CLAIMS

1. A delivery head for delivering a liquid drop by drop comprising an end-piece (14; 114) pierced with a channel for the expulsion of the liquid (32) through which air also enters back in the reverse direction, characterized in that it comprises at the level of the end-piece a valve operating as a non-return valve with respect to the flow of the, the said valve comprising a stopper (34; 40) that is retained in a receiving cavity (33) managed on said channel path and which is movable relative to a seat (36; 126) onto which it applies in a closed position of the valve under the only effect of pressure differences acting on it, the said valve stopper being so made as to let selectively air flow through it when it is applied against said seat.

2. A delivery head according to Claim 1, characterized in that the valve stopper (34; 40) is made of a porous material of so fine porosity as to constitute an anti-bacterial filter.

3. A delivery head according to Claim 1 or 2, characterized in that the valve stopper (34; 40) is made of a hydrophobous material.

4. A delivery head according to one of the preceding claims, characterized in that the end of the end-piece comprises a hole (24) for liquid expulsion drop by drop that is surrounded by a peripheral bulge (29).

5. A delivery head according to one of the preceding claims, characterized in that the valve stopper (34; 40) is adapted to move axially in said cavity (33).

6. A delivery head according to any preceding claim, characterized in that the valve stopper has the shape of a ball (34)

entirely housed in said cavity (33) and is freely movable therein in all directions.

7. A delivery head according to any preceding claim, characterized in that the valve stopper shows the shape of a pin (40) with a head (42) suitable for being housed in the cavity (33) and a frustoconical portion (44) which extends out of the cavity and which interacts with the end of the end-piece.

8. A delivery head according to any preceding claim, characterized in that centripetal grooves (38) are managed in the walls of the cavity (33) and form channels letting the liquid flow through when the stopper abuts against the wall of the cavity in the open position of the valve.

9. A delivery head according to one of the preceding claims, characterized in that a bifunctional membrane (18), which is partly hydrophilic and partly hydrophobous, is mounted at the base of the end-piece (14; 114), said membrane showing preferably an anti-bacterial filtering activity for the outside air.

10. A delivery head according to one of the preceding claims, characterized in that the head comprises a flow-regulating pad (16) housed in the body of an insert (12) preceding the end-piece (14) on the path of expulsion of the liquid, the said pad advantageously being made of a hydrophobous material.

11. A delivery head according to one of the preceding claims, characterized in that the retaining cavity for the valve stopper is provided between the free end of the end-piece pierced with a drop expulsion hole and a central core occupying the inside of the end-piece body through which the liquid expulsion channel is axially managed.

12. A bottle for packaging a liquid to be delivered drop by drop, characterized in that it comprises a delivery head according to Claim 10 and a reservoir (2) for storing the liquid the peripheral walls of which deform elastically and reversibly in order to promote the expulsion of liquid from the reservoir and allow air to return into this reservoir in replacement of the expelled liquid, the pad (16) regulating the flow rate of liquid expelled from the reservoir when the deformable walls are pressed and creating a pressure drop on the entry of air as a balance of the pressures between the inside and the outside of the bottle.

What is claimed is:

1. A delivery head for delivering a liquid drop by drop comprising an end-piece pierced with a channel for the expulsion of the liquid through which air also enters back in the reverse direction, characterized in that said delivery head comprises at a level of the end-piece a valve operating as a non-return valve with respect to flow of the liquid, said valve comprising a stopper that is retained in a receiving cavity provided on said channel path and which is movable relative to a seat onto which said stopper applies in a closed position of the valve under only the effect of pressure differences acting on the stopper, said valve stopper being so made of a hydrophobous material as to selectively let air flow through stopper when stopper is applied against said seat.

2. The delivery head according to claim 1, characterized in that the valve stopper is made of a porous material.

3. The delivery head according to claim 2, characterized in that said porous material the valve stopper is made of is of such fine porosity as to constitute an anti-bacterial filter.

4. The delivery head according to claim 1, characterized in that an end of the end-piece comprises a hole for liquid expulsion drop by drop that is surrounded by a peripheral bulge.

5. The delivery head according to claim 1, characterized in that the valve stopper is adapted to move axially in said cavity.

6. The delivery head according to claim 1, characterized in that the valve stopper has the shape of a ball entirely housed in said cavity and is freely movable therein in all directions.

7. The delivery head according to claim 1; characterized in that the valve stopper shows the shape of a pin with a head suitable for being housed in the cavity and a frustoconical portion which extends out of the cavity and which interacts with a hole for expulsion of liquid drop by drop provided at an end of the end-piece.

8. The delivery head according to claim 1, characterized in that centripetal grooves are provided in the walls of the cavity and form channels letting the liquid flow through when the stopper abuts against a wall of the cavity in an open position of the valve.

9. The delivery head according to claim 1, characterized in that a bifunctional membrane, which is partly hydrophilic and partly hydrophobous to ensure alternating flow between expelled liquid and incoming air, is mounted at a base of the end-piece.

10. The delivery head according to claim 9, wherein said membrane presents such fine porosity as to exhibit an anti-bacterial filtering activity for the outside air.

11. The delivery head according to claim 1, characterized in that the head comprises a flow-regulating pad housed in a body of an insert preceding the end-piece on a path of expulsion of the liquid, said pad being made of a hydrophobous material.

12. A bottle for packaging a liquid to be delivered drop by drop, characterized in that said bottle comprises a delivery head according to claim 11 and a reservoir for storing the liquid, peripheral walls of which deform elastically and reversibly in order to promote expulsion of liquid from the reservoir and allow air to return into the reservoir in replacement of the expelled liquid, the pad regulating a flow rate of liquid expelled from the reservoir when the deformable walls are pressed and creating a pressure drop on entry of air as a balance of pressures between inside and outside the bottle.

13. The delivery head according to claim 1, characterized in that the retaining cavity for the valve stopper is provided between a free end of the end-piece pierced with a drop expulsion hole and a central core occupying an inside of the end-piece body through which the liquid expulsion channel is axially provided.

14. A delivery head for delivering a liquid drop by drop comprising an end-piece pierced with a channel for the expulsion of the liquid through which air also enters back in the reverse direction, characterized in that said delivery head comprises at a level of the end-piece a valve operating as a non-return valve with respect to flow of the liquid, said valve comprising a stopper that is retained in a receiving cavity provided on said channel path and which is movable relative to a seat onto which said stopper applies in a closed position of the valve under only the effect of pressure differences acting on the stopper, said valve stopper being so made as to selectively let air flow through stopper when stopper is applied against said seat, wherein the valve stopper shows the shape of a pin with a head suitable for being housed in the cavity and a frustoconical portion which extends out of the cavity and which interacts with a hole for expulsion of liquid drop by drop provided at an end of the end-piece.