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WANG

(54) **METHOD FOR ELASTIC SWEATBAND AND HEADGEAR USING THE SAME**

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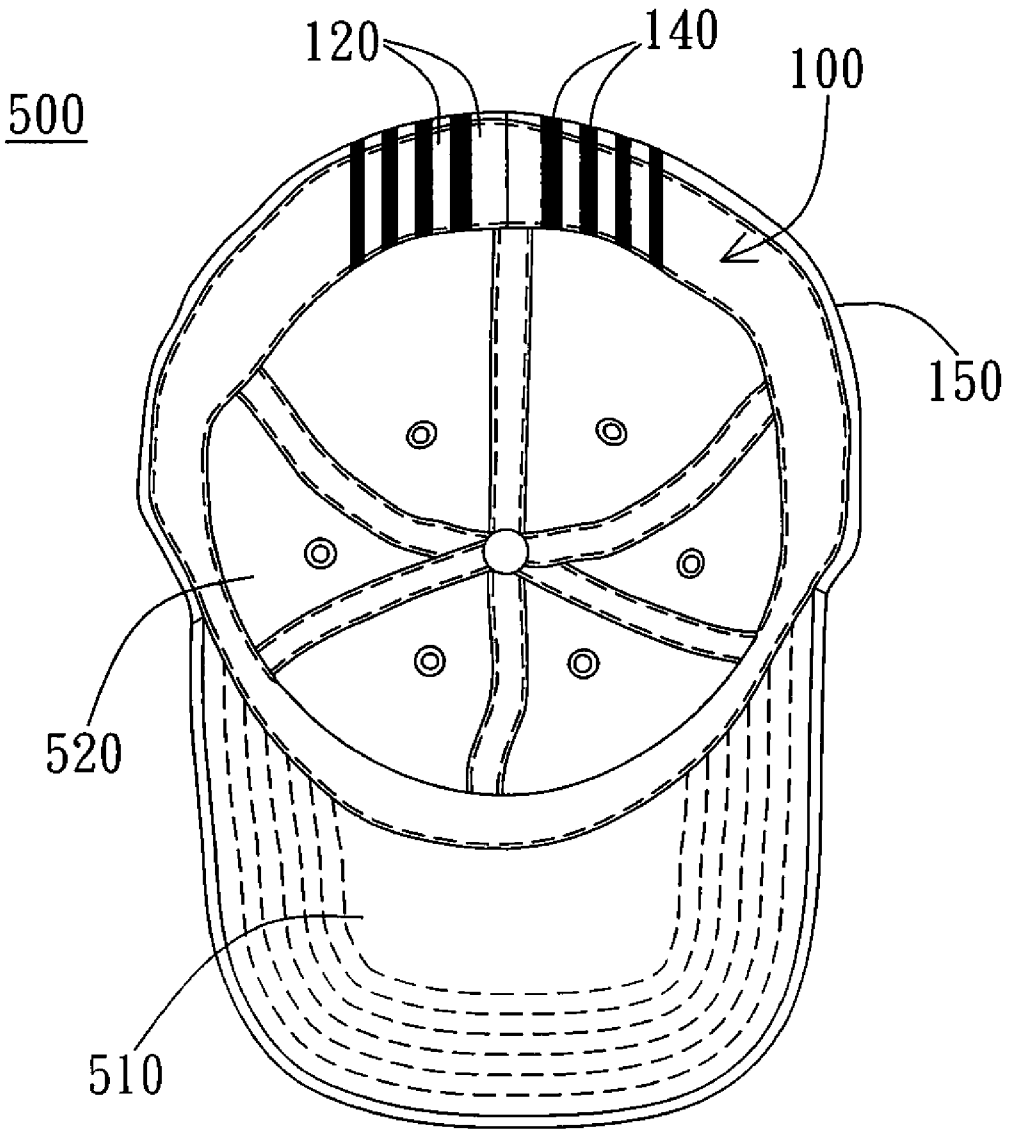
(57) **ABSTRACT**

The present invention is an elastic sweatband including a fabric surface, a peak portion and a trough portion, wherein the peak portion and the trough portion are formed in a longitudinal direction of the fabric surface. The peak portion and the trough portion are paralleled and connected to each other. The peak portion and the trough portion are across two ends perpendicular to the longitudinal direction of the fabric surface respectively. When a force is exerted on the elastic sweatband, a partial of vertical height of the peak portion will be converted into the extension length in the longitudinal direction, so as to provide the extension length in the longitudinal direction of the elastic sweatband.



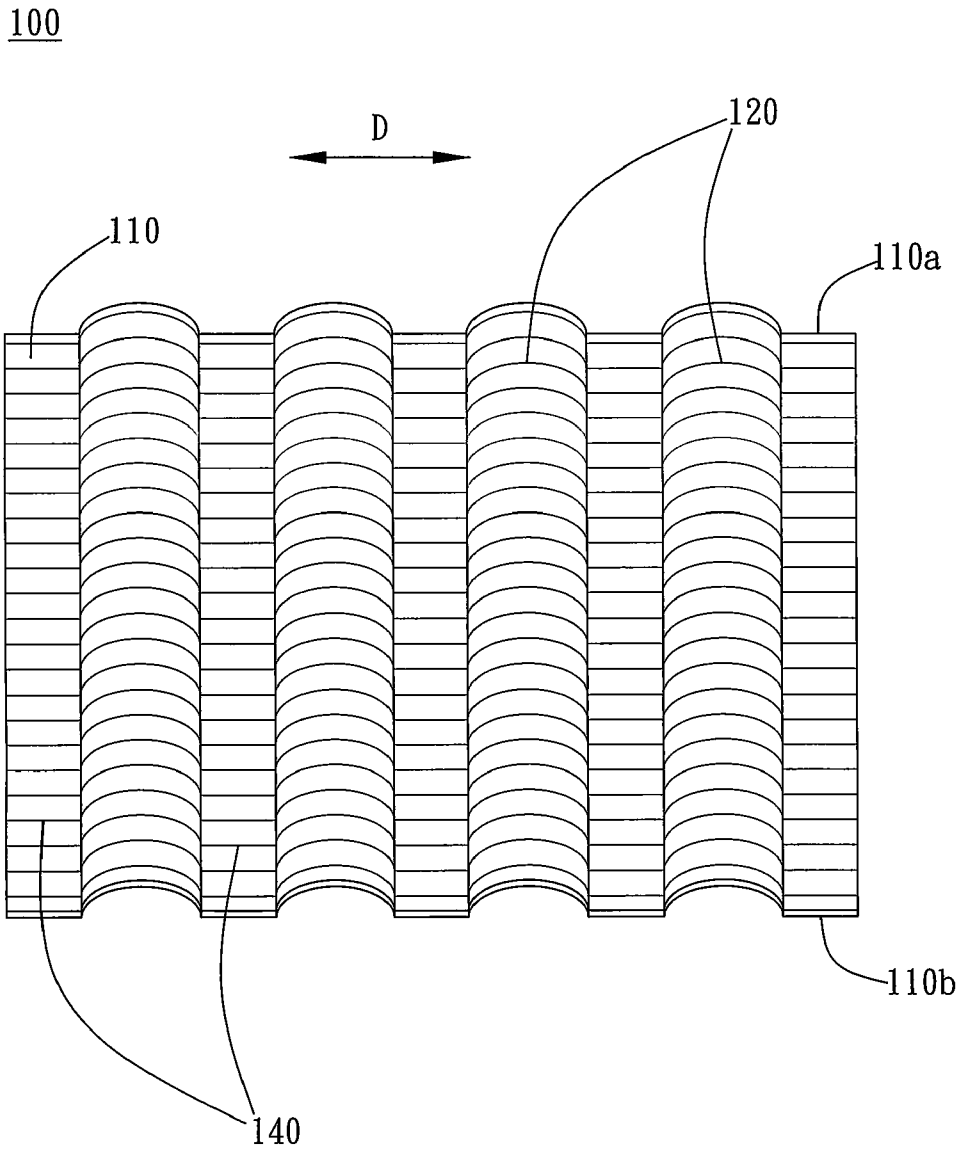


Fig. 1

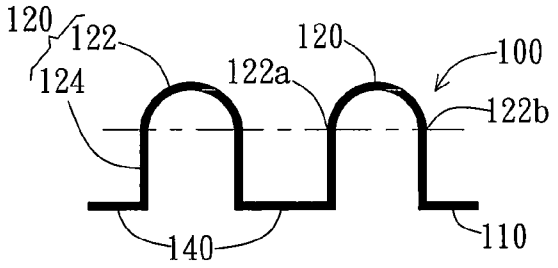


Fig. 2a

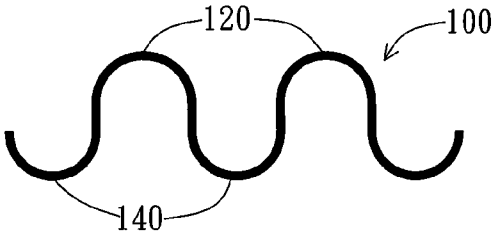


Fig. 2b

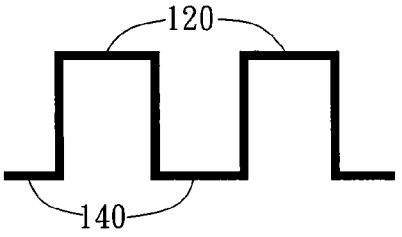


Fig. 2c

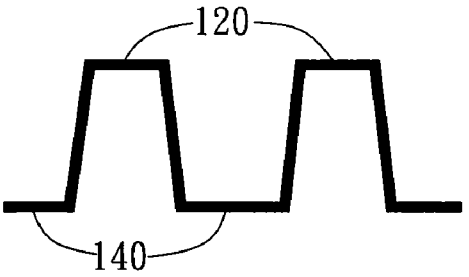


Fig. 2d

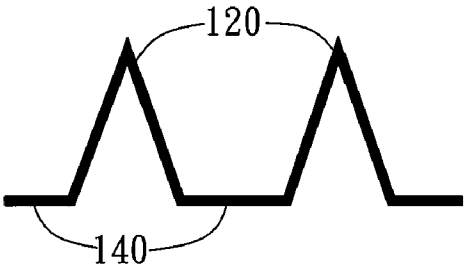


Fig. 2e

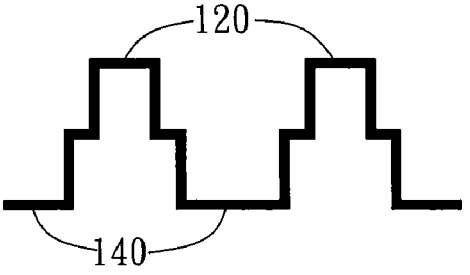


Fig. 2f

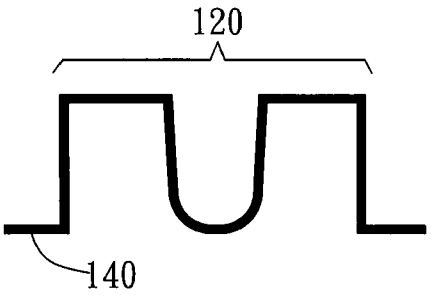


Fig. 3a

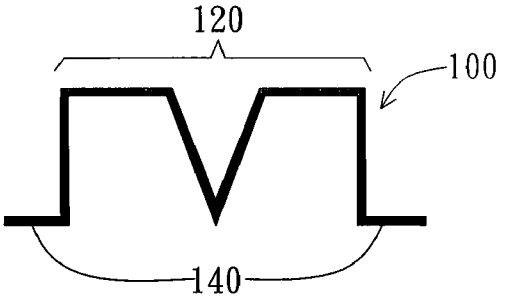


Fig. 3b

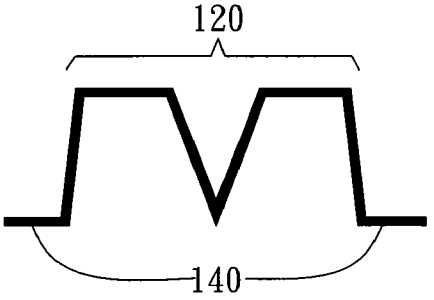


Fig. 3c

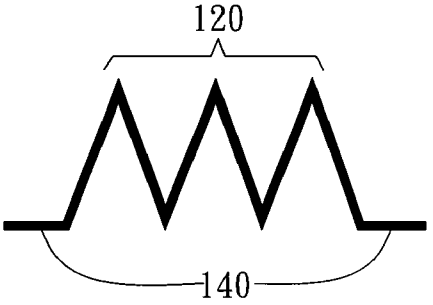


Fig. 3d

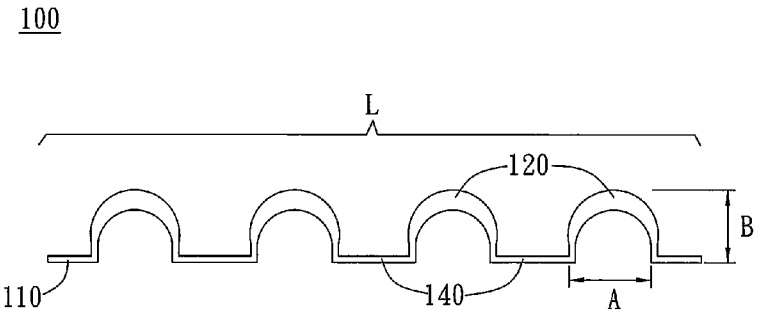


Fig. 4

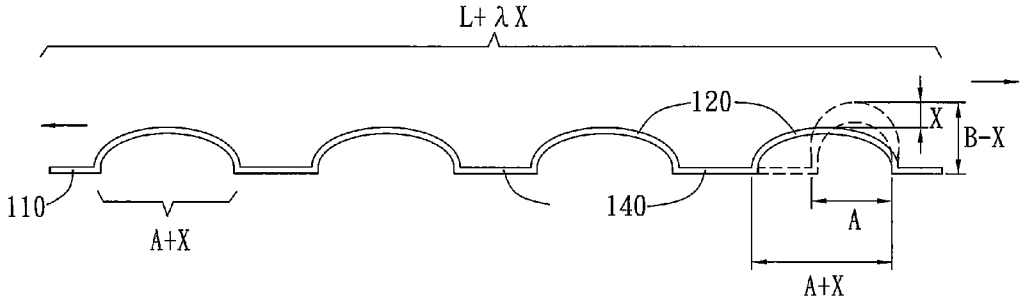


Fig. 5

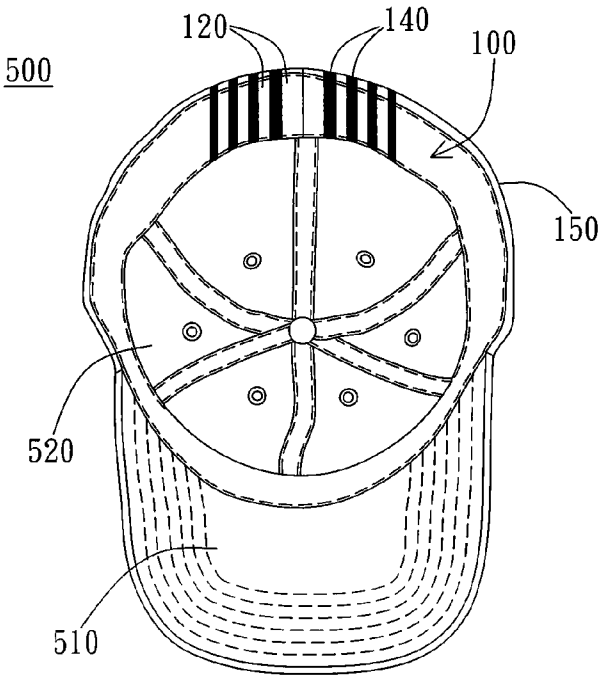


Fig. 6

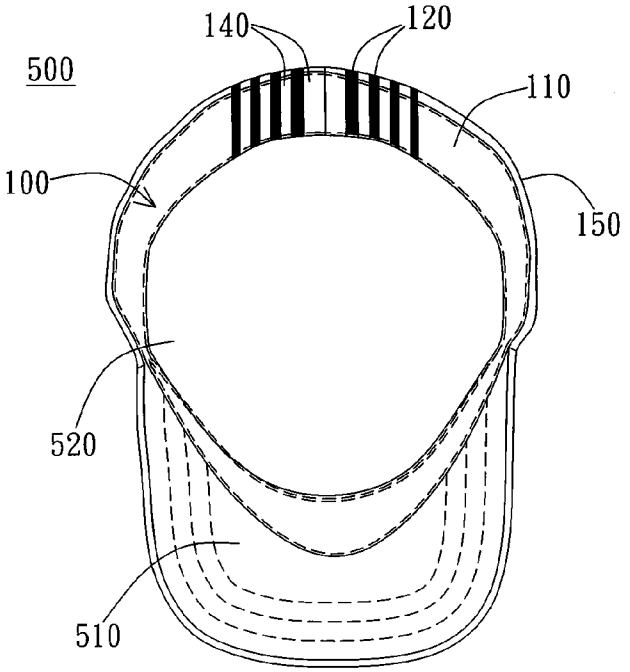


Fig. 7

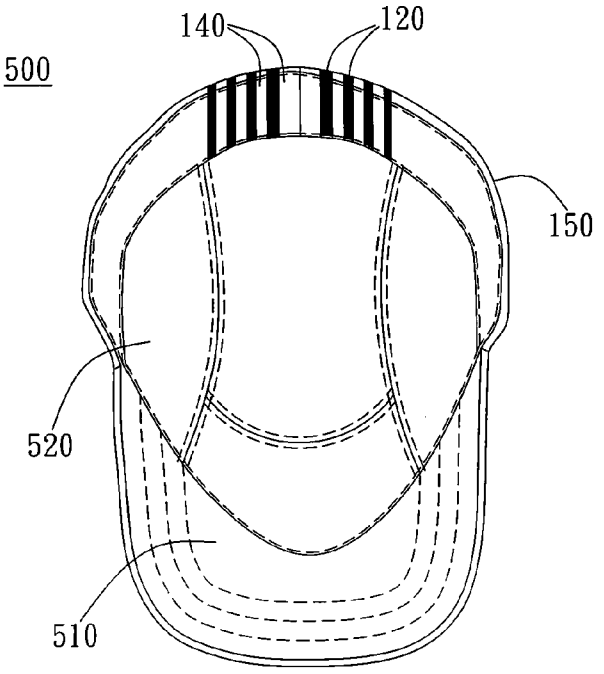


Fig. 8

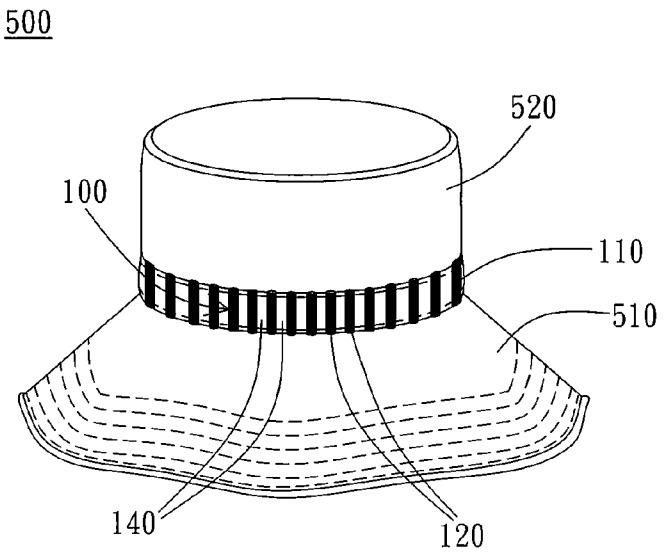


Fig. 9

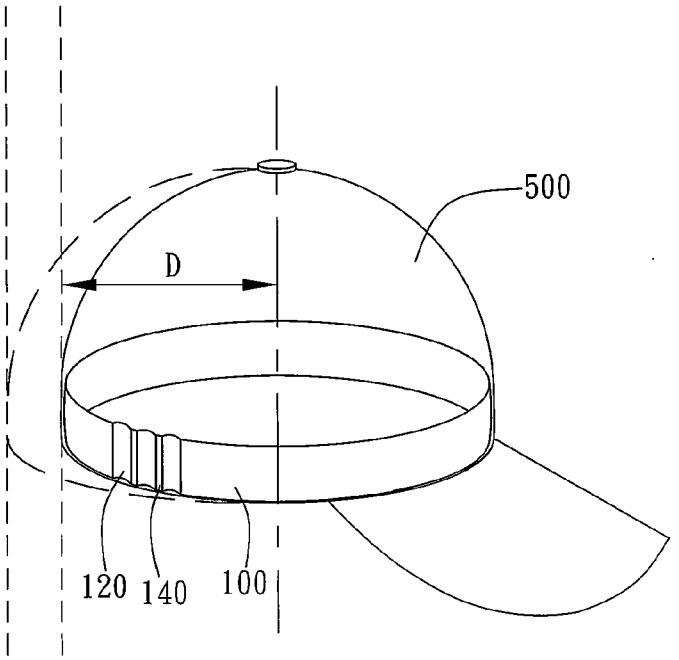


Fig. 10a

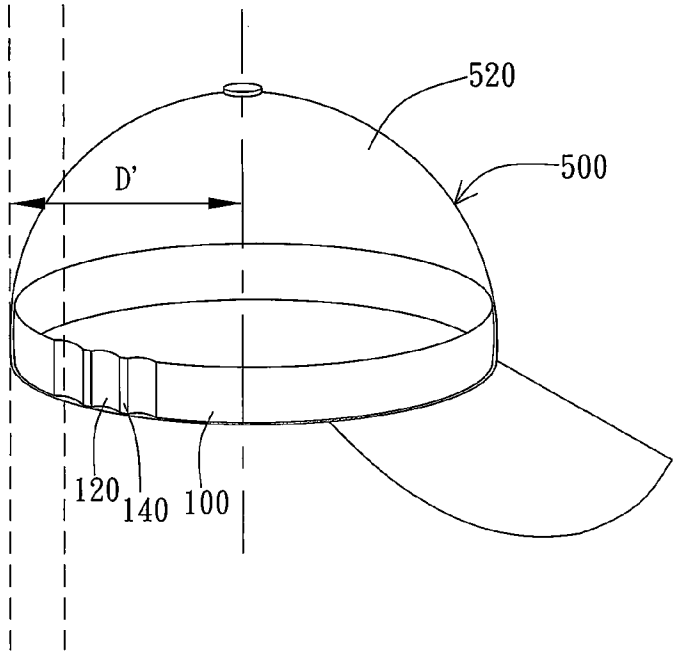


Fig. 10b

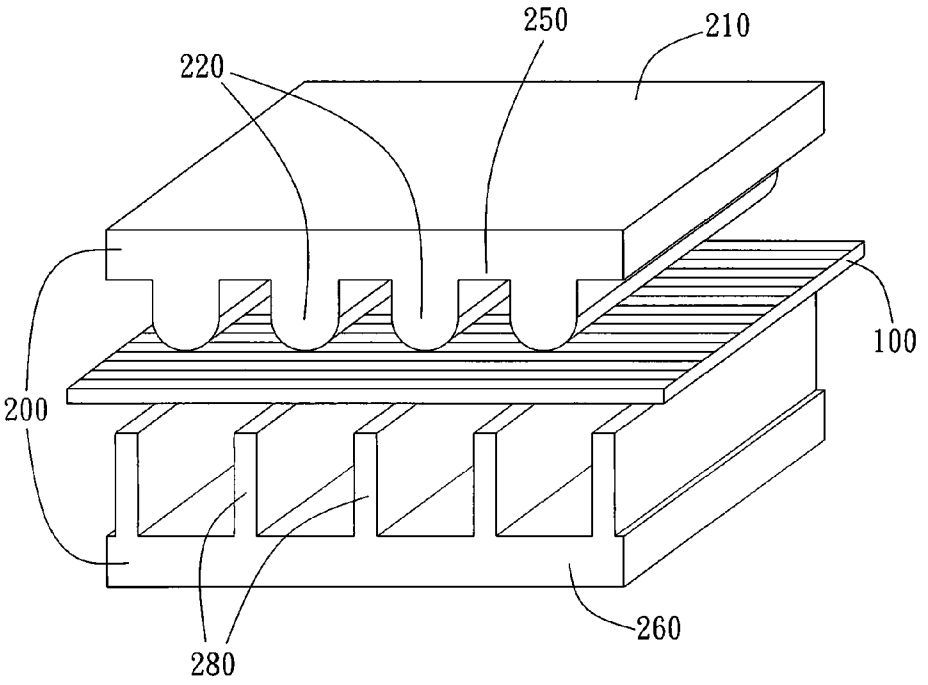


Fig. 11a

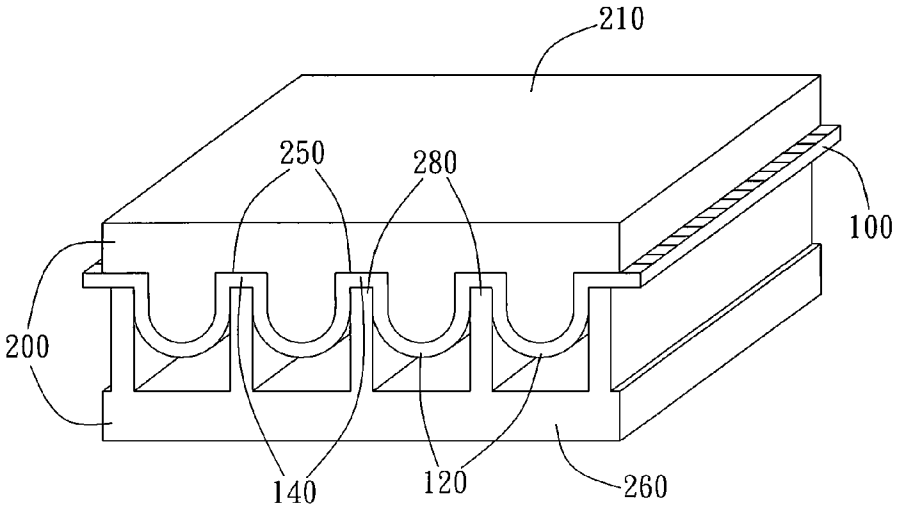


Fig. 11b

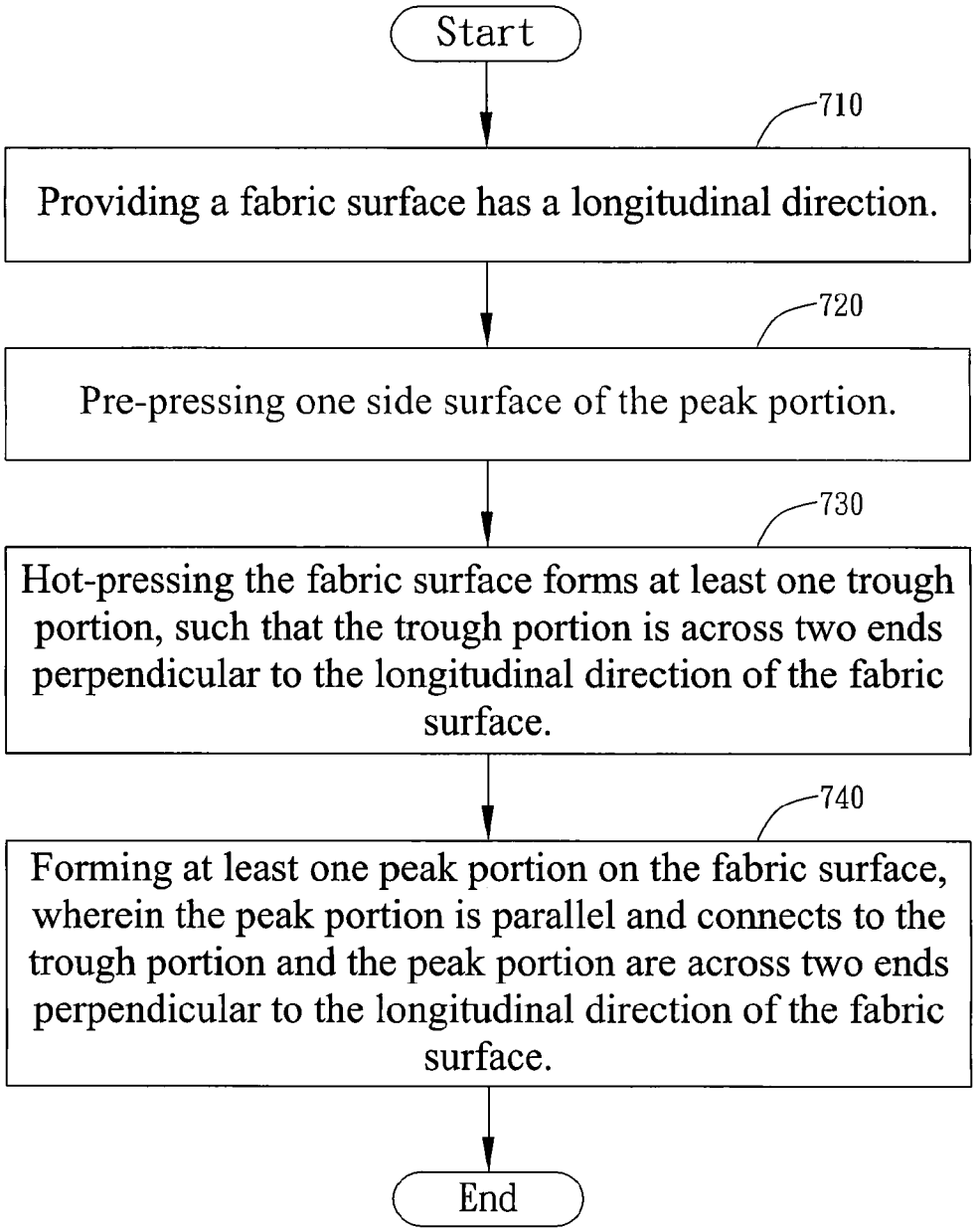

Start
710
Providing a fabric surface has a longitudinal direction.
720
Pre-pressing one side surface of the peak portion.
730
Hot-pressing the fabric surface forms at least one trough portion, such that the trough portion is across two ends perpendicular to the longitudinal direction of the fabric surface.
740
Forming at least one peak portion on the fabric surface, wherein the peak portion is parallel and connects to the trough portion and the peak portion are across two ends perpendicular to the longitudinal direction of the fabric surface.
End

Fig. 12

METHOD FOR ELASTIC SWEATBAND AND HEADGEAR USING THE SAME

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an elastic sweatband and, more particularly, to an elastic sweatband having a peak portion and a trough portion, such that an extension longitudinal length of the elastic sweatband is provided.

[0003] 2. Description of the Prior Art

[0004] Caps are becoming part of human being's life. In occasions such as exercises or going-out, people often utilize a cap/headgear to shade the from sunlight, to absorb sweat or to prevent their hairs from interfering with eyesight. Generally, a cap usually has a cap visor to shade from the sunlight and a crown portion to enclose the head. The cap is generally made of fabrics with good absorption and provided with a stretchable elastic band, so that the cap may fit the wearer's head properly and comfortably. Such a cap allows the wearer to easily put on and to avoid the tense feeling of having something tied to his/her head.

[0005] Caps serve the purposes of shading from rain or sunlight, but also can be used to match clothing of various styles, thus becoming an essential part of the clothing among consumers.

[0006] Accordingly, there is a desire to improve the extensibility of the elastic bands which allows the wearer to wear the elastic band products, such as headbands or headgears comfortably, without feeling restrained or stressed.

SUMMARY OF THE INVENTION

[0007] It is an objective of the present invention to provide an elastic sweatband that includes at least one peak portion and trough portion to expand in a longitudinal direction.

[0008] It is another objective of the present invention to provide an elastic sweatband with increased ventilation, sweat absorption and sweat drain.

[0009] It is another objective of the present invention to provide a headgear/cap of adjustable size for different wearers.

[0010] It is another objective of the present invention to provide a method for forming an elastic sweatband with one or more peak portions and trough portions at any desired location of the longitudinal direction.

[0011] It is another objective of the present invention to provide an elastic sweatband with peak portions and trough portions in a variety of shapes.

[0012] The present invention provides an elastic sweatband including a fabric surface, a peak portion and a trough portion, wherein the peak portion and the trough portion are formed in a longitudinal direction of the fabric surface. The peak portion and the trough portion are parallel and connected to each other and are across two ends perpendicular to the longitudinal direction of the fabric surface respectively. When a force is exerted on the elastic sweatband, a partial of vertical height of the peak portion will be converted into the extension length in the longitudinal direction, so as to provide the extension length in the longitudinal direction of the elastic sweatband.

[0013] In a preferred embodiment, the cross sectional shape of the peak portion includes, but not limited to, a dome shape, a rectangular shape, a trapezoid shape, a triangular shape and an irregular form, while the cross sectional shape of the trough portion includes, but not limited to, a line segment parallel to the horizontal plane. In an exemplary embodiment, the cross sectional shapes of the trough portion and the peak portion both include a dome shape and each of the dome shapes has an arc and two edges. One of the edges of the peak portion is connected to one of the edges of the trough portion, and the arc of the peak portion is oppositing to the arc of the trough portion. In addition, the fabric surface may be formed of one or more layers of stretchable and/or non-stretchable fabrics enclosing at least one soft material by means of knitting or weaving. The soft material mentioned above may include sponge, stretchable/non-stretchable fabric, cotton, or the like. Further, if the material of the fabric surface is made from stretchable fabrics or the like, the extension length of the elastic sweatband is longer than that made from the non-stretchable fabrics.

[0014] The present invention further provides a method for an elastic sweatband including the steps of: providing a fabric surface having a longitudinal direction; hot-pressing the fabric surface to from at least one trough portion, such that the trough portion is across two ends in the direction perpendicular to the longitudinal direction of the fabric surface; forming at least one peak portion on the fabric surface, wherein the peak portion is parallel and connects to the trough portion and the peak portion is across two ends perpendicular to the longitudinal direction of the fabric surface.

[0015] The foregoing objects and summary provide only a brief introduction to the present invention. To fully appreciate these and other objects of the present invention as well as the invention itself, all of which will become apparent to those skilled in the art, the following detailed description of the invention and the claims should be read in conjunction with the accompanying drawings. Throughout the specification and drawings identical reference numerals refer to identical or similar parts.

[0016] Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings, where a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG. **1** shows a partial perspective view of the elastic sweatband according to the present invention;

[0018] FIGS. **2***a*, **2***b*, **2***c*, **2***d*, **2***e* and **2***f* are cross sectional views illustrating the elastic sweatband according to different embodiments of the present invention;

[0019] FIGS. **3***a*, **3***b*, **3***c* and **3***d* are cross sectional exemplary views illustrating the elastic sweatband according to other different embodiments of the present invention;

[0020] FIG. **4** shows a state view when no external force is exerted on the elastic sweatband of the present invention;

[0021] FIG. **5** is a state view illustrating the elastic sweatband is stretched under an external force according to the present invention;

[0022] FIG. **6** shows a schematical view of the elastic sweatband applied to the headgear according to one embodiment of the present invention;

[0023] FIG. **7** shows a schematical view of the elastic sweatband applied to the headgear according to another embodiment of the present invention;

[0024] FIG. **8** shows a schematical view of the elastic sweatband applied to the headgear according to another embodiment of the present invention;

[0025] FIG. **9** shows a schematical view of the elastic sweatband applied to the headgear according to another embodiment of the present invention;

[0026] FIG. **10***a* is a status view when no external force is exerted on the headgear of the present invention;

[0027] FIG. **10***b* shows a status view when an external force is exerted on the headgear to stretch the headgear according to the present invention;

[0028] FIG. **11***a* shows a first embodiment of the elastic sweatband of the present invention;

[0029] FIG. **11***b* shows a second embodiment of the elastic sweatband of the present invention; and

[0030] FIG. **12** shows a flow chart of manufacturing the elastic sweatband according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0031] The present invention provides a method for an elastic sweatband and a headgear using the same, in which a peak portion is provided with a vertical height to achieve the extension length in the longitudinal direction of the elastic sweatband. In a preferable embodiment, the present invention is applied to various caps/headgears or headbands to accodomate a variety of head sizes. In other embodiments, however, the present invention may be also applied to clothing, dresses, adornments, accessories, or the likes. Moreover, the fabric surface may be formed of stretchable or non-stretchable fabrics or a mix of the both, wherein the material of the fabric surface includes cotton, linen, wool, silk, polyester, nylon, eye-lun, spandex, rayon and other elastic fibers, or a combination thereof. In order to illustrate the present invention, various embodiments and structures thereof are described below and accompanied with drawings.

[0032] FIG. **1** shows a perspective view of an elastic sweatband of the present invention. The elastic sweatband **100** includes a fabric surface **110**, at least one peak portion **120** and at least one trough portion **140**. The peak portion **120** and the trough portion **140** are disposed in a longitudinal direction D of the fabric surface **110**. The fabric surface **110** encloses at least one soft material (not illustrated) along the longitudinal direction D and is made by means of knitting or weaving. The fabric surface **110** may be formed of one layer or multiple layers of stretchable and/or non-stretchable fabrics or a mix of the both, such as sponge, cotton or linen. In other embodiments, however, the fabric surface **110** may also include only one peak portion **120** and only one trough portion **140** in the longitudinal direction D of the elastic sweatband **100**. In the embodiment shown in FIG. **1**, the peak portions **120** are preferably parallel to and respectively connected to the trough portions **140**. The peak portions **120** and the trough portions **140** are respectively across both ends **110***a* and **110***b* perpendicular to the longitudinal direction D of the fabric surface **110**.

[0033] When the peak portions **120** and the trough portions **140** are disposed on the fabric surface **110**, the peak portions **120** and the trough portions **140** are randomly or unrandomly distributed over the entire longitudinal direction D between the two ends **110***a* and **110***b* of the fabric surface **110**. As FIG. **1** shows, the cross sectional shape of the peak portion **120** is preferably a dome shape while the trough portion **140** is a line segment parallel to the horizontal plane. The line segment of the trough portion **140** connects to two ends **110***a* and **110***b* of the peak portion **120** respectively. In the embodiment shown in FIG. **2***a*, however, the peak portion **120** includes a half circle formed with an arc **122** and two ends **122***a* and **122***b*. The half circle are further connected two line segments **124** (that connects to two ends **122***a* and **122***b*) perpendicular to the horizontal plane. Thus, the peak portion **120** together with the trough portion **140** form a wave-like portion. Accordingly, the fabric surface **110** includes at least one wave-like portion to form the elastic sweatband **100**.

[0034] In other embodiments, such as shown in FIGS. **2***b*, **2***c*, **2***d*, **2***e* and **2***f*, the cross sectional shape of the peak portion **120** further includes rectangular shape, trapezoid shape, triangular shape and irregular form, while the cross sectional shape of the trough portion **140** includes line segment parallel to the horizontal plane, dome shape or other suitable shapes. As shown in FIG. **2***b*, the cross sectional shapes of the peak portion **120** and the trough portion **140** both include a dome shape formed with an arc and two ends. One end of the arc of the peak portion **120** connects to one end of the arc of the trough portion **140**, such that the arc of the dome shape of the peak portion and the arc of the trough portion face opposite directions. Please refer to FIGS. **2***c*, **2***d*, **2***e* and **2***f*, the cross sectional shape of the trough portion **140** is a line segment parallel to the level and further connects to one end of the peak portion **120** to form, for example, rectangular shape, trapezoid shape, triangular shape or irregular form, thus the combination the peak portion **120** and the trough portion **140** to form various of wave-like portions. The wave-like portions may have other cross sectional shapes under different design or other considerations.

[0035] Further, as shown in FIGS. **3***a*, **3***b* and **3***c*, the peak portion **120** in each wave-like portion may include a set of two peak portions **120**. In the embodiment shown in FIG. **3***d*, however, the wave-like portion includes a set of three or more than three of the peak portions **120**. As shown in FIG. **3***a*, one set of two peak portions **120** includes an arc disposed between each two rectangular shape peak portions **120**, and then connects to a line segment of the trough portion **140**. As shown in FIGS. **3***b* and **3***c*, however, one set of two peak portions **120** may include a tip disposed between each two rectangular/trapezoid shape peak portions **120**. In the present embodiment, the tip is preferably disposed on the bottom end of the wave-like portion and parallel to the line segment of the trough portion **140**. However, in other embodiments, the tip may be disposed higher or lower than the line segment of the trough portion **140**. As shown in FIG. **3***d*, a triangular wave shape includes a set of three peak portions **120**. The set of three peak portions **120** include two tips disposed there between and are parallel to the line segment of the trough portion **140**. Please be noted, the length of the peak portion **120** is generally greater than the length of the trough portion **140** because the peak portions **120** are mostly contributed to the conversion of the extension length in the longitudinal direction of the elastic sweatband **100** than the trough portion **140**.

[0036] As shown in FIG. **4**, the peak portion **120** has a vertical height B, a width A and a total length L when no external force is exerted on the elastic sweatband **100**. As show in FIG. **5**, the vertical height B of the peak portion **120** contributes to the extension length in the longitudinal direction when a force is exerted on the elastic sweatband **100**. In other words, the fabric surface **110** of a non-stretchable fabric is stretched under an external force, such that the vertical

height B decreases X, and the width A is increased to A+X. In the present embodiment, after the stretch, the vertical height of the peak portion **120** becomes B−X of the peak portion **120**, and the width become A+X. Obviously, partial vertical height B of the peak portions **120** is converted into the extension length in the longitudinal direction of the fabric surface **110**, thus the length of the fabric surface **110** is extended to "L+λX" in the longitudinal direction (λ is the number of the peak portions **120**.) However, in other embodiments, the fabric surface **110** of a stretchable fabric is stretched under the external force. Either the trough portion **140** or the peak portion **120** can contribute to the extension length, thus, the total extension length of the fabric surface **110** will greater than the total extension length "L+λX." Accordingly, the total extension length of the elastic sweatband **100** made of stretchable fabric or the like will greater than the total extension length of the elastic sweatband **100** made of non-stretchable fabric or the like.

[0037] FIGS. **6**, **7**, **8** and **9** show several embodiments of the elastic sweatband applied to headgears/caps according to the present invention. Generally, the headgear/cap includes a visor **510**, at least one crown portion **520** and the elastic sweatband **100**. The elastic sweatband **100** is enclosed the fabric surface **110** by means of weaving, kitting or other proper methods. As shown in FIGS. **6** and **7**, the elastic sweatband **100** is wove on the inner edge of the crown portion **520** of the headgear **500** in a ring shape. In the embodiment shown in FIG. **8**, however, the elastic sweatband **100** may only be wove in a segment on the rear of the inner edge **150** of the crown portion **520**. In the embodiments shown in FIGS. **6**, **7** and **8**, a wave-like portion combine the peak portions **120** and the trough portions **140** is preferably only disposed on the rear of the headgear **500**, and the peak portions **120** preferably face the crown space of the headgear **500**. As shown in FIG. **9**, however, the peak portions **120** and the trough portions **140** may be distributed over the entire elastic sweatband **100**. In particularly, the elastic sweatband **100** is woven between the visor **510** and the crown portion **520**, such that the size of the headgear **500** is adjustable to fit different wearers without feeling restrained or stressed.

[0038] FIG. **10***a* shows a status view of the elastic sweatband of the present invention when no external force is exerted. As show in FIG. **10***a*, the radius of the headgear **500** is D when no external force is exerted. In other words, the peak portions **120** and the trough portions **140** will not change their forms. On the contrary, when a force is exerted on the headgear **500**, the radius of the headgear **500** becomes D', as shown in FIG. **10***b*. The peak portions **120** and the trough portions **140** of the elastic sweatband **100** will expand respectively along the longitudinal direction to enlarge the size of the crown portion **520**. The radius D' of the headgear **500** is obviously greater than the radius D. Therefore, the size of the headgear **500** will finally accomnodate the wearer's head size when the wearer wears the headgear **500**. Accordingly, the elastic sweatband **100** disposed on the headgear **500** can be automatically adjusted to fit different wears by means of the peak portions **120** and the trough portions **140**.

[0039] As shown in FIGS. **11***a* and **11***b*, the present invention further provides a method for the elastic sweatband. The elastic sweatband **100** is disposed inside the mold **200** of a manufacturing machine. The mold **200** includes an upper die **210** and a lower die **260**, wherein the machine mentioned-above preferably includes hot-pressing mechanism, high frequency heating mechanism, ultrasonic weave mechanism or other proper mechanisms. In the embodiment shown in FIGS. **11***a* and **11***b*, one side of the upper die **210** preferably has a plurality of protrusions **220** while the lower die **260** has a plurality of contacting pillars **280**. A plurality of grooves **250** disposed between two protrusions **220** correspond to the contacting pillars **280**. In other embodiments, however, the upper die **210** may has only one protrusion **220** while the lower die **260** may has one contacting pillar **280** to make a single peak portion **120** and a single trough portion **140**. In the present embodiment, the contacting pillars **280** and the grooves **250** are preferably matched each other to form the trough portions **140**, and the protrusions **220** are preferably shorted to leave some spaces between the contacting pillars **280** when upper die **210** and are pressed together the lower die **260**. In other words, the shapes of the contacting pillars **280** and the grooves **250** together define the shape of the trough portion **140**, and the shape of the protrusions **220** defines the shape of the peak portion **120**. In other embodiments, however, the protrusions **220** may match the inner surface of the lower die **260** to form the shape of the peak portion **120**, and the contacting pillar **280** may not perfectly match the groove **250** to form the trough portion **140**. In addition, the shape of the mold **200** can be modified to form different peak portions **140** and/or trough portions **140** shown in the mentioned above embodiments.

[0040] When the mold **200** generates heat after electrified, the protrusion **220** of the upper die **210** presses one side of the sweatband **100** into the spaces between the contacting pillars **280**, in the meantime, the groove **250** and the top surface of the contacting pillar **280** fit in to each other for a period of time, such that the peak portions **120** and the trough portions **140** are formed. In this embodiment, the shape of the protrusion **220** is preferably designed to form a peak portion **120** with a dome shape (the dome shape includes a half-circle with two vertical edges.). The contacting pillars **280** and the grooves **250** together form the line segment of the trough portions **140**. In other embodiments, however, the shapes of the peak portion **120** and the trough portion **140** of the elastic sweatband **100** may be formed utilizing different molds **200** under different demand or other considerations.

[0041] Moreover, if the wave-like portion including one set of two or more than two peak portions **120**, the shape of corresponding protrusion **220** of the upper die **210** may include three or more shapes (not illustrated) to form the set of peak portions **120**. Likewise, the wave-like portion including one set of two or more trough portions **140**, the combination shape of the contacting pillars **280** and the grooves **250** may include three or more shapes (not illustrated) to form the set of the trough portions **140**. In the present embodiment, the peak portions **120** and the trough potions **140** are formed by the press-protruding method of the mold **200**. However, in other embodiments, the peak portion **120** and the trough portion **140** may be formed by press-concaving method or other methods.

[0042] As FIG. **12** shown, the method of the elastic sweatband **100** includes the steps of: Step **710**, a fabric surface **110** having a longitudinal direction is provided. In this step, the fabric surface **110** is preferably enclosed at least one soft material (not illustrated) in the longitudinal direction by meaning of knitting, weaving or the like to form the elastic sweatband **100**. The soft material may include sponge, stretchable fabric, non-stretchable fabric, cotton or other proper materials. In other embodiments, however, the fabric surface **110** may be made of stretchable fabric, non-stretch-

able fabric, single layer or multiple layers of fabric beforehand without enclosing the soft material. Step **730** is hot-pressing the fabric surface **110** to form at least one trough portion **140**, such that the trough portion **140** is across two ends perpendicular to the longitudinal direction of the fabric surface **110**. Step **740** is forming at least one peak portion **120** on the fabric surface **110**, wherein the peak portion **120** is parallel and connects to the trough portion **140** and the peak portion **120** are across two ends perpendicular to the longitudinal direction of the fabric surface **110**. In the present embodiment, the fabric surface **110** is preferably hot pressed to form a plurality of similar shapes of peak portions **120** or trough portions **140**. In other embodiments, however, the peak portion **120** and the trough portion **140** may be formed by high frequency machines, ultrasonic weave machines or other proper machines to form different shapes of the peak portions **120** or the trough portions **140** arranged on a portion of the sweatband **100** or the entire sweatband **100**. In addition, the present embodiment further includes a step **720** of pre-pressing one side surface of the peak portion **120** so as to form vertical height of a peak portion **120**. The vertical height is preferably concaved under the line segment of the trough portion **140**. In other embodiments, the vertical height of the peak portion **120** may also protrude form the line segment of the trough portion **140**.

[0043] The shape of the protrusion **220** of the upper die **210** and the contacting pillar **280** of the lower die **260** may be formed and arranged in shape to form a plurality of similar or dissimilar wave-like portion include the peak portion **120** and the trough portion **140**. The design of the shape of the mold **200** is not limited to the present invention.

[0044] While certain novel features of this invention have been shown and described and are pointed out in the annexed claim, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.

What is claimed is:

1. An elastic sweatband, comprising:

a fabric surface having a peak portion and a trough portion in a longitudinal direction, the peak portion and the trough portion paralleling and connecting to each other, wherein the peak portion and the trough portion are respectively across two ends perpendicular to the longitudinal direction of the fabric surface.

2. The elastic sweatband of claim **1**, wherein the cross sectional shape of the peak portion includes a dome shape while the cross sectional shape of the trough portion includes a line segment parallel to the horizontal plane.

3. The elastic sweatband of claim **1**, wherein the cross sectional shape of the peak portion and the trough portion include a half circle formed with an arc and two ends, one end of the peak portion are connected to one end of the trough portion, such that the arc of the peak portion and the arc of the trough portion face opposite directions.

4. The elastic sweatband of claim **1**, wherein the cross sectional shape of the peak portion includes a rectangular shape while the cross sectional shape of the trough portion includes a line segment parallel to the horizontal plane.

5. The elastic sweatband of claim **1**, wherein the cross sectional shape of the peak portion includes a trapezoid shape while the cross sectional shape of the trough portion includes a line segment parallel to the horizontal plane.

6. The elastic sweatband of claim **1**, wherein the cross sectional shape of the peak portion includes a triangular shape while the cross sectional shape of the trough portion includes a line segment parallel to the horizontal plane.

7. The elastic sweatband of claim **1**, wherein the cross sectional shape of the peak portion includes an irregular form while the cross sectional shape of the trough portion includes a line segment parallel to the horizontal plane.

8. The elastic sweatband of claim **1**, wherein the fabric surface encloses a soft material in the longitudinal direction and is made by means of kitting or weaving.

9. An elastic headgear comprising an elastic sweatband comprising a fabric surface with a peak portion and a trough portion in a longitudinal direction, the peak portion and the trough portion paralleling and connecting to each other, wherein the peak portion and the trough portion are respectively across two ends perpendicular to the longitudinal direction of the fabric surface.

10. A method for an elastic sweatband, comprising the steps of:

providing a fabric surface having a longitudinal direction;

hot-pressing the fabric surface forming at least one trough portion, such that the trough portion is across two ends perpendicular to the longitudinal direction of the fabric surface; and

forming at least one peak portion on the fabric surface, wherein the peak portion parallels and connects to the trough portion and the peak portion is across two ends perpendicular to the longitudinal direction of the fabric surface.

11. The method of claim **10**, further comprising pre-pressing one side surface of the peak portion so as to form a vertical height of the peak portion.

12. The method of claim **10**, further comprising forming a plurality of peak portions and a plurality of trough portions, each of the peak portions and each of the trough portions parallelly connect to each other and perpendicularly across two ends of the longitudinal direction.

13. The method of claim **10**, wherein hot-pressing the trough portion includes hot-pressing the trough portions into different cross sectional shapes simultaneously.

14. The method of the claim **10**, wherein the fabric surface further encloses a soft material in the longitudinal direction and is made by means of kitting or weaving.

15. The method of claim **10**, wherein the fabric surface further includes multiple layers of fabrics and is formed by means of kitting or weaving.

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