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QUANTITATIVE JETTING MEANS FOR A PRESSURED INJECTOR-RESERVOIR

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FIG. 1

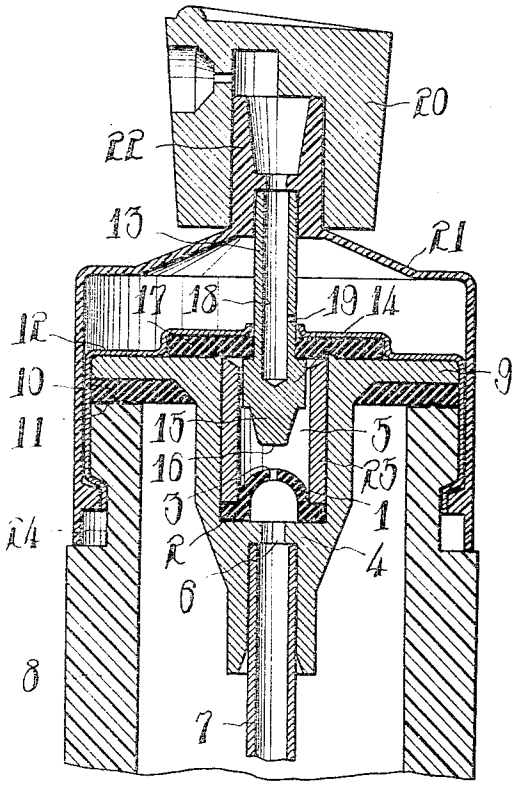

FIG. 2

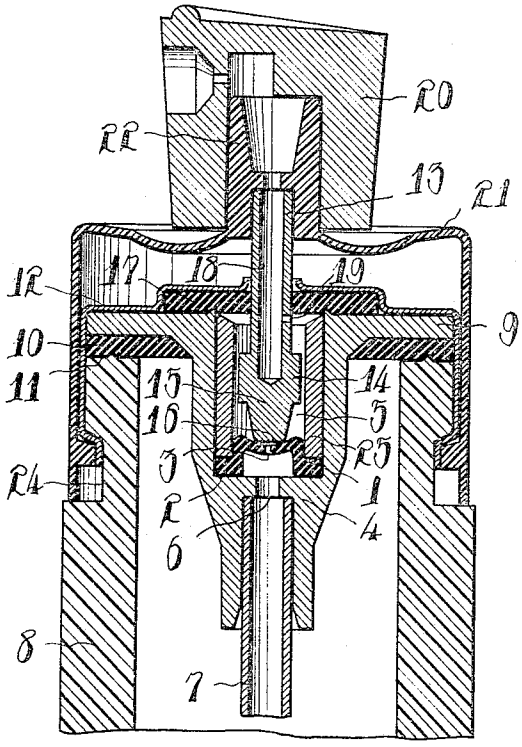

FIG. 3

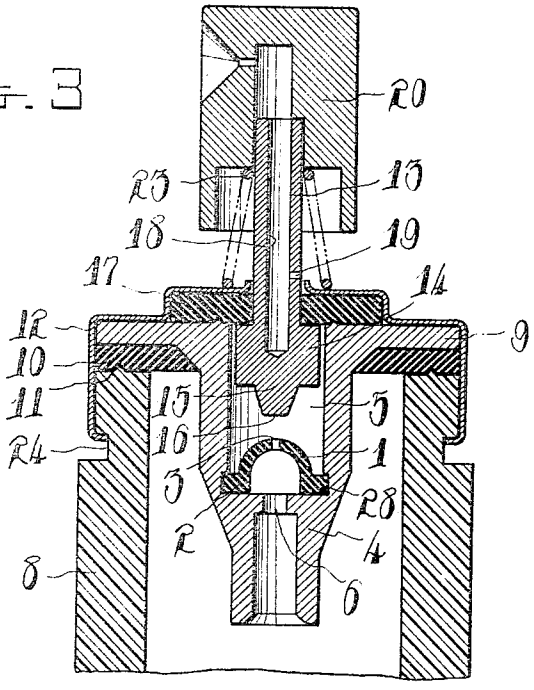

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FIG. 4

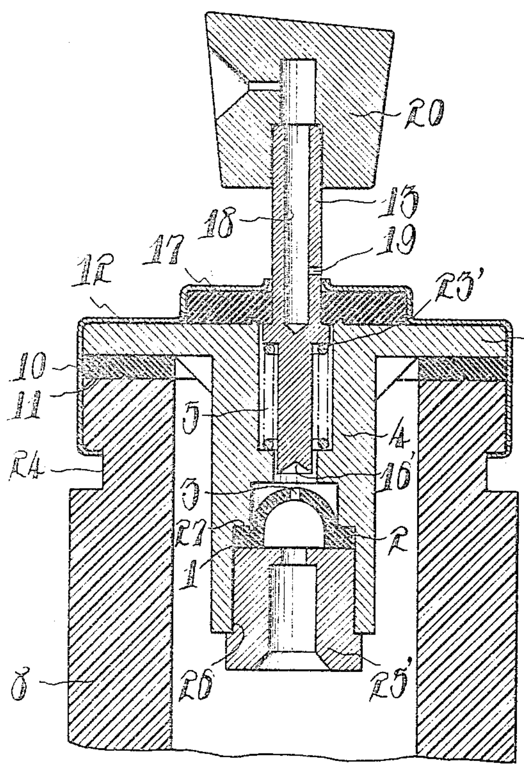
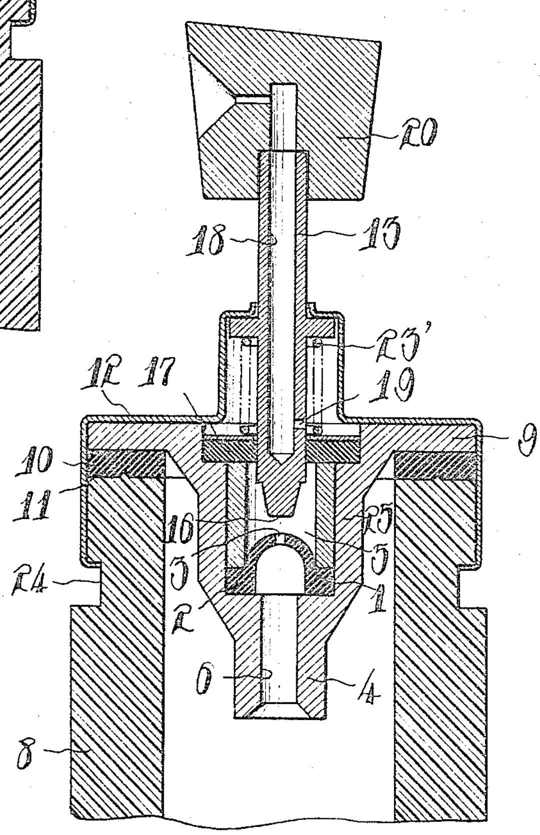


FIG. 5



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QUANTITATIVE JETTING MEANS FOR A PRESSURED INJECTOR-RESERVOIR

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4 Claims. (Cl. 222—402.20)

This invention relates to improvements in a quantitative jetting means for a pressured injector-reservoir and has as an object the provision of a quantitative jetting means of the kind described having a simple structure, which may be cheap to produce and reliable in use.

Briefly stated in accordance with one aspect of this invention, there is provided a quantitative jetting means for a pressured injector-reservoir, comprising a reservoir, a quantitative chamber, a deformable semi-spherical member, and a jetting member. The reservoir is adapted to contain a pressured fluid and closed fluid-tightly by a lid. The quantitative chamber is formed in the central part of and downwards protruded from the lid. The deformable semi-spherical member is made of an elastic material, placed on a single and opened bottom of the quantitative chamber and provided with a central perforation for communicating the interior of the quantitative chamber with the reservoir through a suction pipe. The jetting member is fixed on a tubular valve rod having a bottom end adapted to move vertically inside the quantitative chamber. The valve rod is adapted to be held by the lid fluid-tightly and to communicate the interior of the quantitative chamber with the atmosphere through the tubular valve rod and the jetting member when the tubular valve rod is lowered in the quantitative chamber. The perforation is adapted to be closed by the bottom end of the lowered tubular valve end and at the same time with the last-named communication so as to make the quantitative chamber incommunicable from the reservoir.

The invention will be better understood and other objects and additional advantages of the invention will become apparent upon perusal of the following description taken in conjunction with the drawings, in which:

FIG. 1 is a vertical sectional view of a quantitative jetting means with parts removed, embodying this invention;

FIG. 2 shows the same in the jetting position; and

FIGS. 3, 4, and 5 similar views to FIG. 1, but showing modifications of the quantitative jetting means in accordance with this invention, respectively.

Referring more particularly to FIGS. 1 and 2, the preferred embodiment of this invention will now be described; however, this description will be understood to be illustrative of the invention and not as limiting it to the particular structure shown and described. There is a reservoir 8 having a top opening. On the top end 11 of the reservoir 8 is placed a top flange 9 of a lid. A fluid-tight gasket 10 is inserted therebetween. A downwards protruded cylinder 4 is formed in the center of the lid integrally with the top flange 9. A suction pipe 7 is attached inside a downward bore extended downwards from an opened bottom of the cylinder 4. The inside space of the cylinder 4 constitutes a quantitative chamber 5 which is communicated with the inside of the reservoir 8 through a central hole 6 of the bottom of the cylinder 4 and the suction pipe 7. A semi-spherical member 1 having an annular flange 2 and a central perforation 3 and made of an elastic material such as a natural or artificial rubber or a synthetic resin is placed on the bottom of the cylinder 4. A retaining sleeve 25 is fitted inside the cylinder 4 so as to keep the flange 2 on the bottom of the cylinder 4, and serves to adjust the volume of the quantitative chamber 5. A valve rod 13 is formed with a top open

cylindrical passage 18, a valve body 14, and an invertedly frustro-conical bottom 15. The cylindrical passage 18 is provided with a lateral perforation 19. The valve body 14 is adapted to slide vertically on the inner surface of the retaining sleeve 25. The invertedly frustro-conical bottom 15 is adapted to bear down the semi-spherical member 1 when the valve rod 13 is lowered. A gasket 17 is placed around the valve rod 13 and on the top flange 9 so as to keep the quantitative chamber 5 fluid-tight. The gasket 17, the top flange 9 and the gasket 10 are covered and kept in place by a retaining member 12 having a central hole and a skirt adapted to anchor the retaining member 12 in an annular neck groove 24 formed in the outer surface of the reservoir 8. The valve rod 13 is adapted to pass through the central hole of the retaining member 12 vertically slidably and the lateral perforation 19 of the cylindrical passage 18 of the tubular valve rod 13 is arranged to be shiftable between an upper position or inactive position where the cylindrical passage 18 is communicated with the atmosphere through the lateral perforation 19 and a lower position or a active position where the cylindrical passage 18 is communicated with the interior of the quantitative chamber 5 through the lateral perforation 19. A jetting member 20 is fixed on a central block 22 protruded from an elastic covering member 21. The skirt of the covering member 21 is engaged with the retaining member 12 also around the neck groove 24. The central block 22 is fixed on the top of the tubular valve rod 13 in such a manner that the cylindrical passage 18 is always communicated with the jetting member 20.

In operation, the jetting member 20 usually kept in the upper position by virtue of the elasticity of the covering member 21 is manually pushed down so as to shift the lateral perforation 19 from the upper inactive position to the lower active position and bear down the semi-spherical member 1 by the invertedly frustro-conical bottom 15 as shown in FIG. 2. When the valve rod 13 is thus lowered and the cylindrical passage 18 is brought into communication with the quantitative chamber 5 through the lateral perforation 19, a predetermined quantity of a pressured liquid or a gas confined in the quantitative chamber 5 is jetted through the jetting member 20 by the action of the pressure preliminarily given thereto. In this position, the semi-spherical member 1 is deformed by the invertedly frustro-conical bottom 16 of the valve rod 13 and the central perforation 3 of the former is perfectly closed by the latter so that the quantitative chamber 5 is made completely incommunicable from the inside of the reservoir 8.

When the jetting member 20 is released, it is restored to the original upper position by the elastic action of the covering member 21 so as to lift the tubular valve rod 13 from the lower position to the upper position. Accordingly the lateral perforation 19 is shifted above the retaining member 12 and the invertedly frustro-conical bottom 16 is disengaged from the semi-spherical member 1 so that the quantitative chamber 5 is made incommunicable with the cylindrical passage 18 but instead thereof communicated with the inside of the reservoir 8.

In another embodiment shown in FIG. 3, the covering member 21 is omitted, the elastic action for restoring the jetting member 20 being left to a spiral spring 23 arranged between the jetting member 20 and the retaining member 12. In this embodiment, the retaining sleeve 25 is also omitted. Meantime, an annular groove 28 is provided along the bottom end of the peripheral wall of the quantitative chamber 5 in which the flange 2 of the semi-spherical member 1 is inserted.

In the modifications shown in FIGS. 4 and 5, a coil spring 23' is arranged below the retaining member 12

in lieu of the spiral spring 23 used in the preceding embodiment. To this end, an outward flange is formed integrally with the valve rod 13. The coil spring 23' is compressed between the outward flange and an inward flange formed in the inside wall of the quantitative chamber 5. Such an arrangement as shown in FIG. 4 is prein case where it is necessary that the volume of the quantitative chamber 5 is small in which, for example, a perfume is to be contained. There is shown, in addition, a concave bottom end 16' of the valve rod 13. In the modification shown in FIG. 5, the top flange 9 of the cylinder 4 is provided with a central shoulder, on which the gasket 17 is accommodated. The coil spring 23' is compresed between the outward flange and an inner lid placed on the gasket 17.

Although the invention has been particularly shown and described, it is contemplated that various changes and modifications may be made without departing from the scope thereof as indicated by the following claims.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A quantitative jetting means for a pressured injector-reservoir, comprising a reservoir adapted to contain a pressured fluid and closed fluid-tightly by a lid, a quantitative chamber formed in the central part of and downwards protruded from said lid, a deformable semi-spherical member made of an elastic material, placed on a single and opened bottom of said quantitative chamber and provided with a central perforation for communicating the interior of said quantitative chamber with said reservoir through a suction pipe, and a jetting member fixed on a tubular valve rod having a bottom end adapted to move vertically inside said quantitative chamber, said tubular valve rod being adapted to be held by said lid fluid-tightly and to communicate said interior of said quantitative chamber with the atmosphere through said tubular valve

rod and said jetting member when said tubular valve rod is lowered in said quantitative chamber, and said perforation being adapted to be closed, at the same time, by said bottom end of said lowered tubular valve rod so as to make the quantitative chamber incommunicable from said reservoir.

2. A quantitative jetting means for a pressured injector-reservoir as claimed in claim 1, in which a retaining sleeve is arranged along the inside peripheral wall of said quantitative chamber for retaining a flange of said semi-spherical member in place and for adjusting the volume of said quantitative chamber.

3. A quantitative jetting means for a pressured injector-reservoir as claimed in claim 1, in which said bottom end of said vertically movable valve rod is invertedly frustro-conical in shape and adapted to engage with said semi-spherical member to such an extent that the central part of the latter becomes reversely concave elastically so as to more completely close said perforation.

4. A quantitative jetting means for a pressured injector-reservoir as claimed in claim 1, in which said bottom end of said vertically movable valve rod is concave in shape so as to more completely close said perforation.

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