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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :		(11) International Publication Number:	WO 93/05671
A41D 27/28, 13/00, A41B 9/00	A1	(43) International Publication Date:	1 April 1993 (01.04.93)

(21) International Application Number: PCT/GB92/01771

(22) International Filing Date: 25 September 1992 (25.09.92)

(30) Priority data:
07/765,583 25 September 1991 (25.09.91) US

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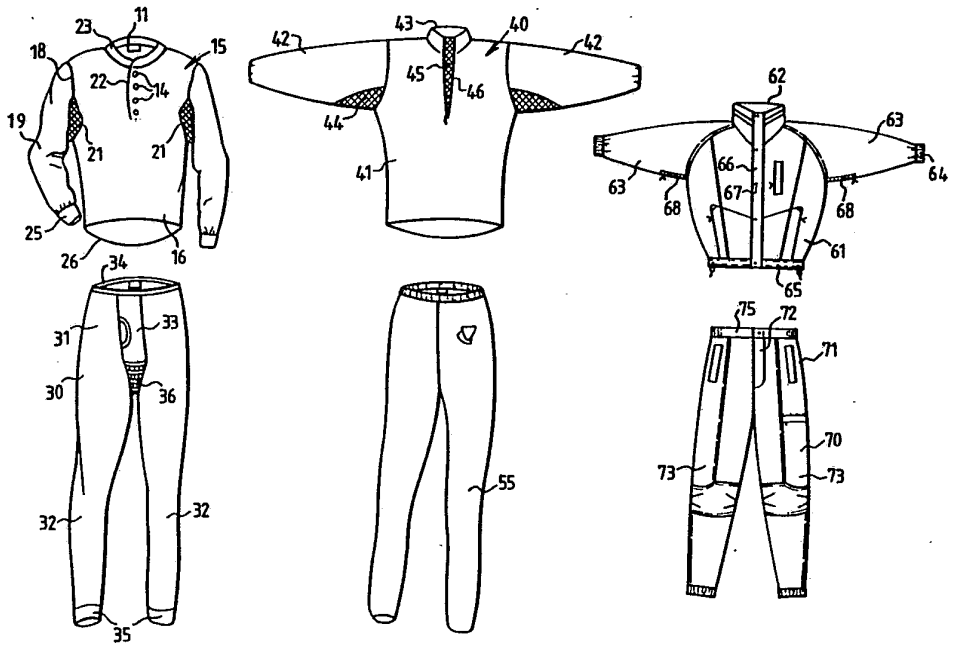
(81) Designated States: AT, AU, BB, BG, BR, CA, CH, CS, DE, DK, ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, PL, RO, RU, SD, SE, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, SN, TD, TG).

Published
With international search report.

(54) Title: EXERCISE CLOTHING AND METHOD OF USING THE SAME



(57) Abstract

A clothing ensemble (40, 55, 30, 15, 60, 70) for use in exercising which includes multiple layers, each layer including a garment (40, 55, 30, 15, 60, 70) adapted to be worn over the trunk and limbs of the body. Each of the layers has a vent (44, 45, 21, 36, 68, 72) area operable to be positioned in at least one of the body joints between said trunk and limbs. The layers are worn so that the vent areas (44, 45, 21, 36, 68, 72) register with each other to thereby provide a path for discharge of heat and moisture from the underlying body joint outwardly through the vent areas (44, 45, 21, 36, 68, 72) of all the layers.

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EXERCISE CLOTHING AND METHOD OF USING THE SAME

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FIELD OF THE INVENTION

The present invention relates to exercise clothing for use during exercise of varying degrees, and has particular application to a novel ensemble of clothing for use in exercise. In this patent, the term "exercise" is intended to embrace any vigorous activity whether done for recreational purpose or for physical conditioning or in sport competition.

BACKGROUND OF THE INVENTION

Prior to the present invention, the design of exercise clothing was concerned primarily with the desirable selection of fibers, the proper selection of fabric construction, and the design of the garments to provide the desired degree of freedom for body movement.

The selection of fabric construction and fiber content of the garments used for exercise is dependent upon the temperature conditions, and in the case of outdoor exercise, weather conditions to be encountered during exercise. Thus, outdoor winter exercise required heavier garments than indoor exercise. In extreme conditions, where a single layer of garment does not provide the desired protection from the cold or weather conditions, it has been a common practice to "layer" garments in order to provide the desired heat insulation and weather protection.

Typically for outdoor activity, a person will dress in underwear or other appropriate body garments, and on top of the underwear will don normal exercise clothing which will have insulating properties appropriate to the conditions under which the exercise is being undertaken. On top of the exercise clothing

is outerwear in the form of jackets, jumpsuits, or the like which protect the exercise clothing from the elements such as rain, snow, seaspray or the like. Typically, the outerwear is made of waterproof fabric or at least water-resistant fabric so that it sheds water and prevents the weather from wetting out the exercise clothing underneath. For less severe weather, a fabric which simply sheds water will often be used in place of the waterproof fabrics which tend to become clammy when worn during exercise. Considerable research has gone into the design of waterproof and water-shedding fabrics which provides sufficient porosity to allow the fabrics to "breathe" while still preserving their waterproof or water-shedding characteristics.

Physical comfort is affected to a large degree by the body heat, which in turn is controlled by the ambient temperature and in part by the heat generated in the body by exercise and the like. The body has physiological processes for seeking to maintain a uniform body temperature by generating sweat or perspiration when the body is hot, and providing a protective air layer by the use of "goose bumps" when the body is cool. When sweating does not provide sufficient cooling, the body reaction increases heart activity to pump blood into the capillaries adjacent the skin to assist in reducing the skin temperature. Shivering is also a physiological reaction which generates body heat through activation of the muscles. In any case, the body reaction saps energy and increases the fatigue resulting from the exercise activity.

Localized hot spots in the body tend to create discomfort and such hot spots are in areas where there are crevices, as in the armpits or the crotch, or where there is restrictive clothing, as in the neckband and waistband of garments. Underwear is

designed to accommodate to the physiological reactions of the body. The most comfortable underwear utilizes a cotton fabric which absorbs moisture and allows it to be dispersed over a wide area to accelerate evaporation and cooling. The dispersion of the moisture through the cotton fabric provides a comfortable undergarment which may be worn next to the skin without itself creating discomfort by reason of its confinement. In U.S. Patent No. 4,797,311, a winterweight underwear fabric is described which provides a high comfort level by reason of a combination of cotton fiber, bulked yarns, and a fabric construction providing air pockets which not only provide an insulating dead-air space but also permit evaporation of moisture, thereby increasing the comfort level provided to the individual wearing the garment.

The thermal fabric of U.S. Patent No. 4,797,311 has been improved by being knitted of a hollow-core polyester fiber identified by E.I. du Pont Co. as THERMAX™. In such fabric, the inner and outer surfaces are characterized by air-entrapping cells formed by channels and ribs and transfer of moisture between the inner and outer surfaces by wicking through the fabric.

SUMMARY OF THE INVENTION

The present invention provides an assembly of garments which combine to minimize overheating of the body during exercise so as to stabilize the body temperature at a comfortable level. In this fashion, the novel ensemble of garments enables the body to be protected from the elements during exercise without causing excessive overheating.

The invention utilizes multiple layers of clothing and accommodates maintenance of the desired body temperature by arranging the garments in the

separate layers so as to effectively allow dispersion and dissipation of body heat, avoiding the need for the body to divert its energy towards temperature conditioning of the body, as by the normal physiological reactions to excessive heat or undue chill.

More specifically, the present invention provides a system of clothing which may be worn during periods of exercise to enhance the maintenance of the proper body temperature without triggering excess physiological reactions.

A significant component of the system of the present invention resides in the provision of a novel body garment, i.e. underwear, which cooperates with outer garments to facilitate the distribution and dissipation of body heat.

Specifically, the novel undergarment of the present invention provides a garment which lies close to the skin. It may have a napped surface of bulked yarns providing a layer of trapped air. The fabric is a modified 2 x 1 rib providing a knitted framework of hollow-core polyester fiber which wicks moisture from the trapped air and distributes it through the fabric. The garment is characterized by venting patches adapted to register with the body joints where hot spots may occur.

BRIEF DESCRIPTION OF THE DRAWINGS

All of the objects of the invention are more fully set forth hereinafter with reference to the accompanying drawings, wherein:

Fig. 1 illustrates an ensemble of clothing garments embodying the present invention and adapted for obtaining the advantages of the novel method of dressing for exercise described hereinafter;

Fig. 2 is a view of an insulating top garment which may be substituted for the insulating top shown

in Fig. 1;

Fig. 3 is a view of an insulating knit which may be substituted for the insulating pant shown in Fig. 1; and

Fig. 4 is an outer top which may be substituted for the outer top shown in Fig. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The ensemble of Fig. 1 is particularly adapted for use in cold weather outdoor exercise such as skiing where it is desirable not only to provide warmth, but also to provide protection against snow and other precipitation.

The ensemble of Fig. 1 comprises three layers, the first layer adapted to be worn closest to the skin and will be identified as underwear. The second layer is adapted to be worn over the underwear and to provide an insulating layer. The third layer is adapted to be worn over the insulating layer and provides the weather protection as the outer layer.

The underwear of Fig. 1 comprises an undershirt 15 and undertrousers 30. The undershirt 15, in the present instance, comprises a body section 16 adapted to be worn on the trunk. The body section has a neck opening at 17 and arm openings at 18 to which are attached sleeves 19. In accordance with the invention, at the juncture of the body portion 15 with the sleeves 19 a vent patch is provided at 21, and in the collar area at 17, an adjustable neck opening is provided by a placket at 22 which may be opened and closed to provide variable venting in the neck area. The vented neck opening 22 extends into the collar 23 and has confronting flaps providing free edges with a series of fasteners 24 which may be selectively opened to enlarge or reduce the size of discharge path provided by the vent opening 22.

The sleeves may have a cuff at their free end at

25 and the body portion 16 may have a waistband 26. In the present instance, the vents 21 in the armpits between the sleeves 19 and the body 16 comprise a mesh patch which is inset into the seam between the sleeve 19 and the body portion 16 of the undershirt and extends toward the elbow along the bottom seam of the sleeve and toward the waist from the bottom of the armhole in the body portion 16 of the shirt 15. Preferably, the body fabric of the undershirt 15 comprises a fabric having the knit construction described in U.S. Patent No. 4,797,311 which exhibits many of the advantages of the traditional waffle-knit fabric which have been used for cold weather protection in recent years, but which do not exhibit oppressive weight associated with such fabrics. In the present instance, the body fabric is knitted from a yarn essentially comprising a hollow-core polyester fiber of the type identified by E.I. du Pont Co. as THERMAX™ or THERMASTAT®. Such fabric may optionally have a napped surface yarn confronting the skin. The knit construction is a modified 2 x 1 rib thermal fabric with a framework of knitted yarns providing air-entrapping cells in the form of channels and ribs facilitating the wicking of moisture from the undersurface of the fabric outwardly. The vent patch is a knitted birds-eye material which has sufficient stretch to conform to the junction between the body section and the sleeve. The birds-eye material is preferably knitted with yarns produced from a channelled polyester fiber identified by E.I. du Pont Co. as COOLMAX™.

The undertrouser 30 is formed of a similar body fabric and has a body portion 31 adapted to be pulled over the trunk of the body and leg portions 32 connected to the body portion 31 in the crotch area of the torso. In the illustrated ensemble, the trouser 30 is designed for use by men and includes a fly front

33 and an elastic waistband 34. The legs 32 are cuffed at 35 and where the legs join the body portion, a vent patch 36 is positioned to overlie the upper portions of the thigh and underlie the crotch adjoining the seam at the bottom of the fly front of the trouser. As in the shirt, the trouser 30 is formed primarily of a thermal knit fabric and the vent portion 36 is a mesh fabric.

The underwear of this body layer of the ensemble may be substituted with undergarments of different construction or of different fabrics. For example, the neck portion of the trunk part of the body section may be provided with a continuous collar which is sufficiently stretchable to be pulled over the head without provision for venting patches. Where the need for warmth is diminished, a lighter fabric may be used in place of the thermal knit having a knitted construction disclosed described in Patent No. 4,797,311. Such fabric may include the basic double-ribbed structure of the outer layer but made with a lighter weight yarn so as to reduce the warming achieved by the undergarment. For example, in using selecting garments for less vigorous exercise in a less severe climate, the undergarment may be of a lighter weight and the insulating layer provided by the napped undersurface may not be necessary. However, the provision of a venting patch in the underarm has been found desirable, even in lighter weight underwear to facilitate the maintenance of the desired body temperature without excess discomfort or fatigue. Other structural changes may be made, for example in the undertrouser, if worn by a female, the fly front trouser may be substituted with a pull-on trouser without a fly front and tailored for conformity to the female lower trunk area. In such case, the venting patch in the crotch simply extends through the underpart of the seam which may extend

from the waistband at the front into the crotch, through the crotch and back to the waistband in the rear. The venting patch is interposed in said seam and extends downwardly along the inner thighs to provide a discharge path for heat and moisture during exercise.

Normally, the underwear is worn directly against the skin, but for certain exercise, for example in track and field competition and in swimming, the competition garments may be worn under the underwear, particularly since such garments are of relatively light weight and do not entrap the body heat and moisture at the body joints.

The insulating layer of the ensemble shown in Fig. 1 includes a thermal jersey 40 and a thermal pant 55. The thermal jersey 40 has a body portion 41 with sleeves 42 and a collar 43. A mesh venting panel 44 is inset into the junction between each sleeve 42 and the body 41 and a mesh panel 45 is fitted into the front of the body portion 41 extending downwardly from the collar 43. In the present instance, the fabric of the jersey is dual ply fabric having good stretch characteristics knitted from THERMASTAT® or THERMAX™ fiber of the Du Pont Company which are hollow core polyester fibers. The hollow core fiber may be formed into yarns and knitted with spandex yarns, or may be made into a composite yarn with the hollow core fiber wrapped around a spandex filament. The vent panels 44 and 45 are formed of a net fabric similar to the fabric of the patches 47 and are inset into the seam at the junction between the arms and the body in the case of the panel 44, and are sewn into the neck opening below the collar 43. The neck opening has a zippered closure 46 overlying the vent panel 45. The zipper may be open and closed to regulate the size of the discharge path for moisture and heat from the neck joint area. The construction of the jersey 40

provides an insulating layer in which the venting panels 44 and 45 register with the vent panels 21 and 22 of the underlying underwear top 15.

The insulating pant 55 is likewise knitted with a THERMAX™ fiber and is of the pull-on type with an elastic waistband. The insulating pant provides a loose fit and does not require the venting panel which is present in the underwear, since the venting from the crotch area is not as significant physiologically as the venting in the armpits and the neck. While the elasticized waistband 56 of the pant does provide a restriction, the loose fit of the legs enables the dissipation of the heat and moisture from the lower torso without causing hot spots which are somewhat debilitating. The use of THERMASTAT® or THERMAX™ fiber provides rapid dispersion of moisture through the insulating layer. The hollow core fibers provide wicking of moisture from the inside of the layer through the layer to the outside and avoids the clammy feeling which results from moisture retention in the underwear layer.

Figs. 2 and 3 illustrate alternate garments for use as an insulating layer overlying the underwear. Fig. 2 illustrates an insulating top 140 having a trunk portion 141, sleeves 142 and a collar 143. In this embodiment of an insulating top, the collar has a front opening 145 formed between flaps and is provided with a zipper fastener 146 which selectively opens and closes the neck opening 145. In the present instance, the neck opening 145 has free edges without a mesh patch of the character described in connection with the embodiment shown in Fig. 1. A mesh patch 144 is positioned in each armpit and is fitted into the seam between the sleeves 142 and the trunk portion 141 of the garment. Whereas the mesh patch in the embodiment of Fig. 1 is confined to the lower seam of the sleeve, the mesh patch 144 in the present embodiment extends

from the seam 147 between the sleeve and the trunk portion along the underside of the sleeve 142 toward the elbow and also extends along the side of the trunk portion toward the waist so as to provide venting areas for both the underside of the arm and the portion of the body underlying the arm. The styling of this embodiment is somewhat different than the styling of the jersey shown in Fig. 1, and it is apparent that other styling designs may be substituted as desired. The fabric of the embodiment shown in Fig. 2 is preferably a fleece-lined fabric of the character described in International Application No. PCT/US90/00855, published August 15, 1991 under International Publication No. WO91/12363. This patent describes a cotton fleece fabric having a jersey outer surface and a fleece inner surface having the stretchability inherent in knitted fabrics but which has limited residual shrinkage. This fabric is suited for use as an insulating layer because of its comfort when worn and the insulation provided by the fleece inner layer.

Another fabric is a dual-ply fabric designed to have 360° stretch without torquing or puckering. Such a fabric is made in two interconnected plies with the fabric of one ply having an S-twist core spun spandex yarn wrapped with hollow core polyester fibers, and the back with a similar yarn but made with the opposite twist so that in finishing the fabric, the front and back plies may be controlled to set and maintain the courses and wales substantially perpendicular to each. The use of the spandex yarn wrapped with the hollow core polyester provides a high level of insulation, and the hollow core fibers permit wicking of the moisture from the inside of the fabric to the outside, thereby dissipating any build-up of heat and moisture within the garment. With the alternate constructions providing a greater

stretchability, the neck vent 45 of the top 40 and the neck opening 145 of the top 140 may be eliminated and replaced by a continuous collar or other neck band.

In Fig. 3, the insulating trouser 155 is similar to the trouser 55 of Fig. 1 but has a drawstring waistband in lieu of the elastic band shown in trouser 55. In this instance, the trunk portion 156 of the trouser is formed in two parts, each integral with a leg portion 157 and the parts are joined by a central seam 158 which originates and terminates in the drawstring waistband 159. The provision of a drawstring waistband at 159 enables the person to provide a degree of venting by loosening the drawstring so as to ease the restriction provided by the waistband. It may be desired to utilize a zippered or buttoned fly in the pants to allow the capability of venting the lower trunk while providing the styling features provided by a fly front.

The outermost layer of the ensemble shown in Fig. 1 includes a jacket 60 and ski pants 70. The jacket 60 is wind and waterproof, having a body portion 61, a collar 62 and sleeves 63. The sleeves have cuffs 64; the body portion has an elasticized waist 65; and there is a front closure 66 extending from the collar 62 to the waist 65. The closure 66 includes fasteners 67 which permit the closure to be partially opened to afford venting of the jacket through this closure. Likewise, in the armpit at the junction of the sleeve with the body portion, zippered openings 68 are provided which can be opened and closed to regulate the size of the discharge path for heat and moisture to provide the desired venting of the underarm joint. The zippered openings 68 extend along the underside of the sleeve so that they are in registry with the venting openings 44 and 21 of the underlying layers so as to provide, when opened, a direct path for discharging heat and moisture from the body out

through the respective venting areas. The pants 70 likewise are of wind and waterproof material, and have the trunk portion 71 with a fly opening 72 and legs 73,73 extending downwardly from the trunk portion 71. An elasticized waistband is provided at 75 and the fly opening 72 may be opened, if desired, to allow venting of the heat and moisture from the lower trunk through the outer pant 70.

The garments shown in Fig. 1 have limited porosity, and for use in vigorous exercise, a different outer garment may be substituted. Fig. 4 illustrates an outer jacket 160 which may be worn in place of the jacket 60. In the present instance, the jacket 160 is comprised of a laminated fleece fabric which enables the garment to be worn with either side out while providing an inwardly-directed fleece surface. The jacket has a trunk portion 161, a collar 162 and sleeves 163. The trunk portion has a zippered opening 166 which extends from the collar 162 to the waist 165. Preferably, the zipper of the zippered opening 166 has a double slide which enables the opening to be opened either from the top or from the bottom or possibly from both the top and the bottom so that the closure provided by the zipper between the slides may be adjusted both as to the extent of the closure and its position between the collar and the waist. Each of the double slides is effective to open the zipper beyond one end of the slide and to close the zipper beyond the opposite end of the slide. The jacket of this embodiment provides a high degree of comfort, both during vigorous exercise and in periods between exercise, even in severe weather conditions. As in the previously-described embodiment, the armpits of the jacket have zippered vents 168 which may also be opened and closed to regulate the venting. These vents extend along the underside of the sleeve so as to register with the vents of the underlying garments.

Additionally, zippered units 169 may also be provided in the trunk portion 161 of the jacket 160 which may be opened to provide discharge paths in registry with the mesh patch vents 144, or the mesh patch vents 44.

The ensemble of clothing provided by the present invention may be varied by the proper selection of garments for each layer. In milder weather, the insulating layer may be omitted completely so as to provide the discharge path directly from the vents of the underwear through the vents of the outerwear. In such case, if it is desired to permit removal of the outerwear, the underwear may be covered by standard clothing items which are sufficiently loose-fitting or porous so as to avoid interference with the venting provided by the vent areas in the underwear and the outerwear. Where the exercise is being performed in different ambient conditions, as for example where certain activities occur indoors and subsequent activities occur outdoors, the clothing ensemble of the present invention permits accommodation by varying the layering of the garments to accommodate the different ambient conditions where exercising occurs. Although the ensemble illustrated in Fig. 1 comprises a single set of garments, it should be recognized that the ensemble may include numerous sets of garments which may be mixed and matched to provide a substantially unlimited variety of clothing for exercise.

The undergarments of the present invention may be used effectively with scuba diving clothing, either wetsuits or drysuits. The air-entrapping cells provided on the inward and outward surfaces of the thermal fabric produce layers of fluid, (either water or air, depending upon the material of the suit) which layers communicate with each other through the vents in the undergarment to achieve improved control of the temperature at the surface of the skin.

While particular embodiments of the present invention have been herein illustrated and described, it is not intended to limit the invention to such disclosures, but changes or modifications may be made therein and thereto within the scope of the following claims.

CLAIMS

1. A clothing ensemble comprising in combination a body garment adapted to be worn over the trunk and limbs of the body and an outer garment adapted to be worn outside of said body garment over the trunk and the same limbs as the body garment,

each of said garments having a trunk portion with openings for the limbs, and a limb portion for each limb connected to said trunk portion, the junctions between said trunk and limb portions of said garment operable to be positioned in the body joints between said trunk and limbs,

said body garment comprising a breathable fabric of limited porosity and permeability to air and moisture over the major portion of its surface and including a segment at said junction of substantially greater permeability than the remainder of said garment to comprise a first vent area of said clothing ensemble within said body garment,

said outer garment comprising a second vent area of said clothing ensemble positioned, when said outer garment is worn on the body over said body garment, to register with the first vent area to thereby provide a path for discharge of heat and moisture from the underlying body joint outwardly through said body garment vent area and said outer garment vent area.

2. An ensemble according to claim 1 including an insulating garment adapted to be worn over said trunk and limbs between said body garment and said outer garment and having a trunk portion and limb portion interconnected at junctions corresponding to the junctions of said body and outer garments,

said insulating garment comprising a third vent area of said clothing ensemble positioned to

register with the first and second vent areas.

3. An ensemble according to claim 1 wherein at least one of said vent areas comprises means to adjust the size of the discharge path therethrough.

4. An ensemble according to claim 3 wherein said adjustable vent area comprises a pair of flaps having confronting and registering free edges and fastener means to interconnect said free edges for a selective distance along the length of the free edges to leave a discharge path between said edges beyond the interconnected distance.

5. An ensemble according to claim 4 wherein said registering free edges comprises a placket construction, said fastener means comprising discrete fasteners positioned at spaced locations along said placket.

6. An ensemble according to claim 4 wherein said free edges comprise complementary elements of a zipper, said fastener means including a zipper slide operable to open said elements beyond one end of said slide and to close said elements beyond the opposite end of the slide, the opening at one end of said slide providing said discharge path.

7. A method of using a clothing ensemble according to claim 1 including the steps of donning the body garment and then donning the outer garment and registering the second vent area in the outer garment with the first vent area in the body garment.

8. A method of using a clothing ensemble according to claim 7 including the step of providing an insulating layer having a vent area and donning the

insulating layer after donning the body garment and before donning the outer garment and positioning the same so as to effect registration of the vent area in the insulating layer with the vent area in the body garment and the outer garment.

9. For a clothing ensemble comprising in combination a body garment adapted to be worn over the trunk and limbs of the body and an outer garment adapted to be worn outside of said body garment over the trunk and the same limbs as the body garment,

underwear comprising a trunk portion and limb covers interconnected by seams, said underwear being made of a breathable fabric of limited porosity and permeability to air and moisture over the major portion of its surface and including a venting patch in the seams of said underwear, said venting patch being made of a fabric of substantially greater permeability than the remainder of said garment to comprise a vent area providing a discharge path for heat and moisture,

said breathable fabric being stretchable to conform to the body and snugly fitting the body and having air-entrapping cells on the inward and outward surfaces providing insulating layers of air confronting the body on the inward surface and facing outwardly on the outward surface, said cells being provided by a framework of knitted yarn comprising a substantial portion of hollow-core polyester fiber to afford wicking of moisture from said inward layer of air outwardly into said outward layer through said framework,

said venting patch being of a net fabric extending from said seam into the limb covers.

10. Underwear according to claim 8 wherein said venting patch also extends from said seam into the

trunk portion.

11. Underwear according to claim 9 including a collar adapted to encircle the neck and a pair of flaps intersecting said collar and extending into said trunk portion toward the waist, and fastener means adapted to interconnect said flaps for a selected distance to leave a discharge path for heat and moisture between said flaps beyond said interconnected distance.

12. Underwear according to claim 9 wherein said knitted framework is constituted of a 2 x 1 rib knitted thermal fabric, in which said inward surface is napped to space said framework away from the body.

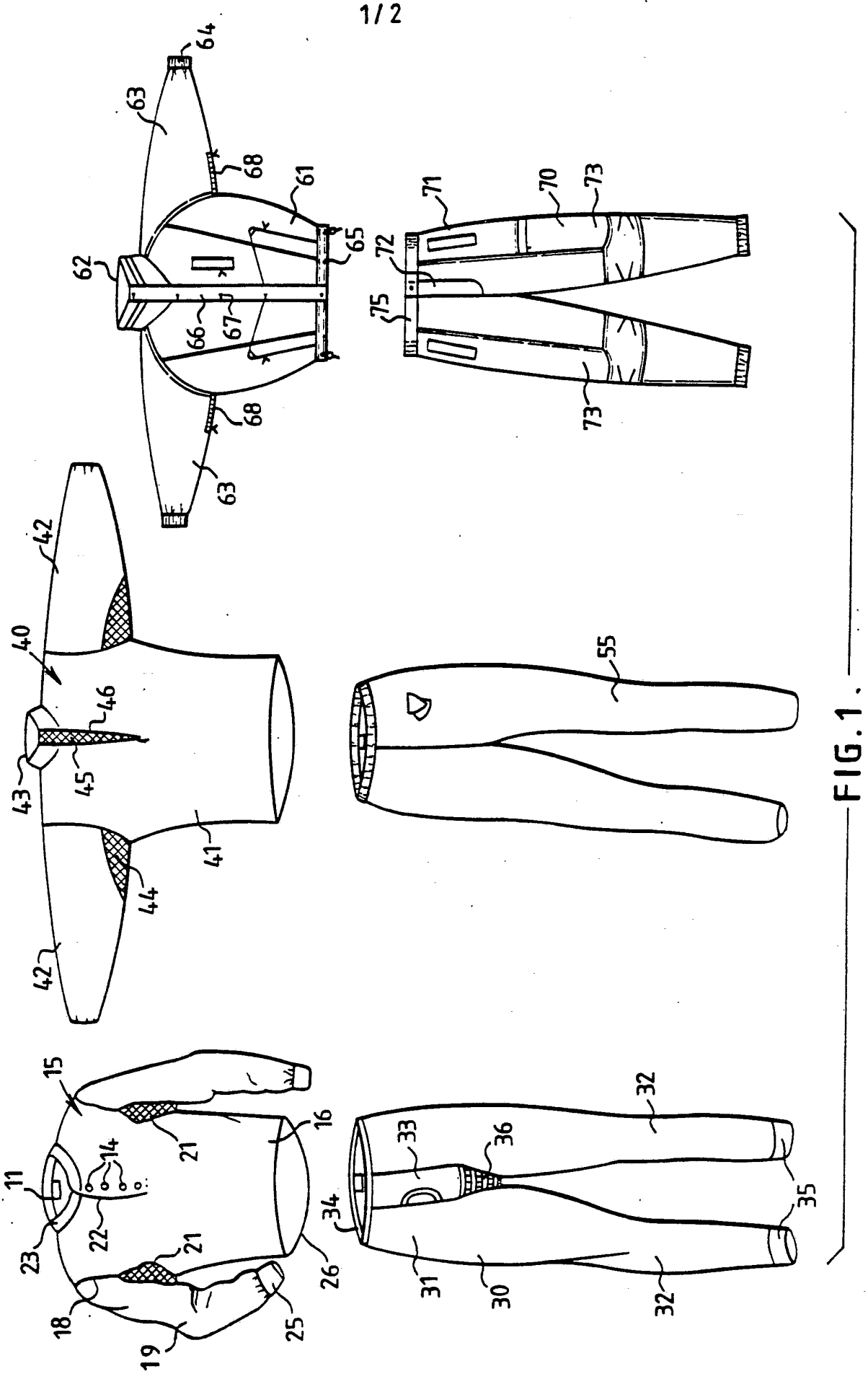
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FIG. 1.

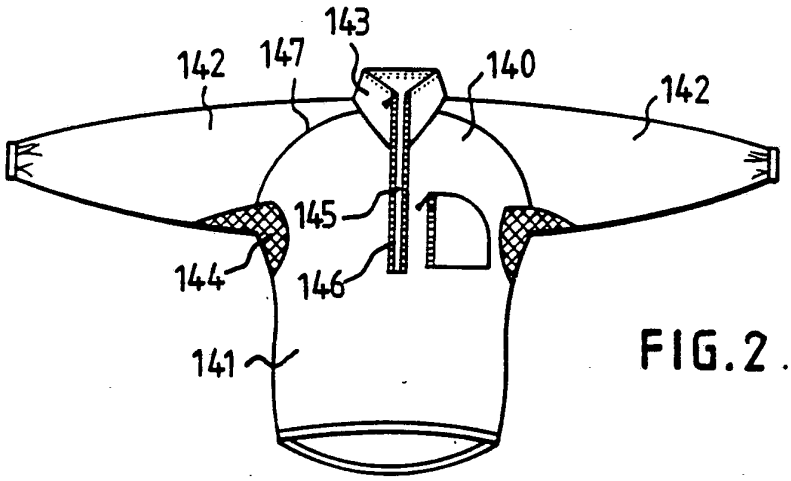

FIG.2.

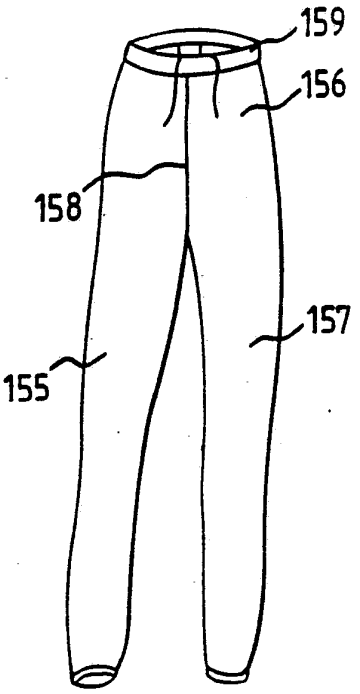

FIG.3.

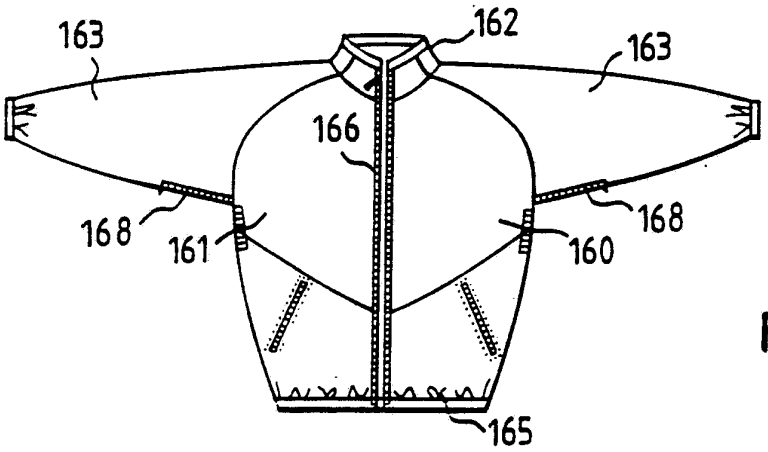

FIG.4.

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 92/01771

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 A41D27/28; A41D13/00; A41B9/00

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	A41D ; A41B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
A	GB,A,2 104 770 (JENG-HORNG HWU ET AL.) 16 March 1983 see the whole document	1
A	US,A,2 715 226 (L. I. WEINER) 16 August 1955 see column 2, line 2 - column 3, line 34; figures 1-5	1
A	FR,A,2 619 997 (P. POLI) 10 March 1989 see claims 1-3; figures 3,4	1
A	US,A,3 761 962 (K. R. MYERS) 2 October 1973 see column 3, line 11 - line 50; figures 1-5	1

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° Special categories of cited documents :[10]

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

"E" earlier document 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

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"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
14 DECEMBER 1992	29 DEC 1992
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	FAIRBANKS S.A.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US,A,4 619 004 (I. H. WON) 28 October 1986 ---	
A	US,A,2 073 711 (J. ROBINSOHN) 9 December 1935 -----	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9201771 SA 65771

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 14/12/92

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A-2104770	16-03-83	None	
US-A-2715226		None	
FR-A-2619997	10-03-89	None	
US-A-3761962	02-10-73	None	
US-A-4619004	28-10-86	None	
US-A-2073711		None	