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SANITARY DISPENSING VALVE

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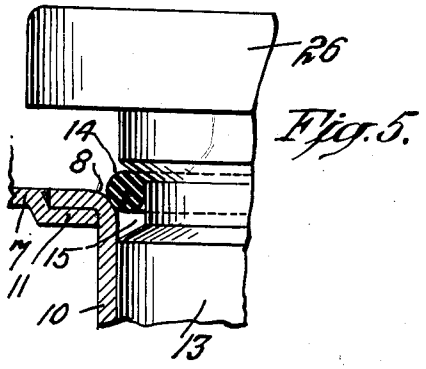


Fig. 5.

Fig. 1.

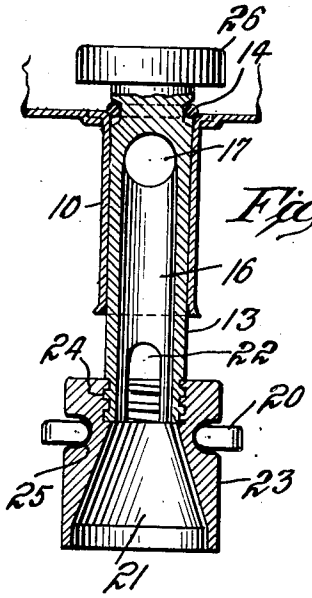


Fig. 3.

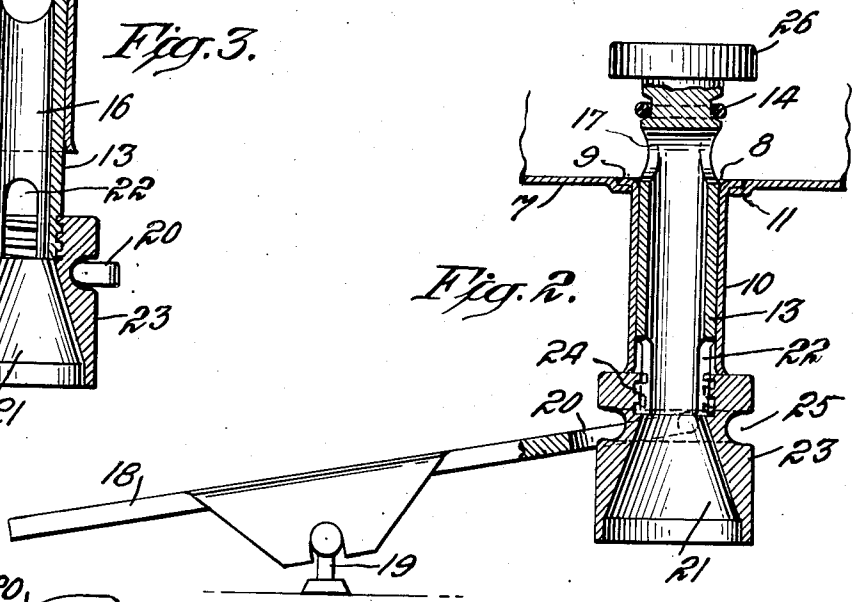


Fig. 2.

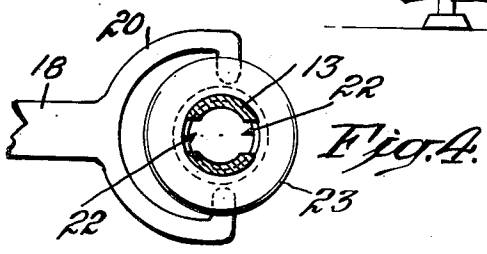


Fig. 4.

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SANITARY DISPENSING VALVE

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1 Claim. (Cl. 251—115)

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The invention here disclosed relates to liquid dispensing valves.

General objects of the invention are to provide a valve for dispensing liquids of a more or less critical, quick spoiling character such as milk and which can be easily kept in clean, sanitary condition.

Further objects of the invention are to provide such a valve in a minimum number of parts, readily separable for cleaning.

Special objects of the invention are to provide a sanitary form of dispensing valve which can be manufactured and assembled at low cost and in which the sealing portion of the valve may, when necessary, be easily removed and be quickly and inexpensively replaced.

Further special objects of the invention are to provide a valve non-residual and self-draining in character so as not to entrap or hold any liquid segregated from the main body of liquid being dispensed.

Other desirable objects attained by the invention are set forth or will appear in the course of the following specification, wherein novel features of the invention are described and broadly claimed.

The drawing accompanying and forming part of the specification illustrates a present commercial embodiment of the invention. Structure, however, may be modified and changed in certain respects, all within the true intent of the invention as hereinafter defined and claimed.

Fig. 1 in the drawing is a broken sectional view showing one of the valves as mounted for use in the bottom of a dispensing container. In this view the valve appears in closed position;

Fig. 2 is a similar view showing the valve in open position;

Fig. 3 is a broken vertical section with sectioned portions appearing as on the section line 3—3 of Fig. 1;

Fig. 4 is a broken horizontal cross-sectional view of the ported, tubular valve stem as on substantially the plane of line 4—4 of Fig. 1;

Fig. 5 is an enlarged broken sectional detail of the replaceable sealing ring and companion valve parts.

Figs. 1 and 2 show how the valve may be mounted with the bottom of the container flush to drain the entire contents of the container.

In these views the bottom wall of a dispensing container is indicated at 7, having a flush opening 8 therein defining a fixed annular valve seat.

Actually this valve seat is provided, in the illustration, by the angularly out-turned flange

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9 on the upper end of a guide tube 10 seated in the annular recessed portion 11 of the bottom wall surrounding the opening 12 through which the tube is passed.

This flanged guide tube may be welded, brazed, soldered or otherwise secured with the flange smooth and flush with the bottom so as to leave no cracks or crevices for accumulation or contamination.

The movable valve element consists of a tubular stem 13 confined in freely slidable relation in the guide tube 10 and carrying near its upper end a ring of rubber, plastic or other resilient material 14, enough larger than the stem to make sealing engagement with the annular valve seat 8. The latter, as shown in Fig. 5, may be somewhat rounded or beveled to effect a wedging engagement of the sealing ring thereover.

The sealing element may be an O-ring of small cross-sectional dimensions to make substantially line engagement with the rounded valve seat 8, so as to leave practically no or minimum valve surface areas.

The valve ring is elastically retained on the stem by being seated in lightly tensioned relation in an annular groove 15 in the upper portion of the stem, of slightly less depth than the cross-section of the ring. This groove is shown in Fig. 5 as formed with inclined side walls and of a width greater than the cross-section of the ring, providing freedom for rolling the ring one way or the other, and sloping shoulders over which the ring may be slipped in removing it for cleaning or replacement purposes. The ability to roll the ring in opposite directions in the groove enables both ring and groove to be quickly and easily scrubbed and these parts to be readily maintained in clean, sanitary condition.

Below the sealing ring the valve stem is of tubular construction, as indicated at 16, this tubular formation extending down and opening out through the lower end of the stem.

At the upper end a transverse passage 17 intercepts the central passage 16, providing ports opening out through the side of the valve stem.

Means for lifting the valve stem to carry the side ports 17 up above the bottom of the tank, is shown in the form of a hand lever 18 fulcrumed on a suitable support at 19 and having a forked end 20 in lifting relation with the lower end of the stem.

To prevent residual effects the valve is made self-clearing or self-draining by providing the tubular stem portion with a downwardly flaring discharge outlet 21 and with syphon breaking

ports 22 in the side of the stem above the flaring discharge mouth.

This flaring discharge passage has the effect of increasing surface tension and drawing the liquid down the valve stem, this action being more or less initiated and aided by intake of air through the ports 22 in the side of the tubular member above the flaring discharge outlet and which ports are below the lower end of the guide tube 10 and fully exposed when the valve is lowered to the closed position, Figs. 1 and 3.

When the valve is lifted the relief ports 22 pass up into the guide tube and hence are closed, as shown in Fig. 2, so as not to affect the full, free discharge of liquid down the tubular member.

For practical reasons the flaring discharge mouth may be made as a separate piece, in the form of a sleeve 23 of larger diameter screwed over the lower end of the valve stem, in position to abut the lower end of the guide tube and hence act as a stop to limit the upward lifting movement of the valve element.

The relief ports 22 are shown provided by slotting the tubular valve element down through the lower end of the same, as indicated in Fig. 3, and the screw connection for the discharge sleeve 23 is shown as a coarse, screw threaded joint 24 readily separable and easy to clean. The split lower end of the tubular member may be slightly spread to impart a spring holding quality for resiliently securing the sleeve in position on the valve stem.

In addition to enforcing automatic drainage and limiting lifting movement of the valve stem, the sleve acts as a weight for closing the valve, and it is further shown as grooved at 25 to receive the fork 20 of the opening lever 18.

The upper end of the valve stem is shown as having a flat head or enlargement 26 providing mass and weight at this end, aiding in the smooth, free, sliding operation of the valve. This smoothly balanced operation of the valve enables clearance between guide tube and tubular valve stem to be kept at a minimum such as to substantially prevent flow of liquid in between the valve stem and tube.

Quick removal of the valve stem may be effected by simply unscrewing the flanged sleeve off the lower end of the stem and after which the valve stem may be lifted up out of the guide tube.

The parts are few and of simple, uncomplicated design. The valve is easily put together or taken apart. No corners or crevices are left for accumulation of liquid or solids.

Because of freedom from crevices the valve is particularly suited for dispensing milk and easily contaminated liquids, such as fruit juices and the like. The valve is self-flushing in its action and this, with the line type of sealing, enables it to handle liquids containing solid or pulpy materials such as orange juice.

The weight makes the valve self-closing but, if desired, the action may be assisted by a spring or, particularly if space is limited, a closing spring may be substituted for the weight.

The straight-down, unimpeded discharge through the center of the valve stem makes the valve self-clearing and avoids drip. No liquid is trapped in the valve to contaminate fresh liquid subsequently drawn from the container. In addition to facilitating easy cleaning, the loose engagement of the sealing ring in the wide groove provided for the same permits the ring, under some circumstances, to adjust itself, as required, to make proper sealing engagement with the valve seat.

The cross passages or ports 17 and 22 may enter the central discharge passage in the valve stem on a downward slant and may extend in only through one side of the valve stem.

The straight up and down self-closing action of the valve stem assures smooth, quiet and quick valve opening and closing operation. In addition to sanitary advantages, the complete self-flushing action of the valve is of particular importance in the handling of refrigerated liquids such as milk and fruit juices, because the valve does not at any time hold any trapped, unrefrigerated or less refrigerated portion of liquid out of the main, refrigerated content of the tank or reservoir.

What is claimed is:

A sanitary dispensing valve comprising a guide tube the axis of which is to be upright in use and having a laterally extended flange at the upper end of the same, said flange and tube joined by a rounded edge faced toward the interior of the tube and forming an annular valve seat having a rounded bearing edge, a valve stem having a free sliding engagement in said guide tube, said valve stem having acentral discharge passage extending from the upper portion down through the lower end of the same and an inlet opening through the side of the valve stem into the upper end of the discharge passage, said valve stem having a shallow flat bottomed annular groove about the same above said inlet, an elastic sealing ring of circular cross section resiliently seated in said shallow groove and extending beyond the periphery of the stem to engage said rounded valve seat when the stem is lowered, said shallow groove being of greater axial extent than the cross sectional diameter of said circular sealing ring and having inclined side walls permitting said sealing ring limited rolling and wedging action in the groove, a valve operating discharge sleeve on the lower end of said tubular valve stem, said sleeve being of greater diameter and projecting laterally beyond the stem into position to operate as a stop shoulder engageable with the lower end of the guide tube to limit the lifting valve opening movement of the stem and having means enabling it to be used as a handle for lifting the valve stem and having sufficient weight to lower the valve stem to effect valve closing movement, said sleeve having readily separable screw threaded engagement over the lower end of the valve stem and whereby upon unscrewing said sleeve the valve stem may be lifted up out of the guide tube for cleaning or other purposes, said sleeve having a downwardly enlarged flaring discharge throat larger than the discharge passage for increasing surface tension and drawing liquid down the discharge passage in the valve stem, and the valve stem having an air inlet port in the side of the same above said discharge throat and below the lower end of the guide tube when the valve stem is in lowered, valve closed position but adapted to be covered by the guide tube when the valve stem is lifted to the extent permitted by engagement of the discharge sleeve with the lower end of the guide tube, and said inlet opening in the side of the valve stem being located in position to be covered by the guide tube when the valve stem is lowered into position with the sealing ring resting on the rounded valve seat and to be above the valve seat when the valve stem is lifted to the extent permitted by engagement of

the valve operating discharge sleeve with the lower end of the guide tube.

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