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(71) Applicant: **BM Polycy Ltd.**
Enfield EN1 1XT (GB)

(72) Inventors:
• **Holdaway, Mark**
Sunningdale, Berkshire SL5 0QR (GB)
• **Garvey, Thomas Bernard**
Milton Keynes, Buckinghamshire MK5 7EE (GB)

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(74) Representative: **chapman + co**
Senghennydd Road
Cardiff, South Wales CF24 4AY (GB)

(54) **UTILITY GLOVE**

(57) The glove (1) has a thumb portion (2) and four finger portions (3, 4, 5, 6) and comprises a liner (7) and at least one three dimensional injection moulded body (8) bonded to the liner, the moulded body extending along a plurality of the finger portions and being provided with grip formations. According to the invention, the grip formations (13a, 13b, 13c, 23a, 23b, 23c) comprise first and

second sequences of channels both extending transverse to the respective finger portion. Ends of the first sequence of channels are contiguous with ends of the second series of channels to form on each finger portion a zone (14) of contiguous channel ends, which zone of contiguous channel ends extends longitudinally of the respective finger portion.

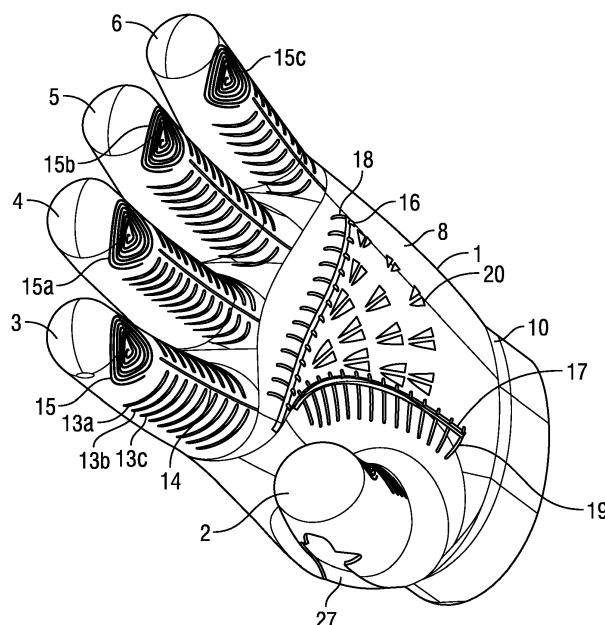


FIG. 1

Description

[0001] The present invention concerns a utility glove, and in particular such a glove which is suitable for use by for construction workers, sports personnel, gardeners and the like. The present invention especially concerns utility gloves providing enhanced reinforcement for a wearer's hands.

[0002] Utility gloves are known which contain a gripping portion for enhanced grip and for prevention of injury to the wearer's hands. Recently developed utility gloves, such as those disclosed in WO2011/052168 and WO2012/125589, include seamless injection moulded reinforcement for areas most likely to be subject to abrasion and impact, namely the base of the thumb, the palm, and palmar portions of the fingers. WO2011/052168 further discloses gripping features for such gloves, but gives no details of preferred shapes or arrangements of such gripping features.

[0003] A utility glove according to the invention has a thumb portion and four finger portions and comprises a liner and at least one three dimensional injection moulded body bonded to the liner; the injection moulded body extends along a plurality of the finger portions and is provided with integrally moulded grip formations. A plurality of integrally moulded grip formations is provided in series on each of the respective finger portions; each such grip formation comprises a first sequence of integral channels extending transverse to the respective finger portion; a second sequence of integral channels extending transverse to the respective finger portion; ends of each first sequence of integral channels and ends of each second sequence of integral channels forming on each finger portion a zone of contiguous channel ends, which zone of contiguous channel ends extends longitudinally of the respective finger portion.

[0004] The sequences of integral channels providing the series of grip formations, and their orientation, are all designed to help conduct away aqueous and other liquids present on the glove, which liquids might otherwise adversely affect the grip ability of the glove materials in wet conditions. The channels on each of the finger portions follow the normal crease lines of the human hand, thereby assisting flexibility of the injection moulded body. The integral channels are preferably formed integrally with the injection moulded body, for ease of manufacture. The integral channels preferably comprise successive ribs or the like, which are substantially equispaced from one another.

[0005] The contiguous channel ends may, in some embodiments, overlap with one another (that is the first sequence overlaps with the second sequence); alternatively, there may be an appropriate gap between the first sequence and the second sequence.

[0006] Each zone of contiguous channel ends is preferably provided on the upper (palmar) side of the respective finger portion, and each such zone typically extends longitudinally along a median line on a surface of the

respective finger portion. In addition to the contiguous ends of the first and second sequences of channels, each of the channels preferably has a free end distal to the respective contiguous end. Such distal free ends preferably each extend at least to the side of the respective finger portion, and may even extend to the lower (dorsal) portion of the respective finger portion.

[0007] Each of the respective finger portions (and preferably also the thumb portion - that is, each respective digit portion) generally has a fingertip integrally formed with the moulded body, on the respective distal phalanx of each digit portion. Each such distal phalanx (or fingertip) may bear a pattern of integrally moulded curved formations, forming a pattern of rows of integral grooves. The integral grooves may be in the form of substantially parallel arches, circles, ellipses or other ovals, or spirals or whorls. The purpose of such formations is to mimic fingerprints at the ends of each of the respective digits, and to thereby maximise the grip properties of the glove. It will be understood that reference to a pattern of such curved formations does not imply that they are at regular intervals; they should correspond to the types of pattern naturally found on the skin of the distal phalanx of the human hand.

[0008] Preferably the moulded body has an integrally formed fold or crease line extending along the respective palmar portion of the glove (the position of the fold or crease line corresponding to that of the proximal palmar line on a human hand).

[0009] The moulded body preferably has a further integrally formed fold or crease line extending around the portion of the glove intended to overlie the thenar (that is, the fleshy area of the palm at the base of the thumb) of the user's hand.

[0010] Grip formations, such as raised protuberances, are typically provided along the lengths of the abovementioned integrally formed fold or crease lines such as those described above, as well as on the palmar portion of the relevant glove.

[0011] It is further preferred that the moulded body contains open passages (free of the injection moulded material) extending at least along the dorsal part of each of the respective finger portions, and preferably also along the dorsal part of the thumb portion. Such open passages are preferably substantially straight sided for at least part of their lengths, and further preferably enlarged at or near the respective knuckle portions. Such enlarged parts of the passages are preferably curved, and more preferably arcuate each forming a segment of a circle. In particular the enlarged parts at the knuckle joints are especially preferred at the respective proximal interphalangeal joints, as well as at the respective distal interphalangeal joints, in order to permit free flexing of the glove, and therefore of the user's hand, at the relevant joints.

[0012] The material of which the moulded body is made is preferably a thermoplastic elastomer (TPE), of which styrenic block copolymer (SBC) elastomers are most preferred. SBC elastomers are some of the most versatile

and easily processed materials in the plastics industry; those to be used to make gloves according to the invention are, of course, selected to be injection mouldable. They do not require drying, have broad processing ranges, and have good to excellent thermal stability, such as a temperature service range of -50 to +125°C.

[0013] There are two general primary types of SBC TPEs in current commercial use, namely those based on Styrene-Butadiene-Styrene (SBS) or Styrene-Isoprene-Styrene (SIS) polymers, and those based on Styrene-Ethylene/Butylene-Styrene (SEBS) or Styrene-Ethylene/Propylene-Styrene (SEPS) polymers. The latter type is most preferred, especially a SEBS block copolymer, which in turn is preferably selected so as to have good dry and wet grip properties.

[0014] The positioning of the thumb portion in the glove according to the invention is preferably at an angle to the fingers of the glove. A preferred such angle is from about twenty to forty degrees (such as about thirty degrees, by which we mean $30^\circ \pm 3^\circ$), the angle being measured relative based on the longitudinal extent of the index finger portion and that of the thumb portion. The thumb portion is thus "pushed under" the axis of the hand so that it is in a more natural resting position relative to most other known gloves.

[0015] The liner forming part of the glove according to the invention is preferably of a knit hydrophilic heat-resistant fabric; such as of a polyamide (nylon), which comprises a porous structure into which the injection moulded material may first penetrate during the injection moulding process, and then be drawn into interstices in the knit fabric so as to be bonded thereto when the injection moulded material solidifies on cooling after the injection moulding process.

[0016] Preferred features and embodiments of the glove according to the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an embodiment of glove according to the invention, viewed from above the palm beyond the fingertips (distal phalanges) of the glove;

Figure 2 is a perspective view of the glove of Figure 1, seen from a first side with the thumb pointing downwards;

Figure 3 is a perspective view of the glove of Figure 1, seen from a second side with the thumb pointing upwards; and

Figure 4 is a back view of the glove of Figures 1 to 3.

[0017] Like parts throughout the drawings are denoted by like reference numerals. Referring initially to Figure 1, there is shown a glove 1 having a thumb portion 2, an index finger portion 3, a middle finger portion 4, a ring finger portion 5 and a little finger portion 6.

[0018] The glove 1 comprises a knitted liner 7 and a three dimensional injection moulded body 8 bonded to

the knitted liner. The injection moulded body 8 covers the majority of the thumb portion 2 and of the finger portions 3,4,5,6, but leaves a dorsal portion 9 free, as well part of as a wrist portion 10 on the palmar face.

[0019] Index finger portion 3 is provided with a series of grip formations, this series comprising a first sequence of channels 13a, 13b, 13c etc and a second sequence of channels 23a, 23b, 23c etc, all those channels extending transverse to the index finger portion 3.

[0020] Respective ends of the first sequence of channels 13a, 13b, 13c are contiguous with corresponding ends of the second sequence of channels 23a, 23b, 23c, so as to form, on the index finger portion, a zone 14 of contiguous channel ends. As can be seen from the drawings, the zone 14 of contiguous ends extends longitudinally of index finger portion 3.

[0021] Similarly, middle finger portion 4 has a series of grip formations (not marked with lead lines in the drawings but in broad terms corresponding to those shown and described with reference to the index finger portion). The series of grip formations as shown comprises a first sequence of channels and a second sequence of channels corresponding to those on the index finger portion, all those channels extending transverse to the middle finger portion 4 and being contiguous as shown in the drawings (and as described above with reference to the index finger portion 3).

[0022] Equally, ring finger portion 5 has a series of grip formations (again not marked with lead lines in the drawings but in broad terms corresponding to those shown and described with reference to the index finger portion). This series of grip formations as shown comprises a first sequence of channels and a second sequence of channels corresponding to those on the index finger portion, all those channels extending transverse to the ring finger portion 5 and being contiguous as shown. Little finger portion 6 has a series of grip formations (again not marked with lead lines in the drawing but in broad terms corresponding to those shown and described with reference to the index finger portion).

[0023] This further series of grip formations comprises a first sequence of channels and a second sequence of channels corresponding to those on the index finger portion, all those channels extending transverse to the little finger portion 6 and being contiguous as shown.

[0024] And finally, thumb portion 2 has a series of grip formations (again not marked with lead lines in the drawings but in broad terms corresponding to those shown and described with reference to the index finger portion). This series of grip formations as shown comprises a first sequence of channels and a second sequence of channels corresponding to those on the index finger portion, all those channels extending transverse to the thumb portion 2 and being contiguous as shown (see in particular Figure 2).

[0025] The distal phalanx (or fingertip) of index finger portion 3 is provided with a pattern of integrally moulded curved formations 15, forming a spiral of integral grooves

as shown. The integral spiral mimics formations found naturally in human fingerprints, and thereby maximises the grip properties of the glove 1. Similar patterns 15a, 15b, 15c and 15d are provided on the respective distal phalanges of middle finger portion 4, ring finger portion 5, little finger portion 6 and, indeed, thumb portion 2.

[0026] The moulded body 8 has an integrally formed fold line 16 extending along the palmar face of the glove (the position of the fold line 16 corresponding to that of the proximal palmar line on a human hand).

[0027] The moulded body 8 further has an integrally formed fold line 17 extending around the portion of the glove intended to overlie the fleshy area of the palm at the base of the thumb of the user's hand.

[0028] Raised ridges 18, 19 are provided along the lengths of the respective integrally formed fold lines 16, 17. There are further chevron shaped projections 20 provided on the palmar portion of the glove.

[0029] The obverse (or dorsal part) of index finger portion 3 has therein a longitudinally extending open passage 21 (free of the injection moulded material) which as shown is mainly straight sided, but with enlarged arcuate cut-away portions 22, 23 (respectively at the proximal interphalangeal joint and the distal interphalangeal joint. These cut-away portions permit free flexing of the glove, and therefore of the user's hand, at the relevant joints.

[0030] Similar open passages 24, 25 and 26 are provided on respectively middle finger portion 4, ring finger portion 5 and little finger portion 6, all having enlarged arcuate cut-out portions 28,29 at the knuckle joint portions. A further similar open passage 27 is also provided on thumb portion 2, but because of the anatomy of the thumb, only a single enlarged arcuate cut-out portion 30 is provided for passage 27.

Claims

1. A utility glove (1) having a thumb portion (2) and four finger portions (3,4,5,6) and comprising a liner (7) and at least one three dimensional injection moulded body (8) bonded to the liner, the moulded body extending along a plurality of the finger portions and being provided with grip formations (13a, 13b, 13c; 23a, 23b, 23c), **characterised in that** the grip formations comprise a first sequence of channels (13a, 13b, 13c) and a second sequence of channels (23a, 23b, 23c), both said sequences of channels extending transverse to the respective finger portion (3), ends of the first sequence of channels overlapping with ends of the second sequence of channels to form, on each finger portion, a zone (14) of contiguous channel ends, wherein the zone of contiguous channel ends extends longitudinally of the respective finger portion (3).
2. A utility glove according to claim 1, wherein each zone of contiguous channel ends is on the palmar

side of the respective finger portion.

3. A utility glove according to claim 1 or 2, wherein each said zone extends longitudinally along a median line of the respective finger portion.
4. A utility glove according to any of claims 1 to 3, wherein each of the channels has a free end distal to the respective overlapping end.
5. A utility glove according to any of claims 1 to 4, wherein each of the respective finger portions and also the thumb portion has a fingertip integrally formed with the moulded body, on the respective distal phalanx thereof.
6. A utility glove according to claim 5, wherein each said fingertip bears a pattern of integrally moulded curved formations (15, 15a, 15b, 15c), forming a pattern of rows of integral grooves.
7. A utility glove according to any of claims 1 to 6, wherein the moulded body has at least one integrally formed fold line (16) extending along the respective palmar portion of the glove.
8. A utility glove according to claim 7, wherein grip formations (18) are provided along the length of the fold line.
9. A utility glove according to claim 7 or 8, wherein the moulded body has an integrally formed further fold line (17) extending around the portion of the glove intended to overlie the glove user's thenar.
10. A utility glove according to claim 9, wherein grip formations (19) are provided along the lengths of the further fold line.
11. A utility glove according to any of claims 1 to 10, wherein the moulded body contains open passages (21, 24,25, 26) extending at least along the dorsal part of each of the respective finger portions.
12. A utility glove according to claim 11, wherein said open passages are substantially straight sided for at least part of their lengths.
13. A utility glove according to claim 11 or 12, wherein said open passages have enlarged parts (28,29) at or near the respective knuckle portions.
14. A utility glove according to claim 13, wherein the enlarged parts form a segment of a circle.
15. A utility glove according to any of claims 1 to 14, wherein the thumb portion (2) is at an angle of twenty to forty degrees relative to the index finger portion (3).

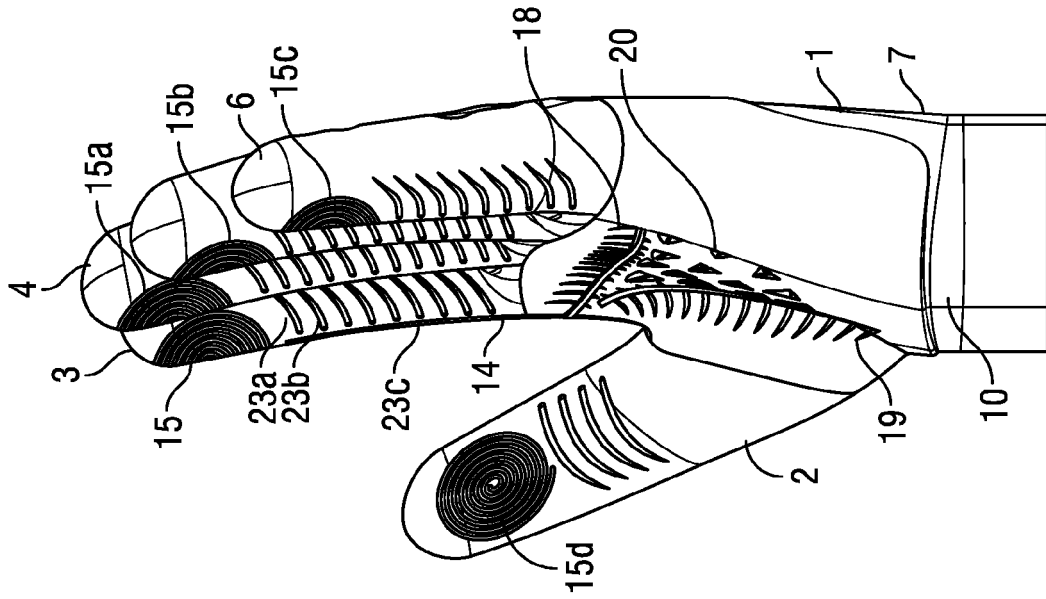


FIG. 2

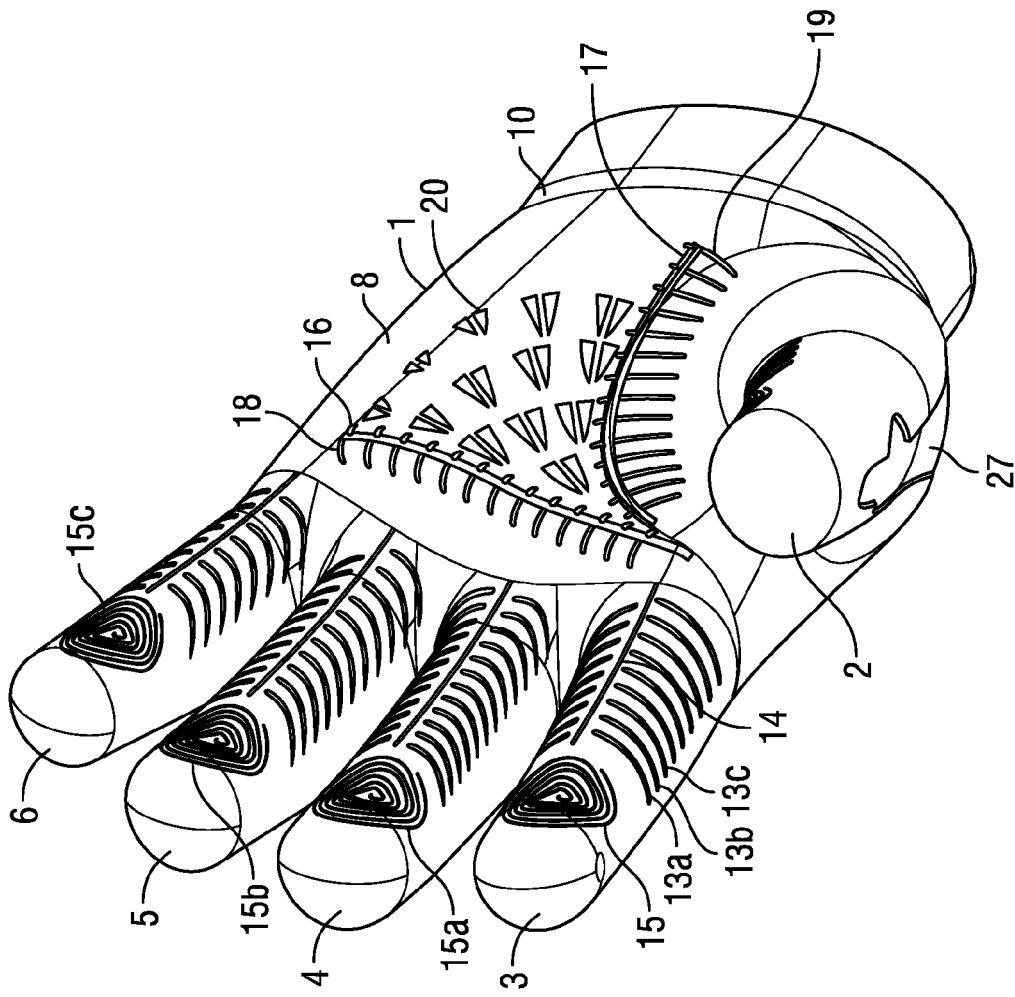


FIG. 1

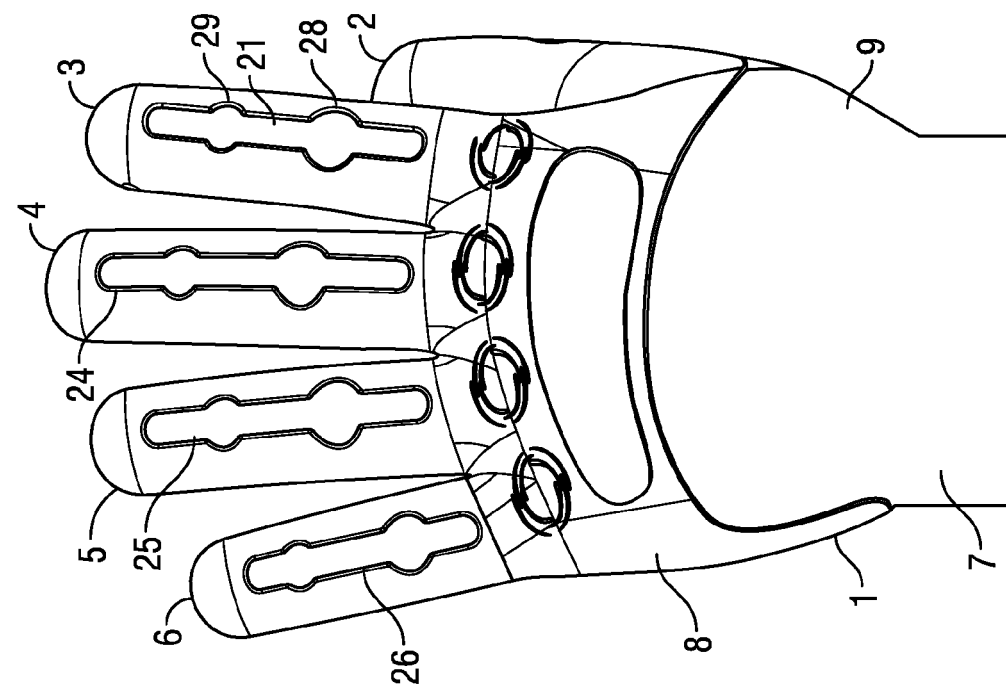


FIG. 4

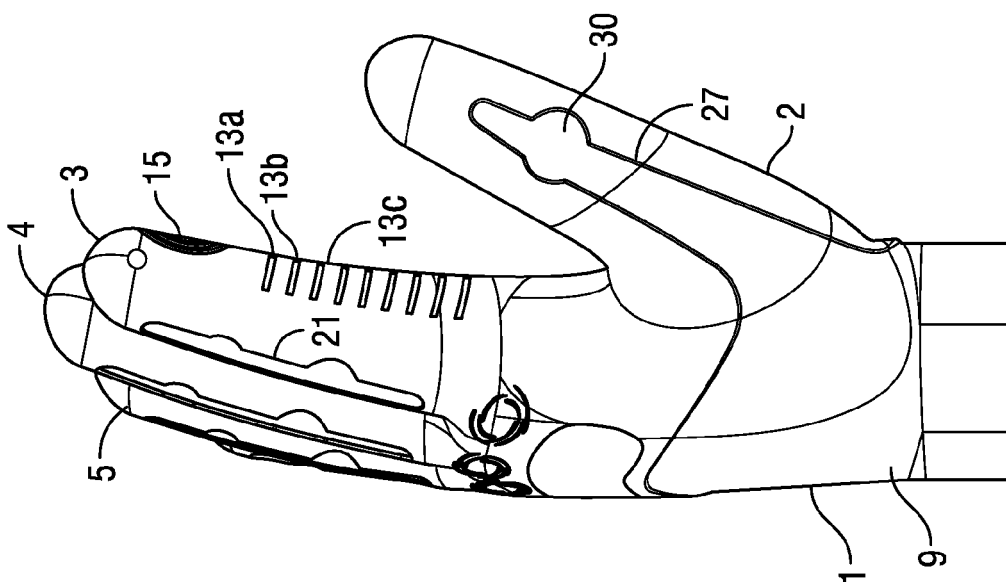


FIG. 3



EUROPEAN SEARCH REPORT

 Application Number
 EP 15 27 5084

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A41D A63B
Place of search		Date of completion of the search	Examiner
The Hague		3 August 2015	D'Souza, Jennifer
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 15 27 5084

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03-08-2015

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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