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J. J. GRUSSEN ETAL

3,330,446

SPRAY-HEADS

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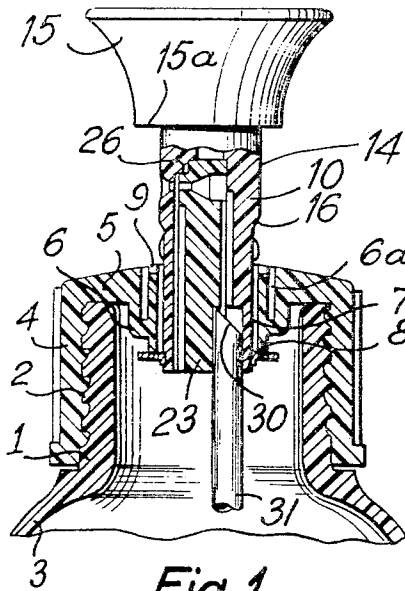


Fig. 1.

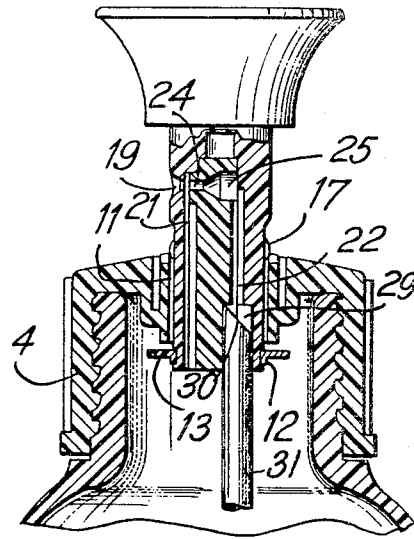


Fig. 2.

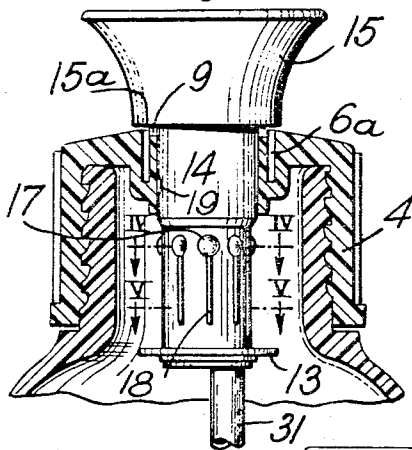


Fig. 3.

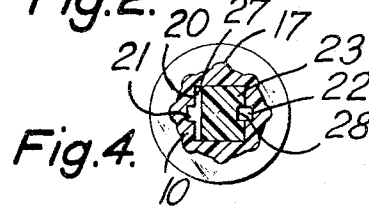


Fig. 4.

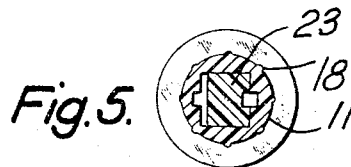


Fig. 5.

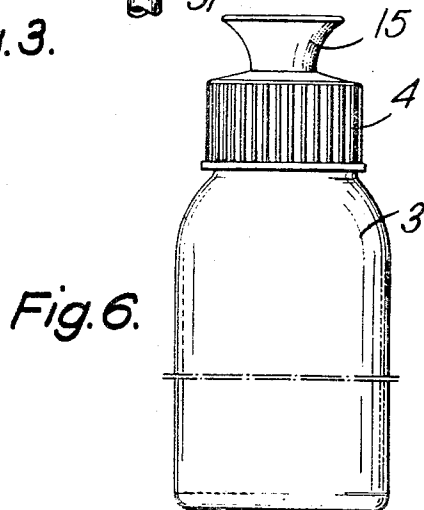


Fig. 6.

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SPRAY-HEADS

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991,066, Patent 1,418,921
1 Claim. (Cl. 222—213)

This invention has for its principal object to improve the functioning of flasks with spray-heads, of the type comprising an elastically deformable liquid storage chamber equipped with a valve which is sealingly applicable against a seat under the effect of the pressure developed in said chamber in the course of its compression during the spraying phase and which is lifted from said seat during the reinflation phase of said chamber and uncovers an additional passage venting the space inside said chamber to the surrounding atmosphere, said additional passage being preferably formed in said head, or in a plugging member supporting said seat, or between said head and said member.

In order to facilitate operation with such an arrangement and improve the manufacture of the component parts by the moulding art, a spray-head according to the invention is axially movable loosely in a plug mounted on the neck of a flask having a flexible and elastic wall, and said spray-head is provided, internally, with a large fitted washer acting as a valve, externally with a set of restraining protrusions arranged in star-fashion, and, between said washer and said protrusions, with uniformly disposed guide ribs adapted to be slidable in a slideway of said plug, whereby to form air intake passageways between the slideway and the head.

This ensures improved sealing during spraying and, during reinflation of the flask, an easier intake of air which obviates any vibration of the head in its slideway formed in the plug, yet without losing the benefit of hermetic sealing when the movable head is thrust fully home leaktightly into said slideway, since the very fact that the valve is a fitted element enables it to be of larger size.

In addition, the protrusions arranged in star-fashion act to limit the inward travel of the plug during reinflation of the flask and contact a serrated bearing surface of the fitted plug, thereby further increasing the air throughput during reinflation.

Again in order to facilitate moulding, the slideway for the spray-head in the plug is formed internally with a relieving groove, thereby imparting the required resiliency to said slideway by reducing its wall thickness.

The spray-head receives internally a driven-in insert the function of which is to act as part of the spraying means and bound the air and liquid passageways.

The fitting of a plunger tube into this head is further facilitated by a bevel cut provided at the inserted end of the tube, between the wall of the spray-head and said insert.

The present invention additionally permits of obtaining a spraying device which is more pleasant to handle.

The description which follows with reference to the exemplary non-limitative embodiment in the accompanying drawing will give a clear understanding of how the invention can be carried into practice.

In the drawing:

FIG. 1 shows in axial section the spray-head and the associated plug, both mounted on the neck of a flask with a resilient and elastic wall, in the position occupied by said head during spraying;

FIG. 2 is a corresponding sectional view showing the spray-head in the position it occupies for air to be admitted into the flask during reinflation;

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FIG. 3 is a sectional view of the assembly, but in which the spray-head itself is not sectioned and occupies the plugging position;

FIG. 4 is a fragmental section taken along line IV—IV of FIG. 3;

FIG. 5 is a fragmental section taken along line V—V of FIG. 3; and

FIG. 6 shows in side elevation on a smaller scale, a spray flask of reduced length equipped with a head according to the invention.

The device illustrated in the drawing comprises, a neck 1 with screw-thread 2 formed on a flask 3 by blowing or moulding a flexible and relatively elastic synthetic plastic material such as polyethylene. Mounted on the neck 1 is plugging means comprising a nut portion 4 with end flange 5 fluidtightly screwed onto said screw-thread. The flange 5 has formed thereon an internal reinforcement 6 which includes, behind an outwardly opening slot 6a, a cylindrical slideway 7. The nut 4 is made in one piece from synthetic plastic material which is relatively less flexible than the material used for the flask. Toward its end located within the flask, the slideway 7 is provided with a flat-ended protruding rim 8 forming a seat and, on its opposite externally located end, with a serrated end-section 9.

The provision of the slot 6a facilitates moulding operations by rendering homogeneous the thicknesses of material to be heat-treated in the mould, while the relative thinness of the slideway 7 endows it with a degree of elastic resiliency.

Into the slideway 7 is driven the hollow cylindrical body 10 of a spray-head. At the inner extremity thereof, and at the end of a reduced section 11 of a diameter less than that of the interior passage of the slideway 7, said hollow cylindrical body has shrink fitted thereon an annular portion 12 of a flat, fitted valve-seat 13 adapted to be applied against the flat end-section of the rim 8.

At its end remote from the section 11, the spray-head 10 has a smooth-walled cylindrical section 14 the diameter of which is at least equal to and preferably slightly greater than that of the interior passage of the slideway 7. This cylindrical section 14 is surmounted with a cap 15 forming a grip and having an annular face 15a which is adapted to cover the serrated end-section 9 of said slideway and the opening of the slot 6a when the cylindrical section 14 is driven into the slideway 7 (see FIG. 3).

Below the fillet 16 between the reduced section 11 and the cylindrical section 14 are provided protrusions 17 which project from section 11. These protrusions have a depth in excess of the clearance existing between the section 11 and the internal passage of the slideway 7. Between each protrusion 17 and an adjacent portion of the washer 13 are formed raised straight ribs 18, and the degree to which these ribs are raised is such that they slide easily through the slideway 7.

The distance separating the face of the washer 13 bearing against the flat end-section of the rim 8 from the protrusions 17 is greater than the height of the slideway 7, so that when said washer 13 is applied against the end-section of the rim 8 (see the spraying position shown in FIG. 1), the protrusions 17 are in spaced relation with the serrated end-section 9. Conversely (flask reinflation position shown in FIG. 2), when the protrusions 17 are in contact with the serrated end-section 9, the washer 13 is in spaced relation with the end-section of the rim 8.

In the wall of the cylindrical section 14 of the head 10 is formed a spraying nozzle 19 constituted by an outwardly opening frusto-conical section and a cylindrical section opening into the hollow portion 20 of the head 10. This hollow prismatic portion 20 has a square base and two of its opposite sides have formed therein facing grooves 21 and 22. Into this prismatic portion is driven a

relatively rigid plastic part 23. This part 23 is of generally prismatic shape with a square section matched to that of the hollow portion 20.

Opposite the nozzle 19, the part 23 has formed therein a cylindrical hole 24 which opens into the groove 21. The rear end of the hole 24 is extended by a cylindrico-conical tuyere 25 which opens out from the rear face of the part 23, opposite the end of the groove 22.

The head section of the part 23 is wedged against an abutment 26 formed on the end of the hollow portion 20, and the opposite end-section of said part is flush with the lower end-section of the reduced section 11.

Beneath the wall bounding the hole 24, the part 23 comprises a reduced section 27 facing the groove 21.

In addition, the part 23 is provided with a groove 28 which opens out opposite the tuyere 25.

Beneath the mating grooves 22 and 28 in the wall of the part 23 and in the wall of the head 10 are formed two complementary recesses which jointly define a groove 29 which opens outwardly at the bottom of the head and which joins at the other end with the passage formed by the two matching grooves 22 and 28. Into this groove 29 is driven relatively tightly the bevelled extremity 30 of a plunger tube 31 the other extremity of which descends close to the bottom 32 of the flask 3, said tube being made of a likewise relatively flexible plastic material.

The tube 31, the groove 29, the passage formed by the grooves 22 and 28, the tuyere 25 and the hole 24 form a passageway for the liquid contained in the flask 3, which is driven thereinto when the wall of the flask 3 is deformed by manual pressure.

The passageway formed by the reduced section 27 and the groove 21, on the other hand, provides a passageway for the air which is also contained in the flask and which is expelled at the same time.

The air propelled thus meets the jet of liquid issuing from the hole 24 and is expelled with it through the nozzle 19 in the form of a spray, the fineness of which will be determined by the relative sections of the different orifices and passages.

When the flask is compressed, the air pressure therein causes the washer 13 to be applied against the flat end-section of the rim 8, and this fluidtight seal allows the air to be expelled only through the reduced section 27 and the groove 21.

Conversely, when the pressure on the flask ceases, the flow of liquid is arrested and the natural elasticity of the flask wall tends to create a negative pressure in the atmosphere contained in the flask. This causes the head 10 to slide inwardly along the slideway 7 until the protrusions 17 abut against the serrated end-section 9, and the washer 13 moves away from the end-section of the rim 8.

This allows the surrounding air to fill the flask by flowing through the nozzle 19, the reduced section 27 and the groove 21, but chiefly between the protrusions 17 and the serrations 9, between the slideway 7 and the ribs 18 and between the rim 8 and the washer 13, with an amply increased flow rate that enables the flask 3 to be re-inflated much more quickly than it can be compressed. The loss of time involved in re-inflation is thus greatly reduced.

All that is necessary in order to hermetically seal the spraying flask is to press on the cap 15 to thrust the spray-head into the flask until the smooth section 14 has been firmly wedged into the slideway 7.

It is to be noted that, with such a constructional form, moulding of the head 10 offers no serious difficulty since there are no large back-off portions other than on the relatively shallow protrusions 17, and because the sealing washer 13 is fitted after the head 10 has been inserted into the slideway 7. The washer 13 can be stamped out of a metal blank.

Sealing is improved since the washer 13 may have any desired width.

The air return into the flask 3 is improved by the co-operation between the protrusions 17 and the serrated edge 9 of the slideway 7 and also by the provision of the ribs 18 on the head 10, which ribs slide easily along the slideway 7 and enable the head 10 to slide without vibration through the slideway 7. The air return is additionally facilitated by the wide gap possible between the washer 13 and the rim 8.

Plugging tightness is further improved by the flexibility of the slideway 7, resulting from the reduction in thickness of its wall due to the existence of the groove 6a.

Finally, the fitting of the tube 31 into the groove 29 and its durability are greatly improved by the bevel 30 on the corresponding end of the tube.

While there has been shown and described, the preferred embodiment of the improved spray-head of this invention, it will be well understood by those skilled in the art that various changes and modifications may be made in this embodiment. It is, therefore, to be understood that the description hereinbefore set forth is not to be considered a limitation of the invention but that changes may be made within the spirit and scope of the invention as set forth in the appended claim.

What we claim is:

In a liquid spraying device having a flask with an elastically deformable wall and a spray-head which is movable between an extended spraying position by compression of the wall of the flask, and a retracted re-inflation position upon subsequent release of the wall, an improvement in which an additional air passage is provided upon movement of the spray-head from the extended position towards the retracted position to insure rapid re-inflation of said flask, said improvement comprising a plug mounted on the flask and provided with a groove to define a slideway having a wall of substantially uniform thickness, the spray-head including a first portion having a smooth outer surface which normally projects from the plug and a second portion of reduced diameter which is freely slideable in said slideway between the extended and retracted positions, ribs on said second portion of the spray-head having clearance in said slideway and forming stable air intake passages into the flask, protrusions on said second portion of the spray-head terminating said ribs and located adjacent said first portion, said protrusions being of larger size than the slideway to engage the latter when the spray-head is retracted to said retracted re-inflation position, the wall of said slideway including an end portion which engages said protrusions, the latter end portion being provided with serrations to restrain entry of the protrusions into the slideway by elastic action, and a washer on the second portion of said spray-head for contacting the plug in the extended position of the spray-head to block said air intake passages and be in sealed relation with said plug, said spray-head being forcibly insertable into the slideway to cause said protrusions and said first portion to enter the slideway and close and seal the flask.

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