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# (54) SYSTEM FOR DISPENSING A FOAM OF A FLUID PRODUCT

ABGABEVORRICHTUNG FÜR SCHAUM EINES FLÜSSIGEN PRODUKTES

SYSTÈME POUR LA DISTRIBUTION D'UNE MOUSSE D'UN PRODUIT FLUIDE

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## Description

**[0001]** The invention relates to a system for dispensing a foam of a fluid product, in particular liquid, used in perfumery, in cosmetics or for pharmaceutical treatments. The invention further relates to a bottle for dispensing comprising such a system mounted on a reservoir wherein the product and the air are conditioned.

**[0002]** In order to allow for the dispensing of the foam, the system comprises a head wherein a mixing chamber of the product with the air is formed, as well as a unit for foaming which has a passage for the supply of mixture coming from said chamber and a passage for dispensing the foam.

**[0003]** The supplying of the mixing chamber is carried out by passages respectively for product and for air, said passages being in communication with the reservoir in order to be supplied respectively with product and with air. As such, by providing a deformable reservoir, in particular manually, the air and the product conditioned are pressurised in said reservoir in order to supply the mixing chamber by the intermediary of passages, so as to dispense the product foam without using a pump.

**[0004]** Furthermore, the deformation of the reservoir is reversible in order to allow for the air return in the reservoir in compensation for the volume dispensed. To do this, a passage for return air is provided between the reservoir and the exterior of the bottle, said passage being provided with an anti-return valve which is arranged to be opened under the effect of the vacuum induced by the returning of the reservoir to its initial shape.

**[0005]** In particular in relation with bottles that can be inclined head downwards during storage and/or during dispensing, it is required to provide a supply valve for the mixing chamber in order to prevent product leakage via the head in the absence of stress on the reservoir. Indeed, when the head is arranged underneath the product, i.e. the bottle is arranged between the horizontal and vertical directions head downwards, simple gravity can suffice to provoke a flow of product via the head.

**[0006]** The supply valve conventionally comprises a product valve and an air valve provided respectively on the passage for product and the passage for air, each of said valves being arranged to open the passage for product - respectively for air - in order to supply the mixing chamber using a pressure that the product - respectively the air - exerts on it. As such, in the absence of deformation of the reservoir, the supplying of the mixing chamber is closed in a sealed manner, the pressurising of the air and of the product in said reservoir actuating the dispensing of the foam.

**[0007]** However, the use of an air return valve and of a supply valve according to prior art is not entirely satisfactory, as it is complex to carry out and requires a substantial number of components. Furthermore, the stresses for opening / closing the different valves are difficult to reconcile, which can lead to product leakage and/or to the dispensing of a foam of which the quality is not always satisfactory.

**[0008]** A system according to the preamble of claim 1 is known from WO2011/115484.

**[0009]** The invention aims to improve prior art by proposing in particular a system that makes possible, even in relation with a use inclined with the head downwards, the dispensing of a foam of good quality, wherein the opening / closing functions of the passages for the product, for air and for air return are carried out simply and reliably.

**[0010]** To this effect, and according to a first aspect, the invention proposes a system for dispensing the foam of a fluid product comprising:

- a head wherein a mixing chamber of said product with the air is formed, said chamber having a passage for product intended to be in communication with a source of product and a passage for air intended to be in communication with a source of air;
- a unit for foaming which has a passage for the supply of mixture coming from the chamber and a passage for dispensing the foam;
- a supply valve of the mixing chamber which comprises a product valve and an air valve is provided respectively on the passage for product and the passage for air, each of said valves being arranged to open the passage for product - respectively for air - in order to supply the mixing chamber using a pressure that the source of product - respectively of air
- exerts on it;

with the mixing chamber having a passage for return air which is provided with an anti-return valve arranged to be opened under the effect of a vacuum in the mixing chamber, the supply valve being arranged to open the passage for air using a vacuum that the source of air exerts on it in order to allow for the air return in said source through the mixing chamber.

**[0011]** According to a second aspect, the invention proposes a bottle for dispensing the foam of a fluid product comprising a reservoir wherein said product and air are conditioned, said bottle comprising such a system for dispensing which is mounted on said reservoir, said reservoir able to be deformed reversibly between a pressurised state of the valves for the air and for the product in order to dispense the foam through the unit for foaming and a vacuum state of the supply valve in order to allow for the air return in said reservoir through the mixing chamber.

**[0012]** Other purposes and advantages of the invention shall appear in the following description, made in reference to the annexed figures, wherein:

- figure 1 is a longitudinal cross-section view of a bottle for dispensing according to an embodiment of the invention, said bottle shown in closed state;
- figure 2 is an enlarged view of figure 1 showing more particularly the system for dispensing in closed state;

- figures 3a and 3b are diagrammatical drawings of the front of two possible configurations for the supply valve according to the invention;
- figures 4 and 5 are views similar to figure 2 wherein the system for dispensing is respectively in dispensing state (figure 4) and in air return state (figure 5).

**[0013]** In relation with the figures, a bottle for dispensing the foam of a fluid product P, in particular liquid, is described hereinbelow, said product able to be of any nature, for example used in perfumery, in cosmetics or for pharmaceutical treatments.

**[0014]** The bottle comprises a reservoir 1 surmounted by a neck 2 whereon a system for dispensing is mounted, the product P and air A being conditioned in said reservoir in order to be mixed for the purpose of dispensing them in the form of foam.

**[0015]** To do this, the system for dispensing comprises a head 3 wherein is formed a mixing chamber 4 of the product P with the air A, as well as a unit for foaming 5 which has a passage for supplying 6 with mixture coming from said chamber and a passage for dispensing 7 the foam to the exterior of the bottle. In particular, the unit for foaming 5 allows for the expansion of the foam and its dispensing to the geometry of the passage for dispensing 7.

**[0016]** In the embodiment shown, the head 3 comprises a support 8 which has an outer plate 9 provided with an inner annular skirt 10 and an outer annular skirt 11. The skirts 10, 11 are concentric in order to form a space wherein the neck 2 is arranged, the inner skirt 10 being in sealed contact on the interior of said neck and the outer skirt 11 being snap-fitted onto the exterior of said neck. Other methods for the sealed fastening of the head 3 onto the neck 2 can be used, for example by screwing or by crimping.

**[0017]** The outer plate 9 comprises a downstream opening 12 formed inside a central wall 13 which extends interiorly by delimiting exteriorly the mixing chamber 4. The head 3 further comprises a base 14 which has an inner plate 15 provided with an outer skirt 16, said skirt being associated around the central wall 13 so that said inner plate delimits the mixing chamber 4 opposite the downstream opening 12.

**[0018]** The head 3 comprises a lid 17 for closing the downstream opening 12 between two dispensings, said lid being mounted by the intermediary of a hinge 18 on an edge of the outer plate 9 between a closed position (figures 1 and 2) and an open position (figures 4 and 5). In particular, the lid 17 comprises an inner edge 19 which, in closed position, is engaged on the central wall 13 in order provide the seal for the closing of the downstream opening 12 during storage.

**[0019]** The system for dispensing comprises a casing 20 wherein the unit for foaming 5 is formed. The casing 20 comprises the passages for supplying 6 and for dispensing 7 between which a foaming chamber 21 is formed, in particular in order to allow for the expansion and the dispensing of the foam formed by the mixture of the product P and of the air A. In order to create a foam of high quality, the passage for supplying 6 and/or for dispensing 7 can be provided with a foaming grid 22 having pores through which the product P - air A mixtures passes under pressure in order to best expand the foam.

**[0020]** The casing 20 is mounted in the downstream opening 12 of the mixing chamber 4 by sealed fitting to the interior of the central wall 13 in such a way that said casing delimits the mixing chamber 4 opposite the inner plate 15. In particular, the passage for supplying 6 is arranged in the mixing chamber 4 and the passage for dispensing 7 is arranged inside the downstream opening 12 in such a way as to be closed by the lid 17 between two dispensings.

**[0021]** The mixing chamber 4 has a passage for product 23 in communication with a source of product 24 formed in the reservoir 1 and a passage for air 25 in communication with a source of air 26 formed in said reservoir. In relation with the figures, each passage 23, 25 is formed in the inner plate 15 in the form of an orifice. Alternatively, a passage 23, 25 can include several orifices and/or be formed in another wall of the mixing chamber 4.

**[0022]** The passage for air 25 is provided with an extension 28 wherein one end of a tubing 27 is mounted, with the other end of said tubing being arranged in the source of air 26 in order to allow for the transport of the air A between said source and said passage for air through the source of product 24. Alternatively, other means for supplying the passage for air 25 can be considered.

**[0023]** In the embodiment shown, the bottle is intended to be used head 3 inclined downwards, the source of product 24 being formed in the portion of reservoir 1 located in the extension of the neck 2 and the source of air 26 in that located in the bottom 29 of said reservoir. In particular, this use implies that the head 3 is arranged under the product P, in particular with the bottle arranged between the horizontal and vertical directions head 3 downwards during the dispensing and/or storage. In the embodiment shown, the lid 17 has a flat upper wall whereon the bottle is intended to be placed head 3 downwards during its storage (figure 1).

**[0024]** The system for dispensing comprises a supply valve 30 of the mixing chamber 4 which comprises a product valve 31 and an air valve 32 provided respectively on the passage for product 23 and the passage for air 25. Each of the valves 31, 32 is arranged to open the passage for product 23 - respectively of air 25 - in order to supply the mixing chamber 4 using a pressure that the source of product 24 - respectively of air 26 - exerts on it. As such, in the absence of sufficient pressure on the valves 31, 32, in particular via simple gravity, the supplying of the mixing chamber 4 is closed in a sealed manner in order to prevent leaking and the pressurising of the valves 31, 32 from actuating the dispensing of the foam.

**[0025]** The supplying of the mixing chamber 4 is carried

out separately for product P and for air A, with a kinematics and in a ratio that can be determined. Advantageously, the opening pressure of the passage for air 25 is less than that of the passage for product 23, for example being respectively 20 mbar and 30 mbar in such a way that the supplying of the mixing chamber 4 starts with the air A only and then continues with the air A and with the product P.

**[0026]** In the embodiment shown, the dispensing of the foam is actuated by the intermediary of the reservoir 1 which is deformable, in particular manually. Indeed, this deformation induces a pressurising of the air A and of the product P which is exerted respectively on the valves for air 32 and for product 31 in such a way as to supply the mixing chamber 4 then the unit for foaming 5. Alternatively, the source of product 24 and/or of air 26 can be pressurised by other means than the deformation of the reservoir 1, or via a non-manual deformation of said reservoir.

**[0027]** In order for the bottle to recover its initial shape between two dispensings, the deformation of the reservoir 1 is reversible, in particular by providing to carry out said reservoir with a shape memory material and/or by providing said reservoir with added elastic means. The dispensing of a volume of foam must then be compensated by an air return of equivalent volume in the reservoir 1. In particular, during the return to its initial shape, the reservoir 1 is in a vacuum state of the supply valve 30 by the intermediary of the passage for air 25.

**[0028]** In order to allow the air return through the mixing chamber 4, the supply valve 30 is arranged to open the passage for air 25 using a vacuum that the source of air 26 exerts on it. As such, a vacuum is formed in the mixing chamber 4 which has a passage for return air 33 provided with an anti-return valve 34 arranged to be opened under the effect of this vacuum in order to supply the reservoir 1 with air A in compensation for the volume dispensed.

**[0029]** The air return through the mixing chamber 4 makes it possible to manage the opening / closing functions of all of the passages, i.e. for the product 23, air 25 and air return 33, by means of the supply valve 30 which is provided at the interface between the reservoir 1 and said mixing chamber, which can be done simply and reliably, in particular in relation with a dispensing of foam of quality with a bottle head 3 downwards.

**[0030]** In particular, the supply valve 30 can be arranged in order maintain the passage for product 23 closed during the air return so that the air A is introduced into the reservoir 1 only by the intermediary of the passage for air 25, in particular without passing through the source of product 24.

**[0031]** In the embodiment shown, the casing 20 comprises a lateral extension 35 wherein the passage for return air 33 is formed outside of the unit for foaming 5. In particular, the passage for return air 33 is carried out on the downstream opening 12, the lid 17 closing said passage for return air between two dispensings.

**[0032]** Advantageously, the air return is not carried out through the unit for foaming 5 but in parallel of the foaming chamber 21. More precisely, the pressure in the mixing chamber 4 during the dispensing maintains the air return valve 34 in closed position in order to supply the foaming chamber 21 with the mixture, with the vacuum in the mixing chamber 4 during the air return opening said valve in order to supply the reservoir 1 with air A without passing through the foaming chamber 21.

**[0033]** In the figures, the passage for return air 33 comprises an orifice whereon is mounted a sealing element 34, said element being arranged in the mixing chamber 4 between a thrust closed position of the orifice (figures 2 and 4) in order to allow for storage and dispensing, and a separated open position of said orifice (figure 5) in order to allow for the air return.

**[0034]** More precisely, the element is formed of a ball 34 which is mounted in a sealed manner on a seat of the orifice 33 by the intermediary of a retaining cage (not shown in the figures). The pressure in the mixing chamber 4 maintains the ball 34 on the seat, the vacuum in said mixing chamber raising said ball in the cage.

**[0035]** Advantageously, at least one valve 31, 32 comprises a membrane 36 made of sealed elastomeric material wherein lips 37 are formed. In particular, all the valves 31, 32 can include lips 37, for example made in the same membrane 36 or each in a different membrane 36.

**[0036]** In the embodiment shown, each valve 31, 32 is carried out with a membrane 36, said membranes being overmoulded on a rigid armature 38 for fastening the supply valve 30 in the mixing chamber 4. By way of example, the armature 38 can be carried out with a polyolefin base such as Polypropylene or Polyethylene, and the membranes 36 with a silicone or thermoplastic elastomeric (TPE) base.

**[0037]** In relation with figures 3, the rigid armature 38 has orifices 39 in each of which a membrane 36 is overmoulded, said orifices being arranged in such a way as to be able to be arranged across from respectively a passage 23, 25 when the supply valve 30 is mounted in the mixing chamber 4. In particular, each orifice 39 has an protruding edge between which the membrane 36 is arranged, said edge pressing under the inner plate 15.

**[0038]** The fastening of the supply valve 30 in the mixing chamber 4 is provided by the fastening of the base 14 around the central wall 13, in particular via a pinch seal of the outside edge of the armature 38 between the inner plate 15 and the end of the central wall 13.

**[0039]** In the embodiment shown, the supply valve 30 comprises an air return valve 40 which is provided on the passage for air 25, said valve being arranged to open said passage for air using a vacuum that the source of air 26 exerts on it.

**[0040]** In figure 3a, the air valve 32 also forms an air return valve 40, said valve being double-acting in order to open the passage for air 25 when the source of air 26 exerts a pressure or a vacuum on it. In particular, the lips 37 of the air valve 32, 40 are then able to be displaced

reversibly under the effect of a pressure or of a vacuum of air between a sealed joined state (figure 2) and a separated open state of the passage for air 25 (figures 4 and 5).

**[0041]** Advantageously, the air valve 32, 40 has a dome whereon the lips 37 are formed, said dome being oriented outwards from the mixing chamber 4. As such, the opening pressure of the passage for air 25 must be sufficient in order to turn the dome over, while the opening vacuum is lower since it must induce only a rising of the lips 37. In particular, the opening vacuum for the air return can be from 5 to 10 mbar and the opening pressure for the supplying with air of 20 mbar.

**[0042]** Likewise, the product valve 31 has a dome of similar geometry and of which the lips 37 can be displaced reversibly under the effect of a pressure of product P between a sealed joined state (figures 2 and 5) and a separated open state of the passage for product 23 (figure 4).

**[0043]** The diameter of the dome of the product valve 21 can be lower than that of the air valve 32 so that the opening pressure of the passage for air 25 is less than that of the passage for product 23. Furthermore, the opening vacuum of the air return valve 40 is less than that of the product valve 31 so that the air return is carried out substantially by the intermediary of the passage for air 25.

**[0044]** In figure 3b, the air return valve 40 is separate from the air valve 32, each being formed from a membrane 36 wherein lips 37 are formed, each of said membranes being overmoulded in an orifice 39 of the rigid armature 38.

**[0045]** In this embodiment the passage for air 25 can include two orifices provided respectively with the air valve 32 and with the air return valve 40, each of said orifices being in communication with the source of air 26.

**[0046]** Each of the valves 32, 40 is single-acting, i.e. their lips 37 can be opened under the effect of a pressure for the air valve 32 and under the effect of a vacuum for the air return valve 40. In particular, the opening vacuum for the air return valve 40 is less than those for the valves for air 32 and for product 31 so that the air return is carried out substantially by the intermediary of said air return valve.

**[0047]** In the embodiments shown, each valve 31, 32, 40 comprises four lips 37 formed around a cross-shaped slot. In particular, a slot can be carried out by cutting, in particular after extension of the dome so as, after release of said extension, improve the sale conferred in joined state.

## Claims

1. System for dispensing the foam of a fluid product (P) comprising:

   - a head (3) wherein a mixing chamber (4) of said product with air (A) is formed, said chamber having a passage for product (23) intended to be in communication with a source of product (24) and a passage for air (25) intended to be in communication with a source of air (26);
   - a unit for foaming (5) which has a passage for supplying (6) with a mixture coming from the chamber (4) and a passage for dispensing (7) the foam;
   - a supply valve (30) of the mixing chamber (4) which comprises a product valve (31) and an air valve (32) provided respectively on the passage for product (23) and the passage for air (25), each of said valves being arranged to open the passage for product (23) - respectively for air (25) - in order to supply the mixing chamber (4) using a pressure that the source of product (24) - respectively of air (26) - exerts on it;

   said system being **characterised in that** the mixing chamber (4) has a passage for return air (33) which is provided with an anti-return valve (34) arranged to be opened under the effect of a vacuum in the mixing chamber (4), the supply valve (30) being arranged to open the passage for air (25) using a vacuum that the source of air (26) exerts on it in order to allow for the air return in said source through the mixing chamber (4).

2. System for dispensing according to claim 1, **characterised in that** the supply valve (30) comprises an air return valve (40) which is provided on the passage for air (25), said valve being arranged to open said passage for air using a vacuum that the source of air (26) exerts on it.

3. System for dispensing according to claim 2, **characterised in that** the air return valve (40) is separate from the air valve (32), each of said valves being single-acting.

4. System for dispensing according to claim 2, **characterised in that** the air valve (32) also forms an air return valve (40), said valve being double-acting in order to open the passage for air (25) when the source of air (26) exerts a pressure or a vacuum on it.

5. System for dispensing according to any of claims 1 to 4, **characterised in that** the supply valve (30) is arranged in order to maintain the passage for product (23) closed during the air return.

6. System for dispensing according to any of claims 1 to 5, **characterised in that** the opening pressure for the passage for air (25) is less than that of the passage for product (23).

7. System for dispensing according to any of claims 1

to 6, **characterised in that** at least one valve (31, 32, 40) comprises a membrane (36) made of sealed elastomeric material wherein lips (37) are formed, said lips able to be displaced reversibly under the effect of a pressure and/or of a vacuum between a sealed joined state and a separated open state of a passage (23, 25).

**8.** System for dispensing according to claim 7, **characterised in that** at least one valve (31, 32, 40) has a dome whereon the lips (37) are formed, said dome being oriented outwards from the mixing chamber (4).

**9.** System for dispensing according to claim 7 or 8, **characterised in that** at least one membrane (36) is overmoulded on a rigid armature (38) for the fastening of the supply valve (30) in the mixing chamber (4).

**10.** System for dispensing according to any of claims 1 to 9, **characterised in that** the head (3) comprises a support (8) and a base (14) which are associated to one another by providing the fastening of the supply valve (30) in the mixing chamber (4) with the valves (31, 32, 40) arranged on the corresponding passages (23, 25).

**11.** System for dispensing according to any of claims 1 to 10, **characterised in that** it comprises a casing (20) wherein the unit for foaming (5) is formed, the mixing chamber (4) having a downstream opening (12) wherein said casing is mounted in a sealed manner.

**12.** System for dispensing according to claim 11, **characterised in that** the casing (20) comprises an extension (35) wherein the passage for return air (33) is formed outside the unit for foaming (5).

**13.** System for dispensing according to claims 11 or 12, **characterised in that** the casing (20) comprises the passages for supplying (6) and for dispensing (7), with a foaming chamber (21) being formed between said passages.

**14.** System for dispensing according to any of claims 1 to 13, **characterised in that** the passages for supplying (6) and/or for dispensing (7) are provided with a foaming grid (22).

**15.** System for dispensing according to any of claims 1 to 14, **characterised in that** the passage for return air (33) comprises an orifice whereon is mounted a sealing element (34), said element being arranged in the mixing chamber (4) between a thrust closed position of the orifice and a separated open position of said orifice.

**16.** Bottle for dispensing a foam of a fluid product (P) comprising a reservoir (1) wherein said product and air (A) are conditioned, said bottle comprising a system for dispensing according to any of claims 1 to 15 which is mounted on said reservoir, said reservoir able to be deformed reversibly between a pressurised state of the valves for air (32) and for product (31) in order to dispense the foam through the unit for foaming (5) and a vacuum state for the supply valve (30) in order to allow for the air return in said reservoir through the mixing chamber (4).

**Patentansprüche**

**1.** System zur Dosierung des Schaums eines flüssigen Produkts (P), umfassend:

- einen Kopf (3), worin eine Mischkammer (4) des besagten Produkts mit Luft (A) gebildet ist, wo besagte Kammer einen Durchlass für das Produkt (23) aufweist, welcher in Kommunikation mit einer Produktquelle (24) steht, sowie einen Durchlass für Luft (25), welcher in Kommunikation mit einer Luftquelle (26) steht;
- eine Einheit zum Schäumen (5), welche einen Durchlass zur Bereitstellung (6) eines Gemischs aus der Kammer (4), sowie einen Durchlass zur Dosierung (7) des Schaums aufweist;
- ein Versorgungsventil (30) der Mischkammer (4), welches ein Produktventil (31) und ein Luftventil (32) umfasst, die respektive auf dem Durchlass für das Produkt (23) und dem Durchlass für die Luft (25) bereitgestellt sind, wobei jede der besagten Ventile angeordnet ist, um den Durchlass für das Produkt (23) und respektive für die Luft (25) zu öffnen, um die Mischkammer (4) unter Verwendung eines Drucks zu beliefern, den die Produktquelle (24) - respektive die Luftquelle (26) auf sie ausübt;

wobei das besagte System **dadurch gekennzeichnet ist, dass** die Mischkammer (4) einen Durchlass für einen Luftrücklauf (33) besitzt, der mittels Rückschlagventil (34) bereitgestellt wird, welches so angeordnet ist, um unter Einwirkung eines Vakuums in der Mischkammer (4) geöffnet zu werden, wobei das Versorgungsventil (30) angeordnet ist, um den Luftdurchlass (25) unter Nutzung eines Vakuums, das die Luftquelle (26) auf es ausübt zu öffnen, um den Luftrücklauf in besagte Quelle durch die Mischkammer (4) zu ermöglichen.

**2.** System zur Dosierung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Versorgungsventil (30) ein Luft-Rücklaufventil (40) umfasst, welches auf dem Luftdurchlass (25) bereitgestellt ist, wobei besagtes Ventil angeordnet ist, um den besagten Luft-

durchlass unter Nutzung eines Vakuums, welches die Luftquelle (26) auf es ausübt zu öffnen.

3. System zur Dosierung gemäß Anspruch 2, **dadurch gekennzeichnet, dass** das Luft-Rücklaufventil (40) vom Luftventil (32) getrennt ist, wobei jedes der besagten Ventile einfachwirkend ist.

4. System zur Dosierung gemäß Anspruch 2, **dadurch gekennzeichnet, dass** das Luftventil (32) ebenfalls ein Luft-Rücklaufventil (40) bildet, wobei besagtes Ventil doppeltwirkend ist, um den Luftdurchlass (25) zu öffnen, wenn die Luftquelle (26) einen Druck oder ein Vakuum auf es ausübt.

5. System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** das Versorgungsventil (30) angeordnet ist, um den Produktdurchlass (23) während des Luftrücklaufs geschlossen zu halten.

6. System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der Öffnungsdruck zum Luftdurchlass (25) geringer ist als der Druck zum Produktdurchlass (23).

7. System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** mindestens ein Ventil (31, 32, 40) eine Membran (36) aus einem abgedichteten elastomeren Material umfasst, worin Lippen (37) gebildet sind, wobei besagte Lippen unter dem Einfluss eines Drucks und/oder eines Vakuums umkehrbar zwischen einem abgedichteten geschlossenen Zustand und einem getrennten offenen Zustand eines Durchlasses (23, 25) beweglich sind.

8. System zur Dosierung gemäß Anspruch 7, **dadurch gekennzeichnet, dass** mindestens ein Ventil (31, 32, 40) eine Kuppe aufweist, auf welcher die Lippen (37) gebildet sind, wo besagte Kuppe aus der Mischkammer (4) nach außen orientiert ist.

9. System zur Dosierung gemäß Anspruch 7 oder 8, **dadurch gekennzeichnet, dass** mindestens eine Membran (36) über eine starre Armatur (38) zur Befestigung des Versorgungsventils (30) in der Mischkammer (4) geformt ist.

10. System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** der Kopf (3) einen Träger (8) und einen Sockel (14) umfasst, die miteinander durch die Befestigung des Versorgungsventils (30) in der Mischkammer (4) mit den, auf den entsprechenden Durchlässen (23, 25) angeordneten Ventilen (31, 32, 40) assoziiert sind.

11. System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** es ein Gehäuse (20) umfasst, worin die Einheit zum Schäumen (5) gebildet wird, wobei die Mischkammer (4) eine nach unten gerichtet Öffnung (12) aufweist, in der besagtes Gehäuse abgedichtet montiert ist.

12. System zur Dosierung gemäß Anspruch 11, **dadurch gekennzeichnet, dass** das Gehäuse (20) eine Extension (35) umfasst, worin der Durchlass für die Rückluft (33) außerhalb der Schäumeinheit (5) gebildet ist.

13. System zur Dosierung gemäß Anspruch 11 oder 12, **dadurch gekennzeichnet, dass** das Gehäuse (20) die Durchlässe zur Versorgung (6) und Dosierung (7) umfasst, mit einer Schäumkammer (21), die zwischen den besagten Durchlässen gebildet ist.

14. System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 13, **dadurch gekennzeichnet, dass** die Durchlässe zur Versorgung (6) und/oder Dosierung (7) mit einem Schäumgitter (22) bestückt sind.

15. System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 14, **dadurch gekennzeichnet, dass** der Durchlass für die Rückluft (33) ein Loch umfasst, auf welchem ein Dichtungselement (34) montiert ist, wobei das besagte Element in der Mischkammer (4) zwischen einer gedrängten geschlossenen Position des Lochs und einer getrennten geöffneten Position des besagten Lochs angeordnet ist.

16. Flasche zur Dosierung eines Schaums eines flüssigen Produkts (P), umfassend einen Tank (1), wo sich besagtes Produkt und Luft (A) befinden, wobei besagte Flasche ein System zur Dosierung gemäß einem der vorstehenden Ansprüche 1 bis 15 umfasst, welches auf dem besagten Tank montiert ist, wobei besagter Tank geeignet ist, umkehrbar zwischen einem unter Druck stehenden Zustand der Ventile für die Luft (32) und für das Produkt (31) zur Abgabe des Schaums durch die Schäumeinheit (5) und einem Vakuumzustand des Versorgungsventils (30) deformiert zu werden, um einen Luftrücklauf in den besagten Tank durch die Mischkammer (4) zu ermöglichen.

**Revendications**

1. Système de distribution de la mousse d'un produit fluide (P) comprenant :

   - une tête (3), dans laquelle une chambre de

mélange (4) dudit produit avec de l'air (A) est formée, ladite chambre ayant un passage pour le produit (23) destiné à être en communication avec une source de produit (24) et un passage pour l'air (25) destiné à être en communication avec une source d'air (26) ;
- une unité de formation de mousse (5) qui a un passage pour fournir (6) un mélange provenant de la chambre (4) et un passage pour distribuer (7) la mousse ;
- une soupape d'alimentation (30) de la chambre de mélange (4) qui comprend une soupape à produit (31) et une soupape à air (32) disposées respectivement sur le passage pour le produit (23) et le passage pour l'air (25), chacune desdites soupapes étant aménagée pour ouvrir le passage pour le produit (23) - respectivement pour l'air (25)-afin d'alimenter la chambre de mélange (4) en utilisant une pression qui est exercée sur elle par la source de produit (24) - respectivement d'air (26) ;

ledit système étant **caractérisé en ce que** la chambre de mélange (4) a un passage pour l'air de retour (33) qui est pourvu d'une soupape antiretour (34) aménagée pour être ouverte sous l'effet d'un vide dans la chambre de mélange (4), la soupape d'alimentation (30) étant aménagée pour ouvrir le passage pour l'air (25) en utilisant un vide que la source d'air (26) exerce sur lui afin de permettre le retour de l'air dans ladite source via la chambre de mélange (4).

**2.** Système de distribution selon la revendication 1, **caractérisé en ce que** la soupape d'alimentation (30) comprend une soupape de retour d'air (40) qui est aménagée sur le passage pour l'air (25), ladite soupape étant aménagée pour ouvrir ledit passage pour l'air en utilisant un vide que la source d'air (26) exerce sur elle.

**3.** Système de distribution selon la revendication 2, **caractérisé en ce que** la soupape de retour d'air (40) est séparée de la soupape à air (32), chacune desdites soupapes étant à simple effet.

**4.** Système de distribution selon la revendication 2, **caractérisé en ce que** la soupape à air (32) forme également une soupape de retour d'air (40), ladite soupape étant à double effet pour ouvrir le passage pour l'air (25) lorsque la source d'air (26) exerce une pression ou un vide sur elle.

**5.** Système de distribution selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la soupape d'alimentation (30) est aménagée pour maintenir fermé le passage pour le produit (23) au cours du retour de l'air.

**6.** Système de distribution selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** la pression d'ouverture destinée au passage pour l'air (25) est inférieure à celle du passage pour le produit (23).

**7.** Système de distribution selon l'une quelconque des revendications 1 à 6, **caractérisé en ce qu'**au moins une soupape (31, 32, 40) comprend une membrane (36) constituée d'un matériau élastomère scellé, dans lequel des lèvres (37) sont formées, lesdites lèvres étant à même d'être déplacées de manière réversible sous l'effet d'une pression et/ou d'un vide entre un état de jonction scellé et un état ouvert séparé d'un passage (23, 25).

**8.** Système de distribution selon la revendication 7, **caractérisé en ce qu'**au moins une soupape (31, 32, 40) présente un dôme sur lequel les lèvres (37) sont formées, ledit dôme étant orienté vers l'extérieur depuis la chambre de mélange (4).

**9.** Système de distribution selon la revendication 7 ou 8, **caractérisé en ce qu'**au moins une membrane (36) est surmoulée sur une armature rigide (38) pour fixer la soupape d'alimentation (30) dans la chambre de mélange (4).

**10.** Système de distribution selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** la tête (3) comprend un support (8) et une base (14) qui sont associés l'un à l'autre en fournissant la fixation de la soupape d'alimentation (30) dans la chambre de mélange (4), les soupapes (31, 32, 40) étant aménagées sur les passages correspondants (23, 25).

**11.** Système de distribution selon l'une quelconque des revendications 1 à 10, **caractérisé en ce qu'**il comprend une chemise (20) dans laquelle l'unité de formation de mousse (5) est formée, la chambre de mélange (4) ayant une ouverture aval (12) dans laquelle ladite chemise est montée de manière étanche.

**12.** Système de distribution selon la revendication 11, **caractérisé en ce que** la chemise (20) comprend une extension, dans laquelle le passage pour l'air de retour (33) est formé en dehors de l'unité de formation de mousse (5).

**13.** Système de distribution selon les revendications 11 ou 12, **caractérisé en ce que** la chemise (20) comprend les passages destinés à l'alimentation (6) et à la distribution (7), une chambre de formation de mousse (21) étant formée entre lesdits passages.

**14.** Système de distribution selon l'une quelconque des revendications 1 à 13, **caractérisé en ce que** les passages pour l'alimentation (6) et/ou la distribution

(7) sont pourvus d'une grille de formation de mousse (22).

**15.** Système de distribution selon l'une quelconque des revendications 1 à 14, caractérisé en ce le passage pour l'air de retour (33) comprend un orifice sur lequel est monté un élément d'étanchéité (34), ledit élément étant aménagé dans la chambre de mélange (4) entre une position fermée par poussée de l'orifice et une position ouverte séparée dudit orifice.

**16.** Bouteille de distribution d'une mousse d'un produit fluide (P) comprenant un réservoir (1), dans lequel ledit produit et de l'air (A) sont conditionnés, ladite bouteille comprenant un système de distribution selon l'une quelconque des revendications 1 à 15, qui est monté sur ledit réservoir, ledit réservoir étant à même de se déformer de manière réversible entre un état sous pression des soupapes pour l'air (32) et pour le produit (31) afin de distribuer la mousse à travers l'unité de formation de mousse (5) et un état de vide pour la soupape d'alimentation (30) afin de permettre le retour de l'air dans ledit réservoir à travers la chambre de mélange (4).

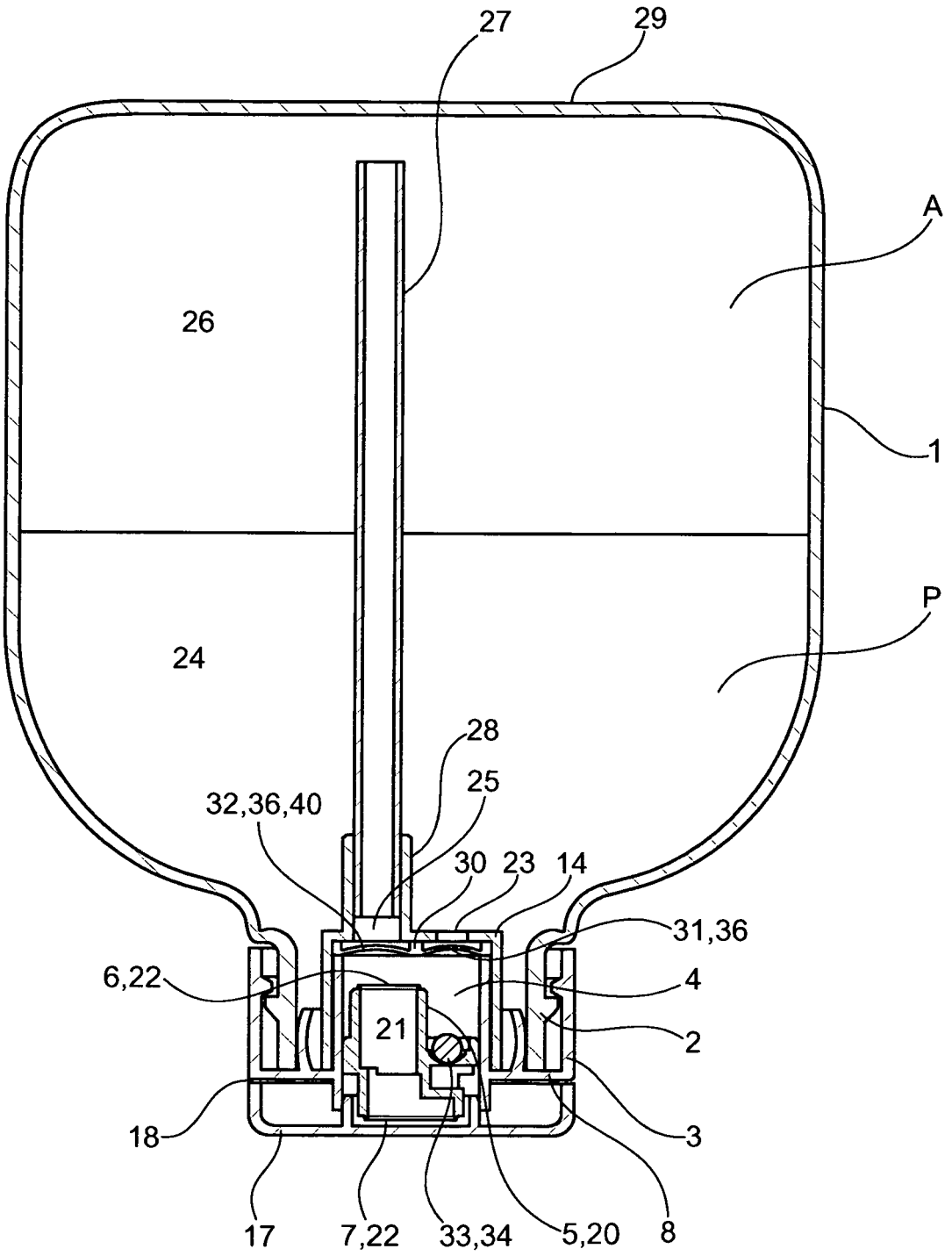

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Fig. 1

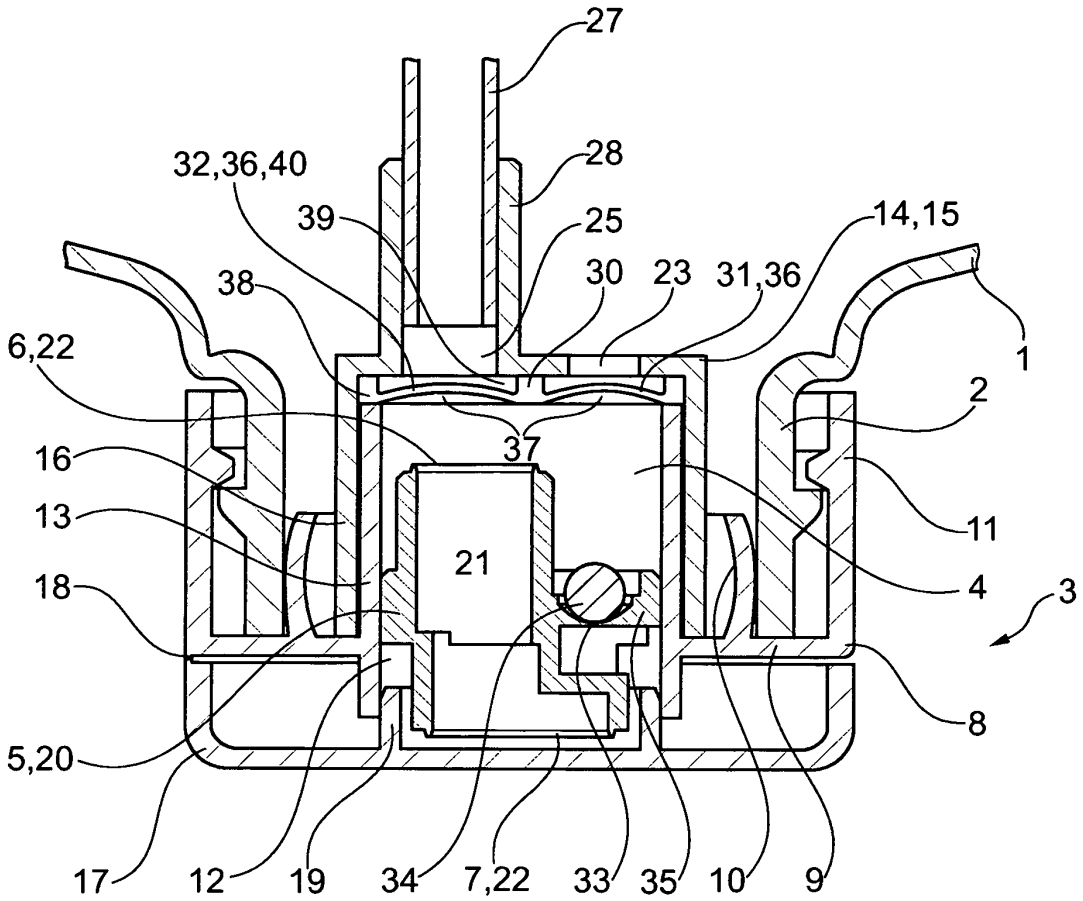



Fig. 2

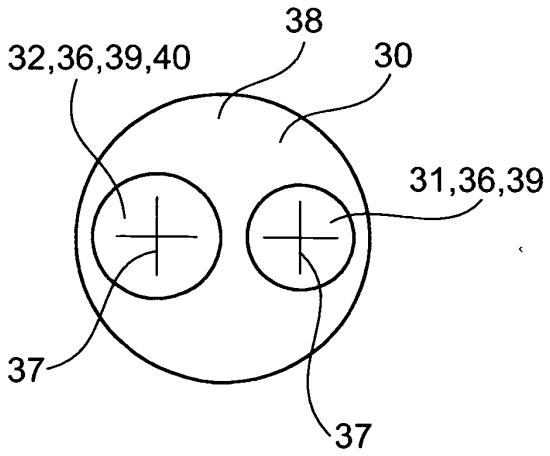



Fig. 3a

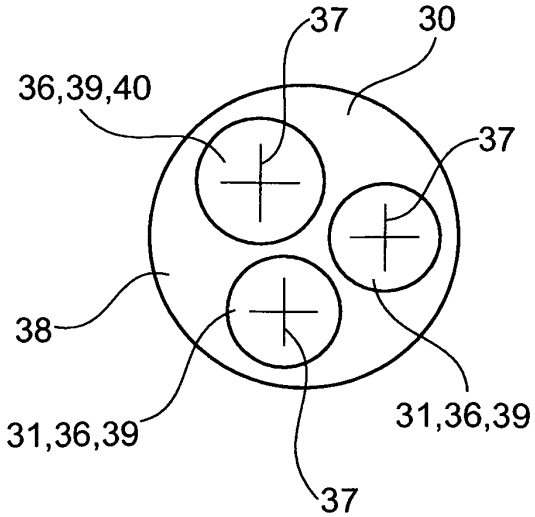



Fig. 3b

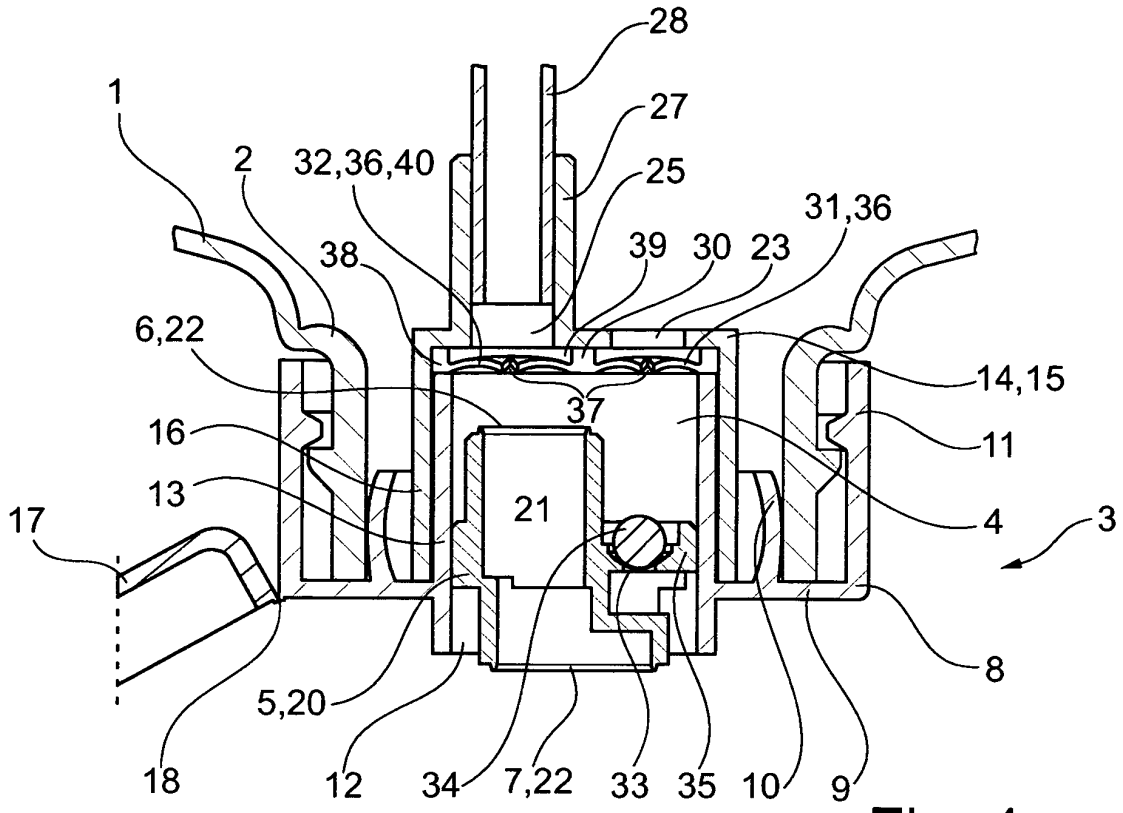

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Fig. 4

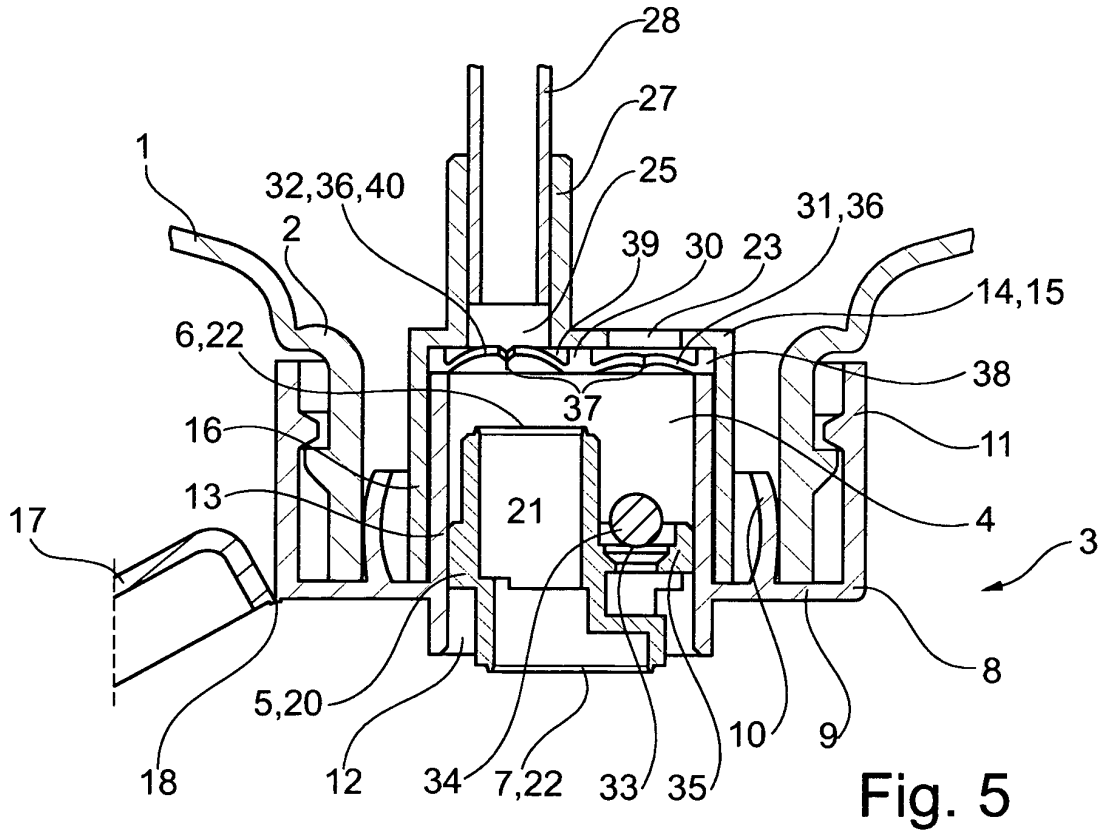

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Fig. 5

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


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