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 depends one or more discharge tubes, each having a terminal discharge orifice controlled by a 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 vent tube, ordinarily provided for the escape of air from the bottle being filled, is adjustably controllable to vary the rate of flow of the escaping air, and thereby vary the rate of flow of the inflowing milk or cream suitable to the variable conditions or temperature and consistency of the liquid so that the formation of froth may be minimized.

Another object is to provide means associated with the vent tube for its maintenance in centralized position within the discharge tube so that the valve member carried on the lower end of the vent tube is assured of being opened with a uniform orifice and is tightly seated when closed.

A further object is to provide means for rendering inoperative, when desirable, certain of the valves in the filling apparatus, and permit their being raised by contact with the bottles, as in normal operation, but without discharging milk into the bottles.

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 similar view including the valve cap for rendering the valve inoperative. Fig. 4 is a sectional plan view taken on the plane of the line 4—4 in Fig. 3. Figs. 5 and 6 represent respectively the vent tube controlling device and the removable cap for rendering the valve inoperative.

Referring to the drawings, the numeral 1 indicates a fragmentary portion of the bottom wall of the reservoir in a bottle filling apparatus. A guide ring 2 is positioned in an opening through the bottom wall 1, and is preferably secured in position by a flared portion 3 projecting over the reservoir wall and a collar 4 threaded on the guide ring in abutment with the underside of the wall. Slidably supported within the guide ring 2 is a discharge tube 5 extending a substantial distance below the guide ring. A yielding annular bottle closure 6, preferably rubber, is removably mounted on the lower end of the tube 5 and abuts a collar 7 fixed on the tube. A bell member 8, supported on the collar 7, forms a canopy about the lower end of the discharge tube to prevent lateral spray from an imperfect seal between a damaged bottle and the closure 6.

Positioned centrally within and in spaced relation to the discharge tube 5 is a vent tube 9 extending upwardly into the reservoir to a height above the level of the contained milk or other liquid. The vent tube 9 is supported by a removable spring clip 10 embracing the tube below a collar 11 fixed upon the tube and resting upon the clip. The clip 10 is provided with tapered extensions 12 on its lower edges which engage with self-centering effect the tapered mouth 13 of the guide ring 3, and thereby maintain the vent tube in central position when the valve is closed. Further extensions 14 are also provided on the clip 10 which are proportioned to enter the upper end of the discharge tube 5, when the latter is raised in the operation of the valve, and which serve to retain the vent tube in central position after the clip has been raised from its seat within the tapered mouth of the guide ring. Similar extensions may be formed on the upper edges of the clip so that the latter is reversible in position.

The lower end of the vent tube 9 carries an annular valve member 15 projecting outwardly of the discharge tube 5 and of sufficient diameter to effect a closure of the lower terminal opening of the discharge tube.
when in abutment with the tube end. Closure of the tube end opening or discharge orifice is normally maintained by a called spring 18 confined at its lower end by the collar 7 and upper wall of the bell 8 and at its upper end by the collar 4. The spring tends to force the discharge tube downward into engagement with the valve member 15, and thereby draw down the vent tube 9 to the limit of engagement between the clip 10 and the guide ring 3, in which position the valve orifice is closed.

The upper and lower surfaces of the member 15 are preferably of conical shape to facilitate the flow of the passing liquid, and may be provided with an out-flowing recess 15' at the end of the vent tube opening through the valve member to prevent the premature back flow through the vent tube of liquid flowing over the valve member, and avoid consequent interference with the escape through the vent tube of the air being displaced from the bottle by the inflowing liquid.

When the parts are in normal position effecting a closure of the discharge orifice, the upper end of the discharge tube 5 is spaced from the clip 10, as seen in Fig. 1.

Upon the elevation of a bottle, by suitable elevating means (not shown), into engagement with the bottle closure ring 5, as seen in Fig. 2, the discharge tube 5 is lifted through the guide ring 3 into abutment with the clip 10, thus effecting the opening of the lower orifice of the discharge tube to the extent of the space normally between the upper end of the tube 5 and the clip, and thereby assuring a uniform valve opening without respect to incidental variations in bottles. The further elevation of the bottle and discharge tube carries the clip 10 upwardly and maintains the vent tube and valve member 15 in constant relation to the discharge tube, their central position being preserved by the engagement of the clip extension 14 within the discharge tube.

As illustrated in Fig. 2 the parts are in position to discharge milk or other liquid from the reservoir into the engaging bottle. In view of the fact that temperature and other variable inherent conditions in milk and cream affect the rate at which the liquid will flow into the bottles with the formation therein of a minimum amount of froth, it is highly desirable to effect a quick and easy adjustment of the rate of flow. To that end I have provided means for controlling the rate of discharge through the vent tube of the air being displaced from the bottle by the inflowing liquid, thereby accomplishing control of the flow of milk by varying the resistance to the outflow of displaced air.

Referring to Figs. 1 and 5, the upper end of the vent tube 9 is provided with a cap 17 effecting a closure of the end of the tube. The cap is preferably slotted longitudinally for a portion of its length to permit resilient frictional engagement with the tube, and may also have a knurled band to facilitate manually turning the cap on the tube. Lateral openings 18 are provided in the end portion of the vent tube with which similar openings 19 in the cap 17 are registerable, wholly or partially as may be desired, by rotation of the cap upon the tube. It will thus be seen that the flow of the escaping displaced air through the ports 18 may be readily regulated by adjustment of the cap 17.

In certain types of bottle filling apparatus a bottle is filled by stages through successive engagement with a series of filler valves. For the smaller sizes of bottles it is desirable to render one or more of the series of valves inoperative so that there is no discharge of milk when the bottle engages these valves in its progress through the machine. For that purpose I have provided a plug-cap 20, illustrated in Figs. 3 and 6. The plug-cap 20 is supported by a plug 21, preferably slotted, adapted to be manually inserted in the lower end of the vent tube 9 and removably secured therein by frictional engagement. A conical cap 22 is carried by the plug 21, adapted to underlie the valve member 15 and extending internally sufficiently to receive the mouth of the bottle when the latter is raised in filling position. By this means the valve is raised without opening the discharge orifice, and the bottle passes through the position without receiving any liquid from that valve.

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

I claim as my invention:

1. In a device of the class described, a support having a 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 operate close one end of said discharge tube, a clip embracing said vent tube adjacent to and spaced from the opposite end of said discharge tube and adapted to abut said support, said vent tube having a stop in abutment with said clip, resilient means tending to maintain said discharge tube in contact with said clip whereby said clip normally is drawn into abutment with said support, 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, and an extension on said projection adapted to enter the adjacent end of said discharge tube.
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said discharge tube to maintain said vent tube in central position when said clip is moved by said discharge tube away from said support.

2. In a device of the class described, a support having a bearing, 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 operate in a manner to close one end of said discharge tube, a clip removably embracing said vent tube adjacent to and spaced from the opposite end of said discharge tube and adapted to abut said support, said vent tube having a step in abutment with said clip, resilient means tending to maintain said discharge tube in contact with said valve member whereby said clip normally is drawn into abutment with said support, and a projection on said clip adapted to enter the adjacent end of said discharge tube to maintain said vent tube in central position when said clip is moved by said discharge tube away from said support.

3. In a device of the class described, a support, a discharge tube slidably mounted in said support, a vent tube extending through said discharge tube in spaced relation thereto, a valve member carried by said vent tube adapted to close the end of said discharge tube, means carried by said discharge tube adapted to receive a moving bottle and thereby move said discharge tube independently of said valve member to open the end of said discharge tube, and means selectively attachable to said vent tube adapted to receive a moving bottle whereby said discharge tube and said valve member are moved jointly to maintain the closure of said discharge tube.

4. In a device of the class described, a support, a discharge tube slidably mounted in said support, a vent tube extending through said discharge tube in spaced relation thereto, a valve member carried by said vent tube adapted to close the end of said discharge tube, means carried by said discharge tube adapted to receive a moving bottle and thereby move said discharge tube independently of said valve member to open the end of said discharge tube, and a cap having a plug arranged for removable support in said vent tube, said cap underlying said valve member and bottle receiving means and being adapted for selective attachment to intercept said moving bottle and cause said discharge tube and valve member to move jointly.

In witness whereof I hereunto attach my signature.

OLAF LARSEN.