March 31, 1925. 1,531,794

O. LARSEN

BOTTLE FILLER VALVE

Filed Nov. 17, 1922 2 Sheets-Sheet 1

FIG. 1

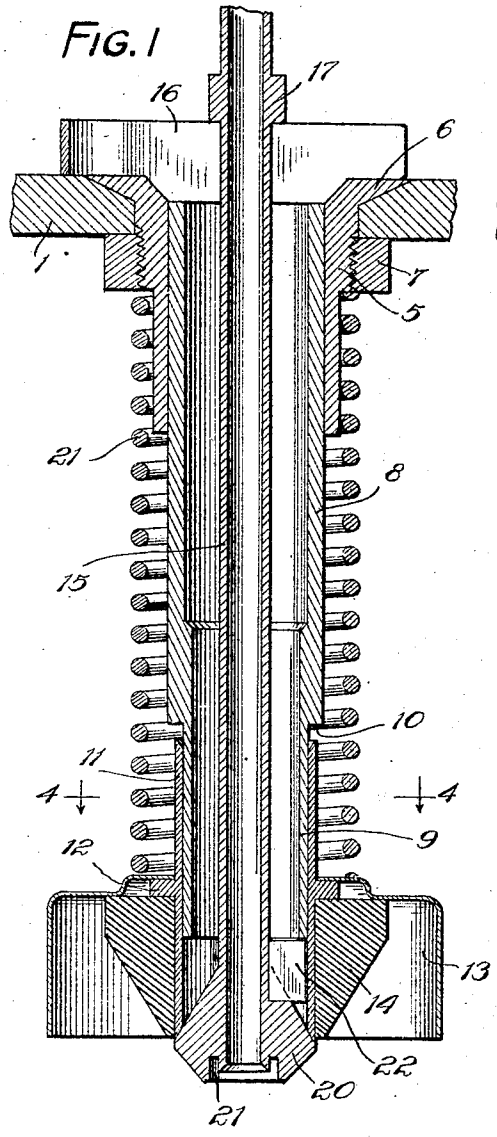

FIG. 2

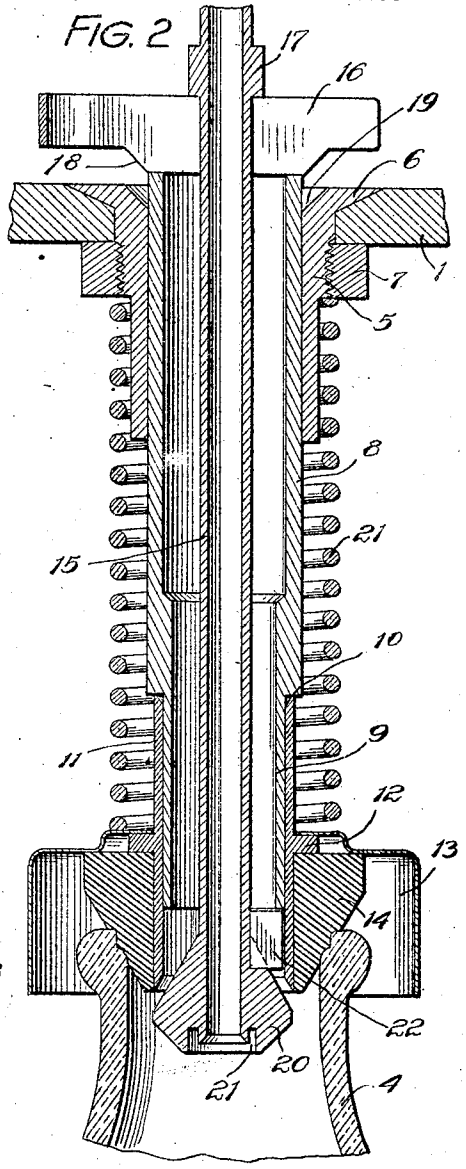

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FIG. 6

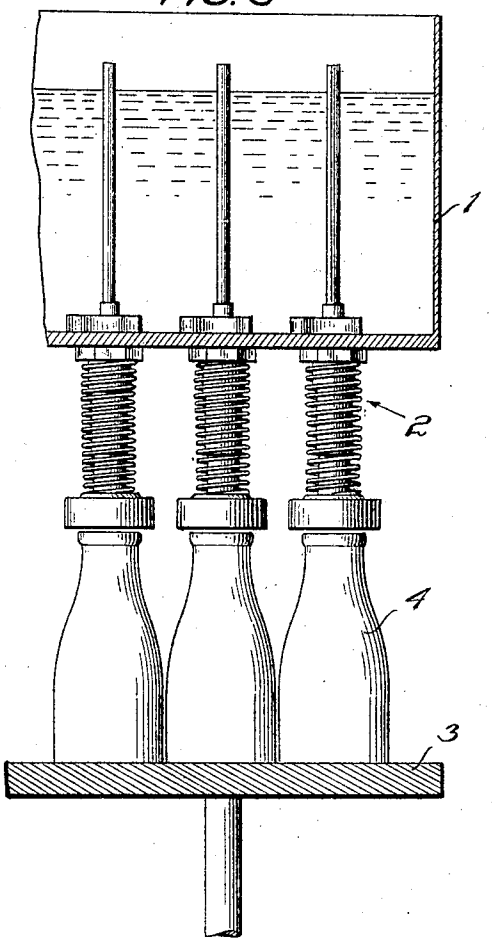


FIG. 3

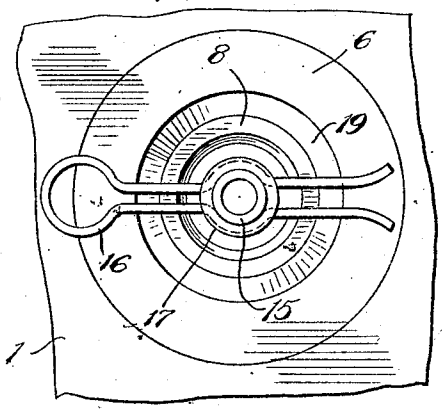
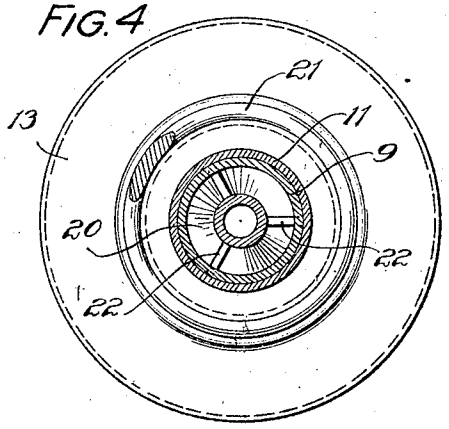


FIG. 4



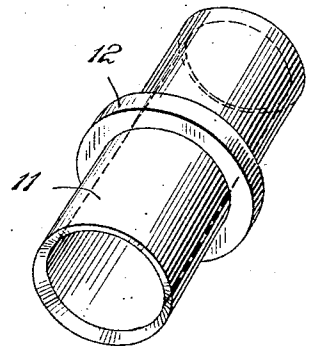


FIG. 5

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Patented Mar. 31, 1925. 1,531,794

UNITED STATES PATENT OFFICE.

OLAF LARSEN, OF FORT ATKINSON, WISCONSIN, ASSIGNOR TO THE CREAMERY PACKAGE MFG. COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BOTTLE-FILLER VALVE.

Application filed November 17, 1922. Serial No. 601,479.

To all whom it may concern:

Be it known that I, OLAF LARSEN, a citizen of the United States, residing at Fort Atkinson, in the county of Jefferson and the State of Wisconsin, have invented certain new and useful Improvements in Bottle-Filler Valves, of which the following is a specification.

The invention relates to the valves employed in liquid container filling apparatus for controlling the discharge of liquid from a reservoir into the bottles or other containers and more particularly relates to such valves in apparatus adapted to the bottling of milk.

The usual construction of such apparatus includes a reservoir from which depend one or more discharge tubes, each having a terminal discharge orifice controlled by valve mechanism operable by contact with the bottle to be filled.

It is an object of this invention to provide a filler valve in which the opening and closing of the discharge orifice is accomplished positively so that any accumulation of thickened liquid or slight friction between the parts will not cause the valve to adhere to its seat and fail to open, as often occurs when the opening operation is effected by gravity alone.

Another object is to provide a reversible valve seat, thereby enabling immediate repair without material loss of operating time in case of injury to the seat and consequent leakage from the valve orifice.

Other objects and advantages will be apparent in the following description of a preferred embodiment of my invention which I have selected for illustration in the accompanying drawings.

In the drawings, Fig. 1 represents a vertical sectional view of a discharge tube and controlling valve mechanism in closed position. Fig. 2 is a similar view of the parts in open position. Fig. 3 is a plan of the parts viewed from the interior of the supply reservoir. Fig. 4 is a horizontal sectional view taken on the plane of the line 4—4 in Fig. 1. Fig. 5 is a detailed view of the reversible seat member. Fig. 6 represents an operative assembly of the valve in filling apparatus.

Referring first to Fig. 6, the apparatus may be described generally as comprising a reservoir 1 in the bottom of which are positioned dependent discharge tubes 2 communicating with the interior of the reservoir and carrying valve mechanism controlling their discharge orifices at their lower ends. A vertically reciprocatory support 3 is operable to lift the bottles 4, manually or automatically positioned thereon in register with the discharge tubes, causing the mouths of the bottles to engage the valve mechanism of the respective tubes, effect a seal therewith, open the valves, and receive milk into the bottles. The support 3 then descends, withdrawing the bottles from the filling tubes and permitting the valves to close against further discharge.

Referring now more specifically to the filler tube and valve construction as illustrated in Figs. 1 to 5, a guide ring 5 is positioned in an appropriate opening in the bottom wall of the reservoir, preferably having a flared portion 6 extending over the reservoir wall, and secured in liquid tight attachment preferably by means of a collar 7 threaded on the guide ring in abutment with the underside of the reservoir wall.

Supported within the guide ring 5, and in liquid tight sliding engagement therewith, is a tube 8 extending a substantial distance below the guide ring. The lower portion 9 of the tube 8 is of reduced outer diameter terminating upwardly in a shoulder 10. Overlying the portion 9 of the tube 8 is a sleeve 11 in liquid tight slidable relation thereto and extending below the end of the tube. A yielding annular bottle closure 14, preferably rubber, removably surrounds the lower portion of the sleeve 11 and abuts a collar 12, fixed on the mid-portion of the sleeve 11. A bell member 13, supported on the collar 12, forms a canopy about the lower end of the sleeve 11 to prevent the lateral spray and loss of milk escaping through an imperfect seal between a damaged bottle and the closure 14.

Positioned centrally within and in spaced relation to the tube 8, is a vent tube 15 extending upwardly into the reservoir to a height above the level of the contained milk or other liquid. The vent tube 15 may be supported by a removable spring clip 16 embracing the tube below a collar 17 fixed on the tube and resting upon the clip. The clip 16 may be provided with tapered extensions

18 on its lower edges proportioned to fit the tapered mouth 19 of the guide ring 6, and thereby maintain the vent tube in central position.

The lower end of the vent tube 15 carries an annular valve member 20 projecting outwardly of the sleeve 11 and of sufficient diameter to effect a closure of the lower terminal opening of the sleeve when in abutment with the sleeve end. Closure of the sleeve end opening or discharge orifice is normally maintained by a coiled spring 21 confined at its lower end by the sleeve collar 12 and the upper wall of the bell 13 and at its upper end by the collar 7. The spring tends to force the sleeve 11 into engagement with the valve 20, and thereby draw down the vent tube 15 to the limit of engagement between the clip 16 and the guide ring 6, in which position the valve orifice is closed.

The upper surface of the valve 20 is preferably conical, the engaging end of the sleeve 11 being suitably shaped to form a seat therefor. The lower surface of the valve also may be tapered to facilitate the flow of passing liquid, and is preferably provided with an annular recess 21 about the terminal opening of the vent tube to prevent the premature back flow through the vent tube of liquid flowing over the valve, and preventing the consequent interference with the discharge through the vent tube of the air being displaced from the bottle by the inflowing liquid.

The upper end of the sleeve 11 also is shaped suitably to form a seat for the valve 20, and in case of injury to the operative lower end, the clip 16 may be removed from the vent tube, the latter withdrawn downwardly, and the sleeve 11 with its supported parts removed from the tube 8. By simply reversing the positions of the bell 13 and closure 14, the sleeve 11 may be reversably assembled on the tube 8, providing thereby a new seat for the valve.

Positioned on the vent tube 15 adjacent the valve member 20, are a series of fixed radial arms or vanes 22 extending proximately to the lower end of the tube 8 and to the inner surface of the sleeve 11, the vanes 22 serving to assure the positive opening of the valve 20 and also to maintain the latter in central position relative to its seat.

When the parts are in normal position effecting a closure of the valve, the upper end of the sleeve 11 is spaced from the shoulder 10. Upon the lifting engagement of a bottle with the closure ring 14, the sleeve 11 is lifted until it abuts the shoulder 10, and with the further rise of the bottle the tube 8 is also carried upward through the guide ring 6. The lesser amount of friction between the sleeve 11 and the tube portion 9 than between the tube 8 and the guide ring 6, due to the smaller bearing area, assures the closing of the space between the end of the sleeve 11 and the shoulder 10 before the tube 8 is lifted. The relative movement of the sleeve in closing this space determines the extent of the opening of the discharge orifice. The further lift of the mechanism carries upward the clip 16 and maintains the vent tube and valve supported thereon in constant relation to the discharge tube. It will here be apparent that a uniform filling flow of liquid may be obtained without variation due to slightly varying heights of the bottles.

If the valve 20 tends to adhere to its seat and rise with the sleeve 11, the vanes 22 immediately are engaged by the end of telescoping portions 9 of the tube 8, and with the initial movement of the sleeve 11 the valve is forced from its seat, thus assuring a positively and fully opened orifice during the filling operation.

It will now be apparent that I have provided a simple durable construction for the effective accomplishment of the purposes and objects set forth.

I claim as my invention:

1. A device of the class described comprising a liquid discharge tube, a sleeve removably mounted on said tube and over-extending an end thereof, said sleeve being endwardly reversible and having both ends adapted to form valve seats, a vent tube positioned in said discharge tube, and a valve member carried by said vent tube adapted to be seated upon the over-extending end of said sleeve.

2. A device of the class described comprising a liquid discharge tube, a sleeve slidably mounted on said tube and over-extending one end thereof, said sleeve being endwardly reversible and having both ends adapted to form valve seats, a collar centrally positioned on said sleeve, a bottle closure interchangeably mounted on either end portion of said sleeve in abutment with said collar, a stop on said discharge tube limiting the inward movement of said sleeve, a vent tube within said discharge tube, a valve member carried by said vent tube adapted to co-operate with the over-extended end of said sleeve to control a flow of liquid from said discharge tube, and yielding means for normally maintaining said sleeve in seated relation to said valve member.

3. A device of the class described comprising a liquid discharge tube, a sleeve slidably mounted on said tube and over-extending the end thereof, a vent tube extending through said discharge tube, a valve member carried by said vent tube adapted to be seated upon the outer end of said sleeve, said sleeve being operable inwardly from said valve member to open an orifice therebetween, and a radial arm on said vent tube extending proximately to the end of said dis-

charge tube adapted to be engaged thereby upon the inward movement of said sleeve to dislodge said valve member from its seat.

4. A device of the class described comprising a liquid discharge tube, a sleeve slidably mounted on said tube and over-extending the end thereof, a vent tube extending through said discharge tube in spaced relation thereto, a valve member carried by said vent tube adapted to be seated upon the outer end of said sleeve, said sleeve being operable inwardly from said valve member to open an orifice therebetween, and a plurality of radial arms on said vent tube extending proximately to the inner wall of said sleeve and to the end of said discharge tube, said arms being adapted to maintain laterally the position of said valve member and to be engaged by the end of said discharge tube upon the inward movement of said sleeve to dislodge said valve member from its seat.

5. In a device of the class described, a support having a guide bearing with a tapered end portion, a discharge tube slidably mounted in said bearing, a vent tube extending through said discharge tube in spaced relation thereto, a valve member carried by said vent tube adapted to operatively effect the closure of one end of said discharge tube, a clip embracing said vent tube adjacent the opposite end of said discharge tube, and a tapered projection on said clip adapted to enter the tapered portion of said bearing to centrally position said vent tube relative to said discharge tube.

6. A device of the class described comprising a guide ring, a liquid discharge tube slidably supported in said guide ring, an endwardly reversible sleeve slidably mounted on said discharge tube and extending outwardly from the end thereof, a stop on said discharge tube limiting the inward movement of said sleeve, a vent tube extending through said discharge tube, a valve mounted on one end of said vent tube adapted to be seated upon the extended end of said sleeve to effect a closure of said discharge tube, supporting means for the other end of said vent tube adapted to limit movement thereof inwardly of said guide ring, and spring means bearing upon said guide ring and said sleeve adapted to yieldingly maintain said sleeve in seated relation to said valve member, said sleeve being operable inwardly from said valve member into abutment with said stop to effect an opening of pre-determined extent between said sleeve and said valve member, and being further operable in such position to move said tube through said guide ring.

In witness whereof I have hereunto set my hand.

OLAF LARSEN.