May 27, 1952 A. O. SAMUELS ET AL 2,598,308

CONTROLLABLE SPRAY DISPENSER

Filed Jan. 20, 1950

FIG. 2

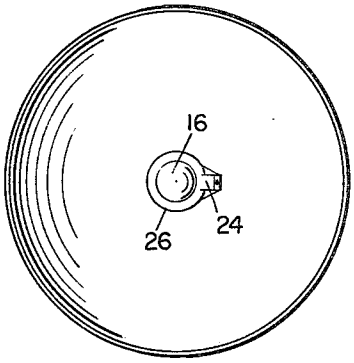
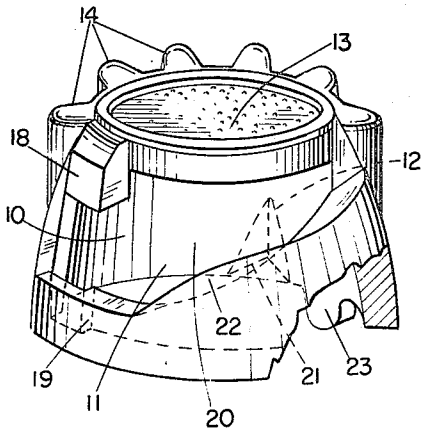


FIG. 1



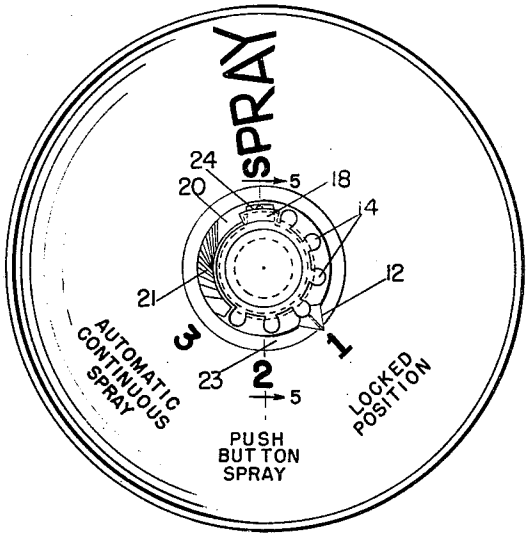


FIG. 3

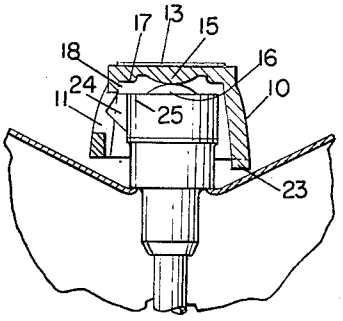


FIG. 4

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CONTROLLABLE SPRAY DISPENSER

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9 Claims. (Cl. 299—150)

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This invention relates to an improved control for a pressure sprayer and, particularly, to a sprayer control adaptable to a self-dispensing or pressurized container characterized by three positions of spray control, namely, an off or locked position, an intermittent or push-button position, and an automatic continuous position.

A considerable variety of self-dispensing pressurized liquid sprayers are on the market today. Most of these conventional sprayers operate in a similar manner, that is to say, a liquid is pressurized in a hermetically sealed container and released as desired by actuating a valve opening the discharge tube. Most valves of this nature protrude from the pressurized receptacle and are of the simple piston type. They function, i. e., open, when the valve is unseated by the exertion of a pressure on the top or external end of the valve piston. The valve, kept in position by the internal pressure of the container and the action of a spring, is unseated in a continuous or intermittent manner depending upon the desire of the operator. The liquid in the container then escapes through the discharge tube and into an atomizing nozzle and finally in a fine stream out of the nozzle. The pressure exerted at the top of the valve is usually accomplished by depressing a small rubber diaphragm or similar activator with the operator's finger.

However, valves of this type become difficult to operate after prolonged use due to fatigue of the operator. That is to say, it is extremely difficult to maintain a continuous or constant pressure by the use of the operator's finger on the valve diaphragm for any great length of time and hence the desired spray, i. e., intermittent or continuous, is difficult to regulate. In addition, due to the lack in most cases of a protective covering for the rubber diaphragm actuating the valve, accidental discharge of the contents of the liquid container are brought about by contact of an object with the rubber diaphragm.

We have invented an improved control for valves of this type which renders the valve actuating device susceptible to continuous or intermittent operation as desired and, further, provides for a safety or off position in which position it is impossible to accidentally discharge the valve. Essentially, we provide a hollow cap which fits over a protruding portion of a valve mechanism actuated by exerting a pressure on the top thereof, and which valve mechanism contains a lug located at the side of the protruding portion. The hollow cap has a lug-engaging groove in the side wall, the groove having at one end an over-

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hanging portion adapted to hold said lug a predetermined distance below the top of the cap, an unobstructed center portion, and an underlying cam rising in elevation toward its other end adapted to cam the lug toward the top of said cap, and a projection at the base of the cap spaced substantially 180 degrees from the overhanging portion of the groove. The cap is thus constructed so as to provide three positions of control for a valve actuating mechanism. The initial or off position is attained when the slotted or grooved side portion of the cap containing an overhanging portion is contacted with the lug on the side of the valve and when the projection at the base of the cap, located 180 degrees from the lug-containing section, is contacted with the top of the container. In this way it is impossible for the operator to press or release the valve, since the overhanging portion and the projection at the base of the cap render the cap immobile in a downward direction. However, upon rotation of the cap a few degrees, the overhanging portion is taken out of contact with the lug and the interior of the cap is contacted with the actuating part of the valve. In this way a slight pressure on the top of the cap actuates the valve. The relative lack of depth of the projection at the base of the cap does not prevent the cap from now moving downward and thus an intermitten spray is provided as desired. A third position or type of spray, i. e., an automatic continuous spray, is accomplished by pressing down on the cap which then releases the valve actuating mechanism and commences a spray, and rotating the cap further in the same direction so that the lug at the side of the valve slips into an angularly positioned cam. The valve is rotated in this direction until the lug is cammed toward the top of the cap, resulting in a continuous automatic spray until the cap is rotated or returned to either the first or second position.

Most advantageously, the cap is made out of a readily molded plastic or machined metal, for instance, a plastic. The cap preferably has a matted external surface to provide a surer degree of contact between the cap and the operator's finger. The sides of the cap may contain reeds so as to facilitate turning by preventing slippage when gripped by the operator's fingers. The cam portion of the side slot is cut at such an angle so as to fit the particular lug on the valve. The length and degree of slope of the cam and its angularly positioned side wall depend on the shape and size of the lug. Most advantageously, the lug may be the atomizing nozzle of the valve, although it does

not necessarily have to be in this form. A pointer or indicator may be placed on the periphery of any portion of the side wall or top of the cap so that the operator may determine accurately what position or positions he desires to attain. In addition, we provide for a numerical marking and lettering on the external portion of the container facing the operator and adjacent to the cap so as to facilitate a simple operation of the control or switch.

In the accompanying drawings we have illustrated this control or switch as adapted to a valve and valve actuating mechanism constructed from the conventional "tin" can of commerce. The can advantageously contains dished ends so as to better withstand pressure and, at the same time, to eliminate projections above the plane of the side wall. In these drawings the control or switch of our invention is advantageously constructed of an easily molded plastic.

Figure 1 is a perspective view illustrating a preferred embodiment of the cap or control, showing its construction in detail.

Figure 2 is a top view of a pressurized receptacle containing a conventional discharge valve before my cap or control has been inserted thereon.

Figure 3 is a top view of a pressurized receptacle and conventional discharge valve upon which has been placed our cap, and which further illustrates the locked or No. 1 position. This figure also illustrates the placement of spraying instructions upon the dished closure plate.

Figure 4 is a cross-sectional view taken across section 5—5 of Figure 3 illustrating the position of the cap in relation to the discharge valve when it is in the locked or No. 1 position.

Figure 1 is a detailed perspective view of a preferred embodiment of my control. The control comprises essentially a hollow cap composed of a cylindrical side wall 10 in which there is located an irregularly shaped lug-engaging groove or slot 11. Most advantageously, at the base of the cylindrical side wall 10 is located an arrow or indicator 12. The top or upper surface 13 of the cylindrical cap is preferably matted. Reeds 14 are provided at the junction of the side wall with the top so as to facilitate turning. The inside of the cap, illustrated more clearly in the cross-sectional view of Figure 4, contains at the top a projection or mound 15 so as to facilitate contact with the rubber diaphragm 16 of a valve actuating mechanism with which this cap is here used in illustration. In addition, the inside of the cap has an annular periphery 17 which extends downwardly in the same direction as the mound or projection 15, but terminates shortly before the maximum downward extremity of the mound. This annular periphery 17 contacts an identical annular portion 25 on the face of the valve mechanism of the pressurized container, thereby providing a sure degree of contact when the valve is actuated and, further, prevents the projection from descending excessively into the rubber diaphragm. The lug-engaging groove 11 in the cylindrical side wall contains at one extremity an overhanging section 18 parallel to the top of the cap extends for a short distance in the slot and is designed to hold a lug on the valve actuating mechanism 26, for example, the protruding atomizer nozzle 24, a predetermined distance below the top of the cap. The lower side of the cylindrical side wall may be indented below the overhanging portion 18 at point 19 so as to provide for the lug on the valve with which the overhanging portion is contacted. The middle or central portion 20 in the grooved side wall is free from any obstructions and represents the maximum width of the slot. Commencing at the other extremity of the slot is an underlying cam or ascending side wall 21 angularly positioned where necessary at 22 so as to provide a close fit with the lug located on the valve. This portion is adapted to cam the lug toward the top of the cap. On the base or bottom of the periphery of the cap is a projection 23 located substantially 180 degrees from the overhanging portion 18 of the grooved side wall and illustrated more clearly by the cut-away section of Figure 1.

Figure 2 illustrates a top view of a conventional valve and valve actuating mechanism located upon a pressurized receptacle for which our control is readily adaptable. The valve comprises essentially an atomizing nozzle 24 and a protruding actuating mechanism 26 operated by rubber diaphragm 16. A slight external pressure upon the rubber diaphragm so as to depress it moves the piston in the valve so as to counteract the effect of the pressure in the container and of a spring usually employed therein, thereby unseating the piston and opening the discharge tube or nozzle.

Figure 3 illustrates in detail a top view of our control cap located upon a self-dispensing type pressurized container containing a valve as illustrated in Figure 2 and shows clearly the three positions of spray obtainable by use of this control. The cap is easily inserted or slipped over the lug on the container valve and placed in position. Most advantageously, and as herein illustrated, the nozzle acts as the lug providing for the off or locked position. The locked or No. 1 position is obtained when the overhanging portion 18 of the grooved side wall 11 is firmly contacted with the nozzle 24 of the sprayer and when the projection 23 at the base of the cap is contacted with the surface of the container. In this way it is impossible to exert a downward pressure on the cap since the overhanging section of the grooved side wall and the projection at the base of the cap combine to render such a downward motion impossible. Thus operation of the sprayer is prevented and in this way accidental discharge is rendered impossible. To obtain an intermittent or push-button spray, the cap is rotated counterclockwise so that the nozzle 24 is located more or less in the center of the groove 11. In this way a slight pressure on the matted surface of the cap is transmitted to the rubber diaphragm 16 and the valve is opened. The projection or mound 15 on the inside of the cap permits an immediate operation of the valve with a minimum degree of pressure. An excessive lowering of this mound into the rubber diaphragm is prevented by the use of the annular shaped seat 17 on the inside of the cap which is contacted with a similar annular portion 25 on the top of the valve. Should the operator desire a continuous automatic spray, the matted surface 13 of the cap is pressed down and rotated even further in a counterclockwise direction. The initial pressure exerted before turning commences the spray, since it depresses the rubber diaphragm, By a slow movement in a counterclockwise direction the nozzle or lug 24 is slowly brought into contact with the angularly positioned cam side wall 21 and when tightly contacted provides an automatic continuous spray without necessity of finger control by the operator, since the nozzle is tightly cammed toward

the top of the cap. Release of the cap to either the one or two position again is simply accomplished by turning the cap to the desired position.

In order to facilitate operation of a self-dispensing sprayer of this type in a combination with our control or switch, it is most advantageous to denote the different positions of spray upon the surface of the cam immediately contiguous to the cap. This may be readily accomplished by the use of a cardboard insert which informs the operator as to the relative position and, further, the direction of spray. Of course, the quantity of instructions and appropriate markings are completely within the discretion of the manufacturer.

Likewise, the cap may be constructed so as to provide only two positions of spray control. In particular, it may be advantageous to provide only a locked or off position and a push-button or intermittent spray or, additionally, only a push-button or intermittent spray with a continuous spray. To provide a spray control containing only a locked or off position and an intermittent spray, the groove in the side wall of the hollow cap is so constructed as to contain only an overhanging portion adapted to hold the lug a predetermined distance below the top of the cap and an unobstructed portion, and a projection at the base of the cap spaced substantially 180 degrees from the overhanging portion of the groove. On the other hand, to provide an intermittent or push-button spray with a continuous spray, the groove in the side wall of the hollow cap contains only an unobstructed portion and an underlying cam rising in elevation adapted to cam the lug toward the top of the cap. Thus in this manner, our control cap is made readily selective for only two positions of spray control depending upon the desired use of the contents of the pressurized container.

We claim:

1. In combination with a protruding portion of a valve mechanism actuated by exerting a pressure on the top thereof and a lug located at the side of said protruding portion, a hollow cap fitting over said protruding portion and said lug, said cap having a lug-engaging groove in the side wall thereof, said groove having at one end an overhanging portion adapted to hold said lug a predetermined distance below the top of said cap, an unobstructed center portion, and an underlying cam rising in elevation toward its other end adapted to cam said lug toward the top of said cap, and a projection at the base of the cap spaced substantially 180 degrees from the said overhanging portion of said groove.

2. The combination of a valve mechanism, a lug, and a hollow control cap as described in claim 1 wherein the lug is the atomizing nozzle of the valve, the cam is angularly positioned so as to provide a close fit with the nozzle and wherein the cap contains a position indicator.

3. The combination of a valve mechanism, a lug, and a hollow control cap as described in claim 1 wherein the top of the hollow cap contains a downwardly projecting mound upon its internal surface surrounded by an annular flat portion slightly less in elevation than the mound.

4. In combination with a protruding portion of a valve mechanism actuated by exerting a pressure on the top thereof and a lug located at the side of said protruding portion, a hollow cap fitting over said protruding portion and said lug, said cap having a groove in the side wall thereof, said groove having an overhanging portion adapted to hold said lug a predetermined distance below the top of said cap and an unobstructed portion, and a projection at the base of the cap spaced substantially 180 degrees from the said overhanging portion of said groove.

5. The combination of a valve mechanism, a lug, and a hollow control cap as described in claim 4 wherein the top of the hollow cap contains a downwardly projecting mound upon its internal surface surrounded by an annular flat portion slightly less in elevation than the mound.

6. In combination with a protruding portion of a valve mechanism actuated by exerting a pressure on the top thereof and a lug located at the side of said protruding portion, a hollow cap fitting over said protruding portion and said lug, said cap having a groove in the side wall thereof, said groove having an unobstructed portion and an underlying cam rising in elevation towards its other end adapted to cam said lug toward the top of said cap.

7. The combination of a valve mechanism, a lug, and a hollow control cap as described in claim 6 wherein the lug is the atomizing nozzle of the valve, the cam is angularly positioned so as to provide a close fit with the nozzle and wherein the cap contains a position indicator.

8. The combination of a valve mechanism, a lug, and a hollow control cap as described in claim 6 wherein the top of the hollow cap contains a downwardly projecting mound upon its internal surface surrounded by an annular flat portion slightly less in elevation than the mound.

9. A device for controlling the operation of a valve mechanism having a lug located at its side and adapted to be operated by the exertion of pressure upon its top, which comprises a hollow cap adapted to fit over said valve mechanism and said lug, said cap having a lug-engaging groove in the side wall thereof, said groove having at one end an overhanging portion adapted to hold said lug a predetermined distance below the top of the cap, an unobstructed center portion, and an underlying cam rising in elevation toward its other end adapted when the cap is on a valve mechanism to cam said lug toward the top of said cap.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,800,156	Rotheim	Apr. 7, 1931