieved which has breathable characteristics via the back hand panel and is waterproof by means of the coating on the palm side (independent from the palm panel material). Nevertheless, manufacturing costs are reduced as no sophisticated material is required for the palm panel.

[0014] According to an alternative embodiment, the coating is provided on the back hand side of the glove extending partially onto the palm. This embodiment results in a glove in which the back hand side is protected by means of the coating whereas superior tactile characteristics are achieved with the uncoated palm panel.

[0015] Preferably, the palm panel comprises a waterproof breathable material. This embodiment results in a good wearing comfort despite the coating on the back hand side of the glove.

[0016] According to a preferred embodiment, the waterproof, breathable material is a membrane and preferably comprises PTFE, in particular ePTFE. This material combines good breathing characteristics with superior waterproofness and mechanical stability.

[0017] The term "membrane" is to be understood as meaning in particular a film or a coating which forms a barrier at least to air passage through this layer, ideally also with regard to further gases such as for example chemical poisonous gases. The barrier layer is water vapor permeable but air impermeable and/or gas impermeable. The barrier layer is referred to as air impermeable when it has an air transmission rate of less than 25 l/m² and in particular an air transmission rate of less than 5 l/m² (EN ISO 9237, 1995).

[0018] A water impermeable and water vapor permeable flexible membrane suitable for the present invention is described in US- A- 3, 953, 566 which describes a porous expanded polytetrafluoroethylene (PTFE) material. The expanded porous PTFE material has a characteristic microstructure of interconnected nodes and fibrils. The water impermeability of the membrane can be improved when the expanded PTFE material has been coated with a hydrophobic and/or oleophobic coating material.

[0019] The water impermeable and water vapor permeable membrane can also be constructed of a microporous material such as for example polyethylene or polypropylene, microporous polyurethane or polyester, or a hydrophilic monolithic polymer such as polyurethane for example.

[0020] Suitable materials for a waterproof and water vapor permeable barrier layer are in particular poly-

urethane, polypropylene and polyester, including polyether ester and laminates thereof, as described in US- A- 4, 725, 481 and US- A- 4, 493, 870. Particular preference, however, is given to expanded microporous polytetrafluoroethylene (ePTFE) as described for example in US- A- 3, 953, 566 and US- A- 4, 187.390, and expanded polytetrafluoroethylene provided with hydrophilic impregnants and/or hydrophilic layers; see for example US- A- 4.194.041. A microporous barrier layer has an average pore size between about 0.2 μm and about 0.3 μm.

[0021] Pore size can be measured using a Coulter Porometer (brand name) from Coulter Electronics, Inc., Hialeah, Florida.

[0022] Preferably, the coating is a waterproof coating such that the glove is a waterproof, breathable glove. The waterproof coating can be formed at low costs from natural rubber latex or nitril rubber latex and allows increasing grip and abrasion resistance while fluid is reliably blocked from penetrating into the glove.

[0023] According to a preferred embodiment, the palm panel and the back hand panel are congruent and the second sealing means extends from a thumb portion of the glove and a little finger portion, respectively, towards a wrist portion of the glove. This portion of the seam between the palm panel and the back hand panel of the glove is particularly suitable for being sealed with the second sealing means.

[0024] According to an alternative embodiment, the palm panel and the back hand panel are formed in one piece and the sealing means extends from a thumb portion or a little finger portion of the glove towards a wrist portion of the glove. Forming the palm panel and the back hand panel in one piece reduces the length of the seam which is necessary for connecting the two pieces. Therefore, it is necessary to employ the second sealing means only in the portion of the seam which extends from the thumb portion towards the wrist portion.

[0025] Preferably, the portion of the seam sealed by the second sealing means extends generally straight. This significantly simplifies the application of the second sealing means.

[0026] According to a preferred embodiment of the invention, the second sealing means is a seam sealing tape. A seam sealing tape is particularly suitable for sealing the seam in a waterproof manner, in particular if the portion of the seam to be sealed extends generally straight.

[0027] It is already known to seal the seams of gloves with seam sealing tapes. This technique is used for producing 5 finger gloves from waterproof laminates and requires sealing the entire seam. This is particularly complex in the finger portions where up to four separate seam sealing tape pieces are necessary for achieving a complete seal. Attempts to change the geometry of the laminate allow reducing the number of seam sealing tape pieces necessary for sealing the fingers. Nevertheless, the working time for producing such gloves is immense so that the gloves are rather expensive. With the inventive

concept, these problems are solved so that a realistic commercially viable process capable of economic mass production is provided.

[0028] According to an alternative embodiment, the second sealing means can be an adhesive. It is also possible to form the second sealing means from the same material as the coating. Both approaches allow application of the second sealing means in an effective manner.

[0029] Preferably, the second sealing means is provided on the inside of the glove as the second sealing means then is better protected.

[0030] According to an alternative preferred embodiment, the palm panel and the back hand panel are formed as separate pieces. This allows but not requires using different materials for the palm panel and the back hand panel.

[0031] It is also possible that at least one of the palm panel and the back hand panel is composed of at least two pieces, in particular from pieces which are formed from materials having different properties. This allows to even better match the characteristics of the glove with certain requirements, for example superior tactile characteristics in a finger portion of the glove and increased mechanical strength in another portion.

[0032] The mechanical strength of the glove can be significantly improved if an abrasion resistant laminate is provided on the palm side. The laminate can be integrated into the coating provided on the palm side of the glove.

[0033] In accordance with a preferred embodiment of the invention, the coating is a dip coating. Such coating can be applied in a proven process at low costs.

[0034] The invention will now be described with reference to different embodiments which are shown in the enclosed drawings. In the drawings,

Figures 1a to 1d show different aspects of a glove according to the prior art,

Figures 2a and 2b show the panels and a glove according to a first embodiment of the invention,

Figures 3a and 3b show the panels and a glove according to a second embodiment of the invention,

Figures 4a and 4b show a glove according to a third embodiment of the invention,

Figures 5a and 5b show a glove according to a fourth embodiment of the invention,

Figures 6a and 6b show the pieces from which the panels for a glove according to a fifth embodiment of the invention are comprised of, and the panels,

Figures 7a and 7b show the panels for a glove according to a sixth embodiment of the invention, and the glove.

[0035] For all embodiments described in the following, a palm panel 10 and a back hand panel 12 are being used which are formed from different materials, except for the embodiment in which palm panel 10 and back hand panel 12 are formed in one piece. Back hand panel 12 is preferably comprising a waterproof, breathable material, in particular from PTFE and more particular from ePTFE.

[0036] Palm panel 10 can be formed from a material which has good tactile properties and allows application of a coating. This material however does not have to be breathable and/or waterproof. In general, palm panel 10 can be made from a simple fabric rather than from a sophisticated membrane material.

[0037] There however are applications in which the same material can be used for the back hand panel and the palm panel.

[0038] Even though the embodiments described in the following use a coating 22 which is generally applied onto the palm side of the glove, it is to be understood that it is also possible to use a coating which is applied onto the back hand side of the glove while using a partially uncoated fabric on the palm side. Then, the waterproof, breathable material will be used for the palm panel while the back hand panel can be made from a simple fabric.

[0039] Further, it is to be understood that using a seam, as is referred to in the following for mechanically connecting the edges of the palm panel and the back hand panel to each other, is only an example of a suitable technique. Other techniques can be used as well, e.g. an adhesive which is applied to one of the panels or to both of them, and which connects the edges such that a glove is formed.

[0040] In Figure 2a, a palm panel 10 and a back hand panel 12 are shown, which are here formed in one piece as they merge into each other along an imaginary partition line PL. Nevertheless, both panels 10, 12 are congruent. In other words, they have the same shape.

[0041] Both panels 10, 12 are comprising a waterproof, breathable material which preferably is PTFE, in particular ePTFE. By joining the outer edges of palm panel 10 and back hand panel 12 from a starting point S towards and end point E (or vice versa), a glove 20 is obtained having the general shape as shown in Figure 2b.

[0042] On the palm side of the glove, a coating 22 is applied which is formed generally in the same manner as already described with reference to Figure 1b, resulting in the majority of seam 14 connecting palm panel 10 and back hand panel 12 being sealed with the coating material. Accordingly, coating 22 forms a first sealing means.

[0043] The coating which is applied can be a dip coating. However, the coating can also be applied by using injection molding techniques. It is also possible to combine a dip coating with an injection-molded coating.

[0044] After the coating has been applied to the glove, additional elements such as leather strips etc. can be applied to the glove, in particular to coated portions.

[0045] Despite the coating, an uncoated seam portion 14A remains. In order to ensure overall waterproof properties of the glove, a second sealing means is employed for sealing seam portion 14A. In this embodiment, a seam sealing tape 42 is used which is applied to seam 14 in the interior of the glove so as to extend from the rearward end of the glove opposite the fingers, at least up to the point as from which seam 14 is covered by coating 22.

[0046] Seam sealing tape 42 is of the type used for sealing seams of cloths manufactured from PTFE materials. It can be applied in a reliable and time-saving manner as seam 14 in seam portion 14A extends along a generally straight line.

[0047] Even though the second sealing means is here described as being formed from a seam sealing tape, other techniques can be used as well. An adhesive material could be applied to seam portion 14A, or some of the material from which coating 22 is formed could be applied. In any case, the step of applying the second sealing means to that part of the seam which is not sealed by the first sealing means can be performed in a simple manner as the seam extends generally straight in portions which requires additional sealing.

[0048] In Figure 3, a second embodiment of the invention is shown. For the elements known from the first embodiment, the same reference numerals are being used, and reference is made to the above comments.

[0049] The difference between the first and the second embodiment is that in the second embodiment, a wrist flap 26 is provided on palm panel 10, resulting in palm panel 10 and back hand panel 12 having different shapes rather than being congruent. Wrist flap 26 determines where the seam between palm panel 10 and back hand panel 12 is arranged on wrist portion 16. As can be seen in Figure 3b, seam 14 is not arranged between the palm side and the back hand side of the glove, but on the palm side. This results in uncovered portion 14A of seam 14 being shorter as compared to the first embodiment. Nevertheless, the second sealing means in the form of a seam sealing tape 42 is employed in order to ensure that the glove is completely waterproof.

[0050] Even though the back hand side of glove 20 is not visible in Figures 2 and 3, it is to be understood that the back hand side of the glove is generally uncoated (apart from marginal portions along the outer contour of the fingers), similar to the glove shown in Figure 1b. This results in the back hand side of the glove being breathable so that a good wearing comfort is provided.

[0051] In Figure 4, a third embodiment of the invention is shown. For the elements known from the previous embodiments, the same reference numerals are being used, and reference is made to the above comments.

[0052] The embodiment of Figure 4 differs from the previous embodiment in that an arm portion 50 is provided which is formed as an extension of wrist portion 16. Further, two wrist flaps 26 are provided symmetrically so that two seam portions 14A extending beyond coating 22 are provided on the palm side of the glove. They each

serve for connecting wrist flap 26 to a wrist piece 24 which is an integral part of palm panel 10. In view of their length, wrist piece 24 and wrist flaps 26 could also be termed as arm pieces and arm flaps.

[0053] Seam portions 14A not covered by coating 22 and extending over the entire arm portion 50 towards wrist portion 16 are here sealed by seam sealing tapes 42 so as to arrive at a completely waterproof glove. As can be seen in Figure 4b, seam portions 14A extend along a straight line. This significantly simplifies the application of seam sealing tape 42 onto the seam, preferably at the inner side of the glove.

[0054] In Figures 5a and 5b, a fourth embodiment of the invention is shown. For the elements known from the previous embodiments, the same reference numerals are used, and reference is made to the above comments.

[0055] The glove shown in Figure 5 basically corresponds to the glove shown in Figure 4, with the difference being that wrist flaps 26 are formed wider such that they can be directly connected to each other. This makes it unnecessary to provide a wrist piece and results in seam 14 being in the form of a closed loop. An additional seam 15 is provided for connecting wrist flaps 26 to each other and to palm piece 10. Single seam 15 extends in a straight line from coating 22 towards the rear end of the glove. Here again, the second sealing means in form of a seam sealing tape 42 is applied at least to the uncoated seam portion 15A so that the glove is completely waterproof.

[0056] In Figure 6a, the pieces are shown from which palm panel 10 and back hand panel 12 are composed. Palm panel 10 is composed of a finger piece 30 and a hand piece 32, and back hand panel 12 is composed of a finger piece 34 and two hand pieces 36, 38.

[0057] Finger piece 30 and hand piece 32 are joined by a seam 33 (shown in Figure 6b). In view of the coating later applied to the glove, no particular provisions regarding waterproofness are necessary for seam 33.

[0058] Finger piece 34 and hand pieces 36, 38 of the back hand panel are joined along two seams 39 (also shown in Figure 6b). As no coating is to be applied to the back hand side of the glove, sealing means 42 are being used for sealing seams 39, namely e.g. seam sealing tapes 42. These can be applied in a simple manner as straight seams 39 are being used. The advantage of forming panels 10, 12 from a plurality of pieces is that different materials can be used for the pieces such that the material properties can be particularly adapted to the specific requirements.

[0059] In Figures 7a and 7b, a sixth embodiment of the invention is shown. For elements known from the previous embodiment, the same reference numerals are being used, and reference is made to the above comments.

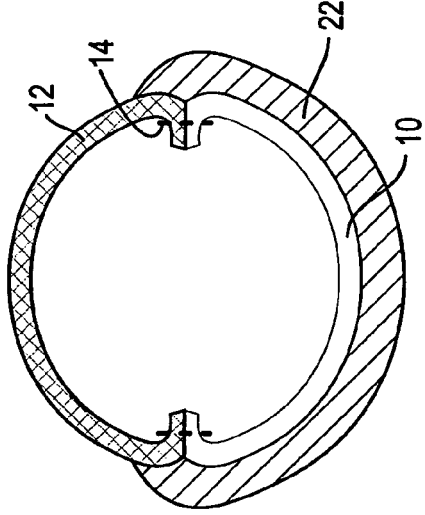
[0060] As can be seen in Figure 7a, palm panel 10 is formed in one piece while the back hand panel is formed from a finger piece 34 and a wrist piece 36. These pieces are connected by means of a seam 33 (please see Figure 7b). The palm panel and the back hand panel are congruent panels which are connected to each other by

means of a seam 14 extending from a starting point S towards an endpoint E (or vice versa). The glove has an arm portion 50 as is known from the third and the fourth embodiment. In order to increase the mechanical strength of the glove, an abrasion resistant laminate 70 is provided. For sealing portions 14A of seam 14 which are not covered by coating 22, a second sealing means in form of a seam sealing tape 42 is applied in the interior of the glove. It can be seen that seam sealing tape 42 is being used over a significant portion of the length of the entire seam. As the respective portions of the seam however extend mainly straight, seam sealing tape 42 can be applied without significant difficulties.

Claims

1. Glove (20) comprising a palm panel (10) and a back hand panel (12), the palm panel (10) and the back hand panel (12) being joined by at least one seam (14, 15) to form the glove (20) having a palm side and a back hand side, the glove (20) being provided with a coating (22) on one side of the glove (20) which extends partially onto the other side of the glove (20) forming a first sealing means to seal the seam (14, 15) over at least a portion of the length thereof, wherein a second sealing means (42) is provided which seals the seam over at least a portion (14A, 15A) of its length which is not sealed by the coating (22).
2. The glove of claim 1 wherein the coating (22) is provided on the palm side of the glove (20) extending partially onto the back hand panel (12), or vice versa.
3. The glove of claim 2 wherein the palm panel (10) and/or the back hand panel (12) comprises a waterproof, breathable material.
4. The glove of claim 3 wherein the waterproof, breathable material comprises PTFE, in particular ePTFE.
5. The glove of any of the preceding claims wherein the coating is a waterproof coating (22), such that the glove (20) is a waterproof, breathable glove.
6. The glove of any of the preceding claims wherein the palm panel (10) and the back hand panel (12) are congruent, the second sealing means (42) extends from a thumb portion of the glove and a little finger portion, respectively, towards a wrist portion (16) of the glove.
7. The glove (20) of any of the preceding claims wherein the palm panel (10) and the back hand panel (12) are formed in one piece and the second sealing means (42) extends from a thumb portion of the glove towards a wrist portion (16) of the glove (20) or from a little finger portion of the glove towards a wrist portion (16) of the glove (20).
8. The glove of any of the preceding claims wherein the portion of the seam (14, 15) sealed by the second sealing means (42) extends generally straight.
9. The glove of any of the preceding claims wherein the second sealing means (42) is a seam sealing tape.
10. The glove of any of claims 1 to 8 wherein the second sealing means (42) is an adhesive.
11. The glove of any of claims 1 to 10 wherein the second sealing means (42) is made from the same material as the coating.
12. The glove of any of the preceding claims wherein the second sealing means (42) is provided on the inside of the glove.
13. The glove (20) of any of the preceding claims wherein at least one of the palm panel (10) and the back hand panel (12) is composed of at least two pieces (30, 32, 34, 36, 38).
14. The glove of any of the preceding claims wherein an abrasion resistant laminate (70) is provided on the palm side.
15. The glove (20) of any of the preceding claims wherein the coating (22) is a dip coating (22).
16. The glove (20) of any of the preceding claims wherein the coating (22) is an injection-molded coating.

Fig. 1b



Prior Art

Fig. 1a

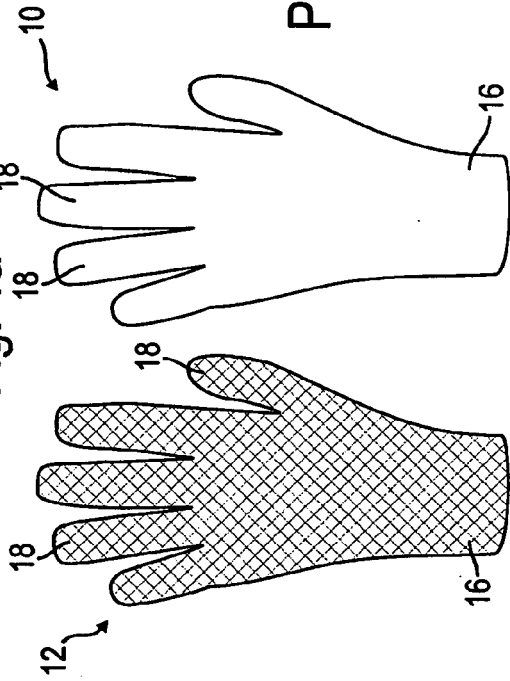


Fig. 1d

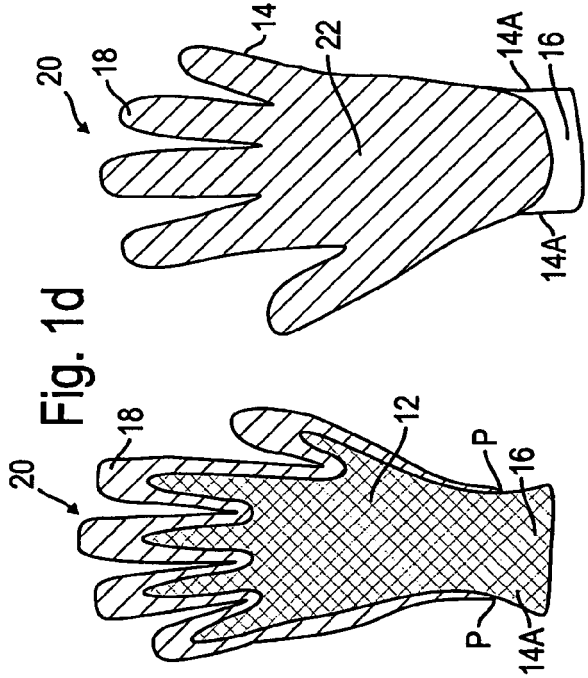


Fig. 1c

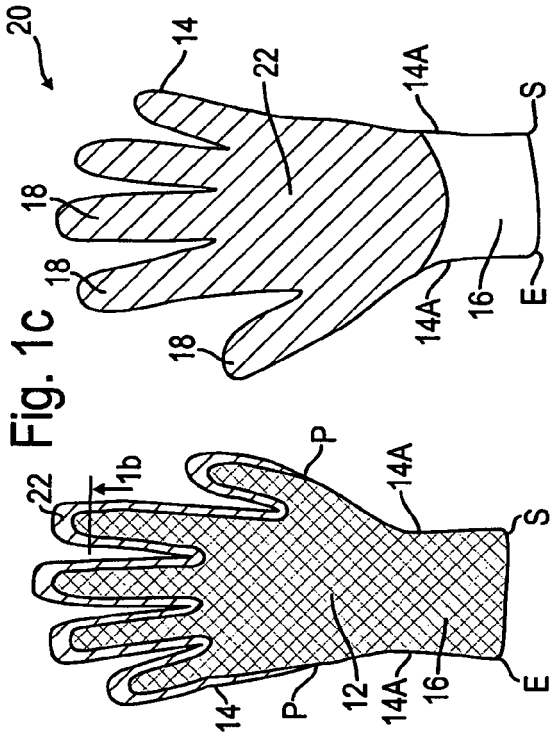


Fig. 3b

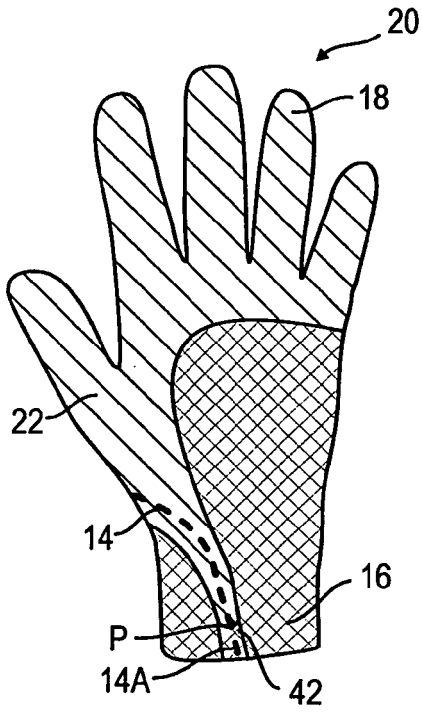


Fig. 3a

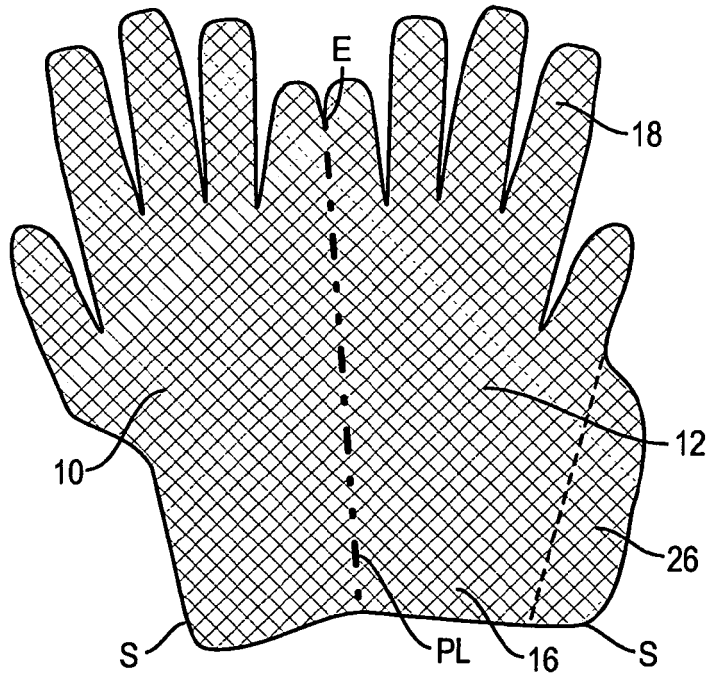


Fig. 2b

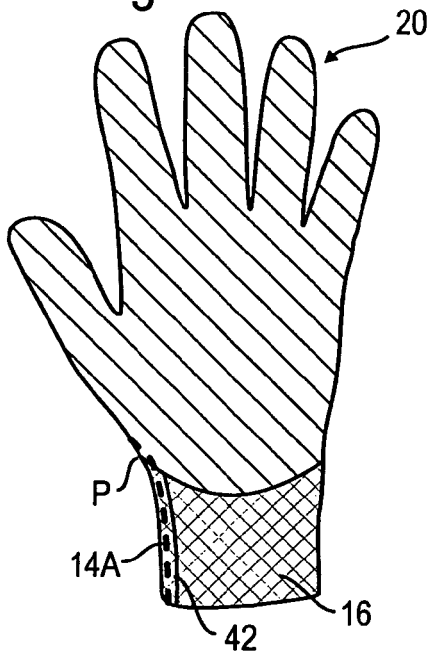
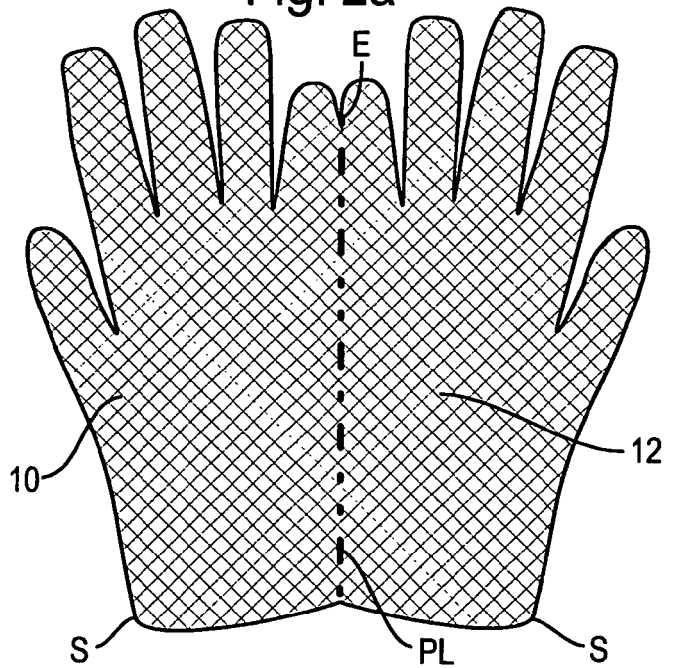


Fig. 2a



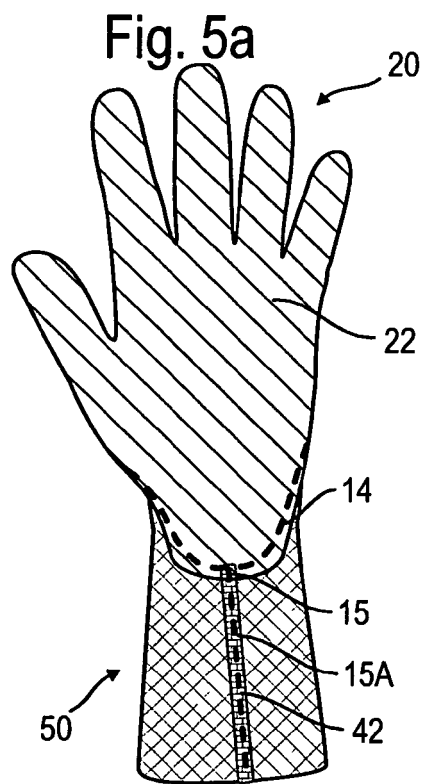
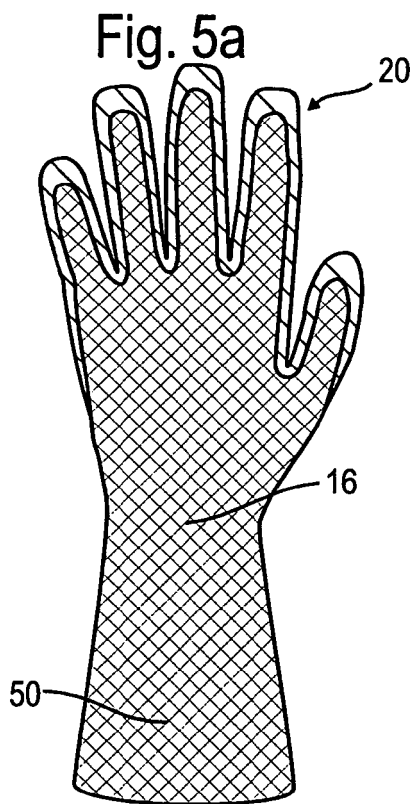
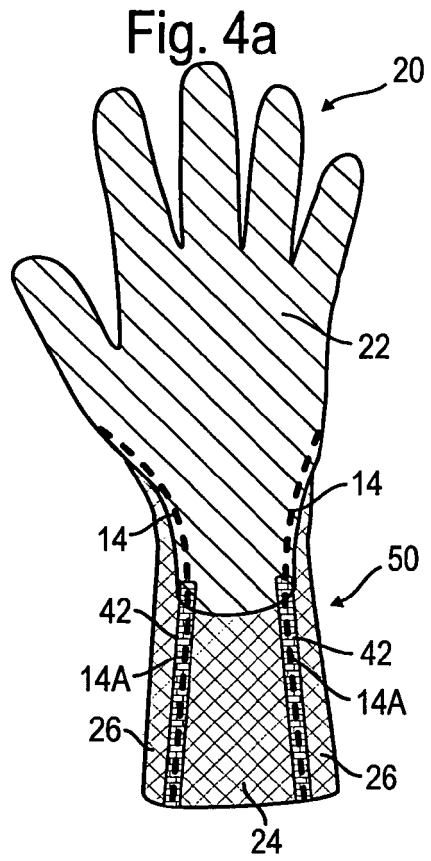
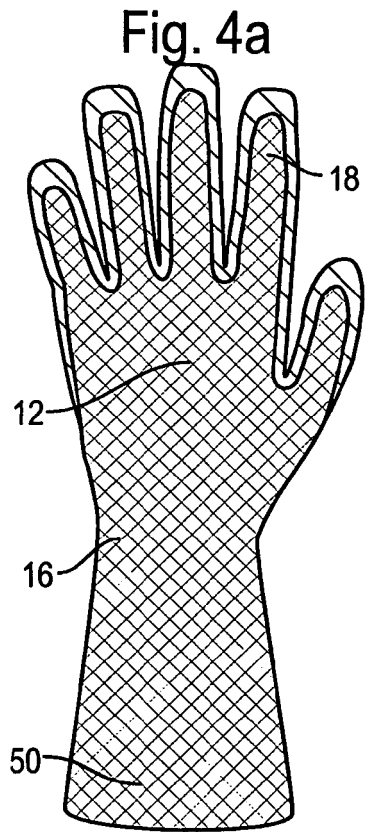


Fig. 6a

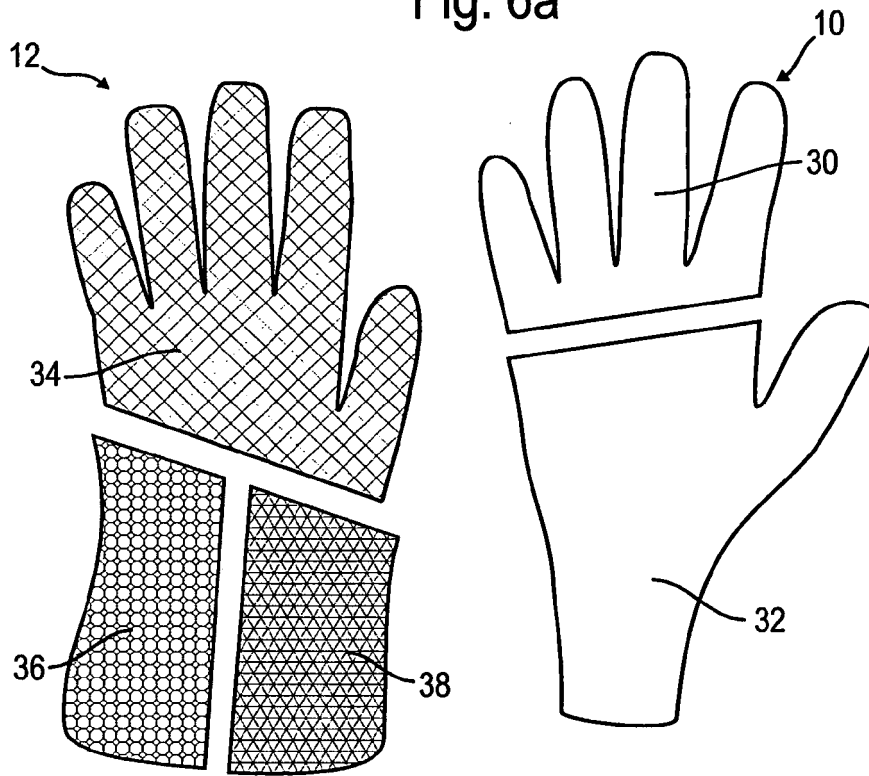


Fig. 6b

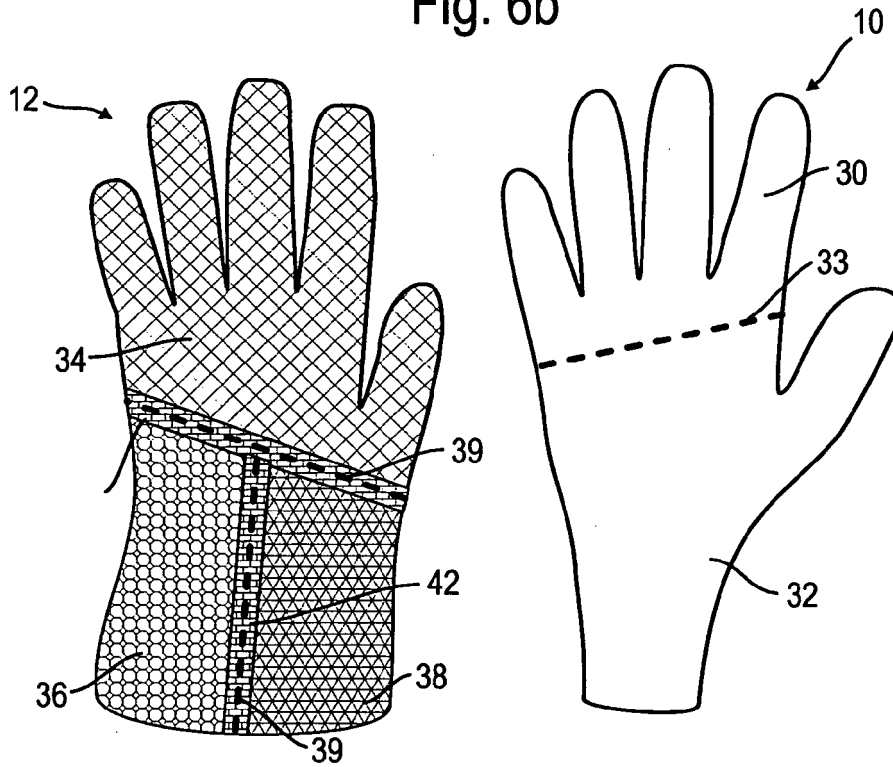


Fig. 7a

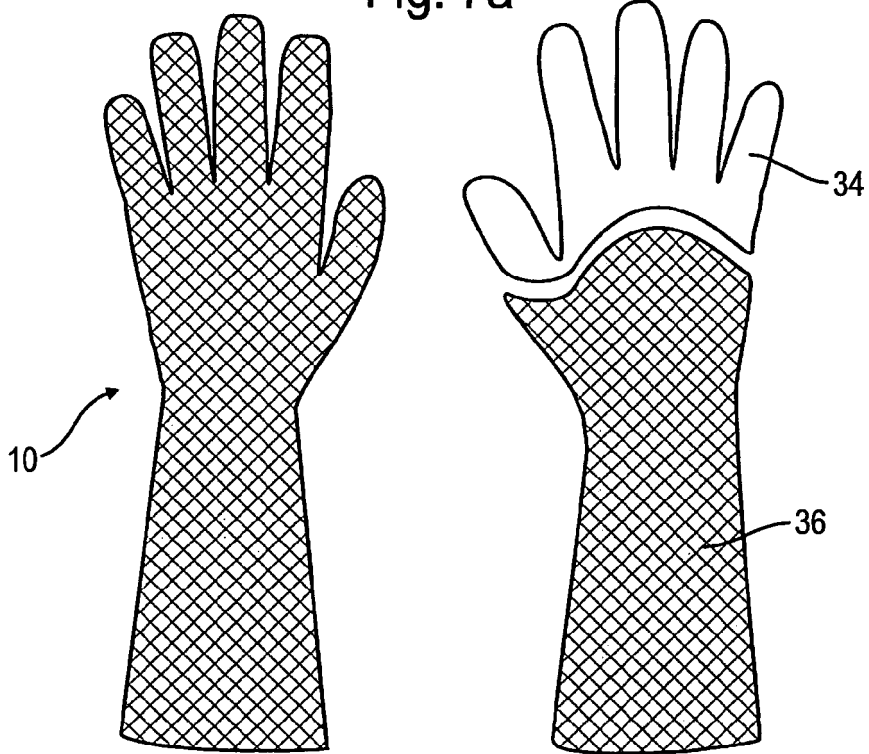
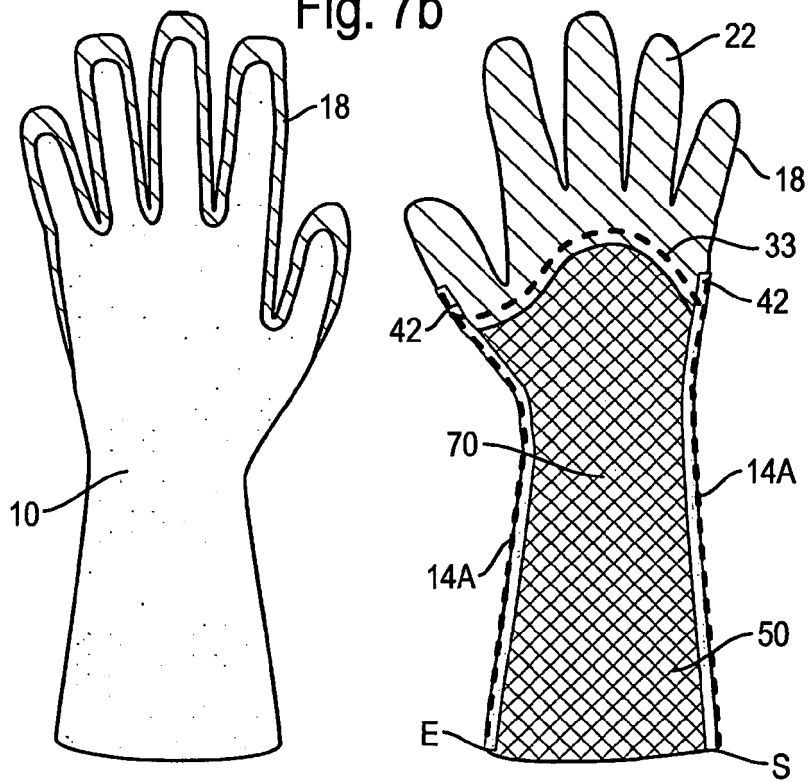


Fig. 7b





EUROPEAN SEARCH REPORT

Application Number
EP 12 00 1931

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2010/018552 A1 (ALPINESTARS RES SRL [IT]; MAZZAROLO GIOVANNI [IT]) 18 February 2010 (2010-02-18) * page 3, line 23 - line 27; figure 4 * -----	1	INV. A41D19/00
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