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(54) **MASK THAT PROVIDES A COMFORTABLE SENSATION TO A USER**

(52) **U.S. Cl. 2/206**

(57) **ABSTRACT**

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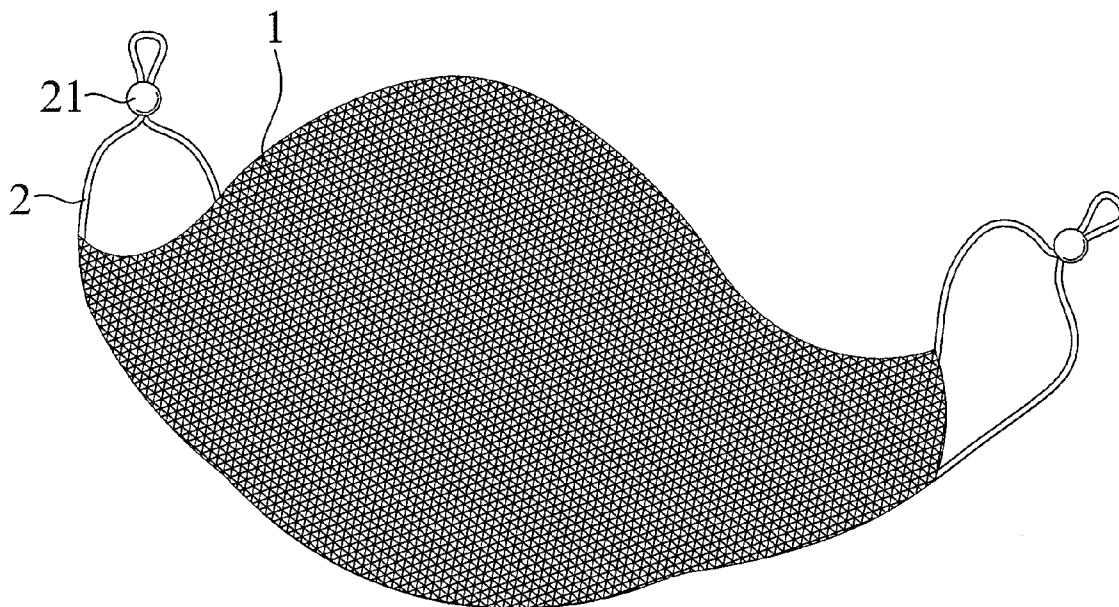
A mask includes a thin film layer having a plurality of net-shaped irregular pores to provide a ventilating effect, two loop-shaped straps mounted on two ends of the thin film layer, and two adjusting rings each movably mounted on a respective one of the straps. The thin film layer is made of soft and tough material, such as e-PTFE, TPE, TPEE, COC or FRP. Each of the pores has a size smaller than that of dust, water molecule, bacterium and virus to isolate and prevent the dust, water molecule, bacterium and virus from entering the thin film layer. When the loop-shaped straps are put on a user's ears, the adjusting rings are moved on the loop-shaped straps to adjust the size of each of the loop-shaped straps so as to fit the user's face.

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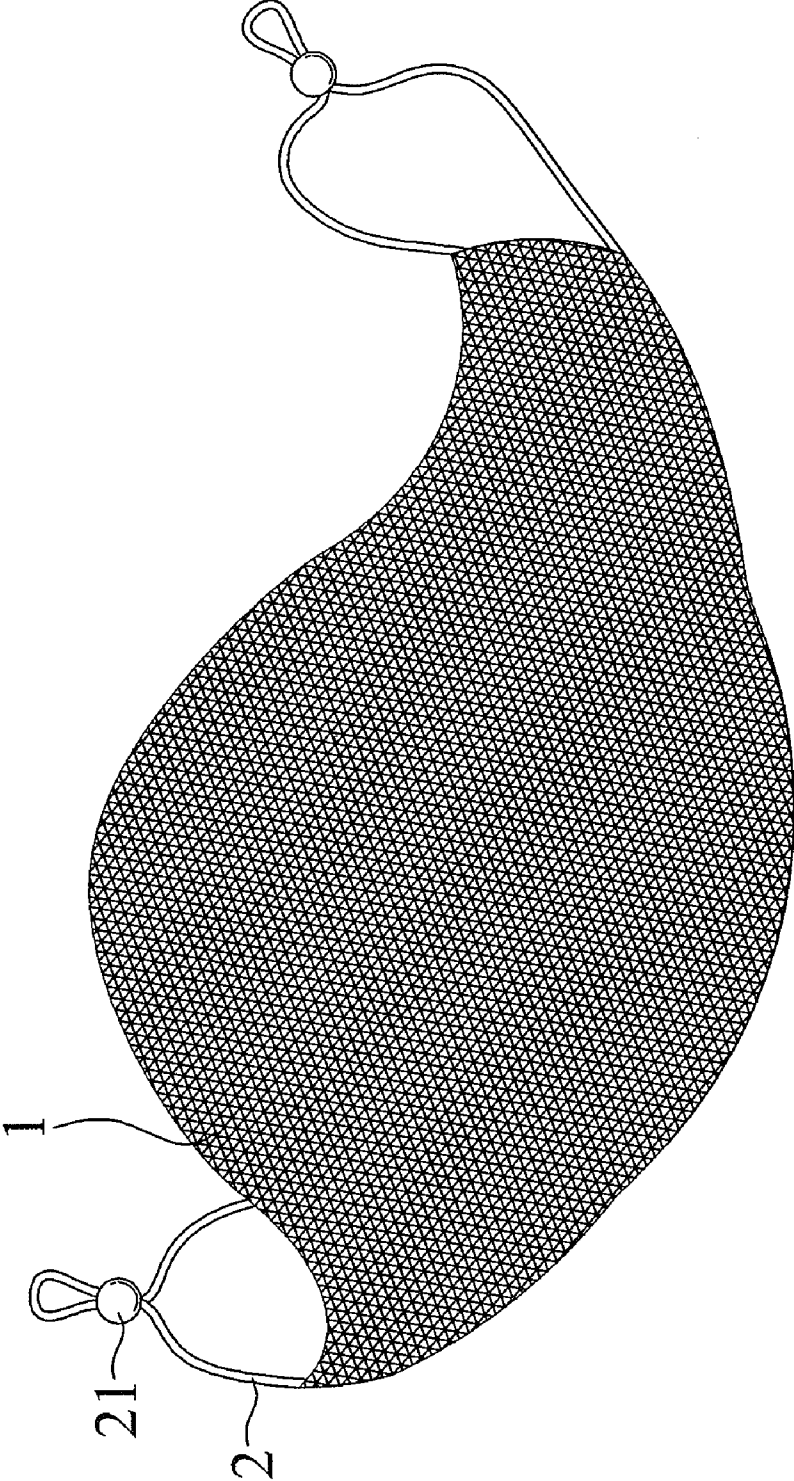


FIG. 1

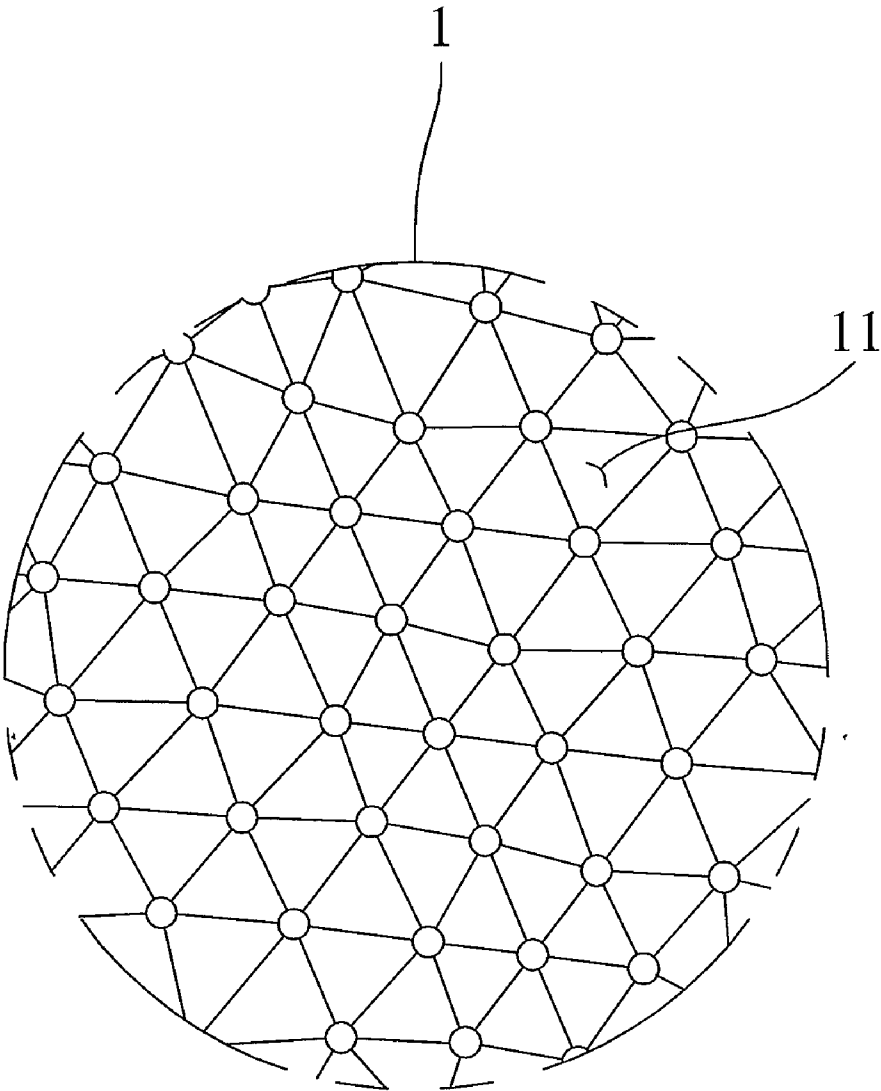


FIG. 2

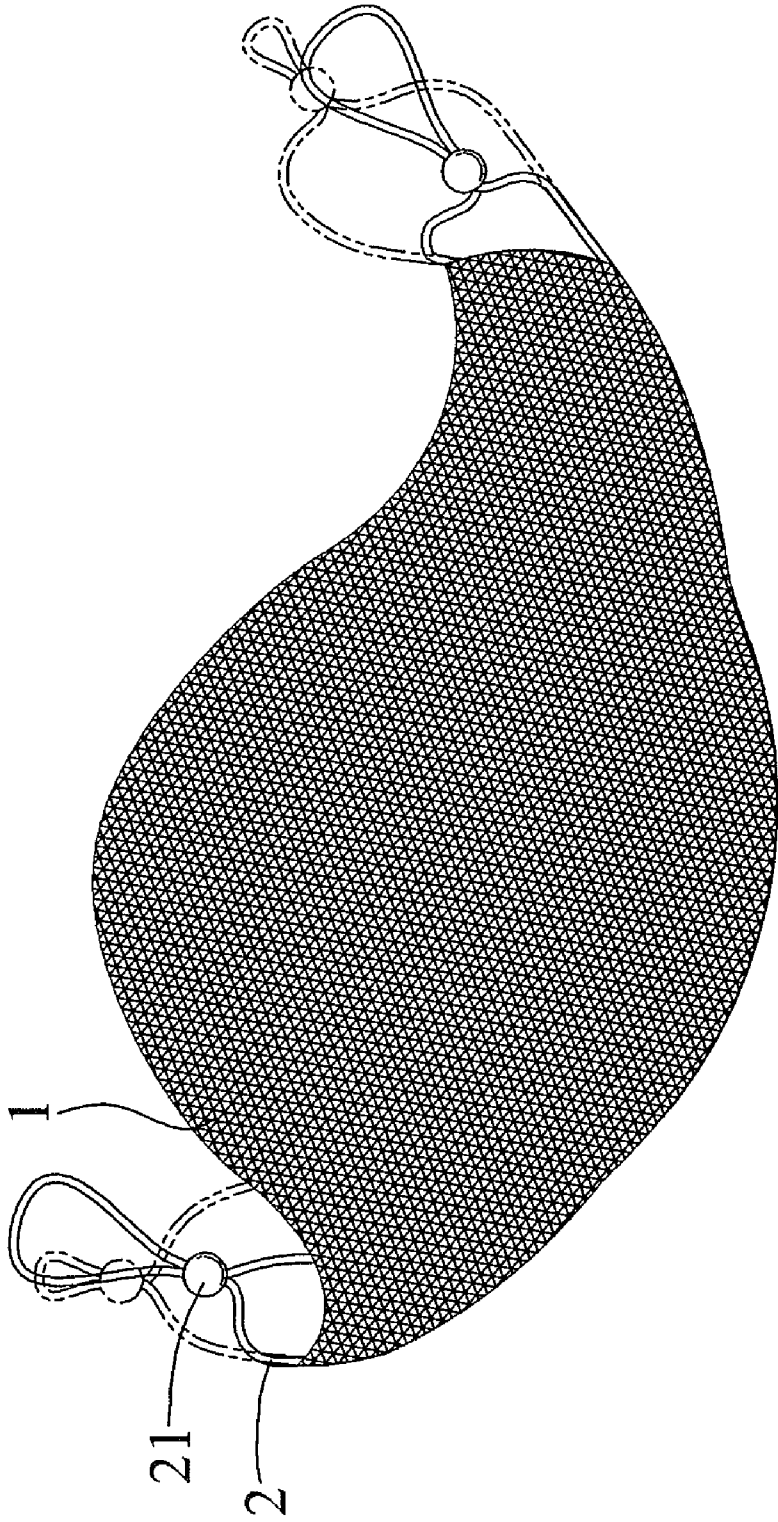


FIG. 3

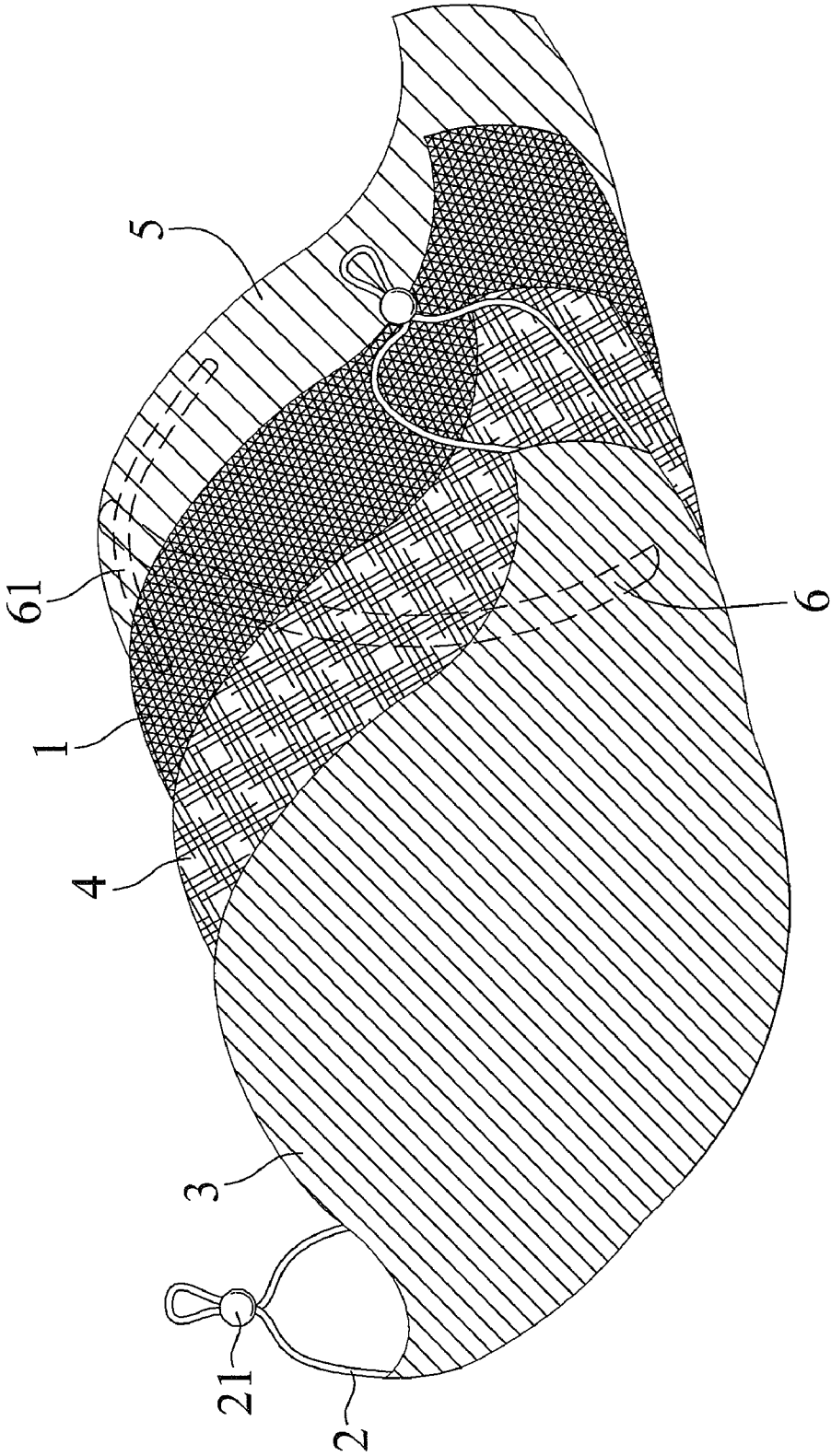


FIG. 4

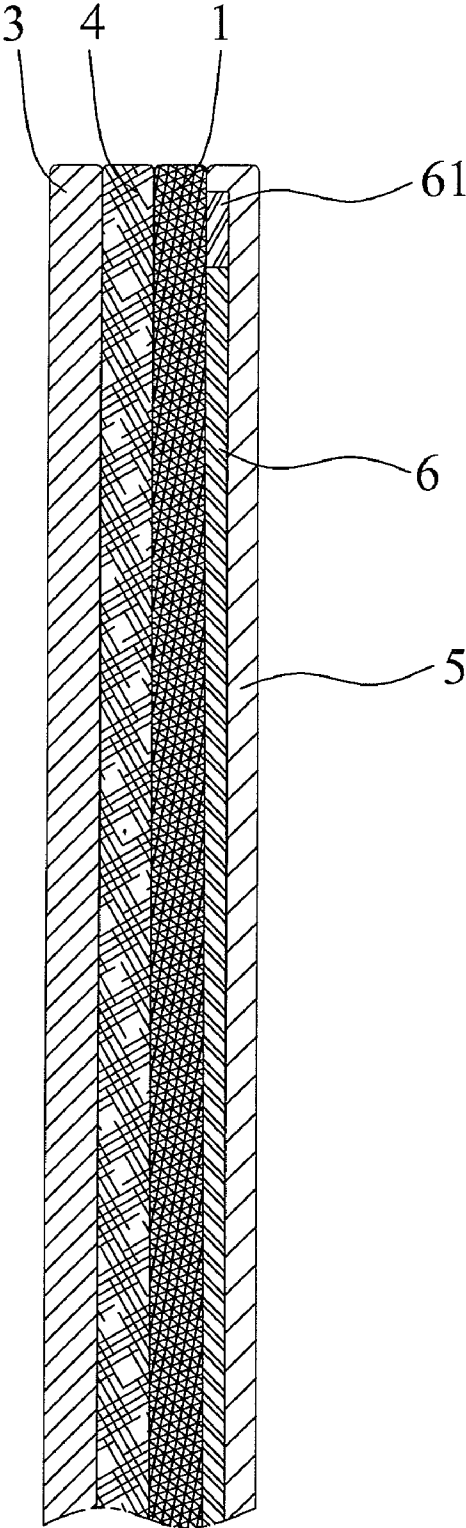


FIG. 5

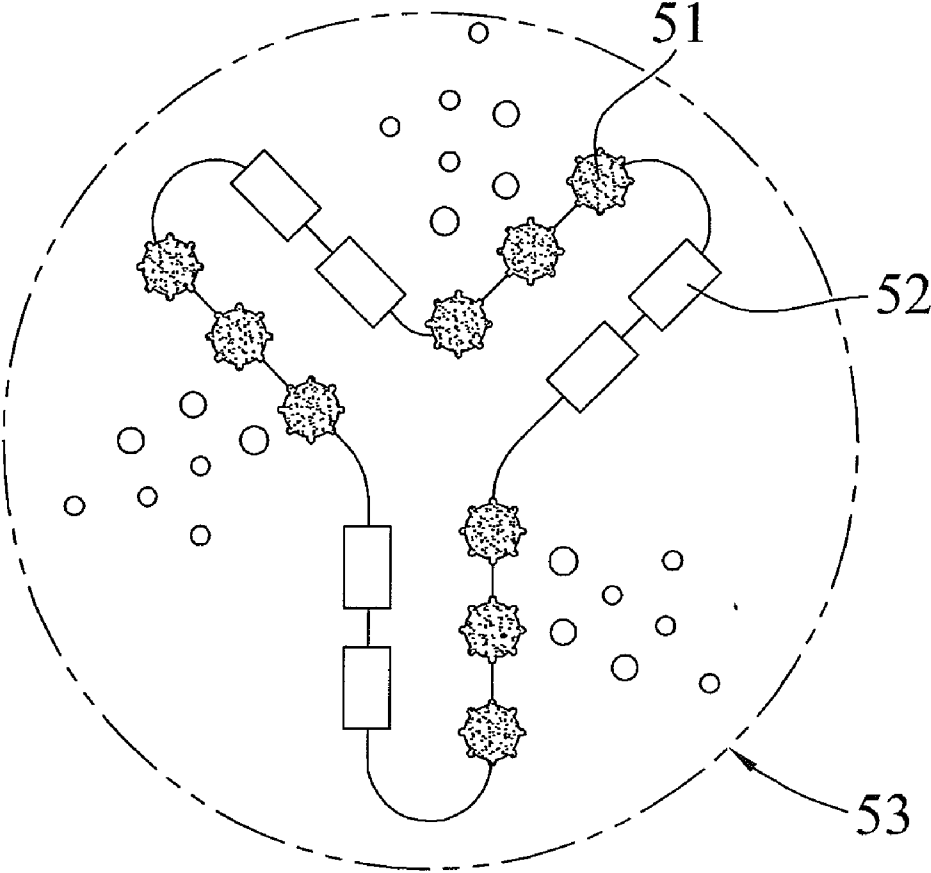


FIG. 6

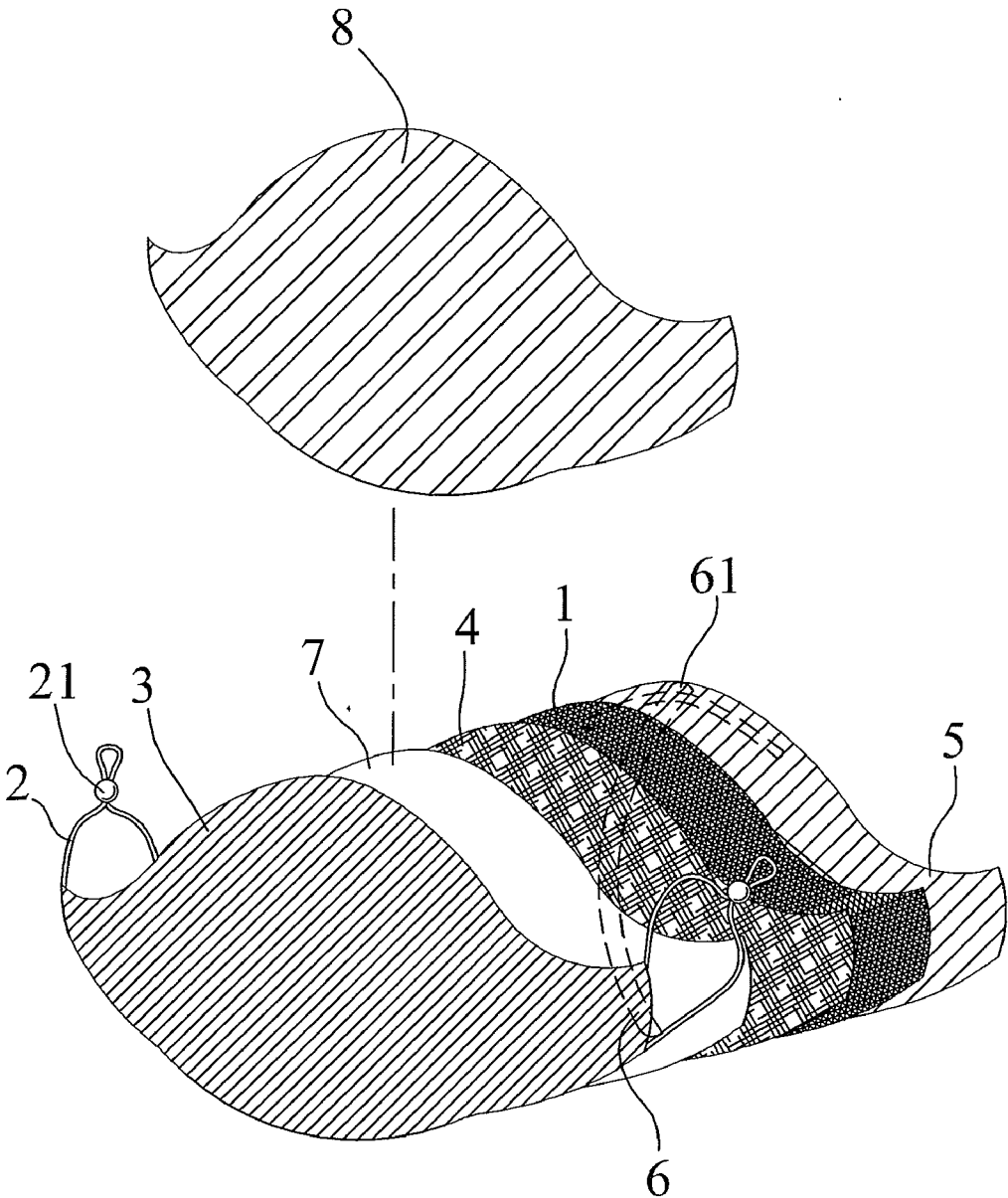


FIG. 7

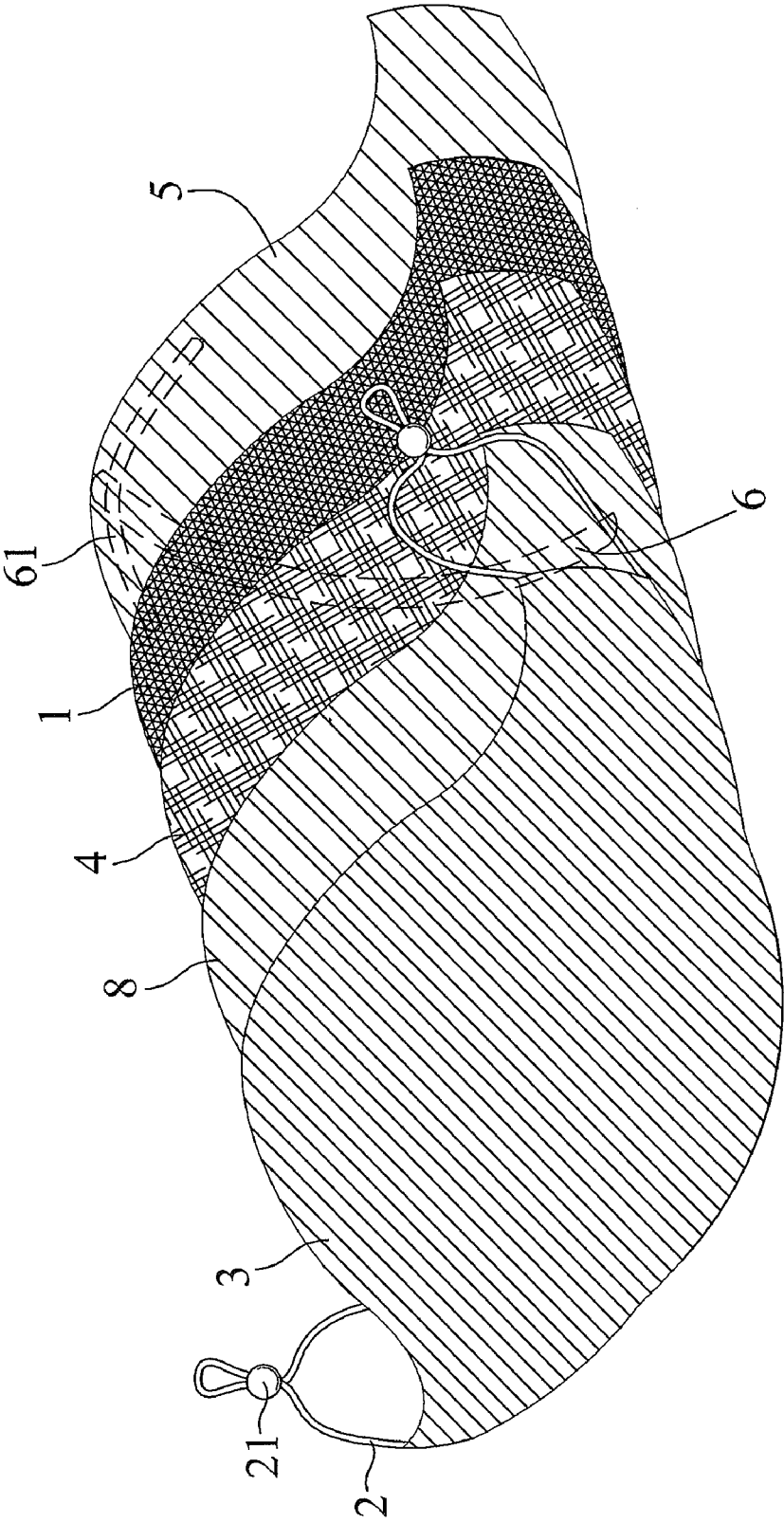


FIG. 8

MASK THAT PROVIDES A COMFORTABLE SENSATION TO A USER

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a mask and, more particularly, to an anti-virus mask.

[0003] 2. Description of the Related Art

[0004] A conventional mask comprises a mask body and two loop-shaped straps mounted on two opposite ends of the mask body. When in use, the straps are put on a user's ears, and the mask body is placed on the user's mouth and nose to isolate harmful substances, such as dust, bacteria and the like, from the user's mouth and nose so as to prevent the harmful substances from touching and entering the user's mouth and nose. However, each of the straps has a fixed size so that the size of each of the straps cannot be adjusted to fit that of different users, and the mask body cannot be placed on the user's mouth and nose exactly and closely, thereby decreasing the sealing effect of the mask. In addition, the mask body has a poor breathability and poor permeability so that when the user wears the mask body, the user cannot breathe smoothly, thereby easily causing an uncomfortable sensation to the user.

BRIEF SUMMARY OF THE INVENTION

[0005] In accordance with one embodiment of the present invention, there is provided a mask, comprising a thin film layer having a surface formed with a plurality of net-shaped irregular pores to provide a ventilating effect. The thin film layer is made of soft and tough material. The thin film layer is made of e-PTFE, TPE, TPEE, COC or FRP. Each of the pores of the thin film layer has a size smaller than that of dust, water molecule, bacterium and virus so that it can isolate the dust, water molecule, bacterium and virus efficiently so as to prevent the dust, water molecule, bacterium and virus from entering the thin film layer.

[0006] In accordance with another embodiment of the present invention, the mask further comprises two loop-shaped straps mounted on two opposite ends of the thin film layer respectively, and two adjusting rings each movably mounted on a respective one of the two straps.

[0007] In accordance with another embodiment of the present invention, the mask further comprises a lining cloth layer mounted on the first side of the thin film layer, a non-woven cloth layer having the first side mounted on a second side of the thin film layer, and an outer cloth layer mounted on a second side of the non-woven cloth layer. The outer cloth layer is provided with an additive. The additive of the outer cloth layer is a water-repellent agent, a Photocatalyst or a nano-silver antibacterial agent.

[0008] In accordance with another embodiment of the present invention, the mask further comprises a spacing layer mounted between the non-woven cloth layer and the outer cloth layer, and an active carbon layer mounted on a surface of the spacing layer and sandwiched in between the non-woven cloth layer and the outer cloth layer. The active carbon layer is removably mounted on the spacing layer for replacement of the active carbon layer.

[0009] In accordance with another embodiment of the present invention, the mask further comprises an active carbon layer directly mounted between the non-woven cloth layer and the outer cloth layer.

[0010] In accordance with another embodiment of the present invention, the mask further comprises a support bar mounted in the lining cloth layer, and a shaping bar mounted in the lining cloth layer. The support bar is sandwiched in between the lining cloth layer and the thin film layer and is located at a central portion of the lining cloth layer. The shaping bar is located at an upper portion of the lining cloth layer and has a middle portion abutting a top of the support bar.

[0011] The primary objective of the present invention is to provide a mask that providing a comfortable sensation to a user.

[0012] According to the primary objective of the present invention, the thin film layer is made of e-PTFE, TPE, TPEE, COC or FRP so that the thin film layer is soft and has a breathability and permeability effects to provide a comfortable sensation to the user.

[0013] According to another objective of the present invention, the thin film layer has a plurality of pores and each having a size smaller than that of the dust, water molecule, bacterium and virus to isolate the dust, water molecule, bacterium and virus efficiently so as to prevent the dust, water molecule, bacterium and virus from entering the thin film layer so that the thin film layer can isolate most of the harmful substances to protect the user's health.

[0014] According to a further objective of the present invention, the thin film layer is made of e-PTFE, TPE, TPEE, COC or FRP so that the thin film layer is waterproof, resistant to chemical agents, resistant to high and low temperature and is easily cleaned.

[0015] According to a further objective of the present invention, the thin film layer has a very small thickness and has a plurality of pores so that the thin film layer has a better ventilating effect to make the user breathe well.

[0016] According to a further objective of the present invention, when the loop-shaped straps are put on a user's ears, the adjusting rings are moved on the loop-shaped straps respectively to adjust the size of each of the loop-shaped straps so as to fit every user's face.

[0017] Further benefits and advantages of the present invention will becoming apparently after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0018] FIG. 1 is a perspective view of a mask in accordance with the preferred embodiment of the present invention.

[0019] FIG. 2 is a locally enlarged view of the mask as shown in FIG. 1.

[0020] FIG. 3 is a schematic operational view of the mask as shown in FIG. 1 in use.

[0021] FIG. 4 is a perspective view of a mask in accordance with another preferred embodiment of the present invention.

[0022] FIG. 5 is a side cross-sectional view of the mask as shown in FIG. 4.

[0023] FIG. 6 is a schematic view of a lining cloth layer of a mask in accordance with another preferred embodiment of the present invention.

[0024] FIG. 7 is an exploded perspective view of a mask in accordance with another preferred embodiment of the present invention.

[0025] FIG. 8 is a perspective view of a mask in accordance with another preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0026] Referring to the drawings and initially to FIGS. 1 and 2, a mask in accordance with the preferred embodiment of the present invention comprises a thin film layer 1 having a surface formed with a plurality of net-shaped irregular pores 11 to provide a ventilating effect. The thin film layer 1 is made of soft and tough material. In the preferred embodiment of the present invention, the thin film layer 1 is made of a material, such as e-PTFE (expanded polytetra-fluoro-ethylene), TPE (thermoplastic elastomer), TPEE (thermoplastic polyester/polyether elastomer), COC (cyclic olefin copolymer), FRP (fiber reinforced plastic) and the like. Each of the pores 11 of the thin film layer 1 has a size smaller than that of a dust, water molecule, bacterium and virus to isolate the dust, water molecule, bacterium and virus efficiently so as to prevent the dust, water molecule, bacterium and virus from entering the thin film layer 1.

[0027] The mask further comprises two loop-shaped straps 2 mounted on two opposite ends of the thin film layer 1 respectively, and two adjusting rings 21 each movably mounted on a respective one of the two straps 2.

[0028] Referring to FIG. 3, when the two loop-shaped straps 2 are put on a user's ears, each of the two adjusting rings 21 is moved on the respective strap 2 to adjust the size of the respective strap 2 so as to fit the user's ears.

[0029] Referring to FIGS. 4 and 5, the mask further comprises a lining cloth layer 5 mounted on the first side of the thin film layer 1, a non-woven cloth layer 4 having the first side mounted on the second side of the thin film layer 1, and an outer cloth layer 3 mounted on the second side of the non-woven cloth layer 4. The thin film layer 1 is sandwiched in between the lining cloth layer 5 and the non-woven cloth layer 4. The non-woven cloth layer 4 is sandwiched in between the thin film layer 1 and the outer cloth layer 3.

[0030] The outer cloth layer 3 is made of a mixed woven fiber cloth to isolate dust and bacteria having a larger size. Preferably, the outer cloth layer 3 is provided with an additive, such as a water-repellent agent, a Photocatalyst, a nano-silver antibacterial agent and the like. Thus, when the outer cloth layer 3 is provided with a water-repellent agent, the outer cloth layer 3 can enhance the waterproof effect of the mask, and when the outer cloth layer 3 is provided with a Photocatalyst or a nano-silver antibacterial agent, the outer cloth layer 3 can provide a sterilizing effect to kill the bacteria and virus.

[0031] The non-woven cloth layer 4 is made of a common fiber non-woven cloth to provide a ventilating effect and to utilize the static electricity to catch these harmful substances in the air. In addition, the non-woven cloth layer 4 increases the strength of the film.

[0032] The lining cloth layer 5 is attached to the user's mouth and nose. Preferably, the lining cloth layer 5 can provide a warming effect to the user when the ambient environment has a lower temperature.

[0033] Alternatively, referring to FIG. 6, the lining cloth layer 5 includes a core shell 53, a plurality of porous members 51 mounted on the core shell 53 and a plurality of phase change material 52 mounted on the core shell 53 and connected with the porous members 51. Thus, the lining cloth layer 5 can provide a cooling effect to the user when the ambient environment has a higher temperature.

[0034] Again referring to FIGS. 4 and 5, the mask further comprises a support bar 6 mounted in the lining cloth layer 5, and a shaping bar 61 mounted in the lining cloth layer 5. The support bar 6 is sandwiched in between the lining cloth layer 5 and the thin film layer 1 and is located at a central portion of the lining cloth layer 5. The support bar 6 has a substantially arc-shaped profile and is disposed at an upright state. The shaping bar 61 is sandwiched in between the lining cloth layer 5 and the thin film layer 1. The shaping bar 61 has a substantially arc-shaped profile and is disposed at a transverse state. The shaping bar 61 is located at an upper portion of the lining cloth layer 5 and has a middle portion abutting a top of the support bar 6. Thus, the support bar 6 co-operates with the shaping bar 61 to fit the user's face so as to facilitate the user wearing the mask.

[0035] Referring to FIG. 7, the mask further comprises a spacing layer 7 mounted between the non-woven cloth layer 4 and the outer cloth layer 3, and an active carbon layer 8 mounted on a surface of the spacing layer 7 and sandwiched in between the non-woven cloth layer 4 and the outer cloth layer 3. Furthermore, the active carbon layer 8 is removably mounted on the spacing layer 7 for replacement of the active carbon layer 8.

[0036] Referring to FIG. 8, the mask further comprises an active carbon layer 8 directly mounted between the non-woven cloth layer 4 and the outer cloth layer 3.

[0037] When in use, referring to FIGS. 1-8, the loop-shaped straps 2 are putting on a user's ears, and the adjusting rings 21 are moved on the loop-shaped straps 2 respectively to adjust the size of each of the loop-shaped straps 2 so as to fit the user's face.

[0038] In the preferred embodiment of the present invention, the mask comprises a thin film layer 1 having a plurality of pores 11. In such a manner, each of the apertures 11 of the thin film layer 1 has a size smaller than that of the dust, water molecule, bacterium and virus to isolate the dust, water molecule, bacterium and virus efficiently so as to prevent the dust, water molecule, bacterium and virus from entering the thin film layer 1 so that the thin film layer 1 can isolate most of the harmful substances to protect the user's health. In addition, the thin film layer 1 is made of e-PTFE, TPE, TPEE, COC or FRP so that the thin film layer 1 is waterproof, resistant to chemical agents and easily cleaned.

[0039] In the preferred embodiment of the present invention, the mask further comprises a lining cloth layer 5 mounted on the first side of the thin film layer 1, a non-woven cloth layer 4 mounted on the second side of the thin film layer 1, and an outer cloth layer 3 mounted on the non-woven cloth layer 4.

[0040] In such a manner, the outer cloth layer 3 has an excellent air permeability and can isolate dust and bacteria having a larger size. And further, the outer cloth layer 3 is provided with an additive, such as a water-repellent agent, a Photocatalyst, a nano-silver antibacterial agent and the like. Thus, when the outer cloth layer 3 is provided with a water-repellent agent, the outer cloth layer 3 is waterproof to protect the non-woven cloth layer 4, and when the outer cloth layer 3 is provided with a Photocatalyst, a nano-silver antibacterial agent, the outer cloth layer 3 can provide a sterilizing effect to kill the bacteria and virus. The non-woven cloth layer 4 can provide a ventilating effect and can filter dust particles whose diameter is about 0.1 μm to 0.3 μm . The lining cloth layer 5 can absorb the moisture and odor and has an air circulating and permeating effect. In addition, the lining cloth layer 5 can

provide a warming effect to the user when the ambient environment has a lower temperature.

[0041] In the preferred embodiment of the present invention, the lining cloth layer **5** includes a core shell **53**, a plurality of porous members **51** mounted on the core shell **53** and a plurality of phase change material **52** mounted on the core shell **53** and connected with the porous members **51**. In such a manner, the phase change material **52** has a heat absorbing and draining function to provide the lining cloth layer **5** a temperature adjusting effect to our skin. Thus, the lining cloth layer **5** can absorb and drain heat from the user to provide a cooling effect to the user when the ambient environment has a higher temperature.

[0042] In the preferred embodiment of the present invention, the mask further comprises an active carbon layer **8** mounted between the non-woven cloth layer **4** and the outer cloth layer **3**. In such a manner, the active carbon layer **8** can filter toxic items, chemical components, malodor and virus more efficiently to protect the user.

[0043] Accordingly, the thin film layer **1** has a plurality of apertures **11** each having a size smaller than that of the dust, water molecule, bacterium and virus to isolate the dust, water molecule, bacterium and virus efficiently so as to prevent the dust, water molecule, bacterium and virus from entering the thin film layer **1** so that the thin film layer **1** can isolate most of the harmful substances to protect the user's health from any danger of infection. In addition, the thin film layer **1** is made of e-PTFE, TPE, TPEE, COC or FRP so that the thin film layer **1** is soft and has a warming effect to provide a comfortable sensation to the user. Further, the thin film layer **1** is made of e-PTFE, TPE, TPEE, COC or FRP so that the thin film layer **1** is waterproof, resistant to chemical agents, resistant to high and low temperature and is easily cleaned. Further, the thin film layer **1** has a very small thickness and has a plurality of pores **11** so that the thin film layer **1** has a better ventilating effect to make the user breathe easy and well. Further, when the loop-shaped straps **2** are put on a user's ears, the adjusting rings **21** are moved on the loop-shaped straps **2** respectively to adjust the size of each of the loop-shaped straps **2** so as to fit the user's face.

[0044] Although the invention has been explained in relation to its preferred embodiment(s) as mentioned above, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the present invention. It is, therefore, contemplated that the appended claim or claims will cover such modifications and variations that fall within the true scope of the invention.

1. A mask, comprising:

a thin film layer having a surface formed with a plurality of net-shaped irregular pores to provide a ventilating effect;

the thin film layer is made of soft and tough material;

the thin film layer is made of e-PTFE (expanded polytetrafluoro-ethylene), TPE (thermoplastic elastomer), TPEE (thermoplastic polyester/polyether elastomer), COC (cyclic olefin copolymer) or FRP (fiber reinforced plastic);

each of the pores of the thin film layer has a size smaller than that of a dust, water molecule, bacterium and virus to isolate the dust, water molecule, bacterium and virus efficiently so as to prevent the dust, water molecule, bacterium and virus from entering the thin film layer.

2. The mask of claim **1**, wherein the mask further comprises:

two loop-shaped straps mounted on two opposite ends of the thin film layer respectively;

two adjusting rings each movably mounted on a respective one of the two straps.

3. The mask of claim **1**, wherein the mask further comprises:

a lining cloth layer mounted on the first side of the thin film layer;

a non-woven cloth layer having the first side mounted on the second side of the thin film layer;

an outer cloth layer mounted on a second side of the non-woven cloth layer.

4. The mask of claim **3**, wherein the outer cloth layer is provided with an additive.

5. The mask of claim **4**, wherein the additive of the outer cloth layer is a water-repellent agent, a Photocatalyst or a nano-silver antibacterial agent.

6. The mask of claim **3**, wherein the mask further comprises:

a spacing layer mounted between the non-woven cloth layer and the outer cloth layer;

an active carbon layer mounted on a surface of the spacing layer and sandwiched in between the non-woven cloth layer and the outer cloth layer.

7. The mask of claim **6**, wherein the active carbon layer is removably mounted on the spacing layer for replacement of the active carbon layer.

8. The mask of claim **3**, wherein the mask further comprises:

an active carbon layer directly mounted between the non-woven cloth layer and the outer cloth layer.

9. The mask of claim **1**, wherein the mask further comprises:

a support bar mounted in the lining cloth layer;

a shaping bar mounted in the lining cloth layer.

10. The mask of claim **9**, wherein the support bar is sandwiched in between the lining cloth layer and the thin film layer;

the support bar is located at a central portion of the lining cloth layer.

11. The mask of claim **9**, wherein the shaping bar is located at an upper portion of the lining cloth layer;

the shaping bar has a middle portion abutting a top of the support bar.

12. The mask of claim **9**, wherein the support bar has a substantially arc-shaped profile; the support bar is disposed at an upright state.

13. The mask of claim **9**, wherein the shaping bar is sandwiched in between the lining cloth layer and the thin film layer.

14. The mask of claim **9**, wherein the shaping bar has a substantially arc-shaped profile; the shaping bar is disposed at a transverse state.

15. The mask of claim **1**, wherein the thin film layer is sandwiched in between the lining cloth layer and the non-woven cloth layer.

16. The mask of claim **1**, wherein the non-woven cloth layer is sandwiched in between the thin film layer and the outer cloth layer.