

July 5, 1955

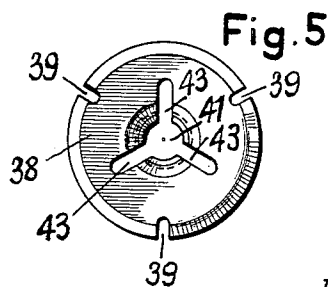
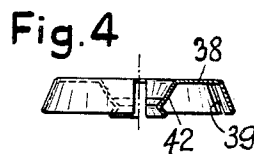
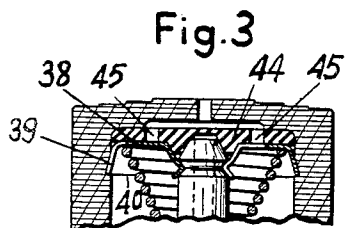
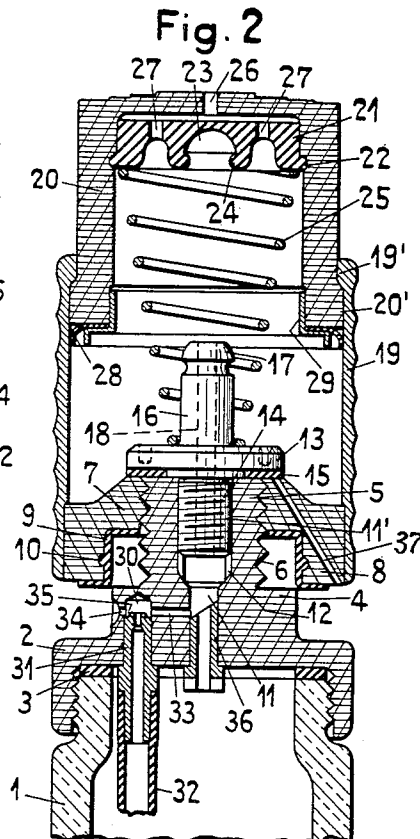
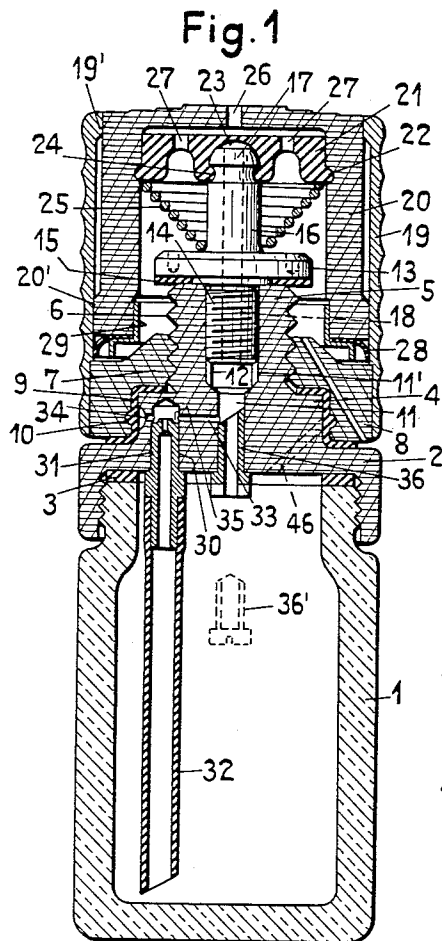
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2,712,472

POCKET SPRAYERS

Filed Aug. 4, 1953

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 6

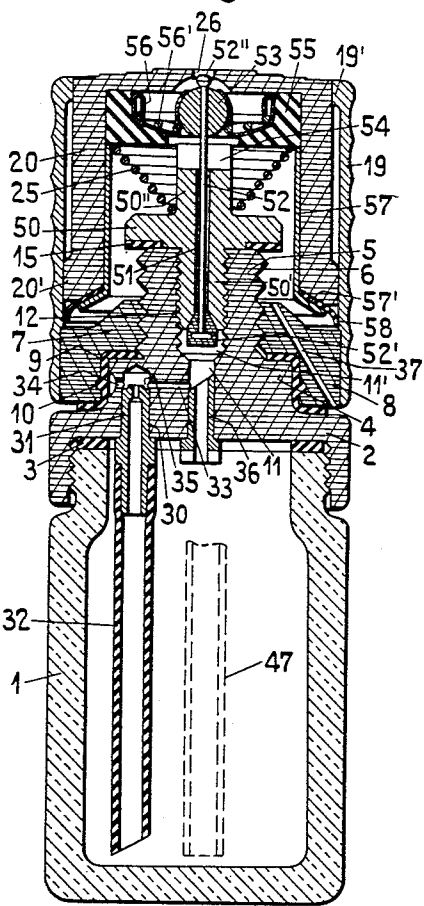
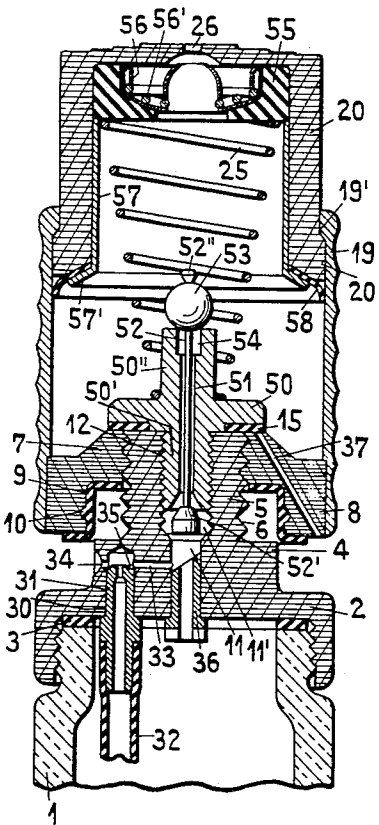


Fig. 7



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POCKET SPRAYERS

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Claims priority, application Switzerland August 7, 1952

9 Claims. (Cl. 299—89)

The present invention concerns a pocket sprayer with a receptacle for the substance to be sprayed which is closed by a head piece having an atomising nozzle arranged therein. The invention is especially characterized in that there is provided, on the top of the head piece and on a shoulder in the peripheral surface of which the aperture of the sprayer is provided, a central extension which has an external screw-thread and on which there can be screwed a ring which has, on its side that is to lie against the head piece, a widened part in which a packing sleeve is inserted and which, when the ring has been completely screwed on the outer screw-thread of the extension of the head piece, covers the shoulder of the head piece together with the aperture of the sprayer in a sealing manner and, when the ring is located in an outer limiting position, which is determined by a stop, frees the aperture of the sprayer, and in which there is fixed on the said ring a sleeve, in the part of which that projects over the ring, a cap, which is acted upon by a compression spring and on the open edge of which that is to lie against the ring a packing ring that rests resiliently on the inner surface of the sleeve, is arranged, is displaceably guided between two limiting positions, there being provided, in the extension of the head piece, a central bore and an air conduit which branches therefrom and is coaxial with the aperture of the sprayer and through which at least a part of the air, which is compressed in the sleeve by pressing the cap into the latter, is led to the atomising nozzle, means being provided for the purpose of, when the ring has been completely screwed on the outer screw-thread of the extension of the head piece, keeping the cap, in opposition to the action of the compression spring acting thereon, in its inner limiting position with simultaneous sealing closure of the central bore of the extension.

In the drawings, there are represented two embodiments of the invention and a modification of a part thereof. In the drawings:

Figs. 1 and 2 are axial sections through a first embodiment of the pocket sprayer for spraying liquids, shown in closed position and in working position, respectively;

Fig. 3 is an axial section through a modification of a part of this pocket sprayer of Fig. 1;

Fig. 4 is partly a side elevation and partly a section through a detail of the modification shown in Fig. 3;

Fig. 5 is a bottom plan view of a detail shown in Fig. 4; and

Figs. 6 and 7 are axial sections through a second embodiment of the pocket sprayer in closed position and in working position, respectively.

The pocket sprayer represented in Figs. 1 and 2 has a container 1 made of transparent material, for example glass or synthetic plastic, which is intended for receiving the liquid to be sprayed and on the neck extension of which, that is provided with a screw-thread, a head piece 2 is affixed or screwed. Between the top edge of the neck extension of the container 1 and the head piece 2 a packing ring or gasket 3 is inserted. On the top side of the head piece 2, there is mounted, on a shoulder 4, a

central extension 5 which is provided with external screw-threads 6. Screwed on external screw-threads 6 of the extension 5 is a ring 7 which has, on its side that is to lie against the head piece 2, a projecting, widened or enlarged part 8 which, when the ring 7 has been completely screwed on the external screw-threads 6 of the extension 5, completely covers the shoulder 4. In the widened part 8 of the ring 7 there is inserted a packing or sealing sleeve 9, the bottom thereof forming an outwardly extending edge which rests on the surface of the part 8 which is to lie against the head piece 2 and the top thereof forming an inwardly extending edge which rests on the bottom surface of the ring 7. This packing sleeve 9 is kept in the widened part 8 of the ring 7 by an annular bead 10 which is provided on the outside of its central, cylindrical part and which engages in a groove in the inside surface of the widened part 8 of the ring 7. The extension 5 has an axial bore 11 which passes through the head piece 2 and the upper, wider part 11' of which is provided with an external screw thread 12, into which a central screw-threaded extension 14, which is mounted on the underside of a plate 13 which projects beyond the extension 5, is screwed. A packing ring 15 is inserted between the plate 13 and the top edge of the extension 5. The plate 13, has, on its upper side, a central extension 16 which has, on its top end, a spherical head 17 which is grooved underneath. The extension 16, the plate 13 and the screw-threaded extension 14 have an axial bore 18 passing through them. On the widened part 8 of the ring 7 there is rigidly fitted an upwardly extending sleeve 19 which is provided with grooves on its outer side. In this sleeve 19 there is guided, axially displaceably, a cap 20 into which a plate 21 of elastic material is inserted. This plate 21 is kept in the cap 20 by means of an edge bead 22 which engages in a groove provided in the inner surface of the cap 20 and it has, at the centre, a bearing 23 for the head 17 of the extension 16 which is provided with an inwardly extending edge bead 24 that can engage in the groove beneath the head 17 of the extension 16. Inserted between the plate 13 and the plate 21 is a conical compression spring 25 which tends to push the plate 21 and, consequently, the cap 20 upwards out of the sleeve 19. The sleeve 19 has, at its top end, an inwardly projecting edge bead 19' and the cap 20 has, at its bottom end, an outwardly projecting edge bead 20', so that the cap 20 can be pressed outwards in the sleeve only until its edge bead 20' lies on the edge bead 19' of the sleeve 19. In the end face of the cap 20 there is provided a central air aperture 26 and the plate 21 has air apertures 27. Arranged on the edge of the cap 20 is a packing ring 28 which rests resiliently on the inner surface of the sleeve 19 and which is retained by a sleeve 29 which is rigidly inserted in the cap 20.

Inserted in a blind hole 30 provided in the inner face of the head piece 2 is an atomising nozzle 31 on the bottom end of which there is fitted a rising tube 32 which extends downwardly to a position near the bottom of the container 1. From the bore 11 an air conduit 33 leads past the opening of the atomising nozzle 31 and, opposite this air conduit 33 in relation to the atomising nozzle, a spraying opening 34 is provided in the shoulder 4 of the head piece 2. The opening of the atomising nozzle 31 lies at least at the level of the axis of the air conduit 33 and of the spraying opening 34 which is co-axial with the air conduit 33. The atomising nozzle 31 has a turned-up part at the top, so that there is formed in the blind hole 30, round the opening of the atomising nozzle 31, an annular space 35 in which drops of the liquid to be sprayed, which flow down from the atomising nozzle 31, are collected. From the inner side of the head piece 2 a sleeve 36 is rotatably inserted in the bore 11. The end of this sleeve 36, which lies in the bore 11, is cut

off obliquely so that, by rotating this sleeve, the opening of the air conduit 33 can, for the purpose of regulating the supply of air to the atomising nozzle 31, as shown in the drawing, be completely freed or can be covered to a greater or smaller extent by the obliquely cut-off end of the sleeve 36.

When the pocket sprayer is in the closed position (Fig. 1), the ring 7 is completely screwed on the external screw-thread 16 of the extension 5. The spraying opening 34 is then closed quite tightly by the packing sleeve 9 which is clamped, on the one hand, between the head piece 2 and the bottom edge of the widened part 8 of the ring 7 and, on the other hand, between the upper surface of the shoulder 4 and the ring 7. The cap 20 is pressed completely into the sleeve 19 and is retained by the edge bead 24 of the bearing 23, which bead is engaging in the groove beneath the head 17, in opposition to the action of the compression spring 25. At the same time, the opening of the bore 18 is closed quite tightly by the bearing 23 of the plate 21, which bearing extends over the head 17. The container 1 is consequently hermetically closed and its contents can neither flow out or evaporate.

When the pocket sprayer is to be used, the ring 7, 8, which is rigidly mounted in the sleeve 19, is, by rotating the latter, screwed upwards on the screw-thread 6 of the extension 5 until it rests against the plate 13 or the packing ring 15 and cannot be rotated further. By the screwing upwards of the ring 7, 8, the cap 20 in the sleeve 19 is pressed outwards and the bearing 23 of the plate 21, which is retained in the cap 20, is pulled off the head 17 of the extension 16. As soon as this has taken place, the cap 20 is forced, by the action of the compression spring 25, into its outer limiting position in the sleeve 19. The spraying opening 34 is freed by the screwing upwards of the ring 7, 8 (Fig. 2).

By pressing the cap 20 into the sleeve 19 and closing the air aperture 26 by means of a finger of the hand that is holding the pocket sprayer, air is pressed from the inside of the cap 20 and the sleeve 19, through the axial bore 18 of the extension 16, of the plate 13 and of the screw-threaded extension 14, into the bore 11 and arrives, partly in the sleeve 36, into the container 1 and presses the liquid to be sprayed contained therein through the rising pipe 32 to the atomising nozzle 31, and partly through the air conduit 33 to the atomising nozzle 31, where the liquid issuing from the latter is atomised and is blown out through the spraying opening 34. When the cap 20 is again released, it is again pressed into its outer limiting position by the compression spring 25, air being sucked up from the outside to the inside of the cap 20 and the sleeve 19 through the air aperture 26 and the air apertures 27 in the plate 21. To close the pocket sprayer after it is used the ring 7 is again screwed on to the external screw-thread of the extension 5, to such an extent that its widened part 8 or the packing sleeve 9 inserted therein again rests on the upper surface of the head piece 2, and the cap 20 is then completely pushed into the sleeve 19, in which position it is kept by the edge bead 24 which engages in the groove beneath the head 17 which has again entered the bearing 23 of the plate 21.

Since, on pressing the cap 20 into the sleeve 19, the air aperture 26 is closed by the finger that is pressing on the cap, an outlet aperture for the air that is present in the cap 20 and the sleeve 19 must be provided. For this purpose, there is provided in the ring 7 and its widened part 8 an air passage 37, the outer opening of which lies at the underside of the part 8 of the ring 7 near its periphery. The upper opening of this air passage 37 lies in the upper surface of the ring 7 at such a position that, when the ring 7 has been screwed upwards, it is closed by the packing ring 15, so that, during the spraying, no air can escape through this air passage 37.

Instead of the plate 21 of elastic material with the

bearing 23 for the head 17 of the extension 16, there may be inserted in the cap 20 a sheet-metal cup 38, the resilient edge of which, that is provided with recesses 39 and is bent downwards, is supported against a shoulder 40 which is provided in the cap 20. This sheet-metal cup 38 has a central aperture 41 and a flange 42 which surrounds the latter and which is divided into resilient flaps by recesses 43 which extend radially from the central aperture 41. These resilient flaps are so made that they engage in the underneath groove of the head 17 of the extension 16 which is pressed into the central aperture 41 of the sheet-metal cup 38 and can retain the head 17 resiliently. Above the sheet-metal cup 38 a packing disc 44 is inserted in the cap 20 which is provided with air apertures 45 and which, when the head 17 of the extension 16 passes through the central opening 41, tightly closes its axial bore 18.

The bore 11 may also be completely closed on the inner side of the head piece 2 by a closing screw 36' or may not entirely pass through the head piece 2, so that the total quantity of air is fed to the atomising nozzle 31 through the air passage 33 and the medium to be sprayed is not pressed upwards in the rising tube 32 by the compressed air fed into the container 1 but is only sucked by the stream of air sweeping over the atomising nozzle 31. In the case of such a construction of the pocket sprayer, there must be provided, in the head piece 2', an air passage 46, the outer opening of which is closed tightly by the packing sleeve 9 when the pocket sprayer is in the closed position. The opening of the air passage 33, which faces the atomising nozzle 31, may, in that case, be constructed as an air nozzle or an air nozzle may be inserted therein.

The pocket sprayer can also be constructed for spraying pulverulent substances, for example disinfectants. In that case, the atomising nozzle 31 is advantageously not provided with a rising tube and, for that purpose, there is connected to the sleeve 36 a tube 47 which extends down into the bottom part of the container 1. By means of this tube a part of the compressed air is led into the bottom part of the container 1 where it whirls upwards the substance to be sprayed.

The form of pocket sprayer represented in Figs. 6 and 7 agrees, in general construction, with the pocket sprayer represented in Figs. 1 and 2 and it differs therefrom only by the construction of the retaining device for the cap 20 and by the means for sealing the continuous axial bore passing through the part that is screwed into the extension 5 of the head piece 2. The same reference numerals are used for the parts of the pocket sprayer according to Figs. 6 and 7 which agree exactly with those of the pocket sprayer shown in Fig. 2 and, with regard to the description of these parts, reference is made to the foregoing description.

A screw-threaded extension 50' on the underside of a plate 50, that projects laterally beyond the extension 5, is screwed into the internal screw-thread 12 of the extension 5. On its upper side, the plate 50 has a central extension 50''. The plate 50, the screw-threaded extension 50' and the extension 50'' have an axial bore 51 which passes through them and in which there lies, with ample clearance, a valve spindle 52 on the bottom end of which a valve cone 52' is mounted, for which a conical widening of the opening of the bore 51 forms the valve seating on the end of the screw-threaded extension 50'. Above the extension 50'' of the plate 50 there is arranged on the valve spindle 52 a ball 53 which is held by a head 52'' of the valve spindle 52. The extension 50'' has, on its top end, a slot 54 which extends transversely over its whole diameter. Inserted in the cap 20 is a ring 55 which preferably consists of elastic material and in which the upper part, consisting of a spring part 56 and a spring 56', of a push-button like retaining device, is held, the bottom part of which is formed by the ball 53. The ring 55 is held in the cap 20 by a sleeve 57 which is rigidly in-

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serted in the cap and between the bottom outwardly flanged edge 57' of which and the bottom edge of the cap 20 an elastic packing ring 58, which rests on the inner surface of the sleeve 19, is inserted.

When the ring 7 has been completely screwed on the outer screw-threads 6 of the extension 5 and the cap 20 has been completely pressed into the sleeve 19, the ball 53 is held in the upper part, formed of the spring part 56 and the spring 56', of the push-button like retaining device (Fig. 6). The compression spring 25, which acts on the ring 55, then tends to displace the ball 53 upwards, i. e. away from the extension 50''; the effect of this is that the valve cone 52' is pressed on to its seating and the bore 51, passing through the plate 50, the screw-threaded extension 50' and the extension 50'', is consequently closed quite tightly. The container 1 is consequently hermetically closed and its contents can neither flow out nor evaporate. If now, for the purpose of working the pocket sprayer, the ring 7, 8, which is rigidly mounted in the sleeve 19, is screwed upwards, by rotating the sleeve 19, on the external screw-threads 6 of the extension 5 until the ring 7 rests on the plate 50 or on the packing ring 15, the ball 53 is pulled out of the spring part 56. The effect of this is that the valve spindle 52 is freed and the valve cone 52' opens the opening of the bore 51. The further operation of the pocket sprayer shown in Figs. 6 and 7 agrees exactly with that of the pocket sprayer shown in Figs. 1 and 2.

What I claim is:

1. A pocket sprayer with a receptacle for the substance to be sprayed which is closed by a head piece having an atomising nozzle arranged therein; characterised by the feature that there is provided, on the top of the head piece, on a shoulder in the peripheral surface of which the aperture of the sprayer is provided, a central extension which is provided with an external screw-thread and on which there can be screwed a ring which has, on its side that is to lie against the head piece, a widened part in which a packing sleeve is inserted and which, when the ring has been completely screwed on the outer screw-thread of the extension of the head piece, covers the shoulder of the head piece together with the aperture of the sprayer in a sealing manner and, when the ring is located in an outer limiting position, which is determined by a stop, frees the aperture of the sprayer, and in which there is fixed on the said ring a sleeve, in the part of which that projects over the ring, a cap, which is acted upon by a compression spring and on the open edge of which that is to lie against the ring a packing ring that rests resiliently on the inner surface of the sleeve, is arranged, is displaceably guided between two limiting positions, there being provided, in the extension of the head piece, a central bore and an air conduit which branches therefrom and is coaxial with the aperture of the sprayer and through which at least a part of the air, which is compressed in the sleeve by pressing the cap into the latter, is led to the atomising nozzle, means being provided for the purpose of, when the ring has been completely screwed on the outer screw thread of the extension of the head piece, keeping the cap, in opposition to the action of the compression spring acting thereon, in its inner limiting position with simultaneous sealing closure of the central bore of the extension.

2. A pocket sprayer according to claim 1, characterised by the feature that the bore of the central extension of the head piece has a wider outer part which is provided with an internal screw-thread and into which is screwed a screw-threaded extension of a plate which rests on the extension of the head piece with the interposition of a packing ring and forms, together with its edge that projects beyond this latter extension, the stop that fixes the outer limiting position of the ring, the said plate having, on its upper side, an extension with a head having a groove beneath it.

3. A pocket sprayer according to claim 2, character-

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ised by the feature that there is rigidly inserted, into the cap which is displaceable in the sleeve, a plate of elastic material in which is provided a bearing for the head of the extension of the plate which, with its screw-threaded extension, is screwed into the internal screw-thread of the bore of the central extension of the head piece which has an edge head which is adapted to engage in the groove beneath the said head and thus, with simultaneous tight closure of an axial bore through this head, the extension, the plate and its screw-threaded extension, to keep itself resiliently on this head.

4. A pocket sprayer according to claim 2, characterised by the feature that there is inserted, into the cap that is displaceable in the sleeve, a sheet-metal cup, the downwardly bent edge of which, that is provided with recesses, is supported against a shoulder that is provided in the cap, the said sheet-metal cup having a central opening and a flange which surrounds the said opening and which is divided, by recesses which extend radially from the central opening, into resilient flaps which are formed in such a manner that they engage in the groove beneath the said head, which is pressed into the central opening, and can be kept resiliently thereat, and that, inserted above this sheet-metal cup, into the cap, is a packing disc which is provided with air apertures and which, when the said head passes through the central opening of the sheet-metal cup, tightly closes its axial bore.

5. A pocket sprayer according to claim 1, characterised by the feature that the central bore of the extension of the head piece passes through said head piece completely, and a regulating member communicating with said bore, said member being adapted to guide air flowing through said bore partly into the interior of the container which receives the substance to be sprayed and partly to the atomising nozzle through an air passage branching from said bore.

6. A pocket sprayer according to claim 5, characterised by the feature that the regulating member, which is provided in the bore of the extension of the head piece that passes through the head piece, consists of a sleeve which is rotatably inserted into the said bore from the inside of the head piece and which has an obliquely cut-off end by means of which, by appropriate rotation of the sleeve, the opening of the air passage which branches from the bore can be wholly or partially covered up.

7. A pocket sprayer according to claim 6, characterised by the feature that the opening of the atomising nozzle is, at least approximately, at the same level as the axis of the air passage that branches from the bore of the extension of the head piece and that the atomising nozzle has, at its top end, a turned-up part which forms an annular collecting space in the blind hole of the head piece into which the said atomising nozzle is inserted.

8. A pocket sprayer according to claim 1, characterised by the feature that, for the purpose of keeping the cap, which is acted upon by a compression spring and is axially displaceable in the sleeve, in its inner limiting position when the pocket sprayer is not in use, there is provided a push-button like retaining device, the top part of which, that is formed of a spring part and a spring, is embedded in a ring inserted in the cap and the bottom part of which consists of a ball which is mounted on a valve spindle which passes with clearance through a bore in a part screwed into the internal screw-thread of the bore of the extension of the head piece, through which part the atomising air is led from the cap and the sleeve to the last mentioned bore and, consequently, to the atomising nozzle and to the container that contains the substance to be sprayed, there being arranged at the bottom end of the valve spindle a valve cone for which the bottom opening of the bore that passes through the valve spindle forms the valve seating, the whole arrangement being such that, when the cap has been completely pressed into the sleeve, the said ball snaps into the top part of the push-button

like retaining device and, under the action of the compression spring that acts upon the cap, pulls up the valve spindle together with the valve cone, so that the latter closes tightly the bore through which the valve spindle passes.

9. A pocket sprayer for a receptacle to be filled with a substance to be sprayed, which receptacle is closable by a head piece having a shoulder and an atomising nozzle; characterised by the feature that there is provided on the top of said head piece a central extension having external screw-threads, a screw-threaded ring member engageable with said screw-threads of said extension and provided on its side that is to lie against the head piece with a widened part in which a packing sleeve is inserted and which, when the ring member has been completely screwed on the outer screw-threads of the extension of the head piece, covers said shoulder on said head piece together with an aperture of the sprayer in a sealing manner and, when the ring member is located in another position frees the aperture of the sprayer, a sleeve fixed on said ring member, a part of said sleeve projecting over the ring member, a cap, which is acted upon by a compression spring and on the open edge of

which that is to lie against the ring member a packing ring that rests resiliently on the inner surface of said sleeve, is arranged, is displaceably guided between two limiting positions, there being provided, in the extension of the head piece, a central bore and an air conduit which branches therefrom and is coaxial with the aperture of the sprayer and through which at least a part of the air, which is compressed in the sleeve by pressing the cap into the latter, is led to the atomising nozzle, and means provided for the purpose of, when the ring member has been completely screwed on the outer screw-threads of the extension of the head piece, keeping the cap, in opposition to the action of the compression spring acting thereon, in its other limiting position with simultaneous sealing closure of the central bore of the extension.

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