# United States Patent

[11] 3,610,481



[72] Inventor **Leonard L. Marraffino**
**884 Northeast 42nd St., Oakland Park, Fort Lauderdale, Fla. 33308**



[21] Appl. No. **828,286**
[22] Filed **May 27, 1969**
[45] Patented **Oct. 5, 1971**


[54] **TWO-FLUID AEROSOL DISPENSER WITH INTERNAL COLLAPSIBLE SECONDARY FLUID CONTAINER**
**10 Claims, 4 Drawing Figs.**


[52] **U.S. Cl.** ..... **222/402.24**
[51] **Int. Cl.** ..... **B65d 83/00**
[50] **Field of Search** ..... 222/402.24, 94, 145, 96, 136; 239/414



[56] **References Cited**
UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 3,217,936 | 11/1965 | Abplanalp | 222/136 |
| 3,482,736 | 12/1969 | Green | 222/136 |
| 3,499,581 | 3/1970 | Lehmann | 222/94 |



*Primary Examiner*—Robert B. Reeves
*Assistant Examiner*—John P. Shannon, Jr.
*Attorney*—Wynne & Finken



**ABSTRACT:** Primary and secondary fluids are held separately in outer and inner pressurized containers prior to dispensing through a common mixing and discharge nozzle. Separate flow passages from the containers to the nozzle are provided and the flow of the primary and secondary fluids through these passages is regulated by a pair of distortable valve elements which also serve as springs.

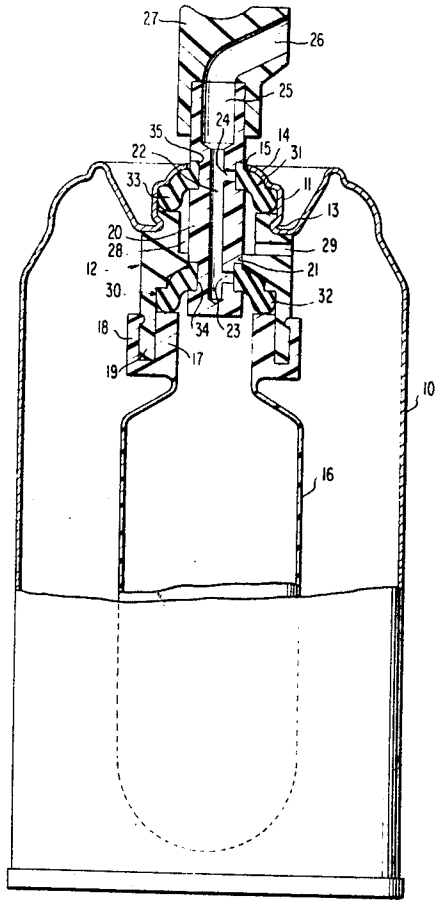



FIG. 1

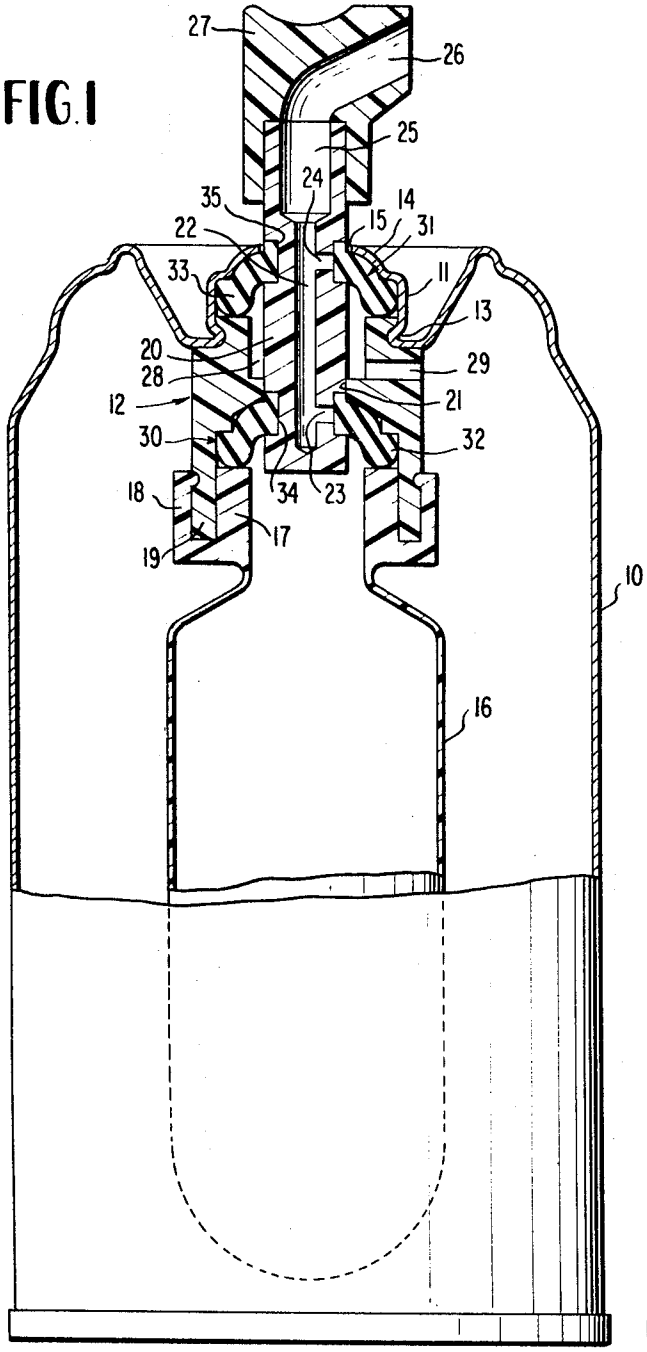



FIG. 4

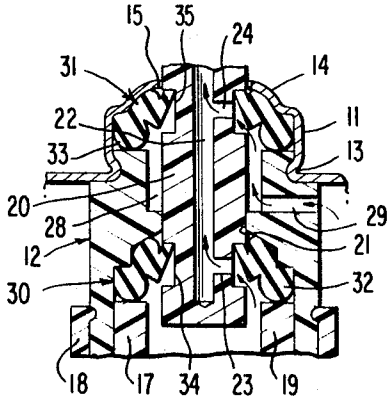



FIG. 2

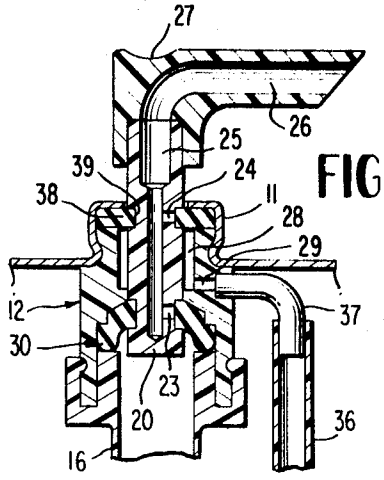
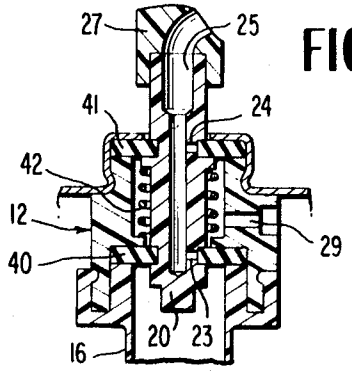



FIG. 3




LEONARD L. MARRAFFINO, INVENTOR.

BY Wynne & Finken

ATTORNEYS

# TWO-FLUID AEROSOL DISPENSER WITH INTERNAL COLLAPSIBLE SECONDARY FLUID CONTAINER

Pressurized dispensers for plural fluids are known in the prior art and difficulties have been experienced particularly with the discharge valve means of such dispensers. The valve means have generally been unduly complicated and costly, difficult to assemble, fragile and sometimes likely to clog up depending upon the nature of the fluids.

The primary objective of this invention is to simplify and render more reliable and positive the discharge valve means for a pressurized dispenser for primary and secondary fluids of a type which should not be mixed together prior to actual dispensing through a common nozzle. The present invention valve structure significantly reduces the number of parts involved, lessens the need for springs and renders the entire device virtually foolproof in operation. Other features and advantages of the invention will appear during the course of the following description.

## DESCRIPTION OF THE DRAWINGS

FIG. 1 is a central vertical section through a pressurized dispenser for primary and secondary fluids in accordance with one preferred embodiment of the invention.

FIG. 2 is a similar view showing a modified embodiment.

FIG. 3 is a similar view showing another slight modification.

FIG. 4 is an enlarged fragmentary vertical section through the valve structure shown in FIG. 1 in an open or dispensing condition.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 1 of the drawings, wherein like numerals designate like parts, the numeral 10 designates an exterior substantially rigid container preferably formed of sheet metal for a primary fluid under pressure which is compatible with metal. The primary fluid may be part liquid and part pressurizing gas or, in some cases, entirely gas. Container 10 is formed at its top to provide a central sleeve holder 11 for a generally cylindrical valve body or head 12 fixedly connected with the holder 11 as by crimping at 13. The holder 11 has a crowned top 14 provided with a central opening 15, as shown.

An inner container 16 for a secondary fluid is provided and the body portion of the inner container is collapsible under the influence of pressure surrounding it in the outer container. The inner container 16 is preferably formed of plastic or some rubberlike material and is therefore very suitable to contain a secondary fluid which is not compatible with metal. Examples of fluids which require dispenser structures of the type involved in this invention are hair dyes, dental impression formulas, polyurethanes, rubberized silicones, epoxies, certain foods, insecticides, lacquers and paints.

The inner container 16 is provided at one end with a relatively thick and rigid neck having inner and outer annular walls 17 and 18 which snugly engage an annular skirt 19 of the valve head 12 in a fluidtight manner.

A valve stem 20 is mounted for reciprocation within a central bearing and guide bore 21 of the valve head 12 and the valve stem has a relatively small central axial bore 22 closed at its lower end and having longitudinally spaced radial branch ports 23 and 24, as shown. The upper end of the bore 22 has an enlargement 25 serving as a mixing chamber for the primary and secondary fluids and leading to a final discharge nozzle opening 26 in a valve pushbutton 27 mounted on the outer end of the valve stem.

Surrounding the midportion of the valve stem 20 between the ports 23 and 24 in an annular chamber 28 formed within the upper end of valve head 12. A radial port 29 leads from this annular chamber through the exterior surface of the valve head into the primary fluid container 10, as shown. The flow passage for the primary fluid into the mixing chamber 25 is through the port 29, chamber 28, port 24 and valve stem bore 22. The corresponding flow passage for secondary fluid in the container 16 is through the port 23 and bore 22 to the chamber 25.



The flow of primary and secondary fluid is regulated by a pair of distortable resilient washer valve elements 30 and 31 formed of rubberlike material and also serving as spring means by biasing the valve stem 20 to the outward nondispensing position shown in FIG. 1. An outer marginal portion 32 of valve element 30 is clamped between the wall 17 and an annular shoulder of valve head 12 while a corresponding marginal portion 33 of valve element 31 is clamped between the outer end of valve head 12 and an annular shoulder of the holder 11.

The valve stem 20 has a spaced pair of annular grooves 34 and 35 adjacent the radial ports 23 and 24 and these grooves receive snugly central openings or bores formed through the washer valve elements 30 and 31, as shown. Consequently, the central bores of valve elements 30 and 31 cover and seal the outer ends of ports 23 and 24 when the valve elements are in normal relaxed conditions as shown in FIG. 1 for maintaining the valve stem 20 in the outward nondispensing position. In this regard, the distortable valve elements 30 and 31 have outwardly crowned central portions surrounding the grooves 34 and 35 and the valve elements are relaxed when they assume this configuration. At this time, the above-described flow passages for primary and secondary fluids are closed by the two valve elements.

As best shown in FIG. 4, when dispensing of the two fluid components, the user depresses the button 27 and shifts valve stem 20 axially inwardly thereby distorting the crowned resilient valve elements 30 and 31 and stretching their respective bores away from the ports 23 and 24 to open these ports substantially simultaneously. When this opening occurs, both primary and secondary fluids from the containers 10 and 16 under pressure will flow through the previously described passages which include the ports 23 and 24 and the two fluids will arrive in the mixing chamber 25 and will be dispensed through the common nozzle opening 26. When the button 27 is released, the spring action of valve elements 30 and 31 will return the valve stem 20 automatically to the outward nondispensing position and the flow of both fluids is shut off due to reclosing of the ports 23 and 24 by the bores of the distortable valve elements.

The structure is simple, reliable and positive in operation. Few parts are involved and the assembling of parts is economical.

FIG. 2 of the drawings shows a modification of the invention wherein the nature of the primary fluid in the container 10 requires the use of a dip tube 36 having an elbow fitting 37 connecting directly into the annular chamber 28 of valve head 12. Additionally, in FIG. 2, the outer distortable washer valve element 38 is in the form of a flat annulus, when relaxed, and has its bore snugly seated in a relatively narrow annular groove 39 of valve stem 20 adjacent the radial port 24. All other parts remain identical to the corresponding parts in the previous embodiment and the mode of operation of the dispenser need not be described again.

FIG. 3 shows a further modification wherein the dip tube 36 of FIG. 2 is omitted and both distortable valve elements 40 and 41 are in the form of relatively thin flat annular discs similar to the element 38 in FIG. 2. Because the valve-closing spring action of the elements 40 and 41 is somewhat diminished, a compression spring 42 may be utilized in the annular chamber 28 to aid in closing the dispenser valve means. All other parts and their functions remain unchanged.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred examples of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

I claim:

1. A pressurized dispenser for primary and secondary fluids comprising separated container means for said fluids, a common valve head having a connection with the separated container means, a reciprocating valve stem having guided engagement with the valve head and having a mixing chamber

for said fluids and separate inlet ports for said primary and secondary fluids, and a pair of distortable resilient washer valve elements each having a connection with said valve head and stem and each having a part covering one of said ports when the valve stem is in a nondispensing position, said valve elements resiliently holding the valve stem in said nondispensing position and allowing the valve stem to be shifted in one axial direction to a dispensing position wherein the valve elements are distorted and said ports are uncovered by said parts.

2. A pressurized dispenser as defined by claim 1, and wherein each valve element is an annular body having a marginal portion clamped to a part of the valve head and having a central bore snugly surrounding the valve stem adjacent to one of said inlet ports.

3. A pressurized dispenser as defined by claim 2, and wherein the valve stem has axially spaced external annular grooves within which the bores of the valve elements are seated.

4. A pressurized dispenser as defined by claim 3, and wherein the valve elements have crowned central portions which are normally spaced axially outwardly of the marginal portions when the valve elements are relaxed and undistorted.

5. A pressurized dispenser as defined by claim 2, and wherein the valve elements are substantially flat annular bodies while in a relaxed undistorted condition.

6. A pressurized dispenser as defined by claim 5, and wherein the valve head has an annular internal chamber surrounding the valve stem between said distortable valve elements, and a compression spring in said chamber.

7. A pressurized dispenser as defined by claim 3, and wherein the axially interior valve element is a relatively thick element having a crowned central portion projecting axially outwardly of its marginal portion, the outermost valve element being a relatively thin flat annular body.

8. A pressurized dispenser as defined by claim 1, and wherein the separated container means comprises an outer substantially rigid container for primary fluid under pressure and an inner container for secondary fluid disposed bodily inside of the outer container and being at least in part collapsible under the pressure of the fluid within the outer container, said valve head having port means in communication with the outer container and in communication with the primary fluid inlet port of the valve stem.

9. A pressurized dispenser as defined by claim 8, and wherein said inlet ports of the valve stem are radially disposed and said washer valve elements have bores which normally seal the outer ends of the radial ports when the valve elements are undistorted, said bores stretching to uncover the ports when the valve elements are distorted by shifting of the valve stem in one axial direction.

10. A pressurized dispenser as defined by claim 8, and wherein said valve stem has a central bore communicating with said radial ports and a somewhat enlarged bore portion constituting a mixing chamber for said primary and secondary fluids.