

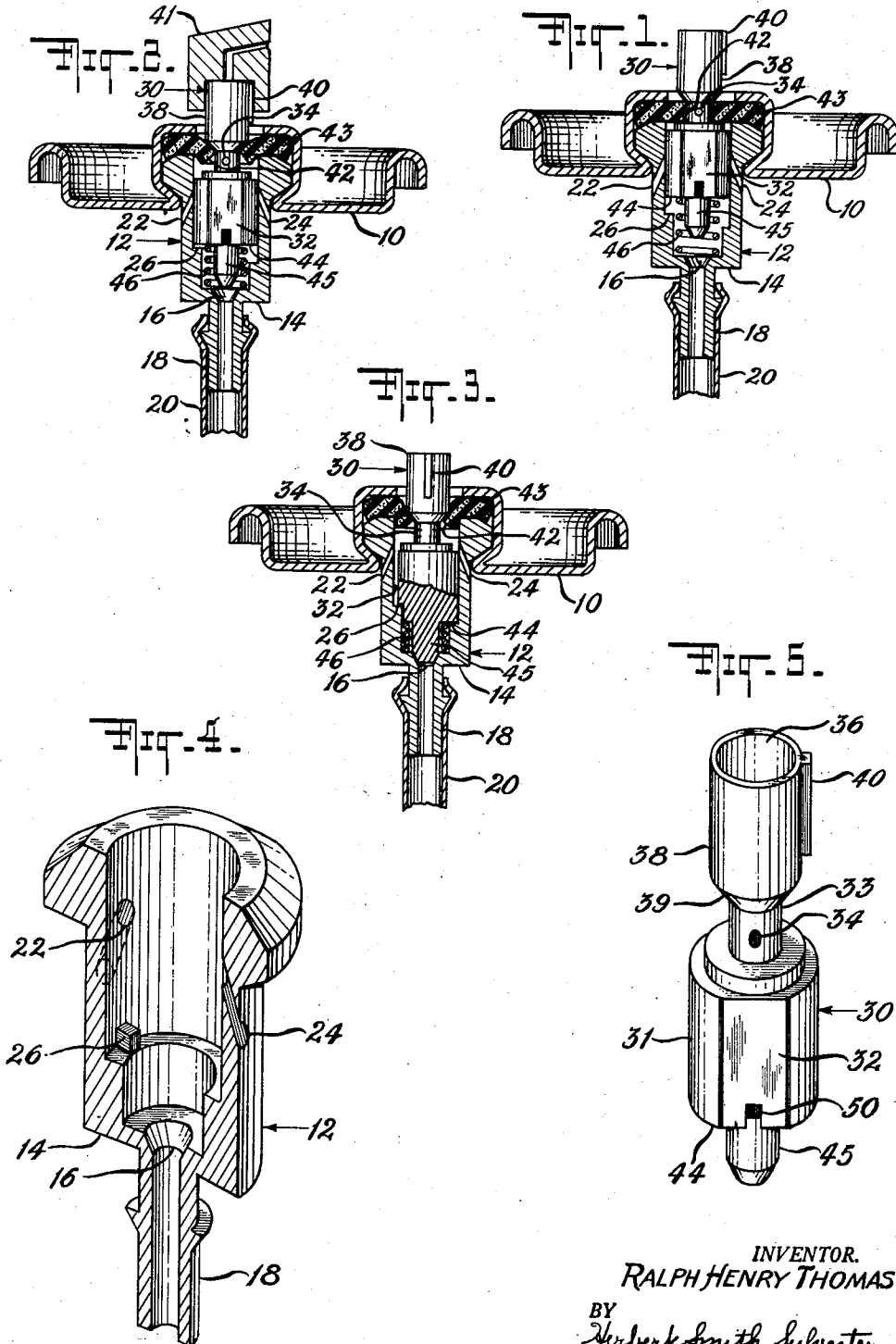
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VALVE

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VALVE

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This invention relates to valves for dispensers of gas-propelled products. More particularly, it relates to self-purging valves for such dispensers wherein propellant gas is employed to flush the valve of product.

The valves and delivery nozzle on dispensers of pressure-propelled products which tend to harden or solidify after being released from their pressurized container (e. g. paints and lacquers) must always be cleansed of product after each usage so as not to be obstructed by hardened product when a later delivery is desired. A common method achieving this result is to invert the container, which usually contains a dip tube or stand pipe, so as to position the intake end of the dip tube in the vapor phase, and then, with the can inverted, to open the valve and permit gaseous propellant to flush the dip tube, valve and delivery nozzle.

The present invention is concerned with an improved valve which permits flushing of the valve and delivery nozzle with propellant gas without requiring inversion of the can or loss of product in the dip tube.

In accordance with the present invention, a self-purging valve for dispensers of gas-propelled products comprises a valve body having therein a product supply opening and a gas admission port, an outlet, a movable valve stem, said valve stem being adapted to assume a first position at which said outlet is closed, a second position at which said outlet is open, and a third position at which said outlet and said gas admission port are open and said product supply opening is closed, means for normally restricting said valve stem to said first and second positions, and means for selectively permitting said valve stem to move to said third position so as to simultaneously close said product supply opening and allow propellant gas to pass through the thereby opened gas admission port and said outlet and purge said valve of product.

In order to more fully illustrate the present invention, reference is made to the accompanying drawings in which

Fig. 1 is a sectional view of a valve constructed according to the present invention in a closed or non-delivering position,

Fig. 2 is a sectional view of a valve constructed according to the present invention in a product-delivering position,

Fig. 3 is a sectional view of a valve constructed according to the present invention in a purging or flushing position,

Fig. 4 is an oblique sectional view of the valve body of Figs. 1-3, and

Fig. 5 is an oblique view of the valve stem of Figs. 1-3.

The valve as shown in Figs. 1-3 is staked to a cap 10 so as to provide an assembly which is ready for crimping to the top of a conventional "aerosol" dispenser. Affixed within said cap is a cylindrical valve body 12 closed at the bottom by a base 14. Centrally located in the base is a product inlet opening 16, which communicates through a projecting tube 18 with a conventional dip tube or standpipe 20. The dip tube sup-

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plies product to be dispensed to the valve in the usual manner.

A pair of diametrically opposed side entry ports 22, 24 pass through the upper portion of the wall of the valve body, and as clearly shown in Fig. 4, the inner surface of the valve body carries a projection 26 extending upward from its base and outward from its wall.

A valve stem 30 is mounted partially within the valve body 12. The stem has an enlarged body portion 31 which is generally cylindrical in cross section but which has a flat portion 32 on its outermost surface. The stem has a necked central portion 33 through which a product outlet orifice 34 communicates the outer surface of said stem with a product delivery passage 36 extending axially upwards through an enlarged head 38, projecting above the neck of the valve stem. The head 38 has a frusto-conical bottom 39 from which the neck 33 extends. The entire valve stem is free to rotate when in the positions illustrated in Figs. 1 and 2. The head 38 of the valve stem carries a key 40 which is adapted to mate with a slotted slip-on spray head 41, so as to facilitate rotary positioning of the valve stem. The annular inner surface 42 of a resilient washer 43 seals the product outlet orifice 34 when the valve stem is at its upper extreme or closed position, as illustrated in Fig. 1.

The valve stem 30 has a flat base 44 from which projects a tapered spring guide 45 adapted to mate with and seal the product inlet opening 16. A helical coil spring 46, mounted on the tapered spring guide 45, urges the valve stem upwards and biases it to the normally closed position illustrated in Fig. 1.

The base of the valve stem is provided with a recess 50 (as clearly illustrated in Fig. 5) into which the projection 26 on the interior of the valve body may nest when the stem is depressed while the projection and the recess are in alignment.

In use, the valve stem is rotated so as to disalign the projection 26 on the valve body and its mating recess 50 in the valve stem and the stem is manually depressed, i. e. by application of downward manual pressure to the spray head 41, until the base 44 of the valve stem abuts the top of the projection 26 on the inner wall of the valve body (as illustrated in Fig. 2). In this position the enlarged head 38 of the valve stem deflects the resilient washer 43 away from the product outlet orifice and the body 31 of the valve stem blocks the side inlet ports 22 and 24. Material to be dispensed rises through the dip tube 20, passes between the valve body 12 and the tapered spring guide 45 and the flat 32 on the valve stem, thence through the orifice 34 and delivery passage 36 to the spray head 41.

When it is desired to purge the valve and spray head, the spray head and valve stem are rotated until the recess 50 thereon is aligned with the projection 26 on the interior of the valve body. (Suitable indicia may be provided on the spray head and cap, for instance, to identify to the user the alignment suitable for normal operation and for valve cleaning.) The spray head and valve stem are then depressed until the tapered spring guide 45 is seated in the product inlet 16, as illustrated by Fig. 3. In this position the product inlet is closed by the spring guide, the product outlet orifice is unsealed, and the body of the valve 31 stem is below the side entry ports 22 and 24, thus unblocking the ports and permitting propellant gas to pass through the ports 22 and 24 to the orifice 34, up through the delivery passage 36, and out through the spray head 41, thus purging these members of liquid.

It is not required for satisfactory operation that the body 31 of the valve stem maintain a gas-tight seal over the ports 22, 24 while the valve is in the product delivery position. Normally these ports will be relatively small,

e. g. having a diameter of about 0.008 inch as compared to a diameter of 0.125 inch commonly used on dip tubes. The small amount of gaseous propellant that may bleed through these ports when the stem is in the product dispensing position merely serves to help atomize the product leaving the spray head.

Although the present invention has been described with reference to a particular embodiment, it will be apparent to those skilled in the art that variations and modifications of this invention can be made and that equivalents can be substituted therefor without departing from the principles and true spirit of the invention. Thus, although dispensers for liquid sprays have been specifically described, it is obvious that the instant valve may be used with a variety of other products including for instance, foams, pastes, and powders.

Having thus described the invention, what is claimed is:

1. A self-purging top mounting valve for dispensers of gas-propelled products adapted for use in a substantially upright position wherein said valve is surrounded by gaseous propellant comprising a valve body having therein a product supply opening and a gas admission port, a valved outlet, a movable valve stem, said valve stem being adapted to close said outlet at a first position, to open said outlet at a second position, and to simultaneously open said outlet and said gas admission port and close said product supply opening at a third position, a projecting member on said valve body normally restricting said valve stem to said first and second positions, and a recess in said valve stem adapted to receive said projection and thereby selectively permit movement of said valve stem to said third position so as to simultaneously close said product supply opening and allow propellant gas to pass through the thereby opened gas admission port and said outlet and purge said valve of product.

2. A self-purging, top mounting valve for dispensers of gas propelled liquid products adapted for use in a substantially upright position wherein said valve is surrounded by gaseous propellant comprising a hollow cylindrical valve body having a vertical wall perforated by a gas admission port, said valve body being closed at the base thereof and having in said base a liquid supply opening; a standpipe adapted to communicate said liquid supply opening with liquid to be dispensed; a vertically movable valve stem rotatable within said valve body, said stem having an enlarged body portion, an upwardly

projecting neck portion having therein a fluid outlet, and a downwardly projecting tapered member adapted to seal said liquid supply opening; means for sealing said fluid outlet; means for biasing said valve stem to a first, uppermost position wherein said fluid outlet is normally sealed; a projecting member on the inner surface of said hollow valve body normally restricting downward travel of said valve stem to a second position wherein said fluid outlet is unsealed, thus permitting dispensing of liquid from said container, and the enlarged body portion of said stem projects above said gas admission port; and a recess in said valve stem adapted to receive said projection on rotation of said rotatable valve stem to a position aligning said projection and said recess, thereby permitting selective further downward travel of said valve stem to a third position wherein said fluid outlet is unsealed, said tapered member closes said liquid supply opening and said enlarged body member depends below said gas admission port so as to allow propellant gas to pass through said port and purge said valve of liquid.

3. A self-purging valve for dispensers of gas-propelled products comprising a valve body having an internal chamber, a product supply opening, a gas admission port and an outlet, said gas admission port being open to the gas phase in the dispenser after loading thereof with propellant, a valve stem movably mounted in said chamber and adapted to assume a first position at which said outlet is closed, a second position at which said outlet and product supply opening are open, and a third position at which said outlet and said gas admission port are open and said product supply opening is closed, means for normally restricting the movement of said valve stem to said first and second positions, and means for selectively permitting said valve stem to move to said third position so as to simultaneously close said product supply opening and allow propellant gas to pass through the thereby opened gas admission port and said outlet and purge said valve of product.

4. A self-purging valve for dispensers of gas-propelled products as set forth in claim 3 wherein said valve stem is normally biased to said first position.

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