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QUICK GASSING TILT VALVE

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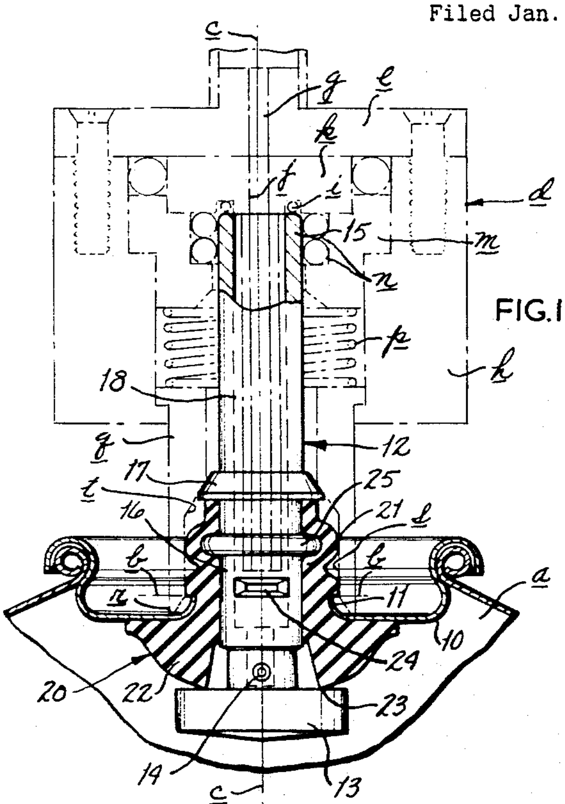

FIG. 1

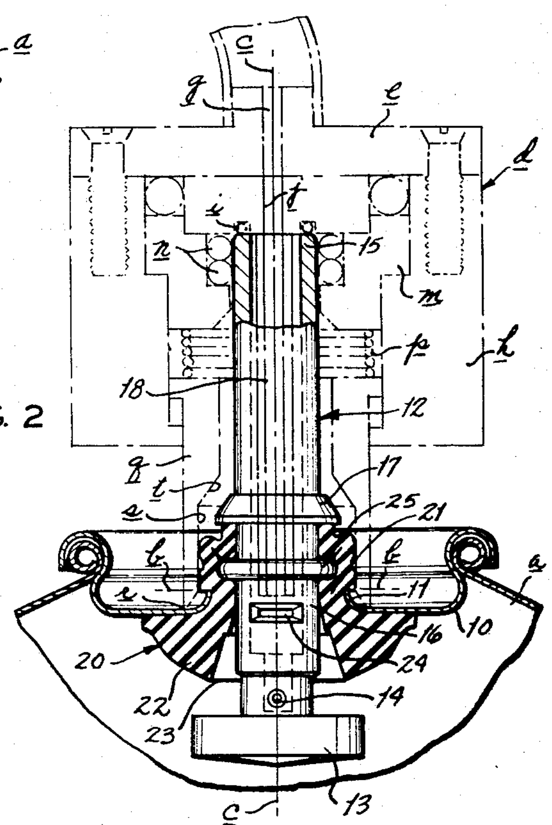

FIG. 2

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QUICK GASSING TILT VALVE

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U.S. Cl. 141—20 1 Claim

ABSTRACT OF THE DISCLOSURE

For use on aerosol cans, provision is made for fast insertion of pressurizing gas through a tilt dispensing valve. As in conventional tilt dispensing valves, a sealing grommet and sleeve sealedly mounts a tubular spout valve in the rimmed opening of the container top wall having an outflow port adjacent to its head within the can. In the present invention the stem has a large gassing port through its wall at a higher level, and an external bead above this level. When the stem is pressed axially inward the sealing sleeve is compressed against the rim of the top wall opening; thus preventing the escape upward of pressurizing gas.

The present invention relates to dispensing valves for gas-pressurized dispensing containers, and particularly to the type which has a rigid tubular walled spout and a rubber grommet-mount seal member by which mounting is effected within the top wall of a single-use dispensing container. Usually such valves operate by tilting the spout, which opens a valve head within the container, laterally from its seat on the seal member. For gassing the valve spout is displaced axially from the seat, and the gas is introduced by a gassing head or similar apparatus, through the spout tube and out into the container through its lateral ports, which serve, during dispensing, as the spout flow inlets.

If the spout flow inlets are designed to be very small, to regulate the rate of dispensing, the rate of inflow of the pressurizing gas will be consequently reduced, requiring a gassing time which is excessive for commercial operations. Alternately, gas has been filled into the container in refrigerated liquid state; but this is undesirable for quantity production.

A purpose of the present invention is to utilize such a valve with constricted inlets, but with fast gassing which proceeds through the tubular spout of the valve. A further object is to permit such fast gassing without sacrificing the secure sealing of the sleeve against the cylindrical wall portion of the spout above its constricted flow inlets.

I accomplish these objectives in the present invention (as well as the other purposes apparent from this disclosure) by providing the cylindrical wall portion immediately above the level of the container top, with a large arcuate slot which serves as a pressurizing gas outlet. When the gassing equipment depresses the spout a substantial distance during the gassing operation, to open the valve downward, this gassing outlet moves downwardly below the level of the container top. The pressurized gas introduced into the tip of the spout by this gassing apparatus forces the seal to deflect and distend below the container top and thus flows rapidly from the spout out through the gassing outlet and past the distended seal into the container.

To overcome any tendency toward leakage upwardly between the cylindrical spout wall and the sleeve surrounding it, I provide a circular external bead which distends the rubber sleeve above the gassing outlet, making the sealing of the sleeve at that point more secure. The bead's radial thickness distends the sleeve to a greater diameter than any part of the valve thereabove; so the gassing head when applied, may fit sealingly against the sleeve and give positive security against any possibility of leakage of gas during the gassing operation.

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In this specification the terms "inlet" and "outlet" are used in their relation to the spout, not the container to which it is affixed. Thus the lateral constricted flow inlets to the spout are used to dispense the container contents, and the gassing outlet of the spout is used to flow gas into the container.

In the accompanying drawings:

FIG. 1 is an elevational view, partly in cross-section and partly fragmentary, of a dispensing valve embodying the present invention; with a gasser head superimposed in position prior to gassing, as shown in dashed lines.

FIG. 2 is a view similar to FIG. 1 showing the gasser head, in dashed lines, pressing the valve spout downward during gassing.

The general type of dispensing valve illustrated is that which is normally operated by tilting with the operator's finger, thus manually to unseat the valve spout from its seal. Shown mounted in the mouth of a gas-pressure dispensing container *a* is a mounting cup **10** having a central upwardly-and-inwardly rimmed opening **11**. The mounting cup **10** serves as a container top. The level *b—b* of the smallest diameter portion of the rimmed central opening **11** is referred to as the "level of the container top."

Employed for dispensing is a rigid tubular-walled spout generally designated **12**, molded of a fairly rigid plastic material and having a longitudinal axis *c—c* and having at the inner end of the spout an imperforate head **13**. Adjacent to its head **13** the tubular-walled spout **12** is penetrated by one or more flow inlets **14**; when the valve is opened and the container is inverted the contents of the container flow under pressure into the tubular-walled spout **12** and outward from its tip **15**. In the present embodiment, the flow inlets **14** are exceptionally small, to serve as constrictions and limit the rate of flow.

Axially outward of the flow inlet **14** the spout **12** has a smoothly cylindrical wall portion **16** which is surrounded sealedly by the sleeve **21** of the grommet-mount seal member **20** hereafter discussed. The upper end of the sleeve portion **21** abuts a downwardly presented external shoulder **17** on the spout **12**, which demarks the upper end of the cylindrical wall portion **16**. Outward of the shoulder **17** is a manipulative portion **18** by which the valve is tilted by the user. This portion may extend to the tip **15**.

The rubber grommet-mount seal member generally designated **20** includes the sleeve portion **21** which projects outwardly from a radially enlarged and thickened tubular body portion **22**. The body portion **22** has at its lower end an annular seating surface **23** against which the valve head **13** seats sealedly for closing and from which it unseats for opening.

The type of valve so generally described but with substantially larger flow inlets, is shown in the U.S. Patent No. 2,704,172 to Lapin, issued Mar. 15, 1955. The flow inlets **14** into the tubular spout **12** of the present valve are formed so small as to serve as flow constrictions; so that the flow rate of the valve, once opened by a fairly small degree of tilting, is rendered substantially independent of further tilting. Such constricted inlets would limit the rate at which gas under pressure might be introduced into the container, if there was no other path of flow.

For purpose of increasing the speed of gassing, to make a valve with such constricted flow inlets suitable for commercial filling operations, I provide a gassing port **24** which extends through the sleeve-sealed cylindrical wall portion **16** of the spout **12**. The gassing port **24** shown is an arcuate slot formed in a plane perpendicular to the axis *c—c* of the spout **12**. In position with the valve closed prior to gassing, FIG. 1, the port **24** lies above the level *b—b* where the container top or mount cup **10** has its smallest opening. Its operation during gassing will be described subsequently.

Formed on the cylindrical wall portion **16** above the gassing port **24** is an external circular bead **25**. It distends the sleeve portion **21** outward, increasing the force by which the sleeve portion **21** grasps the bead **25**. In the present valve the circular bead **25** is uniquely constructed to have so great a radial thickness as to distend the sleeve portion **21** to a greater outer diameter than that of the shoulder **17** or any other portion of the valve which may lie upwardly of the bead **25**.

Gassing is effected through the spout **12** after the mounting cup **10** is sealedly crimped in place into the mouth of the container *a*. The gassing head utilized for this purpose is shown in dashed lines. Referring to FIG. 1, pressurizing gas from a source not shown is delivered under pressure (several times as great as the pressure to be introduced in the container) to a gassing head generally designated *d*. The head *d* includes an upper plate *e* having an upper central opening *g* connected to the pressurizing gas supply; an outer cylindrical shell *h*, and a central depending hollow gassing tube *j* which in use extends inside the valve spout **12**. The hollow gassing tube *j* extends downwardly from a bored metal pad *k* (which may be formed integrally with the tube *j*) aligned with the central opening *g*. Fitted around the tube *j* where it depends from the pad *k* is a small O-ring *i* by which pressure is applied to the dispensing tip **15**. An annular member *m* supported by and within the shell *h* downwardly adjacent to the pad *k* contains other O-rings *n* which seal against the outer wall of the dispensing tip **15**.

Seated telescopically inside the outer shell *h* and urged downwardly by a coil spring *p* is a hollow telescoping guide member *q* terminating in a beveled tip *r* which leads upwardly to an inner cylindrical surface *s*, sized so as to seal against the sleeve **21** as distended by the bead **25**. Above the inner cylindrical surface *s* the telescoping guide *q* has a downwardly presented sloping shoulder *t* which fits against the shoulder **17** of the spout **12**.

The functioning of the present valve construction will now be described.

In the gassing operation, the container *a* with the valve in place is brought under the gassing head *d*, which descends upon it. The beveled tip *r* of the telescoping guide *q* preliminarily aligns the container *a* precisely so that the hollow gassing tube *j* fits within the tubular spout **12**. As the gassing head descends it assumes the position shown in FIG. 1, with the inner sloping shoulder *t* of the telescoping guide *q* abutting the spout shoulder **17** as the spout tip **15** presses against the O-ring *i* around the upper end of the gassing tube *j*. In this position the inner cylindrical surface *s* of the telescoping guide *q* will fit sealedly against the part of the sleeve portion **21** which is distended farthest outwardly by the bead **25** on the spout **12**.

As the gassing head *d* descends further, the O-ring *i* pressing against the stem tip **15**, pushes the spout progressively downward to approximately the position shown in FIG. 2. The contact of the beveled tip *r* of the telescoping guide *q* against the mounting cup **10** holds the guide *q* in place, causing it to telescope with respect to the cylindrical body *e*, as is shown in FIG. 2. The downward movement of the spout **12** presses and seals the sleeve portion **21** of the seal member **20** even more securely against the inner cylindrical surface *s* of the telescoping guide *q*, as the bead **25** lowers within the depth of the cylindrical surface *s*. As the spout **12** so lowers, the gassing port **24** is brought down below the level *b—b* of the mounting cup rim **11**.

Gas under pressure applied in this position within the gassing tube *j* will flow partly through the flow inlet **14** of the spout **12**; but the greater part of it will flow through the gassing port **24**, now below the level of the mounting cup rim **11**. The manner which its flow passes the seal member **20** is as follows: The gassing port **24** has such a large arcuate slot-like opening, presented perpendicular to its axis *c—c*, that the pressure of the gas pushes outward on the resilient grommet-mount seal member **20** to distend it, bending it outwardly beneath the mounting cup rim **11** as shown in FIG. 2. The greater part of the gas to be introduced into the container will thus escape through the gassing port **24** to flow rapidly from the spout, past the distended seal member **20** into the container *a*.

It will be obvious that the deformation of the seal member **20** is substantially the same as if the mounting cup **10** extended flatwise outward from the rim central opening **11**. For this reason, the level *b—b* is considered to be effectively the level of the container top; that is, the level at which the seal member **20** will commence its downward and outward bending as shown in FIG. 2.

The present valve construction has proved to be effective even though the stem is not depressed entirely past this level. With the telescoping guide *q* of the gasser head in place, the sealing of the innercylindrical surface *s* of telescoping guide *q*, against the distended sleeve portion **21** outwardly of the bead **25**, is very secure. Hence if the gas pressure were applied before the spout reached the lowered position shown in FIG. 2, any tendency of gas to escape upward would be prevented by the sealing force exerted by the inner cylindrical surface *s* of the guide *q*, through the seal's sleeve portion **21** and against the bead **25**.

Beads formed externally on dispensing valve spouts have heretofore been used to distend the resilient sleeve portions of sealing grommet-mounts against leakage while distorted by tilt operation for dispensing; this is shown in U.S. Patent No. 2,779,516 to J. W. Soffer. However, there is no known prior use of a bead so large so as to distend the rubber sufficiently outward to provide a seal with a telescoping guide of a gasser head. The said Soffer patented dispensing valve included a helical spring which surrounded the rubber sleeve; there would have been no possible way of having a gasser head press sealingly against the rubber sleeve itself to seal against the escape upward of gas applied at sufficient pressure to deflect the rubber seal body and escape downward.

The present valve has made possible the quick gassing through spouts whose flow inlets **14** are extremely small. For example, spout inlets may be molded commercially, with very little tolerance, to dimensions of .015" or even less. Utilizing two .018" inlets **14** in dispensing pressurized shaving lather has controlled the dispensing flow rate so that, regardless of a degree of tilt, the flow out from the spout **12** will never exceed a desired maximum rate; such flow inlets **14** are thus true flow-rate metering inlets. They are feasibly used in commercial production with the advantage that pressurizing gas may flow rapidly into the container at a quick gassing rate regardless of the desired dispensing rate.

From this disclosure, modifications of the present invention will be obvious to those skilled in the art. Accordingly, the present invention is not to be construed narrowly, but coextensive of the claim hereof.

I claim:

1. A tilt dispensing valve of the type which is depressed axially for introducing pressurizing gas into a dispensing container from a gassing head superimposed thereover, said gassing head having a seal-reacting portion and means for depressing said valve to a gassing portion, which is tilted for dispensing, said valve comprising

a container top wall having a central opening,

a rigid tubular-walled spout having inwardly of the container top wall an imperforate head and a discharge-restricting flow inlet through the spout wall adjacent to the head, and having extending through the opening of the container top wall a cylindrical spout wall portion and having a manipulative portion outwardly thereof and terminating in a dispensing tip,

the spout further having an external circular bead on its cylindrical wall portion at a level spacedly outward of the container top wall opening, and

a rubber seal member including a body portion inwardly of the container top wall, against which the valve head seats sealedly for closing, the body portion having a bore which grasps the cylindrical wall portion of the spout, the seal member further including a sleeve portion extending from said bore sealedly through the top wall opening and upward therefrom about the cylindrical spout wall and beneath, distendedly around, and over the stem bead,

characterized in that the bead and sleeve portion are of such thickness as, when the sleeve portion is so distended around the bead, to provide an outer diameter larger than that of the spout manipulative portion and, together with the container top wall, to establish a length of downward axial spout movement for gassing, and in that

the sleeve portion has, outwardly of the bead and at such outer diameter, an outer gassing-head-sealing surface, and in that

the spout has a gassing port extending through the spout cylindrical wall portion between said external circular bead and said discharge-restricting inlet and normally maintained by the elasticity of the sleeve portion above the container top wall opening and at a height, above the lowermost level at which the seal bore grasps the spout, greater than said length of downward spout movement,

whereby when such a superimposed gassing head depressing means moves the spout axially downward to apply gas through the spout, and the gassing port is lowered to the level of the container top opening but above the said lowermost grasping level of the seal bore, the spout bead compresses the sleeve portion downwardly against the top wall and distends it farther diametrically outwardly against the seal-reacting portion of the gassing head, thereby to seal said outer gassing-head-sealing surface against such superimposed gassing head; and while such compression prevents escape of gas through the sleeve portion upwardly from the gassing port, said gas within the spout distends the seal bore at and downwardly from the lowered gassing port and passes into such dispensing container.

References Cited

UNITED STATES PATENTS

2,739,841	3/1956	Soffer	251—349 X
2,763,406	9/1956	Countryman	222—402.21
3,292,827	12/1966	Frangos	251—353 X
3,169,525	2/1965	Bowen	222—402.22 X

OTHER REFERENCES

German printed application 1,109,970, June 1961, Societe.

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U.S. Cl. X.R.

222—402.16, 402.22