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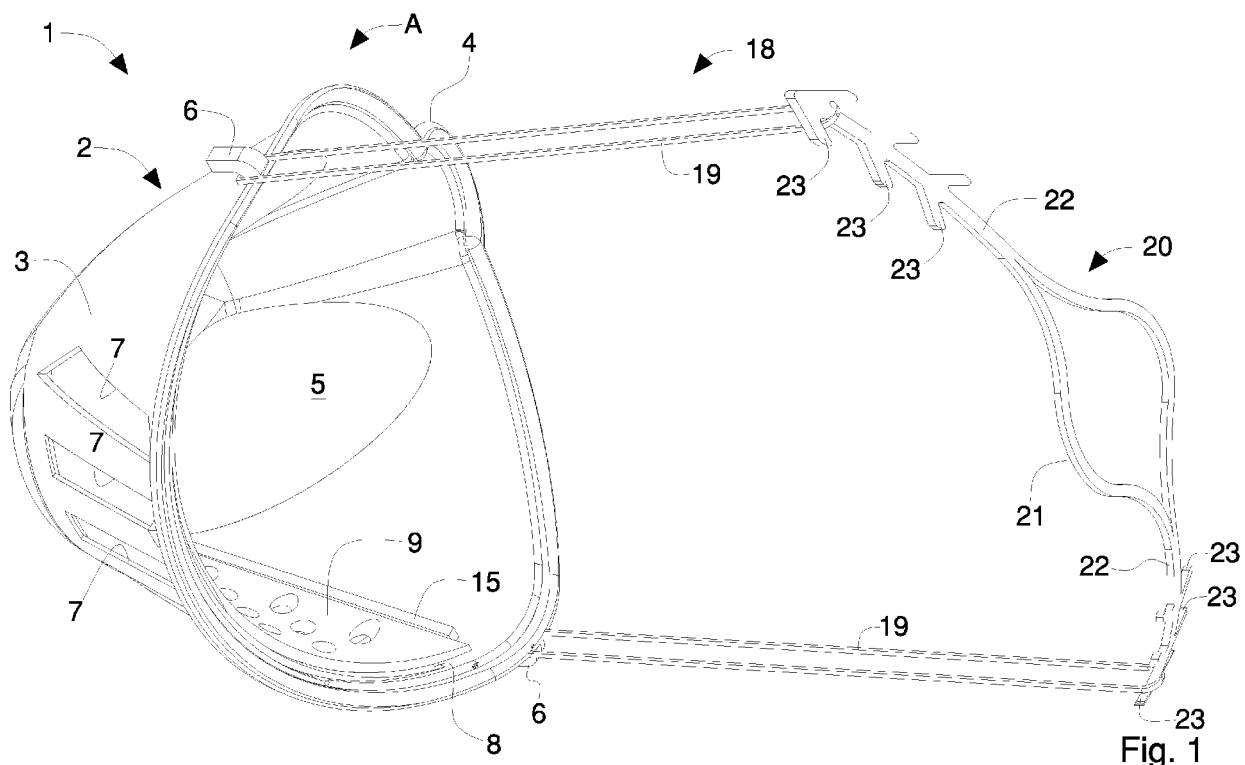
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(54) BREATHING MASK

(57) A breathing mask (1) comprises: a mask body (2) to cover the airways of a user, which mask body (2) includes a shaped portion (3) provided with at least one opening (7) to promote an air passage between the inside and outside of the mask body (2); filtering means (8) for filtering air entering and/or exiting mask body (2); and fixing means (9) for fixing the filtering means (8) to the

mask body (2); in which the fixing means (9) is slidably couplable with an inner wall (10) of the shaped portion (3) and is provided with at least one hooking element (11) configured for engaging releasably in the at least one opening (7) so as to retain the filtering means (8) between the inner wall (10) and the fixing means (9).

**Fig. 1****EP 3 925 472 A1**

Description

[0001] The invention relates to a breathing mask.

[0002] In particular the invention refers to a breathing mask to protect the respiratory apparatus from inhaling ambient particles like pathogenic agents, for example viruses, bacteria and/or polluting agents, for example particulate, and at the same time avoid dispersion of pathogenic agents dispersed in respiratory droplets that may exit the mouth or nose of the person wearing it.

[0003] Still more precisely, the invention relates to a breathing mask with free ventilation that filters the air traversing the mask in which the ventilation occurs entirely through the breathing of the person wearing the mask.

[0004] Breathing masks of stiff or semi-stiff cap shape are known, and foldable breathing masks, the so-called "surgical masks".

[0005] In the present description, reference is made to stiff or semi-stiff breathing masks in the form of a cap.

[0006] In the industrial sector of protection systems for protecting the respiratory apparatus, breathing masks are known comprising a mask body in the form of a shaped cap, which is so configured as to be worn by the user to cover the main airways, i.e. the nose and mouth, thus forming a breathing chamber. Such breathing masks further comprise filter cartridges that enable the user to breathe in clean air and/or to breathe out carbon dioxide without spreading pathogenic agents beyond the mask. Known filter cartridges are configured for being fixed removably to a side portion of the mask body to permit replacement thereof after a given period of use. Also, known breathing masks comprise retaining devices for retaining on the head of the user that are fixed to the sides of the mask body. In particular, retaining devices are known comprising two cords each sewn onto a side of the mask body so as to form a slot through which it is possible to anchor a respective ear or cords with free ends that are tieable behind the head or also elastic belts that are intended to be stretched behind the head of the user.

[0007] One drawback of known breathing masks is that it is particularly laborious to replace the filter cartridges. In fact, complex manual assembly operations are often required of the user that are not always within the reach of elderly or very young users.

[0008] Another drawback of known breathing masks is that they use expensive filter cartridges and require particular attention to transport and conservation.

[0009] Another further drawback of known breathing masks is that they are inconvenient to use for a prolonged time. It in fact often occurs that after a short period of use the user can feel soreness or even scratches at the zones of the ear in direct contact with the cords or discomfort due to the excessive compression exerted on the head by the elastic belts.

[0010] One object of the invention is to improve breathing masks, in particular breathing masks with free venti-

lation.

[0011] A further object is to supply breathing masks that enable filtering means included therein to be replaced.

[0012] Another further object is to provide breathing masks that enable filtering means to be used that are cheap and easy to transport and store.

[0013] Still another object is to provide breathing masks that are easy to wear.

[0014] These objects and still others are achieved by a breathing mask according to one or more of the claims set out below.

[0015] The invention can be better understood and implemented with reference to the attached drawings that illustrate an embodiment thereof by way of non-limiting example, in which:

Figure 1 is a schematic perspective view of a breathing mask according to the invention;

Figure 2 is a view like that of Figure 1, of an exploded view of the breathing mask according to the invention;

Figure 3 is a schematic perspective view of a part of the breathing mask according to the invention;

Figure 4 is a schematic frontal view of the part of the breathing mask of Figure 3;

Figure 5 is a view like that of Figure 4, inside the part of the breathing mask of Figure 3;

Figure 6 is a schematic side view of the part of the breathing mask of Figure 3;

Figure 7 is a schematic bottom view of the part of the breathing mask of Figure 3;

Figure 8 is a schematic frontal view of a retaining element included in the breathing mask according to the invention;

Figure 9 is a schematic frontal view of an exploded view of the part of the breathing mask of Figure 3; and

Figure 10 is a schematic perspective view of a partial exploded view of the part of the breathing mask of Figure 3.

[0016] With reference to Figures 1 to 10, a breathing mask 1 according to the invention is illustrated. The breathing mask 1 is configurable for protecting the human breathing apparatus from the inhalation of ambient particles, such as pathogenic agents, for example viruses, bacteria and/or polluting agents, for example particulate, and at the same time avoiding the dispersal of pathogenic agents dispersed in respiratory droplets that may exit from the mouth and nose of the person wearing the mask. Also, the breathing mask 1 is of the free ventilation type, in which ventilation occurs entirely by the breathing of the user wearing the mask.

[0017] The breathing mask 1 according to the invention comprises a mask body 2, in the shape of a shaped cap, shaped to cover the airways of the user. In particular, when worn, the breathing mask 1 forms, by means of the mask body 2, a breathing chamber intended to be tra-

versed by the air exhaled and inhaled by the user. Also, the mask body 2 is made of one of the following materials: thermoplastic elastomer, for example SBS, SEBS, TPV, silicone, natural rubber, PVC, which are washable in microwave ovens. In a preferred embodiment of the invention, antibacterial additives are added to these materials.

[0018] The mask body 2 comprises a shaped lower portion 3, substantially facing, in use, the mouth of the user. Also, the mask body 2 comprises an upper shaped portion 4 so as to enclose the nose of the user by following the anatomical conformation thereof. The mask body 2 further comprises a pair of depressions 5, positioned to the sides of the upper shaped portion 4, to promote the manipulation of the breathing mask 1 by the user. Also, the mask body 2 comprises a pair of hook-shaped side projections 6, the function of which will be disclosed below.

[0019] The shaped lower portion 3 is provided with at least one opening 7, in particular with five openings 7 of substantially rectangular shape arranged substantially parallel to one another, to promote the passage of air inside and outside the mask body 2. In particular, the openings 7 extend substantially over the entire length of the shaped lower portion 3.

[0020] The breathing mask 1 further comprises filtering means 8 for filtering the air entering and/or exiting the mask body 2, in particular to enable the user to inhale clean air and exhale carbon dioxide without dispersing pathogenic agents beyond the breathing mask 1.

[0021] Advantageously, the filtering means comprises at least one cellulose paper handkerchief 8 of the disposable type, or another handkerchief already presented as antibacterial or antiallergic in use for neonates that is already certified by the ministry of health.

[0022] Also, the breathing mask 1 comprises fixing means 9 for fixing the filtering means 8 to the mask body 2. The fixing means 9 is slidably couplable with an inner wall 10 of the shaped lower portion 3 and is provided with at least one hooking element 11 configured for engaging releasably in a respective opening 7 so as to retain the filtering means 8 between the inner wall 10 and the fixing means 9.

[0023] In particular, the fixing means 9 comprises at least two, in particular three, hooking elements 11, arranged next to one another, in which each of these hooking elements 11 is configured for engaging releasably in a respective opening 7. In particular, the hooking elements 11 have the shape of a hook so as to traverse a respective opening 7 and anchor on an outer wall 12, opposite the inner wall 10, of the shaped lower portion 3.

[0024] Also, the fixing means 9 comprises a fixing means body 13 having a shaped, for example frustoconical, form that is complementary to that of the shaped lower portion 3, the hooking elements 11 projecting from a first transversely larger end zone 14 of the fixing means body 13.

[0025] The fixing means body 13 is made of one of the following materials: polypropylene, polyethylene, polya-

mid, PBT, and polycarbonate, which are washable in microwave ovens. In a preferred embodiment of the invention, antibacterial additives are added to these materials.

[0026] Also, the fixing means body 13 comprises a plurality of passages 24, only some of which have been numbered for greater clarity of the drawings, for example of circular shape, to promote an air passage between the inside and outside of the mask body 2.

[0027] The breathing mask 1 according to the invention further comprises guide means 15 projecting from the inner wall 10 to the inside of the breathing mask 1 to guide the fixing means 9 to couple with and uncouple from the mask body 2. In particular, the guide means comprises two ridges 15 that are substantially rectilinear, and diverging from a more inner portion to a more outer portion of the shaped inner portion 3.

[0028] Also, the breathing mask 1 comprises abutting means 16 to abut on a second end zone 17, transversely shorter than and opposite the first end zone 14, of the fixing means body 13, in a fixing position A for fixing means 9 to the mask body 2. In particular, the abutting means comprises an abutment 16 of curved shape interposed between, and connecting, the aforesaid rectilinear ridges 15.

[0029] The breathing mask 1 is further provided with retaining means 18 to firmly retain the breathing mask 1 on the head of the user. The retaining means 18 comprises a pair of ring elements 19 that are fixable at one end to the side projections 6 of the mask body 2. The ring elements 19 have elastic features and are made of one of the following materials: natural fabric, synthetic fabric, thermoplastic elastomer, etc., which are washable in microwave ovens. In a preferred embodiment of the invention, antibacterial additives are added to these materials.

[0030] Also, the retaining means 18 comprises a retaining element 20 intended to be rested on a rear portion of the head of the user. The retaining element 20 is provided with a central body 21 from which elongated bodies 22 project laterally along each of which at least two, in particular three, hooking elements 23, in the shape of an arrow are provided that are arranged for being hooked to another end by the ring elements 19. Providing several hooking elements 23 on each of the elongated bodies 22, enables the retaining means 18 to be adjusted according to the dimensions of the head of the user to make wearing the breathing mask 1 according to the invention more comfortable. For example, in the case of young users, the hooking elements 23 nearer the central body 21 will be used, whereas in the case of adult users, with generous head dimensions, the hooking elements 23 that are further from the central body 21 will be used.

[0031] In particular, the retaining element 20 is made of one of the following materials: polypropylene, preferably copolymer, polyethylene, etc., which are washable in microwave ovens. In a preferred embodiment of the invention, antibacterial additives are added to these ma-

terials.

[0032] In use, fitting the filtering means or paper handkerchief 8 is particularly simple. In fact, it is sufficient to position the paper handkerchief 8 on the inner wall 10 of the mask body 2 in a zone defined between the ridges 15, 16, slide the fixing means 9 along the inner wall 10 guided by the ridges 15 until the second end zone 17 thereof abuts on the abutment 16 in the fixing position A, and engage the hooking elements 11 in the respective openings 7. In order to dismantle and replace worn filtering means with known filtering means, it is merely necessary to perform the operations listed above in the reverse order.

[0033] It should be further noted that the breathing mask 1 according to the invention enables paper handkerchiefs of the disposable type to be used that are particularly cheap and easy to transport and conserve.

[0034] Also, it should be noted that owing to the retaining element 20, the breathing mask 1 is particularly comfortable for users of any age/size to wear.

[0035] Also, it should be noted that the elements constituting the breathing mask 1 are easily washable and thus reusable several times, in a microwave oven, and in the preferred embodiments are antibacterial.

[0036] Finally, it should be noted that owing to the technical features therein, the breathing mask 1 is particularly pleasing aesthetically.

Claims

1. Breathing mask (1) comprising:

- a mask body (2) to cover the airways of a user, which mask body (2) comprises a shaped portion (3) provided with at least one opening (7) to promote an air passage between the inside and the outside of said mask body (2);
- filtering means (8) for filtering air entering and/or exiting said mask body (2); and
- fixing means (9) for fixing said filtering means (8) on said mask body (2);

characterized in that said fixing means (9) is slidably couplable with an inner wall (10) of said shaped portion (3) and is provided with at least one hooking element (11) configured for engaging releasably said at least one opening (7) so as to retain said filtering means (8) between said inner wall (10) and said fixing means (9).

2. Breathing mask (1) according to claim 1, wherein said at least one hooking element (11) comprises at least two, in particular three, hooking elements (11), and said at least one opening (7) comprises at least two, in particular five, openings (7), wherein each of said hooking elements (11) is configured for engaging releasably a respective opening of said openings

(7) so as to retain said filtering means (8) between said inner wall (10) and said fixing means (9).

3. Breathing mask (1) according to claim 1, or 2, wherein said at least one hooking element (11) is hook-shaped so as to pass through a respective opening (7) and anchor on an outer wall (12), opposite said inner wall (10), of said shaped portion (3).

4. Breathing mask (1) according to one of claims 1 to 3, wherein said fixing means (9) comprises a fixing means body (13) having a shaped form that is complementary to that of the shaped portion (3), wherein said at least one hooking element (11) projects from a first end zone (14) of said fixing means body (13).

5. Breathing mask (1) according to claim 4, wherein said fixing means body (13) comprises a plurality of passages (24) to promote an air passage between the inside and outside of said mask body (2).

6. Breathing mask (1) according to claim 4, or 5, and comprising:

- guide means (15), projecting from said inner wall (10) to the inside of said mask (1) for guiding said fixing means (9) coupling with and uncoupling from, said mask body (2), and
- abutting means (16) for abutting on a second end zone (17), opposite said first end zone (14), of said fixing means body (13), in a fixing position (A) of said fixing means (9) on said mask body (2).

7. Breathing mask (1) according to one of claims 1 to 6, wherein said at least one opening (7) has an elongated shape and extends substantially over the entire length of said shaped portion (3).

8. Breathing mask (1) according to one of claims 2 to 7, wherein said at least two openings (7), in particular said five openings (7), are arranged substantially parallel to one another.

9. Breathing mask (1) according to one of claims 1 to 8, wherein said shaped portion is a lower portion (3) of said mask body (2), i.e. a portion substantially facing the mouth of the user.

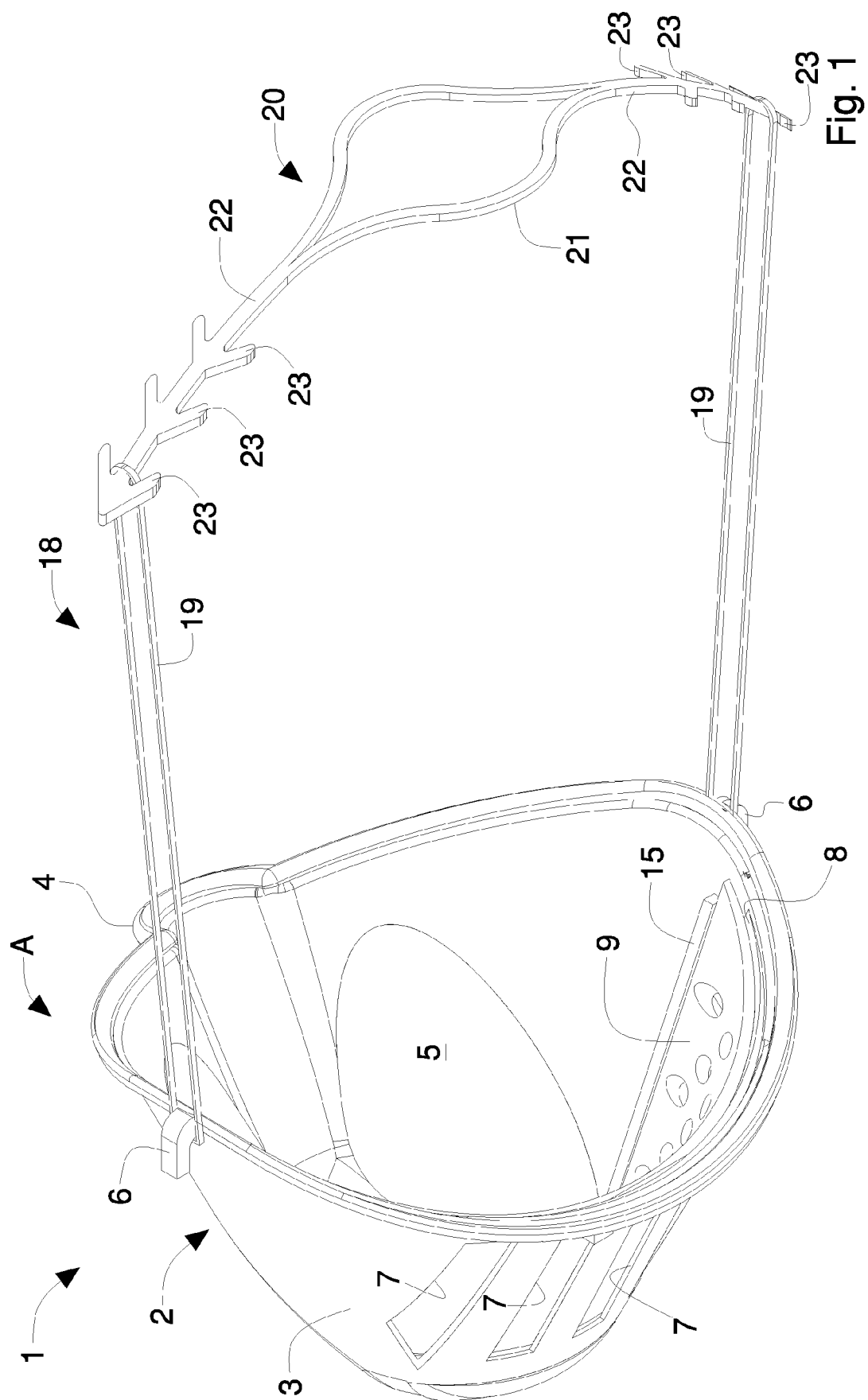
10. Breathing mask (1) according to one of claims 1 to 9, wherein said filtering means comprises at least one disposable cellulose paper handkerchief (8).

11. Breathing mask (1) according to one of claims 1 to 10, wherein said mask body (2) is made of one of the following materials: thermoplastic elastomer, silicone, natural rubber, PVC.

12. Breathing mask (1) according to one of claims 4 to 11, wherein said fixing means body (13) is made of one of the following materials: polypropylene, polyethylene, polyamide, PBT, polycarbonate. 5
13. Breathing mask (1) according to one of claims 1 to 12, wherein said mask body (2) has a cap shape and comprises a shaped upper portion (4) so as to include the nose of a user, following an anatomical conformation thereof. 10
14. Breathing mask (1) according to one of claims 1 to 13, wherein said mask body (2) comprises a pair of depressions (5) to promote the handling of said mask (1) by the user. 15
15. Breathing mask (1) according to one of claims 1 to 14, and comprising retaining means (18) for retaining said mask (1) on the head of a user, wherein said retaining means (18) comprises a pair of ring elements (19) that are fixable with side projections (6) of said mask body (2). 20
16. Breathing mask (1) according to claim 15, wherein said retaining means (18) comprises a retaining element (20) intended for being rested on a rear portion of the head of a user, which retaining element (20) is provided with a central body (21) from which elongated bodies (22) project laterally along each of which at least two hooking elements (23) are provided that are arranged for being hooked by said ring elements (19) and for permitting adjustment of said retaining means (18) according to the dimensions of the head of the user to make wearing said mask (1) more comfortable. 25 30 35
17. Breathing mask (1) according to claim 16, wherein said retaining element (20) is made of one of the following materials: polypropylene, polyethylene. 40
18. Breathing mask (1) according to claim 11, or 12, as claim 12 is appended to claim 11, wherein said thermoplastic elastomer, silicone, natural rubber, PVC, polypropylene, polyethylene, polyamide, PBT, polycarbonate, are antibacterial. 45

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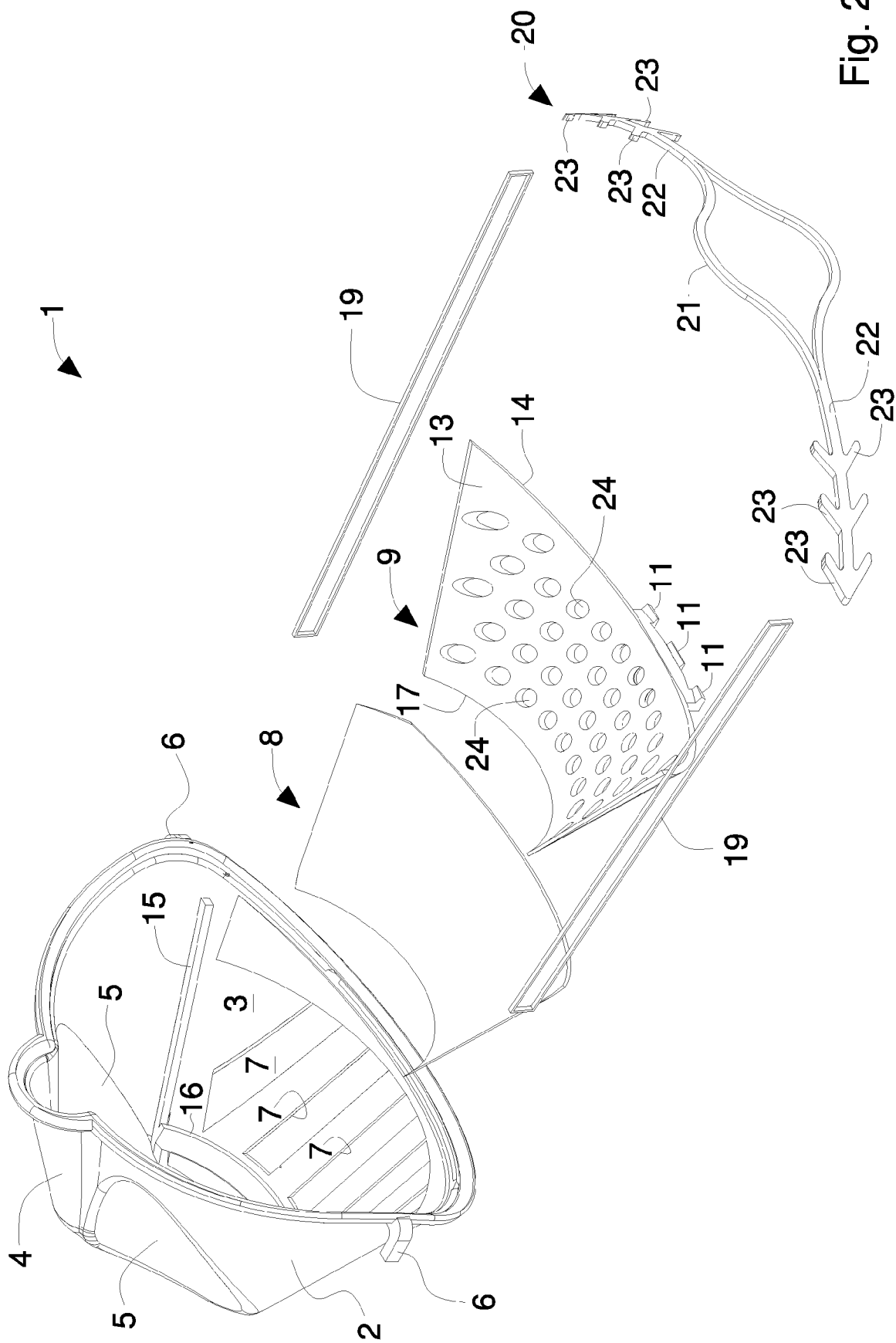


Fig. 2

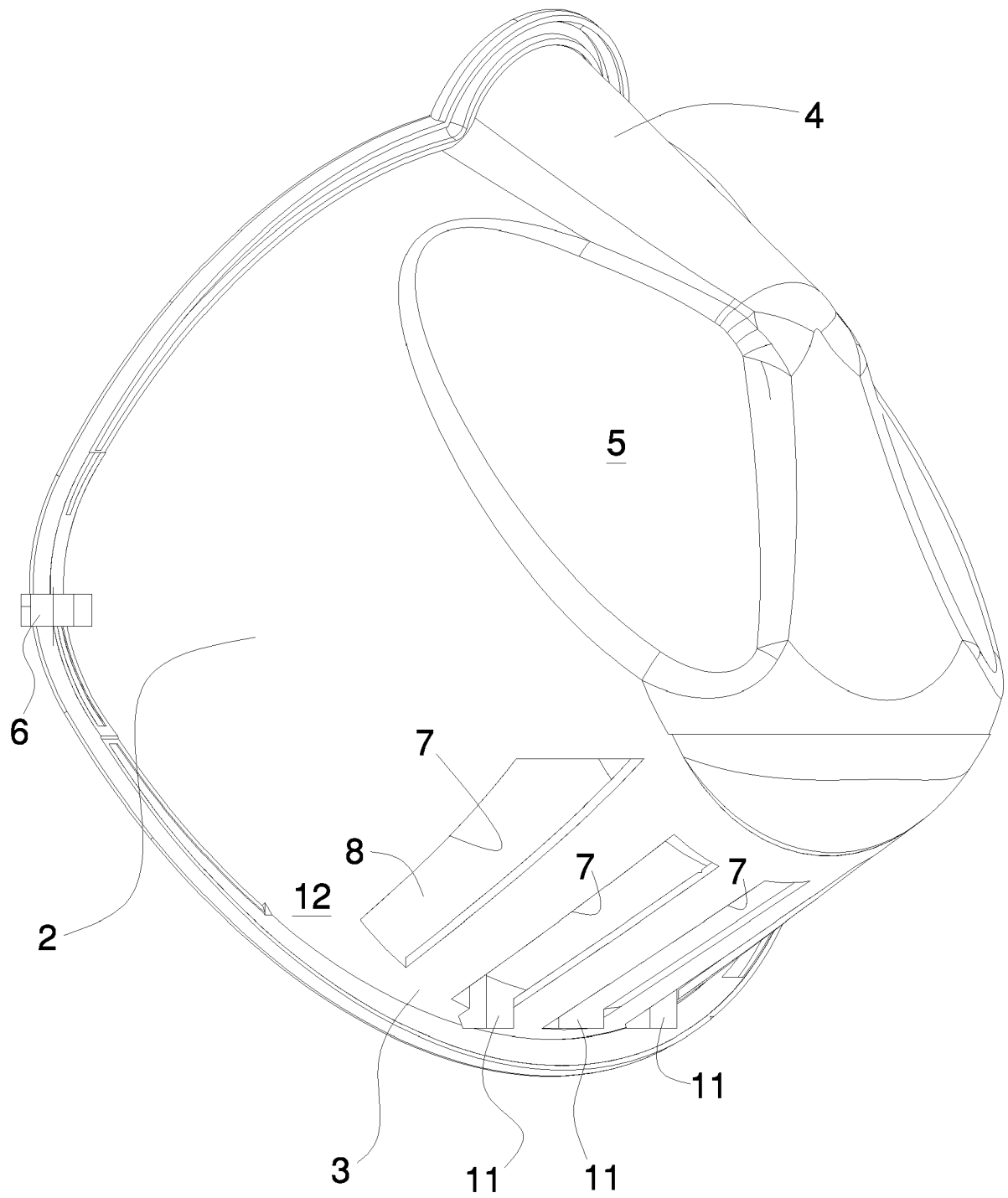


Fig. 3

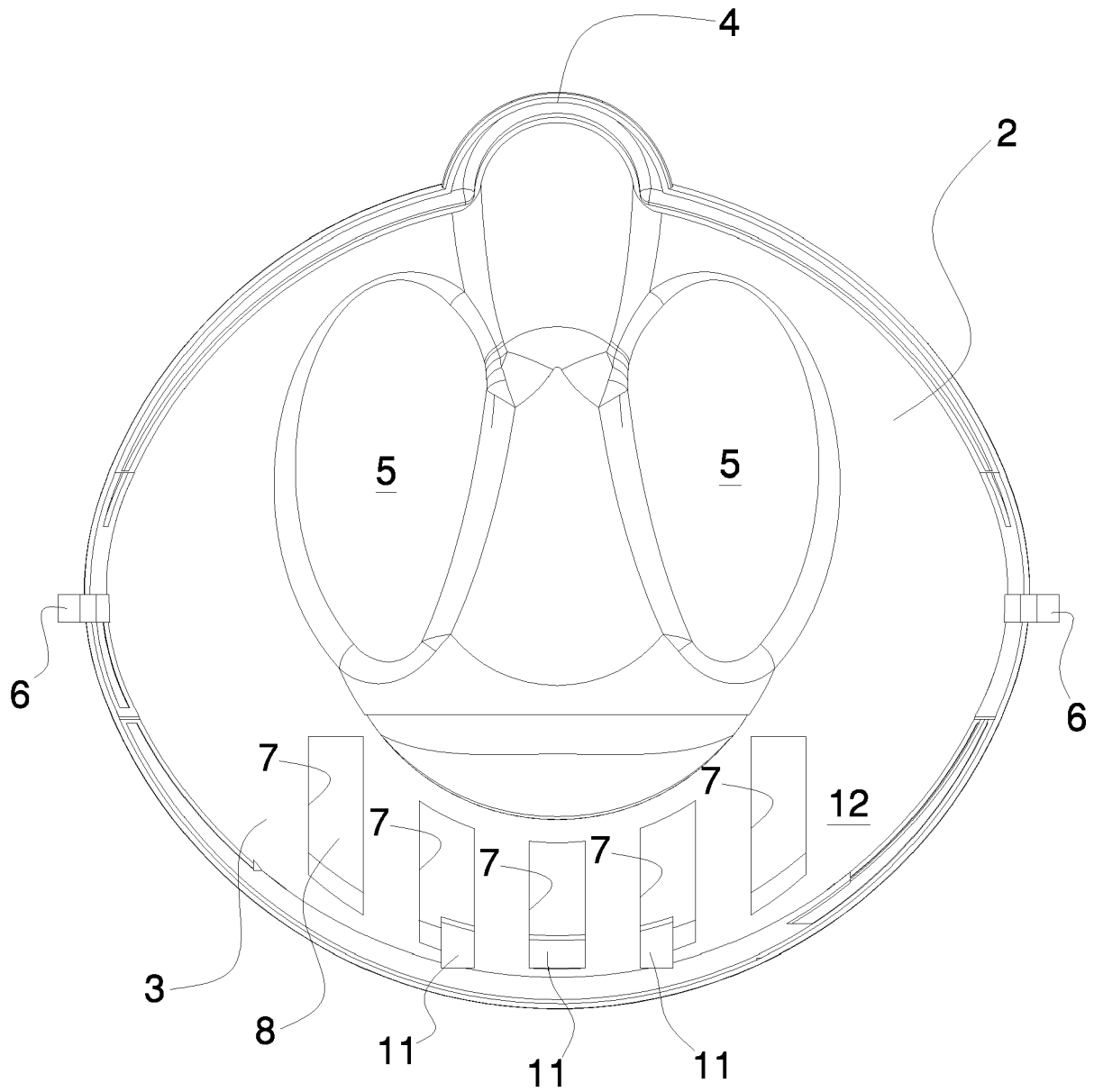


Fig. 4

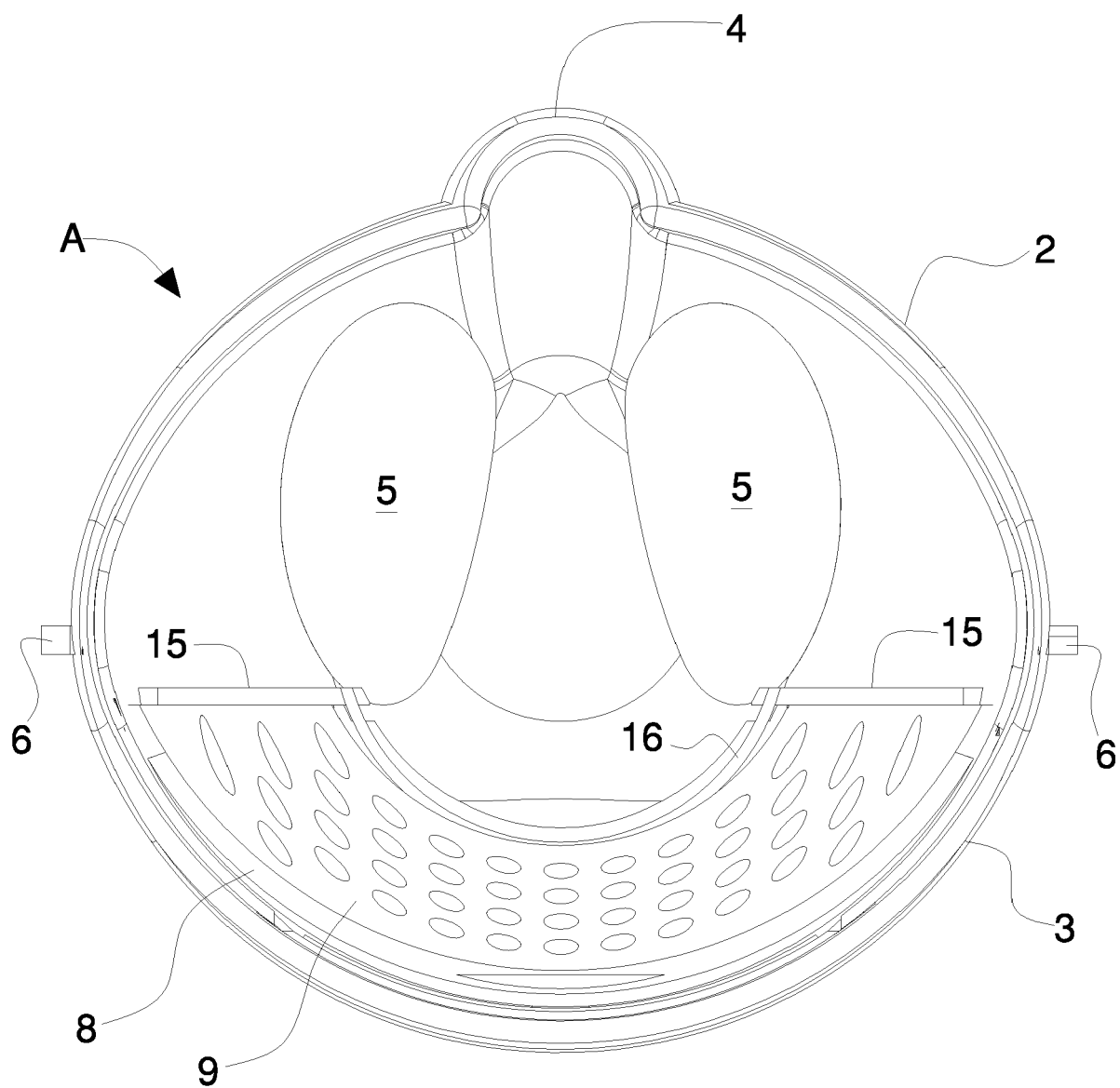


Fig. 5

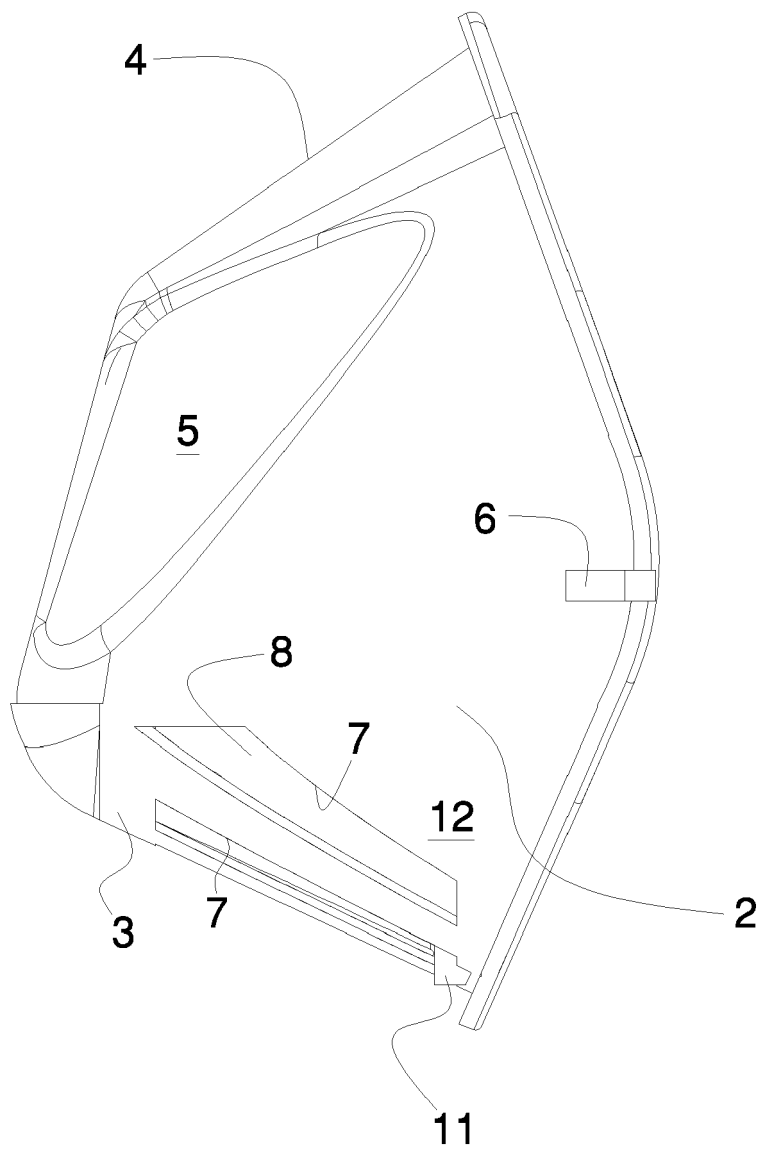


Fig. 6

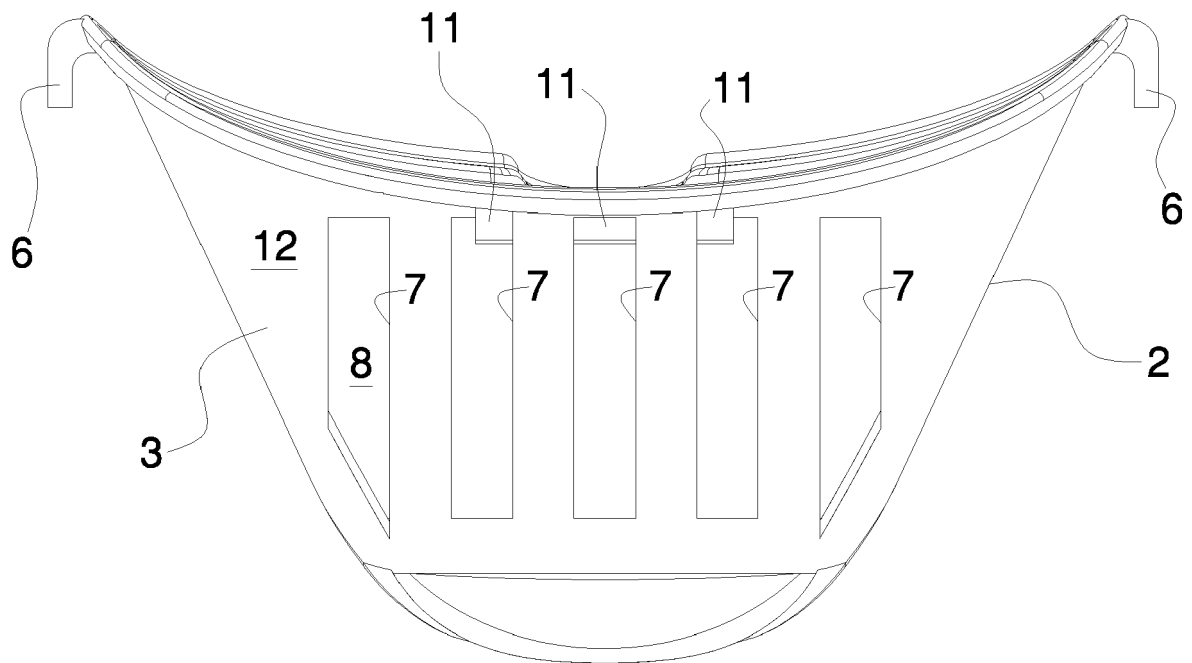


Fig. 7

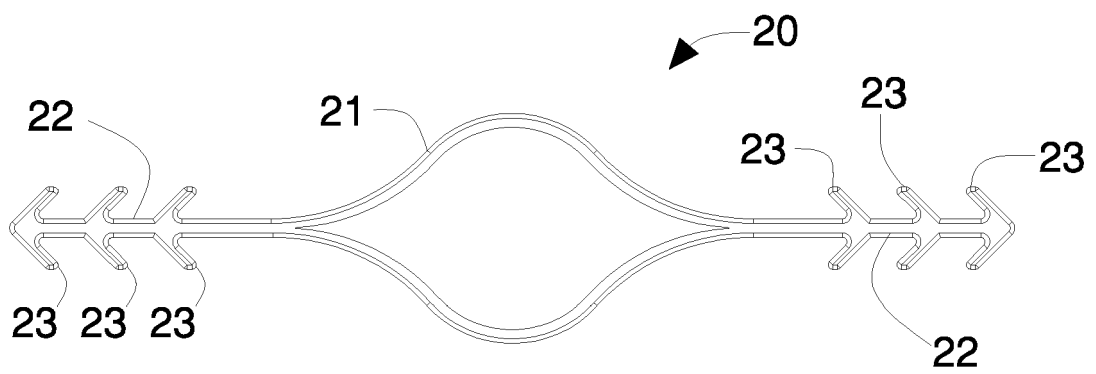


Fig. 8

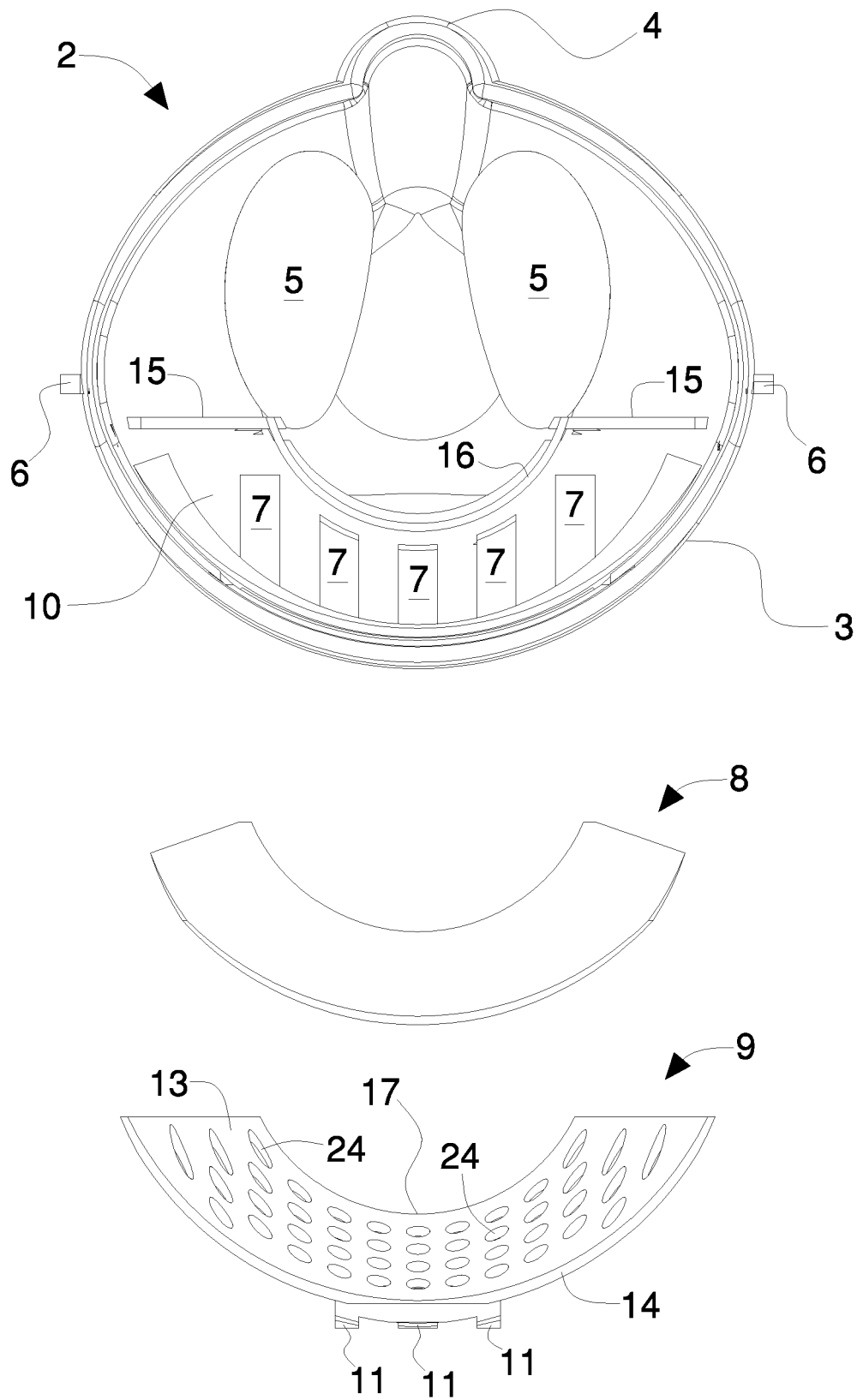


Fig. 9

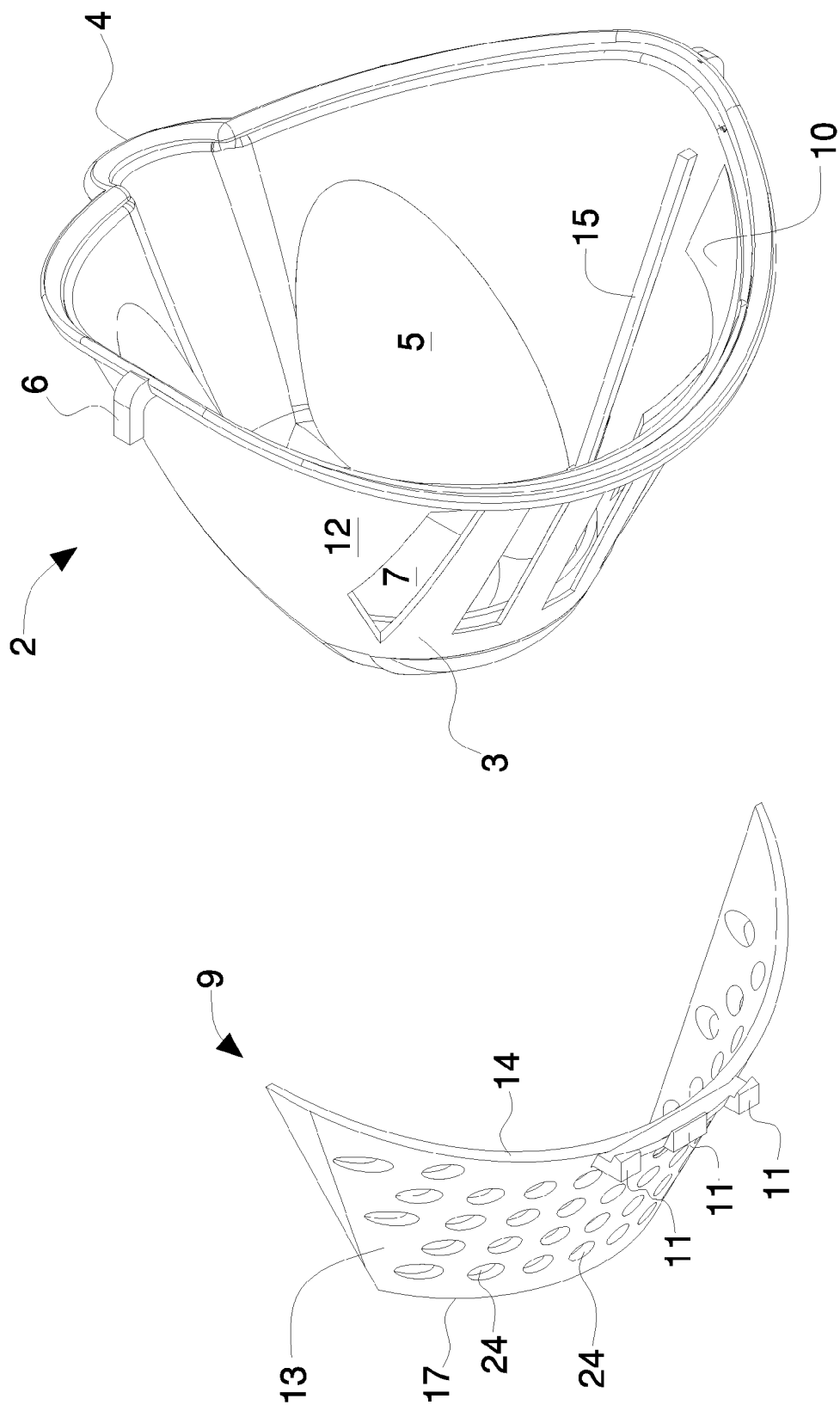


Fig. 10



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Application Number
EP 21 18 0437

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 October 2021	Examiner Dewaele, Karl
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ANNEX TO THE EUROPEAN SEARCH REPORT
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