C. W. DESOBRY.

BOTTLE FILLING MACHINE.

APPLICATION FILED DEC. 13, 1920.

1,419,235.

Patented June 13, 1922.

4 SHEETS—SHEET 1.

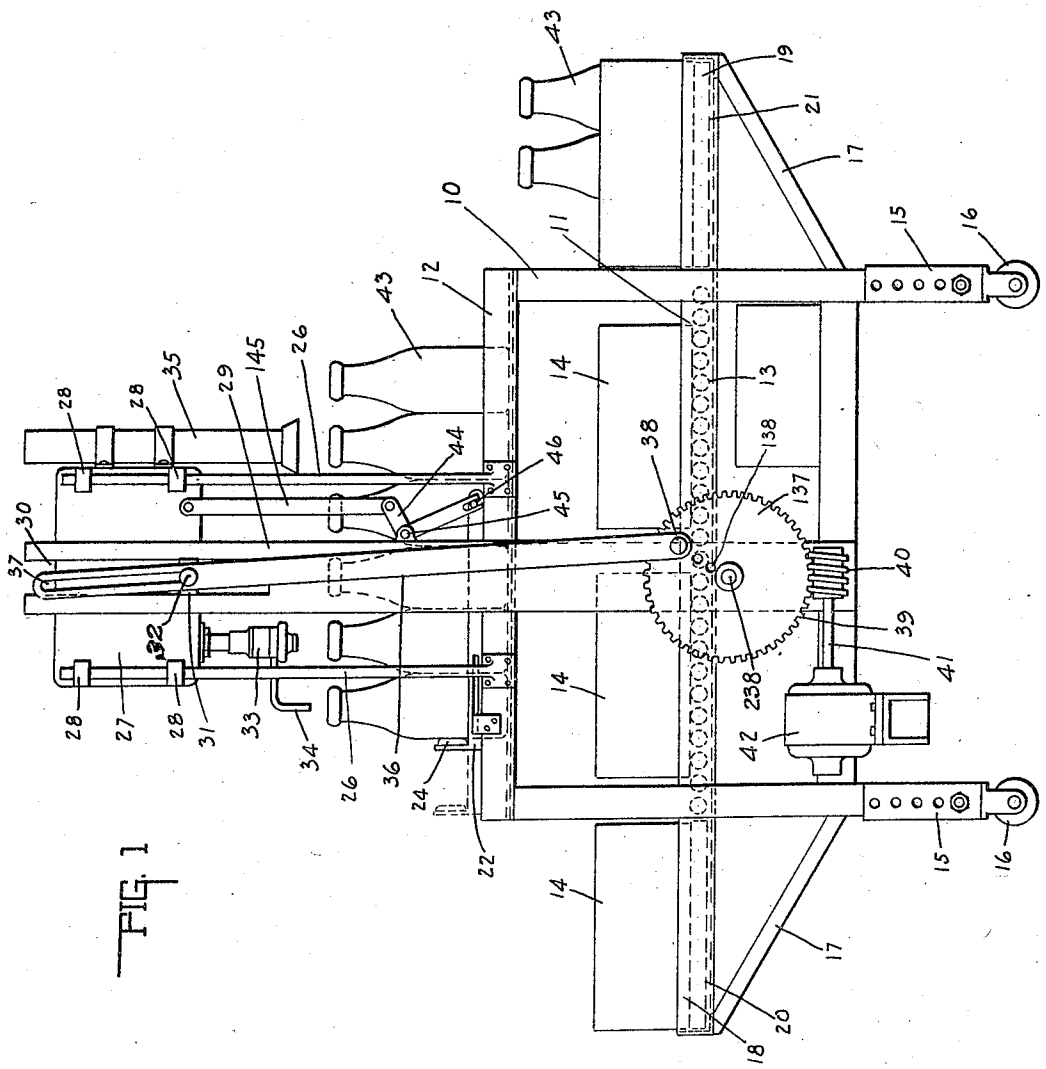


FIG. 1

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4 SHEETS—SHEET 2.

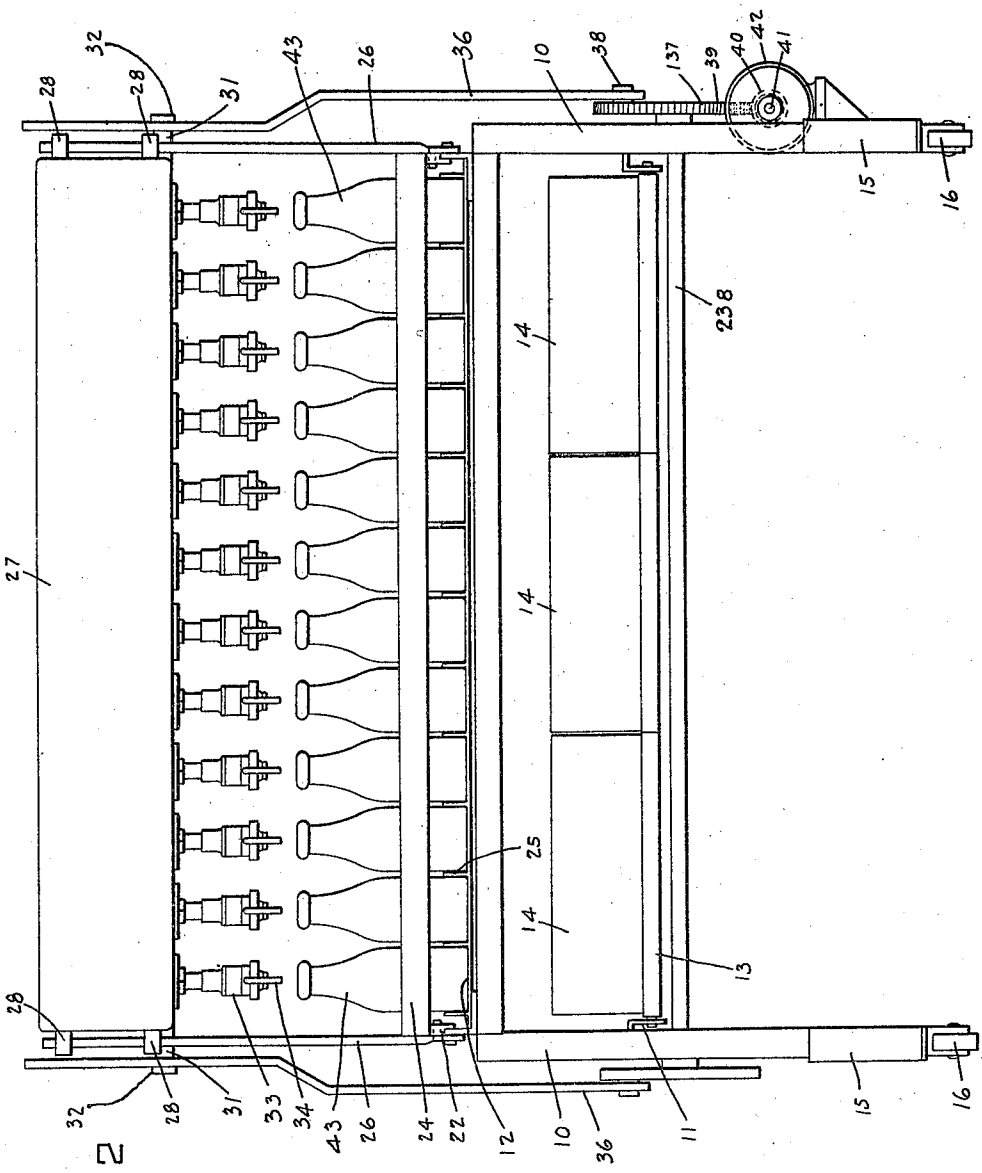


FIG. 2

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4 SHEETS—SHEET 3.

FIG. 3

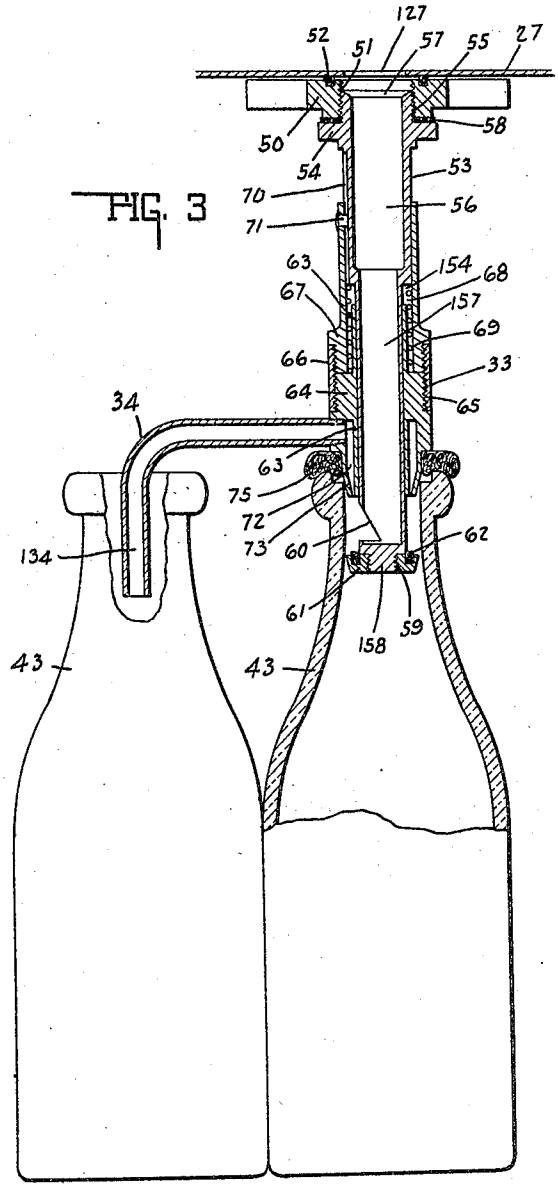


FIG. 4

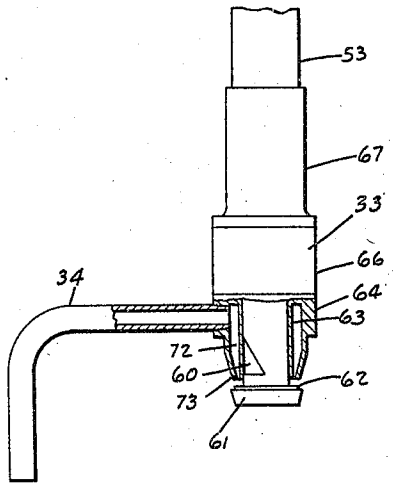
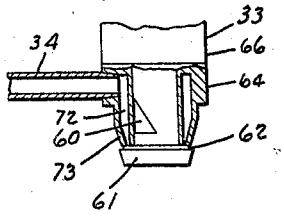


FIG. 5



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4 SHEETS—SHEET 4.

FIG. 6

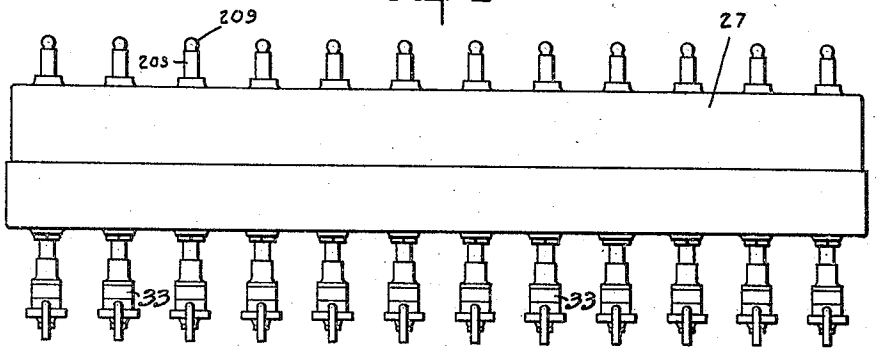
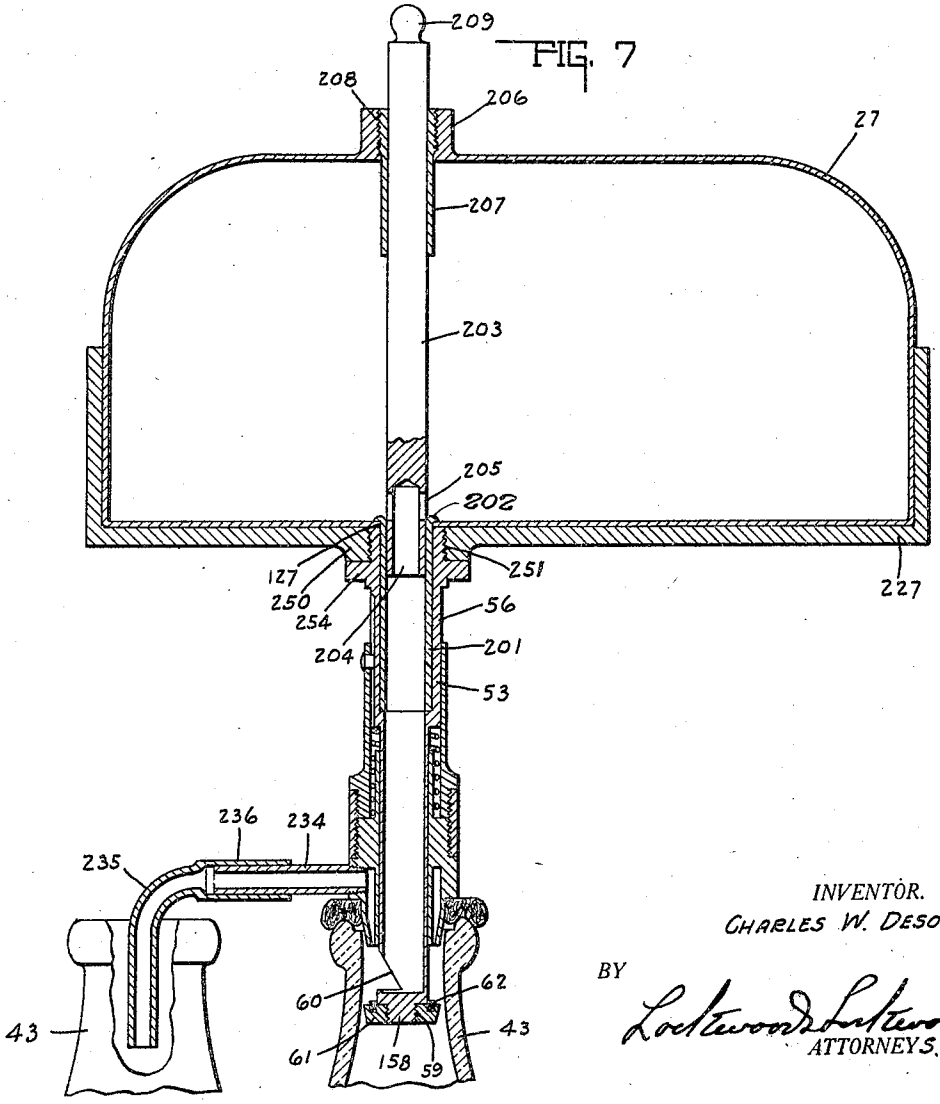


FIG. 7



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UNITED STATES PATENT OFFICE.

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BOTTLE-FILLING MACHINE.

1,419,235. Specification of Letters Patent. Patented June 13, 1922.

Application filed December 13, 1920. Serial No. 430,240.

To all whom it may concern:

Be it known that I, CHARLES W. DESOBRY, a citizen of the United States, and a resident of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Bottle-Filling Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention relates to a bottle filling machine wherein one or more bottles may be filled with a liquid, such as milk, from a reservoir.

The chief object of the invention is to provide means for filling milk bottles and the like in a more efficient manner than that heretofore employed by filling said bottles under pressure.

The chief feature of the invention consists in filling the bottles by a plurality of filling operations, wherein each bottle is passed through the successive filling operations.

Another feature of the invention consists in associating the usual air vent means with the filling means to secure plural stage filling thereby permitting the bottles to be filled under pressure.

Still a further feature of the invention consists in providing valve means for controlling the air discharge and filling channels, such that both of said valve means in the successive operation of the device will be closed or open and at still another time the air valve means will be opened and the filling valve means will be closed.

Still a further feature of the invention consists in providing the liquid discharging channel with a laterally discharging port, whereby the escaping liquid can not prevent the escape of air and said laterally discharging means when associated with the air channel means insures a circulatory system through the bottle and said means.

Another feature of the invention is the provision of valve means for controlling the size of the milk discharge aperture.

Another feature of the invention is that the before mentioned valve is adapted to cut off the filling tube from the reservoir when desired to permit the filling mechanism to be repaired or otherwise adjusted.

The full nature of this invention will be understood from the accompanying drawings and the following description and claims.

In the drawings Fig. 1 is a side elevational view of the machine embodying the invention. Fig. 2 is an elevational view of said machine showing the receiving end thereof with the receiving platform and associated parts omitted. Fig. 3 is an enlarged central sectional view of the filling tube and combined air vent and pre-filling tube with which the filling machine illustrated in Figs. 1 and 2 is equipped. Fig. 4 is a side elevational view of a portion of the filling tube and air vent associated therewith, parts being broken away to show other parts in detail and the filling tube valve in closed position and the air vent valve in open position. Fig. 5 is a similar view showing both of the before mentioned valves in the closed position. Fig. 6 is a side elevational view of a modified form of fluid reservoir and filling tubes. Fig. 7 is an enlarged central sectional view of the vent tube, filling tube and fluid reservoir shown in Fig. 6.

Before proceeding with a description of the details of the filling tube and air vent associated therewith, the general plan of assembly and operation of the entire machine will be given. In said drawings the side frames of the machine are indicated by the numerals 10, and said side frames provide superposed trackways 11 and 12. The trackway 11 supports a plurality of rollers 13, and said rollers are adapted to support the bottle receiving boxes 14. Each of the side frames 10 is provided with suitable supporting feet 15. At each end of the feet and pivotally supported thereby are the caster rollers 16, whereby the filling machine may be moved from one position to any other desired position. To the side frames 10 there are secured, by means of the brackets 17, a receiving platform 18 and a discharging platform 19. Associated with each platform are the rollers 20 and 21 respectively for conveying the bottle receiving boxes 14 to the filling machine and conveying the same therefrom, as indicated in Fig. 1. Slidably supported upon the trackway 12 is a carriage 22 provided with a transversely extending bar 24 which is adapted to engage the milk bottles and the like positioned upon the trackway 12

and move the same from the dotted line to the full line position indicated in Fig. 1, thereby moving the bottles through the machine intermittently or with a step by step movement. Associated with the trackway 12 is a plurality of guiding members 25 which extend transversely of the transverse bar 24 and are positioned at right angles to said trackway or plate portion 12, thereby providing a plurality of parallel tracks or grooves in which the plurality of bottles may be guided and moved through the machine.

Suitably secured to each of the side frames 10 is a plurality of, and preferably a pair of guides or standards 26 which extend upwardly from the side frames and at the sides of the trackway 12 and in parallel relation with each other. A liquid or milk containing tank or reservoir 27 is provided with a plurality of lugs 28 which are slidably supported upon the guide standards 26. Positioned intermediate each pair of guides 26 and preferably at each side of the tank 27, is a standard 29, which standard is provided with a slot or groove 30 in which is slidably positioned a block 31 carrying the pin 32. The block 31 is suitably secured to the tank 27 and suitable means is associated with the pin 32 for reciprocating said tank which is herein illustrated as provided with filling tubes 33, air vent tubes 34 and capping means 35. The means for reciprocating the tank 27 with the filling tube 33, air vent tube 34 and the capper 35 comprises a connecting rod 36 at each side of the standard 29 and each end of each of said connecting rods 36 there is provided an elongated slot 37 in which the pin 32 is slidably positioned. The means for reciprocating the connecting rods 36 comprise a plurality of plate members 137 which carry the eccentric pins 38 pivotally connecting one end of the connecting rods. The plates 137 are supported by a shaft 238. The slidable connection provided by the slots 37 permits relative movement between the rods 36 and the tank, thus enabling the tank to rest with valves open upon the bottles during the movement of the rods through the lower arc in the rotation of the disks 137.

In the present invention one of the plates 137 is preferably provided with a toothed periphery 39 to engage a worm gear 40 carried by a shaft 41 rotatable by suitable power means, such as the electric motor 42, preferably rigidly secured upon the framework of the machine. From the foregoing it will be understood that as the eccentric pin 38 revolves, the connecting rods 36 are elevated and lowered, thereby elevating and lowering the pins 32 with respect to the platform 12. Thus the tank 27, filling tubes 33, air vent tubes 34 and cappers 35 are reciprocated towards and away from the platform 12 upon which is positioned the bottles 43.

The means for reciprocating the carriage or transverse bar 24 comprises a bell crank lever 44 pivotally supported in a bracket 45 upon the standard 29. One end of the bell crank 44 is connected by a link 145 to the reciprocating tank 27, whereas the other end of the bell crank 44 is provided with a pin and slot connection 46 associated with the carriage 22. Thus when the link 145 is moved towards the platform 12 synchronously with the tank, the carriage or transverse bar 24 is moved rearwardly from the full line position to the dotted line position. The operator then removes the bottles from the boxes 14 upon the receiving platform 18 and positions said bottles in the grooves or channels formed upon the platform 12, such that said bottles will be moved into position when said carriage is moved forwardly. The carriage is moved forwardly from the dotted to the full line position by the upward movement of the tank 27. From the foregoing it will be understood that while the capping and filling mechanisms are in position adjacent the bottles and performing the several functions connected therewith, the carriage is stationary and when said mechanisms are being moved into and out of operative positions adjacent the bottles, the bottles are moved from one position into the next successive position for subsequent successive operation.

Reference will now be had to the details of the filling mechanism, a description of the capping mechanism being omitted since the same may be of the usual or any preferred construction. Since all of the filling tubes indicated by the numeral 33 in Figs. 1 and 2 and the air vent tubes associated therewith indicated by the numeral 34 are substantially similar or identical, a description of one of each will suffice for an understanding of them all and, therefore, reference will be had to Figs. 3 to 5 inclusive. In said figures 27 indicates the tank or reservoir adapted to contain the liquid with which the bottles 43 positioned therebeneath are to be filled, which liquid may be milk. Milk, however, is of such a nature that in filling a vessel or container with the same, the air in the container mixes with the milk to form bubbles, and means must be provided for permitting the escape of the air and the air bubbles so that when the bottle is filled there will be substantially no void therein resulting from the collapse of the bubbles. Heretofore this has been accomplished by multi-stage filling, wherein the bottles were successively filled to predetermined amounts, between which filling operations the air bubbles formed thereby were permitted to escape or collapse. How-

ever, this form of multi-stage filling requires an excessive length of time for the reason that the air bubbles had to be dissipated. The other idea for quickly filling a bottle was to completely fill the bottle with liquid and pass the air bubbles and discharged air from said bottles and collect the same in any suitable manner. The present invention, therefore, is an improvement upon both of the foregoing systems by combining the advantages of each and eliminating the disadvantages of both.

The generic idea of the invention consists in supplying liquid to a bottle and positioning the air vent means associated with a liquid discharging means such that the air vent means is adapted to discharge into an adjacent container or bottle for partially filling the same. This construction and arrangement permits bottles to be filled under pressure thereby expediting the filling of said bottles. Herein the bottle being filled may be supplied with liquid under gravity pressure or under a higher pressure until the bottle is filled and a further supply of liquid passes through the air vent means associated with the liquid discharging means and into the next succeeding vessel or bottle so as to begin the filling of the same. Thus, the first mentioned bottle will be completely filled and all of the air bubbles will be discharged therefrom into the adjacent succeeding bottle.

The construction in detail is as follows: The tank or reservoir 27 is provided with an opening 127 see Fig. 3 and positioned adjacent said opening and surrounding the same is a suitable collar or flange 50 which is provided with an interiorly threaded opening 51 concentric with and communicating with the opening 127. The collar 50 is suitably secured to the tank 27. Between the tank 27 and the flanged collar 50 is the usual packing or sealing means 52 to prevent the escape of fluid therefrom. A filling tube 53 is provided with a circular flange or collar portion 54 adjacent its upper end and is exteriorly threaded at 55 so as to be receivable by the interiorly threaded opening 51. A longitudinal discharge channel 56 extends through said tube, as shown. Suitable packing means 58 is associated between the collar portion 54 and the flange 50 so as to provide a pressure and fluid tight joint between said cooperating members, as shown. The tubular portion 53 is reduced in diameter at 154 to provide a circular bearing portion, and said reduced portion is also provided with a reduced channel 157 communicating with the channel 56. The channel 157 terminates in a closed portion 158 which is reduced and externally threaded at 59. Immediately above closure portion 158 is a triangular opening or aperture 60, which opening, aperture or orifice communicates with the channel 157 and discharges laterally or angularly thereof instead of longitudinally thereof, as heretofore has been the custom. A valve member 61 is secured to the closure portion 158 by means of the threaded connection 59 hereinbefore described, and said valve member 61 carries in its upper face suitable gasket or sealing means 62. Slidably supported upon the filling tube and adjacent the restricted portion thereof is another tube portion 63 concentric with said restricted tube portion forming the channel 157. The tube 63 is provided with an outwardly extending circumferential flange 64 which is reduced at 65 to provide a threaded engagement for a locking sleeve 66. Associated with the portion 64 and the locking sleeve 66 is another sleeve 67 which is spaced from the sleeve or tube 63 to form a cylindrical chamber 68 in which is positioned a coil spring 69. The other end of the sleeve 67 extends upwardly and is concentric with and slidably supported upon the tube 53 and said tube 53 is provided with a slot or groove 70 in which is slidable a pin or tooth member 71 carried by the sleeve 67 so that the tube 63 and associated mechanism is non-rotatably positioned and slidably supported upon the tube 53. It will also be noted that the spring 69 is enclosed at all times by the before mentioned construction and is concealed from view, although ready access may be had thereto by means of the locking sleeve 66 hereinbefore described.

In the enlarged or flanged portion 64 of the tube 63 is formed an annular chamber herein termed the air chamber and designated by the numeral 72. Said chamber is formed by means of the tapered or conical wall 73 being positioned concentric the cylindrical portion of said tube 63. It will be noted, see Figs. 3, 4 and 5 that the tapered wall 73 and the tubular portion of the tube 63 terminate adjacent each other and in substantially the same plane to form an annular opening. When the tubular member 53 is elevated by means of the tank 27 being elevated as hereinbefore described, the sealing gasket 62 will be moved into position adjacent said annular opening, as shown in Fig. 5 and close and seal the same. The foregoing construction also provides that the triangular discharge aperture or orifice 60 in the fluid supply conduit will always be closed in the upward movement of the tubular portion 53 by the relatively downwardly movable lower tubular portion of the tube 63. As shown clearly in Figs. 4 and 5, the liquid discharging lateral orifice 60 is adapted to be closed before the annular air orifice hereinbefore described is sealed by the packing 62, and when said last mentioned packing seals the last mentioned orifice or chamber 72, it will be noted that the liquid valve is also sealed.

Communicating with the chamber 72 is the outwardly extending air vent tube 34 hereinbefore described, which is preferably bent and is provided with a depending portion 134 adapted to be positioned within the neck of the bottle. Also carried by the flange portion 64 of the tube 63 is the packing, gasket or cushion 75 such that when the valve or tube 53 is seated upon a bottle top, the mouth thereof is sealed from the atmosphere such that the liquid discharged through the communicating openings and channels 127, 157, 56, 57 and 60, will discharge into the bottle at one side thereof and force the air originally in the bottle upwardly into the chamber 72 at the opposite side thereof and through said chamber and the vent means 34 and 134 into the next adjacent bottle. Continued fluid flow results in the complete filling of the bottle with fluid beneath the tubular portion 53 until such time as the fluid discharges through the vent tube 34 into the next adjacent bottle to partially fill the same. It is thereby insured that all bubbes are removed from the first mentioned milk bottle, the bubbles in the partially filled bottle collapsing by the time the second mentioned bottle is positioned for complete filling. The foregoing construction, as will readily be perceived, permits said bottles to be filled under pressure thereby reducing the time of filling and increasing the efficiency of the filling machine.

It will, therefore, be understood that the bottle will be filled with bubbleless fluid to substantially the level of the tapered end 73 before the lateral orifice 60 is closed, and said lateral orifice 60 is closed before the air chamber 72 is cut off from communicating with the bottle neck and therefore the last remaining air bubbles are permitted to escape through the chamber 72 before said air chamber is cut off from communicating with the bottle. The valve 158 is maintained in the closed position by means of the spring 69 and thereby prevents overfilling of the bottles due to dripping which heretofore has prevailed with other types of filling machines. If the timed relation is such that the fluid is supplied to the bottle after the same is filled, the surplus fluid escapes to the adjacent partially filled bottle. Overfilling of the bottles causes considerable wastage of the fluid supplied thereto since the capacity of the bottle is limited due to the cap thereof, and furthermore if the bottle is overfilled that portion overflowing the same will be splashed and scattered around the machine by the capping mechanism when said bottle is presented thereto, thereby causing unsanitary conditions around the filling machine. Thus only the predetermined required amount of milk will be retained by each bottle.

From the foregoing the advantages will be apparent of having the air vent open at the top of the bottle neck and above the fluid discharge aperture instead of below the same and within the body of the bottle. The particular advantage, of course, is the filling of the bottle under pressure.

In Figs. 6 and 7 is illustrated a modified form of the invention wherein 27 indicates the tank substantially similar to the tank illustrated in the preceding figures unless otherwise changed as hereinafter described. Similarly the filling tubes are designated by the numeral 33 in Fig. 6. The reservoir 27, however, in this instance is supported upon suitable channel means 227 and the channel means in the present instance is provided with a plurality of collars, flanges or bosses 250, substantially similar to the collars 50 illustrated in the preceding figures. The tank as usual is provided with the opening 127 which registers with the boss 250 and associated with the boss 250 by means of the interiorly threaded opening 251 is another collar portion 254 forming the upper end of the filling tube 53 and by which the filling tube is secured to and in registration with the opening 127 so that the channel 56 of said filling tube registers with the opening 127. In the present instance, however, there is positioned in the channel 56 a sleeve 201 which extends upwardly through the filling tube and is suitably secured in the opening 127 and to the reservoir 27 by being turned so as to provide a gripping portion, or flared portion 202. Slidably supported in the sleeve 201 is a valve member 203 which at its lower end is provided with a longitudinal channel 204 and transversely extending ports or apertures 205 which communicate with the longitudinal channel 204 so that when the valve is in the position illustrated in Fig. 7 fluid will be discharged from the tank 27 through the ports 205, channel 204 into the sleeve 201 positioned in the channel 56. The stem of the valve member 203 extends upwardly through a sleeve 207 and is provided with a handle portion 209 at the upper end thereof. The sleeve 207 extends inwardly into the reservoir 27 and adjacent its upper end is provided with a threaded portion 208, which is receivable by the threaded collar or neck 206 formed upon the reservoir 27. The engagement of the valve stem 203 in the sleeve 207 is of such a fit that the valve member may be readily adjusted in position from the full open position shown in Fig. 7 to the closed position or any intermediate position, as desired, the friction between said sleeve 207 and said valve stem maintaining the valve in the adjusted position. Other suitable adjustable maintaining means may be provided if desired. It will thus be apparent that each of the filling tubes 53 may be cut off from the reservoir 27 when it is desired to prevent the flow of

fluid through said filling tube. This permits repairs to be made to the filling tube or adjustments thereto without disturbing the fluid in the reservoir 27. This feature of the invention prevents wastage of the fluid whenever accidents are encountered in the filling operation.

In Fig. 7 the vent means is shown provided with suitable means such that the same may be adjusted to the particular bottles to be filled. Thus, when quarts, pints or half pints are being filled the axial center of said bottles are at different distances from each other. Therefore, the lateral portion 234 of the vent tube terminates adjacent the bend thereof and the bent and depending portion 235 is provided with an enlarged sleeve portion 236 which telescopes the lateral portion 234. In the present invention frictional engagement of the telescoping vent tube and sleeve is deemed sufficient to maintain the depending portion 235 in the adjusted position.

While the invention has been described in great detail the same is not to be limited thereby, since said details are considered descriptive and not restrictive in character.

The invention claimed is:

1. A bottle filling device including in combination a filling tube communicating with a liquid reservoir, a second tube telescopically arranged upon said first mentioned tube to provide an air chamber, one of said tubes having a laterally discharging aperture therein, and a closed end adjacent thereto, both of said tubes being arranged to provide a longitudinal chamber therebetween, a coil spring concentric with said tube and positioned in said second mentioned chamber, whereby said tubes will be slidable longitudinally of each other to control said aperture, pin and slot means associated with both tubes for preventing relative rotation of said tubes, and vent means communicating with said first mentioned chamber and adjustably associated with said second mentioned tube.

2. A bottle filling device including in combination a filling tube adapted to communicate with a liquid reservoir, a chamber enclosing the lower end of said tube, said tube having a lateral discharging aperture therein, and the chamber having an arcuate opening between the inner and outer walls thereof, the inner wall of said chamber being adapted to control the lateral discharge aperture, and closure means for said tube adjacent the lateral discharge aperture and projecting transversely of said tube to control said arcuate opening.

3. A bottle filling device including in combination a filling tube adapted to communicate with a liquid reservoir, a chamber enclosing the lower end of said tube, said tube having a lateral discharging aperture therein, and the chamber having an annular opening between the inner and outer walls thereof, the inner wall of said chamber being adapted to control the lateral discharge aperture, and closure means for said tube adjacent the lateral discharge aperture and projecting transversely of said tube to control said annular opening.

4. A bottle filling device including in combination a filling tube adapted to communicate with a liquid reservoir, a chamber enclosing the lower end of said tube, said tube having a lateral discharging aperture therein, and the chamber having an arcuate opening between the inner and outer walls thereof, the inner wall of said chamber being adapted to control the lateral discharge aperture, closure means for said tube adjacent the lateral discharge aperture and projecting transversely of said tube to control said arcuate opening, and seal means supported by said closure means.

In witness whereof, I have hereunto affixed my signature.

CHARLES W. DESOBRY.