

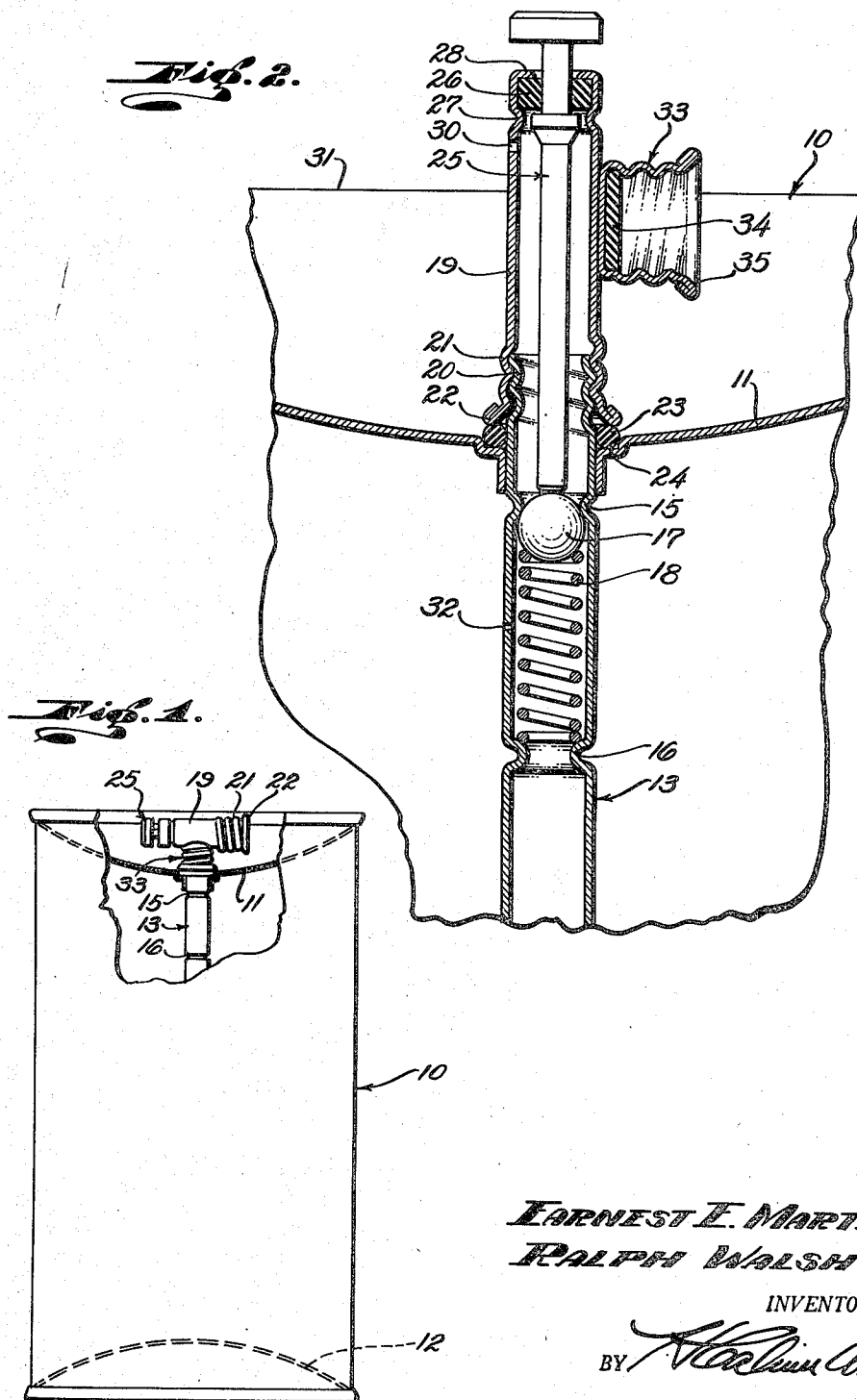
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E. E. MARTIN ET AL

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VALVE CONTROL FOR PRESSURE FLUID CONTAINERS

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**EARNEST E. MARTIN,
RALPH WALSH**

INVENTORS

BY *Alfred White*

ATTORNEY

UNITED STATES PATENT OFFICE

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VALVE CONTROL FOR PRESSURE FLUID CONTAINERS

Earnest E. Martin, Pasadena, and Ralph Walsh, Los Angeles, Calif., assignors to Universal Properties, Inc., Los Angeles, Calif., a corporation of California

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This invention relates generally to improvements in dispensing valve devices for fluid containers, and is concerned particularly with valve-equipped vessels for dispensing pressure fluids such as insecticidal solutions of the aerosol type having super atmospheric vapor pressure and contained in the vessel in liquid phase.

One major object of the invention is to provide a valve device with a control head particularly adapted for accommodation within the head of a container given concave shape to effectively resist internal fluid pressure. Specifically the invention contemplates the use of a valve control having a dispensing head which, when the containers are in packaged condition or otherwise subjected to possible damage to the dispensing head, is entirely accommodated within the concavity of the container end.

A further object is to provide a type of valve control dispensing head which is detachable from the body or stem portion of the valve, or of a primary valve acting to seal the container with the dispensing head removed, and which is provided with an attachment permitting connection of the head with the valve body in a sealing position permitting the head to be entirely contained within the vessel concavity, whereas when connected to the valve body in a dispensing position, the head may project beyond or outside the vessel.

All the various features and objects of the invention as well as the details of a typical and illustrative embodiment will be understood to better advantage from the following description of the accompanying drawing, in which:

Fig. 1 is a view partly in section showing the pressure fluid can with the dispensing head or cap applied to the syphon tube and contained within the concavity of the container head; and

Fig. 2 is an enlarged fragmentary cross-section showing the cap in changed (dispensing) position and its relation to the self-closing valve.

As previously indicated, the invention has particular applicability in conjunction with a pressure fluid container in the form of a can 10, the head 11 and bottom 12 of which are made in concave form, giving the can added strength and resistance against internal pressure. The can is particularly made to contain a solution of an insecticide in a liquefied normally gaseous solvent or propellant, for example a solvent containing dichlorodifluoromethane and having a vapor pressure around 25 pounds per square inch. The can is charged and its contents dispensed through a tube 13 made for example of $\frac{1}{8}$ inch

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O. D. seamless tubing extending through the concave head 11 and brazed thereto at 14.

The tube is given rolled deformations at longitudinally spaced locations to form upper and lower inside shoulders 15 and 16 presenting accurately shaped and smoothly curved surfaces. A check valve, preferably in the form of a metal ball check 17, seats upwardly against shoulder 15 by virtue of the container pressure and the thrust of coil spring 18 bearing against shoulder 16. In the process of inserting the valve and spring assembly in the tube, shoulder 15 may first be formed, the valve and spring inserted in the tube, and shoulder 16 then rolled while the spring is compressed away from it. The tube thus is formed as a valve containing unit to be inserted through and brazed in the concave head 11.

An upper or cap section 19 of the tube is detachably secured to the lower section 13 in the position of Fig. 2, by interengaging threads 20 and 21 rolled in the adjacent ends of the sections. The cap has an outwardly flared bottom flange 22 which engages against a seal ring 23 contained within the head recess 24, to maintain a fluid-tight seal. The cap contains an axially movable stem 25 engageable against the valve 17 and extending at its upper end through a seal ring 26 confined between shoulders 27 and 28.

As the stem 25 is depressed to unseat the valve 17, fluid escapes from the container through tube 13 into the cap from which the fluid is discharged as a spray or fog from orifice 30, formed for example by an 0.0225 inch drill. As will be observed, the orifice 30 is positioned above the top line or plane 31 of the can so that the spray is projected free and clear of any consequential impingement against the can. A second orifice 32 of smaller size than opening 30, and formed for example by an 0.012 inch drill, extends through the wall of tube 13 at a location below the valve 17 and above the liquid level in the can to admit sufficient vapor to the fluid stream being discharged through the tube, to assist in effecting complete atomization of the spray particles discharged from orifice 30.

The cap section 19 carries a laterally projecting closure 33 in the form of an integrally attached threaded cap containing a sealing gasket 34 and having an outer flared flange portion 35. In addition to affording a positively sealed closure for the top of the tube 13, the cap 33 serves as a means of permitting attachment of the entire cap assembly in a position such that it is completely contained within the concavity of the can head 11 and thus protected against impact or

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damage under such circumstances as might occur if the cap assembly were permitted to extend appreciably outside the top plane of the can.

The can initially is filled with the cap assembly removed by application of the upper end of tube 13 to a filling machine. Upon reception of the charge in the can and removal of the filling head, valve 17 seats to seal the container. During shipment of the can and until such time as its contents are to be dispensed, cap 33 may be screwed onto the tube 13 to serve the twofold purpose of effecting a positive seal by the engagement of cap flange 35 against the seal ring 23 and the engagement of gasket 35 against the upper end of the tube, and to permit accommodation of the entire cap assembly within the concavity of the can head. When the contents are to be dispensed, the cap assembly is removed and reapplied in the position of Fig. 2, positioning the stem 25 for operation to control the valve 17. The direction of the spray discharged from orifice 30 is predeterminable by reference to the position of the cap 33, since the latter is located diametrically opposite the orifice.

We claim:

1. A pressure fluid can having a concave head, a siphon tube extending through said head and having an upper threaded end, the wall of said tube being annularly deformed to provide an inside annular shoulder, a check valve seating upwardly against said shoulder to normally prevent fluid escape from the container through the tube, a spring contained within the container inside the tube and acting to seat the valve, a cap having a threaded end attachable in one position of the cap to the threaded end of the tube to retain said cap in a position extending upwardly out of the head concavity, means carried by the cap and operable in said position thereof to engage and unseat said valve to release fluid through an orifice in the cap, and a threaded cup-shaped closure carried by one side of said body and attachable to said tube to positively seal the tube against fluid escape, the cap being entirely contained within the concavity of the head when the tube is sealed by said closure.

2. A pressure fluid can having a concave head, a siphon tube extending through said head and having an upper threaded end, the wall of said tube being annularly deformed to provide an inside annular shoulder, a check valve seating upwardly against said shoulder to normally prevent fluid escape from the container through the tube, a spring contained within the container

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inside the tube and acting to seat the valve, a cap having a threaded end attachable in one position of the cap to the threaded end of the tube to retain said cap in a position extending upwardly out of the head concavity, means carried by the cap and operable in said position thereof to engage and unseat said valve to release fluid through an orifice in the portion of the cap above said concavity, and a threaded cup-shaped closure carried by one side of said body and attachable to said tube to positively seal the tube against fluid escape, the cap being entirely contained within the concavity of the head when the tube is sealed by said closure, said discharge orifice being located in the side of said body diametrically opposite said cap.

3. A pressure fluid can having a concave head, a siphon tube extending through said head and having an upper threaded end, the wall of said tube being annularly deformed to provide an inside annular shoulder, a check valve seating upwardly against said shoulder to normally prevent fluid escape from the container through the tube, a spring contained within the container inside the tube and acting to seat the valve, a cap having a threaded end attachable in one position of the cap to the threaded end of the tube, to retain said cap in a position extending upwardly out of the head concavity, an axially movable stem carried within said cap and operable in said position thereof to engage and unseat said valve to release fluid through a discharge orifice located in the cap beyond the head concavity, sealing means in the cap for preventing fluid leakage about the stem, and a threaded cup-shaped closure carried by one side of said body and attachable to said tube to positively seal the tube against fluid escape, the cap being entirely contained with the concavity of the head when the tube is sealed by said closure.

EARNEST E. MARTIN.
RALPH WALSH.

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