Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2475537 C 2013/04/02

(11)(21) 2 475 537

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) Date de dépôt PCT/PCT Filing Date: 2003/02/05
(87) Date publication PCT/PCT Publication Date: 2003/08/14
(45) Date de délivrance/Issue Date: 2013/04/02
(85) Entrée phase nationale/National Entry: 2004/08/09
(86) N° demande PCT/PCT Application No.: DE 2003/000320
(87) N° publication PCT/PCT Publication No.: 2003/065833
(30) Priorités/Priorities: 2002/02/08 (DE202 01 940.3);
2002/12/12 (DE102 58 388.9)

(51) Cl.Int./Int.Cl. *A41D 13/00* (2006.01),
A41D 13/002 (2006.01), *A41D 13/005* (2006.01),
A41D 27/28 (2006.01), *A41D 31/00* (2006.01),
A41D 31/02 (2006.01)

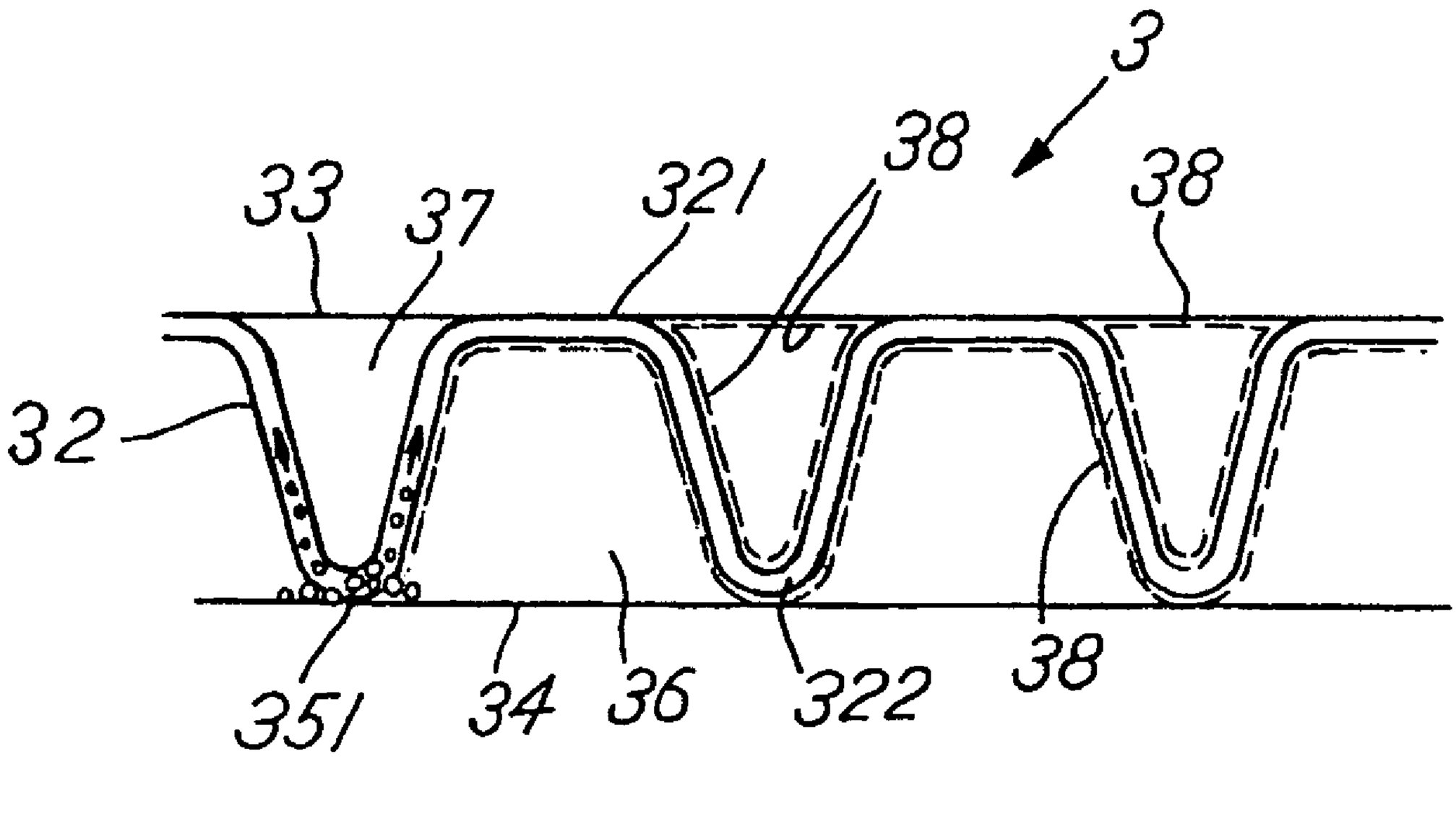
(72) Inventeur/Inventor:
LAMBERTZ, BODO W., DE

(73) Propriétaire/Owner:
X TECHNOLOGY SWISS GMBH, CH

(74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : VETEMENT THERMOREGULANT ET PROCEDE POUR ELIMINER L'HUMIDITE PRESENTE DANS DES ZONES DE LA PEAU

(54) Title: THERMOREGULATING ARTICLE OF CLOTHING AND METHOD FOR REMOVING MOISTURE FROM AREAS OF THE SKIN



(57) Abrégé/Abstract:
The invention relates to a thermoregulating item of clothing, especially for wearing during sport activities such as jogging, skating, skiing or the like. Said item of clothing has at least one thermoregulating area (1, 2) which can be formed inside the item of clothing, from thermoregulating elements (3) which are arranged as required. The invention also relates to a method for removing humidity from areas of the skin, especially during sport activities. To this end, a fabric (32) comprising textile ribs (322) is produced, said fabric guiding humidity away from the skin (34) towards the textile surface by means of capillary action. The textile surface is formed by webs (321).

ABSTRACT

The invention relates to a thermoregulating item of clothing, especially for wearing during sport activities such as jogging, skating, skiing or the like. Said item of clothing has at least one thermoregulating area (1, 2) which can be formed inside the item of clothing, from thermoregulating elements (3) which are arranged as required. The invention also relates to a method for removing humidity from areas of the skin, especially during sport activities. To this end, a fabric (32) comprising textile ribs (322) is produced, said fabric guiding humidity away from the skin (34) towards the textile surface by means of capillary action. The textile surface is formed by webs (321).

Thermoregulating Article of Clothing and Method for Removing Moisture from Areas of the Skin

The invention pertains to a thermoregulating article of clothing especially for use during sports activities such as jogging, skating, skiing, etc. The invention also pertains to a method for removing moisture from areas of the skin especially during sports activities.

Clothing is used for protection, especially for protection against the weather. Under certain conditions, such as during sports activities, the clothing also serves to protect against injury. Except at high outside temperatures, clothing consists primarily of several different articles of clothing, which are worn in layers. The outermost layer of clothing has essentially the task of being windproof and water-repellent in order to prevent the wearer from becoming chilled by the wind and to protect him or her from the intrusion of water into the clothing.

Especially in the case of multi-layer clothing, perspiration can occur. The amount of perspiration is usually above average during sports activities. As a result of perspiration, the clothing becomes much less comfortable to wear because of an unpleasant feeling on the skin, especially in the areas where the greatest perspiration occurs. As a result of the subsequent drop in temperature after the end of the athletic activity, this perspiration also increases the danger of catching cold or of developing muscle stiffness or the like. To reduce these dangers, efforts are made to carry away the moisture. For this purpose it is known that articles of clothing can be provided with terry loops on the side facing the skin; the terry loops are intended to absorb the moisture. A disadvantage of the articles of clothing designed in this way is that, although terrycloth is able to absorb the moisture, it does not carry the moisture away from the skin but rather simply absorbs it into itself. As a result, the moisture remains in the article of clothing, so that, at the end of the sports activity, the areas of the clothing which cover the zones of heavy perspiration remain wet. Because these wet areas remain in contact with the skin, an unpleasant feeling is produced. The unpleasant feeling is made even worse by the fact that, after the sports activity, both the wearer and the clothing cool off and thus the moisture which comes into contact with the skin is now cold as well. The known articles of clothing, furthermore, fail to deal with the presence of zones subjected to different moisture loads.

Although a thermoregulating sock, which is provided with an air channel to improve the thermoregulation of the foot, is known from DE 297-15,762 U1, the problem of becoming chilled hardly occurs in the case of socks, because the sock is usually enclosed within the solid structure of a shoe. For this reason, it is not important for socks to provide protection against the intrusion of water either.

The invention is therefore based on the task of creating thermoregulating clothing which improves the efficiency with which perspiration can be removed from the skin and which makes it possible for the moisture which has accumulated to evaporate. Another task of the invention is to provide a fabric which can absorb the unevaporated portion of the moisture, simultaneously prevent the wearer from becoming chilled, and prevent moisture from penetrating from the outside to the especially stressed areas. According to the invention, this task is accomplished by at least one thermoregulation zone.

By means of the invention, thermoregulating clothing is created, especially for sports activities, which significantly improves the efficiency with which accumulating perspiration is removed and which also protects the wearer from becoming chilled. By providing different thermoregulation zones in different areas of the clothing, it is possible to provide areas with different moisture absorption or moisture removal capacities in accordance with the amount of perspiration which is likely to occur in the various areas of the body while at the same time preventing the intrusion of moisture from the outside and protecting the wearer from the danger of become chilled, especially in the areas which are likely to suffer a drop in temperature. The invention therefore provides an article of clothing which deals with the load in question, involving either an increase or a decrease in body temperature, by providing a thermoregulation zone adapted individually to that load. As a result, the overall performance range of the body is increased.

As an elaboration of the invention, a thermoregulation zone is designed essentially in the form of thermoregulating channels. The thermoregulating channels consist preferably of thermoregulating knitted mesh fabric. The thermoregulating channels make it possible for

most of the moisture to evaporate. In addition, the thermoregulating channels make it possible for the moisture to be taken up by the fabric. With the help of the thermoregulating channels, furthermore, the moisture can be transported from areas of heavy perspiration to an area of the clothing in which free evaporation is possible.

A thermoregulation zone is preferably produced out of materials of different thicknesses. In an embodiment of the invention, the thermoregulation zone can also be designed to consist of multiple layers. As a result, it becomes possible, first, for a relatively large amount of moisture to be absorbed by the clothing and simultaneously transported away from the skin to the outer layer of the clothing, as a result of which the clothing remains comfortable on the skin. Second, the possibility is also created of preventing unpleasant feelings of cold from occurring in those areas where such feelings frequently occur, such as on the knees during skiing, for example, by making the clothing thicker in these areas.

In a preferred elaboration of the invention, a thermoregulation zone is in the form of cushioning. The cushions can be located in various areas of the clothing. They prevent the intrusion of moisture through the clothing, but they also prevent injuries as a result of falls, especially injuries to the knees and elbows. The cushions are also able to prevent pressure points.

In another embodiment, the thermoregulation zones are introduced in the form of elements into the article of clothing, where the top surface of a fabric, which is folded into a wave-like configuration and in which ribs and webs are formed, is covered with retaining fabric. This has the result of significantly improving the removal of perspiration from the skin. In addition, through the modular arrangement of such elements, it is possible to adapt the article of clothing optimally to specific areas of the body and to the amounts of perspiration which can be expected in those areas. Thus it is possible to produce an article of clothing which deals with to the load in question, whether caused by a high or a low temperature, by providing a thermoregulation zone adapted specifically to that load, as a result of which the overall physical performance range of the wearer is increased.

In a further elaboration of the invention, the ribs and the retaining fabric form a hollow space. An additional hollow space is advantageously formed between the webs and the skin, in which case the ribs form the lateral boundaries of the space. These hollow spaces create an air cushion between the skin and the environment, a cushion which has the effect of equalizing the temperature between the high body temperature during sports activities and the low outside temperatures present, for example, during the winter. As a result, a feeling of cold on the skin is avoided. In the opposite case (ambient temperature higher than the skin temperature – in summer, for example), the opposite effect occurs. Overall, therefore, the feeling of comfort is significantly improved.

In an advantageous embodiment of the invention, the yarn of the fabric is coated. The coating is preferably applied by electroplating, as a result of which it is guaranteed, for example, that the coating covers the entire surface of the yarn. The coating preferably consists of silver, copper, or gold. These coatings have a magnetically shielding effect. Silver and copper, furthermore, prevent the spread of bacteria and/or kill them. As a result, the odor of perspiration is considerably reduced.

In a further embodiment of the invention, the thermoregulating element is provided with fastening elements on the side facing away from the skin. These are preferably formed by hook-and-loop fasteners. The fastening elements make it possible to add new thermoregulation zones to the article of clothing at a later time.

The invention is also based on the task of creating a method by means of which moisture can be transported effectively and continuously away from the skin. According to the invention, this task is accomplished in that a fabric is produced with textile ribs, by which moisture is carried away from the skin by capillary action to webs, which form the textile surface.

The invention thus provides a method for the effective removal of moisture from areas of the skin, especially for the removal of the perspiration associated with sports activities. Because the moisture is carried away from the skin by capillary action via textile ribs to a

textile surface, the location of the surface where evaporation occurs is shifted. This shift in location results in the continuous drying of the surface of the skin.

In another elaboration of the invention, the removal of moisture from areas of the skin is optimized in that, with the help of air chambers, body heat is used to accelerate the flow of moisture through the textile ribs.

An aspect of the invention relates to an element, for use in articles of clothing wherein a top surface of a fabric which has been folded into a wave-like configuration is covered with retaining fabric; wherein ribs and webs are formed in the fabric; wherein a hollow space is formed between the webs and the skin, the lateral boundaries of this space being formed by the ribs; wherein the ribs are narrower than the webs; wherein the folded fabric consists of areas of different materials; and wherein a first material of bases of the ribs is suitable for absorbing moisture rapidly, a second material of walls of the ribs acts as a wick causing moisture to be transported away from a wear's skin and a material of the webs enables moisture evaporation.

Another aspect of the invention relates to a use of the element as described above for the removal of moisture from areas of the wear's skin.

Other elaborations and embodiments of the invention are indicated in the subclaims. An exemplary embodiment of the invention is illustrated in the drawing and is described in detail below:

– Figure 1 shows a front view of a person wearing thermoregulating clothing;

– Figure 2 shows a view of the person of Figure 1 from the right;

– Figure 3 shows a view of the person of Figure 1 from behind;

– Figure 4 shows an enlarged view of the side of the area marked "X" in Figure 3 facing away from the skin;

– Figure 5 shows the side of the area of Figure 4 facing the skin;

– Figure 6 shows a cross section along line VI-VI of Figure 4;

– Figure 7 shows a cross section along line VII-VII of Figure 4;

– Figure 8 shows a cross section through a thermoregulating element;

– Figure 9 shows a schematic diagram of a regional textile mix in the corrugated fabric;

– Figure 10 shows a view of the side of the element facing the skin; and

– Figure 11 shows a schematic diagram of the method for removing moisture from the skin.

The article of clothing selected as the exemplary embodiment is a pair of overalls. The overalls cover the person shown from the neck to the wrists and ankles. The article of clothing has various thermoregulation zones 1, 2. The thermoregulation zones 1, 2 are produced out of different materials. It is possible to use material combinations such as fleece wool and elastic fibers such as Elastan fibers or hollow-chamber fibers. The thermoregulation zones1 are formed out of knitted mesh fabric or the like, whereas thermoregulation zones 2 are made of materials of different thicknesses and of material in multiple layers.

The thermoregulation zone 1 produced of knitted mesh fabric is designed essentially in the form of a thermoregulating channel 11. The thermoregulating channel 11 helps to conduct moisture away from an area subject to especially heavy perspiration. It extends from the area of the arm pits to the back and then to the hip area and down across the seat. Another thermoregulating channel 12 extends from the chest area of the article of clothing toward the sides and then vertically downward along the article of clothing from the upper body to the legs, finally proceeding down the legs to the ankles. A third thermoregulating channel 13 is provided in the area above the thigh, which it surrounds in a ring-like manner. The thermoregulating channels 11, 12, 13 are made of special knitted mesh material, the selected yarn of which covers only 80% of the skin. This has the result of optimizing the air circulation.

Another thermoregulation zone 1 of knitted mesh fabric is also provided in the form of a thermoregulating area 14 at the back of the knee. The thermoregulating area 14 is produced of very thin fabric, which absorbs the accumulating sweat and makes it possible for the moisture to evaporate. As a variation of this embodiment, it is also possible to arrange a thermoregulating areas of this type in the area of the arm pits and the insides of the elbows. Thermoregulating areas 15 are also provided on the insides of the thighs. The thermoregulating areas 15 also consist of very thin material, which leads to good thermoregulation on the inside surfaces of the thighs, which are subject to an especially heavy load through high body temperatures during sports activities.

The thermoregulation zones 2 are distributed over the article of clothing. In the area of the shoulders, the thermoregulation zone designated 21 is formed by a plurality of parallel ribs 211. Between the ribs, expansion joints 212 are preferably provided, which guarantee a high degree of freedom of movement. The thermoregulation zone 21 consists of stretch-rib fabric. As a result of the ribs 211, a type of cushioning is created. As a modification of the exemplary embodiment shown in the drawing, the thermoregulation zone 21 can also have a rib structure finer than that shown or a waffle structure.

Another thermoregulation zone designated 22 is provided in the form of a reinforcement in the area of the elbows and in the area of the knees (reference number 23). Here, too, expansion joints 222, 232 are provided between the rib-like reinforcements 221, 231; these joints allow maximum freedom of movement. The ribs 211, 221, 231 are preferably made of Nylon. The thermoregulation zones 21, 22, 23 serve, first, as cushioning, to reduce the danger of injury especially during sports activities. Second, the zones are also suitable for preventing moisture not caused by perspiration from penetrating into the areas of the clothing which are especially at risk of such moisture penetration. At the same time, the thermoregulation zones 21, 22, 23 prevent chills, such as those which could be caused by drafts. The cushions are made of synthetic yarns, composite fabrics, or similar materials. The thermoregulation zones 21, 22, 23 are made of thermoregulating fabric, preferably of the rib-knit type. In this type of knitting, the fabric does not rest flat on the skin, which means that more air can reach the skin. In the exemplary embodiment, the areas 21, 22, 23 are made of Nexten. Expansion zones 28, which have a vertically oriented rib structure, are located laterally adjacent to the thermoregulation zones 23. The zones 28 result in optimal adaptation of the article of clothing to the body during any kind of movement.

Between the thermoregulating channels 11 and 13, a rib-like thermoregulation zone 24 is formed in the area of the hips and seat; in the exemplary embodiment, these ribs are oriented vertically. The thermoregulation zone 24 forms a ring and thus also extends across the front of the article of clothing. The thermoregulation zone 24 consists of ribs 241, which are made of material which is thicker than the material of the joints 242 between them. In the exemplary embodiment, the joints are designed as thermoregulating channels. As a result of the greater thickness of the ribs 241, the body is protected from chills, but the body is also protected against overheating by the joints in between, which are designed as thermoregulating channels. In contrast to the exemplary embodiment shown here, it is also possible to divide the thermoregulation zone 24 into individual smaller zones, which can be interrupted or limited by air channels 11, 12, 13.

In addition to the thermoregulation zones 1, 2, the article of clothing can also be provided with cushions, where in particular so-called "stab padding" 25 can be used. These

pads are preferably placed in the area of the lower legs and forearms. The padding is preferably made of hollow-chamber fibers, around which wool or cotton is spun. Hollow-chamber synthetic yarns are especially good at damping impact and pressure. In addition, cushions can also be provided in the area of the Achilles tendon to reduce abrasion by high-top shoes. It is also possible to provide thin cushioning in the area of the thighs to protect this area as well from the danger of chills or from the intrusion of moisture.

Additional cushions 26 are located in the area of the ankles (Figure 1). The cushions 26 serve to avoid pressure points. In addition, the cushions 26 help to optimize the fit of the article of clothing. As a modification of the exemplary embodiment, it is also possible to provide cushions 26 on the outer sides of the legs.

The article of clothing also has a thermoregulation zone 27 on the back. Thermoregulation zone 27 is essentially triangular in shape. It consists of webs 271, which are oriented horizontally. The webs 271 have an approximately round cross section; in the exemplary embodiment, their diameter is approximately 5 mm. The webs 271 are in contact with the skin, as a result of which, as can be seen in Figures 6 and 7, a tube -like configuration is obtained, which is hollow on the inside. Between the webs 271 are strips 272 facing away from the skin, which, in the exemplary embodiment, are approximately 6-10 mm wide. They are not usually in contact with the skin. Certain sections of the strips 272 are connected to each other by bridges 273. As a result of this design, only a small portion – perhaps only 20%, depending on the design – of the material of the back thermoregulation zone 27 is in contact with the skin. The tube -like configuration of the webs 271 increases their surface area, which improves the air circulation. The webs serve simultaneously as spacers and also have a wicking effect, which collects the excess perspiration, draws it up, and carries the moisture occurring on the back horizontally away to the laterally adjacent areas of the back thermoregulation zone 27. The moisture can then evaporate in these areas of the article of clothing, which are located at points of lesser sweat accumulation. The air cushions which are formed also have an insulating effect. As a result, good thermoregulation is created precisely in the areas of the back subject to heavy perspiration. As a modification of the exemplary embodiment, it would also be possible to provide mesh-like fabric on the side facing the skin;

this fabric would then rest on the surface of the skin and thus form additional air chambers between the strips 272, which are not in contact with the skin, and the fabric.

The article of clothing is provided with air traps 29 in the area of the calves. The air traps 29 have a design which is essentially the same as that of the back thermoregulation zone 27, and, in the exemplary embodiment, they are oriented horizontally. They consist of webs 291, between which strips 292 are located. The air cushions which are also created here protect the body from becoming chilled. The intermediate strips 292 also have the effect of allowing the article of clothing to stretch in this area, which results in extremely good adaptation to any type of movement.

Additional thermoregulating elements can be used to form thermoregulation zones in the article of clothing in order to adapt the article of clothing optimally to specific areas of the body and to the amount of perspiration which can be expected there. The thermoregulating element 3 shown by way of example in Figure 8 is based on a fabric 32, which is folded into a wave-like configuration. The top surface of the fabric 32 thus formed is covered by a retaining fabric 33. The element 3 rests elastically on the skin 34, which is wetted with beads of sweat. The element 3 also has hollow spaces 36, 37. In the exemplary embodiment according to Figure 8, the fabric 32 and the retaining fabric 33 are provided with a coating 38.

As a result of the corrugations of the fabric 32, webs 321 and ribs 322 form alternating rows. The ribs 322 cooperate with the retaining fabric 33 to form the hollow space 37. The hollow spaces 36 are formed between the webs 321 of the element and the skin 34. The lateral boundaries of the hollow spaces 36 are formed by the ribs 322, which rest on the skin 34. In this exemplary embodiment, the webs 321 are twice as wide as the ribs 322.

The element 3 is made of several different materials. The base of the rib 3221 is made of material A. This material is suitable for absorbing moisture very quickly, especially moisture in the form of perspiration. The rib walls 3222 are made of a material B. This has a wicking function, which has the effect of transporting the moisture away from the skin 34 toward the webs 321. The webs 321 consist of a material C. The moisture transported by material B to the webs 321 can be easily released by material C to the atmosphere. That is, the webs are

able to provide an evaporative function. The evaporative surface area is shifted away from the skin 34. In the transition areas between the individual materials, it is possible to provide a blend of the materials. Thus, as can be seen in Figure 9, a blend of materials A and B can be present in the transition area between them, and a blend of materials B and C can be present in their transition area.

Because of the very narrow design of the ribs 322, the element 3 makes only pointwise contact with the skin 34. The rib bases 3221 which are in contact with the skin are not as hydrophobic as the other areas of the element. As a result of the capillary action (wicking effect) of the rib walls 3222 in the direction away from the skin 34, a dry feeling is created on the skin even when perspiration is extremely heavy. In addition, the flow of moisture is optimized through the use of different materials. The flow of moisture toward the outside is also supported by the body heat being radiated by the skin 34.

In the exemplary embodiment according to Figure 8, the fabric 32 and the retaining fabric 33 are provided in certain sections with a coating 38. The coating 38 is preferably applied by electroplating. It consists of copper, gold, polytetrafluoroethylene or, preferably, of silver. With the help of different coatings it is possible to achieve different effects. For example, with the help of copper or silver, it is possible to achieve an antifungal effect. A coating of polytetrafluoroethylene, however, has the effect of reducing friction with the skin.

The hollow space 36 has the function of an air chamber and serves to store heat, which warms the web 321. In the method according to the invention, the fabric 32 is fabricated with textile ribs 322 which conduct moisture away from the skin 34 to the webs 321, which form the textile surface. As a result of the accelerated evaporation 351 which thus occurs over the relatively large surface area of the web 321, a negative pressure is produced in the adjacent rib walls 3222, which in turn has the result of increasing the flow of moisture away from the skin 34. The greater the amount of heat given off by the skin 34, therefore, the higher the evaporative capacity of the webs 321.

Figure 11 is a schematic diagram which shows how the inventive method functions during sports activities. Here T_H is the temperature of the skin (corresponding approximately to body temperature); T_K is the temperature in the air chamber; and T_U is the ambient temperature. In the case shown here, the ambient temperature T_U is lower than the skin temperature T_H, from which it follows that the temperature in the air chamber T_K is lower than the skin temperature but higher than the ambient temperature. Moisture is therefore removed from the skin as required. When the body is at rest, less heat is given off by the skin, and the capacity for moisture-removal is small – but there is also only a small amount of perspiration. In the course of sports activities, perspiration increases, and skin temperature also rises, as a result of which a high moisture-removal capacity is achieved.

Areas in the form of the hollow spaces 36, 37, which function as air chambers, are also provided; these chambers serve as air insulators. As a result, the quality of the thermoregulation is improved even more. The air chamber 37 is also heated continuously by the heat radiated off by the skin. As a result – especially under cold weather conditions – insulation is created between the heated skin and the cold ambient air, so that the clothing feels comfortable to wear. In addition, the overall elastic property of the element causes a compressive effect, which improves the maintenance of blood pressure, as a result of which the supply of energy to the cells is increased. Muscle vibration is also reduced. It is preferable not to use any yard goods in the production of these elements.

Through the provision of the various thermoregulation zones 1, 2 and possibly with use of thermoregulating elements 3, the article of clothing according to the invention takes into account the various types of loads to which the body is subjected especially during sports activities. For example, in zones in which high body temperatures and heavy perspiration occur (e.g., at the backs of the knees, on the back, on the inner surfaces of the thighs) during sports activities, thermoregulation zones are provided which avoid the buildup of heat, conduct the sweat away from the skin, and improve the evaporation. In zones where the body temperature does not rise very much even during sports activities and where perspiration is therefore also below average (on the knees and elbows, at the hips, for example),

thermoregulation zones are provided which prevent a cold feeling. Overall, therefore, the physical performance range is expanded.

Insofar as an article of clothing has been discussed in the specification and in the claims, the invention is not limited to a one-piece design of this type; on the contrary, some or all of the thermoregulation zones can be distributed over several articles of clothing, such as a top and pants. The combination of some or all of the features of the invention in separate articles of clothing is also included within the scope of the invention. The features of the invention can be provided both in underwear and in outerwear.

CLAIMS:

1. An element, for use in articles of clothing wherein a top surface of a fabric which has been folded into a wave-like configuration is covered with retaining fabric;

wherein ribs and webs are formed in the fabric;

wherein a hollow space is formed between the webs and the skin, the lateral boundaries of this space being formed by the ribs;

wherein the ribs are narrower than the webs;

wherein the folded fabric consists of areas of different materials; and

wherein a first material of bases of the ribs is suitable for absorbing moisture rapidly, a second material of walls of the ribs acts as a wick causing moisture to be transported away from a wear's skin and a material of the webs enables moisture evaporation.

2. Element of Claim 1, wherein the articles of clothing are for sports activities.

3. Element according to Claim 1 or 2, wherein the ribs cooperate with the retaining fabric to form a hollow space.

4. Element according to Claim 1, wherein the fabric and the retaining fabric are provided with a coating.

5. Element according to Claim 4, wherein the coating consists of at least one of copper, silver and gold.

6. Element according to any one of Claims 1 to 5, wherein the element is designed in the form of a multi-layer cushion.

7. Element according to any one of Claims 1 to 6, wherein the element is provided with fastening elements on the side facing away from the wear's skin.

8. A use of the element according to any one of Claims 1 to 7 for the removal of moisture from areas of the wear's skin.

9. The use of Claim 8 during sporting activities.

FIG.1

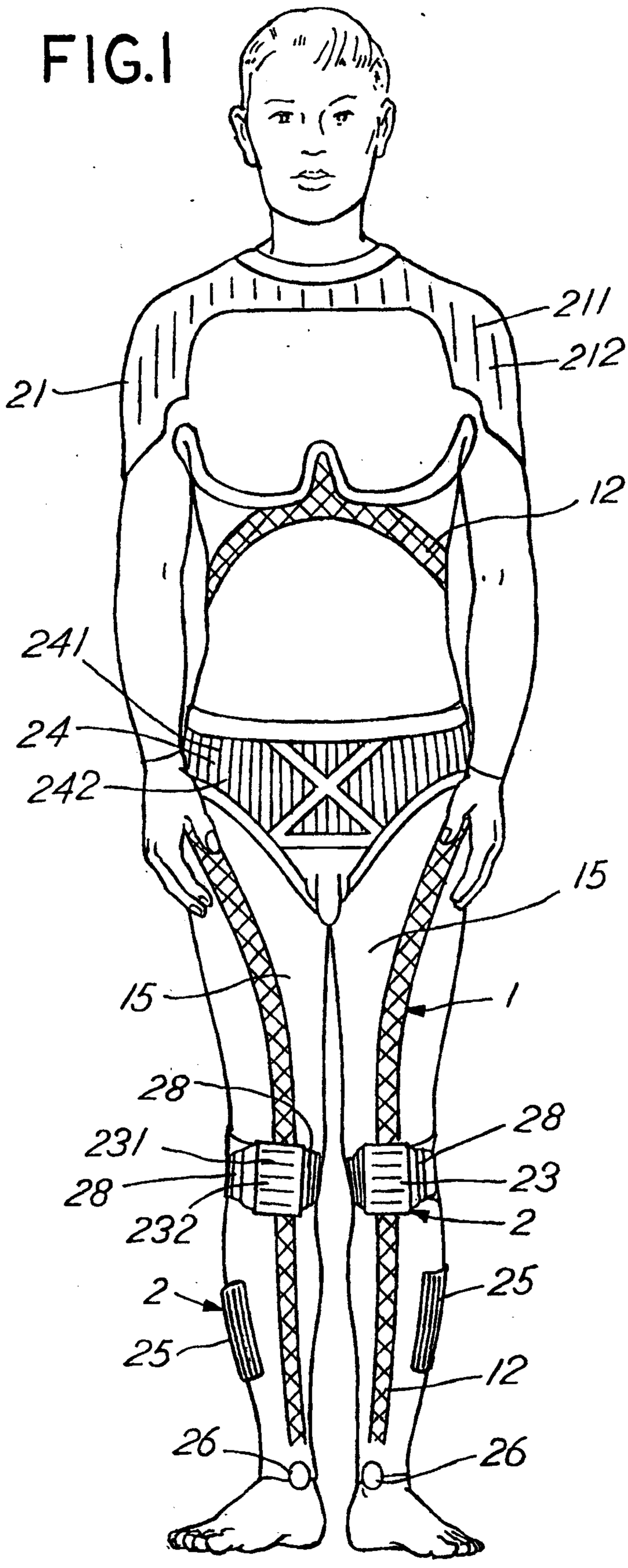

211
212
21
12
241
24
242
15
15
1
28
28
231
28
23
28
232
2
2
25
25
12
26
26

FIG.2

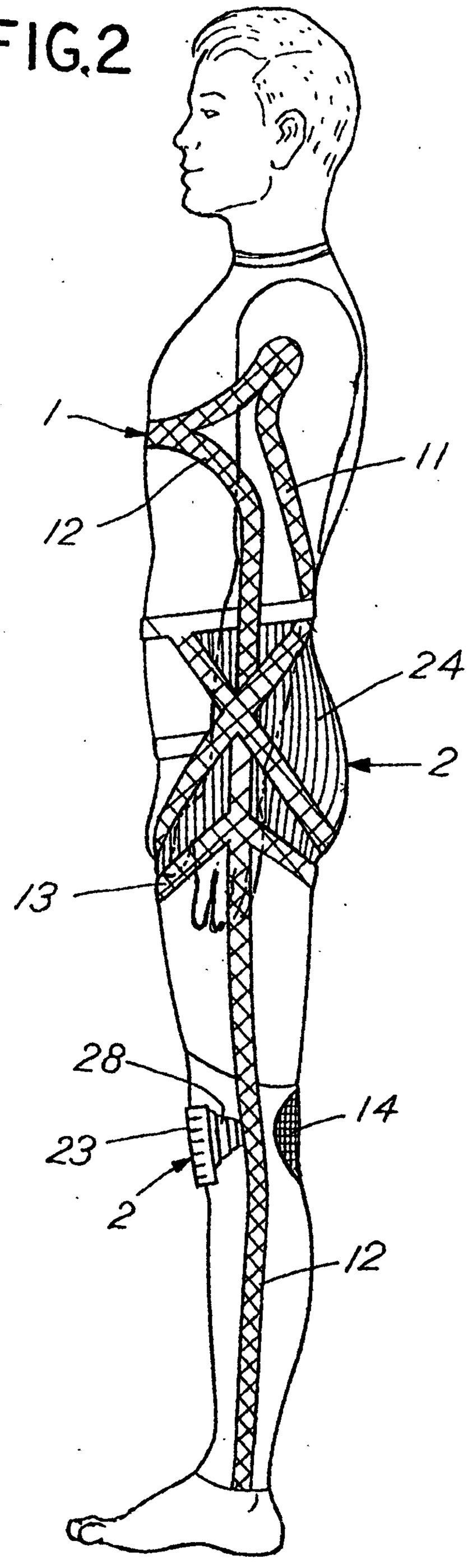


FIG.3

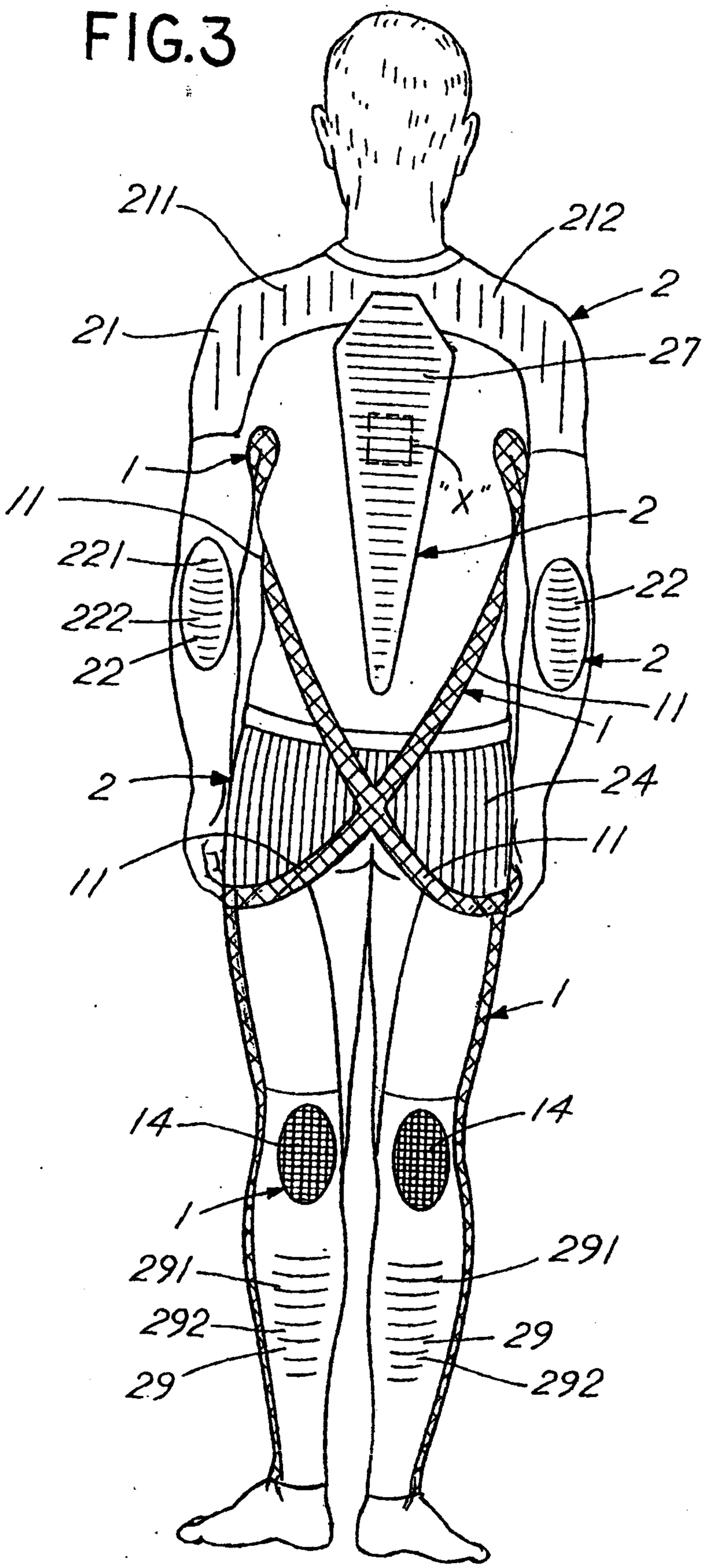

211
212
2
21
27
1
"X"
11
2
221
22
222
22
2
11
1
2
24
11
11
1
14
14
1
291
291
292
29
29
292

FIG.4

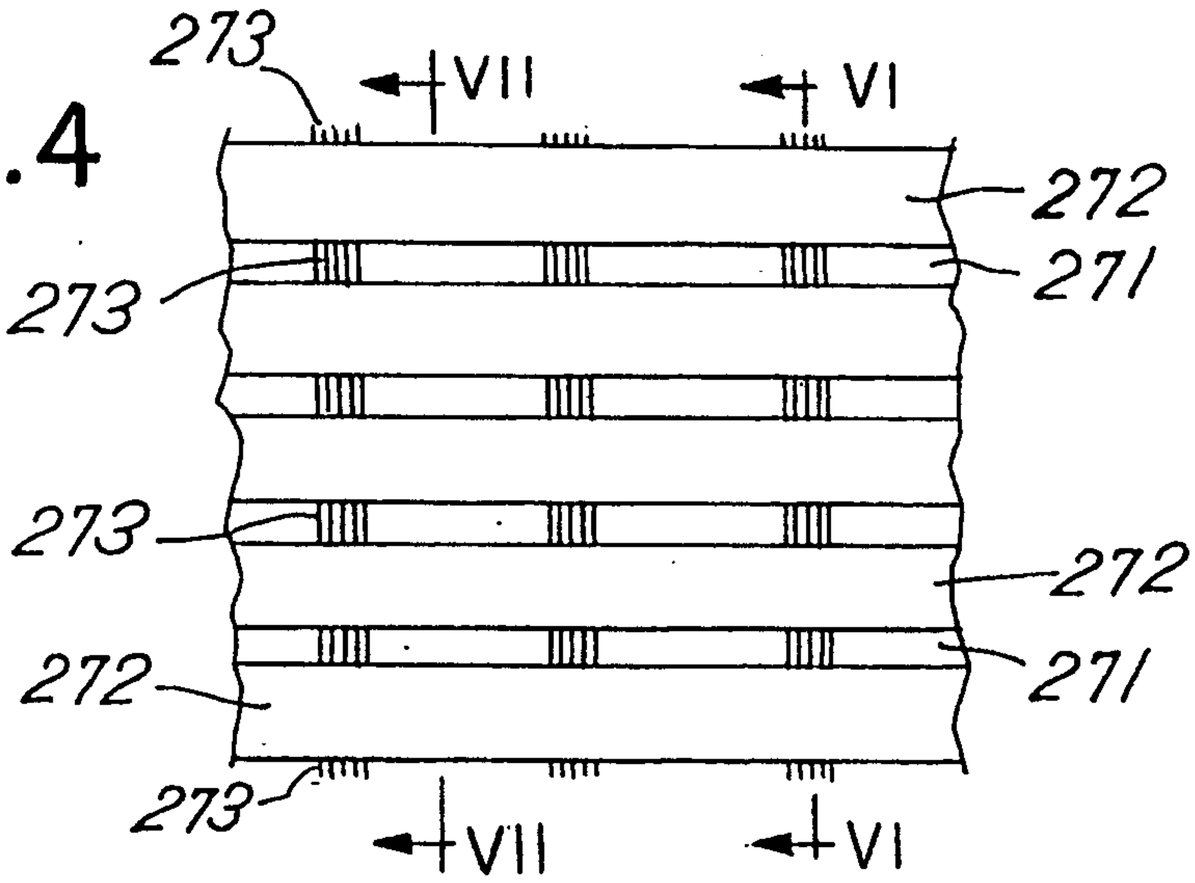


FIG.5

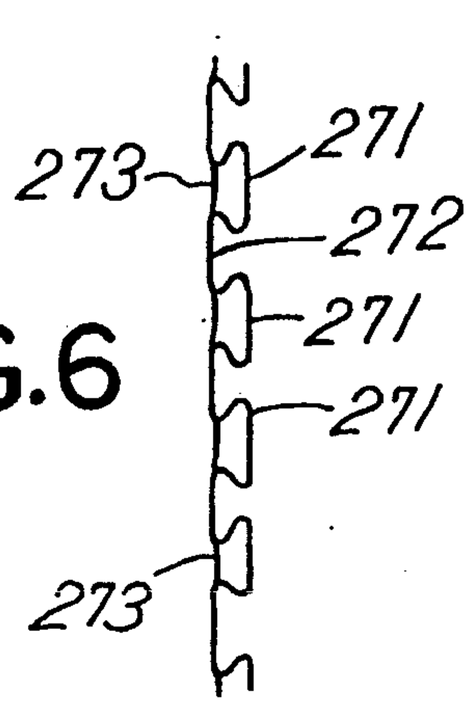


FIG.6

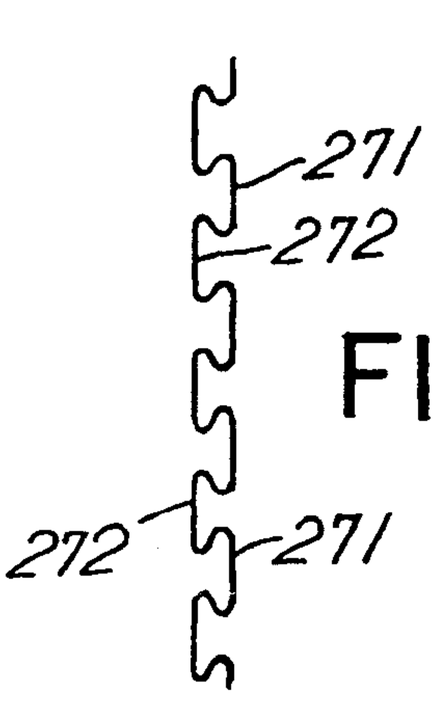


FIG.7

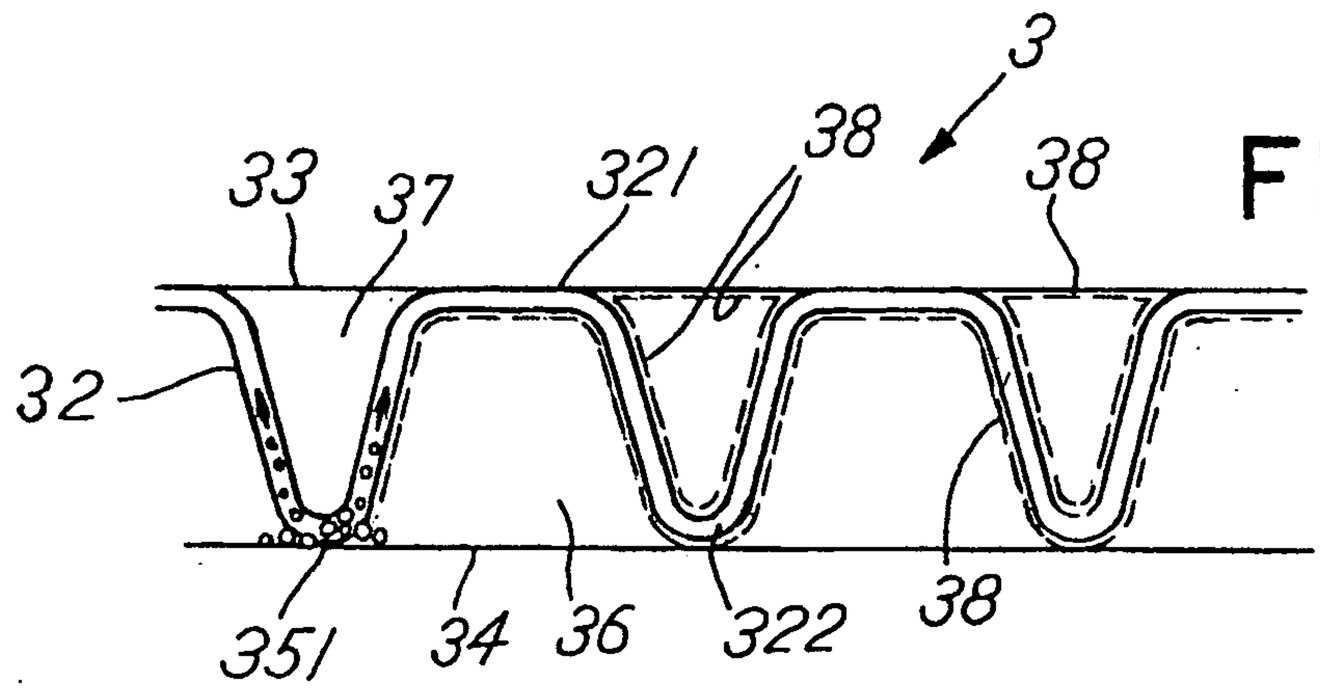


FIG.8

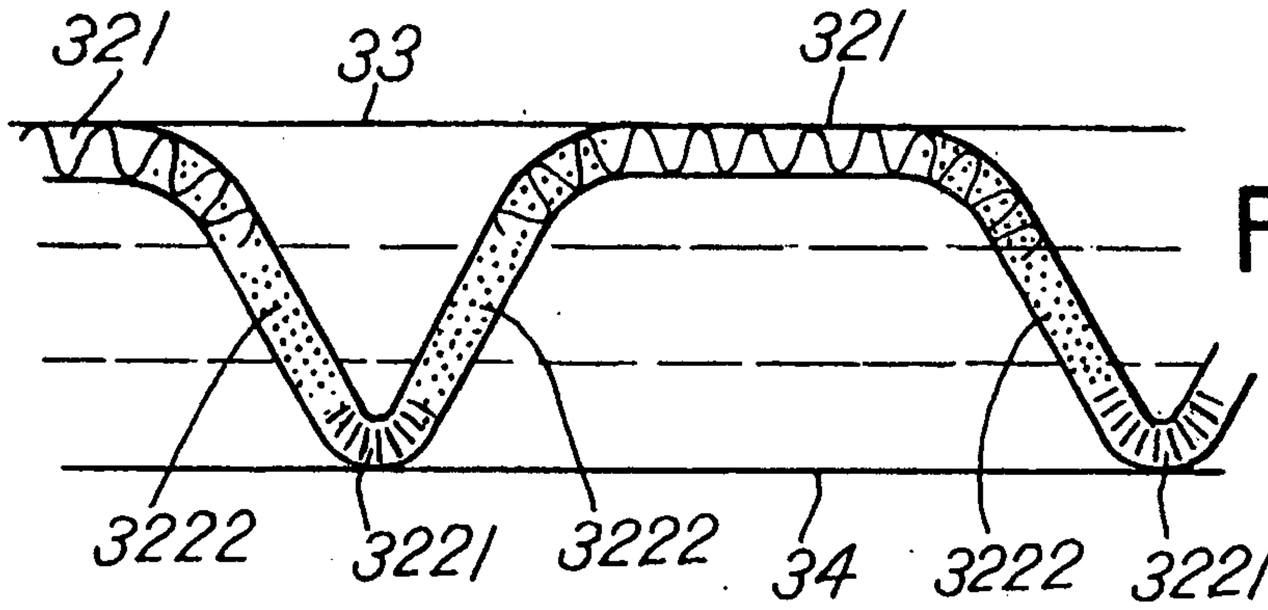


FIG.9

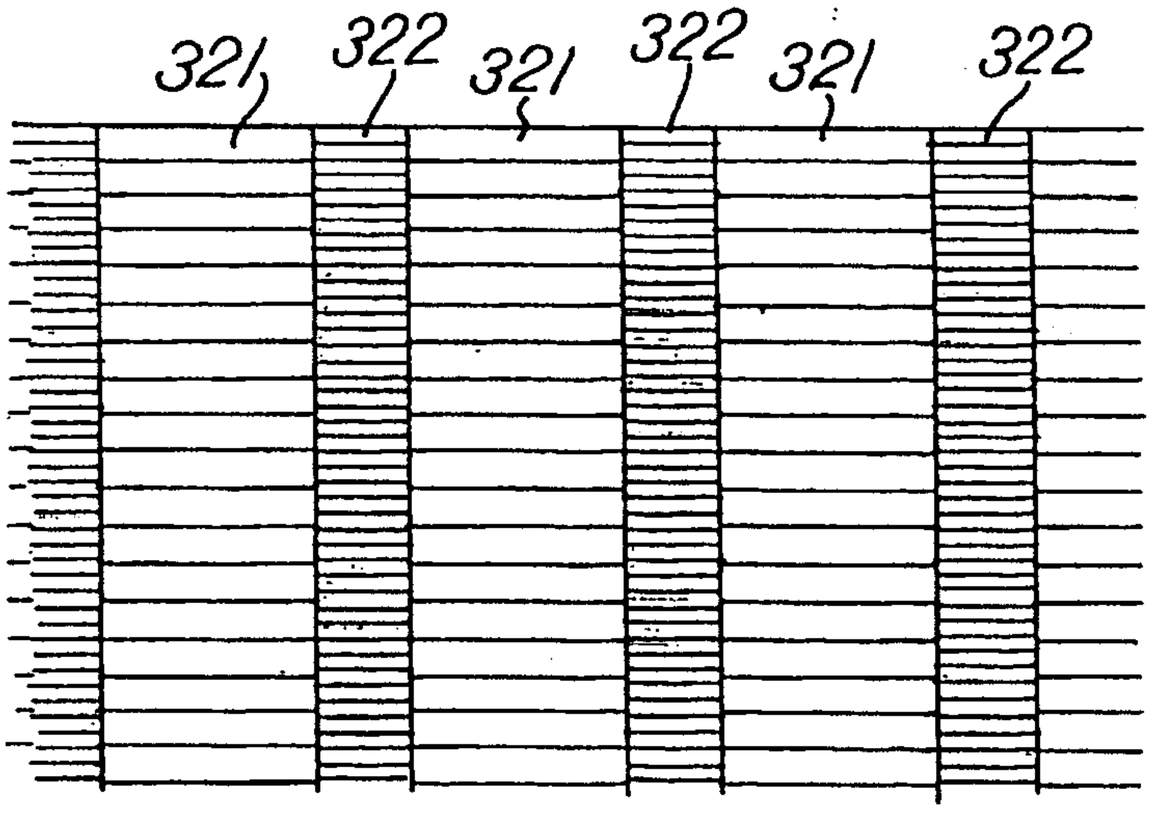
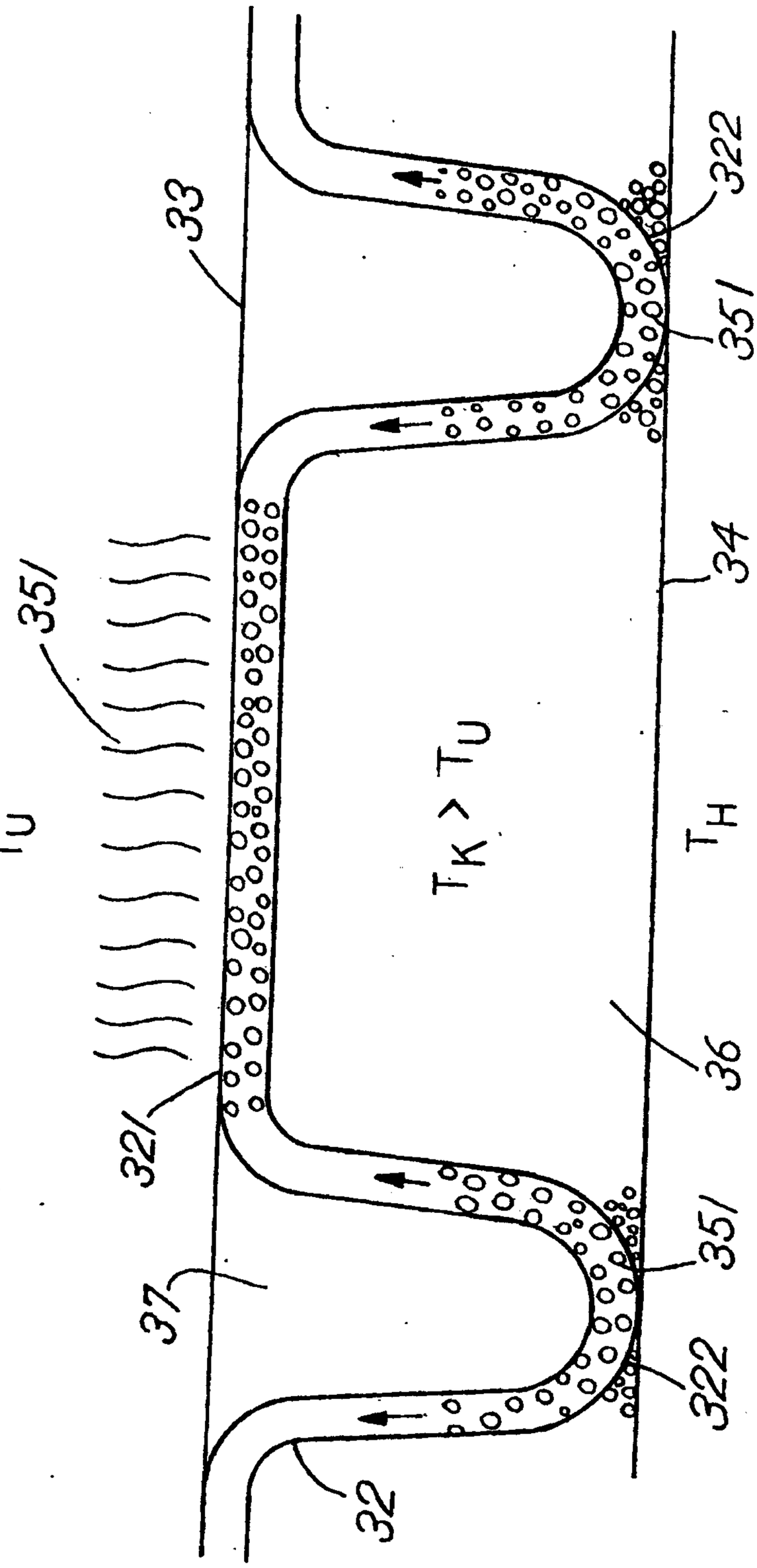
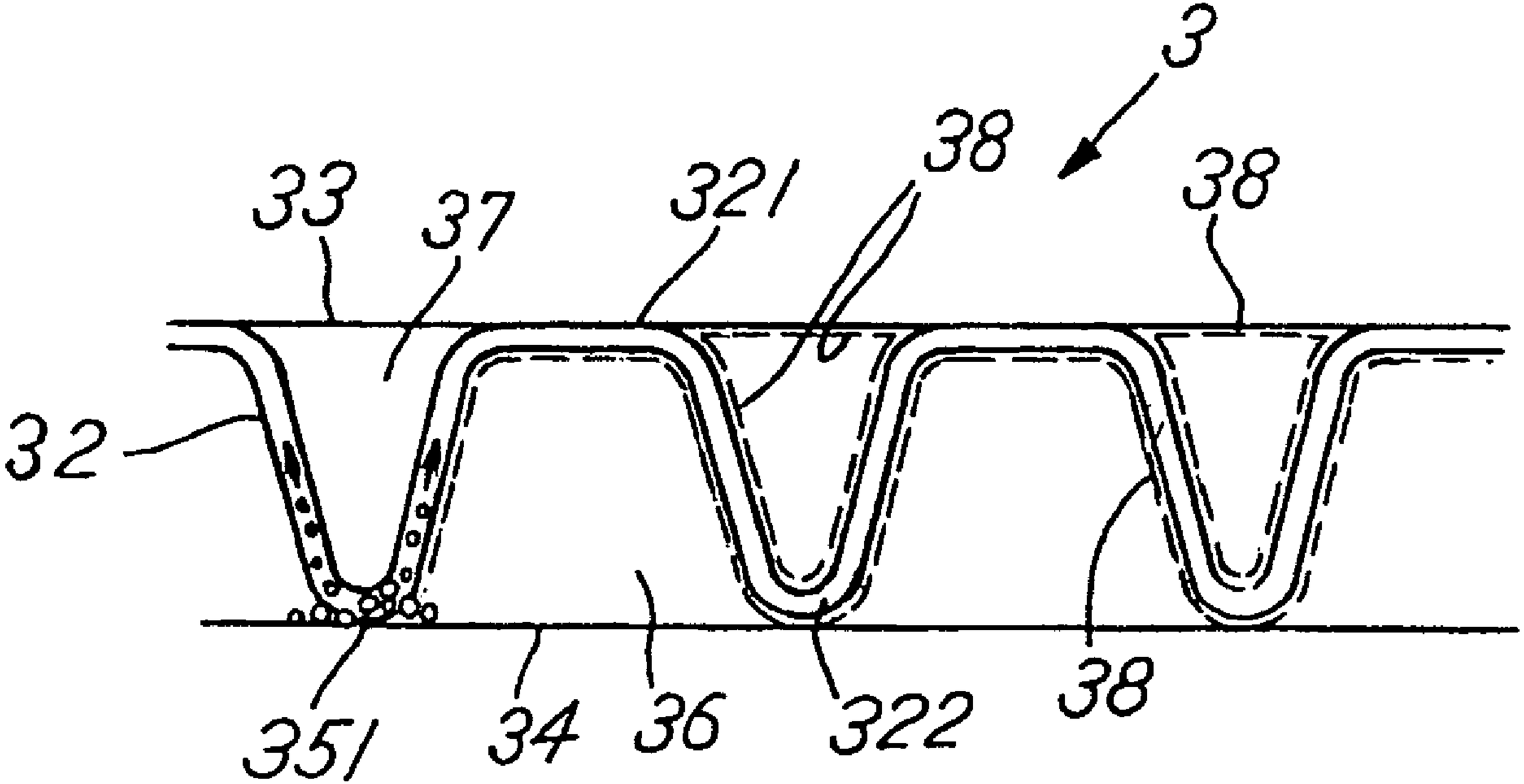


FIG.10

FIG.11




3
38
33
37
321
38
32
351
34
36
322
38