

April 25, 1967

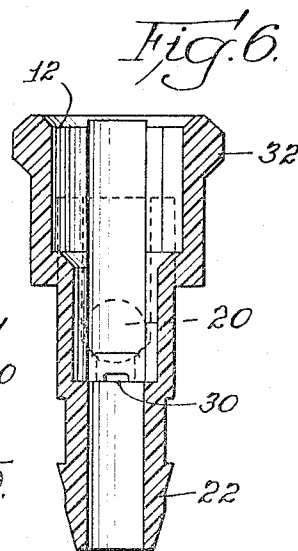
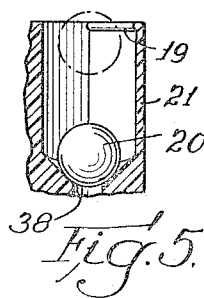
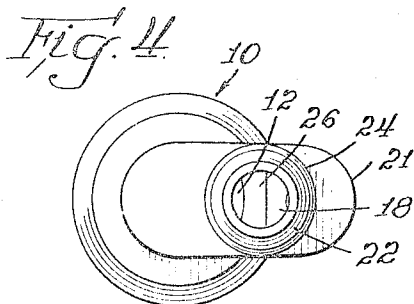
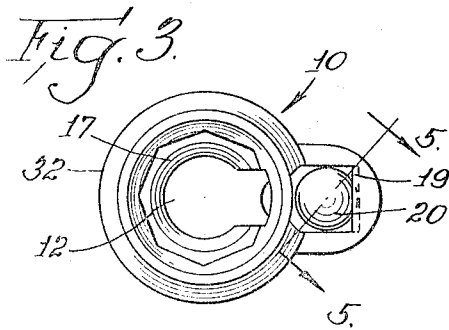
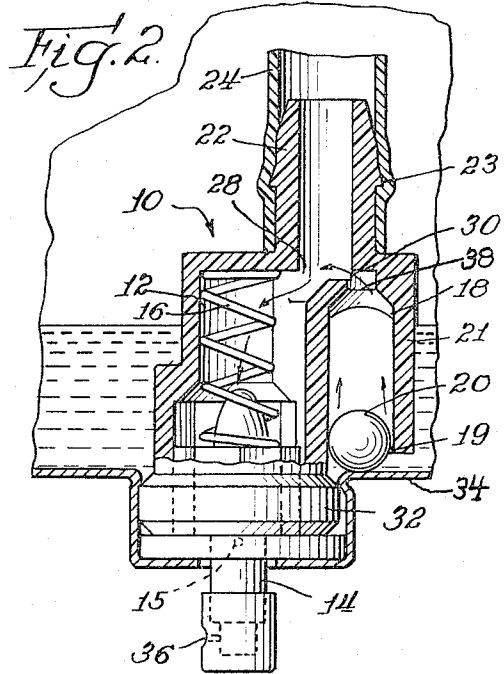
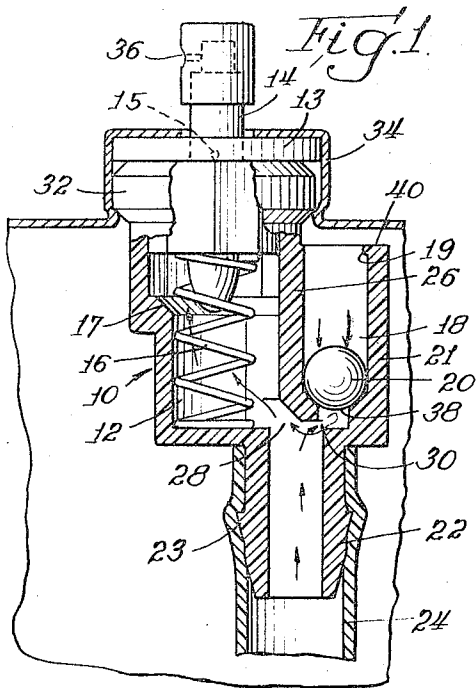
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3,315,693

ANYSIDE-UP TYPE AEROSOL VALVE

Filed April 10, 1964

2 Sheets-Sheet 1



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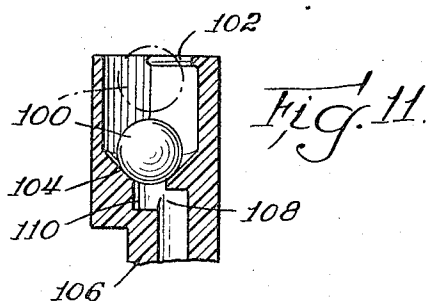
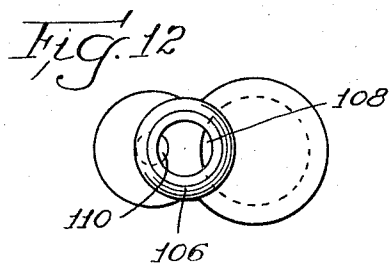
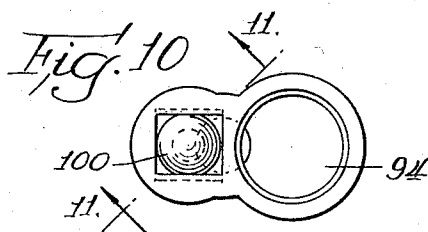
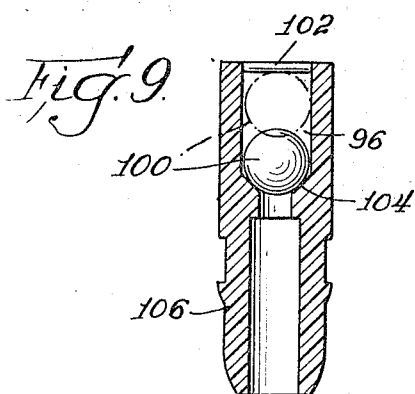
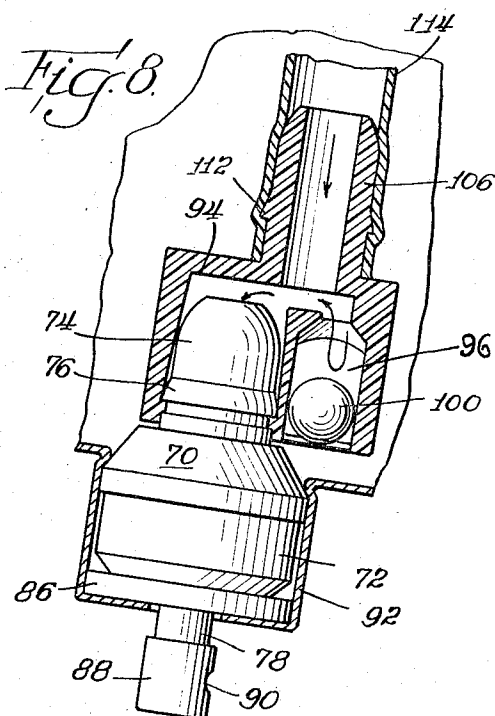
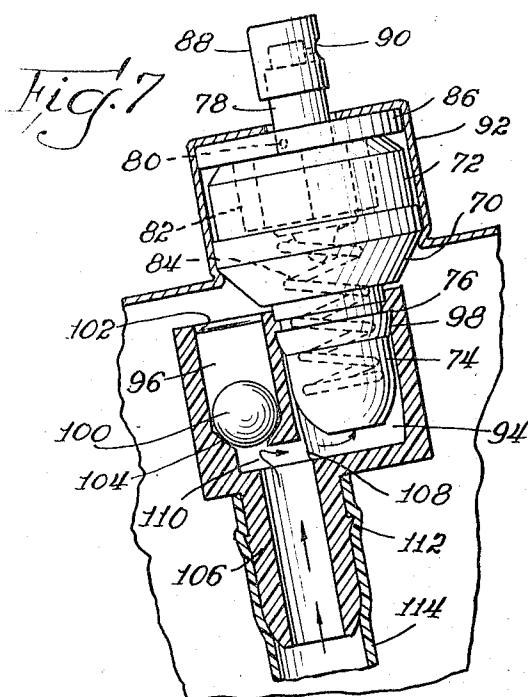
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ANYSIDE-UP TYPE AEROSOL VALVE

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2 Sheets-Sheet 2



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3,315,693

ANYSIDE-UP TYPE AEROSOL VALVE

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9 Claims. (Cl. 137—43)

This invention relates to an aerosol valve and more particularly to an aerosol valve which can be used "anyside-up" whereby the aerosol can to which the valve is affixed can be used in any position.

Current aerosol valves which permit dispensing the product while the aerosol can is in an upright, inverted or any intermediate position between the two, have several undesirable features which limit their application. In particular, the spray is usually intermittent which, in itself, is objectionable to the consumer. Also, it causes loss of propellant, which is necessary to fully dispense all of the packaged product. In addition to these undesirable operating characteristics, such aerosol valves are relatively expensive and difficult to manufacture and assemble. They also frequently require the modification of existing canning apparatus.

An object of this invention is to provide a new and improved "anyside-up" type aerosol valve.

A further object is to provide an attachment for existing aerosol valves to convert them to anyside-up type valves.

A still further object is to provide a new and improved anyside-up type aerosol valve which avoids intermittent spray patterns.

Another object is to provide an anyside-up valve which is less subject to breakdown due to corrosion, rough handling or settling of the ingredients in the propellant containing composition.

Another object is to provide an anyside-up type valve wherein loss of propellant is avoided.

Another object is to provide an anyside-up valve which provides better emptying of the can than heretofore possible.

Another object is to provide an anyside-up valve which is more easily manufactured than heretofore possible.

Another object is to provide a design for a valve body or an attachment for an ordinary valve to effect an anyside-up aerosol valve which may be easily and economically molded, using less material than heretofore possible.

Another object is to provide an anyside-up aerosol valve which can utilize standard component valve parts.

Another object is to provide an anyside-up aerosol valve which can be utilized with standard aerosol cans currently available.

Another object is to provide an anyside-up aerosol valve which can be inserted and crimped in the valve opening of a standard aerosol can currently available utilizing existing packaging machinery.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

Broadly, the new aerosol valve or attachment for an existing aerosol valve comprises a by-pass chamber in communication with the chamber of the valve body and having a flow check means therein whereby product flow is controlled. It is preferably positioned adjacent to valve body and has its upper end immediately below the upper inside surface of the aerosol can whereby substantially complete emptying of the can is enabled. More specifically, the new valve or attachment comprises tandemly arranged chambers, one acting as the valve chamber 12 (see FIG. 1) and the other as the by-pass cham-

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ber 18. The by-pass chamber has a check valve means, such as a ball 20, which seats when the valve is used in an up position. The valve, in this position, acts in customary aerosol valve fashion—the product passes up the dip tube and the dip tube attachment tail which communicates with both chambers (see FIG. 1), into the valve chamber 12 and out the dispensing orifice 36. However, when the valve is used in an inverted position, the ball drops, and product passes around it. It then passes into the valve chamber 12 and out the dispensing orifice 36. So, in effect, the construction provides an "anyside-up" valve.

The attachment embodiment (FIG. 7) utilizes the tail of standard valve bodies as the point of affixation, but in other essentials is similar in function to that described above.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is a plan view of an embodiment of the aerosol valve of this invention with the valve body partially cut away to show its interior construction, the aerosol valve being shown in an upright operative position.

FIG. 2 is a plan view of the aerosol valve of FIG. 1, shown in an inverted operative position.

FIG. 3 is a top plan view of the valve body of the aerosol valve of FIG. 1.

FIG. 4 is a bottom plan view of the valve body of the aerosol valve of FIG. 1.

FIG. 5 is a sectional view of the valve body, taken along the lines 5—5 in FIG. 3.

FIG. 6 is a sectional view of the valve body of the aerosol valve of FIG. 1.

FIG. 7 is a plan view of another embodiment of this invention; specifically an attachment for existing "stock" aerosol valves with the attachment body partially cut away to show its internal construction; the aerosol valve being shown in an upright operative position.

FIG. 8 is a plan view of the attachment modified aerosol valve of FIG. 7, shown in an inverted operative position.

FIG. 9 is a sectional view of the body of the attachment of FIG. 7.

FIG. 10 is a top plan view of the body of the attachment.

FIG. 11 is a sectional view of the body, taken along the line 11—11 of FIG. 10.

FIG. 12 is a bottom plan view of the body of the attachment.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Referring now to FIGS. 1–6, the embodiment of the "anyside up" valve of this invention shown comprises a valve body 10, with a tubular valve stem 14 and a valve stem biasing means 16 both of standard design therein. The valve body 10, in accordance with this embodiment, is molded as one piece, preferably of any suitable plastic material, such as polystyrene, polyethylene, polypropylene, nylon, and polyester resin. The valve body 10 has an enlarged upper portion 32, which is crimped within valve housing 34. The inside walls of portion 32 and the lower portion of tubular valve stem 14 are preferably octagonal in shape to avoid rotation of the valve stem 14 when received within the chamber 12. Thus the dispensing orifice 36 will always be pointed in one direction.

Portion 32 of the valve body also contains the sealing means, such as an annular gasket 13 for the orifice port 15 formed in the valve stem 14, and the top open end of the valve housing. The inside wall of the chamber 12 may have a beveled step 17 to assist in centering the valve

stem biasing means 16, which may be a helical spring, as shown.

There is a second chamber 18, termed "the by-pass chamber" formed adjacent the valve body 10. Its top edge is positioned so that it is in close proximity with the valve housing 34 when the anyside-up valve of this invention is assembled.

The inside walls of by-pass chamber 18 are preferably polygonal, such as square-shaped, as best seen in FIG. 3, and may even be sloping away from the axis of the entire valve. The floor of chamber 18 has a seat for a ball 20, which is loosely retained within the chamber by an inwardly protruding annular lip 19 formed on the top edge of the wall 21. The ball acts as a flow check means as explained in greater detail below.

A dip tube attachment tail 22 is secured to the lower end of chambers 12 and 18. Each chamber has an opening 28 and 30 respectively, which leads into the dip tube attachment tail 22.

It might be noted (FIGS. 3 and 4 especially) that the dip tube attachment tail is offset with respect to both chambers 12 and 18. The reason for this is explained below.

A dip tube 24 is secured to the tail 22 via anchoring ring 23 and extends to the bottom of the aerosol container.

To operate this valve when the aerosol container into which it has been crimped, is held in upright position, the user merely depresses the valve stem 14, in the usual fashion. Such depression causes the orifice port 15 to clear the sealing means 13 and the packaged product under pressure of the propellant is thereby released. It flows upwardly through the dip tube 24, through the dip tube attachment tail 22, through opening 28 into chamber 12, then through the orifice port 15, through the tubular valve stem 14 and out orifice 36. As such flow occurs, the ball 20, by reason of its own weight and the downwardly exerted force of the propellant and/or the packaged product, is seated to seal by-pass orifice 38 in the floor of chamber 18. In essence, the valve in this position, dispenses the product in substantially the same manner as an ordinary aerosol valve.

However, when the packaged product is dispensed, with the aerosol container in an inverted position, as shown in FIG. 2, the ball 20 drops, under its own weight, to the top of by-pass chamber. The polygonal shaped walls of by-pass chamber 18 now permits the packaged product which has also dropped to the top of the inverted aerosol can to flow freely around the ball 20, and up through by-pass orifice 38, through opening 30 into chamber 12 and from there, out through the tubular valve stem 14, and the dispensing orifice 36, in the customary fashion. Should any propellant flow through the dip tube 24 and the dip tube attachment tail 22, it intermixes with the product being dispensed and actually assists in dispensing of said product. Thus, there is no loss of propellant without product.

Since the ball 20 is contained in a polygonal shaped opening in chamber 18, to permit the product and propellant to freely pass by the ball 20, there is no fluttering. This was heretofore a great problem in such aerosol valves.

It might also be noted that, as designed, the top wall 40 of the by-pass chamber 18 of the valve is in close proximity to the valve housing 34. Therefore, no matter how the user uses the can there will be virtually complete emptying of the aerosol container. The dip tube will provide such complete emptying if the can is used in an upright position. If the can is used in an inverted position, the product will flow to the top of the aerosol container where it will be "sucked" into by-pass chamber 18 so long as the depth of the product exceeds the distance between the top of chamber 18 and the valve housing 34. So by designing the top in close proximity to the valve housing, substantially complete emptying is therefore again affected. Thus, the valve is free of dependance

upon positioning during use to affect excellent emptying.

In FIGS. 7-12, there is shown a second embodiment of this invention. It consists of an attachment for currently existing designs of standard aerosol valves.

As shown, a standard aerosol valve usually comprises a valve body 70 of tubular shape with an enlarged upper portion 72 and a lower dip tube attachment tail 74. The tail has the usual dip tube anchoring ring 76 on its outer surface. Within the tubular valve body is the hollow valve stem 78 with an orifice 80 in its side wall, just above guide knob 82. A solid valve stem with a mushroom like configuration and with provision for flow around the stem within the valve body could also be used.

A biasing means 84, such as a helical spring, biases the stem upwardly against the valve sealing means 86, such as a ring-shaped rubber gasket. Externally, a push-button 88 is affixed to the upper end of the valve stem 78 and it contains a dispensing orifice 90 as shown.

A valve housing 92 is crimped over the enlarged upper portion 72 of the valve body to retain all of the parts of the aerosol valve in operative condition. In all respects, the valve shown is typical of those currently being sold on the market.

Now, with respect to the attachment which converts the valve shown to an anyside-up valve, it comprises two tandemly or adjacently arranged chambers 94 and 96. Chamber 94 acts similar to the valve stem receiving chamber 12 of the embodiment described above. In this instance, however, it is designed to receive the dip-tube attachment tail 74 of customary aerosol valves, and might be more aptly described as a dip-tube tail chamber.

The wall of chamber 94 has an annular notch 98 which snaps over the anchoring ring 76 of the dip-tube attachment tail 74. Thus, once fastened to the tail, there is an integral-like leak-proof connection between the valve and the attachment which embodies this invention.

Chamber 96 acts as the by-pass chamber and is similar to by-pass chamber 18 of the embodiment described in detail above. This chamber receives the by-pass ball 100 and the ball is retained within the chamber by a similar inwardly protruding annular lip 102.

As in the chamber of the embodiment described above, the walls are polygonal-shaped, preferably square, to permit flow of the aerosol product around the ball when it is not seated, as shown in FIG. 7, upon ball-seat 104.

Both chambers communicate with a second dip-tube attachment tail. It is preferably integral with the walls of said chambers. Passageways 108 and 110 communicate with chamber 94 and by-pass chamber 96, respectively. The dip-tube attachment tail has a dip-tube anchoring ring 112 for the purpose of anchoring dip-tube 114 thereto.

In operation, the valve of FIGS. 7 to 12 with the attachment thereon functions in the same manner as the unitary anyside-up valve described above and shown in FIGS. 1 to 6. That is, with the aerosol container in an upright position, as shown in FIG. 7, the product and the propellant flow through the dip tube 114, the dip tube attachment tail 106 of the attachment through passageway 108 into chamber 94, then up through the customary dip tube attachment tail 74 and out through valve stem 78 and through the dispensing orifice 90. The ball 20, as before, is seated on ball seat 104, and therefore, no product nor propellant flows out through chamber 96.

When the aerosol container is inverted, as shown in FIG. 8, the ball 20 drops, under its own weight, to the top of the chamber 96 where it is retained by the lip 102. The product flows freely around the ball 100 since the walls of chamber 96 are polygonal or square. It then flows through passageway 110 into chamber 94 by a circuitous route as shown by the arrows. From chamber 94 it flows up through the valve stem 14 and out through the dispensing orifice 90 in the customary fashion.

It might be noted that the internal construction of both embodiments, the singular valve body 10 of FIG. 1

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or the attachment embodiment of FIG. 7 may be easily injection molded, with minimum expenditure for tooling and/or subsequent machining or drilling. In fact, the individual chambers and the dip tube attachment tail 22 are offset so that the openings leading from the tail into each chamber and from chamber to chamber are automatically formed. Therefore, it is unnecessary to later drill passageways between each, as is generally the case with current similar type aerosol valves. Furthermore, the need for additional structural elements such as a slide ring or an enlarged ring receiving shoulder is avoided.

It might also be noted that numerous modifications of the valve body or the attachment can be made without departing from the scope of the invention. For example, chamber 18 or 96 may be formed to provide a non-vertical track for the ball, that is, the walls may be slanted. Furthermore, the ball 20 could be replaced by a floating disc or a hinged flap affixed to the top of chamber 18 or 96. It is also unnecessary that the valve stem 14 be of the hollow type shown. It could as easily be a solid mushroom-shaped valve stem of the type well known in the art.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently obtained and, since certain changes may be made in the above article without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language might be said to fall therebetween.

Now that the invention has been described, what I claim as new and desire to secure by Letters Patent is:

1. A valve comprising a valve housing a tubular valve body affixed thereon, a valve stem reciprocally operable within said body, valve stem biasing means to bias said stem outwardly of said valve body, and valve sealing means mounted between said valve housing and said valve body, said sealing means being positioned to seal said valve when said stem is biased against said sealing means, a by-pass chamber adjacent to and having a side wall in common with said valve body, one end of said by-pass chamber being open and positioned adjacent said valve housing, the opposite end of said by-pass chamber comprising an orifice in communication with the interior of said valve body, and means loosely disposed in said by-pass chamber capable of sealing said orifice when said valve is disposed in a position whereby said means will tend to be adjacent said orifice.

2. The valve of claim 1 wherein said means loosely disposed in said by-pass chamber comprises a ball.

3. The valve of claim 2 wherein the interior of said by-pass chamber is polygonal in shape to avoid fluttering of said ball.

4. The valve of claim 3 wherein said valve body and said by-pass chamber have a bottom wall common to one another, said common side wall being terminated short of

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said common bottom wall to form said orifice in communication with the interior of said valve body.

5. An aerosol valve capable of being used in any position comprising a tubular valve body with a valve chamber, a valve stem reciprocally operable within said chamber, valve stem biasing means to bias said valve stem outwardly of said chamber, valve sealing means positioned against one end of said chamber, a valve housing secured to said valve body to retain said valve sealing means against said end of said chamber, a tubular by-pass chamber adjacent said valve chamber and having a side and a bottom wall in common therewith, one end of said by-pass chamber being open and positioned adjacent said valve housing, said side wall being terminated short of said bottom wall to form an orifice in communication with said valve chamber, a dip tube attachment tail affixed to said bottom wall substantially below said common side wall, and a ball loosely disposed in said by-pass chamber capable of sealing said orifice when said valve is disposed in a position whereby said means will tend to be adjacent said orifice.

6. An attachment for a standard aerosol valve to convert it to an anyside-up valve, said valve having a dip tube attachment tail, comprising a first and a second chamber adjacently arranged and having a side wall and a bottom wall in common, said first chamber being adapted to be affixed to said dip tube attachment tail of said valve and said second chamber comprising a by-pass chamber and having one end open and the other end thereof comprising an orifice in communication with said first chamber, means loosely disposed in said by-pass chamber capable of sealing said orifice when said valve is disposed in a position whereby said means will tend to be adjacent said orifice, and a dip tube attachment tail affixed to said common bottom wall.

7. The valve of claim 6 wherein said means loosely disposed in said by-pass chamber comprises a ball.

8. The valve of claim 7 wherein the interior of said by-pass chamber is polygonal in shape to avoid fluttering of said ball.

9. The valve of claim 8 wherein said common side wall is terminated short of said common bottom wall to form said orifice in communication with the interior of said first chamber.

References Cited by the Examiner

UNITED STATES PATENTS

2,273,737	2/1942	Snyder	137—43 X
2,904,229	9/1959	Samuel	137—38 X
2,924,360	2/1960	Samuel	222—394
2,968,428	1/1961	Samuel	137—38 X
2,991,044	7/1961	Briechele	222—394
3,223,293	12/1965	Sequist	222—394

FOREIGN PATENTS

855,794 12/1960 Great Britain.

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