Jan. 28, 1958 C. B. WENNER 2,821,436

DOOR ACTUATED ATOMIZING DEVICES

Filed June 30, 1955

Fig. 1.

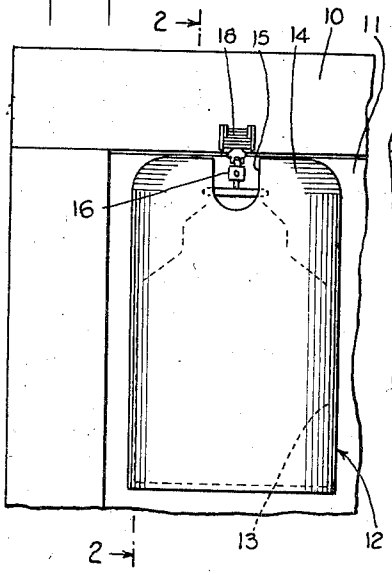



Fig. 2.

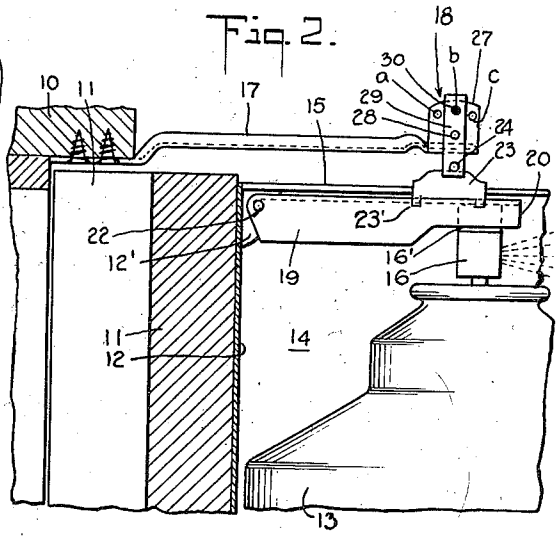



Fig. 3.

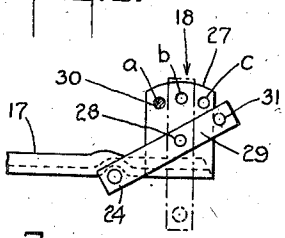



Fig. 4.

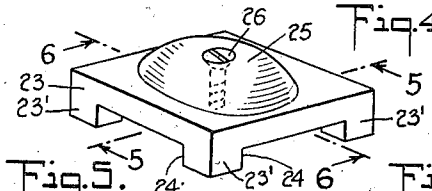



Fig. 5.

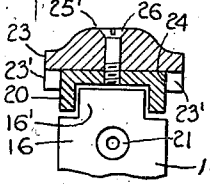



Fig. 6

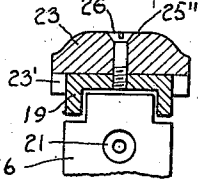



Fig. 7.

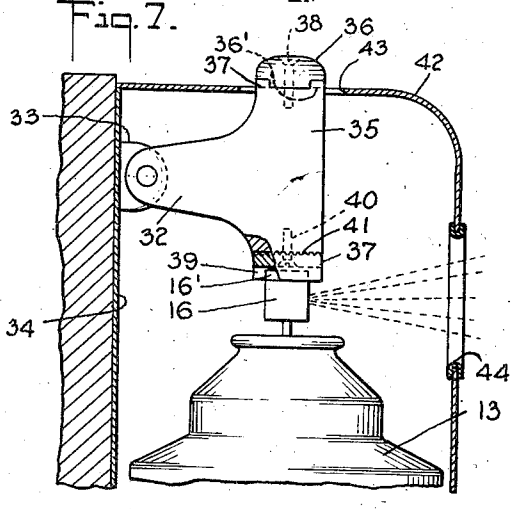
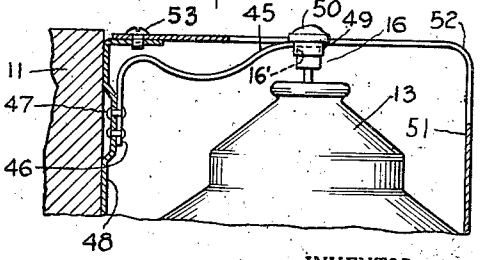



Fig. 8.




INVENTOR.
CHARLES B. WENNER
BY Howard E. Thompson Jr
ATTORNEY

United States Patent Office 2,821,436
Patented Jan. 28, 1958



2,821,436

# DOOR ACTUATED ATOMIZING DEVICES

Charles B. Wenner, Darien, Conn., assignor to Airkem, Inc., New York, N. Y., a corporation of New York

Application June 30, 1955, Serial No. 519,153

11 Claims. (Cl. 299—82.5)

This invention relates to a valve actuating mechanism for use with aerosol containers and other atomizing dispensers and particularly to a mechanism of the class described wherein a swingably mounted part provides means for both actuating a valve and maintaining predetermined alignment of the discharge thereof. More particularly, the invention relates to a valve actuating mechanism of the class described wherein the swingably mounted member thereof is provided with a cam element in spaced relation to the valve engaging maens for receiving actuating impulses from cooperating means movable with respect thereto.

In the operation of atomizing dispensers and particularly dispensers of the aerosol type, it is frequently desirable to provide automatic actuation of the discharge valve as the result of the movement of some member or element which is normally subject to periodic movement. A typical instance in which such automatic actuation is desirable and which will be hereinafter discussed for purpose of illustration is in the opening and/or closing movement of a door to provide for the periodic discharge of materials such as odor counteractants, air fresheners, disinfectants, insecticides, and the like.

In providing for actuation of a discharge valve of an aerosol container or the like in the opening and/or closing movement of a door, the aerosol container is suitably mounted on the door or door frame with a cooperating member mounted on the other door part providing impulses for actuating the valve in the door movement. The conversion of the relative transverse movement between the parts to a vertical valve actuated movement presents a problem for which solutions heretofore available have been quite intricate and costly. A further problem arises due to the freely rotatable mounting of most aerosol valves in aerosol containers making it difficult to maintain a predetermined direction for the spray as it is released in actuation of the valve.

The latter aspect of the problem has been dealt with in my pending application Serial No. 485,711, filed February 2, 1955, for Valve Aligning Means, and the present application may be considered as a continuation-in-part thereof. The valve actuating mechanism of the present application, however, provides a new means for converting the transverse movement of an impulse member to a vertical valve actuating movement in a simple and efficient way by means of a unitary swingable member which is durable in construction and inexpensive to produce and which incorporates as an integral part thereof means for maintaining predetermined alignment of the discharge orifice of a valve.

Novel features of the invention will readily be understood from a consideration of the following description taken together with the accompanying drawing in which the valve actuating mechanism and various parts thereof are identified by suitable reference characters in each of the views and in which:

Fig. 1 is a front elevation view of my valve actuating



mechanism as associated with a door mounted cabinet for an aerosol container;

Fig. 2 is a partial sectional view substantially on the line 2—2 of Fig. 1 showing the impulse member (mounted on the door frame) in operative engagement with the cam element of the valve actuating mechanism;

Fig. 3 is a partial view similar to Fig. 2 showing a different position of adjustment of the impulse member;

Fig. 4 is a perspective view of the adjustable cam member of the valve actuating mechanism as seen in Fig. 1;

Fig. 5 is a sectional view of the cam element as shown in Fig. 4 taken along the line 5—5 and indicating the association thereof with a valve head;

Fig. 6 is a view similar to Fig. 5, but with the cam element oriented to show a section along the line 6—6 as seen in Fig. 4;

Fig. 7 is a view similar to Fig. 2 showing a modified form of the valve actuating mechanism; and

Fig. 8 is a view similar to Fig. 2 showing a further modified form of the valve actuating mechanism.

In Figs. 1 and 2 of the drawing I have shown portions of a typical door frame 10 and door 11 with means as indicated by the mounting bracket or cabinet 12 for mounting an aerosol container 13 adjacent the upper edge of the door 11. The mounting means 12 can be any device for securely clamping the container 13 to the door, but for the sake of neatness is preferably provided with a detachable cover part 14 having a cutout 15 centrally of the upper portion thereof to expose the discharge valve 16 and actuating mechanism therefor.

In alignment with the valve 16 and actuating mechanism and secured to the door frame 10 is a protruding arm 17 having at the free end thereof adjustable means 18 for imparting impulses to the valve actuating mechanism in opening and/or closing movements of the door.

The valve actuating mechanism has been shown in Fig. 2 as comprising a swingable member 19 in substantial alignment with the protruding arm 17 on the door frame and having at its free end 20 a channeled portion for engaging an aligning lug 16' on the valve 16 which serves to maintain proper orientation of the discharge orifice 21, note in Figs. 5 and 6.

Actuation of the valve 16 is effected by swingable movement of the member 19 through a relatively small arc, and any mounting of the member 19 on the casing or bracket 12 which will provide such a limited swinging movement can be employed. Thus, while the member 19 has been shown as a link pivoted to protruding legs 12' by means of a pin 22, it will be evident that the member 19 could be fashioned as a spring member secured to the bracket or mounting 12. The pivoted construction has been shown for purpose of illustration since this is considered to be the more economical construction while at the same time providing the strength and durability required in continued use of the device.

Adjacent the free end 20 of the swingable member 19 and secured to the upper surface thereof is a cam element 23 for receiving actuating impulses from a cam or roller part 24 of the adjustable imparting impulse means 18. The cam element 23 is shown in greater detail in Figs. 4, 5 and 6 as having protruding corner lugs 23' on the lower portion thereof forming passages 24 which straddle the channeled end 20 of the swingable member 19. The cam element is provided with a domed upper surface 25 which is elongated in one direction to form a short bearing surface 25' along one axis and a long bearing surface 25'' along the other axis. As shown in Fig. 5 of the drawing, the long bearing surface will register with the roller or cam element 24, whereas as oriented in Fig. 6, the short bearing surface will register with the roller or cam element 24. The cam element 23 is retained in posi-

tion by means of a set screw **26** which permits the cam element to be readily changed from the position shown in Fig. 5 to that shown in Fig. 6.

As the roller or cam element **24** rides over the cam surface **25**, it causes depression of the end **20** of the valve actuating mechanism and ejection of spray through the valve orifice **21**. In various uses and applications of the device the duration of spray required in each actuation of the valve will vary considerably depending for example on the size of area to be treated, the speed in which the door normally moves, and the like. The adjustable feature in the cam element **23** permits a substantial variation in the actuating time or duration of the spray as will be apparent. It is understood in this connection that the particular length of bearing surfaces **25'** and **25''** indicated in the drawing is purely illustrative and that these surfaces can be suitably modified to provide the type of operation desired with a particular material being atomized.

A further control in operation of the device is provided by the adjustable impulse means **18** which has been shown in Figs. 2 and 3 of the drawing as comprising upwardly extending end flanges **27** on the arm **17** having central apertures **28** for pivotally mounting swinging arms **29** which carry at their lower extremity the cam or roller **24**. The upper extremities of the flanges **27** are provided with a plurality of registering apertures identified as *a*, *b*, and *c* for receiving a pin **30** and the pivoted arms **29** are also provided with apertures **31** adapted to register with apertures *b* to receive the pin **30** as shown in Fig. 2 of the drawing. When so arranged, rotation of the arms **29** about the pivot **28** is prevented and the cam or roller **24** will actuate the valve mechanism in both opening and closing movements of the door. When the pin **30** is arranged in apertures *a*, as seen in Fig. 3, the arms **29** carrying the cam or roller **24** are free to swing in one direction as shown in the full line position, but are prevented from swinging in the other direction as shown in dotted lines in Fig. 3. Thus, with the pin **30** arranged in apertures *a*, the cam or roller **24** will ride freely over the cam element **23** as the door is closing without actuating the valve, but will depress the cam element **23** as the door is being opened.

It will be evident from the foregoing that changing the pin **30** from the position shown in Fig. 2 to that shown in Fig. 3 has the effect of reducing by one-half the time of valve actuation in a complete opening and closing movement of the door. If it is desired that the actuation will take place only during closing movement of the door, the pin **30** is moved from apertures *a* to apertures *c* as shown in Fig. 3.

In Fig. 7 of the drawing is shown a slightly modified form of valve actuating mechanism wherein a swingable part **32** pivoted to lugs **33** on a bracket or casing part **34** is provided with an elongated vertical cross-head **35** having a cam element **36** at the upper end thereof and a valve engaging element **37** at the lower end thereof. The cam element **36** is generally similar to that shown in Figs. 4, 5 and 6 of the drawing except that the aligning means permitting orientation when the set screw **38** is loosened is provided by recesses **36'** engaging protruding lugs **37** on the swingable part **32**. The cam element **36** will thus provide long and short cam surfaces which may be interchangeably aligned to register with an actuating roller or cam in the manner previously described.

The valve aligning element **37** has been shown as comprising a separate member having a channel **39** to receive a protruding lug **16'** of a valve **16** and secured to the swingable member **32** by means of a set screw **40**. The registering surfaces of valve aligning element **37** and the swingable member **32** are suitably provided with serrations **41** for locking the aligning element in different positions of rotary adjustment. Such provision for rotary adjustment is particularly advantageous in instances where no housing is employed around the valve and valve actuating mechanism.



As shown in the drawing, an aerosol container **13** or other vaporizing dispenser together with the valve actuating mechanism are encased in the detachable cover part **42** having an upper aperture **43** through which the cam element **36** may protrude and a front aperture **44** through which the spray emanating from the valve may pass. The elongated cross-head **35** of the valve actuating mechanism provides the vertical displacement which permits the spray opening or aperture **44** to be disposed substantially below the upper surface of the cover part **42**, thus providing an attractive over-all appearance while enclosing more completely the working parts of the device.

In certain applications the spray aperture **44** may be arranged in other positions i. e. to one side or the other of the valve **16** in which event rotary adjustment of the valve aligning element **37** will permit proper orientation of the valve **16** and discharge orifice thereof with the spray opening **44**.

The further modification as shown in Fig. 8 corresponds closely with the modification shown in Figs. 1 and 2 in that the container **13** and valve **16** thereof are aligned near the top of a door **11**. In place of the pivoted link **19** as shown in Figs. 1 and 2, however, is a spring arm **45** having an offset end **46** secured by rivets or the like **47** to a mounting means or cabinet part **48** for the container **13**. The free end of the spring **45** is provided with depending flanges **49** forming a channel for locking engagement with aligning lug **16'** on the valve **16** in the manner previously described in discussing Fig. 2 of the drawing. Secured to the upper surface of the spring **45** in alignment with the valve engaging end thereof is a cam element **50**, preferably adjustable as in the case of the cam **23**, for engagement with impulse means of the type shown in Figs. 1 and 3 of the drawing.

The spring **45** is suitably formed with a reverse or **S** curvature embodying curves of relatively large radius to provide a combination of vertical swingability of the free valve engaging end with a minimum of longitudinal movement as the cam element **50** is engaged by the impulse means passing longitudinally thereover.

While the valve actuating mechanism as disclosed in Fig. 8 can be employed in connection with a mounting means which supports the container **13** exposed to view, it is preferable to employ a casing or cover part **51** detachable with respect to the mounting means **48**, having a top front opening **52** for exposure of the cam **50** and providing for passage of spray discharged from the valve **16**. Suitable means indicated by the screw **53** can be provided for detachably securing the casing or cover part **51** in position.

While my valve actuating mechanism has been described particularly as applied to operation in the opening and/or closing movements of a door, it will be apparent that any relatively movable parts can be employed to effect the operation of the device provided that the direction of relative movement between the valve actuating mechanism and the impulse means is substantially longitudinally of the swingable member, i. e. substantially perpendicularly to the pivot or swinging axis thereof.

Various changes and modifications in the valve actuating mechanism herein disclosed will occur to those skilled in the art and to the extent that such changes and modifications are embraced by the appended claims, it is to be understood that they constitute part of my invention.

I claim:

1. A valve actuating mechanism for a vertically reciprocating valve, said mechanism comprising means for positioning a vertically reciprocating valve with respect to a vertical support, a swingable valve engaging member coupled with said means and protruding laterally from said vertical support to dispose the free valve engaging end thereof in the path of reciprocation of said valve, said valve engaging end of the swingable member having valve aligning means separably interfitting with said valve to prevent rotation of said valve, a cam element protrud-

ing from said swingable member above, and at least in partial vertical alignment with, said valve aligning means, an impulse member having means for mounting on a support separate from and movable with respect to said vertical support, the path of relative movement between said impulse member and said swingable member being substantially longitudinally of said swingable member, and means on said impulse member operatively engaging said cam element in at least one direction of said relative movement to depress the free end of said swingable member and actuate the valve engaged thereby.

2. A valve actuating mechanism as defined in claim 1 wherein said cam element comprises a part adjustably coupled with said swingable member and selectively providing cam surfaces of different length in the different positions of adjustment thereof.

3. A valve actuating mechanism as defined in claim 1 wherein the swingable member is a substantially T-shaped part pivoted at its base to said vertical support to dispose a vertically elongated portion in substantial alignment with the axis of reciprocation of said valve, the upper and lower ends of said vertically elongated portion carrying respectively said cam element and said valve aligning means.

4. A valve actuating mechanism as defined in claim 1 wherein the swingable member comprises a channeled element having a pivotal mounting at one end thereof with the other channeled end forming said valve aligning means.

5. A valve actuating mechanism as defined in claim 1 wherein the swingable member comprises a channeled element having a pivotal mounting at one end thereof with the other channeled end forming said valve aligning means, and wherein the cam element comprises a part detachably coupled with said swingable member and having aligning means straddling the channeled contour of said swingable part in different positions of orientation.

6. A valve actuating mechanism as defined in claim 1 wherein the swingable member comprises a preformed spring element having an elongated valve engaging end, and a mounting end offset with respect to said valve engaging end.

7. A valve actuating mechanism as defined in claim 1 wherein the swingable member comprises a preformed spring element having an elongated valve engaging end, and a mounting end offset with respect to said valve



engaging end, and said spring element intermediate the ends thereof having a reverse curvature providing free vertical movement of said valve engaging end.

8. A valve actuating mechanism as defined in claim 1 wherein the aligning means comprises a part detachably secured to said swingable member and rotatably adjustable about an axis substantially coinciding with the axis of reciprocation of said valve.

9. A valve actuating mechanism as defined in claim 1 wherein the impulse member includes a movable cam engaging part and means for restricting movement of said part to selectively provide for operative engagement with the cam when the impulse member moves in one direction, in the other direction, and in both directions with respect to said cam.

10. A valve actuating mechanism for the automatic operation of the reciprocating valve of an aerosol container in the relative movement of a part supporting said container and a part supporting impulse means, said mechanism comprising a swingable member mounted on said first named part, said member being elongated in the direction of relative movement of said parts and having means at the swingable end portion thereof providing aligning engagement with said aerosol valve, a cam element on said member in spaced relation to said last named means adapted to register with said impulse means, and said impulse means including a movable member operatively engaging said cam element to depress the same in at least one direction of relative movement between said parts.

11. A valve actuating mechanism as defined in claim 10 wherein the cam engaging member of said impulse means is carried by a pivotal support providing swinging movement to both sides of a central operative position, and adjustable means associated with said pivotal support for selectively restricting movement from said central position.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,705,787 | Schuell | Mar. 19, 1929 |
| 2,534,464 | Marini | Dec. 19, 1950 |
| 2,534,465 | Marini | Dec. 19, 1950 |
| 2,600,661 | Kochner | June 17, 1952 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 424,026 | Great Britain | Feb. 13, 1935 |