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DISPENSING VALVE WITH CONSISTENCY CONTROL

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Fig. 1.

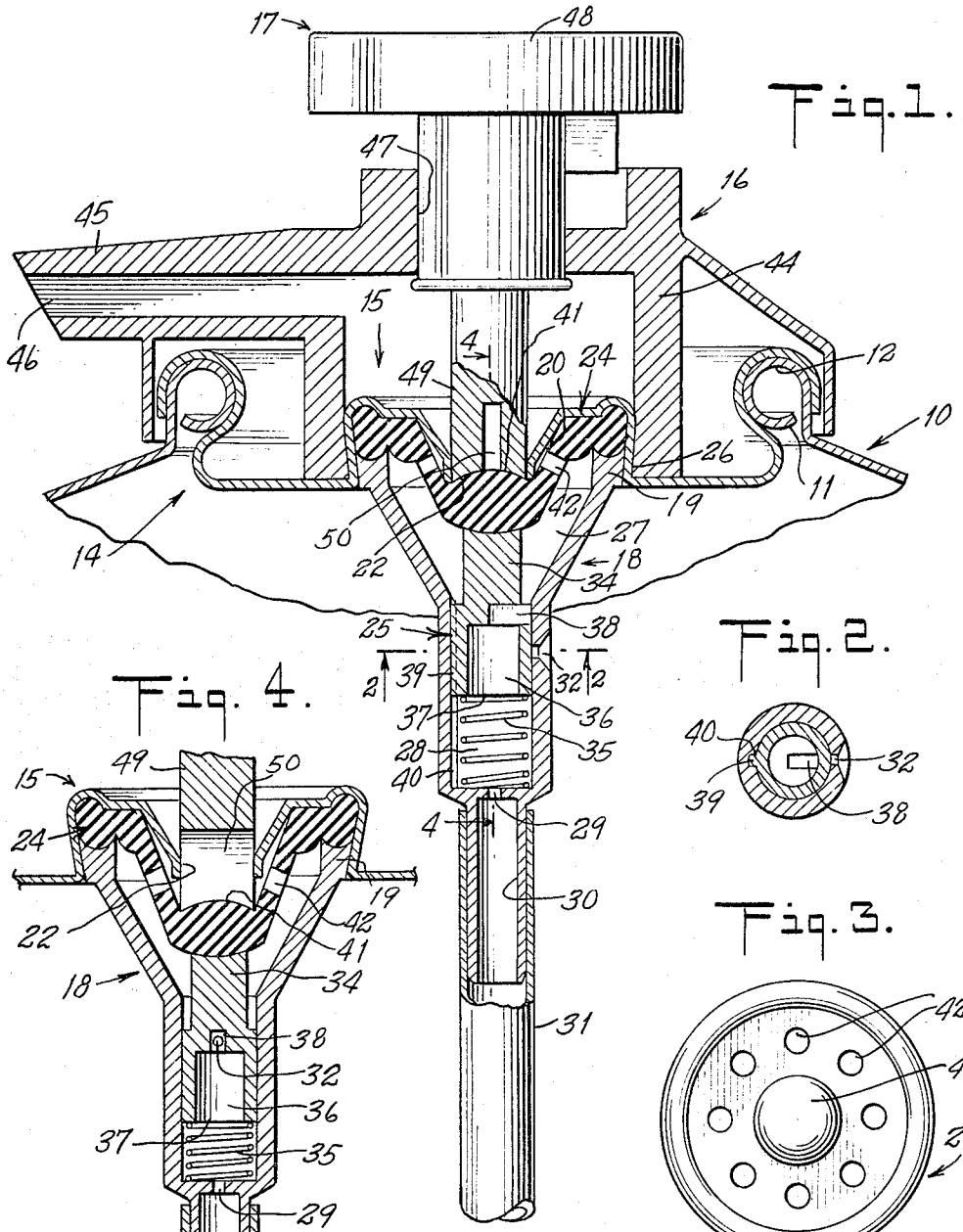


Fig. 2.

Fig. 3.

Fig. 4.

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DISPENSING VALVE WITH CONSISTENCY CONTROL

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The present invention relates to valves for dispensing aerated fluids from receptacles by means of a gaseous medium confined within the receptacle and, more particularly, to an improved valve of such type wherein the consistency of the aerated fluids can be selectively controlled while such fluids are discharged from the receptacles.

The present invention is primarily concerned with apparatus for dispensing fluid products, such as shaving lather and products which are confined in a receptacle with a gaseous medium under pressure for expelling and foaming, whipping or aerating the same.

Heretofore, numerous valves have been devised for dispensing aerated products but without provision for controlling the consistency of the product.

In co-pending United States patent application Serial No. 319,171, filed Oct. 28, 1963, now Patent No. 3,191,816 granted June 29, 1965, valves are disclosed which are capable of selectively controlling the consistency of the product, and it is the aim of the present invention to further improve such valves.

Accordingly, an object of the present invention is to provide an improved valve for controlling the consistency of a foamed or whipped or other aerated product.

Another object is to provide such a valve which functions in an extremely reliable manner without waste of the product or the gaseous medium.

Another object is to provide such a valve which can be easily controlled by the consumer of the product to dispense the product at a desired consistency.

A further object is to provide such a valve which is simple, practical and economical in construction.

Other and further objects will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the present invention, the foregoing objects are generally accomplished by providing a valve for dispensing a foamed or aerated product at its normal consistency which is dependent upon fluid or liquid to gaseous medium confined in the receptable and for reducing this consistency at will. Such an arrangement is particularly advantageous where the portion of the product first discharged from the receptacle has a tendency to have a higher consistency than is required, and gaseous medium then available can be utilized to adjust the product to a more desirable consistency. In practice, it has been found that it is advantageous to so utilize the gaseous medium, whereby when the receptacle is almost empty, the ratio of liquid or fluid to gaseous medium is such that the product still has an adequate consistency.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing, forming a part of the specification, wherein:

FIG. 1 is a fragmentary longitudinal sectional view of the upper end of a receptacle equipped with a valve in accordance with the present invention, illustrating the valve in its closed position.

FIG. 2 is a sectional view taken along the line 2—2 on FIG. 1.

FIG. 3 is a plan view of the valve member of the valve.

FIG. 4 is a fragmentary sectional view taken along the line 4—4 on FIG. 1, illustrating the valve in an open position.

Referring now to the drawing in detail there is shown apparatus for dispensing foamed or aerated products which generally comprises a receptacle **10** containing a fluid to be dispensed therefrom by a gaseous medium under pressure confined therein and having an opening **11** at the top thereof defined by an annular bead **12**, a closure **14** for the opening **11** having its peripheral zone secured to the bead **12**, a valve **15** supported at the underside of the closure **14**, and a dispensing head **16** mounted on the closure **14** including a valve operating element **17**.

The valve **15** comprises a body **18** having a flange **19** at its upper end, a valve seat **20** provided by an annular depending portion of the closure **14** and having an outlet **22**, a valve member **24** between the valve body **18** and the valve seat **20**, and an arrangement **25** in the valve body **18** for controlling the consistency of the dispensed product. The closure **14** further has an inverted cup-shaped section **26** which converges downwardly to effect securement of the valve body flange **19** and the peripheral zone of the valve member **24** therein.

The valve body **18** has an upper chamber portion **27** facing the valve member **24** and its seat **20**, and has a tubular lower chamber portion **28** extending downwardly from the upper chamber portion. The valve body **18** is formed with a first inlet **29** at its lower end for the fluid and a tubular section **30** for connecting a siphon tube **31** in fluid flow communication with the inlet **29** and is also formed with a second inlet **32** in its side wall adjacent its upper end for admitting gaseous medium from the receptacle into the valve body chambers.

The control arrangement **25** includes a piston **34** slidably mounted in the lower chamber **28** and a spring **35** for urging the upper end of the piston **34** against the underside of the valve member **24** for the purpose described hereinafter. The piston **34** has a passageway **36** including an enlarged inlet **37** and a side outlet **38** for establishing fluid flow communication between the inlet **29** and the upper chamber **27** when the piston is in an upper position and for establishing fluid flow communication between the second inlet **32** and the side outlet **38**. The piston **34** has a reduced upper end whereby fluid flow communication is established between the inlet **32** and the upper chamber **27** when the piston is in a lower position.

In order to prevent turning of the piston **34** in the valve body and to maintain the inlet **32** in alignment with the outlet **38**, the piston has a key **39** and the lower chamber has a keyway **40**, or a similar arrangement may be provided.

Preferably, the inlet **29** is dimensioned to meter fluid and gaseous medium at a desired rate. The choice of such dimension depends on the character of fluid to be dispensed and the gaseous medium utilized.

The valve member **24** is a yieldable disc formed of rubber or the like which is positioned over its valve seat **20** as shown. The valve member **24** has a formation **41** on its upper surface for closing the valve seat outlet **22** and has passageway means provided by annularly arranged apertures **42** between the formation **41** and its peripheral zone. These apertures are closed by the valve seat **20** while the formation **41** closes the outlet **22** and are opened when the valve member is moved to cause the formation to open the outlet **22**.

The dispensing head **16** has a tubular depending portion **44** secured over the closure section **26**, a nozzle portion **45** formed with a passageway **46** in fluid flow communication with the valve seat outlet **22**, and an opening **47** at the top for slidably mounting the valve operating element **17**.

The valve operating element includes a push button **48** and a depending stem **49** for engaging the valve member formation **41**, which stem is adapted to pass through the valve seat outlet **22** to effect unseating of the valve member **24** when the push button is depressed. The resiliency of the valve member **24** normally urges the element **17** upwardly.

The lower end of the stem **49** is recessed or slotted diametrically at **50** to provide fluid flow communication between the valve member apertures **42** and the valve outlet **22** when the valve member is unseated (FIG. 4).

In operation with the movable valve elements positioned as shown in FIG. 1, the valve seat outlet **22** and the apertures **42** are closed and the upper chamber **27** is in fluid flow communication with the lower end of the receptacle by way of the siphon tube **31**, the inlet **29**, and the piston passageway **36** from its inlet **37** to its outlet **38**. There is no flow of fluid.

When the push button **48** is pressed downwardly to partially unseat the valve member **24**, the valve seat outlet **22** and the apertures **42** are opened and the piston passageway provided by its reduced upper end and its outlet **38** remains in communication with the upper chamber **27**, whereby aerated or foamed product now is discharged through the nozzle passage **46** for use.

In the event the consistency of the product is greater than desired, it can be reduced by pressing the push button further downwardly to its lowermost position, so that the passageway outlet **38** now registers with the gaseous medium inlet **32** as shown in FIG. 4. Gaseous medium then mixes with the liquid passing through the outlet **38**, to dilute the liquid, whereby its consistency is reduced.

When pressure on the push button is relieved to allow the piston **34** to rise to the position with the valve member **24** closed, flow of liquid and/or gaseous medium ceases and the foamed product is no longer dispensed.

A very important advantage of diluting the product with gaseous medium in the manner just described is that the gaseous medium cannot escape from the receptable when mixed with a sufficient volume of liquid to produce the foamed product, whereby there is no danger of using up the gaseous medium before the liquid contents of the receptacle are fully discharged therefrom.

It also will be observed that the passageway **36** is relatively large, so that it cooperates with the lower chamber **28** to provide a zone for mixing the gaseous medium and the liquid just upstream of the passageway outlet **38**.

From the foregoing description it will be seen that the present invention provides an improved valve for the purpose indicated herein which valve is simple, practical and economical in construction and is reliable in operation to control the consistency of the foamed or aerated product.

As various changes may be made in the form, construction, and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matters are to be interpreted as illustrative and not in any limiting sense.

What is claimed is:

1. A valve for a receptable containing a fluid to be dispensed therefrom by a gaseous medium under pressure confined within the receptacle, which valve comprises a body having an upper chamber portion, a tubular lower chamber portion extending downwardly from said upper portion and formed with a first inlet at its lower end for the fluid and with a second inlet in its side wall at its upper end for the gaseous medium, and a valve seat extending across said upper chamber portion formed with an outlet facing said lower chamber portion; a movable valve member positioned between said upper chamber portion and said valve seat for engaging said valve seat and having a formation for closing said valve seat outlet; a piston slidably mounted in said lower chamber portion having passageway means including a lower inlet and an upper outlet for establishing fluid flow communication between said upper chamber portion and said first valve body inlet when said piston is in upper and lower valve opening positions and for establishing fluid flow communication between said second valve body inlet and said upper chamber portion only when said piston is in a lower valve opening position; a spring for urging the upper end of said piston against the underside of said valve member; and valve operating means for unseating said valve member and effecting downward movement of said piston.

2. A valve according to claim **1**, wherein said first valve body inlet is dimensioned to meter the flow of fluid at a predetermined rate.

3. A valve according to claim **1**, wherein said valve body and said piston have cooperating guide means for preventing turning of said piston within said lower chamber portion.

4. A valve for a receptacle containing a fluid to be dispensed therefrom by a gaseous medium under pressure confined within the receptacle, which valve comprises a body having an upper chamber portion, a tubular lower chamber portion extending downwardly from said upper portion and formed with a first inlet at its lower end for the fluid and with a second inlet in its side wall at its upper end for the gaseous medium, and a valve seat extending across said upper chamber portion formed with an outlet facing said lower chamber portion; a movable valve member positioned between said upper chamber portion and said valve seat for engaging said valve seat and having a formation for closing said valve seat outlet; and having passageway means between its periphery and said formation, said passageway means being closed by said valve seat when said formation closes said valve seat outlet and establishing fluid flow communication between said upper chamber portion and valve seat outlet when said formation is positioned to open said outlet; a piston slidably mounted in said lower chamber portion having passageway means including a lower inlet and an upper outlet for establishing fluid flow communication between said upper chamber portion and said first valve body inlet when said piston is in upper and lower valve opening positions and for establishing fluid flow communication between said second valve body inlet and said upper chamber portion only when said piston is in a lower valve opening position; a spring for urging the upper end of said piston against the underside of said valve member; and valve operating means for unseating said valve member and effecting downward movement of said piston.

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