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(54) PROTECTIVE GLOVE

(57) The present disclosure relates to a protective glove (10) including a glove body (12) of flexible material having an outer visible surface (14) and shaped to define an inner housing for accommodating a hand of a user. The glove body (12) includes, or defines, one or more covering areas (17, 18) adapted to cover articulation zones (20, 21) of the fingers, wherein the one or more

covering areas (17, 18) of the said glove body (12) are devoid of an opening or a surface discontinuity in the region of, or surrounding, the one or more articulations of the fingers. The protective glove includes one or more protection elements (25, 26), said one or more protection elements (25, 26) being fixed on the outer visible surface (14) of a corresponding covering area (17, 18).

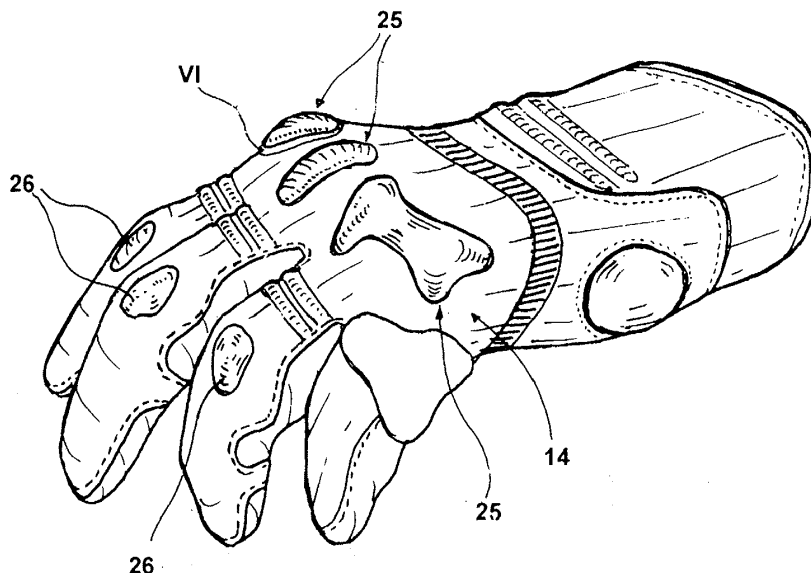


FIG.3

Description

[0001] The present disclosure relates in general to a glove provided with rigid or semi-rigid protection elements.

[0002] In many sporting and non-sporting activities it is advisable to use gloves provided with protection elements arranged in predetermined positions in order to protect the user from accidental impacts which may occur while carrying out the activity.

[0003] A typical example is that of the gloves used by motorcycling riders while riding, in particular at a professional level.

[0004] In order to protect the hand in the event of accidents of the type described, gloves provided with rigid or semi-rigid protection elements arranged in the region of the articulations of the fingers are normally used, while the palm of the hand is generally protected by means of padding elements, intended essentially to dampen any impact.

[0005] Historically a protection glove for motorcycling use includes a glove body, namely a body made of a flexible material so that it may be adapted to the hand of a user and at the same have a sufficient tensile strength. The glove body defines a housing inside which the user's hand is accommodated.

[0006] Conventionally the glove body is made of leather and has in the region of the articulations of the fingers, such as the metacarpophalangeal articulations, namely the articulations situated between the metacarpal bones and the proximal phalanges, an insert made of carbon fibre or some other abrasion-resistant material. In other words, the glove body has one or more cavities in the leather in the region of the metacarpophalangeal articulations for accommodating an insert made of an erosion-resistant material.

[0007] As a result, the glove body made of leather or other flexible material has, when viewed, an opening or window in the region of the metacarpophalangeal articulations and this opening or window is closed and covered with a layer of anti-abrasion material.

[0008] This opening affects an area generally covering all the metacarpophalangeal articulations, namely all five articulations situated between the metacarpal bones and the proximal phalanges.

[0009] Joining together of the layer which has a greater abrasion resistance and a remaining part of the glove body is performed by means of stitches. These stitches therefore surround all five articulations situated between the metacarpal bones and the proximal phalanges.

[0010] The presence of these stitches, however, constitutes a major drawback primarily owing to the structural complexity involved.

[0011] Stitching together of the leather and the anti-abrasion material must necessarily be performed using artisanal methods, with the further drawback that a perfect uniformity between gloves of the same size cannot be ensured.

[0012] Moreover, the stitches, and therefore the surface interruptions, constitute weakness zones in the glove which are subject to tearing. In other words, the presence of a large number of stitches substantially weakens the structure of the glove itself and, in the event of a fall, said stitches may easily tear owing for example to frictional contact with the ground, thus causing the possible displacement and/or loss of the protection elements, with the result that they are substantially ineffectual.

[0013] The present disclosure proposes providing a protective glove which is able to overcome the drawbacks mentioned above with reference to the prior art and/or achieve further advantages.

[0014] This is achieved by providing a protective glove according to the independent claim 1. The technical problem is also solved by a method for manufacturing a protective glove as indicated in claim 11.

[0015] Particular embodiments forming the subject of the present disclosure are defined in the corresponding dependent claims.

[0016] The present disclosure is based on the recognition by the author of the present disclosure that, in order to avoid or reduce as far as possible the weakness zones of the glove, it is convenient to provide a glove body without windows or openings in the region of the articulations of the fingers, and therefore revolutionize the protective gloves as designed hitherto by abandoning the well-established tradition of providing a carbon-fibre insert.

[0017] In other words, a method according to the present disclosure envisages:

- providing a glove body of flexible material having an outer visible surface, wherein the glove body is shaped to define an inner housing for accommodating a hand of a user and covering articulation zones of the fingers, wherein the articulation zones of the fingers are covered continuously by means of the flexible material without surface discontinuities in the region of or in a covering area surrounding the one or more articulations of the fingers;
- fixing one or more protection elements, namely adapted or configured to provide protection from impact, for example a rigid plate or semi-rigid element, on the outer visible surface of a corresponding covering area of a respective articulation of the fingers,
- arranging a plate counter-element or abutment plate element on an inner side of the glove in the region of the protection element. In fact, the plate counter-element is situated inside the glove. The abutment element allows the articulation zone to be reinforced and provides the glove with a stronger structure in this zone so that the flexible material of the glove body is subject to minimum stress and tension when the hand assumes clenched-fist positions and the articulation zones emerge/project more from a remaining part of the hand and therefore the protection element may adhere as far as possible and remain

as stable as possible on the glove body.

[0018] As a result, in the region of each articulation zone, the glove includes, instead of an opening closed by means of a carbon-fibre insert with an anti-abrasion function, a continuous material which forms the glove body, and two superimposed plate elements, one on the outer side with respect to the flexible surface of the glove body and one on the inner side with respect to the flexible surface of the glove body. The outer protection element allows a high degree of protection from impact and abrasion, while the inner plate counter-element ensures an adequate positioning stability for the outer protection element, owing to the fact that the plate counter-element is arranged in the region of the articulation zones, and therefore on the hand side, and may therefore limit/compensate for any tensions caused by the glove body on the outer plate element following movement of the hand and also provide further protection for the articulation zones of the hand.

[0019] Stabilization of the protection element is therefore obtained inside the glove.

[0020] In one embodiment the plate counter-element is fixed directly to the protection element and may receive coupling elements of the protection element in order to ensure a solid and direct connection and at the same time allow any connecting, fixing or other elements on the outer side of the glove for the protection element to be kept to a minimum. The coupling elements may in fact be arranged on the inner side of the protection element directed towards the glove body and therefore towards the protection counter-element, so as not to be visible from the outside.

[0021] According to this aspect, the protection element may have the simplest and most linear shape or profile with suitable effect in terms of appearance of the glove, without screws, hooks or other mechanical connection means and be fixed, concealed from sight, to the plate counter-element inside the glove. Preferably the protection element has a concave shape, for example spoon shape, with a minimum surface area covering only the knuckles.

[0022] In one embodiment, the protection elements are separated from each other, so that a flexible zone in between the protection elements acts as a hinge element. Similarly the plate counter-elements are separate from each other, as described in the European patent application filed on the same date by the Applicant and claiming the priority of Italian Patent Application No. 102014902280407. Both applications are incorporated herein by way of reference sources.

[0023] In one embodiment, the plate counter-element has a size and shape greater than those of the protection elements so as to allow the aforementioned compensation effect to be maximized. Even more particularly, in one embodiment, the plate counter-element has a seat having a shape complementing that of the protection element so as to allow the protection element to be seated

more stably.

[0024] As a result, in accordance with an embodiment of the present disclosure, the method may not include a step for forming an opening or a surface discontinuity in the region of, or surrounding, the one or more articulations of the fingers, nor include a consequent step of closing said opening with a material having a high abrasion resistance, such as a layer of carbon fibre, and instead envisages reinforcing the articulation zone by means of two plate elements which are connected together and allow the surface of the glove body to be left intact.

[0025] With the glove according to the present disclosure it is possible to avoid interruption zones in the material which may be easily exposed to tearing and achieve stable positioning of the protection elements with less stress. In fact, it is envisaged that a visible surface of the glove body in the region of the articulations of the fingers may be devoid of interruptions in the surface and that a protection element is positioned in a stable manner on this visible surface of the glove body in the region of the finger articulation.

[0026] As a result all the possible weaknesses due to discontinuities in the material between the material of the glove body and a material with a greater abrasion resistance may be avoided, eliminating completely the risk of tearing in the event of a fall. It should be understood that, in the context of the present disclosure, reinforcing stitches may be present around the articulations of the fingers. What is important is that there is a continuity of the material in this articulation zone of the fingers.

[0027] Moreover, the protective glove according to the present disclosure may be made using a production method which is much simpler and faster, owing to the fact that it is not required to provide the opening in the region of the articulations of the fingers and consequently join together different materials.

[0028] Moreover, mounting of the protection element on the glove body and fixing to the plate counter-element may be entirely or partly automated and carried out by means of special equipment, with a consequent reduction in the preparation times and therefore also with an advantage of an economic nature.

[0029] For example, in an embodiment of the present disclosure, the protection element is applied, as a mounting, and/or glued onto the glove body in the region of the plate counter-element.

[0030] Alternatively, in one embodiment of the present disclosure, the protection element is fixed by means of one or more coupling elements of the mechanical type directly to the plate counter-element.

[0031] The protection element may be provided with one or more coupling pins intended to be inserted inside corresponding holes in the abutment plate. The coupling pins may be bent in the manner of clips, after insertion inside the holes, so as to ensure secure fixing of the protection element to the glove body.

[0032] Further advantages, characteristic features and modes of use forming the subject of the present disclo-

sure will become clear from the following detailed description of embodiments thereof, provided by way of a non-limiting example.

[0033] It is evident, however, that each embodiment forming the subject of the present disclosure may have one or more of the advantages listed above; in any case it is not required that each embodiment should have simultaneously all the advantages listed.

[0034] Reference will be made to the figures of the accompanying drawings in which:

- Figure 1 shows a plan view of a hand provided with protection elements;
- Figure 2 shows a view of a glove with exploded parts according to an embodiment of the present disclosure;
- Figure 3 shows a view of a glove according to an embodiment of the present disclosure;
- Figure 4 shows a plan view of an abutment element according to an embodiment of the present disclosure;
- Figure 5 shows a view of a step of coupling together an abutment element and a protection element according to an embodiment of the present disclosure;
- Figure 6 shows a view, on a larger scale, of a detail VI of Figure 3 relating to an abutment element and a protection element according to an embodiment of the present disclosure.

[0035] With reference to the accompanying drawings, an embodiment of a glove according to the present disclosure is indicated by the reference number 10.

[0036] The protective glove 10 includes a glove body 12 of flexible material having an outer visible surface 14 and shaped to define an inner housing for accommodating a hand of a user.

[0037] The expression "glove body" is understood as meaning within the scope of the present disclosure the set of one or more layers and one or more materials which provide the glove with a three-dimensional structure such as to define a housing for the hand. This structure has overall a flexibility and mobility such as to allow a suitable mobility and operability of the hand.

[0038] The flexible material from which the glove body is made may be leather or imitation leather, a synthetic fabric or another suitable material known to the person skilled in the art for manufacturing a sports glove for a motorcyclist. The material may also be understood as being a plurality of materials, or a plurality of layers, such as to provide the glove body with a sufficient flexibility and allow a suitable movement of the hand.

[0039] The expression "outer visible surface" is understood as meaning the surface or face of the glove which is visible from the outside by the user when the glove is worn. This "outer visible surface" may be made completely of the one or more flexible materials used to make the glove body or may include applications or inserts depending on the requirements.

[0040] The glove body 12 includes, or defines, one or more covering areas 17, 18 which cover a corresponding number of articulation zones 20, 21. In particular the reference number 17 refers to the covering area which covers the metacarpophalangeal articulation zone 20, each comprised between a proximal phalange and a respective metacarpal bone. The reference number 18 refers to the covering area which covers the proximal interphalangeal articulation zone 21, each comprised between a proximal phalange and the intermediate phalange. In the continuation of the present disclosure, the expression "articulation zone" may refer to any articulation zone of the fingers such as the metacarpophalangeal articulation zone 20, the proximal interphalangeal articulation zone 21 or the distal interphalangeal articulation zone comprised between a distal phalange and the intermediate phalange.

[0041] The term "covering area" is understood as meaning that the glove body and therefore the flexible material from which the glove body is made covers the articulation zone 20, 21 situated underneath and covered by the covering area.

[0042] According to one aspect of the present disclosure, the one or more covering areas 17, 18 of the said glove body 12 are devoid of an opening or a surface discontinuity in the region of, or surrounding, the one or more articulations of the fingers.

[0043] In other words, the flexible material of the glove body 12 does not have any variation in the material or surface discontinuity of the material in the covering area. The one or more layers of flexible material therefore extends continuously in the region of one or more articulations of the fingers so as to define one or more covering areas. There is therefore in the region of the one or more articulation zones 12, or around the one or more articulation zones 12, no material insert which has a greater abrasion resistance compared to the abrasion resistance, such as a carbon fibre layer.

[0044] As a result, the material of the glove body extends without discontinuity of material over the entire articulation, for example over the entire metacarpophalangeal articulation 20 extending between a proximal phalange and a respective metacarpal bone or over the entire proximal interphalangeal articulation zone 21, extending between a proximal phalange and the intermediate phalange.

[0045] If one considers a hand closed in the form of a clenched fist and the grooves and humps formed by the metacarpophalangeal articulations, it may be said that the flexible material from which the glove body 12 is mainly made extends continuously in the zone of the grooves and the humps.

[0046] According to one aspect of the present disclosure, the protective glove 10 includes one or more protection elements 25, 26, each fixed on the outer visible surface 14 of a corresponding covering area 17, 18.

[0047] The term "protection element" refers to a body which may be rigid or semi-rigid (namely partially rigid)

and which may have a plate-like shape. This body is adapted to protect from impacts and/or abrasions the articulation zone of the hand. This element is called in the related jargon "protection".

[0048] Even more particularly, the one or more protection elements 25, 26 are plate-like elements, plate elements or similar protection elements having a rigid consistency intended to perform an impact protection function. The one or more protection elements 25, 26 may have a concave or substantially spoon-like shape so as to be able to adapt to the articulation zone of the hand which, as is known, when the hand is closed in the manner of a clenched fist, defines a projection or hump. In one embodiment, such as that shown in the drawings, each protection element 25, 26 is associated with a respective articulation zone 20, 22 except for a protection element 25 which extends in bridge fashion over two articulation zones 20 of the little finger and the ring finger.

[0049] Even more particularly, the reference number 25 refers to a rigid or semi-rigid protection element which protects the metacarpophalangeal articulation zone 20 comprised between a proximal phalange and a respective metacarpal bone. The reference number 26 refers to a rigid protection element which protects the proximal interphalangeal articulation zone 21 comprised between a proximal phalange and the intermediate phalange.

[0050] The rigid protection element 25 or 26 may be made of metallic material or any other rigid or semi-rigid protection material.

[0051] Moreover, according to the present disclosure, the protective glove 10 includes one or more plate counter-elements or abutment elements 30 situated on an inner side of the glove body 12 concealed from view in the region of a corresponding articulation of the fingers.

[0052] The one or more protection elements 25, 26 are fixed to a corresponding plate counter-element or abutment element 30. As a result the flexible material of the glove body is arranged between the one or more abutment elements 30 and the one or more protection elements 25, 26.

[0053] Each plate counter-element 30 may have a size greater than that of the protection element and be provided with a raised edge 34, which defines a seat and acts as a retaining or containing frame for the corresponding protection element 25, 26, 27, and favour stabling coupling together.

[0054] Basically the protection element 25, 26 is housed in the seat of the plate counter-element and is stably accommodated there.

[0055] The plate counter-element may be made of a suitable protection material, such as a plastic material.

[0056] In order to connect the one or more rigid protection elements to the outer visible surface 14 of the corresponding covering area 17, 18 a gluing step, or any step known in the sector for effecting fixing onto a fabric, may be performed. In other words, the one or more protection elements may be glued, or generally mounted, on the outer visible surface 14 of the corresponding cov-

ering area 17, 18.

[0057] As an alternative to or in combination with gluing, the one or more protection elements 25, 26 may be fixed to the outer visible surface 14 of the corresponding covering area 17, 18 by means of mechanical coupling elements.

[0058] The one or more protection elements 25, 26 are therefore directly connected or bonded to the outer visible surface 14.

[0059] The mechanical coupling elements may be pin elements 28 which are formed integrally with the respective one or more protection elements 25, 26 and are coupled for example with the glove body 12. In other words, in an embodiment of the present disclosure, the one or more protection elements 25, 26 include said mechanical coupling members 28 which are fixed to coupling counter-elements, such as holes.

[0060] In fact the mechanical coupling elements 28 are pin elements and said coupling counter-elements are holes 31 formed in said one or more plate counter-elements 30, said pin elements 28 being folded at an angle after insertion inside the respective holes 31.

[0061] The pin elements are formed on an inner side, directed towards the visible surface of the glove body, so as not to be visible and not interfere or create an inconvenience for the user when using the glove.

[0062] Inside the glove, the glove body 12 may include a lining and/or a layer of expanded material which may act as a cushion and may minimize any discomfort for the user felt owing to the presence of the one or more plate counter-elements 30.

[0063] In the embodiment shown in the drawings, it can be seen that some of the protection elements in the metacarpophalangeal articulation zone 20 extending between a proximal phalange and a respective metacarpal bone are independent of each other (in particular, for example, in the intermediate zone between the index finger and the middle finger, and between the middle finger and the ring finger) such that a portion of the glove body in between the articulation zones of the index finger, ring finger and middle finger are flexible connection zones which act as hinge zone or mutual twisting zone for the covering areas.

[0064] In other words, the layer of flexible material extends continuously in the region of the articulations of the fingers. In fact, the continuity of the flexible material favours this possibility of movement.

[0065] The plate counter-elements 30 (in particular, for example, in the zone in between the index finger and the middle finger, and between the middle finger and the ring finger) are similarly independent of each other so as to allow mobility of the hand and the articulations.

[0066] The subject-matter of the present disclosure has been described hitherto with reference to preferred embodiments thereof. It is to be understood that other embodiments relating to the same inventive idea may exist, all of these falling within the scope of protection of the claims which are illustrated hereinbelow.

Claims

1. Protective glove (10) including a glove body (12) of flexible material having an outer visible surface (14) and shaped to define an inner housing for accommodating a hand of a user, wherein the glove body (12) includes, or defines, one or more covering areas (17, 18) adapted to cover articulation zones (20, 21) of the fingers, wherein the one or more covering areas (17, 18) of the glove body (12) are devoid of an opening or of a surface discontinuity in the region of, or surrounding, the one or more articulation zones of the fingers, and wherein said protective glove includes one or more protection elements (25, 26), or elements suitable for protection from impacts, said one or more protection elements (25, 26) being fixed on, or associated with, the outer visible surface (14) of a corresponding covering area (17, 18) and wherein the protective glove (10) includes a plate counter-element or abutment plate element (30) arranged on an inner side of the glove in the articulation zone (20, 21) so that, in the articulation zone (20, 21) of the fingers, the protective glove (10) has, instead of a surface discontinuity, a multilayer configuration including at least one protection element (25, 26) on an outer visible surface (14) of the glove body (12), the covering area (17, 18) which is part of the glove body (12), and the plate counter-element (30) on an inner side with respect to the outer visible surface (14) of the glove body (12).
2. Protective glove (10) including a glove body (12) including at least one layer of flexible material having an outer visible surface (14) and shaped to define an inner housing for accommodating a hand of a user, wherein the layer of flexible material extends continuously in the region of one or more articulation zones of the fingers so as to define one or more covering areas (17, 18) for one or more articulations of the fingers, and wherein said protective glove includes one or more protection elements (25, 26), or elements suitable for protection from impacts, each element being fixed to, or associated with, the outer visible surface (14) of a corresponding covering area (17, 18) and wherein the protective glove (10) includes a plate counter-element or abutment plate element (30) arranged on an inner side of the glove in the articulation zone (20, 21) so that in the articulation zone the protective glove (10) includes a continuous material which forms the glove body (12), the protection element (25, 26) on an outer visible surface (14) of the glove body (12) and the plate counter-element (30) on an inner side with respect to the outer visible surface (14) of the glove body (12).
3. Protective glove (10) according to claim 1 or 2, wherein the one or more protection elements (25, 26) include mechanical coupling elements (28) fixed to counter-coupling elements (31) associated with a respective plate counter-element (30).
4. Protective glove (10) according to claim 3, wherein said mechanical coupling elements (28) are pin elements and said coupling counter-elements are holes (31) formed in said plate counter-element (30), wherein said pin elements (28) are bent at an angle after insertion into the respective holes (31).
5. Protective glove (10) according to any one of the preceding claims, wherein the plate counter-element has a protection function for the articulation zones.
6. Protective glove (10) according to any one of the preceding claims, wherein the plate counter-element (30) has a surface greater than the corresponding protection element (25, 26) and an edge portion projects at least partially perimetally from an edge of the protection element (25, 26).
7. Protective glove (10) according to any one of the preceding claims, wherein the plate counter-element (30) includes a seat for stably accommodating a corresponding protection element (25, 26).
8. Protective glove (10) according to any one of the preceding claims, wherein the flexible material is leather, imitation leather or a fabric, such as a synthetic fabric and/or wherein the one or more protection elements (25, 26) are made of metallic material.
9. Protective glove (10) according to any one of the preceding claims, wherein at least some of the protection elements (25, 26) of the metacarpophalangeal articulation zone (20) extending between a proximal phalange and a respective metacarpal bone, in the intermediate zone between the index finger and the middle finger, and/or between the middle finger and the ring finger, are independent of each other and wherein at least some of the plate counter-elements (30) of the metacarpophalangeal articulation zone (20), in the intermediate zone between the index finger and the middle finger, and/or between the middle finger and the ring finger, are independent of each other, and wherein a portion of the glove body in between the articulation zone of the index finger and the middle finger, and/or the middle finger and the ring finger is a flexible connection zone which acts a hinge zone or mutual twisting zone for the covering areas.
10. Protective glove (10) according to any one of the preceding claims, wherein said one or more protection elements (25, 26) are rigid or semi-rigid protection elements applied directly onto the visible surface of the body of the glove (12).

11. Method for manufacturing a protective glove (10),
the method including the steps of

- providing a glove body (12) of flexible material
having an outer visible surface (14), wherein the
glove body (12) is shaped to define an inner
housing for accommodating a hand of a user
and for covering articulation zones (20, 21) of
the fingers, wherein the articulation zones of the
fingers are covered in a continuous manner by
means of the flexible material without surface
discontinuity in the region of or in a covering area
(17, 18) surrounding the one or more articulation
zones of the fingers; 5
- fixing, or associating, one or more protection
elements (25, 26) or one or more elements suit-
able for protection from impacts on the outer vis-
ible surface (14) of a corresponding covering ar-
ea (17, 18). 10
- fixing, or associating, one or more plate coun-
ter-elements (25, 26) on an inner surface of a
corresponding covering area (17, 18) so that the
covering area (17, 18) is in an intermediate po-
sition between a protection element (25, 26) and
a corresponding plate counter-element (25, 26). 15 20 25

12. Method according to claim 13, wherein the method
does not include a step for forming an opening or a
surface discontinuity in the region of, or surrounding,
one or more articulation zones of the fingers. 30

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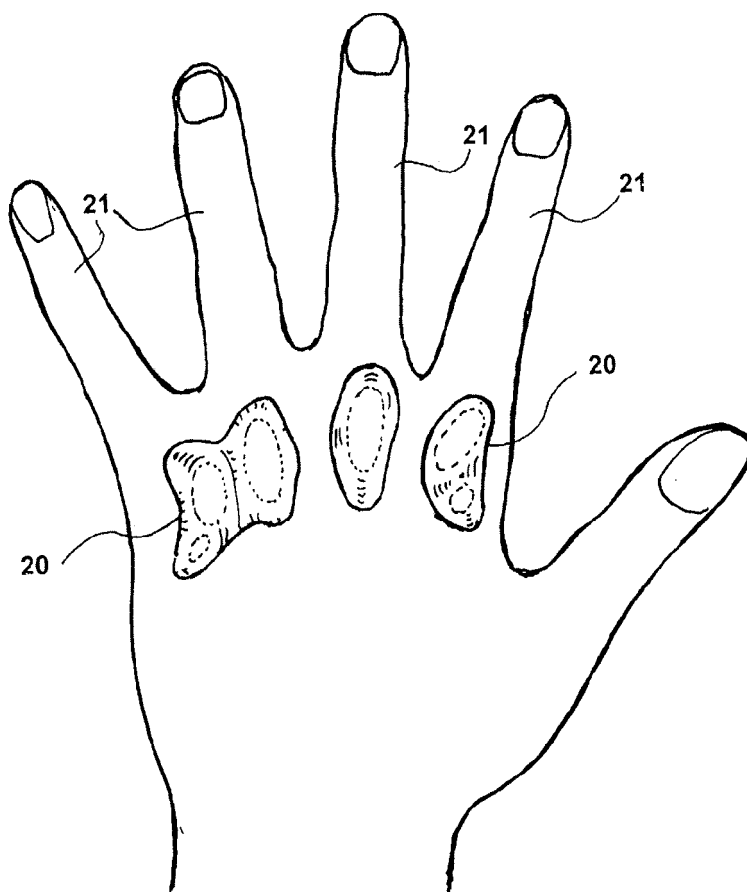


FIG.1

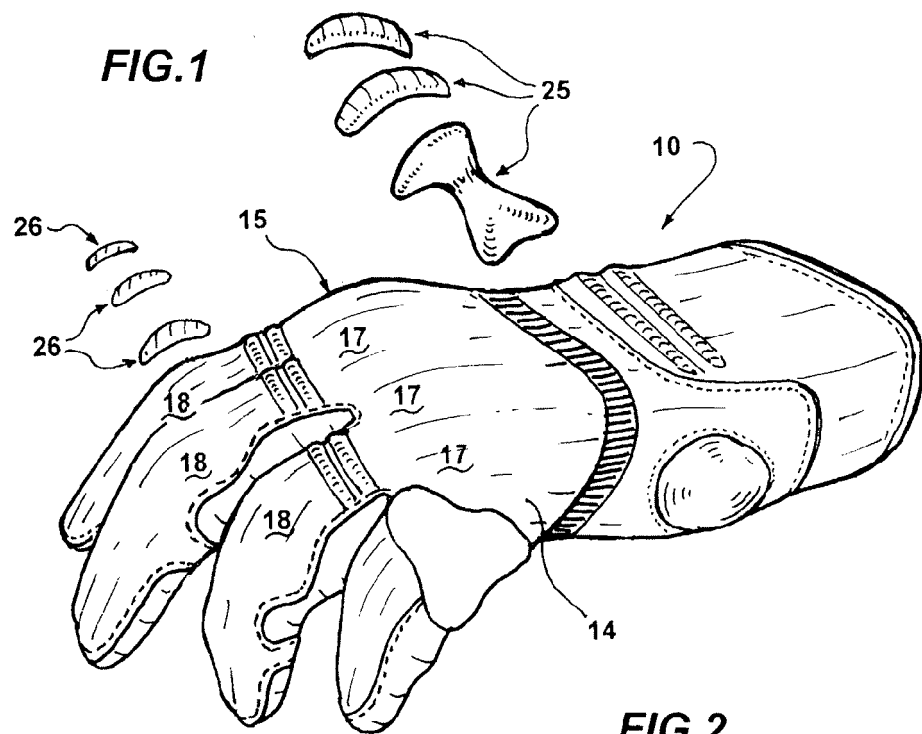


FIG.2

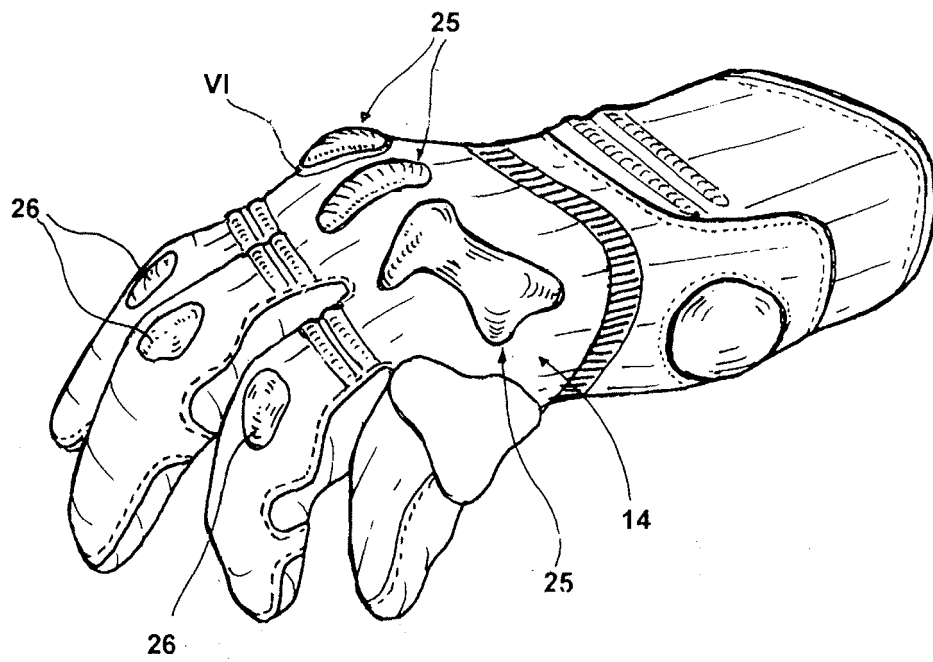


FIG.3

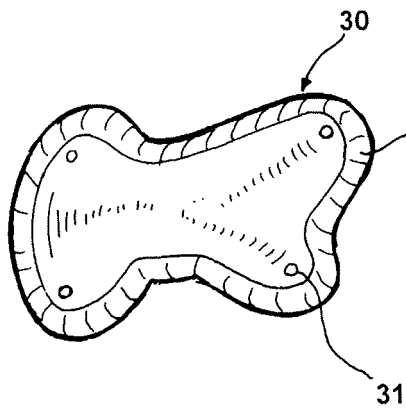


FIG. 4

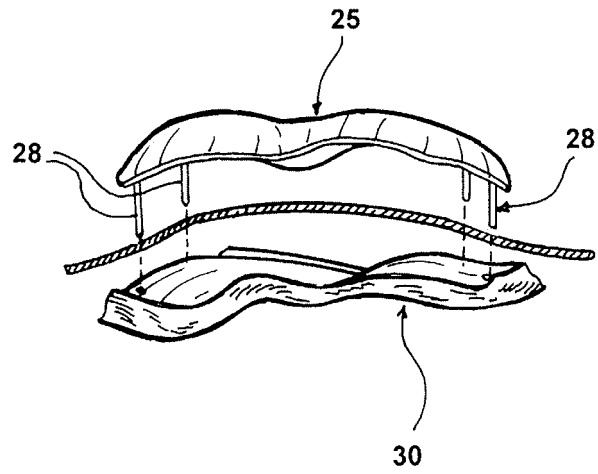


FIG. 5

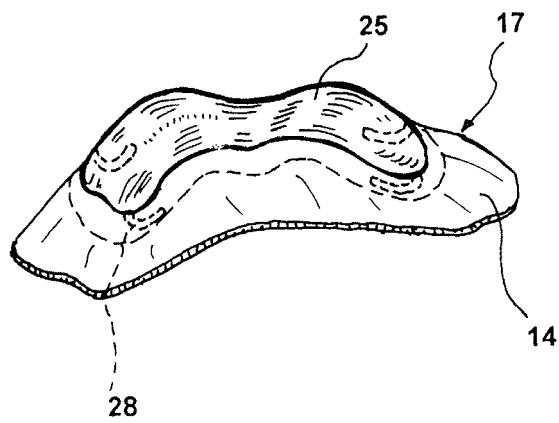


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 15 17 6585

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2007/083968 A1 (STOKES LESLIE J [GB]) 19 April 2007 (2007-04-19) * paragraphs [0087] - [0090]; figures 1a,1c,2,3 *	1,2,10,11	INV. A41D19/015
A	JP 2005 325456 A (KANEHIRA TADAAKI) 24 November 2005 (2005-11-24) * abstract; figure 1 *	1,2,11	
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A	US 4 094 014 A (SCHROEDER CHARLES W) 13 June 1978 (1978-06-13) * column 2, lines 8-26; figure 1 *	1,2,11	
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A	US 3 882 548 A (SHINAGAWA KOICHIRO ET AL) 13 May 1975 (1975-05-13) * column 1, lines 47-68; figure 1 *	1,2,11	TECHNICAL FIELDS SEARCHED (IPC) A41D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 November 2015	Examiner D'Souza, Jennifer
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 17 6585

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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