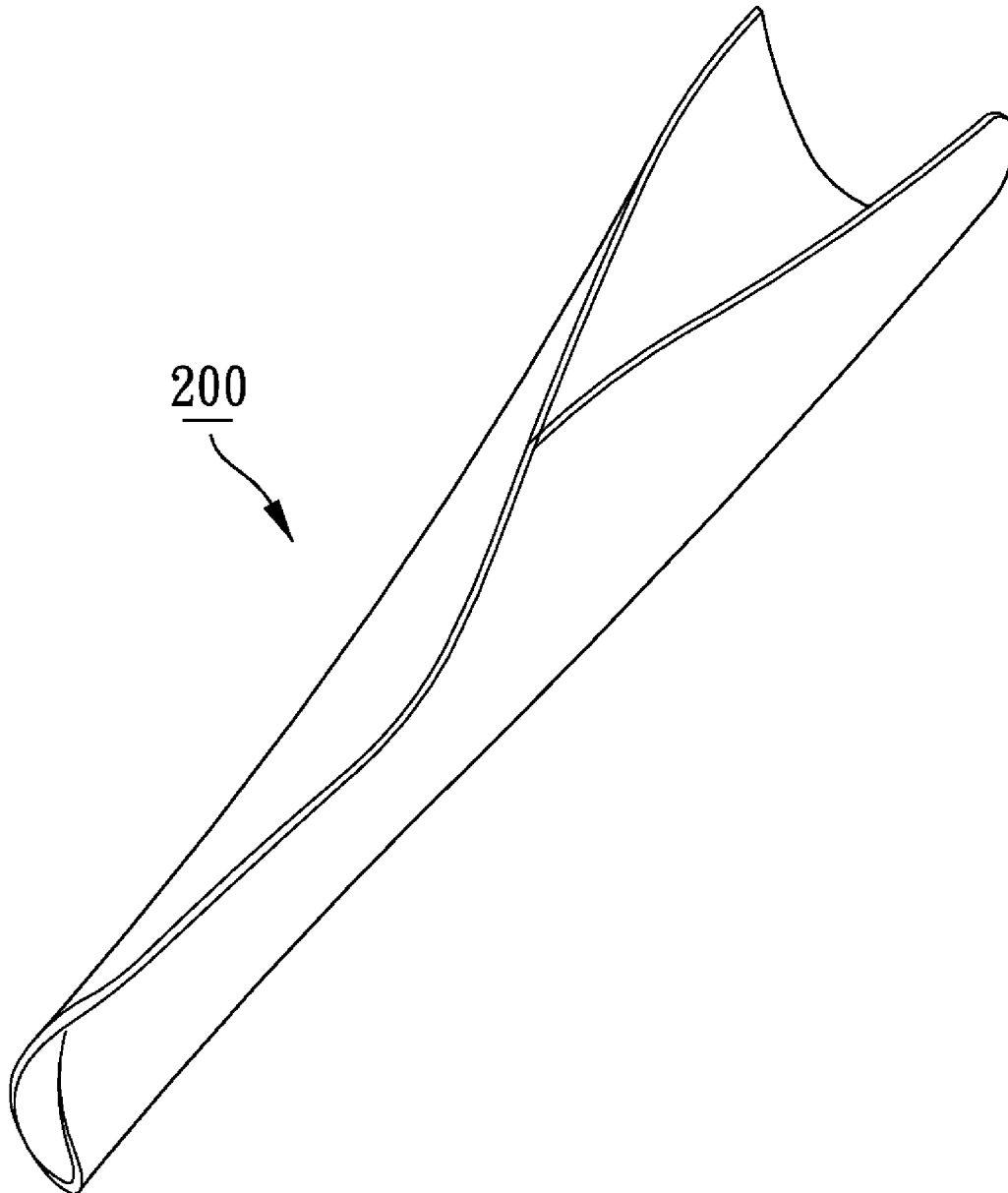




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(19) **United States**(12) **Patent Application Publication**
LIU(10) **Pub. No.: US 2014/0014232 A1**(43) **Pub. Date: Jan. 16, 2014**(54) **MOLDABLE FUNNEL**(76) Inventor: **Lai-Cheng LIU, (US)**(21) Appl. No.: **13/549,497**(22) Filed: **Jul. 15, 2012****Publication Classification**(51) **Int. Cl.**
B65B 1/04 (2006.01)(52) **U.S. Cl.**
USPC **141/391**(57) **ABSTRACT**

A moldable funnel is provided. A plurality of through holes are evenly arranged in a hand-moldable sheet, and at least parts of the through holes are unopened at a perimeter edge of the hand-moldable sheet. The hand-moldable sheet has shape-retention characteristics to retain the moldable funnel in a specific shape into which it is molded. Two covering layers at least cover two corresponding surfaces of the hand-moldable sheet respectively and are connected to each other via at least parts of the through holes. Whereby, the moldable funnel can be molded in a specific shape suitable for a specific space, so as to provide advantageous effects of adding liquid easily, conveniently, safely and rapidly, and the moldable funnel is light in weight, convenient for storage and space-saving.



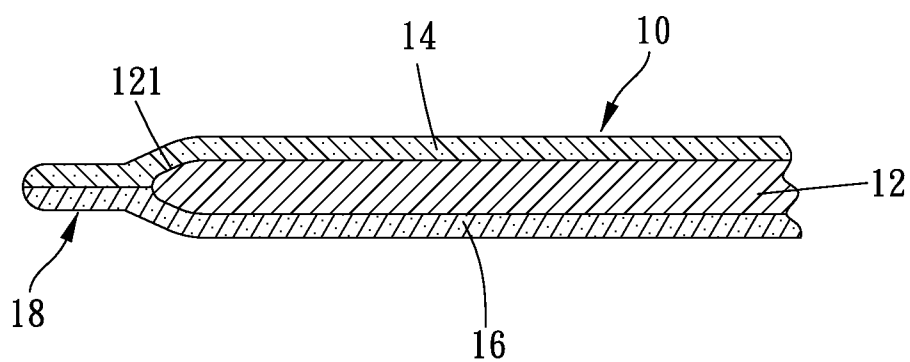
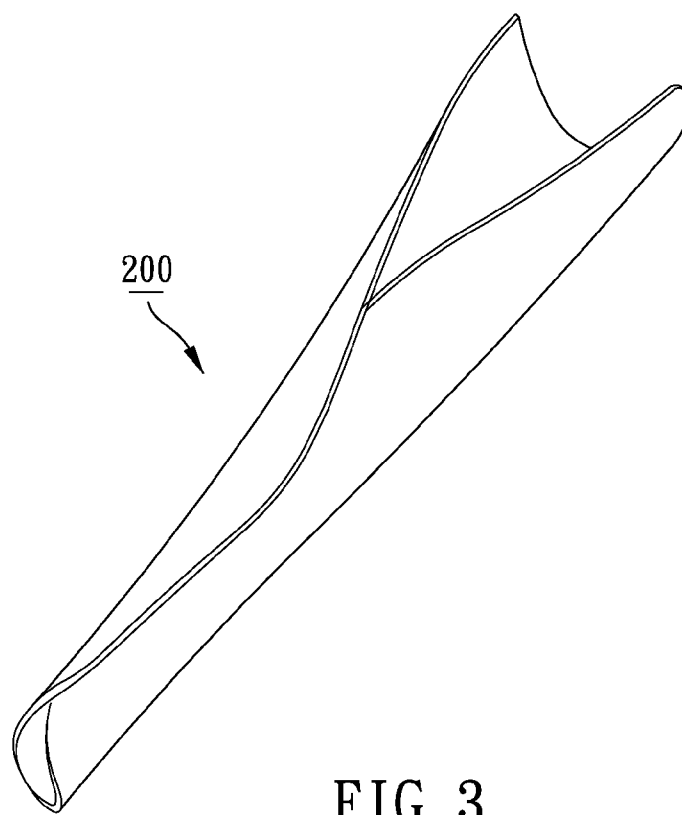
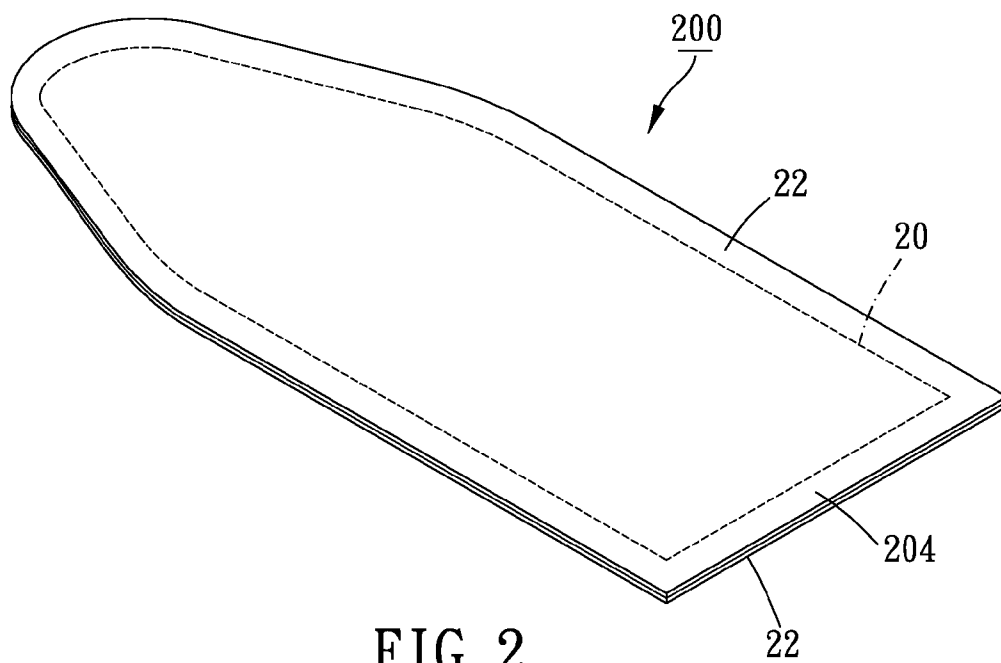


FIG. 1
PRIOR ART



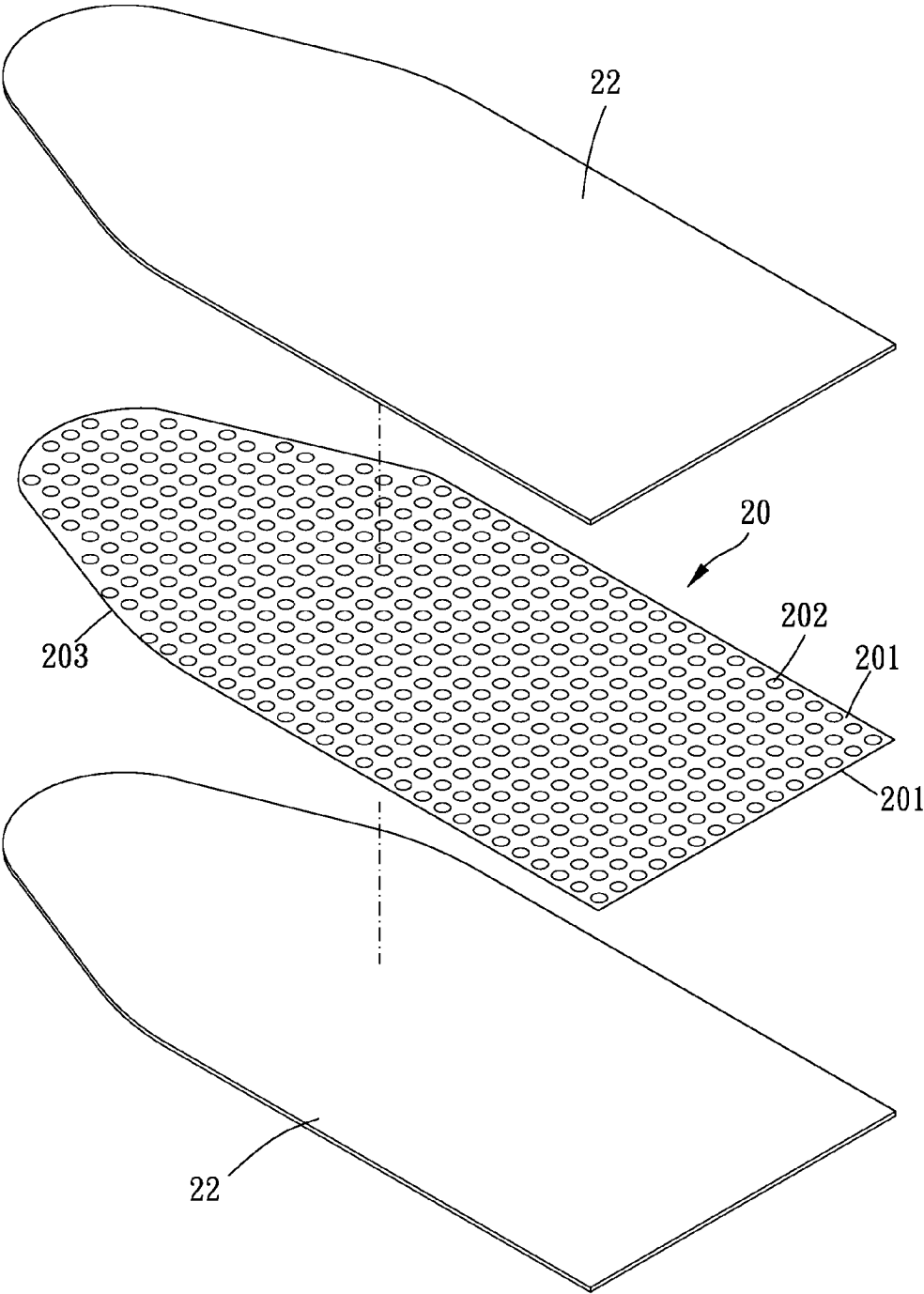


FIG. 4

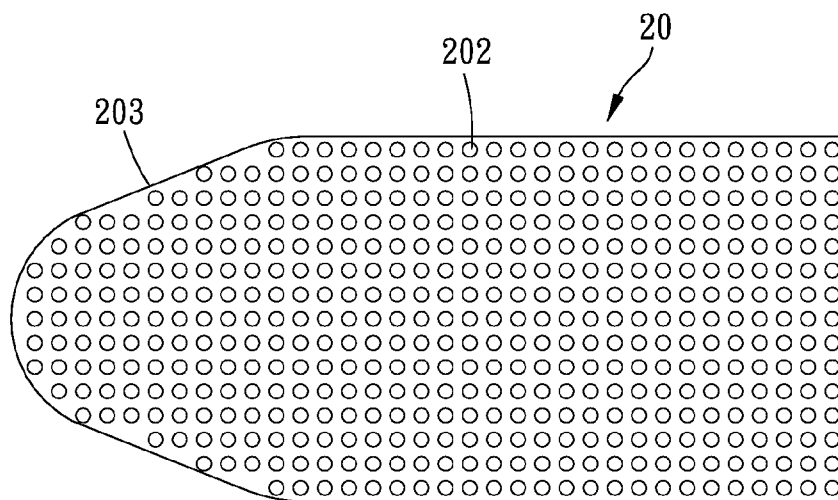


FIG. 5

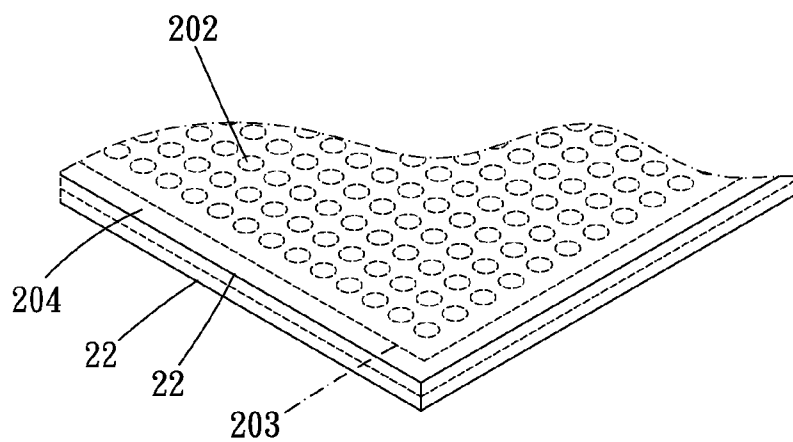


FIG. 6

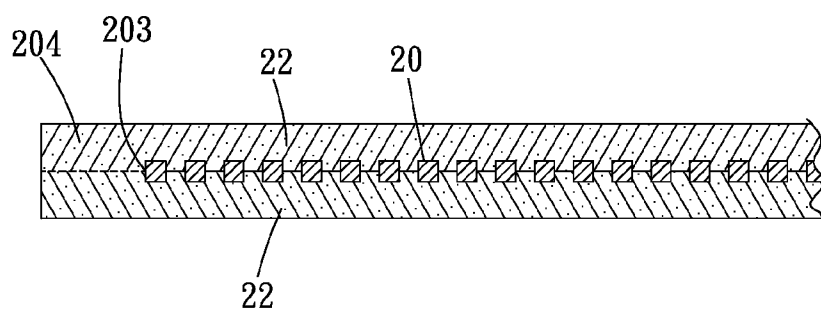


FIG. 7

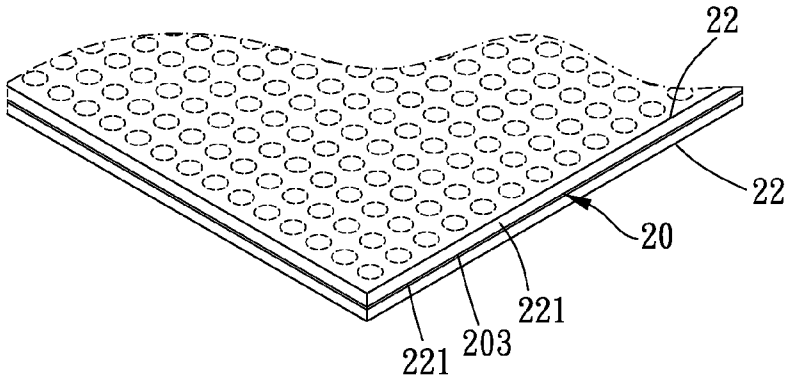


FIG. 8

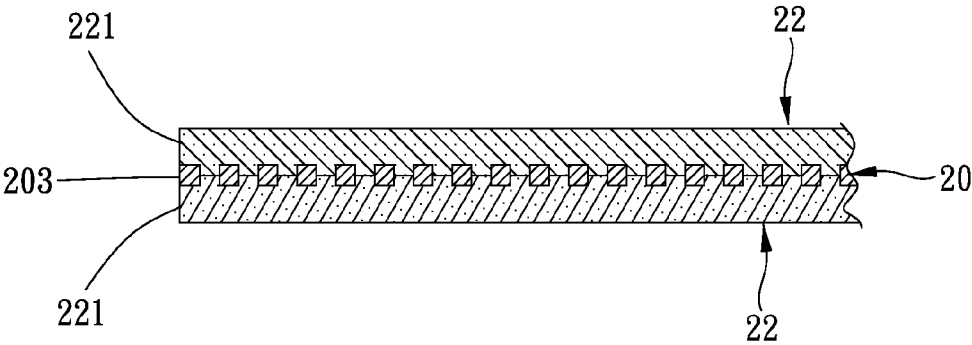


FIG. 9

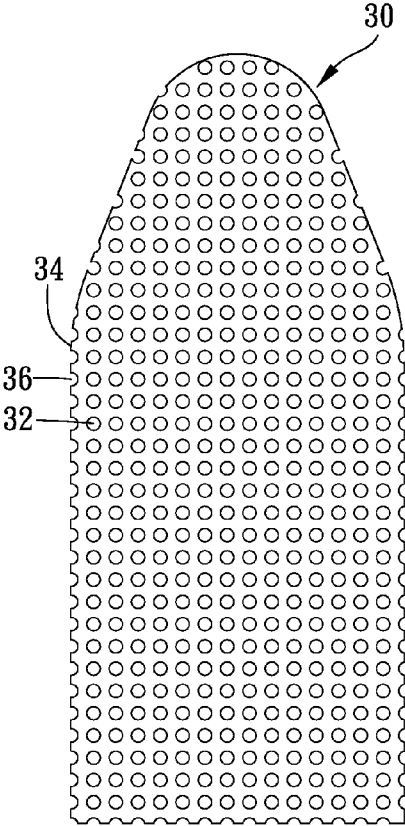


FIG. 10

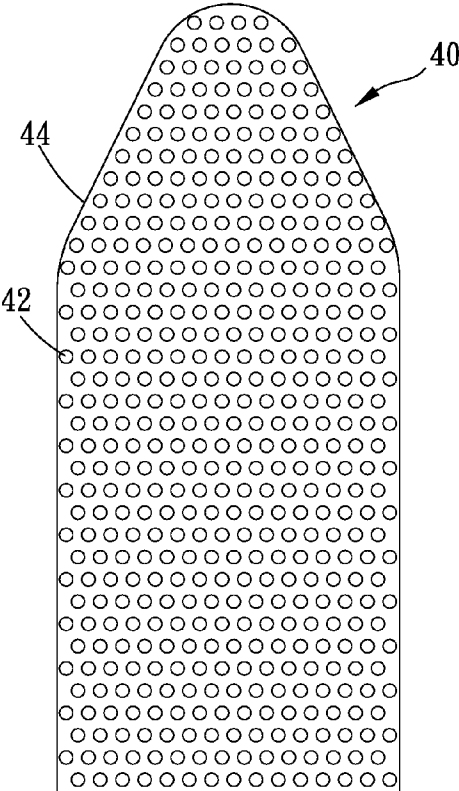


FIG. 11

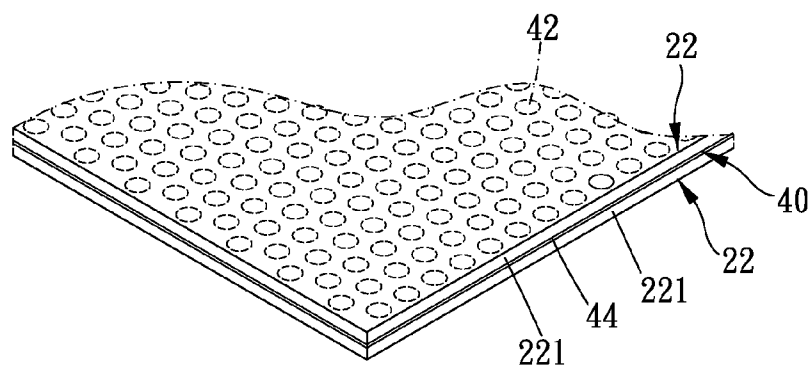


FIG. 12

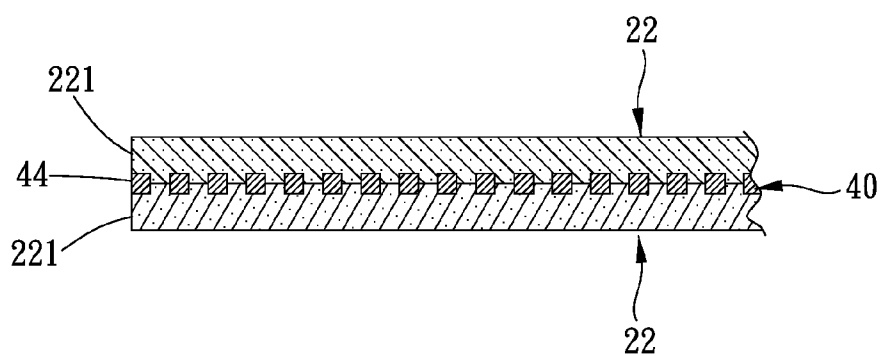


FIG. 13

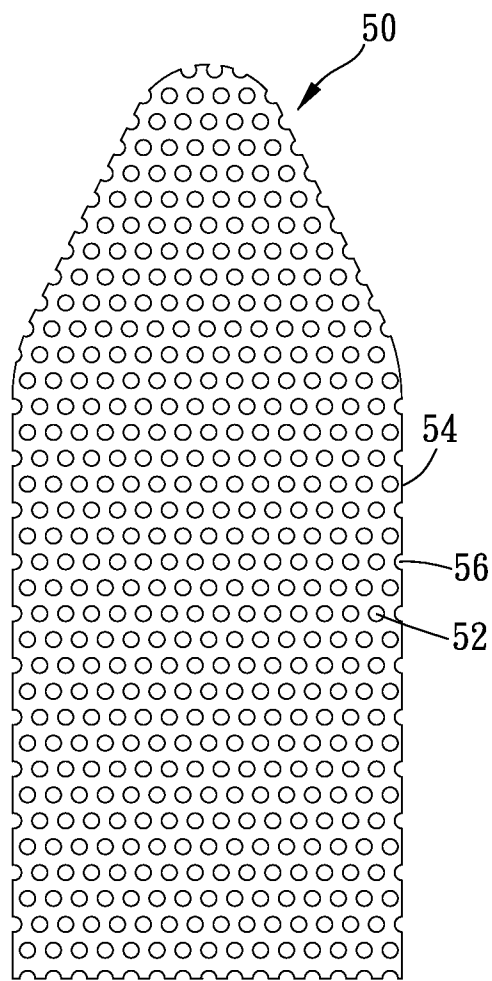


FIG. 14

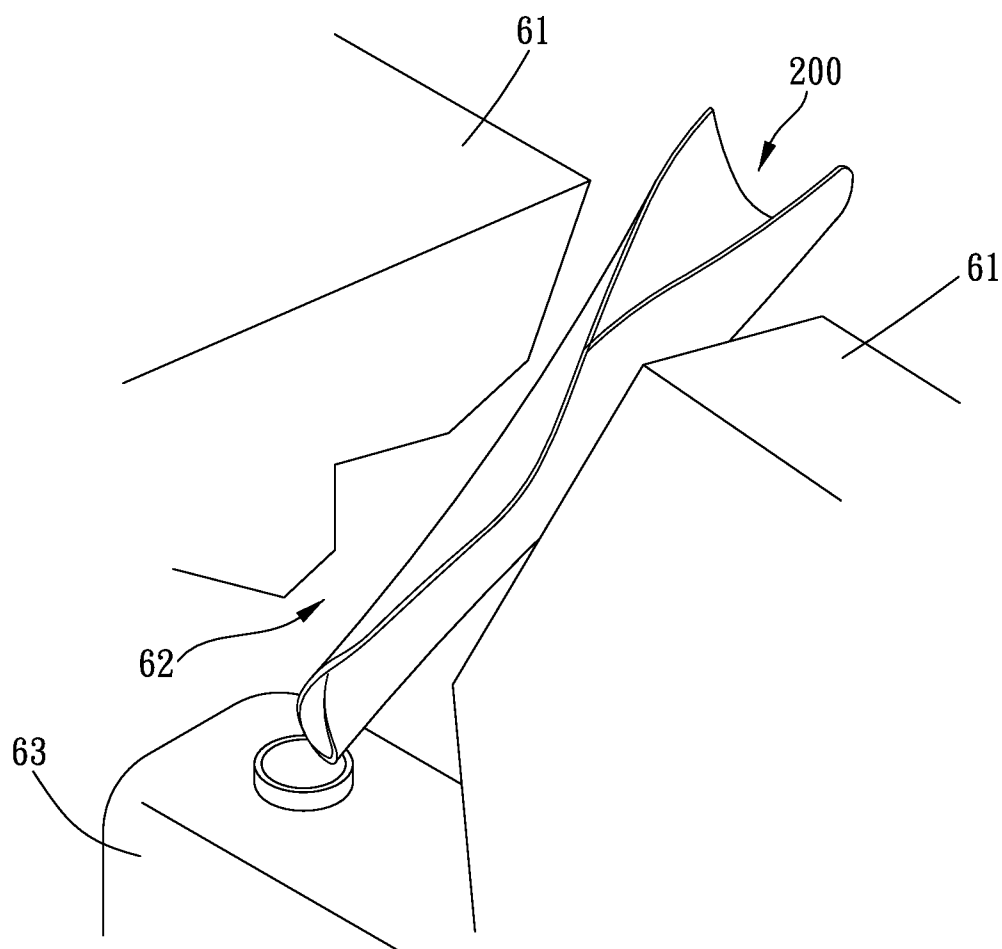


FIG. 15

MOLDABLE FUNNEL

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a funnel, more particularly, to a moldable funnel.

[0003] 2. Description of the Prior Art

[0004] For operations of many machines, lubrication or maintenance is necessarily required. Various functional liquids such as engine oil or transmission liquid has to be removed and added regularly for requirements of lubrication or maintenance, so as to assure the safety of driving, maintain parts of a machine to function regularly and increase lifetime of the machine. However, the liquid-adding task is usually carried out in a narrow or crooked space, so it is very inconvenient. Besides, since the narrow or crooked space is usually constructed of a plurality of parts that are hard and sharp, it can possibly cause damage to a hand of user. For facilitating the liquid-adding task and avoiding the escape of the liquid, a kind of moldable funnel is developed accordingly.

[0005] As shown in FIG. 1, a pliable surface construction **10** like the above-mentioned conventional liquid-adding tool is disclosed in U.S. Pat. No. 7,851,038. In U.S. Pat. No. 7,851,038, the pliable surface construction **10** comprises a pliable hand-moldable sheet **12** made of lead and two pliable covering layers **14**, **16**. The pliable covering layers **14**, **16** are adhered to and completely encompass the oppositely facing surfaces of the pliable hand-moldable sheet **12**. The two pliable covering layers **14**, **16** are larger in size than the hand-moldable sheet **12** and extend beyond the perimeter edge **121** of the pliable hand-moldable sheet **12**. The two pliable covering layers **14**, **16** are adhered together beyond the perimeter edge **121** to form a lip **18** surrounding the perimeter edge **121** of the hand-moldable sheet **12**. The pliable surface construction **10** comprises the thick lead-made hand-moldable sheet **12**, so that it is heavy in weight and not eco-friendly, and the pliable surface construction **10** is uneven after it is flattened, thus affecting another liquid-adding task. Furthermore, the two pliable covering layers **14**, **16** are disposed on the oppositely facing surfaces of the pliable hand-moldable sheet **12** via adhering and not connected together in the regions located correspondingly on the oppositely facing surfaces of the pliable hand-moldable sheet **12**, such that the combination strength of the two pliable covering layers **14**, **16** and the pliable hand-moldable sheet **12** is poor.

[0006] The present invention is, therefore, arisen to obviate or at least mitigate the above mentioned disadvantages.

SUMMARY OF THE INVENTION

[0007] The main object of the present invention is to provide a moldable funnel which can be manually molded into and retained in a specific shape suitable for a specific space, so as to provide advantageous effects of adding liquid easily, conveniently, safely and rapidly.

[0008] To achieve the above and other objects, a moldable funnel of the present invention includes a hand-moldable sheet and two covering layers.

[0009] The hand-moldable sheet includes two corresponding surfaces and a plurality of through holes. The through holes are evenly arranged in the hand-moldable sheet, and at least parts of the through holes are unopened at a perimeter edge of the hand-moldable sheet. The hand-moldable sheet has shape-retention characteristics to retain the moldable fun-

nel in a specific shape into which it is molded. The two covering layers at least cover the two corresponding surfaces of the hand-moldable sheet respectively and are connected to each other via at least parts of the through holes.

[0010] Whereby, since the hand-moldable sheet has shape-retention characteristics, the moldable funnel may be manually molded into and retained in a specific shape suitable for any specific, narrow or crooked space, so as to provide advantageous effects of adding liquid (such as oils, water or the like) easily, conveniently, safely and rapidly. Besides, the moldable funnel is also light-weight, easy to store and space-saving.

[0011] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment(s) in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a drawing showing a pliable surface construction disclosed in U.S. Pat. No. 7,851,038;

[0013] FIG. 2 is a perspective view of a moldable funnel according to a first embodiment of the present invention;

[0014] FIG. 3 is a drawing showing the moldable funnel in use according to the first embodiment of the present invention;

[0015] FIG. 4 is a perspective breakdown drawing of the moldable funnel according to the first embodiment of the present invention;

[0016] FIG. 5 is a drawing showing a hand-moldable sheet according to a first embodiment of the present invention;

[0017] FIG. 6 is a partial perspective drawing of the moldable funnel according to the first embodiment of the present invention;

[0018] FIG. 7 is a partial cross-sectional view of the moldable funnel according to the first embodiment of the present invention;

[0019] FIG. 8 is a partial perspective drawing of a moldable funnel according to another embodiment of the present invention;

[0020] FIG. 9 is a partial cross-sectional view of the moldable funnel according to another embodiment of the present invention;

[0021] FIG. 10 is a drawing showing a hand-moldable sheet according to another embodiment of the present invention;

[0022] FIG. 11 is a drawing showing a hand-moldable sheet according to a second embodiment of the present invention;

[0023] FIG. 12 is a partial perspective drawing of a moldable funnel according to the second embodiment of the present invention;

[0024] FIG. 13 is a partial cross-sectional view of the moldable funnel according to the second embodiment of the present invention;

[0025] FIG. 14 is a drawing showing another hand-moldable sheet according to the second embodiment of the present invention; and

[0026] FIG. 15 is a drawing showing a moldable funnel being applied to a space according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] As shown in FIGS. 2 to 7, a moldable funnel **200** of a first embodiment according to the present is provided. The

moldable funnel **200** is adapted for applying to a space which is specific, narrow or crooked. The moldable funnel **200** is of a moldable construction and can be manually molded into and retained in a specific shape suitable for the specific, narrow or crooked space, so as to facilitate the task of adding liquids such as oils or water.

[0028] The moldable funnel **200** includes a hand-moldable sheet **20** and two covering layers **22**. The moldable funnel **200** is substantially flat before it is molded (as shown in FIG. 2) and includes a first portion which is substantially rectangular and a second portion which integrally taperedly extends from the rectangular first portion, and the front end of the second portion is substantially arcuate. The moldable funnel **200** can be retained in the specific shape after molded (as shown in FIG. 3).

[0029] The hand-moldable sheet **20** includes two corresponding surfaces **201** and a plurality of through holes **202**. The through holes **202** are evenly arranged in the hand-moldable sheet **20**, and at least parts of the through holes **202** are unopened at a perimeter edge **203** of the hand-moldable sheet **20**. More specifically, in this embodiment, the through holes **202** are evenly arranged in array in the hand-moldable sheet **20** along a direction which is perpendicular to the two corresponding surfaces **201** of the hand-moldable sheet **20**, and all of the through holes **202** are unopened at the perimeter edge **203** of the hand-moldable sheet **20**. The hand-moldable sheet **20** has shape-retention characteristics to retain the moldable funnel **200** in the specific shape into which it is molded. In this embodiment, the hand-moldable sheet **20** is made of aluminum which has better re-conversing ability; however, the hand-moldable sheet **20** may be made of lead or other suitable materials as long as the materials have shape-retention characteristics.

[0030] The hand-moldable sheet **20** may be manufactured by being cut not through any through hole **202**, such that the perimeter edge **203** of the hand-moldable sheet **20** is substantially smooth (as shown in FIGS. 4 and 5). More specifically, the hand-moldable sheet **20** is manufactured by being cut along the intermediate between each two adjacent through holes **202** according a required specific shape.

[0031] The two covering layers **22** at least cover the two corresponding surfaces **201** of the hand-moldable sheet **20** respectively and are connected to each other via at least parts of the through holes **202**. The two covering layers **22** are connected via at least parts of the through holes **202**, and thus enhancing the combination strength of the two covering layers **22**. More specifically, in this embodiment, the two covering layers **22** cover the two corresponding surfaces **201** of the hand-moldable sheet **20** respectively, are connected to each other via all of the through holes **202**, and are further connected together beyond the perimeter edge **203** of the hand-moldable sheet **20**. That is, the hand-moldable sheet **20** is entirely covered by the two covering layers **22**. Parts of the covering layers **22** beyond the perimeter edge **203** of the hand-moldable sheet **20** are connected together to form a lid **204** which extends outwardly from the perimeter edge **203** of the hand-moldable sheet **20** (as shown in

[0032] FIGS. 6 and 7). Preferably, the extent of the lid **204** extending outwardly from the perimeter edge **203** is greater than the diameter of the through hole **202**, and more preferably greater than three times of the diameter of the through hole **202**. In fact, the extent of the lid **204** may be varied according to various requirements, so as to enhance the combination of the two covering layers **22** and prevent the separation of the two covering layers **22**.

The two covering layers **22** may be made of rubber such as, but not limited to, neoprene rubber, butyl rubber, acrylonitrile butadiene rubber (nitril rubber). Preferably, the two covering layers **22** are made of a material which is pliable but strong, scrape-proof, abrasion-proof, light-weight and stretchable, such that the hand-moldable sheet **20** can be well protected, and the hand-moldable sheet **20** and the covering layers **22** can be connected together tightly and homogeneously molded.

[0033] The combination of the hand-moldable sheet **20** and the two covering layers **22** may be carried out preferably via hot pressing, so that the two covering layers **22** are slightly melted to be able to flow through the through holes **202** and integrated together, and parts of the two covering layers **22** are further integrated together beyond the perimeter edge **203** of the hand-moldable sheet **20**. After the hot pressing is completed, the parts of the two covering layers **22** integrated in the through holes **202** and beyond the perimeter edge **203** are cooled and solidified to form an integral structure, that is, the two covering layers **22** are integrated in an integral structure and completely cover the hand-moldable sheet **20**.

[0034] Additionally, in other embodiment, the two covering layers **22** may be adhered to the two corresponding surfaces **201** of the hand-moldable sheet **20** respectively via an adhering material such as adhering gel (not shown) (i.e., the two covering layers **22** may not be connected to each other via the through holes **202**). Parts of the two covering layers **22** may be selectively integrated together beyond the perimeter edge **203** of the hand-moldable sheet **20**, namely, the two covering layers **22** do not entirely integrated together. Alternatively, each of the two covering layers **22** may be dimensioned in a size that is substantially equal to that of the hand-moldable sheet **20**, and the two covering layers **22** may be disposed respectively on the two corresponding surfaces **201** of the hand-moldable sheet **20** via hot pressing or adhering, such that perimeter edges **221** of the two covering layers **22** are substantially aligned with the perimeter edge **203** of the hand-moldable sheet **20** (as shown in FIGS. 8 and 9).

[0035] As shown in FIG. 10, in another embodiment, a hand-moldable sheet **30** including a plurality of through holes **32** is provided, in which the through holes **32** are substantially arranged in array. A perimeter edge **34** of the hand-moldable sheet **30** is formed with a plurality of openings **36** that open outwardly. The openings **36** may be formed by cutting the hand-moldable sheet **30** through parts of the through holes **32**. More specifically, the hand-moldable sheet **30** is formed with the openings **36** with a substantially fixed spacing, by cutting the hand-moldable sheet **30** through parts of the through holes **32** near the perimeter edge **34**. Melted portions of the two covering layers are allowed to go through the openings **36** and then be cooled and connected together, thus further enhancing the combination strength of the perimeter edges of the two covering layers and the perimeter edge **34** of the hand-moldable sheet **30**. The effect of enhancing combination strength can also be achieved in such a manner that the two covering layers and the hand-moldable sheet **30** are combined via hot pressing or adhering, the hand-moldable sheet **30** is entirely covered, or the perimeter edges of the two covering layers are aligned with the perimeter edge **34** of the hand-moldable sheet **30**.

[0036] As shown in FIGS. 11 to 13, a second embodiment of moldable funnel **40** according to the invention is provided. In this embodiment, a plurality of through holes **42** of the hand-moldable sheet **40** are substantially alternatively dis-

posed in line and row and penetrate through the hand-moldable sheet 40. The hand-moldable sheet 40 is formed without any through hole 42 being cut through, and formed with a substantially smooth perimeter edge 44 with out any opening. More specifically, the hand-moldable sheet 40 is manufactured by being cut along the intermediate between each two adjacent through holes 42 according a required specific shape. Similarly, the hand-moldable sheet 40 may be entirely covered by the two covering layers 22. Alternatively, the perimeter edge 44 of the hand-moldable sheet 40 may be not covered by the two covering layers 22, and the perimeter edges 221 of the two covering layers 22 are substantially aligned with the perimeter edge 44 of the hand-moldable sheet 40 (as shown in FIGS. 12 and 13). In addition, the two covering layers 22 may be disposed on the two corresponding surfaces of the hand-moldable sheet 40 respectively via hot pressing or adhering, and the two covering layers 22 may be adhered only to the two corresponding surfaces of the hand-moldable sheet 40 and not be combined together via the through holes 42. Since the through holes 42 are substantially alternatively disposed in line and row in the hand-moldable sheet 40, the two covering layers 22 may be connected together without continuous-unconnected portions in the same line and the same row, thus further enhancing the combination strength of the two covering layers 22. It is noted that parts of the covering layers 22 beyond the perimeter edge 44 of the hand-moldable sheet 40 may be connected together to form a lid which extends outwardly from the perimeter edge 44 of the hand-moldable sheet 40.

[0037] As shown in FIG. 14, a hand-moldable sheet 50 including a plurality of through holes 52 is provided. A perimeter edge 54 of the hand-moldable sheet 50 is formed with a plurality of openings 56 that open outwardly. The openings 56 may be formed by cutting the hand-moldable sheet 50 through parts of the through holes 52. The arrangement of the openings 56 at the perimeter edge 54 of the hand-moldable sheet 50 can help to enhance the combination strength of the perimeter edges of the two covering layers and the perimeter edge 54 of the hand-moldable sheet 50. Alternatively, parts of the covering layers beyond the perimeter edge 54 of the hand-moldable sheet 50 may be connected together to form a lid which extends outwardly from the perimeter edge 54 of the hand-moldable sheet 50.

[0038] As shown in FIG. 15, the moldable funnel 200 is adapted to use in a narrow or crooked space 62 which is constructed of parts. The moldable funnel 200 is manually molded into and retained in a specific shape suitable for the narrow or crooked space 61, so as to carry out a task of adding water into a radiator 63 of automobile or adding oil or the like into a container.

[0039] Given the above, since the hand-moldable sheet has shape-retention characteristics and the materials of the two covering layers are pliable, strong and stretchable, the moldable funnel can be retained in a specific shape such as tubular shape or the like after molded. The tubular moldable funnel can further be bent according to various requirements, so that it can favorably and smoothly pass through the narrow or crooked space. Hence, when a user carries out a liquid-adding task in a specific, narrow or crooked space (for example, adding of engine oil, adding of transmission fluid, adding of water into a radiator, or adding of water into a container of windshield washer device), the moldable funnel can be manually molded into and retained in the specific

shape suitable for the specific, narrow or crooked space, so as to facilitate the liquid-adding task.

[0040] Furthermore, the two covering layer may be combined together via the through holes and combined together beyond the perimeter edge of the hand-moldable sheet, thus enhancing the combination strength of the two covering layers.

[0041] Generally speaking, since the specific, narrow or crooked space is usually constructed of a plurality of parts of an apparatus or device, and the parts are usually hard and sharp, it can possibly cause damage to a hand of user. However, by using the moldable funnel of the invention, the user can carry out the liquid-adding task without hands reaching into the specific space, thus preventing the user from being injured and enhancing the safety of use. Also, since the two covering layers are made of materials that are pliable but strong, scrape-proof, abrasion-proof and stretchable, it can prevent the moldable funnel from being scraped or damaged when the moldable funnel is put into the specific space, and the lifetime is thereof increased.

[0042] Additionally, the hand-moldable sheet and the covering layers are made of light-weight materials, and the total weight of the moldable funnel can be therefore lowered.

[0043] Besides, after a liquid-adding task is completed, the moldable funnel can be selectively flatted or rolled up, so as to facilitate storage and save space.

[0044] Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

What is claimed is:

1. A moldable funnel, including:

a hand-moldable sheet, including two corresponding surfaces and a plurality of through holes, the through holes being evenly arranged in the hand-moldable sheet, at least parts of the through holes being unopened at a perimeter edge of the hand-moldable sheet, and the hand-moldable sheet having shape-retention characteristics to retain the moldable funnel in a specific shape into which it is molded; and

two covering layers, at least covering the two corresponding surfaces of the hand-moldable sheet respectively and being connected to each other via at least parts of the through holes.

2. The moldable funnel of claim 1, wherein the through holes are substantially disposed in array and penetrate through the hand-moldable sheet.

3. The moldable funnel of claim 1, wherein the through holes are substantially alternatively disposed in line and row and penetrate through the hand-moldable sheet.

4. The moldable funnel of claim 1, wherein the perimeter edge of the hand-moldable sheet is formed with a plurality of openings that open outwardly.

5. The moldable funnel of claim 1, wherein the hand-moldable sheet is made of aluminum.

6. The moldable funnel of claim 1, wherein the covering layers is adhered to the two corresponding surfaces of the hand-moldable sheet.

7. The moldable funnel of claim 1, wherein the covering layers are further connected together beyond the perimeter edge of the hand-moldable sheet.

8. The moldable funnel of claim 2, wherein the covering layers are further connected together beyond the perimeter edge of the hand-moldable sheet.

9. The moldable funnel of claim 3, wherein the covering layers are further connected together beyond the perimeter edge of the hand-moldable sheet.

10. The moldable funnel of claim 4, wherein the covering layers are further connected together beyond the perimeter edge of the hand-moldable sheet.

11. The moldable funnel of claim 5, wherein the covering layers are further connected together beyond the perimeter edge of the hand-moldable sheet.

12. The moldable funnel of claim 6, wherein the covering layers are further connected together beyond the perimeter edge of the hand-moldable sheet.

13. The moldable funnel of claim 1, wherein the covering layers uncover and are substantially aligned with the perimeter edge of the hand-moldable sheet.

14. The moldable funnel of claim 2, wherein the covering layers uncover and are substantially aligned with the perimeter edge of the hand-moldable sheet.

15. The moldable funnel of claim 3, wherein the covering layers uncover and are substantially aligned with the perimeter edge of the hand-moldable sheet.

16. The moldable funnel of claim 4, wherein the covering layers uncover and are substantially aligned with the perimeter edge of the hand-moldable sheet.

17. The moldable funnel of claim 5, wherein the covering layers uncover and are substantially aligned with the perimeter edge of the hand-moldable sheet.

18. The moldable funnel of claim 6, wherein the covering layers uncover and are substantially aligned with the perimeter edge of the hand-moldable sheet.

* * * * *