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(54) Title: IMPROVED SPORTS APPAREL

(57) Abstract: There is herein described sports apparel. More particularly, there is described ventilated sports apparel and a method of cooling a person wearing ventilated sports apparel.

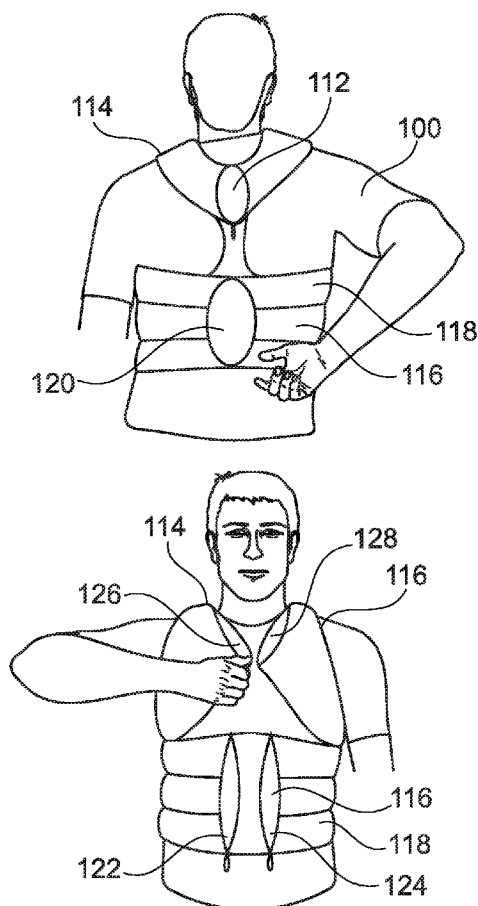


Fig. 1





OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.

TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
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LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
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IMPROVED SPORTS APPAREL

FIELD OF THE INVENTION

The present invention relates to sports apparel. More particularly, the present
5 invention relates to ventilated sports apparel and a method of cooling a person wearing
ventilated sports apparel.

BACKGROUND OF THE INVENTION

Although many types of sports apparel exist that attempt to ventilate a person
10 during use, there are a number of disadvantages with existing products. For example,
existing products have difficulty in providing enough ventilation to allow a sports person
to keep cool during sporting activities. This means that sports apparel may become
saturated with sweat. The persons exercising are therefore not cooled properly and their
efficiency and sporting performance may dramatically decrease. There is therefore a
15 need for sports apparel with improved ventilation.

It is an object of at least one aspect of the present invention to obviate or mitigate
at least one or more of the aforementioned problems.

It is a further object of at least one aspect of the present invention to provide
improved sports apparel.

20 It is a yet further object of at least one aspect of the present invention to provide
ventilated sports apparel.

It is a yet further object of at least one aspect of the present invention to provide
a method of cooling a person wearing ventilated sports apparel.

It is a yet further objection of at least one aspect of the present invention to
25 provide a method of naturally ventilating a person wearing sports apparel.

SUMMARY OF THE INVENTION

According to a first aspect of the present invention there is provided a sports apparel capable of being worn by a user, said sports apparel comprising:

at least one or more air flow channels attached or incorporated into the sports apparel;

the airflow channels comprising an inlet and an outlet for airflow;

the airflow channels having an opening and closing mechanism; and

wherein the airflow channels taper from the front to the back of the sports apparel thereby increasing the airflow through the at least one or more air flow channels thereby increasing airflow efficiency and cooling of the user.

The present invention therefore relates to a sports apparel which provides increased ventilation for a user and for at least part of a human body which allows the human to remain cooler during exercise, such as running, playing football, playing ball games etc.

On the front of the sports apparel there is an opening for the at least one or more airflow channels. The opening may be closed using any suitable mechanism such as a zip or a hook and loop fastener (e.g. Velcro, Trade Mark).

The sports apparel may therefore be naturally ventilated by the user moving in, for example, a forward or substantially forward direction.

The sports apparel may be any form of garment and may, for example, be a running vest, a football shirt, a gym vest, a cycling vest and the like.

The airflow channels may be designed to provide focussed cooling for a range of specific sports. During a sporting activity, a user may open and close the opening for the airflow channels to adjust the airflow volume and regulate body temperature to obtain optimal comfort.

The airflow channels taper from the front to the back or the garment.

The airflow channels may be in the form of channels extending around both sides of the sports apparel, from the front to the back.

The sports apparel may comprise at least one or a plurality of airflow channels extending around the side, from the front to the back in a substantially circumferential manner. Therefore, a user wearing the garment will experience ventilation and cooling around the whole of their upper torso.

The airflow channels may have a cross-sectional opening of around 1 – 10 cm² and may be substantially tubular in form.

Therefore, a user running wearing the garment will have cool, dry air entering from the front of the garment through the opening into the airflow channels. The air will then pass through the airflow channels around the user on both sides. As the air passes through the airflow channels and through the tapered sections, this will provide increased airflow and therefore improved cooling for a user. Hot and moist air may therefore exit through a hole or a plurality of holes at the rear of the sports apparel. During sporting activity the user may therefore be kept cool and dry.

The airflow channels may be exposed or concealed behind a facing fabric panel.

The tapering occurring in the airflow channels may reduce the cross sectional area by up to about 50% thereby providing a substantially increased air flow around the torso of the user.

The present invention also relates to garments where there are openings which may be opened and closed. Located underneath the opening there may be a mesh which allows air to pass through. The opening may be closed by a user to stay warm where necessary.

The garments may also have ridges or protruding creases to improve the aerodynamic for the user when moving. The ridges or protruding creases may therefore create a more aerodynamic shape and reduce resistance during cycling, running or swimming.

The ridges in the present invention may have a width of anywhere from 0.1 cm – 1 cm and preferably about 1cm – 5 cm. The ridges may have a height of about 0.1 cm – 5 cm and preferably about 0.5 cm – 2 cm.

According to a second aspect of the present invention there is provided a method
5 of providing ventilation for a user wearing a sports apparel, said method comprising:

providing at least one or more air flow channels attached or incorporated into the sports apparel;

the airflow channels comprising an inlet and an outlet for airflow;

the airflow channels having an opening and closing mechanism; and

10 wherein the airflow channels taper from the front to the back of the sports apparel thereby increasing the airflow through the at least one or more air flow channels thereby increasing airflow efficiency and cooling of the user.

The sports apparel may be as defined in the first aspect.

15 **BRIEF DESCRIPTION OF THE DRAWINGS**

Embodiments of the present invention will now be described, by way of example only, with the reference to the accompanying drawings in which:

Figure 1 shows the front and rear view of a sports apparel in the form of a garment according to an embodiment of the present invention;

20 Figure 2 is an expanded view of an airflow channel in the garment shown in Figure 1;

Figure 3 is a side view of the garment shown in Figure 1 being worn by a user during use;

Figure 4 is a front and rear view of the garment shown in Figures 1, 2 and 3
25 being worn by a user during use;

Figure 5 is a view of a further garment according to an embodiment of the present invention showing the garment open and closed;

Figure 6 is a view of a further garment according to an embodiment of the present invention used for cycling;

Figure 7 is a view of a further garment according to an embodiment of the present invention used for running;

5 Figure 8 is a view of a further garment according to an embodiment of the present invention used for swimming;

Figure 9 is a view of a pair of shorts according to an embodiment of the present invention used for swimming, running or cycling; and

10 Figures 10 and 11 are cross-sections of ribs placed on garments according to embodiments of the present invention.

BRIEF DESCRIPTION

Generally speaking the present invention resides in the provision of a sports apparel which is naturally ventilated. By naturally ventilated is meant that the sports apparel has a flow of air moving through the sports apparel as a user moves during a sporting activity.

Figure 1 shows a front and rear view of the garment 100 according to the present invention. The top half of Figure 1 shows a rear view of the garment 100 and shows that there is an airflow channel 114 in the upper part of the garment 100 and three airflow channels 116 located around the torso area of a user. Furthermore, as shown in the top half of Figure 1, there are two exit holes 112, 120 located in the rear of the garment 100.

In the bottom half of Figure 1 the front part of the garment 100 is shown. This shows that there are two openings 122, 124 located in the front of the garment 100. There are three airflow channels 118 along with two further openings 126, 128 located to provide an opening for the upper located airflow channel 114.

A user is able to open and close the openings 122, 124, 126, 128 during use using any type of closing mechanism such as a zip fastener or a hook and loop fastener

(e.g. Velcro, Trade Mark). A user is therefore able to open and close the openings 122, 124, 126, 128 to adjust the airflow flowing through the channels.

The designs of the channels 114 can be varied to provide focussed cooling for specific sports e.g. cycling, running etc.

5 Figure 2 is an expanded view of the airflow channel 118 and shows that air may enter on one side of the airflow channel 118 and exit through the other thereby allowing cooling and evaporation of sweat to occur on a user. The body movement drives air through the airflow channels in the garment, wicking away moisture and cooling the body during use.

10 The airflow channels 118 in the garment are made from soft and flexible material that are substantially air impermeable so that they can act as channel for a flow of air. During use, the airflow channels 118 are lifted away from a user thereby lifting the fabric away from the skin maintaining a free path for the cooling air.

15 Figure 3 shows a user wearing the garment 100. This shows that cool and dry air enters from the front portion of the garment and exists from the rear of the garment through the exit holes 112, 120. Figure 3 also shows that the airflow channels 118 taper from the front to the rear of the garment 100 thereby increasing the airflow speed through the channel and increasing airflow efficiency and the cooling of a user.

20 Figure 4 shows a further front and rear view of the garment 100. The left hand of Figure 4 shows the two openings 122, 124 in the garment 100 open and connected to the airflow channels 118 along with the openings 126, 128 which are connected to the upper airflow channel 114.

25 The right hand of Figure 4 shows the openings 112, 120 at the rear of the garment 100 closed. A user may close the openings 112, 120 in the event that the user is cold or does not require any further cooling at that time.

 Figure 5 represents a further garment 200. On the left hand side the garment 200 has it opening 212 opened. Located underneath the opening 212 there is a mesh

214 which allows air to pass through. As the wearer runs cool air flows down channels 210 cooling the user. On the right hand side the opening 212 is closed. This allows the user to stay warm where necessary.

Figure 6 is a garment 300 used for cycling. Although not shown for clarity
5 purposed this garment will also have openings for cooling as previously described. In addition, this garment has ridges 310 on the top of the shoulder area and a ridge 312 extending down the front of the garment 300. The ridges 310,312 are to create a more aerodynamic shape and reduce resistance during cycling.

In Figure 7 the garment 400 has ridges 410 on the front portion of the sleeve
10 and a ridge 412 extending down the front of the garment 400. Although not shown for clarity purposed this garment will also have openings for cooling as previously described.

In Figure 8 the garment 500 has ridges 510 on the the sleeve and a ridge 512 extending down the front of the garment 500. Although not shown for clarity purposed this garment will also have openings for cooling as previously described.

15 In Figure 9 the shorts 600 have ridges 610 on the front of the garment shorts. Although not shown for clarity purposed this garment will also have openings for cooling as previously described.

Figures 10 and 11 are cross-sections of different shapes of ridges 710, 810. The ridges may be simple creases in the garments or may be supported underneath by a
20 support structure to create a more pronounced and protruding shape.

The shape and configuration of the ridges may be adjustable and may be changed in shape by a user by, for example, inserting different shapes of inserts or pulling a cord which may change the surrounding tension in the garment around the ridge and hence the shape of the ridge. In a further alternative, the ridge can be made
25 from a flexible structure which may be changed in shape by a user. For different sports the shape and size of the ridge may be changed.

The ridges in the present invention may have a width of anywhere from 0.1 cm – 1 cm and preferably about 1cm – 5 cm. The ridges may have a height of about 0.1 cm – 5 cm and preferably about 0.5 cm – 2 cm.

In the garments of the present invention a liner may be inserted on the inside or
5 the outside of the garment such as for a cyclist when they are quickly descending a hill or for a runner running in cold conditions. Such a liner may be used to improve the aerodynamics for the user.

It should be noted that the garment may be made from any suitable flexible material such as cotton or any other polyester fabric or breathable fabric which is
10 presently known. The material forming the airflow channels may be of any flexible type material but substantially impermeable to air to allow an airflow to occur.

The garments according to the present invention may be any type of sporting garment such as running vest, football shirt, gym vest, cycling vest, swimming etc.

Whilst specific embodiments of the present invention have been described
15 above, it will be appreciated that departures from the described embodiments may still fall within the scope of the present invention. For example, any suitable type of material may be used to form the sports apparel. Moreover, any suitable type of means may be used to provide the air flow channels which may comprise any type of suitable opening and closing mechanism.

CLAIMS

1. A sports apparel capable of being worn by a user, said sports apparel comprising:
at least one or more air flow channels attached or incorporated into the sports
5 apparel;
the airflow channels comprising an inlet and an outlet for airflow;
the airflow channels having an opening and closing mechanism; and
wherein the airflow channels taper from the front to the back of the sports
apparel thereby increasing the airflow through the at least one or more air flow channels
10 thereby increasing airflow efficiency and cooling of the user.
2. A sports apparel according to claim 1, wherein the sports apparel provides
increased ventilation for a user and for at least part of a human body which allows the
human to remain cooler during exercise, such as running, playing football, playing ball
15 games etc.
3. A sports apparel according to any of claims 1 or 2, wherein on the front of the
sports apparel there is an opening for the at least one or more airflow channels.
- 20 4. A sports apparel according to any of claim 3, wherein the opening is closed using
a zip or a hook and loop fastener (e.g. Velcro, Trade Mark).
5. A sports apparel according to any preceding claim, wherein the sports apparel is
naturally ventilated by the user moving in a forward or substantially forward direction.
25
6. A sports apparel according to any preceding claim, wherein the sports apparel is
any form of garment e.g. a running vest, a football shirt, a gym vest and a cycling vest.

7. A sports apparel according to any preceding claim, wherein the airflow channels are designed to provide focussed cooling for a range of specific sports.

5 8. A sports apparel according to any preceding claim, wherein during a sporting activity, a user opens and closes the opening for the airflow channels to adjust the airflow volume and regulate body temperature to obtain optimal comfort.

9. A sports apparel according to any preceding claim, wherein the airflow channels
10 are in the form of channels extending around both sides of the sports apparel, from the front to the back.

10. A sports apparel according to any preceding claim, wherein the sports apparel comprises at least one or a plurality of airflow channels extending around the side, from
15 the front to the back in a substantially circumferential manner.

11. A sports apparel according to any preceding claim, wherein the airflow channels have a cross-sectional opening of around 1 – 10 cm² and are substantially tubular in form.

20

12. A sports apparel according to any preceding claim, wherein a user running wearing the sports apparel will have cool, dry air entering from the front of the garment through the opening into the airflow channels, the air will then pass through the airflow channels around the user on both sides and as the air passes through the airflow
25 channels and through the tapered sections, this will provide increased airflow and therefore improved cooling for a user.

13. A sports apparel according to claim 12, wherein hot and moist air exits through a hole or a plurality of holes at the rear of the sports apparel.

14. A sports apparel according to any preceding claim, wherein the airflow channels
5 are exposed or concealed behind a facing fabric panel.

15. A sports apparel according to any preceding claim, wherein the tapering occurring in the airflow channels reduces the cross sectional area by up to about 50% thereby providing a substantially increased air flow around the torso of the user.

10

16. A sports apparel according to any preceding claim, wherein located underneath openings in the garments there is a mesh which allows air to pass through.

17. A sports apparel according to any preceding claim, wherein the garments also
15 have ridges or protruding creases to improve the aerodynamic for the user when moving.

18. A sports apparel according to any preceding claim, wherein the ridges or protruding creases have a width of from 0.1 cm – 1 cm or 1cm – 5 cm, and a height of
20 0.1 cm – 5 cm or 0.5 cm – 2 cm.

19. A method of providing ventilation for a user wearing a sports apparel, said method comprising:

providing at least one or more air flow channels attached or incorporated into the
25 sports apparel;

the airflow channels comprising an inlet and an outlet for airflow;

the airflow channels having an opening and closing mechanism; and

wherein the airflow channels taper from the front to the back of the sports apparel thereby increasing the airflow through the at least one or more air flow channels thereby increasing airflow efficiency and cooling of the user.

- 5 20. A sports apparel as hereinbefore described and/or as shown in any of Figures 1 to 11.

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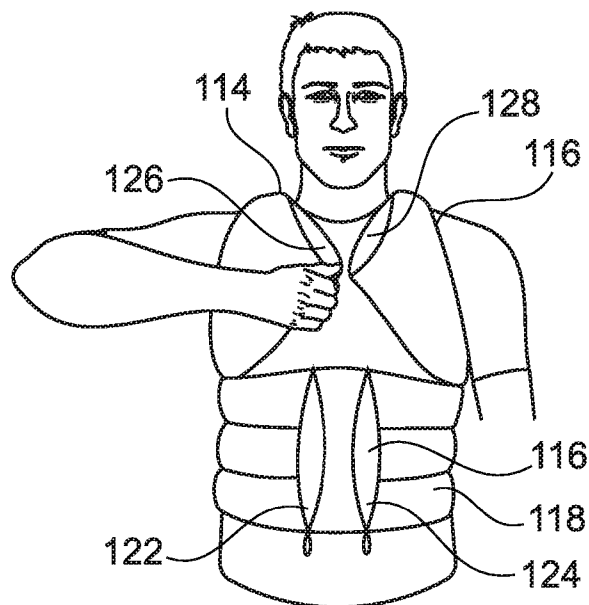
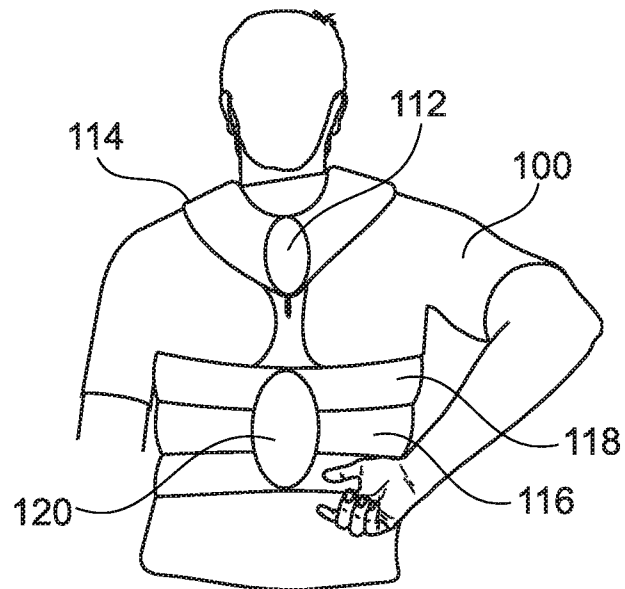


Fig. 1

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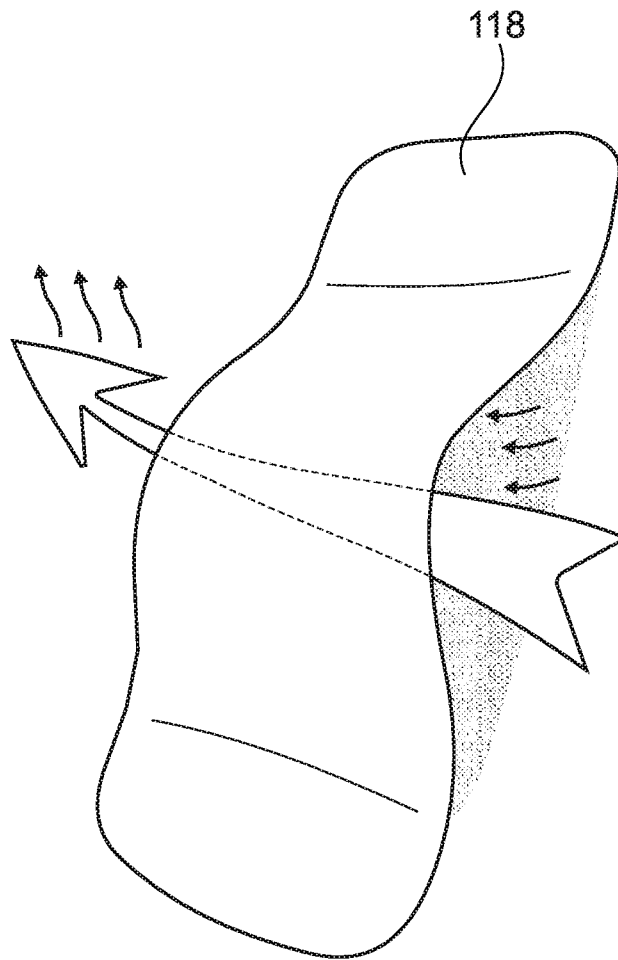


Fig. 2

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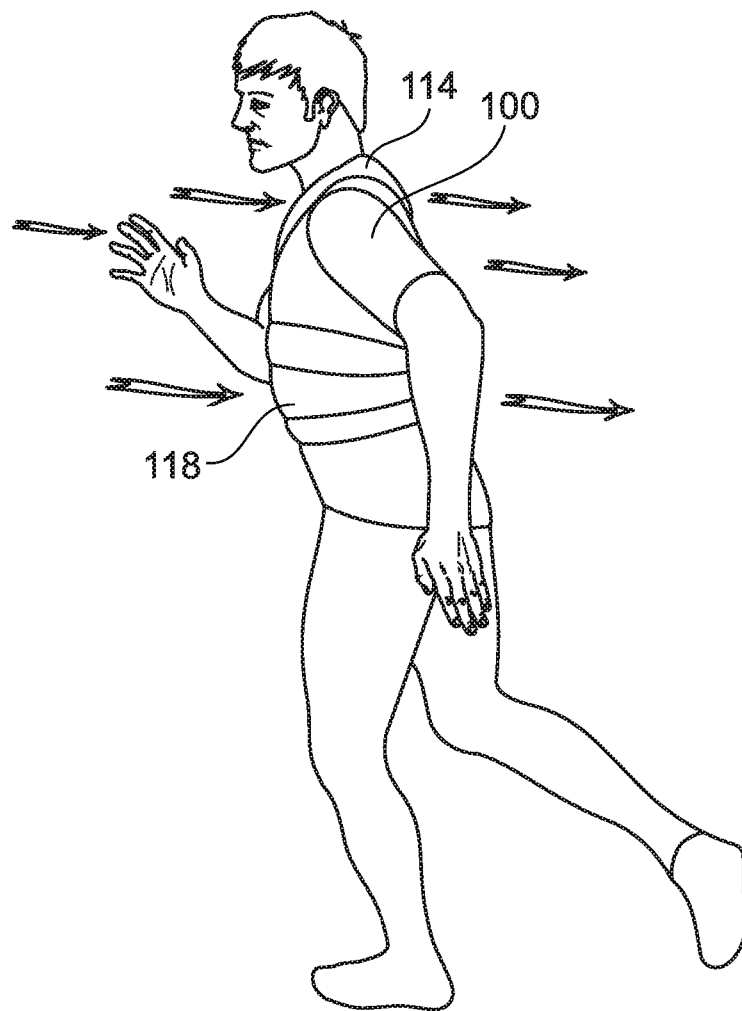


Fig. 3

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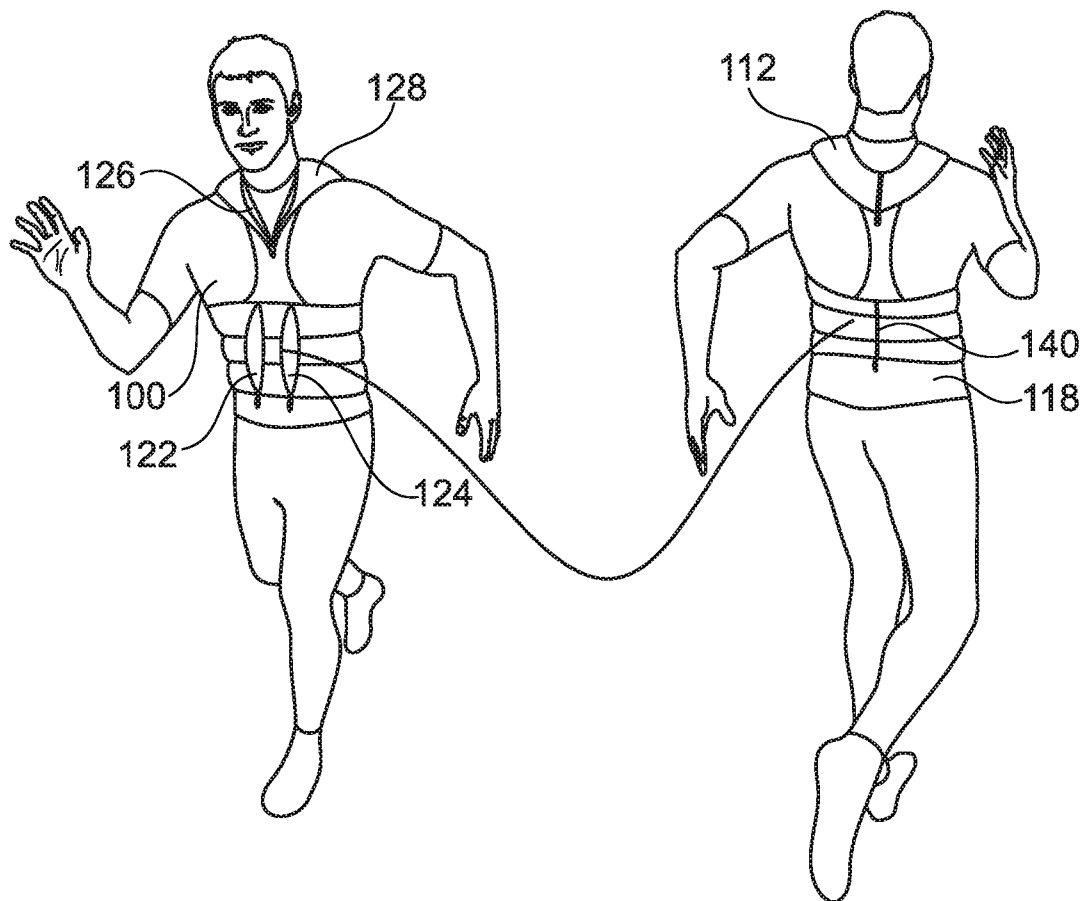


Fig. 4

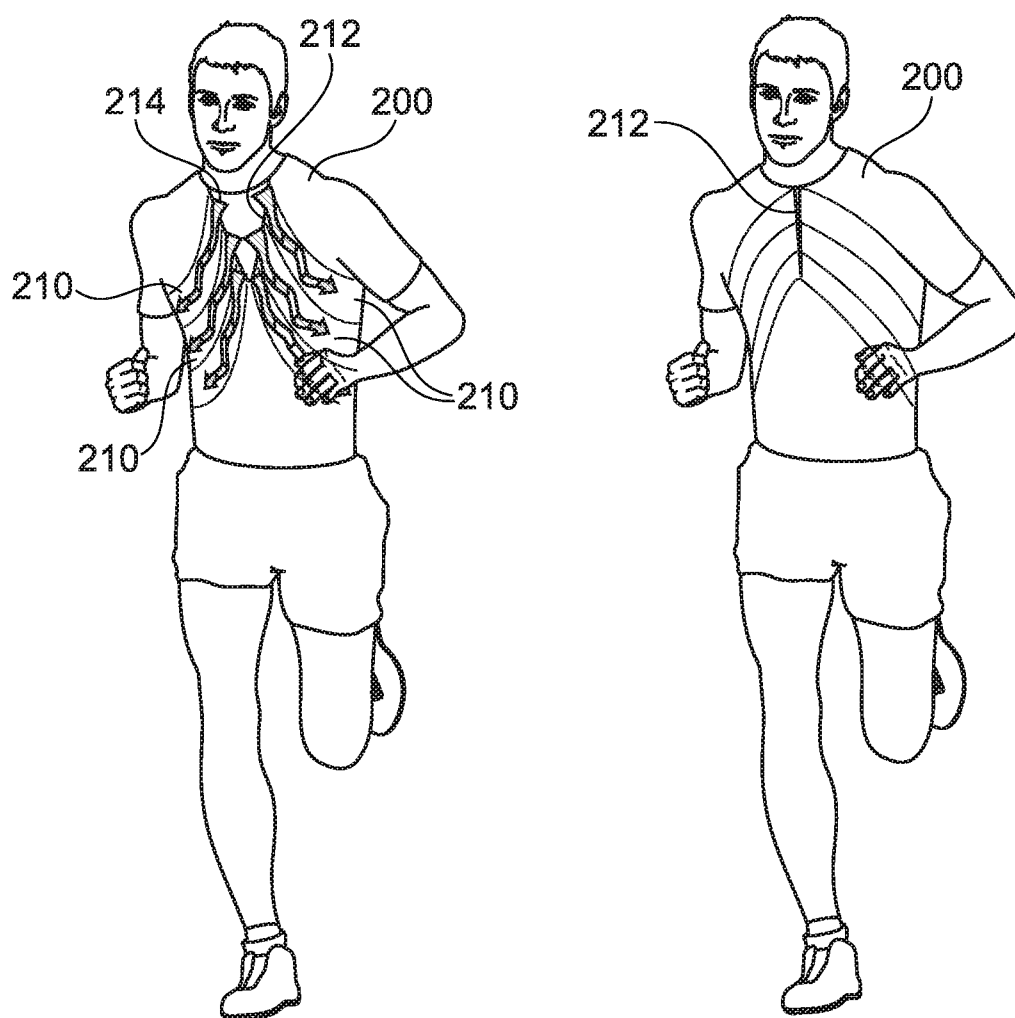


Fig. 5

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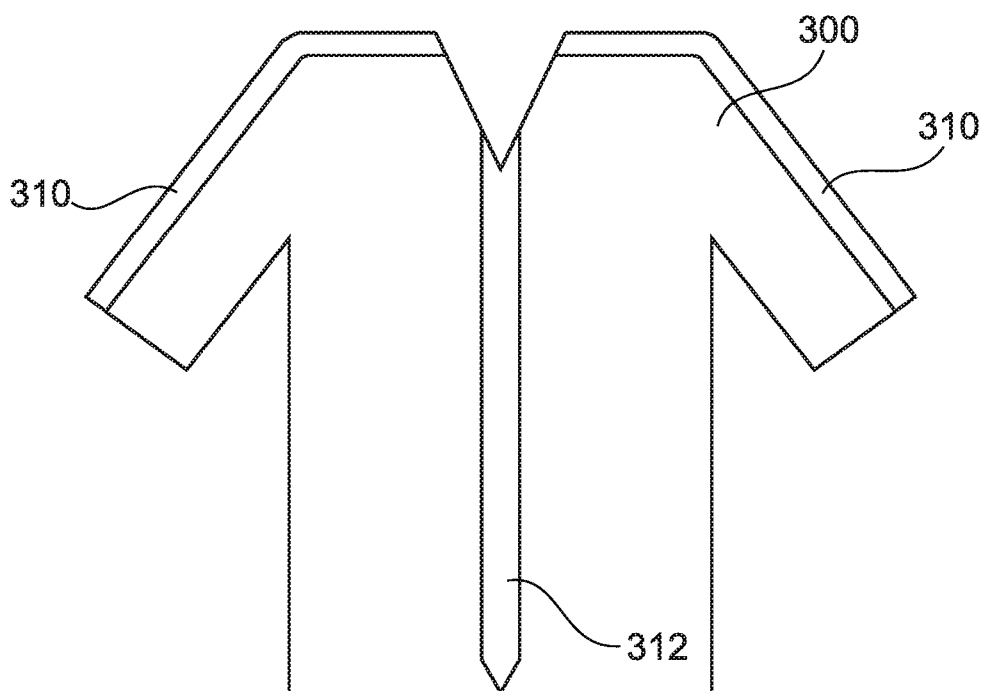


Fig. 6

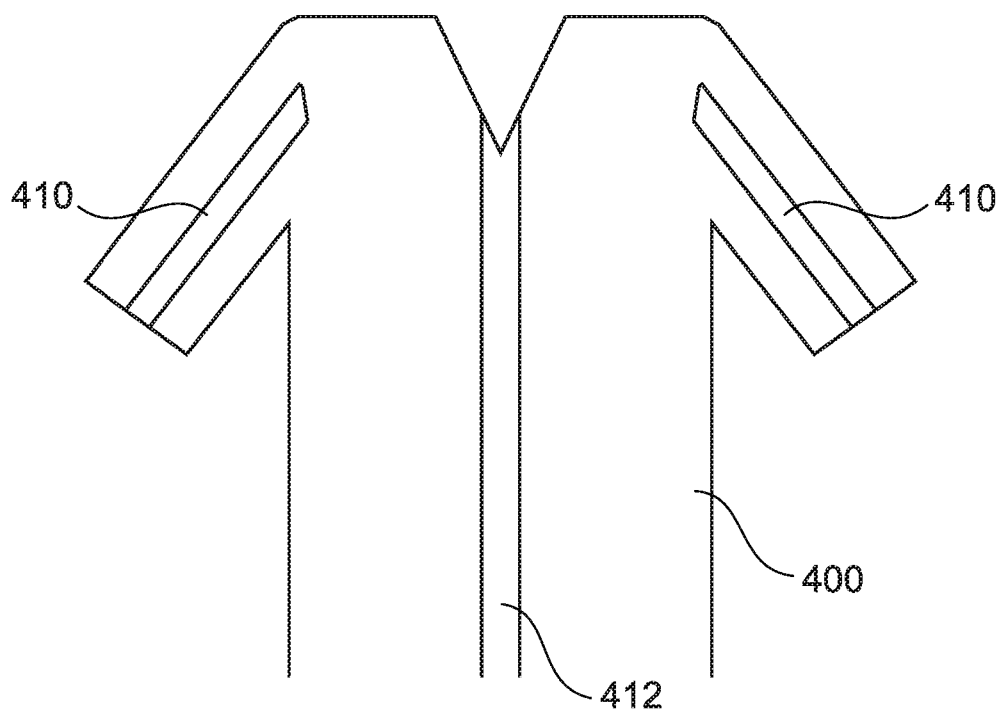


Fig. 7

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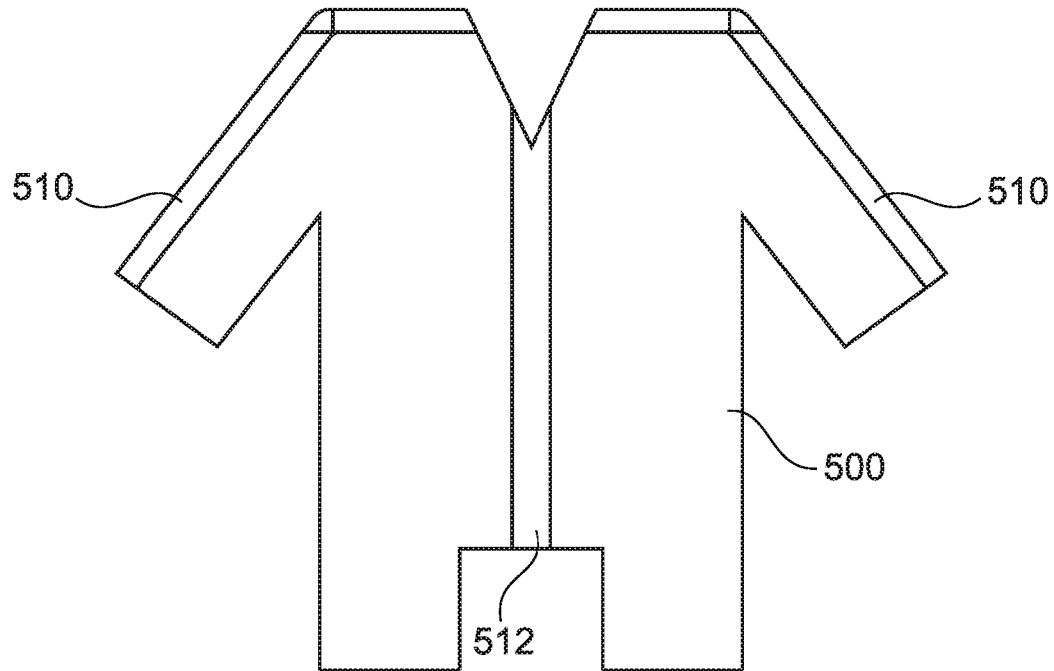


Fig. 8

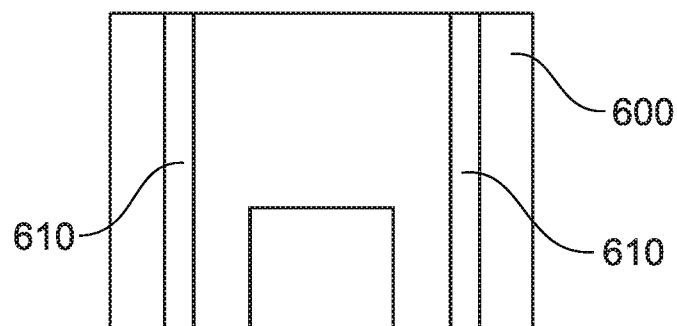


Fig. 9

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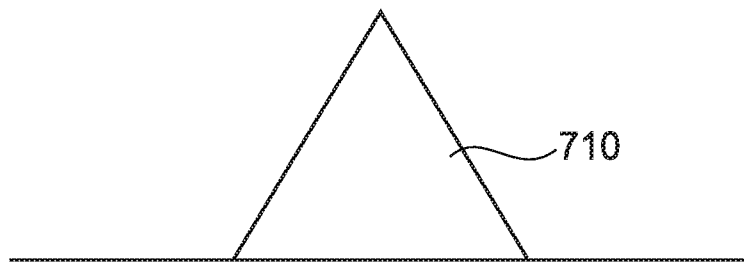


Fig. 10

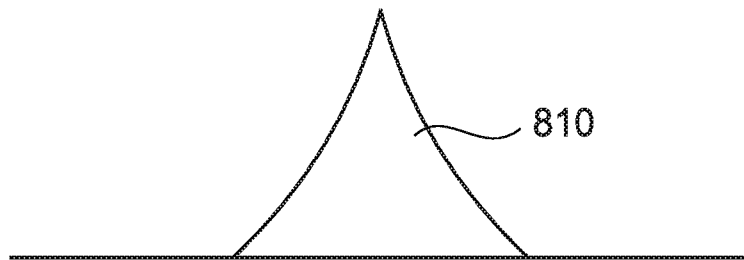


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2014/050267

A. CLASSIFICATION OF SUBJECT MATTER
INV. A41D27/28
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A41D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 105 477 A (GOLDE PAUL J [US]) 21 April 1992 (1992-04-21) column 3, lines 38-50; figures 3-5,8 -----	1-19
X	EP 1 972 217 A1 (TNO [NL]) 24 September 2008 (2008-09-24) paragraphs [0021], [0028], [0029]; figure 4 -----	1-20
X	DE 20 2006 012701 U1 (X TECHNOLOGY SWISS GMBH [CH]) 7 December 2006 (2006-12-07) paragraphs [0017], [0019], [0020]; figures 1-3 -----	1-20
X	US 2011/265242 A1 (LAMBERTZ BODO W [CH]) 3 November 2011 (2011-11-03) paragraphs [0009], [0010], [0026], [0027]; figures 4,5 -----	1-20
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

5 March 2014

Date of mailing of the international search report

12/03/2014

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INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2014/050267

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/237168 A1 (BRAUN DAVID C [US]) 2 December 2004 (2004-12-02) paragraphs [0004], [0017], [0018], [0024]; figure 4 -----	1
X	EP 1 428 441 A1 (SALOMON SA [FR]) 16 June 2004 (2004-06-16) paragraphs [0010], [0027]; figures 1,2 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2014/050267

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