United States Patent [19]

Focht

[11] **3,863,816**

[45] **Feb. 4, 1975**

[54] **VARIABLE FLOW RATE ACTUATOR BUTTON FOR A PRESSURIZED AEROSOL DISPENSER**

[75] Inventor: **John Richard Focht,** Yonkers, N.Y.

[73] Assignee: **Precision Valve Corporation,** Yonkers, N.Y.

[22] Filed: **Nov. 1, 1972**

[21] Appl. No.: **302,784**

[52] **U.S. Cl.** **222/402.17,** 239/397

[51] **Int. Cl.** **B65d 83/14**

[58] **Field of Search** ... 222/402.17, 42, 575, 402.11; 239/397, 579

[56] **References Cited**

UNITED STATES PATENTS

3,176,888	4/1965	Focht	222/402.17
3,363,968	1/1968	Williams	222/402.11 X
3,703,994	11/1972	Nigro	222/402.17 X

Primary Examiner—Robert B. Reeves
Assistant Examiner—Thomas E. Kocovsky
Attorney, Agent, or Firm—Davis, Hoxie, Faithfull & Hapgood

[57] **ABSTRACT**

A variable flow rate actuator button for a pressurized aerosol dispenser having a plug which is rotatably received in a socket in the button to register different size circumferentially spaced, longitudinal feed grooves in the sidewall of the plug with a longitudinal groove in the button socket to provide variable flow rate communication between the discharge orifice of the actuator and the hollow valve stem of the pressurized aerosol dispenser.

5 Claims, 7 Drawing Figures

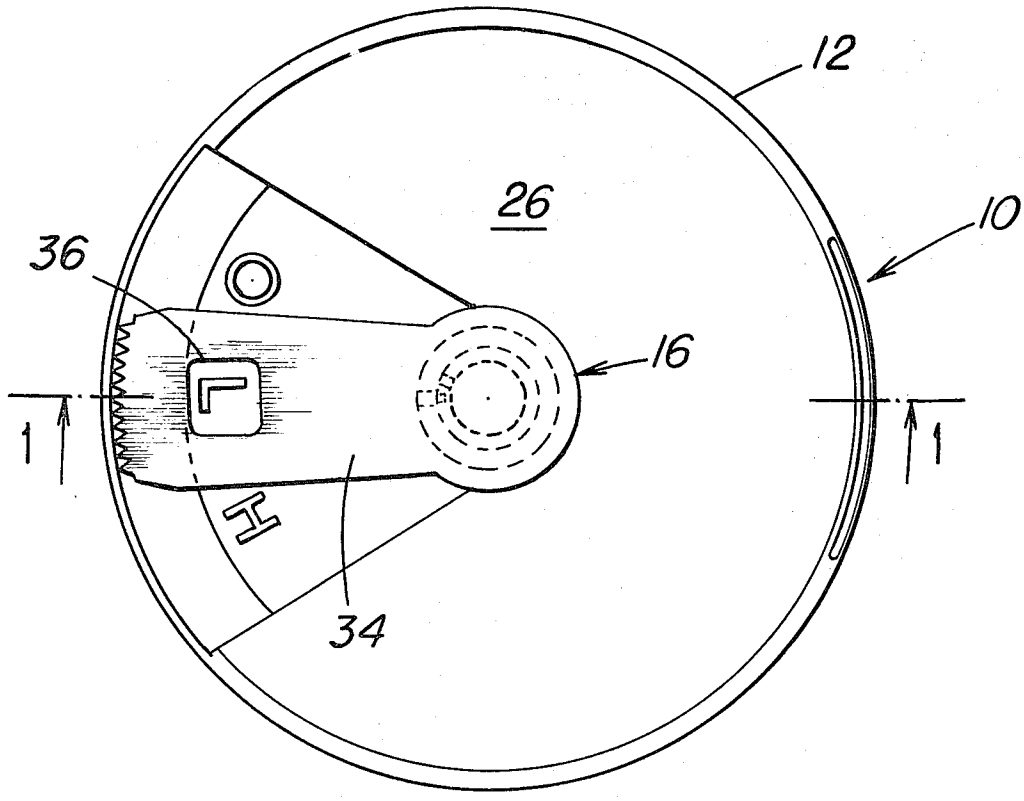


FIG. 1

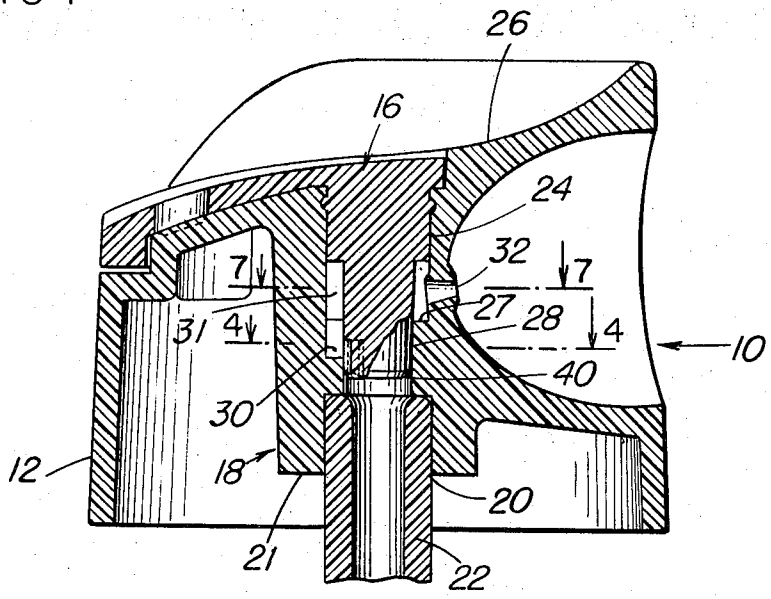


FIG. 2

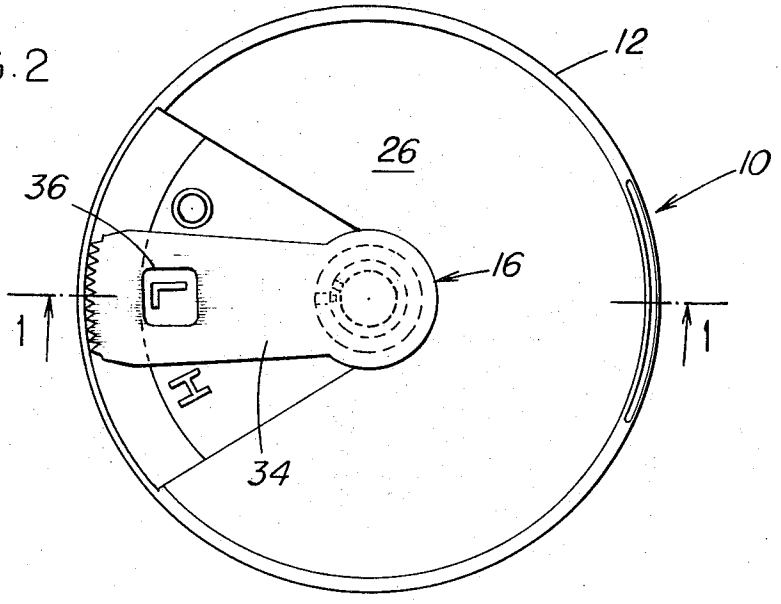


FIG. 5

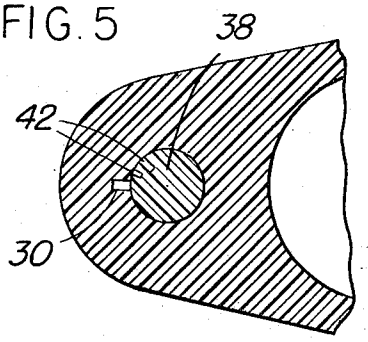


FIG. 3

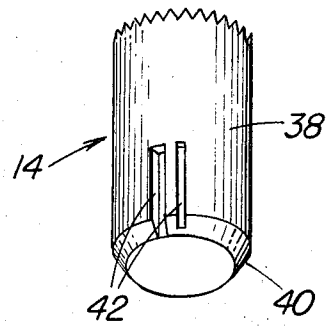


FIG. 4

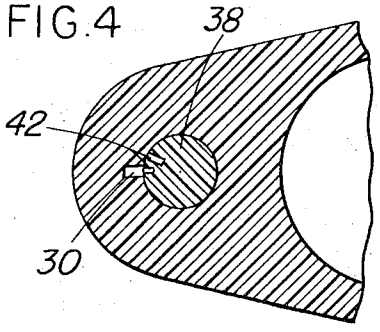


FIG. 7

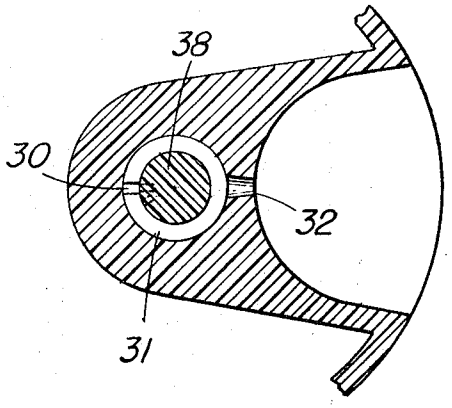
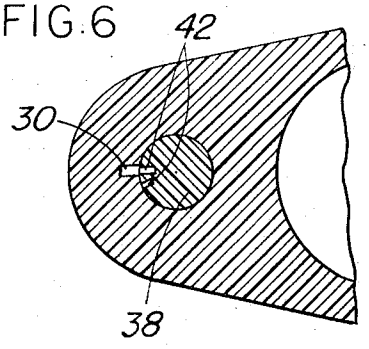


FIG. 6



VARIABLE FLOW RATE ACTUATOR BUTTON FOR A PRESSURIZED AEROSOL DISPENSER

This invention relates to valve actuating buttons for pressurized aerosol dispensers, more specifically, it relates to a variable flow rate actuating button.

Actuator buttons are adapted to be mounted upon the hollow tubular valve stems of aerosol containers and are provided with a fluid flow passage which establishes communication between a discharge orifice in the button and the hollow valve stem of the container valve. Generally, these buttons are constructed such that the character and volume of the product discharge is substantially constant and not subject to adjustment.

Various constructions of variable flow rate actuators are known in the art. In my U.S. Pat. No. 3,176,888, several embodiments of two piece variable flow rate actuator buttons are disclosed. The button body includes a bore or socket into which is fitted a separate plug member having a laterally extending finger piece. The plug member is rotated relative to the button body by manually moving the finger piece. The several embodiments disclose that the plug portion includes internal passages arranged in the bottom of the plug member which are capable of being brought into selective registration with the discharge orifice of the button and with an intermediate passage in the floor of the socket leading to the hollow interior of the tubular valve stem of the container valve. The relative rotational position of the plug member with respect to the body of the button results in the selection of passage registrations for different discharge flow rates and in some embodiments sufficient relative rotation will prevent product flow to the discharge orifice. The body of the button and the plug member are each injection molded from plastic and are snap fitted to form the assembled variable flow rate actuator.

The present invention is an improvement over the several embodiments disclosed in my aforementioned patent in that the passages for effecting selective registration are arranged in the sidewall of the plug so that they are easier to mold, less subject to minor dimensional error and provide more positive control of the discharge rate since the internal passages are arranged in the sidewall rather than the bottom of the plug member where it is difficult to provide selective sealing contact between the bottom of the plug member and the floor of the socket which includes the intermediate passage. That is, the bottom of the plug must be perfectly positioned in sealing contact with the floor of the socket to ensure selective registration between the intermediate passage and the internal passage. Further, with the present invention the hollow valve stem is in direct communication with the passages for effecting selective registration and the product is not required to pass through an intermediate passage between the valve stem receiving cavity and the plug receiving socket which passage may become clogged.

It is an object of the present invention to provide an improved variable flow rate actuator button.

It is a further object of the present invention to provide a variable flow rate actuator button which is easier to mold than the prior art actuator buttons.

It is a further object of the present invention to provide a variable flow rate actuator button which is less susceptible to clogging.

It is a further object of the present invention to provide a variable flow rate actuator button which provides more positive control of the flow rate.

Other objects, aspects and advantages of the present invention will be more apparent when the detailed description is considered in conjunction with the drawing.

Briefly, the present invention includes a two piece molded plastic variable flow rate actuator button having a plug member rotatably mounted in a socket in the body of the button. The plug includes a plurality of circumferentially spaced feed grooves arranged in its sidewall which extend longitudinally from the bottom end of the plug along the sidewall. The feed grooves are in direct communication with the hollow valve stem of a pressurized aerosol dispenser and are selectively placed in registration with a longitudinal groove in the socket of the body of the button by rotation of the plug member to provide communication with the discharge orifice of the button.

The present invention is illustrated with the accompanying drawing in which:

FIG. **1** is a sectional view taken along line **1—1** of FIG. **2** showing the two piece variable flow rate actuator button of the present invention;

FIG. **2** is a top plan view of the two piece variable flow rate actuator button of FIG. **1**;

FIG. **3** is an enlarged perspective view of a portion of the plug member showing the feed grooves;

FIG. **4** is a sectional view of a portion of the variable flow rate actuator button taken along line **4—4** in FIG. **2**, showing the plug feed groove of smaller cross-sectional area in registry with the longitudinal groove of the socket;

FIG. **5** is a sectional view of a portion of the variable flow rate actuator button similar to FIG. **4**, showing both plug feed grooves out of registry with the longitudinal groove of the socket;

FIG. **6** is a sectional view of a portion of the variable flow rate actuator button, similar to FIG. **4**, showing the plug feed groove of larger cross-sectional area in registry with the longitudinal groove of the socket; and

FIG. **7** is a sectional view of a portion of the variable flow rate actuator button taken along line **7—7** in FIG. **1**.

Referring to FIG. **1**, the variable flow rate actuator button **10** includes a body portion **12** and a rotatable plug member **16**. The body portion **12** has a central portion **18** with a valve stem receiving cavity **20** formed in its bottom **21** to receive the hollow valve stem **22** of a pressurized aerosol dispenser (not shown) and a socket **24** formed in the upper surface **26** of the body portion **12** to receive the rotatable plug member **16**.

The socket **24** is axially aligned with and extends into communication with the valve stem receiving cavity **20**. The socket **24** as a reduced diameter portion **27** at its lower end for snug rotatable contact between the plug member **16** and the sidewall **28** of the reduced diameter portion **27**. A longitudinal passage or groove **30** is arranged in the sidewall **28** of the reduced diameter portion **27**. The groove **30** may advantageously be rectangular in cross-section. The groove **30** provides communication between the reduced diameter portion **27** and the larger diameter annular chamber of the upper portion **31** of the socket **24**. A discharge orifice **32** in the body portion **12** provides communication between the larger annular chamber **31** of the socket **24** and the environment.

The upper surface **26** of the button **10** is advantageously shaped to receive a finger to facilitate actuation. Further, the upper surface **26** advantageously includes a plurality of indicia O — L — H, to indicate the flow rate, off, low or high, see FIG. **2.** The rotatable plug member **16** includes a lever **34** having a window or aperture **36** which exposes one of the indicia O — L — H, to provide a visual indication of the flow rate.

Referring also to FIG. **3,** the depending plug member **16** is shaped in the form of a stepped cylinder for snap-fitting into the socket **24.** The plug member **16** has a reduced diameter portion **38** which is partially received within the reduced diameter portion **27** of the socket **24** and a chamfered bottom **40** to facilitate insertion into the reduced diameter portion **27** of the socket **24.** A plurality of circumferentially spaced, longitudinal feed passages or grooves **42** extend inwardly from the sidewall of the reduced diameter portion **38** of the plug member **16** and communicate with the chamfered bottom **40** of the plug member **16.** The plug feed grooves **42** are of different cross-sectional areas to provide different flow rates and are circumferentially spaced relative to one another to permit selection upon rotation of the lever **34.** Further, the plug feed grooves **42** are of rectangular cross-section; however, it should be understood that the plug feed grooves **42** can be of other cross-sectional shapes or less extensive longitudinally.

In operating the variable spray actuator button **10,** one of the plug feed grooves **42** is brought into registry with the groove **30** in the socket **24** of the body portion **12** by rotating the plug member **16** until the indicium for the desired flow rate shows through the window **36.** In FIG. **4,** the plug feed groove **42** with the smaller cross-sectional area is in registry with the socket groove **30** to provide a complete product flow path between the hollow valve stem **22** and the discharge orifice **32** at a low flow rate. The indicium L is thus exposed as illustrated in FIG. **1.** In FIG. **5,** the plug feed grooves **42** are both out of registry with the socket groove **30.** The indicium O is thus exposed by the window **36,** indicating that the button **10** is off. In FIG. **6,** the plug feed groove **42** having the larger cross-sectional area is in registry with the body socket groove **30.** The indicium H is thus exposed by the window **36,** indicating a high flow rate.

FIG. **7** shows the product flow path between the body socket groove **30,** the larger annular chamber **31** of the body portion **12** and the discharge orifice **32.** The plug feed groove **42** having the larger cross-sectional area is in communication with the socket groove **30.**

The just described variable flow rate actuating button **10** is inexpensive to mold and requires no complicated or delicate die surfaces to mold the cooperating flow rate controlling grooves **42** and **30.** The structure of the present invention does not require an aperture or passage in a transverse wall for registry with flow rate controlling passages as do the illustrated embodiments of my aforementioned patent. Consequently, the present invention is less likely to become clogged. Further, minor discrepancies in molding dimensions or the perfection of seating of the end of the plug member against the floor of the socket do not affect the flow rate. The present invention can be readily disassembled by the consumer for cleaning, if necessary, and easily reassembled.

Although described in connection with a dispenser valve having a hollow upstanding valve stem, it is apparent that the invention can be used with other forms of dispenser valves such as those having a socket for receipt of a pin or plug which depends from the button or those in which the valve and button are integral.

What is claimed is:

1. A variable flow rate actuator for a pressurized aerosol dispenser comprising:
- a body and a plug having a cylindrical portion;
- said body including a discharge orifice, means for connection to a dispenser valve and a cylindrical socket in communication with the connection means to receive said plug cylindrical portion;
- said body including a groove extending longitudinally of the cylindrical wall of said socket;
- said plug cylindrical portion being positioned in said socket to overlie the body socket groove, said plug being rotatable relative to said body;
- a plurality of circumferentially spaced grooves of different cross-sectional areas extending longitudinally of the sidewall of said plug cylindrical portion to the bottom end of said plug portion, the plug grooves being selectively registerable with said body socket groove upon rotation of said plug, said plug portion grooves being in direct communication with said dispenser valve;
- said discharge orifice being in communication with said body socket groove.

2. The actuator as claimed in claim **1** wherein:
- said body includes indicia to indicate various flow rates;
- said plug includes a finger engageable lever to assist in rotation of said plug; and
- said lever includes means to designate an indicium appropriate to the flow rate selected by the relative position of said plug and said body.

3. The actuator as claimed in claim **1** wherein:
- said body socket groove is rectangular in cross-section and extends longitudinally of said socket; and
- said plug grooves are rectangular in cross-section and extend longitudinally of the sidewall of said plug cylindrical portion.

4. The actuator as claimed in claim **3** wherein:
- the grooves of said plug and said body are open along their longitudinal extent.

5. A variable flow rate actuator for a pressurized aerosol dispenser comprising:
- a body and a plug having a cylindrical portion;
- said body including a discharge orifice, means for connection to a dispenser valve and a cylindrical socket in communication with the connection means to receive said plug cylindrical portion;
- said socket including an upper portion and a lower portion of smaller diameter;
- said body including a groove in the cylindrical wall of said socket;
- said plug being positioned in said socket to overlie the body socket groove, said plug being rotatable relative to said body;
- said plug cylindrical portion including a reduced diameter portion partially received within the lower portion of said socket;
- a plurality of circumferentially spaced grooves of different cross-sectional areas extending longitudinally to the bottom end of said plug reduced diameter portion, the plug grooves being selectively registerable with said body socket groove upon rotation of said plug;
- said body socket groove being located in the sidewall of said lower portion of said socket;
- said discharge orifice being in communication with said body socket groove.

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