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(54) **MEMBRANE FOR BOTTOM-VENTILATION OF A BABY BOTTLE**

(57) A membrane for bottom-ventilation of a baby bottle (1) containing suckable liquid, having an air inlet cut (22), characterized in that at least one of the facing edges (23,23a) of the cut (22) is formed with surface roughness.

The invention solves the problem of progressive healing of the cut formed on the membrane element of a ventilation device to equalize the pressure inside a baby bottle during suction, thereby avoiding the progressive increase of the force required to cause separation of the edges of the cut and the passage of ventilation air.

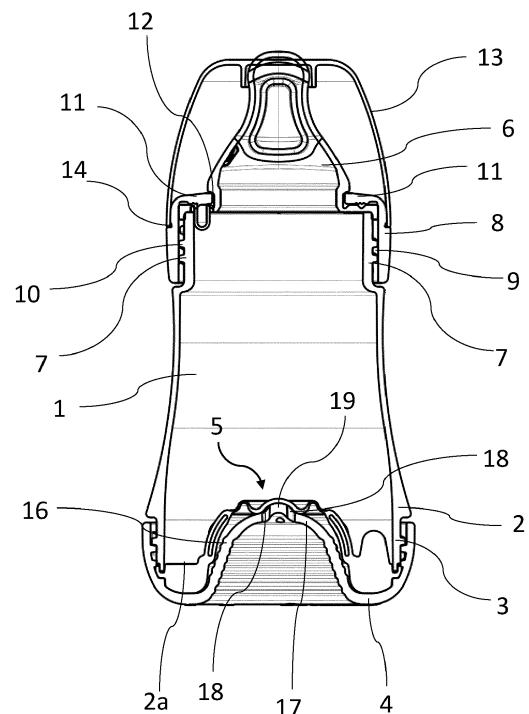


Fig.1

Description

[0001] The present invention relates to a membrane for bottom ventilation of a baby bottle containing liquid to be sucked, which has an improved air inlet cut.

[0002] As is known in the field of baby bottles, valves are provided to compensate for the negative pressure generated inside the baby bottle as the baby sucks the liquid, mainly milk, by creating a passage for air between the interior of the baby bottle and the outside environment.

[0003] A very common type of valve having the above mentioned purpose consists of a calibrated cut formed on a flexible area of a silicone membrane device inserted in the bottom cover of the baby bottle, which can be removed using conventional threads.

[0004] In accordance with the prior art, the cut is formed in a central flexible region of the membrane using a sharp blade of a suitably defined size, without causing material removal.

[0005] By this arrangement, once the blade has been removed, the facing surfaces are smooth and spring back to contact with each other, thereby creating a compact structure that ensures hermetic sealing, at least until a given pressure builds up and causes them to separate and open the cut.

[0006] Due to the physical and chemical properties of the silicone material in use, this process will cause the cut to somewhat heal up, whereby the force required to separate the edges of the cut will progressively increase with time and depending on the frequency of use of the device.

[0007] If a baby bottle is bottom-vented, this will cause a serious drawback in that it will increase the negative pressure required to open the passage inside the bottle, and hence the suction effort that the baby will have to apply on the nipple.

[0008] The object of the present invention is to solve the problem of progressive healing of the cut formed on the membrane element of a ventilation device to equalize the pressure inside a baby bottle during suction.

[0009] This and other objects, as better explained hereafter, are fulfilled by the cut formed on the membrane of the ventilation device, improved as defined in claim 1 hereinafter.

[0010] The invention will be now described in greater detail with reference to one embodiment thereof, given by way of illustration and without limitation, and shown in the annexed drawings, in which:

- Figure 1 shows a cross-sectional view of a baby bottle having a conventional vent valve at the bottom of the bottle;
- Figure 2 shows a magnified cross-sectional view of a membrane with a cut for bottom ventilation of the baby bottle, which is placed in the bottom closing cover of the bottle of Figure 1;
- Figure 3 shows a perspective view of the membrane

of Figure 2;

- Figure 4 shows a schematic perspective view of the opposite surfaces of the ventilation cut with the improvement of the invention.

[0011] Referring to the above drawings and to Figure 1 in particular, numeral 1 designates the baby bottle containing the liquid to be sucked, namely milk.

[0012] A cover 4 is removably connected to the lower end 2, e.g. using a thread 3, to close the opening 2a of the lower end 2.

[0013] The cover 4 conventionally accommodates a device for venting the bottle 1, generally referenced 5, which is intended to balance the pressure inside the bottle 1, as the liquid is being sucked by the baby through the nipple, generally referenced 6 in Figure 1.

[0014] The latter is conventionally attached to the upper end 7 of the bottle 1, by means of a nut 8 with the interposition of the threads 9 and 10 and with edge 11 of the nut 8 fitting in the annular groove 12 of the nipple 6. A removable cap 13, axially fitting in a recess 14 of the nut 8, conventionally protects the nipple 6.

[0015] The ventilation device 5 is supported, in the cover 4, by a dome-shaped element 16 which has one or more holes 18 arranged around a cusp element 19 near its end 17 distal from the bottom of the cover 4.

[0016] The ventilation device 5 comprises a membrane element 20 made of silicone material having a flexible central portion 21 formed therein, which rests on the cusp element 19 and above the holes 18.

[0017] One or more cuts 22 are centrally formed in said flexible portion 21 of the membrane 20. Each cut opens as its facing edges move apart from each other, thereby allowing the ingress of outside air into the baby bottle 1 through the holes 18 once the flexible portion 21 of the cusp element 19 has been lifted.

[0018] According to the invention, at least one of the opposed mutually facing surfaces 23, 23a of the cuts 22, as schematically shown in Figure 4, is formed with roughness.

[0019] Alternatively, the surfaces 23, 23a are both formed with roughness, for example, with a plurality of alternating recesses and protrusions.

[0020] Preferably, but without limitation, the recesses and protrusions that form such roughness have values ranging from 10 to 200 microns and can be formed on the surfaces of the cut by using a suitable file blade.

Claims

1. A membrane for bottom-ventilation of a baby bottle (1) containing suckable liquid, comprising one or more air inlet cuts (22), **characterized in that** at least one of the facing sides (23, 23a) of each cut (22) has surface roughness.
2. Membrane as claimed in claim 1, **characterized in**

that both facing sides (23, 23a) of the cut (22) have surface roughness.

3. Membrane as claimed in claim 1 or 2, **characterized in that** said surface roughness consists of a plurality of crossing recesses whose value ranges from 10 to 200 micron.

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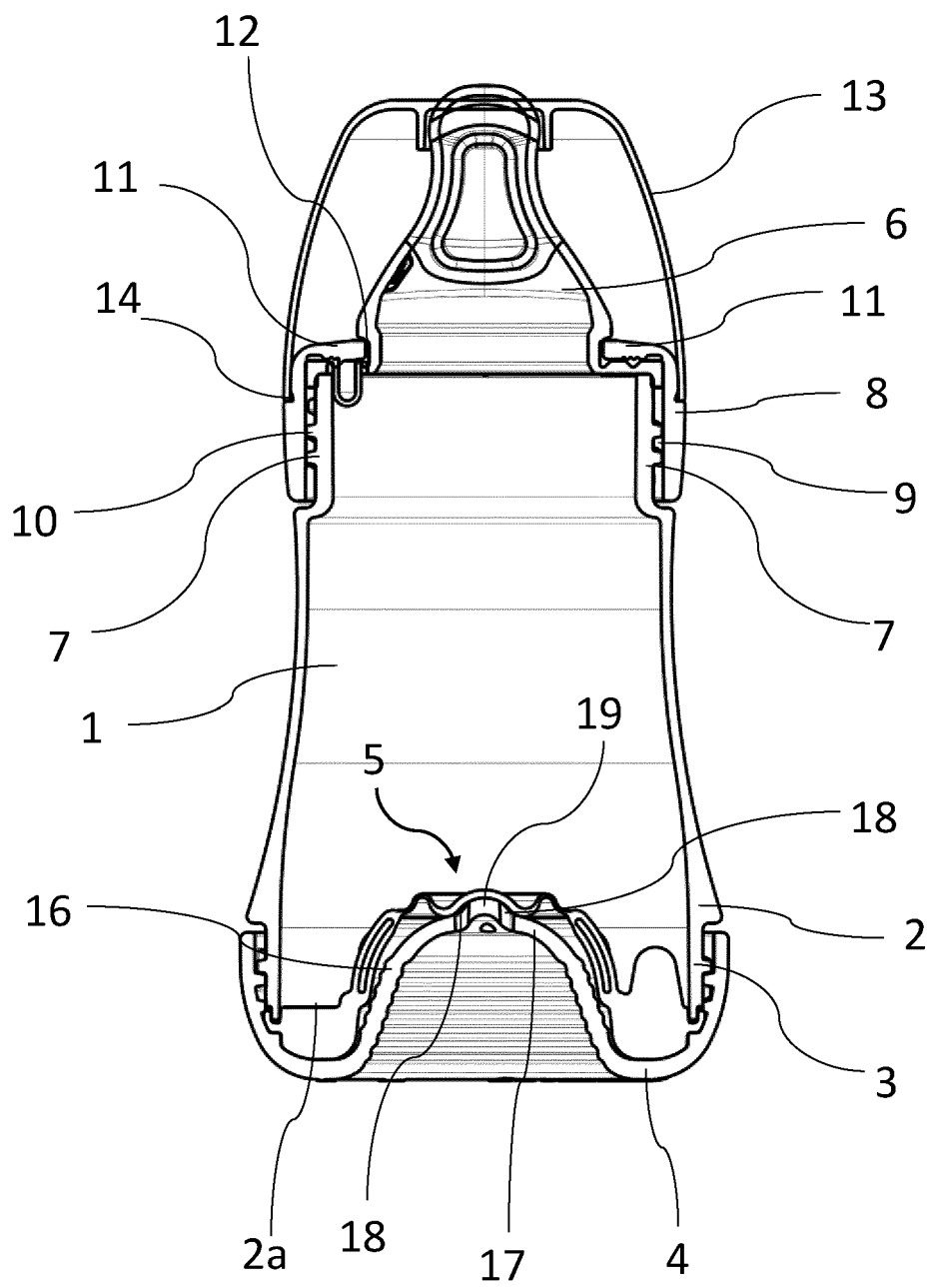


Fig.1

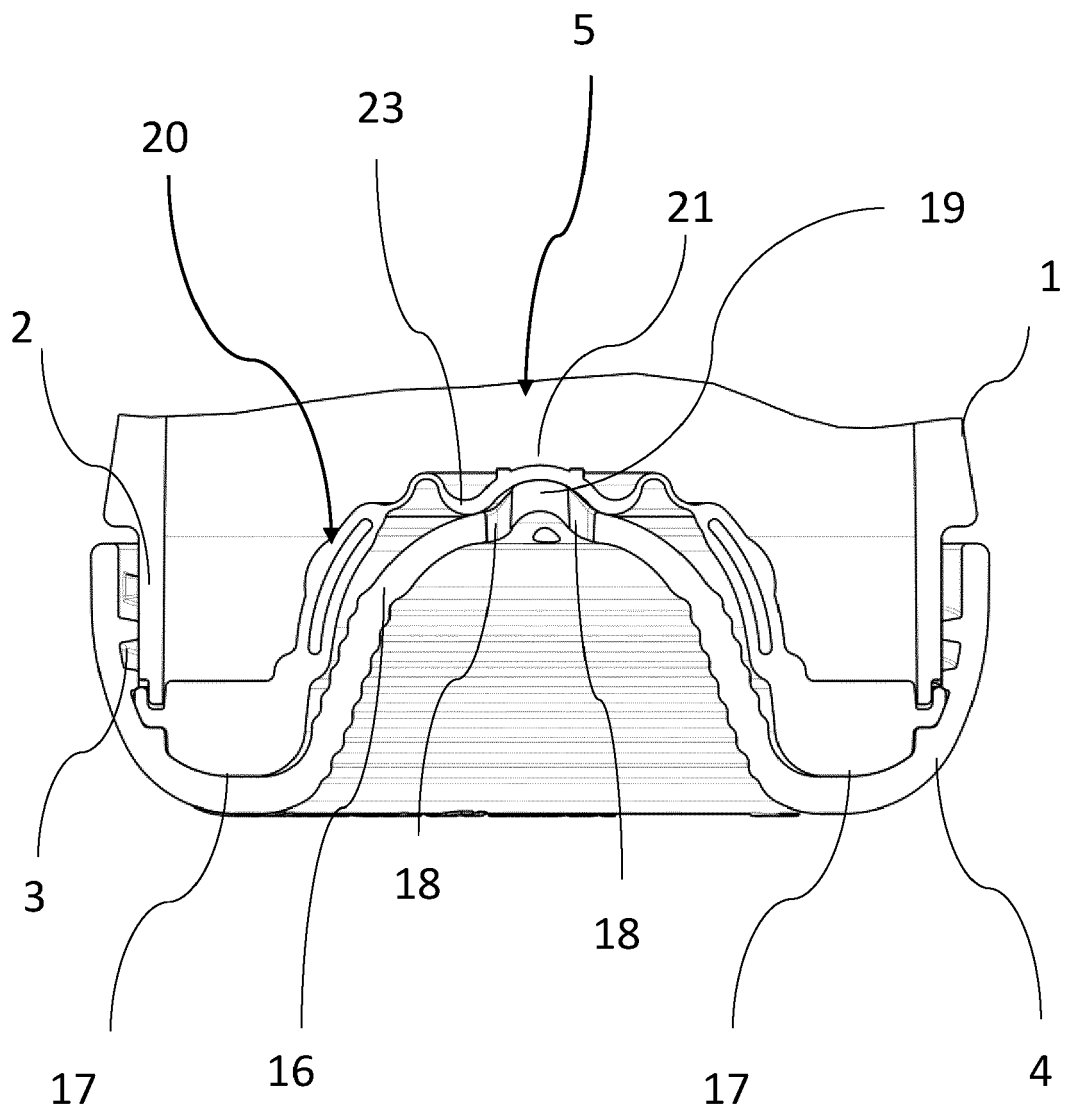


Fig. 2

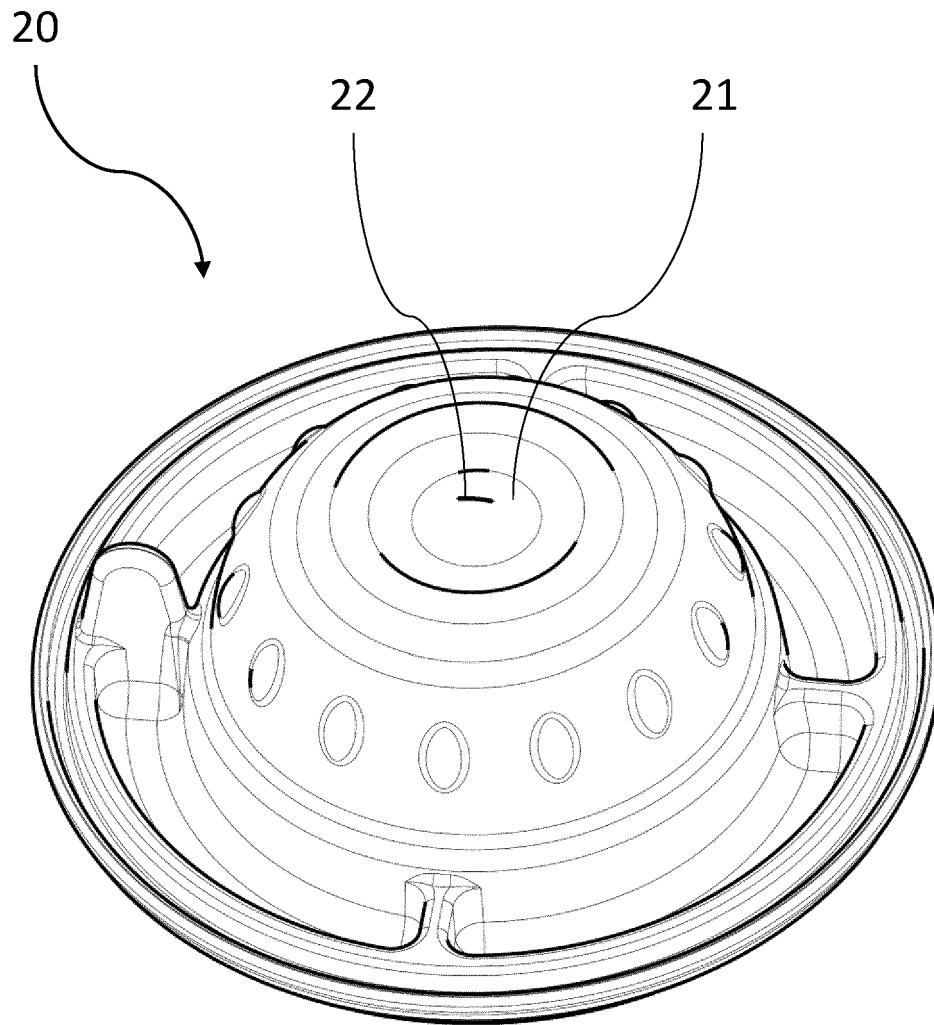


Fig. 3

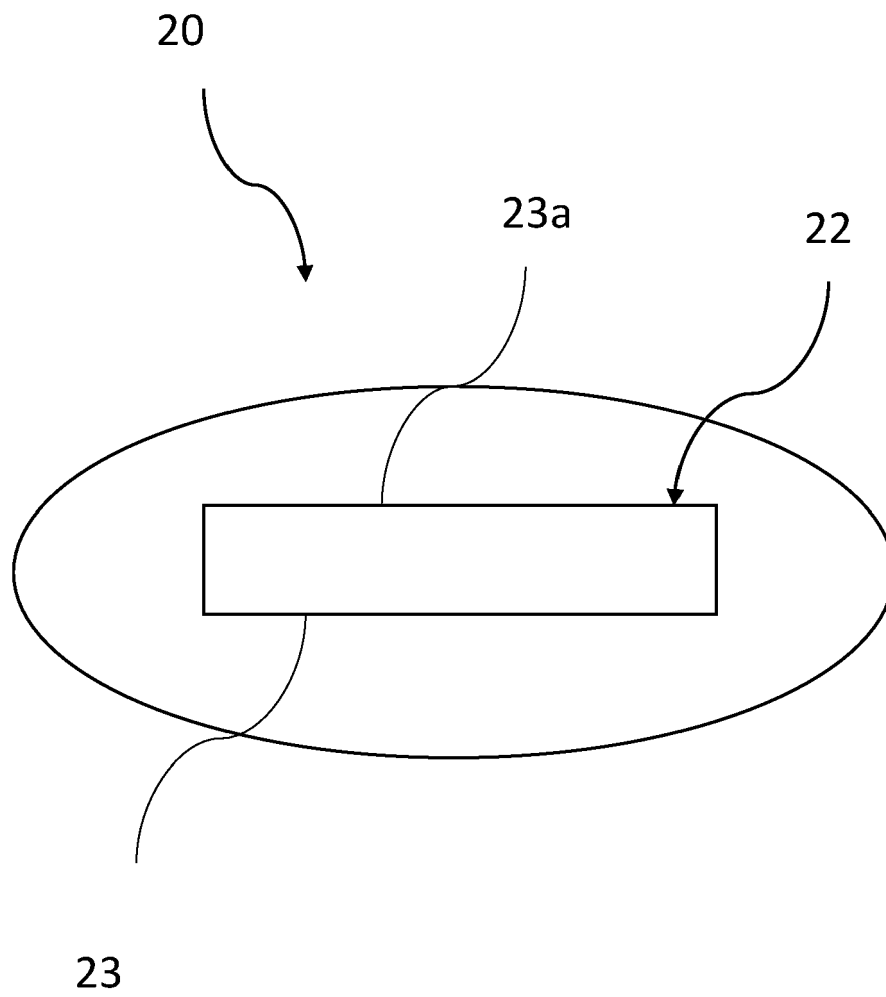


Fig. 4



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 17 4577

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A	WO 2008/079282 A2 (PLAYTEX PRODUCTS INC [US]; RENZ CHARLES J [US]) 3 July 2008 (2008-07-03) * page 9, paragraph 2nd; figures 19A,20 *	3	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61J
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 28 September 2020	Examiner Gkama, Alexandra
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 20 17 4577

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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