



(86) **Date de dépôt PCT/PCT Filing Date:** 2012/09/11  
 (87) **Date publication PCT/PCT Publication Date:** 2013/11/07  
 (85) **Entrée phase nationale/National Entry:** 2014/10/30  
 (86) **N° demande PCT/PCT Application No.:** CN 2012/081234  
 (87) **N° publication PCT/PCT Publication No.:** 2013/163855  
 (30) **Priorité/Priority:** 2012/04/30 (TH1201002002)

(51) **Cl.Int./Int.Cl. A61J 11/02** (2006.01)  
 (71) **Demandeur/Applicant:**  
MAGIC LOVE LIMITED, CN  
 (72) **Inventeur/Inventor:**  
CHAITANARIT, SIRIPEN, TH  
 (74) **Agent:** BORDEN LADNER GERVAIS LLP

(54) **Titre : TETINE AYANT UNE VALVE D'AJUSTEMENT DE PRESSION**  
 (54) **Title: A NIPPLE WITH PRESSURE-ADJUSTING VALVE**

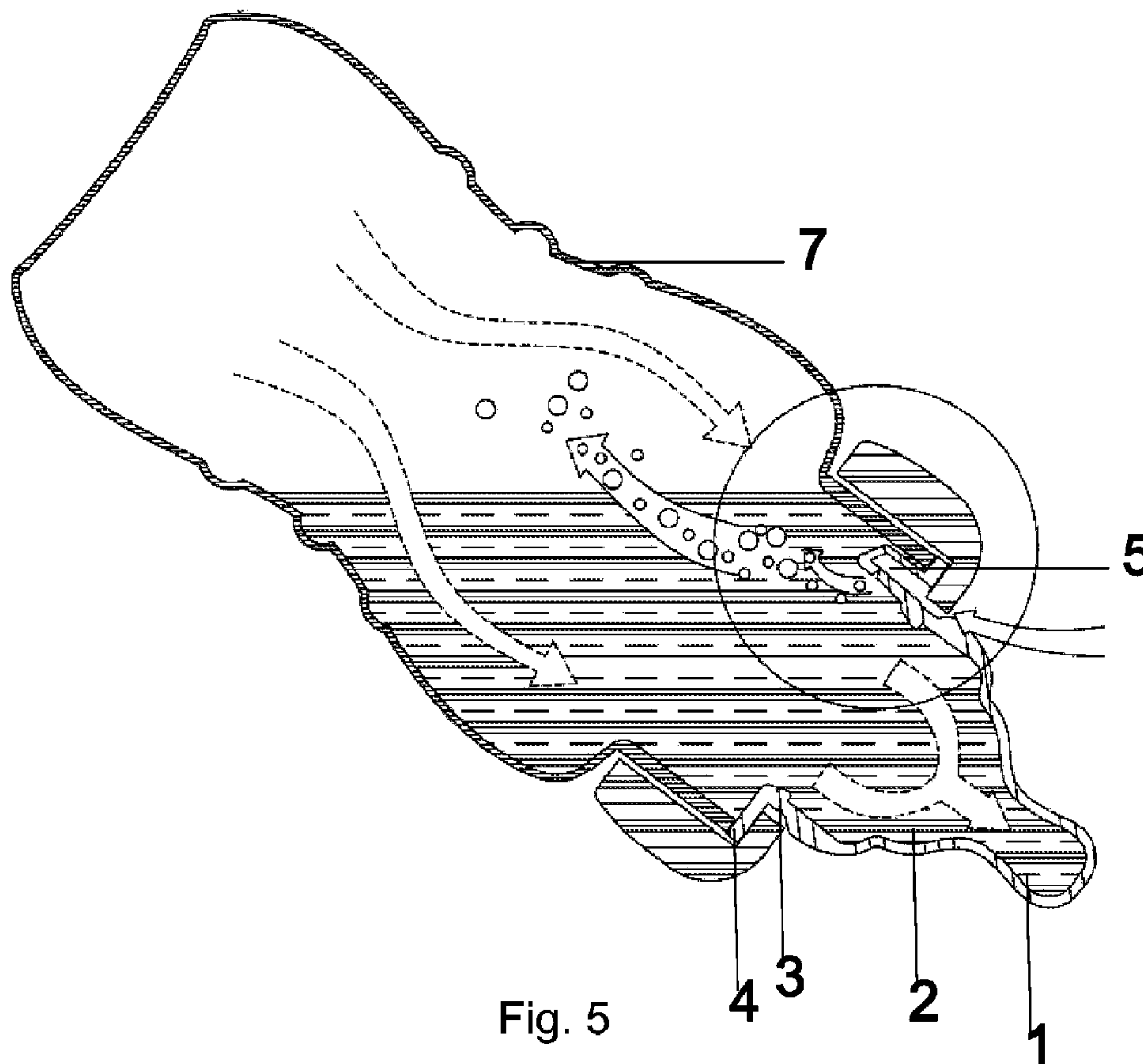


Fig. 5

(57) **Abrégé/Abstract:**

A nipple with the developed pressure adjusting valve (5) is provided in the present invention. The pressure adjusting valve (5) is mounted in the bottom of air cavity of the mounting flange (4) and shaped like a hollowed cylinder having a closed end, and the

**(57) Abrégé(suite)/Abstract(continued):**

inside of the valve is used as a valve cavity (9) for air flowing. A side wall (10) of the pressure adjusting valve (5) above the bottom-closed end is formed with at least one slit (11) at a part of periphery of said valve (5). Through the airflow passageway of the valve, the slit (11) serves as an open-closed door to allow the ambient air to flow into the liquid-containing bottle (7). advantageously, the air can flow into the liquid-containing bottle easily and conveniently in the invention, thereby allowing the liquid to flow out from the bottle continuously and steadily, preventing the nipple from collapsing and preventing a vacuum formed inside the bottle as well as preventing the leakage of liquid from the pressure adjusting valve when the bottle is inverted or sucked.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau(10) International Publication Number  
**WO 2013/163855 A1**(43) International Publication Date  
7 November 2013 (07.11.2013)

## (51) International Patent Classification:

A61J 11/02 (2006.01)

## (21) International Application Number:

PCT/CN2012/081234

## (22) International Filing Date:

11 September 2012 (11.09.2012)

## (25) Filing Language:

English

## (26) Publication Language:

English

## (30) Priority Data:

1201002002 30 April 2012 (30.04.2012) TH

(71) Applicant (for all designated States except US): **MAGIC LOVE LIMITED** [CN/CN]; Room 1109 CC Wu Building, 302-8 Hennessy Road, Wanchai, Hong Kong (CN).

## (72) Inventor; and

(75) Inventor/Applicant (for US only): **CHAITANARIT, Siripen** [TH/TH]; 27/160, Moo 5, Pan Tai Norrasing, Muang Samut Sakhon, Samut Sakhon (TH).(74) Agent: **JEEKAI & PARTNERS**; Suite 602, Jinyu Tower, A129 West Xuan Wu Men Street, Xicheng District, Beijing 100031 (CN).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## Published:

— with international search report (Art. 21(3))

(54) Title: A nipple with pressure-adjusting valve

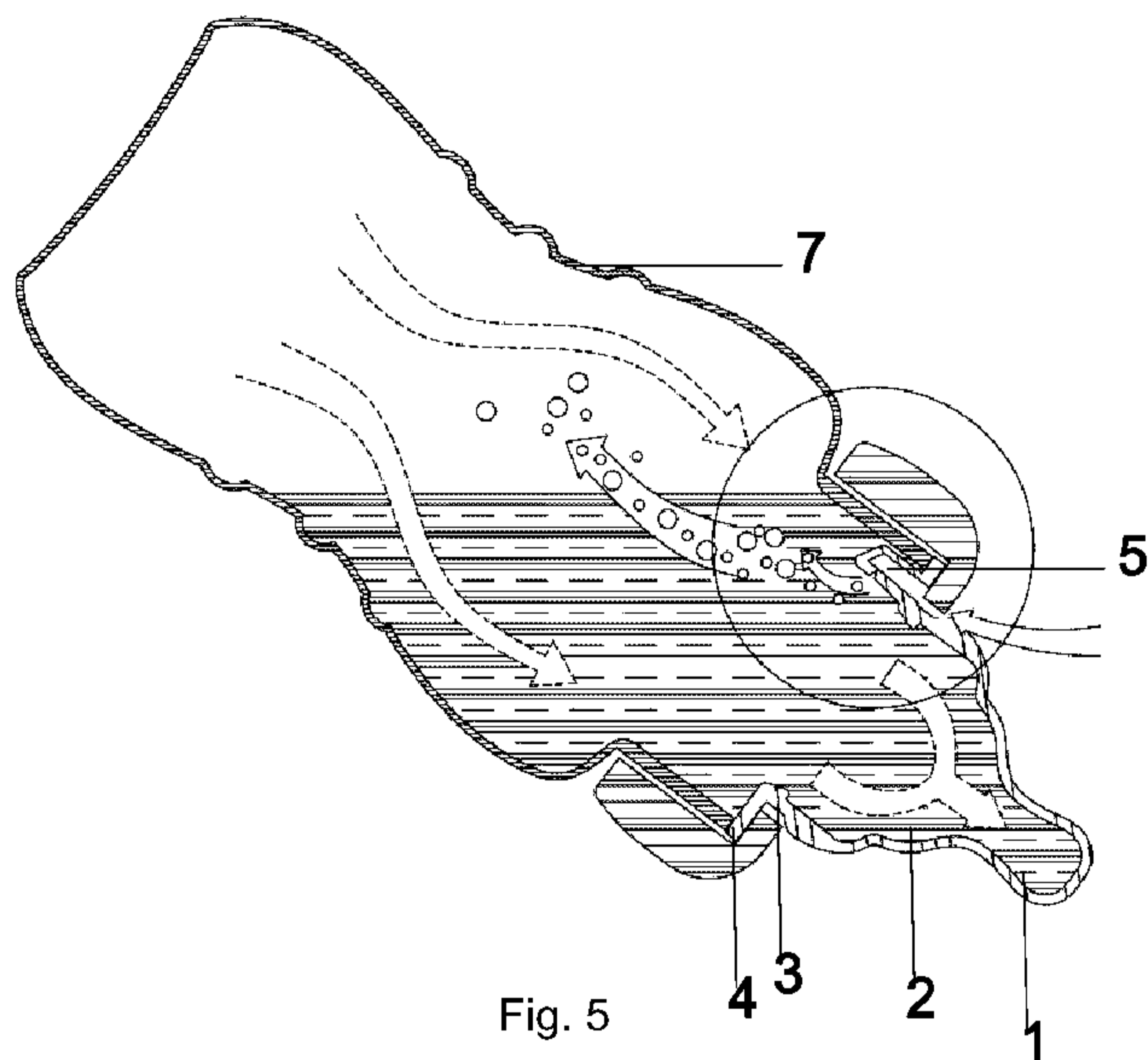


Fig. 5

(57) Abstract: A nipple with the developed pressure adjusting valve (5) is provided in the present invention. The pressure adjusting valve (5) is mounted in the bottom of air cavity of the mounting flange (4) and shaped like a hollowed cylinder having a closed end, and the inside of the valve is used as a valve cavity (9) for air flowing. A side wall (10) of the pressure adjusting valve (5) above the bottom-closed end is formed with at least one slit (11) at a part of periphery of said valve (5). Through the airflow passageway of the valve, the slit (11) serves as an open-closed door to allow the ambient air to flow into the liquid-containing bottle (7). advantageously, the air can flow into the liquid-containing bottle easily and conveniently in the invention, thereby allowing the liquid to flow out from the bottle continuously and steadily, preventing the nipple from collapsing and preventing a vacuum formed inside the bottle as well as preventing the leakage of liquid from the pressure adjusting valve when the bottle is inverted or sucked.

## Specification

### Title of the Invention

5 A nipple with pressure-adjusting valve

### Field of the Invention

The invention relates to engineering field. In particular,  
10 this invention relates to a nipple with pressure-adjusting  
valve.

### Summary of Invention

15 The nipple with the pressure adjusting valve comprises  
a hollowed cylinder shaped-pressure adjusting valve having  
a closed end, which is mounted to a valve cavity at a  
mounting flange. The interior of the valve is used as a  
opening for air flowing. At a part of a periphery of said  
20 valve, a side wall of the valve positioned above the bottom-  
closed end is formed with at least one slit, which serves as  
opened-closed door to allow the ambient air to flow into the  
liquid-containing bottle via the the valve cavity.

An objective of the present invention is to provide the nipple with the pressure adjusting valve in preferred embodiment and a more efficiency work. According to the present invention, it can be easily and conveniently put the air into the liquid-containing bottle thereby causing the liquid enabling to flow out from the bottle continuously and steadily, preventing the nipple from collapsing and preventing a vacuum from forming inside the bottle as well as preventing the leakage of liquid from the pressure adjusting valve when the bottle is inverted or sucked.

### **Background of the Invention**

In past, a conventional feeding bottle comprises a liquid-containing bottle, which is provided for containing liquid such as milk, water or juice etc.; a nipple, which serves as a duct for exiting liquid from the liquid-containing bottle; a nipple cap, which is provided for fastening the nipple onto the liquid-containing bottle; a bottle cover, which is provided to seal a top end of the liquid-containing bottle. There are various shapes of the liquid-containing bottle,

however, the top end of liquid-containing bottle is a cylinder shaped-lip having the screw-groove on outer surface of the bottle. The said screw-groove on outer surface of the bottle can match to the screw-groove on the inner surface of the nipple cap. The said nipple cap also is configured to tight-fittingly fasten a nipple onto a liquid-containing bottle. The bottle cover is fitted over the top end of the bottle and an inside of bottom end of the bottle is coupled appropriately to an outer surface of the nipple cap, and the bottle cover can be open for use as desired. Thus, the structure as mentioned above can form the inside of the liquid-containing bottle to have a closed system with an opening positioned on the top end of the nipple.

If the liquid-containing bottle is empty, generally, a range of air pressure inside the bottle is equal to that of the air pressure outside the bottle or if there is the liquid contained in the bottle placed in vertical, the range of air pressure pressing down on the top of the liquid contained in the bottle is still equal to that of the ambient pressure.

However, when the liquid-containing bottle is inverted, the air over the liquid in the bottle is flow down to the bottom end of the bottle instead. If a rest area of the air inside the

bottle is small, it results in a low interior pressure, which cannot resist to the ambient pressure compressing around the nipple head being only a opening for exiting the liquid. Thereby, the liquid is stopped and unable to flow out of the  
5 bottle. For this reason, the user needs to exert more force to suck up the liquid.

Generally, the problems have been found that when the nipple has been sucked continuously for a long period without releasing the nipple from mouth, the vacuum  
10 condition is occurred in the bottle, resulting in the nipple collapsion, and difficult of releasing liquid because there is no air ventilation or air intake. When the user exert more force to suck up the liquid, the user may feel an ache at cheek pouch, or unable to suck up the liquid until allowing  
15 the air to flow into bottle again. When the vacuum condition is occurred, if the user continuously sucks up the liquid without releasing the nipple to sufficiently put the air into the bottle, the user might suck an air instead or the bottle may be adjoined to user's mouth.

20 There has been a development of an air putting method for adjusting an air pressure inside the bottle by inventing the pressure-adjusting valve for nipples in various

shapes. In stead of direct ventilation through the liquid exiting channel at the end of nipple, the installment of air intake hole, air intake slit, or swell valve having slit pararell to liquid-containing bottle is used, thereby enabling to put  
5 the air into the bottle for adjusting the air pressure inside the bottle at the time of consumption. Nevertheless, the problem of unsteady air intake and the leakage of the liquid from the valve have still been found in the said pressure-adjusting valve.

10 For example, in using of nipple comprising of a convex valve having a slit in longitudinal and pararell to the liquid-containing bottle, the problem of the leakage of liquid and unsteady air intake have been found. This is because the said slit in longitudinal and pararell to the bottle is formed to  
15 separate the mounting flange of the valve into two parts so that the air pressure pressing down on the slit to open the valve is two-part distributed and is lowered. If air pressure acting on each side is not enough to push the valve against water pressure and gravitational force pressing down on  
20 another end of valve, the air cannot flow conveniently into the bottle. Consequently, user needs to exert more suction force to open the pressure-adjusting valve. However, if the

pressure-adjusting valve is open too much, the liquid above the top of the valve is ready to flow and leak from the valve, by virtue of liquid weight and gravitational force etc.

As discussed above, the inventor improves the nipple  
5 comprising of the pressure-adjusting valve in preferred embodiment of the present invention to overcome the prior art's disadvantages and provide a more efficiency work.

### **Brief description of the drawing**

10 **FIG.1** is a perspective view of a nipple comprising of the pressure-adjusting valve of the present invention

**FIG.2** is a front view of the nipple comprising of the pressure-adjusting valve of the present invention

15 **FIG.3** is the cross-sectional view of the pressure-adjusting valve of the present invention

**FIG.4** is the cross-sectional view of the pressure-adjusting valve of the present invention

20 **FIG.5** is the cross-sectional view of liquid-containing bottle with the nipple comprising of the pressure-adjusting valve of the present invention in use.

**FIG.6** is an enlarged view showing air flowing of liquid-containing bottle with the nipple comprising the pressure-adjusting valve of the present invention.

**FIG.7** is the cross-sectional view of of side of nipple  
5 comprising of a pressure-adjusting valve which is in the open state to allow air to flow into liquid-containing bottle.

### Detailed description of the present invention.

Referring to Figs. 1 and 2, the nipple with the  
10 pressure-adjusting valve of the present invention is made of elastic material, such as synthetic rubber or natural rubber etc.

In embodiments of the present invention comprise of a nipple head 1, a nipple body 2, a nipple neck 3, a  
15 mounting flange 4, and a pressure-adjusting valve 5.

The nipple head 1 is a tip of nipple and is shaped a cylindrical-inverted dome. The nipple duct 6 is formed at the center of the tip of said nipple head 1. Further, the nipple body 2 is shaped the hallowed-inverted cone. A size of  
20 diameter of top end of the said nipple body 2 is equal to that of bottom end of the said nipple head 1. The size of diameter of bottom end of the nipple body 2 is equal to that

of top end of nipple neck 3 , which is larger than top end's diameter size of the said nipple body 2. The shape and surface of the nipple body 2 can be designed according to properties and utilities's requirement.

5 In an embodiment of the present invention, a hallowed-vertical cylinder shaped-nipple neck 3 is connected between the nipple body 2 and mounting flange 4. In some embodiment of the present invention, some type of nipple can be formed by connecting the nipple body 2 to  
10 the mounting flange 4 directly without the nipple neck 3.

A flat ring shaped-mounting flange 4, which is extended roundly and vertically from the nipple neck 3, is placed in paralell to a bottle lip 7. An air cavity 8, which is formed at the mounting flange 4, is connected to the  
15 pressure-adjusting valve 5 for air flowing to adjust the air pressure inside the bottle 7. The air cavity 8 for air flowing has a shape and size similar to a cavity positioned on top end of the valve 5 connected at the bottom of the mounting flange 4.

20 Referring to FIGs.3 and 4, there are shown the cross sectional views of the front and the side of the pressure-adjusting valve of the present invention, respectively. The

pressure-adjusting valve 5 is shaped a hallowed cylinder having one closed end and interior of the valve 5 is used as a valve cavity 9 for air flowing. The top end of the valve cavity 9 of the pressure-adjusting valve 5 is formed to be a  
5 open end connected the inside periphery of the said valve cavity 9 to an air cavity 8 at the mounting flange 4. To enhance strength of the valve 5, the external surface of top end of the valve 5 is extended to attach to the bottom surface of the mounting flange 4. In addition, a side wall 10  
10 of the valve 5 above the bottom-closed end is formed with at least one slit 11 at the part of periphery of said valve 5. The slit 11 can be either continuous slit or spaced slits, which it depends upon the requirement and application. The slit 11 serves as opened-closed door to allow the ambient  
15 air to flow into the bottle through the valve cavity 9 located in the valve 5.

To enhance the slit 11 formed on a surface area of a side of the valve 5, the external surfaces of side wall 10 is additionally cut over and under slit 11 of the valve 5. The  
20 cuts of slit 11 are inwardly inclined toward each other so that the interior surface of the cuts of slit 11 is tightly closed and no space is formed within the interior surface of side

wall 10. Thereby, a weight of the surface area of the side wall 10 can be reduced and an ambient air can be pushed into the inner conveniently.

Referring to FIG.5, 6 and 7, there are shown the function of the pressure-adjusting valve 5. If the liquid-containing bottle 7 is empty, normally, a range of the air pressure inside the bottle 7 is equal to that of the air pressure outside the bottle 7. This cause the slit 11 of the valve 5 is closed tightly. If there is the liquid in the liquid-containing bottle 7 placed vertically, the range of the air pressure pressing down on the liquid contained in the bottle 7 are kept equal to that of the external pressure or pressure of the valve cavity 9 of the valve so that the slit 11 is still tightly closed.

When the liquid-containing bottle 7 is inverted, the air over the liquid in the bottle 7 is flow down to the bottom end of the bottle instead. If a rest area of the air inside the bottle 7 is small, it results in a range of interior pressure lower than that of the air pressure outside the bottle 7. This is because, normally, the air will move from the area having a high air pressure to the area having a lower air pressure. And if there are various cavities for air flowing, the air will

move to the cavity allowing the air to most convenient flow into the bottle.

In general, there is an air distribution in all direction. According to the present invention, there are two channels  
5 for air flowing into the liquid -containing bottle 7. One is the nipple duct 6 and another is the air cavity 8 of the mounting flange 4. Normally, it is difficult that the air can flow into the bottle 7 through the nipple duct 6 because the air compresses the nipple head 1 in all direction or the nipple  
10 head is sucked, resulting in the air flows through the air cavity 8 into the bottle instead. Moreover, the valve cavity 9 according to the present invention is formed with a bottom-closed end and at least one slit 11 is formed on the side wall of the valve cavity 9 as well. When the bottom end of  
15 the valve cavity 9 is pushed by the air thereabove, the slit 11 is open to allow the ambient air to contineously flow into the bottle having lower pressure.

When the user is sucking the nipple, the air will be put into the air cavity 8 of the mounting flange 4 to the valve  
20 cavity 9 of the valve 5 and pass through the open slit 11 into the interior of the bottle 7 in order to keep the balance of the pressure inside the bottle 7 and the pressure outside the

bottle 7 all the time. This is to prevent a vacuum from forming inside the bottle when the bottle is sucked. With the aforesaid principle, function and reasons of the nipple according to the present invention, the obtained nipple with the pressure adjusting valve 5 can be put the air into the bottle 7 easily and conveniently, thereby causing the liquid enabling to flow out from the bottle 7 more continuously and steady.

In preferred embodiment, the nipple with the pressure-adjusting valve 5 of the present invention, which is able to prevent the liquid leakage from the valve 5 when the bottle is inverted or sucked. Due to the fact that the weight of liquid inside the bottle 7 above the pressure-adjusting valve 5 will press down at the bottom end of the valve 5 thereby causing the slit 11 of the side wall 10 is tightly closed enough to the liquid not to leak from the slit 11. The force of liquid acting to the slit 11 on the side wall 10 of the valve 5 is only a liquid pressure from the side wall 10 of the valve 5, without the gravitational force. Therefore, the pressure of liquid acting to the slit 11 at the side wall 10 of the pressure-adjusting valve 5 of the present invention is less than a liquid pressure acting to the slit 11 at the end of the valve 5

of the conventional nipple. When the user is sucking or the bottle is inverted, the user is able to suck from the bottle 7 continuously and conveniently and also there is no leakage of the liquid from the valve 5. Additionally, the nipple of the present invention can be detached and cleaned conveniently.

It will be understood that the invention as presented and claimed herein are used to illustrate and describe embodiments and examples merely, without any intention to limit the scope of the disclosure thereto. Various equivalent changes, alternations or modifications based on the claims of the disclosure are all consequently viewed as being embraced by the scope of the claim as appreciated by those skilled in the art.

15

### **The best mode of the invention**

As stated in the detailed description of the invention above.

**Claim:**

1. A nipple comprising a nipple head (1), a nipple body (2), a nipple neck (3), a mounting flange (4) and a pressure adjusting valve (5),

5

wherein a cylindrical-inverted dome shaped nipple head (1), which is a tip of the nipple and is formed with a nipple duct (6) at the center of the said nipple head (1); a hallowed-inverted cone shaped nipple body (2) attached to a vertical-hallowed cylinder shaped nipple neck (3), which is mounted between the nipple body (2) and the mounting flange (4); a flat ring shaped mounting flange (4) extended from the nipple neck (3) roundly and vertically; and an air cavity (8) defined on the mounting flange (4), which is attached to the valve cavity (9) of the pressure adjusting valve (5) at the bottom of the mounting flange (4) for allowing air to flow into liquid-containing bottle (7).

10

15

characterized in that interior of the pressure adjusting valve (5) is shaped a hallowed cylinder having closed-bottom end. The side wall (10) of the pressure adjusting valve (5) positioned over the closed-bottom end is formed with a slit (11) at a part of periphery of said side wall (10) of the pressure adjusting valve (5).

20

2. The nipple of claim 1, wherein at least one slit (11) is formed at the part of periphery of side wall (10) of the pressure adjusting valve (5).
- 5
3. The nipple of claim 1 or 2, wherein the slit (11) formed at the part of periphery of side wall (10) of the pressure adjusting valve (5) is a continuous slit.
- 10
4. The nipple of claim 1 or 2, wherein slit (11) formed at the part of periphery of side wall (10) of the pressure adjusting valve (5) is the spaced slits.
- 15
5. The nipple of any of claim 1-4, wherein side wall (10) is cut above and under slit (11) of the pressure adjusting valve (5) and the cuts of slit (11) are inwardly inclined toward each other so that interior surface of side wall (10) is tightly closed and no space is formed within the interior surface of side wall (10).
- 20
6. The nipple of any of claim 1-5, wherein the nipple is made of elastic material.

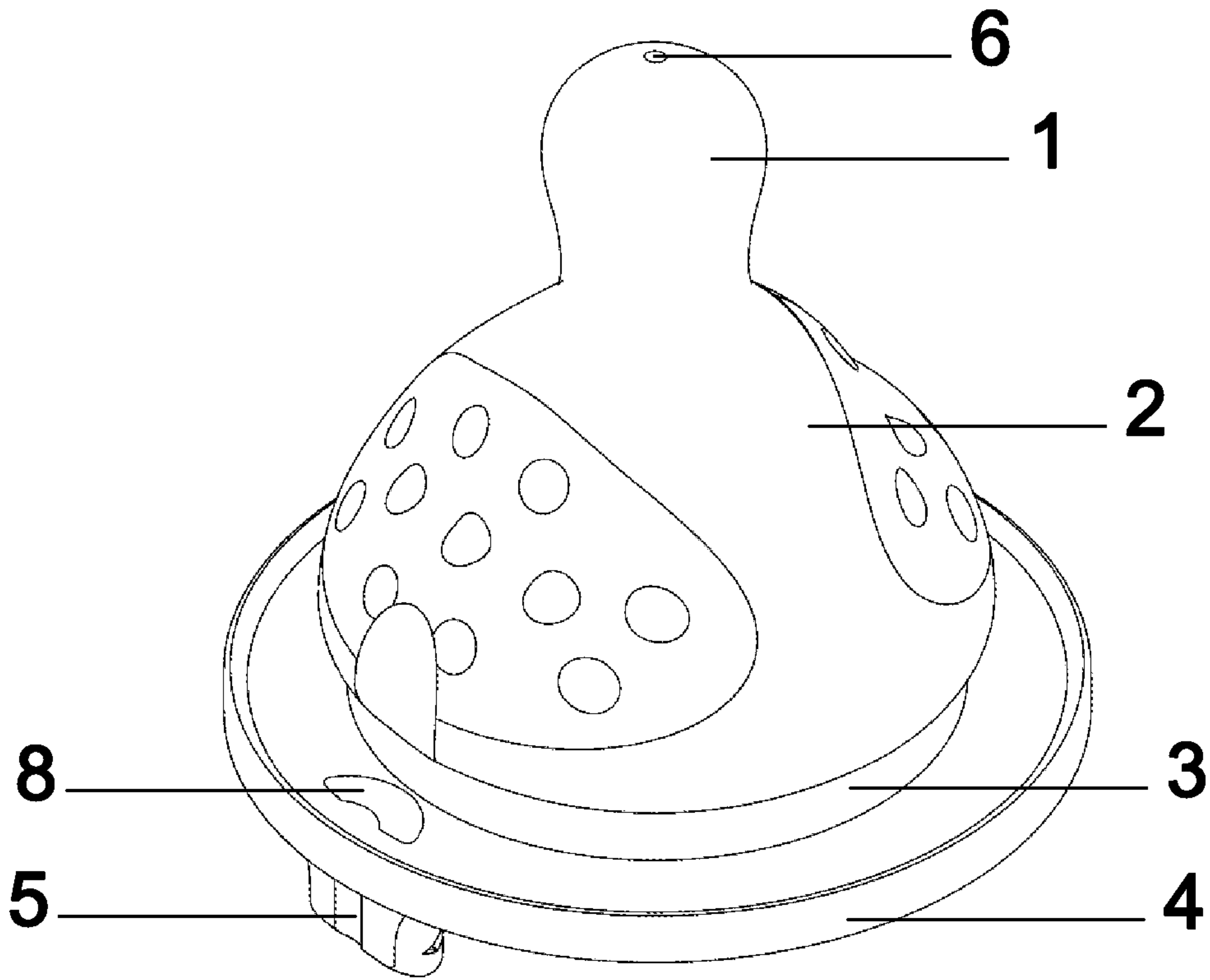


Fig. 1

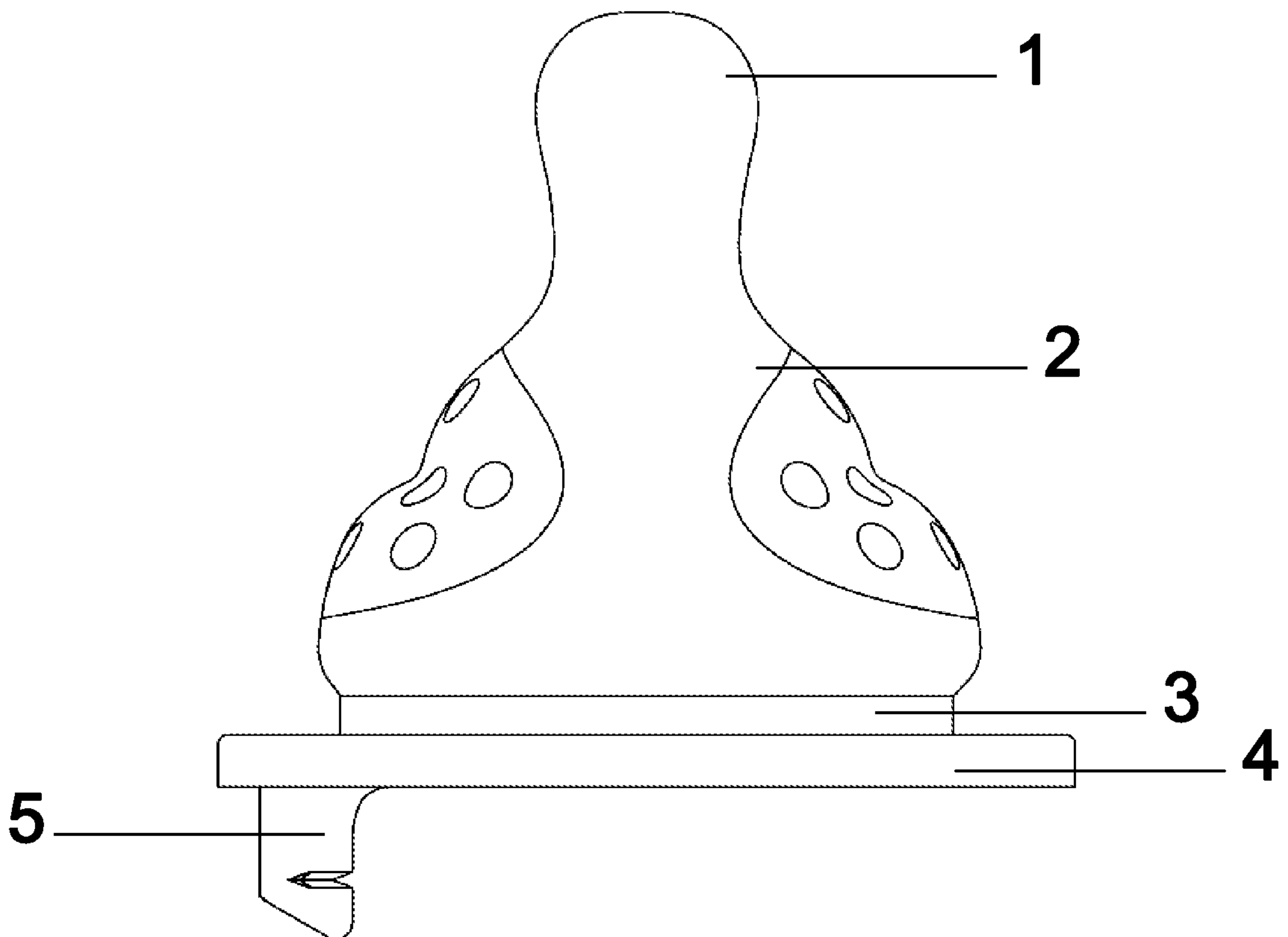


Fig. 2

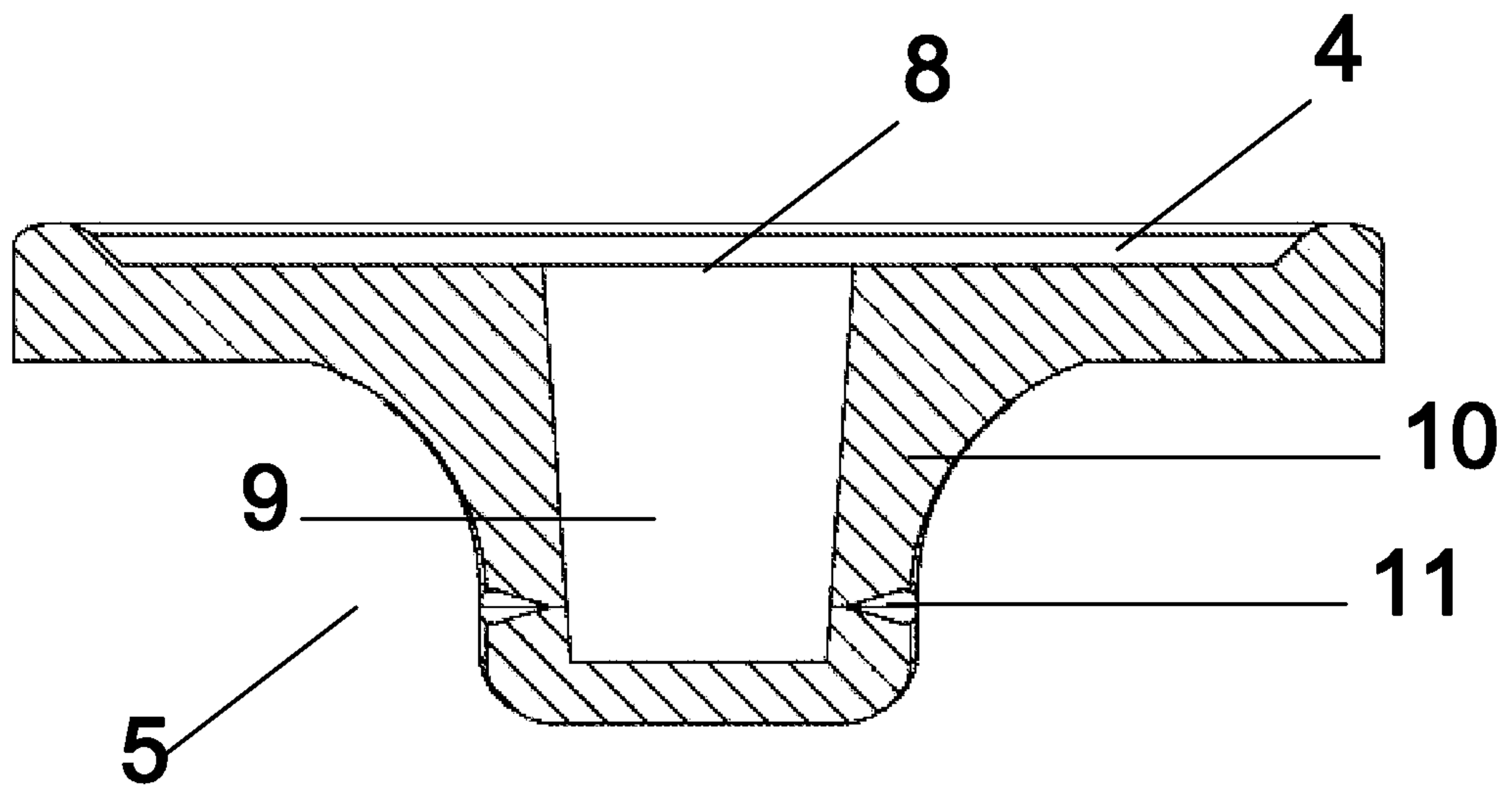


Fig. 3

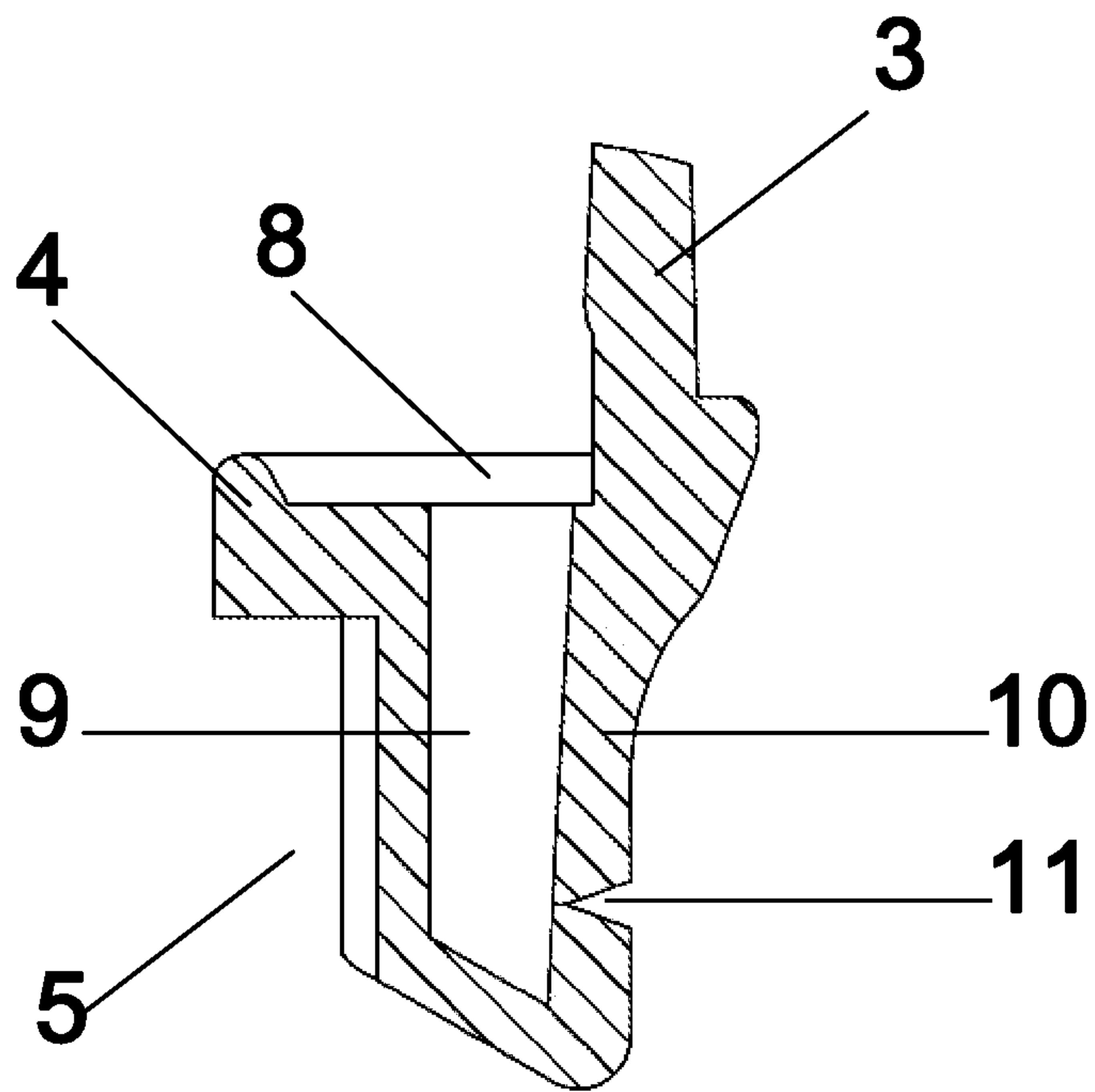


Fig. 4

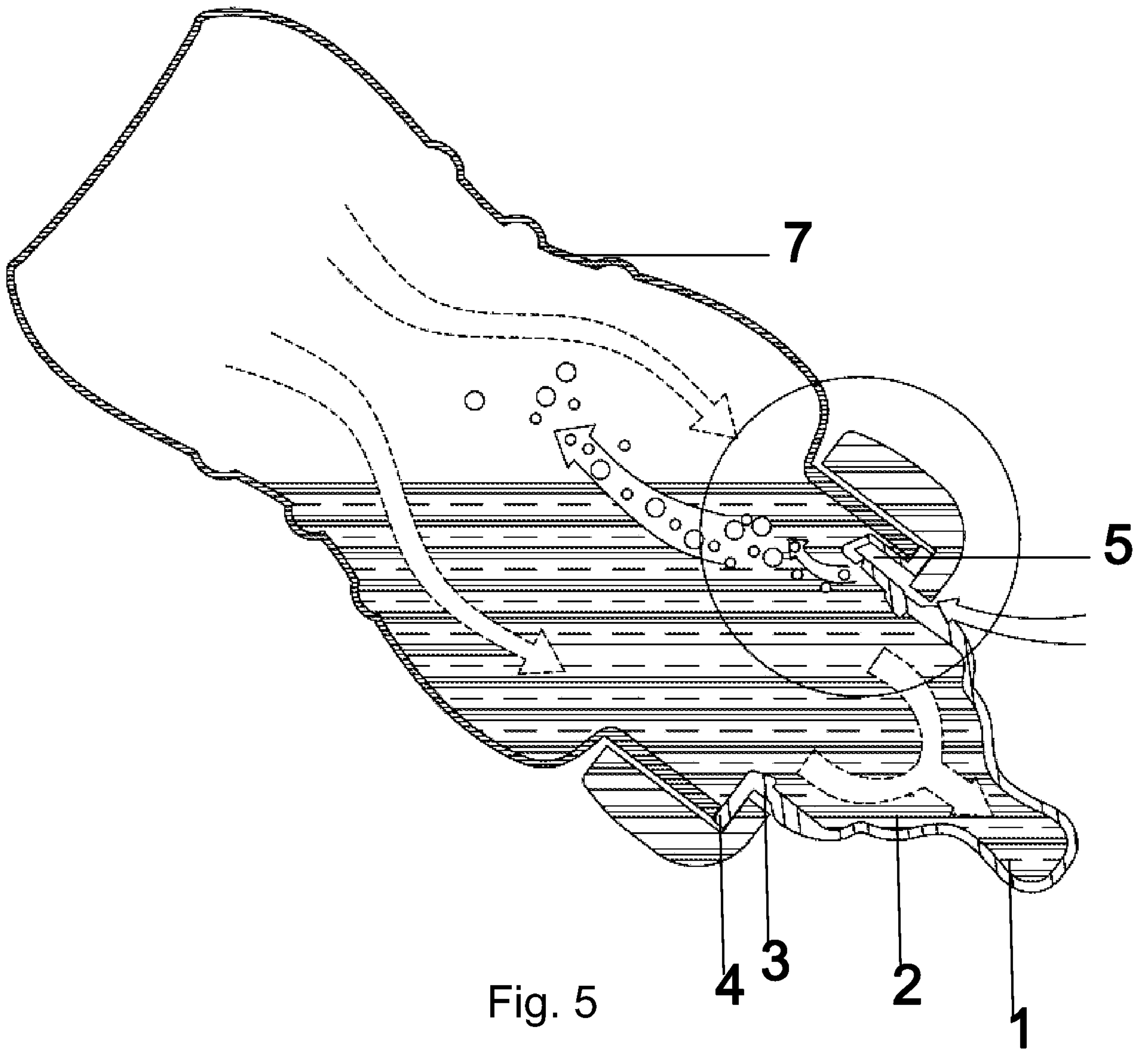


Fig. 5

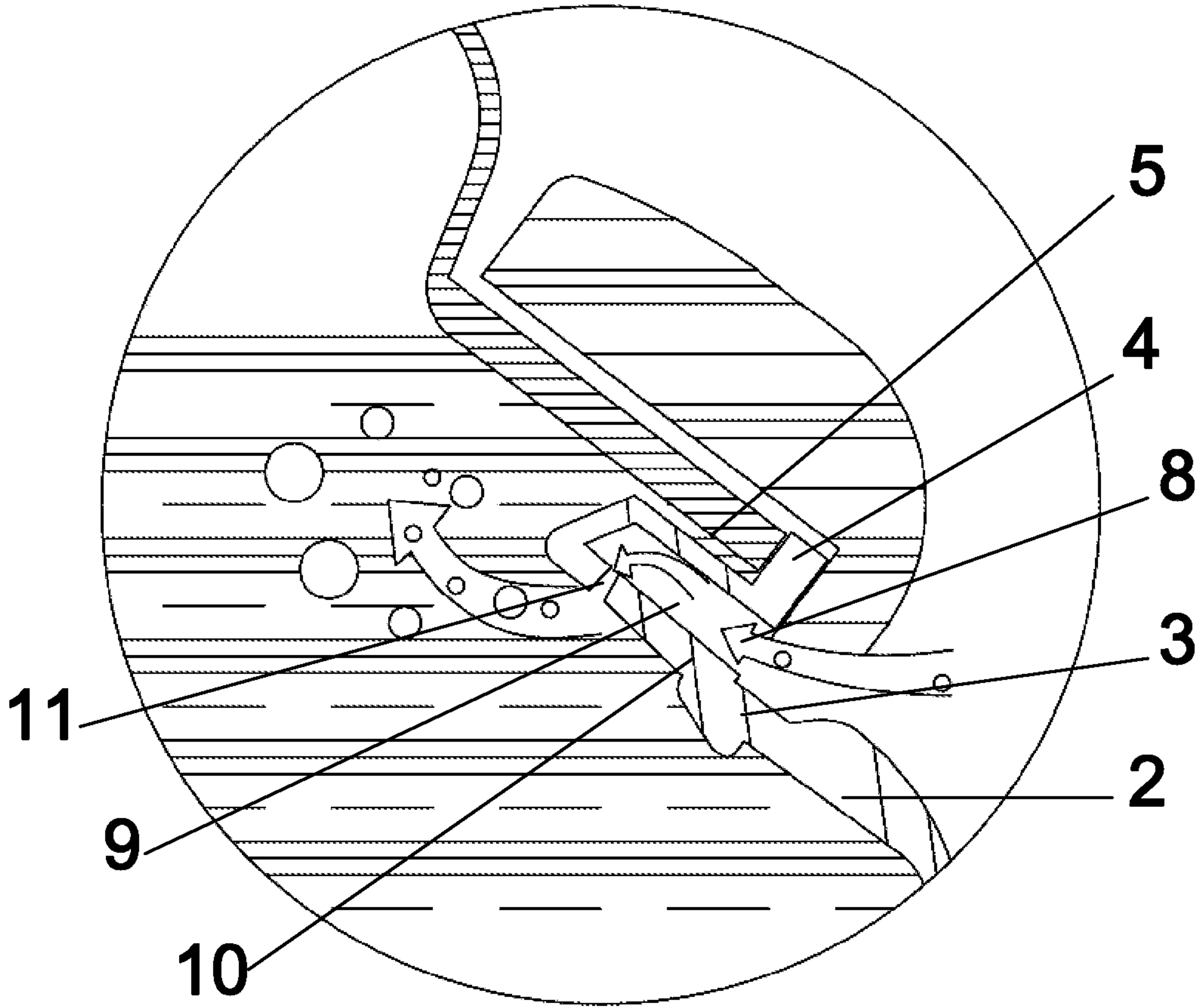


Fig. 6

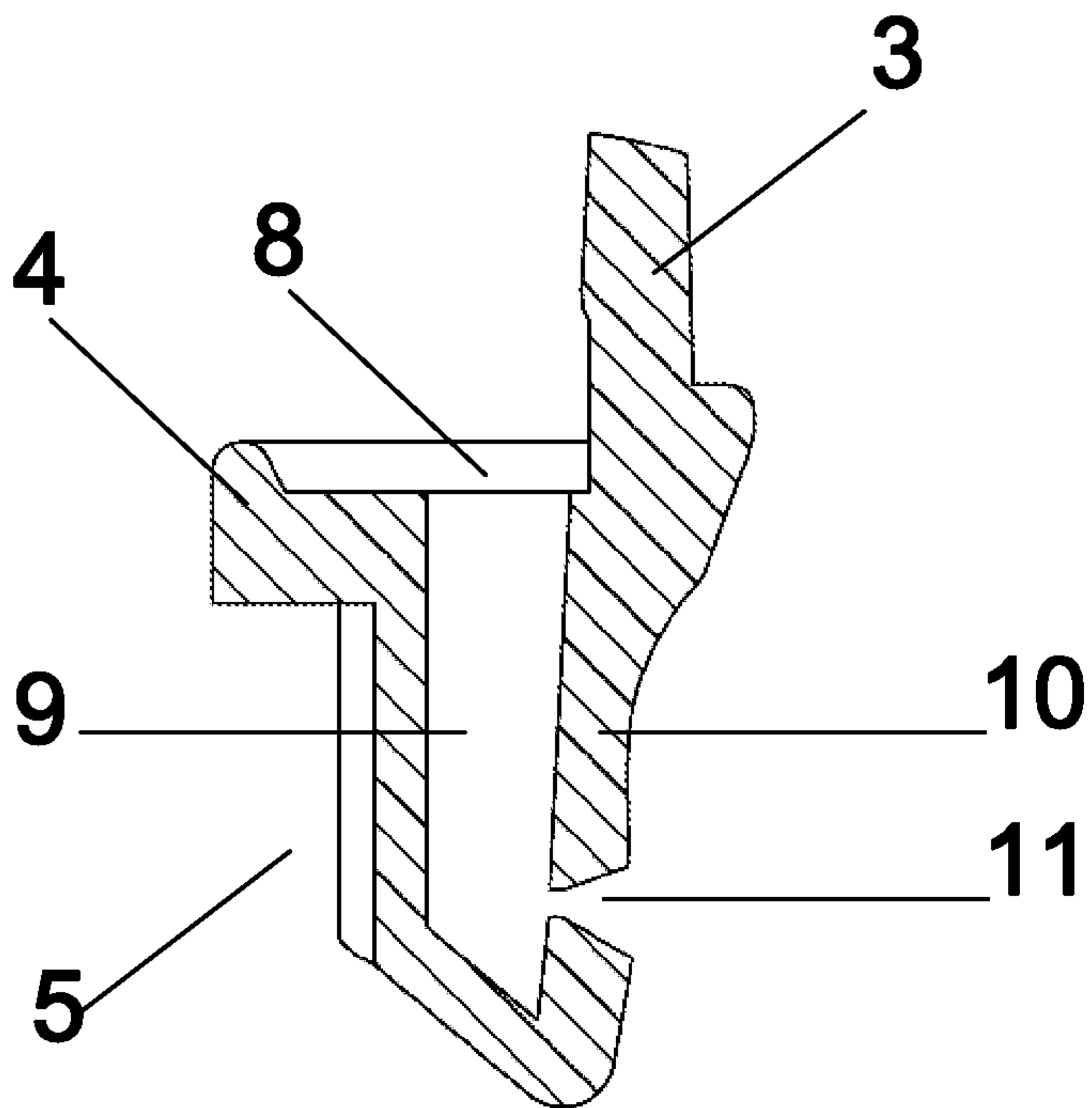


Fig. 7

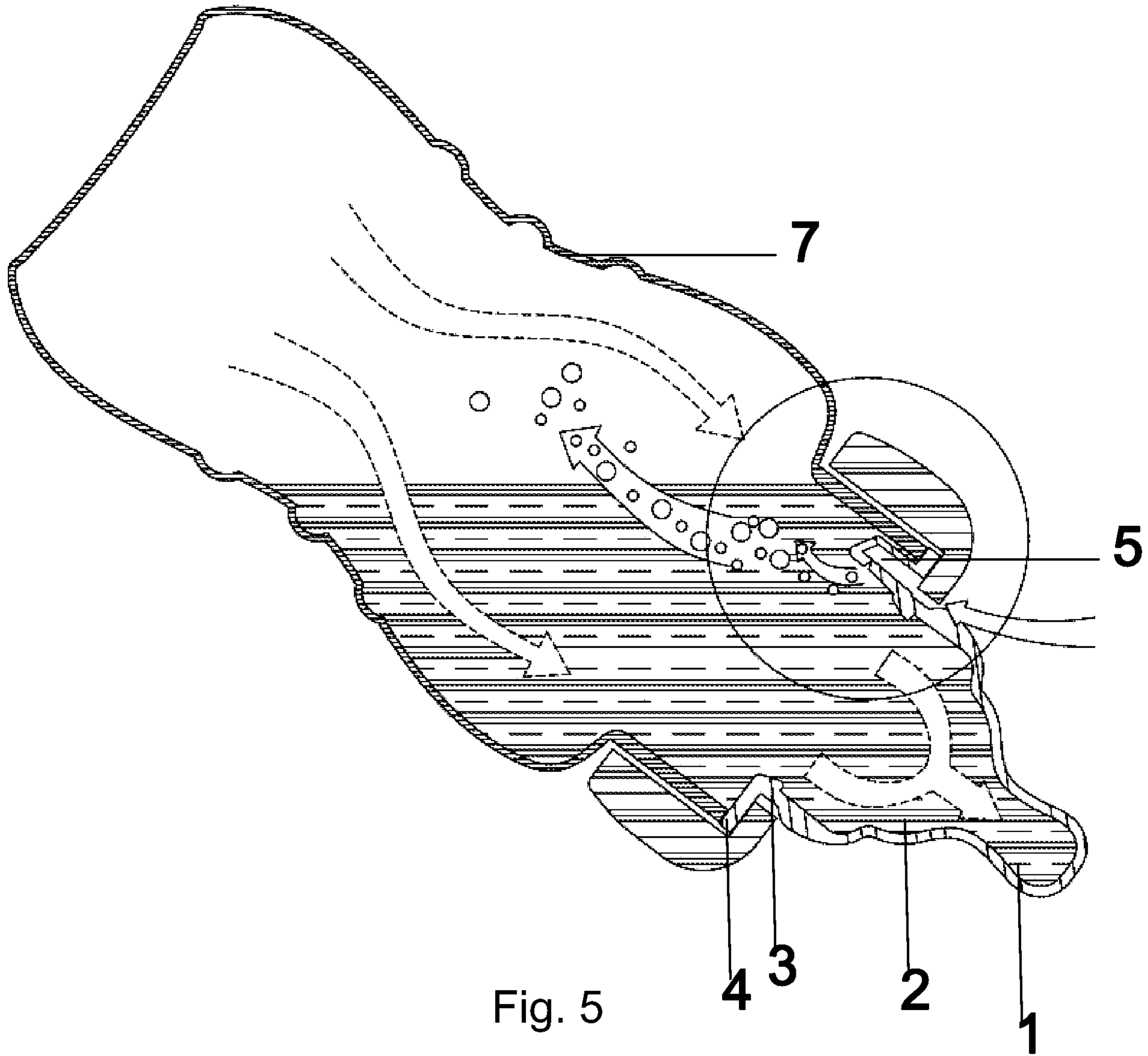


Fig. 5