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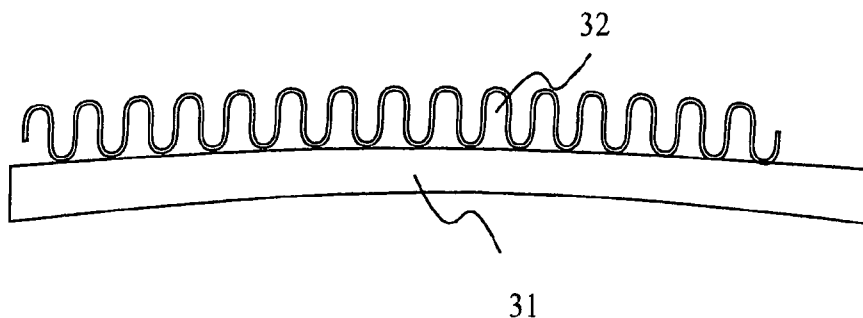


FIG 6

(57) Abstract: This invention provides a ventilation helmet comprising a hard outer shell layer (10), a shock absorbing padding layer (20) tightly mounted within the hard outer shell layer (10), and a ventilation padding layer (30) under the shock absorbing padding layer (20), wherein the ventilation padding layer (30) comprises a frame (31) with a shape that fits the user's head and having through holes (32) arranged in the crossed lateral and longitudinal rows on entire surface thereof; and wavy bars (32) glued to the upper surface of the ventilation padding layer (40) at positions between crossed lateral and longitudinal rows of the frame (31), thereby providing a ventilation space between user's head skin and inner surface of the shock absorbing padding layer (20).



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VENTILATION HELMET

Technical Field

This invention relates generally to helmets, more particularly concerns protective helmets having additional portions arranged to increase the air circulation.

Background of this invention

The major objective of protective helmets is to protect the wearer's head which can be seriously bumped when playing sports activities, and more particularly for two-wheeler riders, such as, for example, motorcycles, bicycles. To this end, the helmet usually consist of at least two layers which have been entirely overlapped on each other, that is, the outer layer being composed of hard resin, and the inner padding layer. Moreover, the helmet usually have additional common portions such as helmets' brim in order to protect the wearer from the sun and helmet straps in order to keep helmet stable on the user's head .

The inner padding layer is made from materials which have shock-absorbing ability to absorb shocks in case of a trouble, most commonly expanded polystyrene (EPS). Such materials typically have insulation properties. On the other hand, although there is a small space between the wearer's head skin and the inner surface of the insulation layer, this space is often not big enough to keep the head skin ventilated, that is, the heat from the wearer's head cannot escape out, the sweat from the scalp makes the humidity in this small space increased, thereby the users often feel very uncomfortable in case of the long use, especially on sunny days or warm, humid weather, or when they got stuck in congestion or traffic jam.

Therefore, the users does not give preference to helmets which have the chin protective portion, instead, they give preference to half helmets, more preference is given to the helmets having a wide cut near the ear because the wind from the outside shall at least be able to cool down the inside of the edge of the helmet.

Many people choose large helmets, and/or the straps have not been buckled properly in order to make their head feel cooler, regardless of the unsafety which might be occurred whenever they got in trouble.

There is a lot of improvements to enhance the air circulation between the padding layer and user's head skin.

The benefits of solutions such as adding a thin net layer which closely embraces the head of the wearer, or adding a thin padding layer of fabric right beneath the padding layer, etc., are not high because the space between the head skin and the inner surface of the padding layer has been insignificantly increased.

US Patent No. 3,925,821 proposed a helmet which has a distributed air circulation gap from the air-directing baffles arranged on the outer side of the hard shell, extended through the padding layer and directed rearwardly.

The UK patent application No. GB 9021267.1 proposed a helmet which further has an air circulation gap from the chin protective portion to the inner portion of the helmet and escaping out at the rear of the helmet.

US Patent No. 4622700 proposed a helmet with the air directing baffles arranged on surface of the hard shell and the air circulation gaps extending through the padding layer, thereby the air flows flowing through the surface of the helmet have been introduced into the interior of the helmet and/or to generate vacuum pressure to aspirate the air from within the helmet interior outwardly.

As it can usually be seen for bicyclists-racers, some types of helmets do not have the hard shell and the padding layer is made being composed of a plurality of hard ribs arranged in the direction from front to the back.

US Patent No. US6081929 proposed a helmet which further has an air circulation fan mounted in the opening extended through the hard shell layer and the padding layer in position near the top of the head.

Japanese patent publication No. JP2004068237A proposed a helmet which has a similar air circulation fan, wherein solar panel has been used to provide electricity to the fan.

In general, the above mentioned solutions have brought about good air circulation effects. However, a common disadvantage of these solutions is that they have modified the shape of the padding layer, that is, they require appropriate moulding sets for manufacture of the padding layer, or change the production processes, such as, for example, making the holes extending through the padding layer. More importantly, since the padding layer is the main component which has protective function for the head in the case there is any trouble, that is, the shock absorbing effects, the change of structure of the padding layer, or the presence of the holes extending through the padding layer can make helmets unsatisfactory in meeting the safety requirements.

Therefore, there is a need for helmets which ensure both the safety functions, as well as the ventilation properties.

This invention proposes solution to resolve the above mentioned problems.

Summary of this invention

It is a object of the invention to provide a helmet which has the ventilation properties and smoothness while still meet the protective and safety requirements for the users.

It is a further object of the invention to provide a helmet which can be manufactured by utilizing the existing production lines.

The invention achieves the above objects by proposing a ventilation helmet comprising a hard outer shell layer, a shock absorbing padding layer which has been tightly mounted within the hard outer shell layer, and a ventilation padding layer beneath a shock absorbing padding layer, wherein the ventilation padding layer comprising a frame with a shape which fits the user's head and having the through holes arranged in the crossed lateral and longitudinal rows on the entire surface thereof; and wavy bars glued to the upper surface of the ventilation padding layer at positions between the crossed lateral, longitudinal rows of the frame, thereby providing a ventilation space between user's head skin and the inner surface of the shock absorbing padding layer .

Brief Description of Drawings

The features, characteristics, and advantages of the invention will be more fully understood from the following description with the illustrative drawings, in which:

Fig. 1 is a sectional longitudinal view of a ventilation helmet according to an embodiment of the invention;

Fig. 2 is a fragmentary perspective view illustrating the layers of a ventilation helmet according to an embodiment of the invention;

Fig. 3 is a perspective view illustrating a ventilation padding layer of a ventilation helmet of the invention;

Fig. 4 is a perspective view illustrating a ventilation padding layer having wavy bars of a ventilation helmet of the invention;

Fig. 5 is a perspective view illustrating the wavy bar of a ventilation helmet of the invention when being glued to the curved bar; and

Fig. 6 is a sectional longitudinal view of the wavy bar in Fig. 5.

Brief Description of Embodiments of the Invention

As being illustrated in Figures from Fig. 1 to Fig. 4, a ventilation helmet of the invention also consists of a hard outer shell layer 10, and a shock absorbing padding layer 20 tightly mounted within the hard outer shell layer 10 as known common helmets. Additionally, the helmet of the invention may include other known common portions such as a helmet brim 50 and a strap with a lock 60.

The charactering feature of the helmet of the invention is to additionally include a ventilation padding layer 30 fitly arranged beneath a shock absorbing padding layer 20, wherein the ventilation padding layer includes:

a frame 31 having a shape which fits the user's head and having through holes 33 arranged in the crossed lateral, longitudinal rows on the entire surface thereof; and

wavy bars 32 (best illustrated in Fig. 4) glued to the upper surface of the ventilation padding layer 40 at positions between the crossed lateral, longitudinal rows

of the frame 31.

With the presence of the ventilation padding layer, there is a certain space generated on the entire area of user's head skin within the interior of the helmet and the inner surface of the shock absorbing padding layer 20. Thereby, even when driving slowly or stopped, thanks to the significant distance between the head skin and the shock absorbing padding layer 20, the hot air inside the helmet and the sweat can escape outwardly through the lower edge region of the helmet of the invention, that is, to ensure ventilation function.

The ventilation function shall be shown more clearly when the wheeler is moving. Then, the air flows flowing from outside to the beneath of the lower edge of the helmet shall enter the interior of the helmet, pushing the hot and humid air outwardly and cooling the wear's head down.

In a practical embodiment, a ventilation helmet of the invention was manufactured having a frame 31 of a thickness in the range from 0.2 to 0.5 mm. When manufactured from suitable materials, that is, materials with bearing capacity, having relative resiliency and more particularly not being cracked, broken under the effect of strong shakes, such as, for example, polymers such as polyethylen, the frame 31 partially contributes to the shock absorbing function when trouble(s) may occur.

Fig. 3 and Fig. 4 illustrate through holes 33 having a rectangular shape, square shape or triangle shape, generally having a polygonal shape. However, it is also possible to manufacture frame(s) with through holes 33 having any suitable shape, such as, for example, circular shape, rhombus shape, hexagonal shape, etc..

In other practical embodiments, a frame 31 was manufactured with through holes 33 of square shape having a length in the range from 5 to 10 mm, or circular shape having a diameter in the range from 6 đến 12 mm.

Through holes 33 was arranged so that the distance between them is sufficient for glueing wavy bars 32. As it can be seen in Fig. 3, with through holes 33 arranged in the crossed lateral, longitudinal rows on the entire surface as such, actually the frame 31 includes curved bars connecting laterally, longitudinally similarly to bamboo

basket weaving style.

Obviously, in order to ensure rigidity of the frame, it is preferable that the lower perimeter edge does not have through holes.

It can be seen that the height of the ventilation space includes two portions: the thickness of the ventilation padding layer (corresponding to the depth of through holes 33) and the height from the bottom to the top of the wavy bars, wherein more important is the height of the wavy bars.

Therefore, for the helmets that have portions for guiding the air from the outside into the beneath of the shock absorbing padding layer 20, such as, for example, from the chin protective piece, or from the holes in the front or in the back, it is possible to use only wavy bars having lower peaks.

In a practical embodiment, wavy bars 32 are elastic plastic bars with a width being in the range from 4 to 9 mm, the thickness being in the range from 0.1 to 0.4 mm, the distance between two consecutive peaks is in the range from 4 to 6 mm and the height from the top to the bottom is in the range from 4 to 6 mm. However, it is also possible to manufacture and use the wavy bars having other suitable dimensions.

Due to the wavy shape, the wavy bar 32 can be optionally bent, thereby it is possible to glue them to the straighted bars or the bars having any curvedness as respectively shown in Fig. 5 and Fig. 6. In these figures, the bars 31 have been shown as the individual bars. According to the helmet of the invention, the bars 31 themselves are the frame 31, particularly being the portion between the lateral and longitudinal through hole rows.

The wavy type of the wavy bars can be any harmonic oscillation type, preferably the sine-shaped since although the contacting area with the curved bars is relatively small, that is, it is more difficult to glue to the frame 31, the circular shaped ends ensure to protect the users from injuries in case of accidents.

The wavy structure of the wavy bars 32 ensures the ventilation function of the ventilation padding layer 30. On the other hand, the wavy bars 32 also have a function to partially absorb shocks in the case there is any trouble thanks to a certain

deformation capability when pressed. Therefore, in order to ensure safety for the helmet wearers, preferably that the wavy bars 32 are made of material which is capable of deformation but not broken when subjected to a strong impact in order to avoid the formation of broken fragments which may cause injuries to the head skin.

In a preferred embodiment, wavy bars 32 are made of elastic materials, such as, for example, polymers such as polyethylene or rubber, preferably ethylene propylene diene monomer rubber (hereinafter being referred as EPDM). Remarkable advantages of this embodiment are that it is not only able to effectively absorb light shocks but also brings about the smoothness to the wearer.

Wavy bars can be separately manufactured, or in the form of the bars glued on suitable substrates in order to be glued on the frame.

It can be seen that it is not necessary to glue the wavy bars 32 to the entire area between through holes 33 but it is possible to glue the bars only at some positions, and the wavy bar 32 can be glued to the frame 31 interruptedly or continuously. For loops adjacent to the lower edge of the helmet, and/or a semi-loop which extends from the front to the rear passing the top of the head, it is preferable to continuously provide with the wavy bars 32 (as shown in Fig. 4) or substantially continuously in order to keep the helmet balanced when in use.

In another preferred embodiment, as shown in Fig. 1 and Fig. 2, the helmet of the invention further includes a liner 40 arranged within the interior of the ventilation padding layer 30 and closely wrapped around the user's head. The liner 40 can be a cheese-cloth or cloth combined with the mesh in order to ensure good ventilation, and at the same time convenient for cleaning when necessary. In a practical embodiment, the liner 40 includes a loop 41 which wraps transversely around the head and is made from fabric and the cap of the helmet is made from mesh 42 as illustrated in Fig. 2. This design ensure that the air easily flows from the space under the helmet through the ventilation padding layer and a liner outwards of the helmet and vice versa.

Efficiency of the invention

It can be seen that ventilation helmet of the invention also includes the known

common hard shell layer and shock absorbing padding layer, and a ventilation padding layer can be additionally inserted into the existing available helmets. Therefore, it is possible to utilize the existing available production lines for manufacture of the ventilation helmet of the invention. Furthermore, it is only required to test the safety of the ventilation padding layer, there is no need to re- test the helmet of the invention in compliance with strict standards applied for the hard shell layer and the shock absorbing padding layer.

In practice, when the frame and wavy bars are further included, the inner diameter of the helmet shall be decreased by about 8 to 15 mm. However, it is not necessary to increase the diameters of the hard shell layer and of the shock absorbing padding layer in order to manufacture the helmets with size(s) suitable for the user's head because many people choose large helmets in order to have their head feel cooler. The addition of the appropriately fitted ventilation padding layer, shall make helmets become ventilated and smooth shall encourage wearers to fasten the straps in an appropriate manner, ensure the safety when participating in the traffic.

Other embodiments

Although the invention has been described in connection with preferred embodiments as above mentined, it should be understood that those embodiments are only to illustrate the invention, the invention is not to be limited to the disclosed embodiments.

From the above described embodiments, a skilled in the art can make common modifications, changes or additions, such as, for example, to change the shape of the helmet, the shape of the lower edge of the helmet, to add the known common structures to adjust the diameter of the ventilation padding layer to fit the user's head, etc...

Those modifications, changes still fall under the nature and scope of the invention.

Claims

1. A ventilation helmet comprising:
 - a hard outer shell layer (10),
 - a shock absorbing padding layer (20) tightly mounted within the hard outer shell layer (10);
 - characterized in that the helmet additionally comprises:
 - a ventilation padding layer (30) tightly arranged beneath the shock absorbing padding layer (20), wherein the ventilation padding layer comprises:
 - a frame (31) with a shape that fits the user's head and having through holes (32) arranged in the crossed lateral and longitudinal rows on entire surface thereof; and
 - wavy bars (32) glued to the upper surface of the ventilation padding layer (30) at positions between crossed lateral and longitudinal rows of the frame (31);
 - thereby providing a ventilation space between user's head skin and inner surface of the shock absorbing padding layer (20).
2. The helmet as claimed in claim 1, characterized in that the wavy bars (32) are made of elastic materials.
3. The helmet as claimed in claim 1 or claim 2, characterized in that the helmet additionally comprises a liner (40) arranged within the ventilation padding layer (30) and closely wrapped around the user's head.

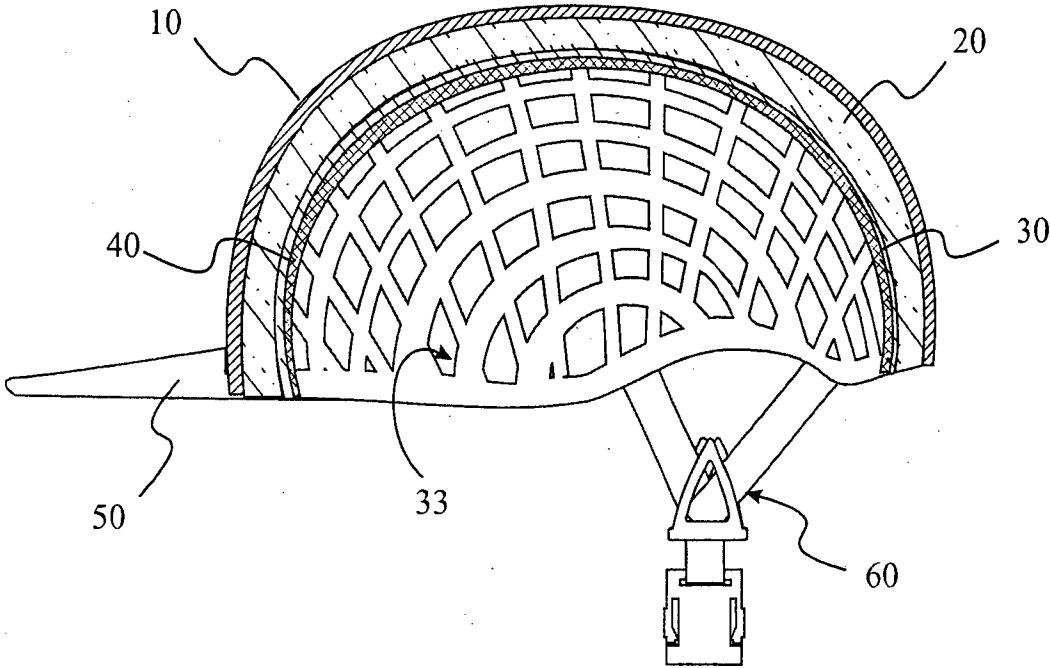


FIG 1

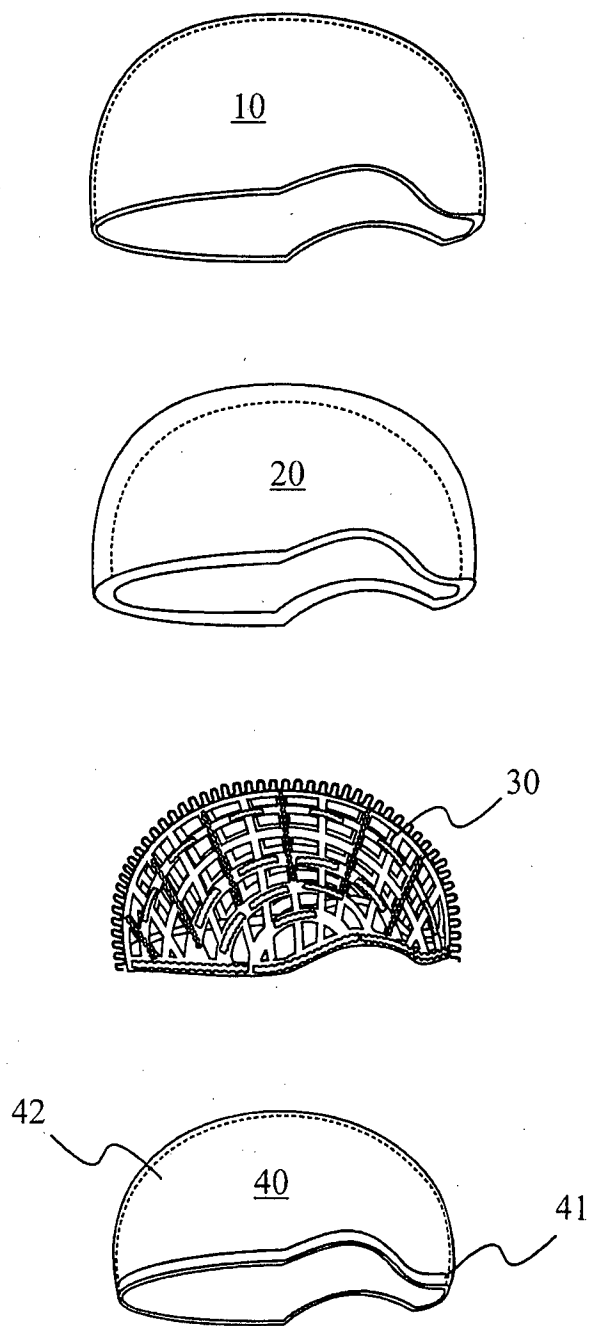


FIG 2

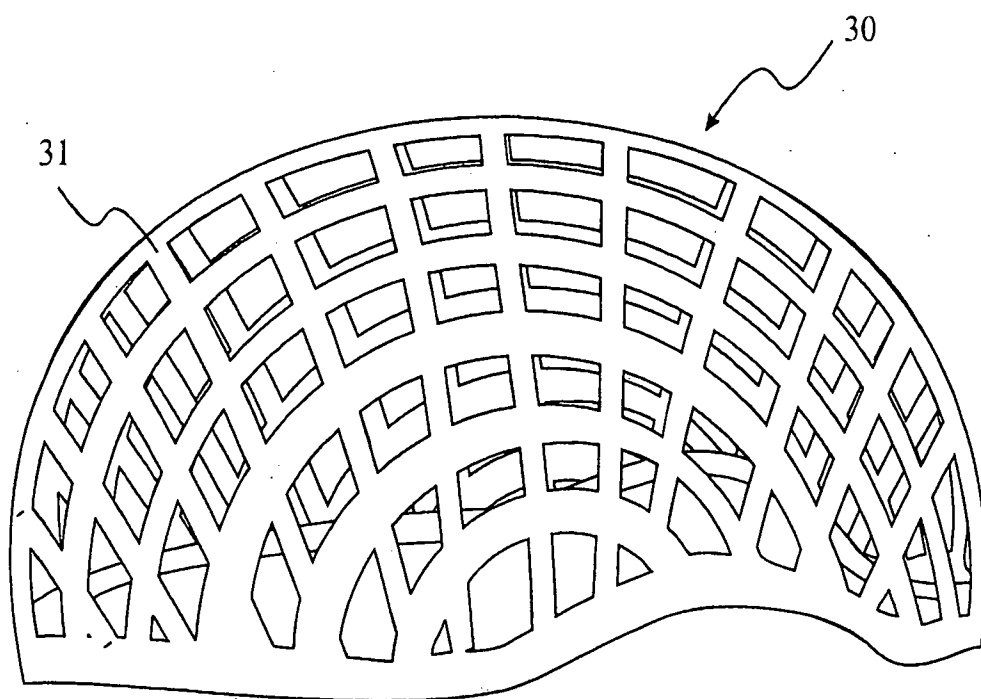


FIG 3

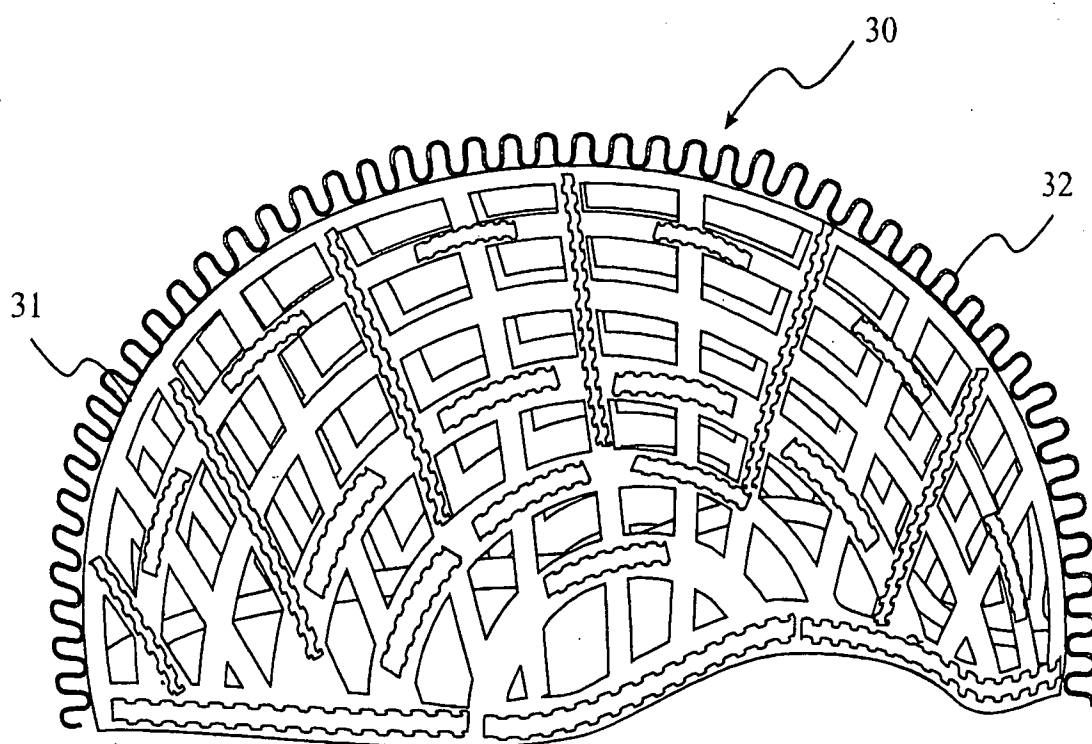


FIG 4

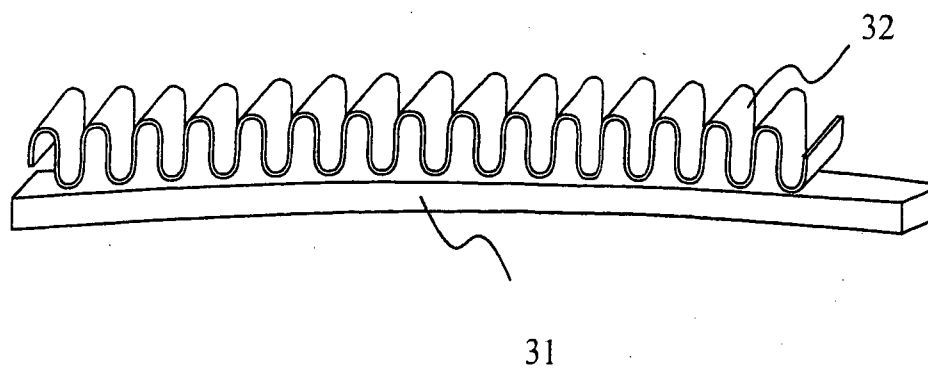


FIG 5

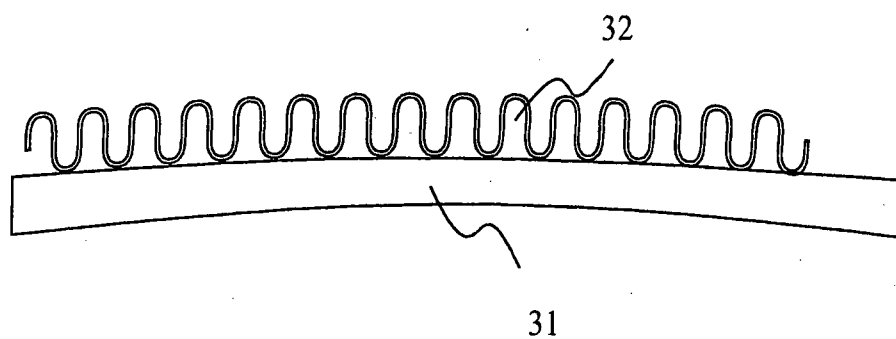


FIG 6

INTERNATIONAL SEARCH REPORT

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2015/0223546 A1 (YOCHANAN COHEN) 13.08.2015, abstract, [0053], [0077], [0082], fig. 1, 6, 13, 17	1-3
Y	GB 1108502 A (DONALD CHAPMAN) 03.04.1968, abstract, col. 1 lines 23-32, col. 2 lines 76-82, fig. 1-4	1-3
Y	WO 9834506 A1 (M.P.H. ASSOCIATES, INC, et al.) 13.08.1998, p. 7 lines 27-29	1-3
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