Nov. 7, 1961 W. J. TYGARD 3,007,613

VALVE ACTUATOR AND SUPPORT FOR PRESSURE OPERATED DISPENSERS

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FIG. 1.

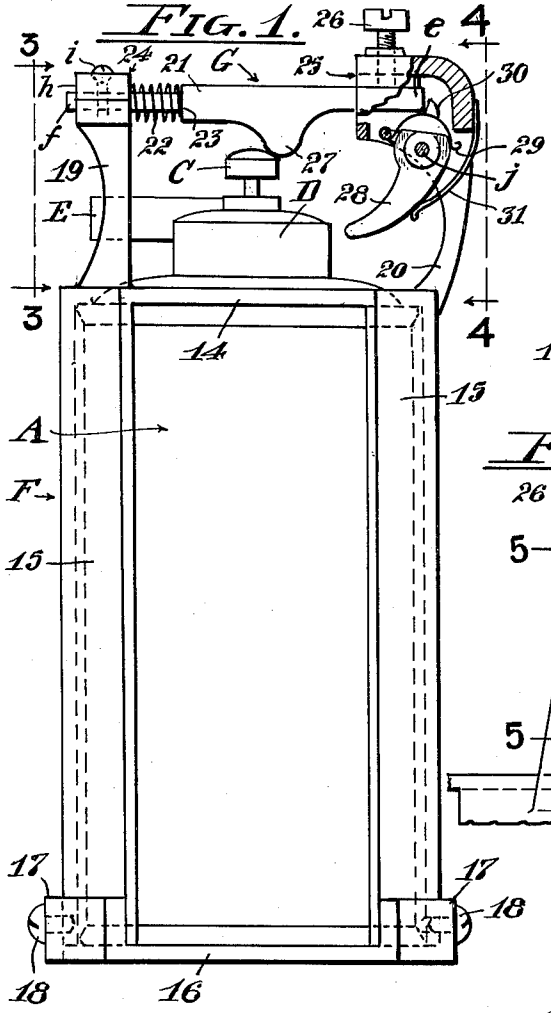


FIG. 3.

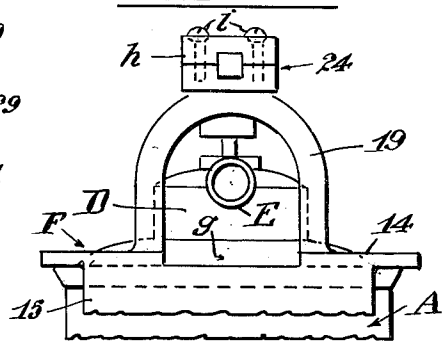


FIG. 4.

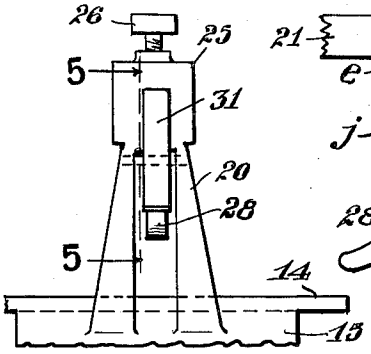


FIG. 5.

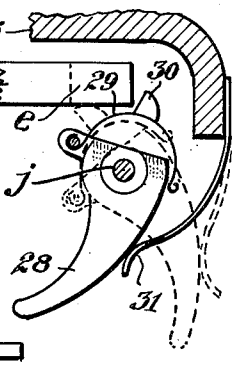


FIG. 2.

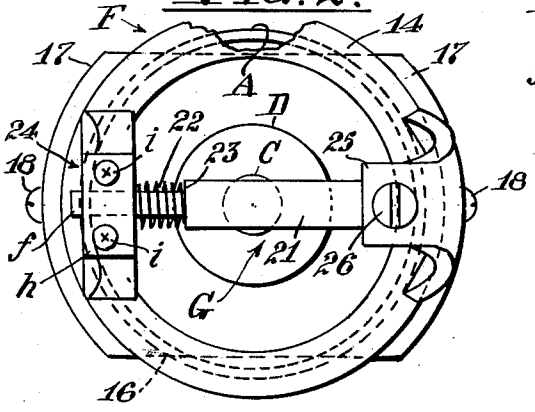
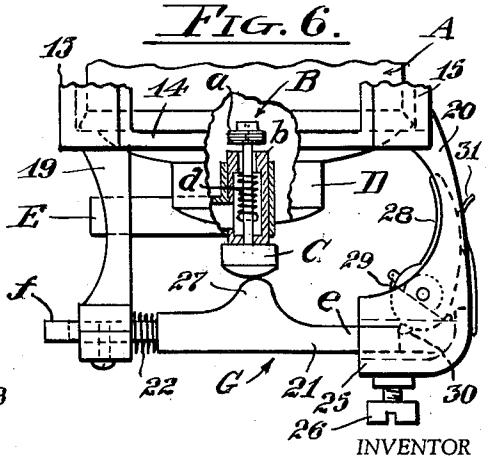


FIG. 6.



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VALVE ACTUATOR AND SUPPORT FOR PRESSURE OPERATED DISPENSERS

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FIG. 7.

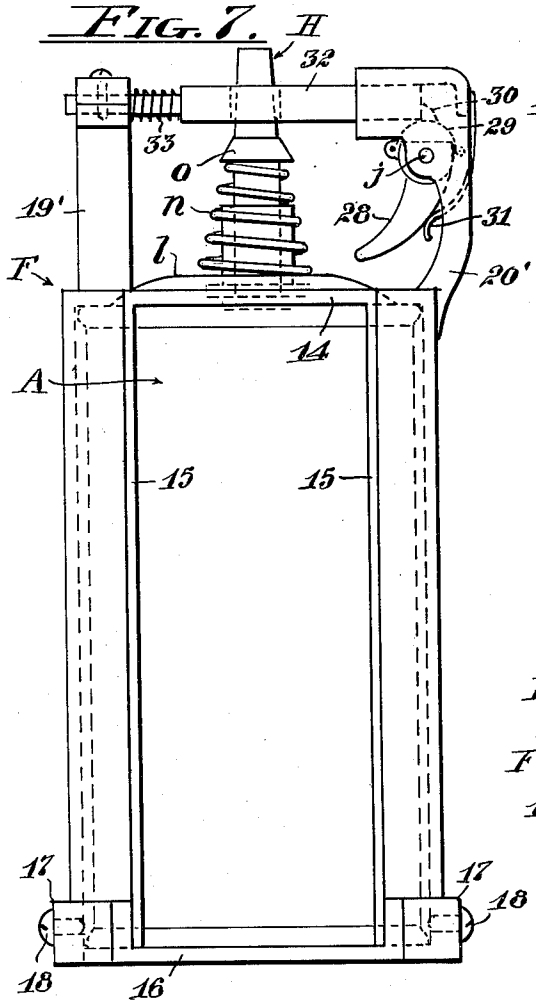


FIG. 9.

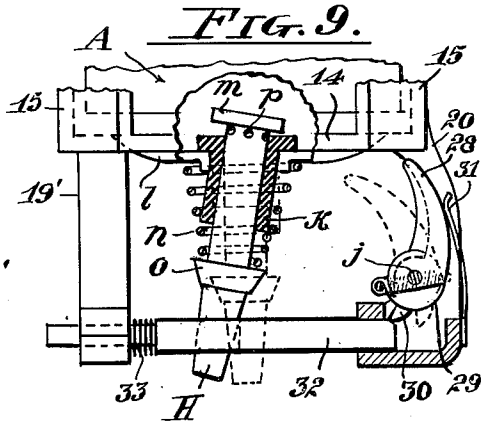


FIG. 10.

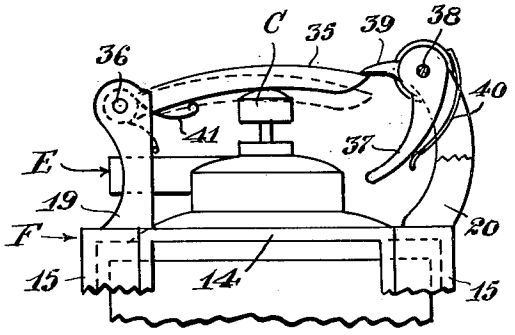


FIG. 8.

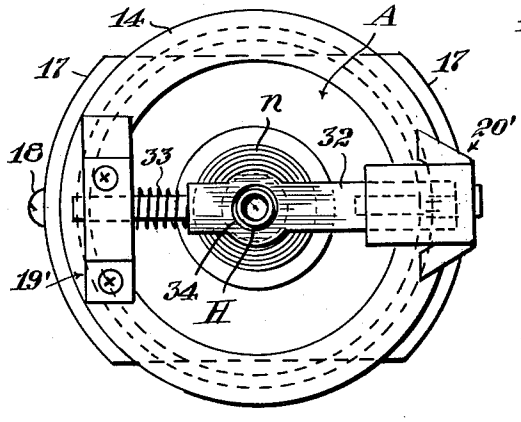
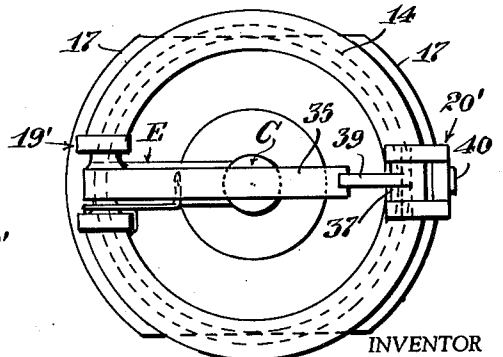


FIG. 11.



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VALVE ACTUATOR AND SUPPORT FOR PRESSURE OPERATED DISPENSERS

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5 Claims. (Cl. 222—394)

This invention relates to an actuator and an attachment therefor for fluid dispensers of the type embodied in pressure containers such as are employed in packaging liquid soap and similar material wherein the material is delivered from the container by pressure of gas confined in the container on opening a discharge valve.

The valve with which such containers are ordinarily equipped is normally closed and is generally opened manually by imposing pressure of a finger on a valve stem, the valve being thus held open for whatever time is required to permit discharge of a desired quantity of the material. The construction of the valve and the mode of delivery of the material under pressure is such that it is difficult to effect discharge of a definite quantity of the material, since a momentarily prolonged duration of valve opening will result in the discharge of a quantity of the material exceeding the amount actually needed thus resulting in waste of the material.

The primary object of the invention is to provide an attachment to the container which is operable to actuate the valve to its open position for a predetermined period of time so as to insure discharge of a definite small quantity of the material at each operation of the valve, and whereby the delivery of a greater quantity of the material is attained by repeated operations of the valve.

Another object is to provide a valve actuator which is trigger controlled in such fashion that a pull on a trigger will act to effect opening of a valve and to hold the valve open for a short duration.

Another object is to provide a construction whereby the valve actuator may be readily applied and securely attached to a container and subsequently detached therefrom for application to another container.

With the foregoing objects in view together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed, and as illustrated by way of example in the accompanying drawing in which:

FIG. 1 is a view in side elevation of one form of the attachment showing it as applied to one type of valve container and as disposed in readiness for an operation;

FIG. 2 is a plan view with portions broken away;

FIG. 3 is a detail in elevation as seen on the line 3—3 of FIG. 1 in the direction indicated by the arrows;

FIG. 4 is an end elevation as seen on the line 4—4 of FIG. 1 as seen in the direction indicated by the arrows;

FIG. 5 is a view in section taken on the line 5—5 of FIG. 4 showing the control trigger and depicting it in its normal position in full lines and in its operated position in dotted lines;

FIG. 6 is a fragmentary view in side elevation of the attachment with parts broken away showing it and the container to which it is attached as disposed in an inverted position in readiness for operation;

FIG. 7 is a view in side elevation of another form of the invention showing it applied to another type of valve container and as normally disposed;

FIG. 8 is a plan view of the structure shown in FIG. 7;

FIG. 9 is a detail in elevation with portions broken away showing the device of FIG. 1 inverted and depicting it in its operated position in full lines and in its normal position in dotted lines;

FIG. 10 is a fragmentary view in elevation of another form of the invention; and

FIG. 11 is a plan view of the structure shown in FIG. 10.

Referring to the drawings more specifically wherein corresponding reference characters are employed to designate corresponding parts throughout the several views, A indicates a conventional cylindrical liquid soap container of the type equipped with a normally closed spring pressed valve B having a reciprocal stem C, which valve is mounted on the upper end D of the container and controls discharge of the content of the container through a laterally projecting nozzle E as particularly shown in FIG. 6.

In carrying out the invention as here shown the valve actuator attachment embodies a frame F adapted to be detachably mounted on the container A which frame comprises an annular upper end member **14** for seating on the rim of the upper end of the container, from opposed marginal portions of which end member extends a pair of parallel side members **15—15** adapted to overlie and substantially conform to the cylindrical side of the container A. The outer ends of the side members **15—15** terminate adjacent the bottom of the container and are detachably connected together by a flat annular base **16** on which the bottom of the container seats, the base **16** having opposed upstanding arcuate marginal flanges **17** which overlie the lower end portions of the side members **15—15** and are detachably secured thereto as by set-screws **18**.

Formed on the end member **14** on diametrically opposite marginal portions thereof is a pair of upstanding standards **19—20** on the upper ends of which is mounted a trigger controlled valve actuator G constituting the essence of the present invention.

In the form of the invention shown in FIGS. 1 to 6 inclusive the valve actuator G is adapted for operation of the type of container A equipped with a valve B embodying a longitudinally reciprocal stem C in which the valve element *a* on the stem C normally rests on a seat *b* under the urge of a spring *d* exerting an outward thrust on the stem C, the valve element *a* controlling the discharge of the container content through the nozzle. In this instance the valve actuator G embodies a longitudinally reciprocal slide bar **21** of square cross section having inner and outer end portions *e* and *f* supported and guided in the upper ends of the standards **19—20**, the bar being normally disposed in a retracted position by the thrust of a spring **22** wound around the outer end portion *f* of the bar **21** and bearing between the standard **19** and a shoulder **23** on the bar. The standard **19** is in the form of an inverted U and extends astride the nozzle E, the end member **14** having an open slot *g* extending between the side members of the standard **19** to permit positioning of the standard astride the nozzle. The square outer end portion *f* of the bar **21** is slidable in a correspondingly shaped guideway in a separable bearing **24** on the upper end of the standard **19**, the bearing embodying a cap *h* overlying the outer end portion f of the bar **21** and held in place on the standard by screws *i*.

The square inner end portion *e* of the bar **21** extends into a flat sided guideway **25** on the upper end of the standard **20** which guideway is elongated vertically to permit vertical adjustment of the inner portion *e* of the bar in the guideway; a screw **26** threaded in the top wall of the guideway **25** having its inner end presented to the top face of the bar to act as a stop limiting upward movement of the bar **21**. The underside of the bar **21** has a rounded projection or cam **27** arranged to abut and depress the stem C on advance of the bar **21**.

Pivotally mounted on a pivot pin *j* on the standard **20** is a depending trigger **28** the upper end of which is fitted with a bow spring **29** fixed on one end only to the trigger and having thereon a lug **30** positioned for abut-

ting engagement with the inner end of the bar **21** so that on rocking the trigger **28** in a rearward direction the lug **30** will advance and move the slide bar **21** therewith.

A plate spring **31** fixed on a back wall of the guideway **25** bears against the back margin of the trigger **28** and yieldably thrusts the trigger to its forwardmost position.

In the operation of the device above described, the container with the attachment applied thereto, is inverted as shown in FIG. 6 whereupon a pull is imposed on the trigger **28** as by the forefinger such as to retract the trigger as indicated in full lines in FIG. 6, and in dotted lines in FIG. 5, thereby causing the lug **30** to engage and advance the slide bar **21** so as to cause the cam **27** to ride onto and depress the valve stem C. This action effects opening of the valve B and permits the content of the container to flow to discharge under gas pressure within the container during the period the valve is maintained in its open position. This period will be very brief since on fully retracting the trigger **28** the lug **30** will move clear of the outer end of the slide bar **21** so that the spring **22** will then act to retract the slide bar to its normal position and thereby move the cam **27** off the valve stem C so that the latter will be moved under the urge of the spring *d* to effect closing of the valve B thereby terminating discharge of the container content. On release of the trigger **28**, the plate spring **31** will restore the trigger to its normal position, the lug **30** moving from the underside of the slide bar to its position in front of the end of the latter. This movement of the lug effects depression of the bow spring **29** relative to the upper end of the trigger **28** which action permits inward movement or depression of the lug necessary for its retrograde movement from beneath the slide bar to a position at the inner end of the bar.

The device will then be in readiness for another operation. In this instance the device is subject to adjustment to vary the duration of the valve opening and thereby vary the quantity of material discharged at each operation. This is accomplished by adjusting the screw **26** to raise or lower the outer end of the slide bar relative to the lug **30** whereby the moment of disengagement of the lug from the outer end of the slide bar may be varied.

In the form of the invention shown in FIGS. 7, 8, and 9, wherein the device is designed for application to the type of pressure containers A in which the discharge valve B is embodied in a tiltable nozzle H which also serves as the valve stem. The construction of the valve B in this instance is particularly shown in FIG. 9 wherein *k* indicates an elastic nipple mounted on and extending through the upper end wall *l* of the container, through which extends the nozzle H which has a flange *m* on its inner end. A stiff spiral thrust spring *n* bears between the end wall *l* and a flange *o* on the nozzle and acts to normally dispose the nozzle in axial alignment with the container in which position the flange *m* seats on the inner end of the nipple *k* so that discharge apertures *p* in the nozzle adjacent the flange *m* will be closed by the nipple *k*.

Mounted on the standards **19'—20'** is a slide bar **32** of rectangular cross section normally disposed in a retracted position under the urge of a spring **33**. The slide bar **32** has an opening **34** intermediate its ends through which is freely extended the outer end portion of the nozzle H. The outer end of the slide bar **32** is engaged by a trigger **28**, constructed, mounted and operated in the manner previously described in connection with the device depicted in FIGS. 1–6. The standards **19'—20'** are mounted on a frame F corresponding to that previously described.

In the operation of the modified form of the device above described, a pull on the trigger **28** will effect advance of the slide bar **32** so as to tilt the nozzle H from the position shown in dotted lines in FIG. 9 to the position shown in full lines, the assembly then being disposed in an inverted position or nearly so. Tilting of the nozzle H rocks the flange *m* on its margin thereby exposing one or more of the apertures *p* to the interior of the container so as to open the valve thus formed to permit discharge of a portion of the container content in the usual manner, such discharge being quickly cut-off by return of the slide bar to normal when the lug **30** clears the outer end of the slide bar which operation with the restoration of the trigger is that previously described.

In the form of the invention shown in FIGS. 10 and 11, the device is designed for application to the type of pressure container shown in FIGS. 1–6. In this instance a rocker arm **35** is mounted on a pivot pin **36** on the standard **19** and extended forwardly over the upper end of the stem C and seated thereon with its outer end terminating adjacent the upper end of the standard **20**. A dependent trigger **37** pivoted on a pin **38** on the standard **20** has a finger **39** fixed thereon which normally overlies the upper margin of the outer end of the arm **35** under the urge of a plate spring **40** bearing on the outer margin of the trigger **37**. A spring **41** bears between the standard **19** and the under side of the arm **35** and acts to normally dispose the arm in its uppermost position with its outer end engaged by the finger **39**.

In the operation of the device just described, the container is inverted and a pull imposed on the trigger **37** in opposition to the spring **40** to cause the finger **39** to swing the arm **35** from the position shown in full lines in FIG. 10 to the position indicated in dotted lines thereby advancing the valve stem to effect opening the valve thereon. The finger **39** in advancing rides over the end of the arm **35** when the latter is in its fully advanced position thereby releasing the arm so that the spring **41** will restore the arm to its initial position thus permitting the valve B to close. On release of the trigger **37** the spring **40** will act to swing the trigger inwardly thereby causing the finger **39** to engage and flip the outer end of the arm **35**, the finger then passing to the upper side of the arm to its normal position shown in FIG. 10 whereupon the device is conditioned in readiness for another operation.

The devices here shown are each characterized by the delivery of a uniform or substantially uniform quantity of the container content on each operation of the trigger control, until the gas pressure in the container is exhausted. To effect discharge of a quantity of material exceeding that effected in a single operation simply requires one or more succeeding operations.

While I have shown and described specific embodiments of the invention, I do not limit myself to the exact details of construction set forth, and the invention embraces such changes, modifications and equivalents of the parts and their formation and arrangement as come within the purview of the appended claims.

I claim:

1. A fluid dispenser for pressure containers having an outlet and a valve normally closing said outlet embodying a stem; in combination, a frame, means detachably connecting said frame to a container, a valve actuator carried by said frame engageable with said valve stem, a spring engaging said actuator and thrusting it to a normally retracted position, a manually operable trigger carried by said frame, means on said trigger engageable with said actuator adapted to advance it in opposition to said spring and adapted to release said adaptor when the latter is moved to an advanced position, said actuator being moveable to its retracted position under the urge of said spring independent of said trigger, means embodied in said actuator for actuating said valve stem to momentarily open said valve as said actuator moves to its advanced position, and a spring engaging said trigger to restore it to its initial position on release thereof after its manual operation independent of said actuator.

2. The structure called for in claim 1 in which said valve actuator comprises a reciprocal slide bar having a cam arranged to engage and depress said valve stem on movement of said slide bar to an advanced position and to release said valve stem on movement of said slide bar to a retracted position.

3. The structure called for in claim 1 in which said valve actuator comprises an arm pivoted on said frame and extending in overlying abutting engagement with said stem adapted to be depressed by the engaging means on said trigger and to be released from said engaging means on movement of said arm to its depressed position.

4. The structure called for in claim 1 in which said valve actuator comprises a reciprocal slide bar having a valve stem receiving opening intermediate the ends thereof for swinging said valve stem laterally on longitudinal movement of said slide bar.

5. A fluid dispenser for pressure containers having an outlet and a valve normally closing said outlet embodying a stem; in combination, a movable valve actuator engageable with said stem, means for removably carrying said actuator on a container; spring means engaging and yieldably opposing movement of said actuator in one direction, a manually operable trigger, a pivotal mounting therefor on said actuator carrying means, a lug carried by said trigger releasably engageable with said actuator arranged to advance said actuator in opposition to said spring means on swinging said trigger in one direction and to release said actuator when said trigger has been moved to a retracted position, said spring means being operable to restore said actuator to its normal position on disengagement of said lug from said actuator, said actuator being moveable to its normal position on disengagement of said lug independent of said trigger, means on said actuator for engaging said valve stem to open said valve on advance of said actuator, and a spring pressing said trigger to a normal position independent of said actuator.

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