Dec. 30, 1952 J. HENCHERT 2,623,785

DISPENSING DEVICE FOR VOLATILE PRODUCTS

Filed July 19, 1948

Fig. 1.

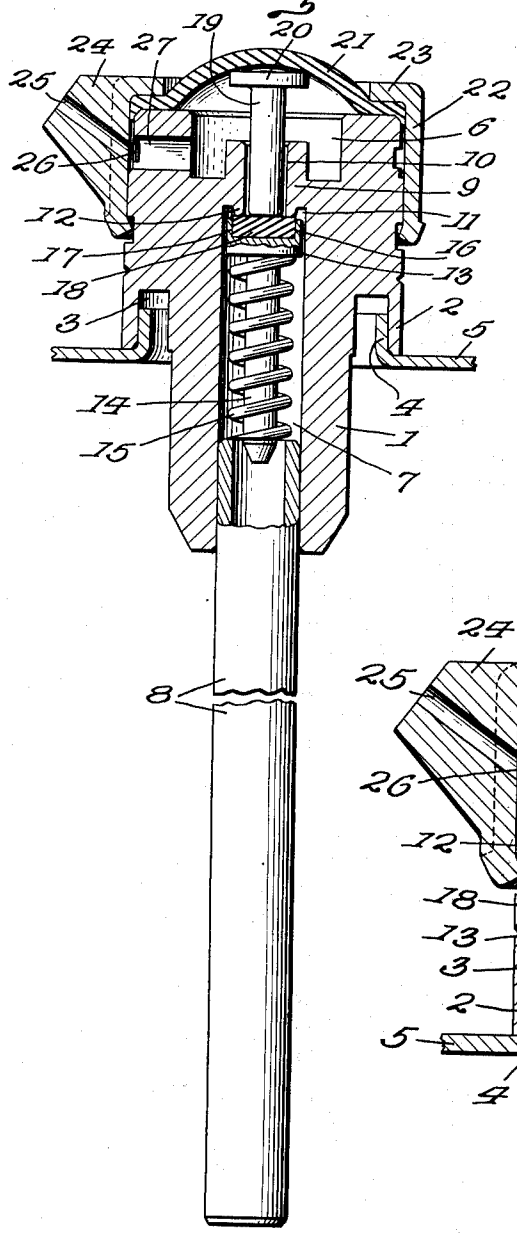


Fig. 3.

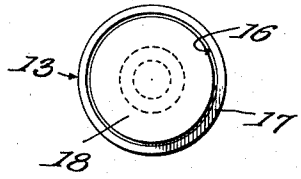
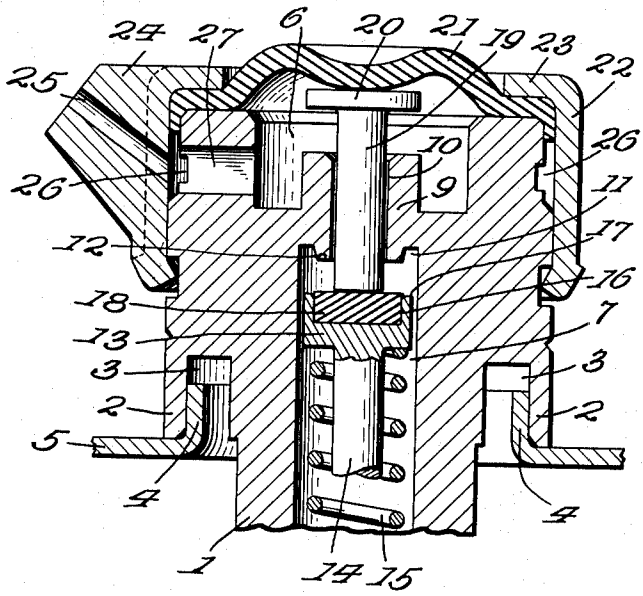


Fig. 2.



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DISPENSING DEVICE FOR VOLATILE PRODUCTS

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1 Claim. (Cl. 299—95)

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The invention relates to new and useful improvements in a dispensing valve unit for volatile products retained in containers under pressure.

An object of the invention is to provide a dispensing valve unit of the above type wherein a valve body has upper and lower chambers connected by a passage in which a valve operating rod moves with sufficient clearance to provide a restricted flow passage permitting the product to pass into the upper chamber, and wherein the flow of the product is controlled by an elastic valve disk confined in a recess in a valve supporting head which disk is adapted to engage an annular depending valve seat of smaller diameter than the recess, so as to insure contact of the valve disk with the valve seat at all times.

A further object of the invention is to provide a dispensing valve unit of the above type wherein the recess for the elastic valve disk is so dimensioned as to prevent lateral swelling of the valve disk when contacted by the product.

A further object of the invention is to so dimension and shape the valve seat and the end wall of the lower chamber so that the valve head cannot contact the valve seat or the end wall and thereby prevent the valve from closing.

In the drawings which show by way of illustration one embodiment of the invention:

Figure 1 is a vertical sectional view through the valve dispensing unit and a portion of the supply pipe associated therewith, with the valve shown in closed position.

Figure 2 is an enlarged sectional view of the upper portion of the valve unit and showing the valve moved to open position.

Figure 3 is a plan view of the valve head with the elastic valve disk in place in the recess in the valve head.

The invention has to do with a dispensing valve unit for volatile products, gases or liquids retained under pressure in a container. While the unit is capable of general use, it is particularly adapted for spraying liquid aerosol compositions.

In the drawings a portion of the can end is shown with the improved dispensing valve unit attached thereto. The valve unit includes a valve body 1 having a depending skirt 2 spaced away from the valve body so as to provide an annular recess 3. The skirt is adapted to extend down over a flange 4 formed on a can end 5. This can end is preferably of metal. When metal is used the skirt is secured with an upstanding flange by solder bonding in the usual manner.

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The valve body is shaped so as to provide an upper chamber 6 and a lower chamber 7. A tube 8 is attached to the lower end of the valve body and extends to the bottom of the container and serves as a means through which the fluid is forced by pressure in the container into the lower chamber of the valve body.

There is a partition 9 which separates the chambers and this partition is provided with a passageway therethrough indicated at 10. The lower side of the partition 9 is counterbored at 11, so as to provide a depending annular valve seat 12 surrounding the passage 10.

Located in the lower valve chamber 7 is a valve supporting head 13. This supporting head is carried by a rod 14 and a spring 15 surrounding the rod bears at its upper end against the head and at its lower end against the end of the tube 8. This head 13 is slightly less in diameter than the diameter of the lower chamber 7 so that the valve head is guided by and is free to move in said chamber. The clearance space between the head and the wall of the lower chamber provides a restricted passage for the product to pass the head and through the passageway in the partition into the upper chamber when the valve is open.

Said valve head is provided with a recess 16 surrounded by a relatively thin annular wall 17. Located in this cup shaped valve supporting head is a disk 18 of suitable elastic material, preferably rubber. The disk fills the recess and its upper face is substantially flush with the upper face of the surrounding wall 17.

The diameter of the recess is slightly greater than the outer diameter of the annular valve seat 12 and the width of the counterbore is greater than the thickness of the annular wall 17 so that regardless of the position of the support valve head in the chamber 7 the valve disk will always make contact with the valve seat and at no time will the valve supporting head contact said valve seat so as to prevent a tight sealing of the passage when the valve is moved to closed position.

The spring 15 normally raises the valve disk to contact with the valve seat and closes the passage 10 through the partition 9. Extending through this passage in the partition is a valve operating rod 19. Said valve operating rod is preferably provided with a flat head 20. Extending across the upper end of the valve body is a flexible member 21. This member is preferably of rubber. This member 21 is clamped to the valve body as shown in the illustrated embodiment of the invention by a sleeve 22 having a flange 23 at the

upper end thereof which clamps the outer edge portion of the member 21 against the upper end of the valve body. The ring is forced into contact with the member 21 and then is peened at its lower end into a groove in a valve body.

When the disk is clamped to the valve body it takes the convex form shown in Figure 1. Said sleeve 22 is provided with a projecting nozzle 24 having a dispensing passage 25 which connects with the annular passage 26 between the sleeve and the valve body. Said valve body has a radial passage 27 connecting this annular passage 26 with the chamber 6.

The clearance space between the wall of the passage 10 and the valve operating rod 19 has an area substantially equal to the area of the dispensing passage 25. The radial width of the passage 10 is however about one-tenth of the diameter of the passage and therefore any large specks of dirt, chemical, crystals or solid foreign material which might close the passage 25 will not pass through this annular passage surrounding the valve rod.

The upper chamber is of minimum size to permit proper expansion of the volatile liquid after passing through the restricted passage 10 before it is dispensed through the passage 25. This small chamber permits a small accumulation of liquid or vapor therein to be immediately dispersed when the valve is opened so there is no delayed spraying action.

The dispensing of the product is accomplished by applying thumb pressure to the flexible member 21. This will flex the member inwardly causing it to contact with the upper end of the valve operating rod and force the rod downwardly so as to move the valve disk away from the valve seat and thus permit the liquid product to flow past the valve through the restricted passage 10 and be released into the chamber 6 where it will vaporize and then pass through the restricted passage 25 where it is further released in the form of a spray.

It is obvious that minor changes in the details of construction may be made without departing from the spirit of the invention as set forth in the appended claim.

I claim:

A dispensing device for liquid products retained under pressure in a container comprising a valve body having a lower chamber and an upper expansion chamber arranged one above the other directly over and in vertical alignment therewith, said chambers being separated by a partition having a passage therethrough, said partition on the underside thereof being counterbored to provide a depending annular seat immediately surrounding said passage and spaced away from the wall of the counterbore, a rod mounted for reciprocation in said lower chamber, a valve head carried thereby, said valve head being guided by the wall of the lower chamber and with sufficient clearance to provide a restricted flow passage permitting the product to pass the valve head, said valve head having a recess formed in the upper face thereof, which recess is of slightly larger diameter than the outer diameter of the annular seat, said recess being surrounded by a relatively thin annular wall, the width of the counterbore being greater than the thickness of the annular wall, a valve disk of elastic material fitted in said recess, the outer face of which is substantially flush with the outer face of the valve head, said valve disk being engageable with the valve seat for closing the passage in said partition, a spring surrounding the rod in the lower chamber and operating to move the valve disk into sealing engagement with the valve seat, a valve operating stem resting freely on the valve and extending upwardly through the passage in the partition into the upper chamber, said passage and stem being dimensioned so as to provide a restricted annular flow channel of uniform cross sectional dimension discharging directly into an expansion chamber, said dispensing device having a dispensing orifice connected to the upper chamber and leading to the atmosphere, the cross sectional area of said orifice being substantially equal to the cross sectional area of the flow channel, a flexible disk extending across the valve body and forming the upper wall of said expansion chamber, and means for clamping the disk to the valve body so that it is exposed for direct finger engagement by the operator, said disk when depressed engaging the stem for opening the valve.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
681,172	Koenig	Aug. 20, 1901
807,243	Chapin	Dec. 12, 1905
1,492,838	Dilweg	May 6, 1924
1,757,473	Pieper	May 6, 1930
1,799,727	Byars	Apr. 7, 1931
2,064,794	Klauminzer	Dec. 15, 1936
2,171,373	Rosenwald et al.	Aug. 29, 1939
2,442,746	Anderson et al.	June 8, 1948
2,534,509	Franck	Dec. 19, 1950
2,550,863	Roehr	May 1, 1951

FOREIGN PATENTS

Number	Country	Date
28,975	Australia	June 3, 1931
79,738	Austria	Jan. 10, 1930
294,006	Italy	Mar. 9, 1932
483,261	Germany	Sept. 20, 1929