April 3, 1962 W. C. BEARD, JR 3,028,054

REMOTE ACTUATING MEANS FOR AEROSOL DISPENSERS

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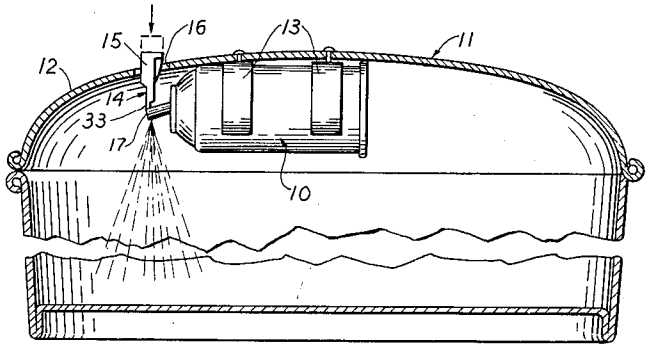


Fig. 1

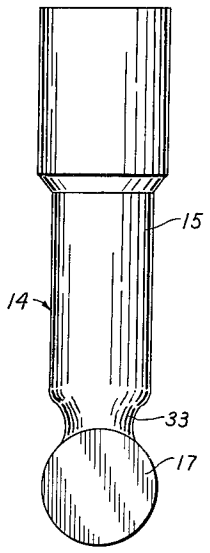


Fig. 3

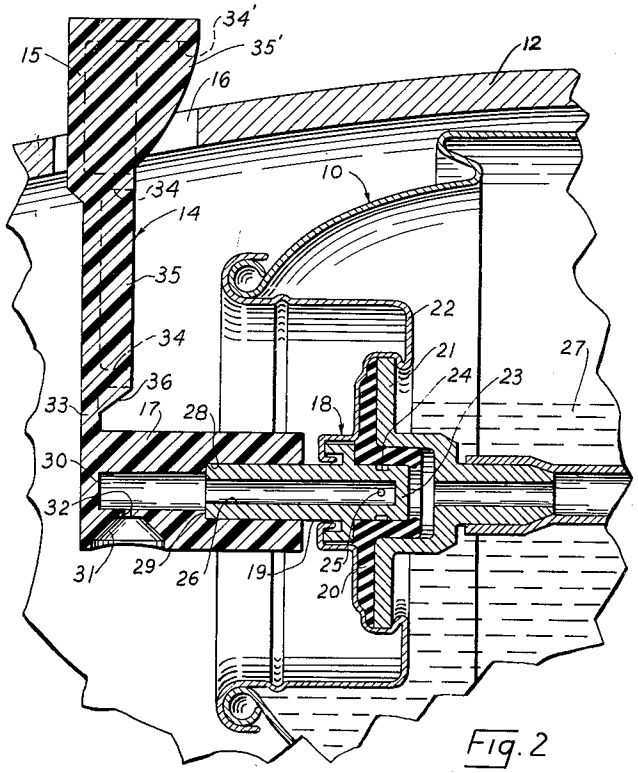


Fig. 2

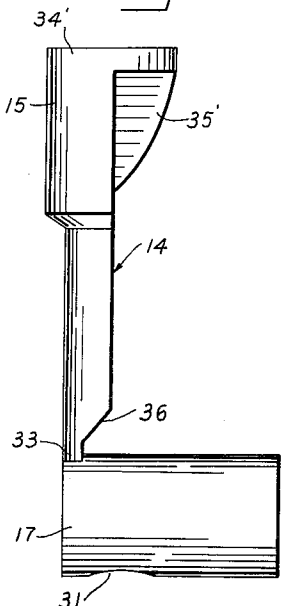


Fig. 4

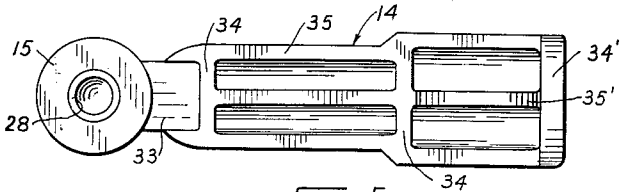


Fig. 5

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REMOTE ACTUATING MEANS FOR AEROSOL DISPENSERS

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4 Claims. (Cl. 222—180)

This invention relates to valve control actuating means for aerosol containers and more particularly to actuating means for controlling an aerosol spray valve at a point removed from the container and valve so that the valve can be remotely operated.

The spray valve actuator of the present invention is adapted primarily for use with pressurized spray devices of the type having dispensing valves which are operated upon tilting the valve stem as distinguished from the plunger type of dispensing valves, in which the valve stem is moved longitudinally in order to operate the valve. In this respect, it has been customary to provide a suitable nozzle at the outermost end of the valve stem, through which the fluid is atomized when the nozzle and stem together are tilted to open the valve.

In order to operate a spray valve of the above mentioned character, a force must be exerted on the nozzle or valve stem in a direction substantially perpendicular to the longitudinal axis of said stem. Ordinarily such force is applied by simply placing a finger on the back of the nozzle or stem itself and pressing forward. However, certain insecticides, germicides, fungicides or other liquids are known to be harmful to a person when they come in contact with the skin and should therefore be marketed in spray devices adapted to be remotely operated. Furthermore, it is sometimes desirable to place an aerosol container within another container, such as a garbage can, and to be able to dispense the contents of the aerosol device without opening the outer container. It must also be borne in mind that in devices of this kind the spray container or aerosol can is almost always of the disposable type and is destroyed as soon as the can is empty. Reduction in costs is, therefore, an extremely important consideration, as an increase of only a fraction of a cent in the cost of the spray device will mean a large increase in total cost when hundreds of thousands or millions of such devices are involved.

Accordingly, it is a primary object of the present invention to provide novel actuating means for the spray valves of aerosol pressurized containers of the above-mentioned character, wherein said means embodies a simple, durable, highly efficient yet extremely inexpensive construction.

Another object is to provide an integrally formed spray nozzle and push-rod construction for use with aerosol spray devices.

A still further object is to provide an improved spray valve actuating means which is more specifically but not exclusively designed to permit the mounting of an aerosol spray device internally of an enclosure or on the opposite side of a protective wall, while providing means for effectively operating the spray valve of said spray device from a location outside said enclosure or protective wall.

Actuating means according to the invention comprise a nozzle portion and a push-rod integrally joined thereto by means of a hinge section, wherein the nozzle portion is freely tiltable relative to the push-rod to permit rectilinear movement of the push-rod for tilting the nozzle when actuating the spray valve. The nozzle portion and push-rod are constructed so as to be relatively rigid and may be formed in a mold using a suitable plastic material, the nozzle and push-rod being integrally joined by a flexible hinge section of relatively thin cross section. Such a

device may be readily manufactured at low cost so that it can be discarded along with the spray container when the latter is empty.

Other objects and advantages of the invention will become apparent from the following description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a fragmentary cross-sectional view of a container illustrating the actuator of the present invention in use;

FIG. 2 is an enlarged fragmentary sectional view of a spray container and actuator wherein the actuator is illustrated in operative position on the stem of a valve of one particular design;

FIG. 3 is an enlarged top plan view of the actuator of the invention;

FIG. 4 is a side view of the device shown in FIG. 3; and

FIG. 5 is a bottom view thereof.

Referring to the drawings, FIG. 1 illustrates a practical application of the invention wherein an aerosol spray can **10** is mounted inside an enclosure or container **11** such as, for example, a diaper or garbage pail which is to be frequently sprayed with a certain germicide, deodorizer or other liquid. In the particular arrangement illustrated, the container **11** is provided with a cover **12**, having a pair of spring clips **13** secured to the underside thereof. Clips **13** are of the so-called "bicycle" type which have a gripping force sufficient to fix the spray can **10** in place during normal use while permitting easy removal of same for replacement purposes. An actuator **14**, having an elongated push-rod **15** extending through an opening **16** in cover **12** and a connecting nozzle portion **17**, is positioned on the end of the valve stem of a valve **18** (FIG. 2) in the spray can **10**.

The dispensing valve **18** is of a construction shown in the application of Frank Venus, Jr., Serial No. 438,543, filed June 22, 1954. The valve shown for illustrative purposes includes a tiltable tubular valve stem **19** having one end fitted into a resilient valve seat **20** in the manner illustrated in FIG. 2. A flanged valve cup **21** is provided to hold the gasket and valve stem assembly in place when the recessed cover **22** is crimped over the lip of the mouth of can **10**. The end **23** of valve stem **19** is closed and is provided with a circumferential channel **24** with a plurality of communicating apertures **25** extending into the inner bore **26** of stem **19**. When stem **19** is tilted by applying a force substantially in a direction normal to its longitudinal axis, a part of end **23** thereof is lifted away from the valve seat **20** to permit the fluid **27**, which is normally under pressure, to pass into channel **24**, through apertures **25** into bore **26** and outwardly of stem **19**. Upon release of stem **19**, the resiliency of the valve seat **20** will cause the valve stem to return to its normal inoperative position (FIG. 2) whereby channel **24** will be completely sealed by the material of gasket **20** and prevent further discharge of fluid **27**.

The present invention, which is directed to the actuator **14**, provides an improved means for operating valve stem **19** generally in the above described manner, but from a location somewhat remote from the valve stem **19** and on the opposite side of a partition, such as the cover **12**, separating the operator from the spray can **10**. This permits the operation of the spray can **10** from a location outside the container **11** and further obviates the possibility of harmful liquid contents which might be thus dispensed from contacting the skin of an operator. Actuator **14** is preferably injection molded or otherwise efficiently formed of an inexpensive yet durable plastic material, such as polyethylene or the like, which is sufficiently flexible and tough to permit flexing where the part

is thin in cross section yet rigid enough to withstand compressive forces applied to the push-rod **15**.

The nozzle portion **17** of actuator **14** is cylindrical in shape and is provided with an internal bore **28** which is reduced in diameter at a predetermined distance from its open end to form an annular shoulder **29**. The larger diameter of bore **28** is controlled to produce a press fit on the stem **19** as shown in FIG. 2, and the shoulder **29** of bore **28** limits the extent to which nozzle **17** may be forced onto stem **19** by striking its upper end.

With the nozzle **17** fitted on stem **19** in the manner illustrated in FIG. 2, the innermost end of bore **28** provides a chamber **30** for receiving fluid passing through stem **19** when valve **18** is actuated. An enlarged recess **31** is provided in the outer surface of nozzle **17** opposite push-rod **15** with an orifice **32** extending between recess **31** and chamber **30** to form a nozzle for atomizing the fluid **27** which is forced under pressure into chamber **30** when valve **18** is actuated.

In order to effectively actuate valve **18** in the manner described above, nozzle **17** and push-rod **15** of actuator **14** are joined together by an integrally, formed reduced flexible hinge-like, section **33**. Push-rod **15** and hinge section **33** are preferably joined with the nozzle portion **17** at a location diametrically opposite the orifice **32** thereof and are disposed along an axis normal to the longitudinal axis of the nozzle portion **17**. Push-rod **15** is generally semicircular in cross-sectional shape and is provided with a plurality of transversely and longitudinally extending ribs **34** and **35**, respectively (FIGS. 2 and 5), which render it relatively rigid despite the flexibility of the material of which it is made. The outer end of the push-rod forms a fully circular disk **34'**, against which the finger is pressed in order to actuate the valve, the outer half of disk **34'** being supported at the center by a wall **35'** that curves down to the middle longitudinal rib **35**, as shown in FIGS. 4 and 5. By so constructing push-rod **15**, the desired rigidity may be obtained while providing a substantial saving in material. It is apparent, therefore, that this construction permits use of a flexible plastic material that provides adequate rigidity of the push-rod while allowing the hinge section to be bent repeatedly without breaking.

The length of the combined push-rod **15** and hinge section **33** is selected so that the uppermost end of push-rod **15** will extend outwardly of cover **12** (FIGS. 1 and 2) an amount sufficient to allow proper actuation of valve **18**. By depressing push-rod **15** as illustrated more particularly in FIG. 1, valve stem **19** is tilted downwardly to discharge the fluid **27** through nozzle opening **32** in the conventional manner. In thus manipulating push-rod **15**, the angle between it and the nozzle portion **17** attached to valve stem **19** is allowed to change due to the flexibility of the narrow hinge section **33**. When the push-rod is released, the resilient action of the gasket **20** will return it to its initial position of use (FIG. 2) and simultaneously close valve **18** as described above.

It should be particularly noted that by providing the integrally formed, reduced hinge-like section **33** between push-rod **15** and nozzle portion **17** of actuator **14**, a free flexing between push-rod **15** and nozzle portion **17** is obtained, thereby providing an effective and smooth acting actuating means for operating valve **18** of the spray device **10**. In this connection, the side walls of push-rod **15** adjacent hinge section **33** are beveled at **36** so that they are not squeezed against the back of the nozzle portion **17** when the latter is tilted upon depressing push-rod **15**.

It is to be understood that the spray device **10** may be operatively mounted on other parts of container **11** such as a side wall, wherein it will be disposed in a vertical position rather than the horizontal position illustrated in FIG. 1. Furthermore, the container of FIG. 1 is of course shown by way of illustration only, as the device of the invention is not limited in use to any particular size or shape of container, and may be in fact simply a protective shield, through which the push-rod extends.

What is claimed is:

1. An actuator for use with dispensing valves in aerosol spray devices comprising a cylindrically shaped relatively rigid nozzle portion having a longitudinal bore therein for receiving a connecting part of a dispensing valve to be used therewith, a spray orifice between said bore and the outer surface of said nozzle portion, an elongated relatively rigid push-rod connected to said nozzle portion at a point substantially diametrically opposite said spray orifice and normally extending substantially perpendicular to the longitudinal axis of said nozzle portion, and a relatively thin, flexible hinge section integrally formed between said nozzle portion and push-rod connecting said push-rod to said nozzle portion.

2. An actuator as defined in claim 1 which is made of a resilient, tough, plastic material and is molded as an integral unit, said push-rod being constructed of relatively thin-walled longitudinal sections joined by transverse sections rendering said push-rod relatively rigid despite the resiliency of the material of which it is made.

3. A spray device comprising, in combination, a pressurized spray container fixedly mounted on a wall of an enclosure, said spray container being provided with a spray valve having a valve stem adapted to operate said valve upon tilting said stem relative to said container with said valve stem extending substantially parallel to said wall; an actuator for tilting said valve stem from a location on the opposite side of said wall; said actuator comprising a nozzle portion having a recess for fittedly receiving the end of said valve stem, a relatively rigid push-rod connected to said nozzle portion and extending through an aperture in said wall substantially perpendicular to the longitudinal axis of said valve stem, and a relatively thin, flexible hinge section integrally formed between said nozzle portion and push-rod connecting said push-rod to said nozzle portion, said push-rod being restrained within the aperture in said wall for substantially rectilinear movement when a force is applied against its outer end, while said hinge section permits said valve stem to tilt with respect to said push-rod.

4. An actuator for use with a dispensing valve in an aerosol device in which the valve has a tiltable member for actuation thereof, said actuator comprising a relatively rigid nozzle portion having means for rigidly mounting it on the tiltable member of said valve such that upon tilting said nozzle portion said valve is actuated, an elongated relatively rigid push-rod flexibly connected to said nozzle portion and extending transversely thereto for remotely tilting said nozzle portion upon longitudinal movement of said push-rod, and a relatively thin, flexible hinge section integrally formed between said nozzle portion and push-rod permitting said nozzle portion to tilt with respect to said push-rod upon such longitudinal movement of said push-rod.

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