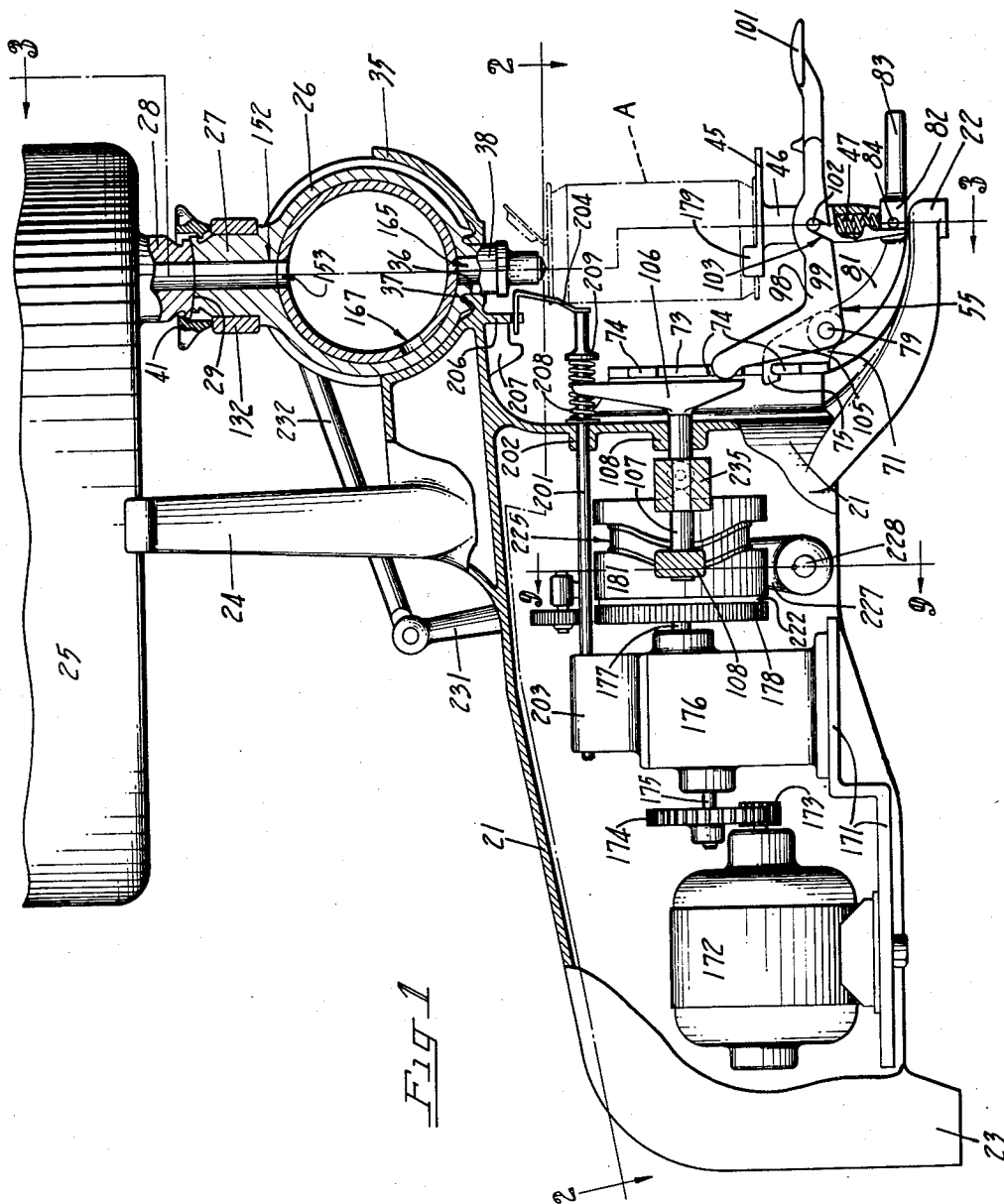


Aug. 8, 1944.

J. D. LE FRANK
CAN FILLING MACHINE
Filed Sept. 4, 1941

2,355,089

5 Sheets-Sheet 1



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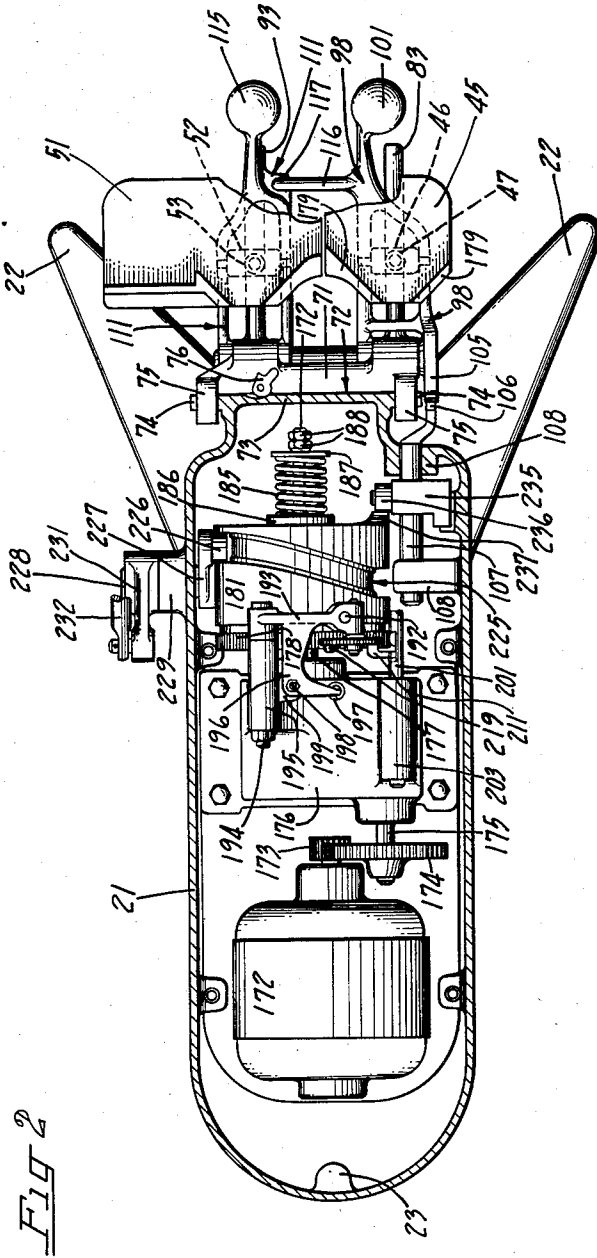
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CAN FILLING MACHINE

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5 Sheets-Sheet 2



Fig²

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CAN FILLING MACHINE

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5 Sheets-Sheet 3

Fig 3

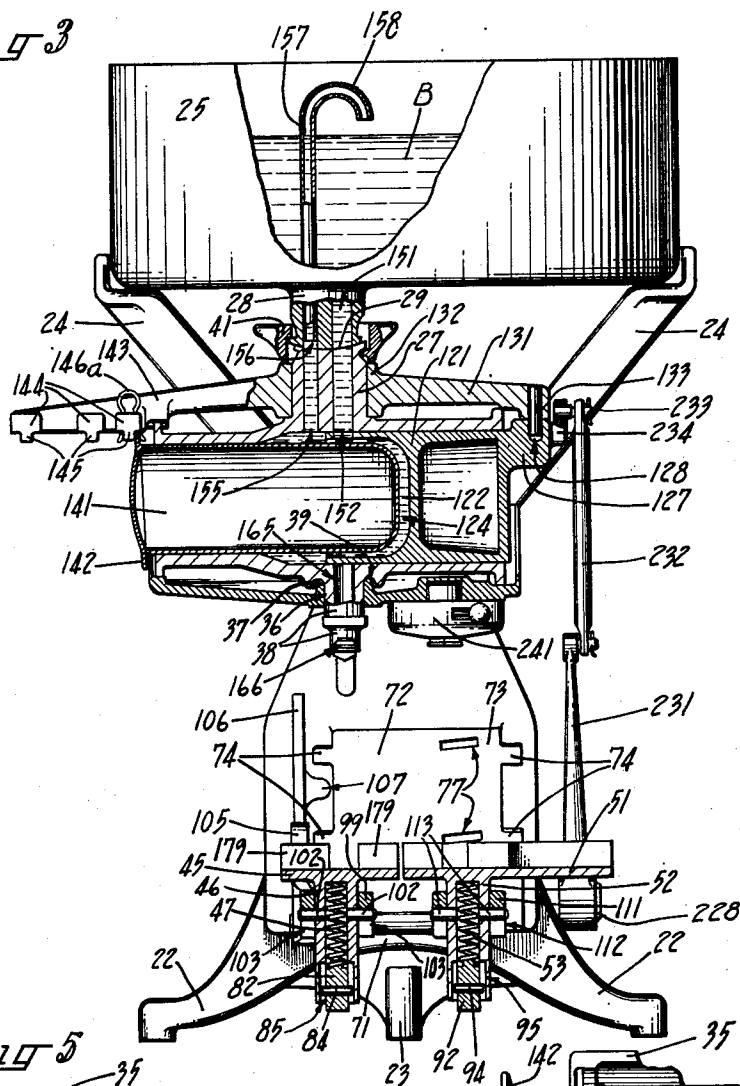


Fig 5

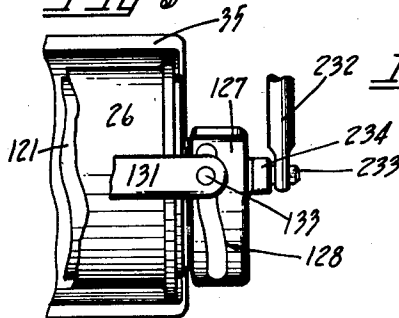
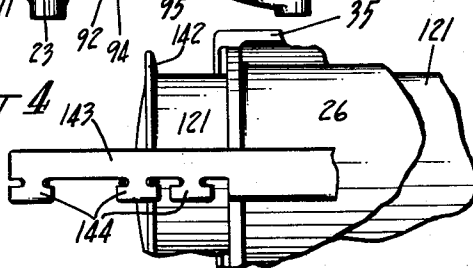


Fig 4



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CAN FILLING MACHINE

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Fig 6

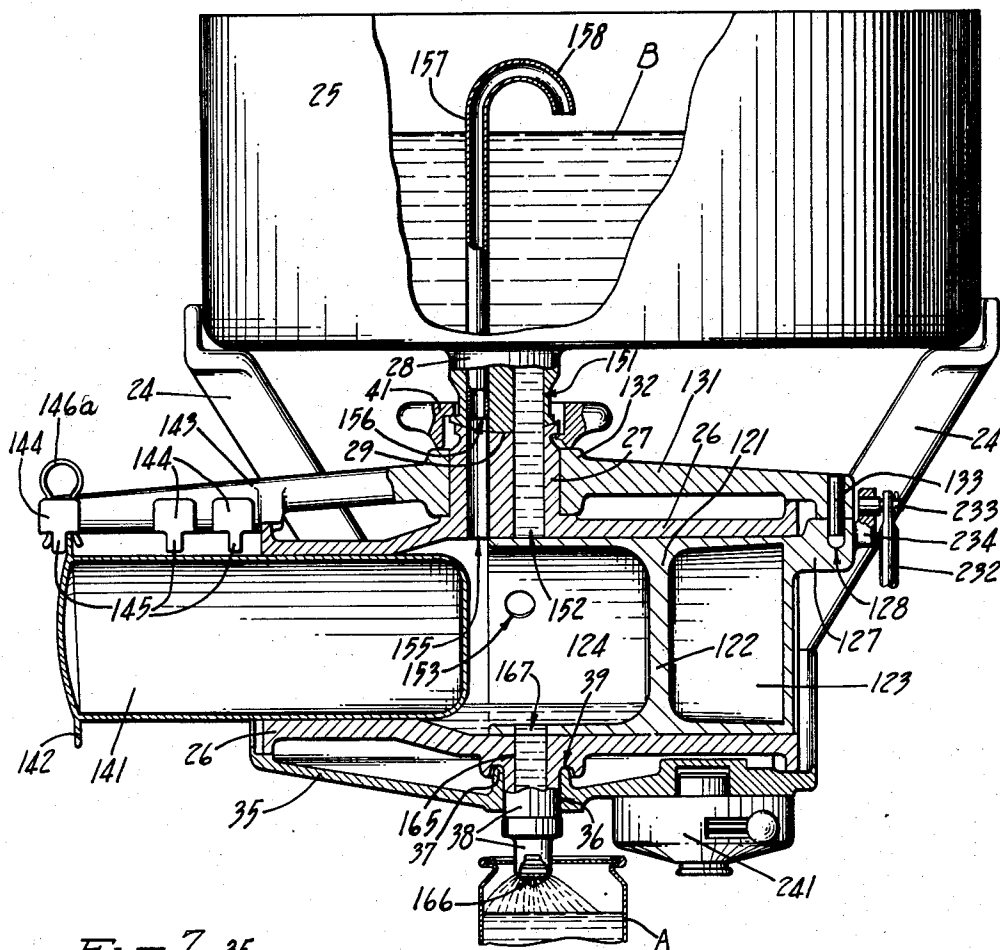


Fig 7

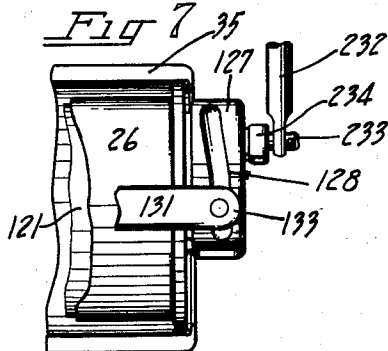
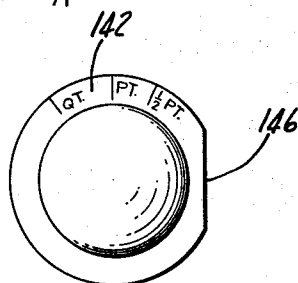


Fig 8



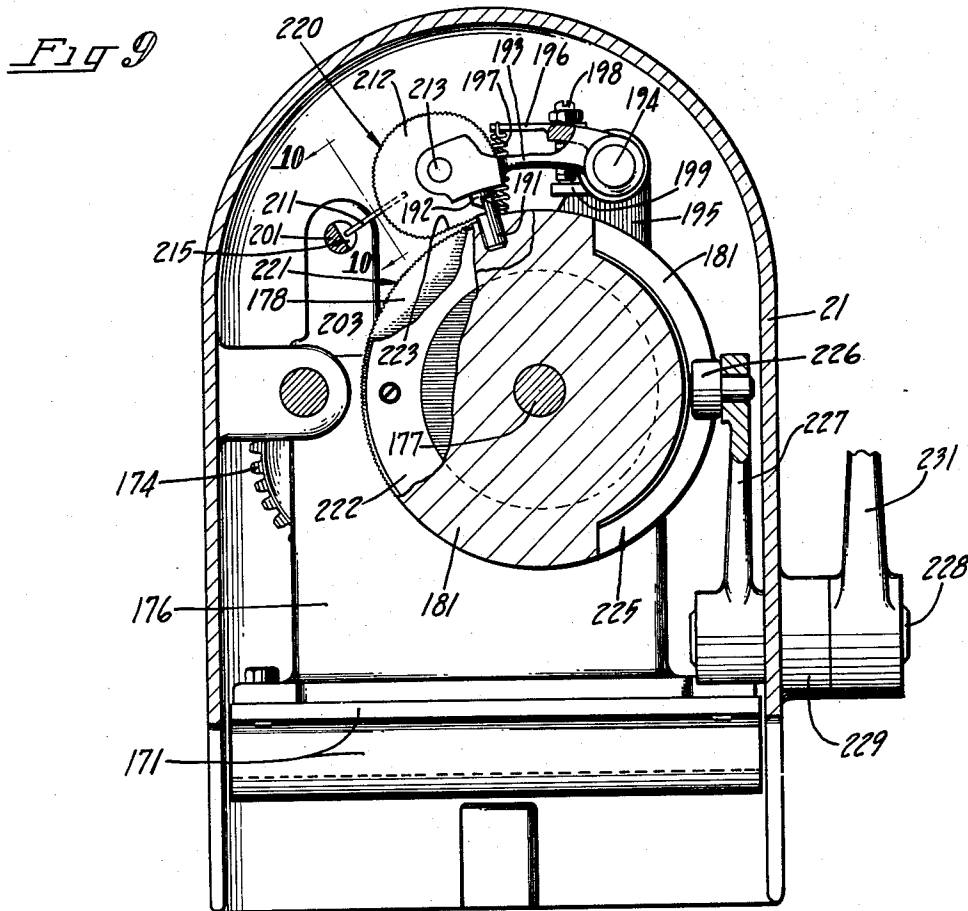
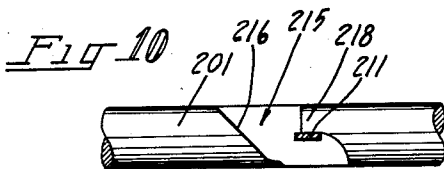
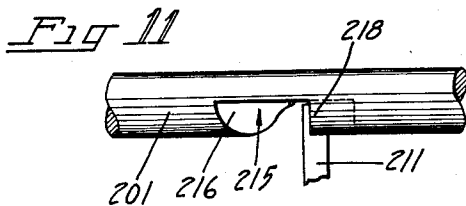
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2,355,089

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,355,089

CAN FILLING MACHINE

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corporation of New Jersey

Application September 4, 1941, Serial No. 409,578

11 Claims. (Cl. 226—128)

This invention relates to a machine for filling cans with measured quantities of liquid milk and is particularly adapted to the filling of milk into fibre containers, the machine being of a portable nature best adapted for the use of small canneries and packers who require only semi-automatic filling machinery of only limited capacity.

The machine embodying the present invention comprises broadly a supporting frame having an easily removable milk supply reservoir or tank and having measuring devices located beneath the tank. Provision is also made for supporting fibre milk cans in position for filling, the measured charge of milk being discharged into the can in a semi-automatic cycle of operation.

The present machine preferably also comprises a support for receiving the filled can and for holding it in position so that a hinge and plug type of closure secured to the top of the fibre milk can may be sealed in position for closing the filled can.

The filling and measuring device of the present invention is adjustable so that by a simple adjusting operation the measuring device can be set to fill a quart, a pint and a half-pint or other desired quantity of milk into a can of corresponding capacity. The containers are placed by hand into the machine and on the support platform and the act of positioning the container sets in motion the necessary mechanism for its filling operation.

An object of the invention is the provision of a portable machine for accurately filling measured quantities of milk into positioned containers.

It is also an object of the invention to provide such a machine which is operated through the medium of a constantly rotating motor and which has means for holding the filling mechanism out of operation until a container has been properly placed on the filling platform of the machine.

It is a further object of the invention to provide a portable machine for filling liquid into a positioned container, the filling and measuring elements being easily adjusted to provide for different filling capacities.

Another object of the invention is the provision in a machine of the character described of a single valve of the rotary type which in one position permits the liquid to flow into the measuring chamber and in another position permits discharge of the liquid into a container being filled.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a side elevation with parts broken away of a machine embodying the present invention;

Fig. 2 is a sectional plan view taken approximately along the broken section line 2—2 of Fig. 1;

Fig. 3 is a composite sectional view and front elevation as viewed substantially along the broken line 3—3 in Fig. 1;

Fig. 4 is an enlarged plan detail of the adjusting features for adjusting the size of the filling chamber;

Fig. 5 is a similar view of the opposite end of the machine and illustrating mechanism related to the discharge of the liquid into the container;

Fig. 6 is a view similar to Fig. 3, but on a larger scale, of the upper part of the machine and showing particularly the filling of a container;

Fig. 7 is a detail view similar to Fig. 5 but with the parts in a different position;

Fig. 8 is a detail view of one end of the valve as viewed from the left in Fig. 6;

Fig. 9 is an enlarged sectional view taken substantially along the line 9—9 in Fig. 1 and this shows the details of the driving mechanism; and

Figs. 10 and 11 are enlarged detail views of a control rod which is associated with the setting of the filling mechanism, Fig. 10 being viewed along a section line 10—10 in Fig. 9 and Fig. 11 being an elevation taken at right angles.

A portable machine for filling and closing container A and embodying the present invention is illustrated in the drawings and comprises a housing frame 21 (Figs. 1 and 3) which is mounted upon front legs 22 and a rear leg 23 (see also Fig. 2). The housing 21 is provided with inclined support arms 24 on which is mounted a liquid supply or reservoir tank 25.

The housing frame 21 at the front of the machine and over the front legs 22, supports a cylindrical valve casing or cylinder 26 which carries the filling mechanism of the machine, and which casing or cylinder encloses a measuring chamber. This casing 26 is extended at the top into a stem 27 which is adapted to engage a depending stem 28 formed on the reservoir tank 25. The upper surface of the stem 27 is concave as at 29 to provide a close contact fit for a

convex surface formed on the bottom of the tank stem 28.

To provide for quick assembly of the cylindrical casing 26 with the housing 21, the latter is formed with a semi-circular saddle 35 (Fig. 1) which is of a dimension on its inside curved surface, to fit the outside surface of the cylindrical casing 26. This saddle 35 has an opening 36 at its center and an annular rim 37 is formed in the saddle wall and surrounds this opening.

The cylindrical casing 26 is provided with a nozzle section 38 which is adapted to be passed down through the opening 36 in the housing section when the cylindrical casing is inserted into supported position. Nozzle section 38 of the casing is surrounded by a groove 39 in which the rim part 37 fits. This centers the cylindrical casing in its proper position.

When the cylindrical casing has been properly seated within the saddle 35, its stem 27 is vertically disposed. At this time the reservoir tank 25 may be slid along its supporting arms 24 so that the lower convex surface of the tank stem 28 is brought into close engagement with the concave surface 29 of the cylindrical casing.

When in this position the two stem members 27, 28 are locked together by a locking ring 41 which is formed with interrupted thread parts for engagement of both stems when the collar is turned into locking position. Since the cylindrical casing 26 carries most of the filling mechanism, this construction provides for easy and accurate location of the filling mechanism relative to the rest of the machine as will be understood more clearly as the description proceeds.

This allows for removal of the filling parts for cleaning and in a similar manner the reservoir tank 25 is also quickly removed from the rest of the machine. These parts can be dismantled and cleaned in a liquid bath or in any desired manner as often as necessary. The tank and the cylindrical casing and parts carried thereby constitute all of the mechanism which comes into contact with the filling liquid and, as will be hereinafter more fully explained, this removal of the filling parts in no way interferes with the other parts of the machine.

Directly beneath the cylindrical casing 26 when it is in position within the machine, is a can support platform 45 (Figs. 1 and 3) for the can A. A fibre milk can is shown by way of illustration. This platform 45 is formed with a hollow depending sleeve section 46 which is supported on a spring 47 located in the hollow sleeve part of the platform. This platform 45 or support is one of two platforms arranged side by side. The second platform, designated by the numeral 51, is in the same horizontal plane with the platform 45 and is formed with a hollow sleeve section 52 which rests upon an enclosed spring 53.

This arrangement of platforms permits filling of the container with liquid while it is carried on the platform 45 following which the filled container need only be moved sideways onto the adjoining platform 51 so that the following step of closing the filled container can be carried out. This will be more readily understood following a more detailed description of the mechanism which will now be given.

Both platforms 45 and 51 are carried upon a removable mounting unit 55. Such a unit is made removable to adapt the machine quickly to a can having a different height. In the drawing there is disclosed a unit which is adapted for supporting the platforms in three different posi-

tions to allow for filling and closing cans of the quart, pint and half-pint sizes.

Support unit 55 comprises a supporting frame 71 (Figs. 1, 2 and 3) which at the rear, as at 72, is formed with a flat surface. Such a surface is placed against a flat surface plate 73 which is an integral part of and which extends forward a slight distance from the frame housing 21. Such a plate is formed with oppositely disposed lugs 74, there being one pair of oppositely disposed lugs for each horizontal position of the support unit 55.

When the support unit 55 is to be placed into the desired horizontal position two hooks 75 formed one on each side at the top of the frame 71 are placed just above the two oppositely disposed lugs 74 which correspond to the particular height desired. The unit is then dropped down with the hooks in engagement with the lugs. The half pint size of container being the shortest in height is located at the highest position. In arranging this support unit for this container, therefore, the hooks are placed above the upper lugs 74. In like manner the pint size being of intermediate height the unit will be positioned on the intermediate lugs. The quart size which has the greatest container height has the support hooks 75 engaged over the lowermost lugs 74, as shown in Figs. 1 and 3.

When the support unit has been brought into position with its hooks extending over the proper lugs, it is locked in this position. For this purpose a pivot key 76 (see Fig. 2) is provided on the top of the frame part 71 adjacent its vertical surface 72. This key is adapted to be swung into locking position within one of three slots 77 (Fig. 3). There is a slot 77 for each desired position, each slot being disposed within the plate 73 intermediate its corresponding set of lugs 74.

The frame 71 of the support unit 55 is formed with a pair of bearings which provide a support for a horizontally disposed shaft 79. Frame 71 extends down and away from the connection with the housing 21 as a pair of parallel arms 81. Each arm 81 extends forward to a position beyond the center of the cylindrical casing 26.

The arm 81 on the side of the machine where the platform 45 is located, extends through the lower end of the sleeve 46 as a support section 82. This section extends further forward in a hand grip 83. The section 82 (Fig. 3) provides a support for the spring 47 and through it a support for the platform 45. Section 82 carries a pin 84 which slides in vertical slots 85 cut on the inside of the sleeve section 46. This construction prevents dislocation of the platform from its spring held support and at the same time allows compression of the spring for a purpose which will hereinafter be more fully described.

The second arm 81 which extends below the platform 51 provides a support therefor in a supporting section 92. This section extends forward in a hand grip 93. Section 92 passes through a slotted lower end of the sleeve 52 and carries the spring 53. The section 92 also carries a pin 94 which slides in vertical slots 95 cut on the inner surface of the sleeve 52.

From the foregoing description it now will be evident that both platforms 45 and 51 are supported in the same flexible or yielding manner in the supporting unit 55. The hand grips 83, 93 of such a unit provide convenient means for removing the support unit 55 and for placing it in proper position.

Provision is made for manually depressing both platforms 45 and 51 when desired or the platform 51 may be independently depressed. In addition to this manual operation both platforms may be depressed automatically at the termination of the filling operation. This will now be more fully described.

A bell crank lever 98 (Figs. 1, 2, and 3) is pivotally mounted on the cross shaft 79. This bell crank extends forward in a horizontal bifurcated lever arm 99 where it passes on two sides of the platform stem 46. In front of the stem the bifurcated section merges into a handle 101. A pair of axially aligned pins 102 are carried on opposite sides of the sleeve 46 and these project outwardly into slots 103 formed in the lever parts 99. It will now be evident (Figs. 1 and 2) that when the handle 101 is depressed and the bell crank lever 98 is rocked on the shaft 79 the sleeve 46 and its platform 45 will be lowered. This constitutes manual depression of the platform.

The bell crank lever 98 is also provided with an arm 105 (see also Figs. 2 and 3) which extends alongside of the plate 73. The upper end of this arm is adapted to rest against a cam plate 106 which is carried on the forward end of a horizontally disposed rod 107 journaled in bearings formed in lugs 108, constituting an integral part of the frame housing 21. The rod 107 is adapted to be slid in and out under cam action which will be more fully explained hereinafter.

In a similar manner the platform 51 is also adapted for manual as well as automatic depression. For this purpose there is provided a bifurcated bell crank lever 111 (Figs. 2 and 3) which is pivotally mounted at the opposite end of the shaft 79 from the bell crank lever 98. Parallel walls of the bifurcated section of this lever pass on opposite sides of the platform sleeve 52. These wall sections are also slotted as at 112 and a pair of axially aligned pins 113 secured in the platform sleeve extends out into the slots. The bifurcated lever 111 at the front merges into a handle 115 which is located alongside the handle 101. This provides for manual depression of the platform 51.

The automatic lowering of the platform 51 is effected by the same cam control actuation of the bell crank lever 98 for the platform 45. For this purpose the lever 98 is formed with a horizontally disposed projection 116 which extends over toward the bell crank lever 111. This latter lever is provided with a shelf 117 against which the projection 116 strikes when the bell crank lever 98 is depressed, either manually as through the handle 101 or automatically when the bell crank lever 98 is rocked on its support.

By reason of this construction, it is possible to depress the platform 51 to remove a filled and sealed can without lowering platform 45 thus permitting continued filling action on the can supported on platform 45. On the other hand, when the platform 45 is depressed, which is not done until completion of the filling operation, the platform 51 is simultaneously lowered. The advantages of such independent and interconnected operation will be evident.

As long as the machine is in operation, certain parts of the machine are continuously actuated. The filling mechanism, however, remains inoperative until a container A has been placed in proper position on the platform 45 for filling. This actuation feature and its dependence on the continuously moving parts will be considered

after the measuring chamber and the actual mechanics of filling has been described.

The cylindrical casing 26 is open at both ends. This casing contains a rotary valve member 121 (Figs. 1 and 6) which is cylindrical in form and tightly fits within the cylindrical casing. This valve member is or may be formed with a central web or wall 122 which divides it into a dead chamber 123 and a filling chamber 124.

The front wall of the dead chamber projects beyond (to the right in Fig. 6) the end of the cylindrical casing 26 as an extension lug 127. The lug 127 is arcuate in form and its outer wall is just outside of the periphery of the valve member (see also Figs. 3 and 5). This lug is slotted as at 128, the slot being formed in the peripheral surface of the lug. Such a slot is offset and provides for slight longitudinal movement of the valve member 121 during the filling operation. Such valve actuation will be described later.

A support bar 131 is formed to encircle the stem 27 of the cylindrical casing in a bearing hub 132 and this provides for holding the bar in stationary position. The bar 131 extends forward over the lug 127 and carries a vertically disposed pin 133 which projects downwardly into the slot 128 formed in the lug 127.

By reason of the offset contour of the slot 128, rotation of the valve member 121 hereinafter described causes the lug and its groove to travel along the end of the bar. As the slot 128 traverses the stationary pin 133 during such rotation the valve member is shifted longitudinally. This opens the filling chamber 124 to the liquid within the reservoir tank 25.

The filling chamber 124 is closed at the end opposite the web 122 by a displacement cylinder 141 which has an outside diameter of a dimension to provide a liquid tight fit within one end of the cylindrical casing 26 (see Fig. 6). This displacement member also extends inside the valve on the smaller sizes of filling chamber, there being clearance between cylinder and valve, as best illustrated in Fig. 3.

Such a displacement cylinder blocks off one end of the filling chamber and is adapted to be placed in a different position longitudinally of and on an axis with the valve member 121. The position of the displacement cylinder 141 relative to the web 122 of the valve member determines the capacity of the valve filling chamber. Figure 6 illustrates the displacement cylinder 141 at a relatively great or maximum distance from the web which is the position for measuring the contents in the valve filling chamber which will fill a quart can A, this being the largest size given. Fig. 3 illustrates the opposite extreme position of the displacement cylinder, this being the position for filling the smallest size or half-pint container A. The end wall of the displacement cylinder is relatively close to the web wall 122 of the valve member in such position.

Provision is made for easily obtaining the different positions of the displacement cylinder to provide for the particular volume of fill desired. The outer end of the displacement cylinder is formed with an extended end flange 142. The bar 131 is extended beyond its hub connection 132 in an arm 143 which provides a support for a number of locking lugs 144 formed on the bar. There are three lugs 144, for this purpose each lug being formed with a depending projection 145 which is adapted to form a stop for the flange 142 of the displacement cylinder 141.

The flange 142 (as best illustrated in Fig. 8) is cut away at 146 so that this cut-away part of

the flange will clear the projection 145 of a lug 144 when the displacement cylinder is being moved. In other words, when the cut-away part 146 is oriented to an uppermost position, the displacement cylinder may be pulled out or pushed in past the lugs with sufficient clearance. With the cylinder in its desired longitudinal position it is necessary merely to rotate it on its longitudinal axis so that the remaining portion of the flange is brought against the inner wall of the selected lug projection 145.

Figure 6 illustrates such a location against the outermost lug 144, while Fig. 3 illustrates the displacement cylinder flange 142 against the innermost lug projection 145. After being brought into such located position, the flange of the displacement cylinder is locked in place by a spring clip 146a which may be slipped over the flange and over the particular stop lug involved.

The tank stem 28 (Figs. 3 and 6) is formed with a vertical bore 151, the upper end of which leads to the interior of the supply tank 25. This bore 151 communicates with a similar vertical bore 152 cut through the cylindrical casing stem 27. These aligned bores 151 and 152 permit the milk or other contents B to flow down into the inner end of the valve casing 26. When the valve member 121 is in the position illustrated in Fig. 6, the wall of the valve extends across or shuts off the bottom of the bore 152 and prevents further discharge of the milk or other liquid contents.

The valve member 121 in the outer wall of the filling chamber 124 is formed with a port 153 (Figs. 1 and 6). This port is out of register with the bore 152 and communication is blocked between the filling chamber 124 and the reservoir 25 when the valve is in the position of Fig. 6. When the valve member 121 is rotated on its longitudinal axis to the position shown in Figs. 1 and 3 the port 153 is in communication with the bottom of the bore 152 and thereupon milk flows from the reservoir into the chamber 124.

The stem 27 of the cylindrical casing 26 is cut through with a second vertical bore 155 which communicates with a similar bore 156 cut through the reservoir stem 28. The two bores 155, 156 are parallel with the bores 151 and 152 and provide for a vent which terminates above the level of the liquid B in the tank 25. A vent tube 157 is mounted in the tank and its lower end is fitted tightly within the bore 156. The upper end of the tube is curved as at 158 its extreme end terminating within the tank and above the liquid level.

The lower end of the bore 155 where it opens into the filling chamber is disposed immediately rearwardly of the inner end of the valve member 121, when the latter is in an innermost position as illustrated in Fig. 6. This is when the chamber is cut off from the reservoir. When the valve member is in chamber filling position (Fig. 3) the valve is disposed in an outward longitudinal position, the change of positions being brought about through the cam action of the groove 128 cooperating with the stationary pin 133, as has been hereinabove described.

This longitudinal movement of the valve 121 is utilized to obtain a more solid fill in the can by eliminating foam which may accumulate in the filling chamber as the milk passes from the reservoir. The foam floats at the top of the mass of liquid within the filling chamber and passes up into the vent bores 155, 156 and the vent tube 157, the more solid milk below the foam rising to near the level of milk in the reser-

voir. When the milk is to be discharged into the can, which is when the inward movement of the valve 121 takes place, this movement slightly contracts or diminishes the capacity of the filling chamber with the result that practically all of the foam is forced out through vent tube back into the reservoir.

The actual amount of milk remaining to be filled into the can is a measured charge, that is, the liquid within the filling chamber plus that within the vent tube. This is just enough to fill the half-pint, pint or quart size of can A depending upon the capacity of the filling chamber as determined by the position of the displacement cylinder.

When the can A is properly positioned to receive its measured charge the platform 45 is in a raised position so that the filling opening of the can surrounds the nozzle section 38 of the cylindrical casing 26. Such a lifting action moves the can from the position shown in Fig. 1 to that shown in Fig. 6. The nozzle 38 is provided with a vertical passageway 165 which at the lower end communicates with a fan shaped discharge slot 166. When the can A is in the filling position, this discharge slot is disposed below the top and is inside of the can.

The valve member 121 is formed with a lateral opening 167 which provides an exit port from the filling chamber 124 for the measured charge of milk when such opening is brought into alignment with the passageway 165 of the nozzle. Mechanism which will be hereinafter described, provides for this rotation of the valve member so that such alignment is provided only when the filling chamber 124 contains its measured charge of milk and when the container A is in proper position to receive the measured charge.

It will be observed by reference to Fig. 1 that when the port 153 is in position to receive the milk from the bore 152 and from the reservoir that the discharge opening or port 167 is out of alignment with the nozzle passageway 165. Similarly when the opening 167 is aligned with the passageway 165 (Fig. 6) for discharge of the milk into the can, the port 153 is out of alignment with the bore 152 thus blocking off communication with the reservoir.

When the can A has been completely filled and the milk is drained from the filling chamber 124 and passageways associated with this draining action, the platform 45 and the filled can A is then automatically lowered to complete the filling cycle. This actuation of the parts to provide for the filling cycle will now be considered.

The housing frame 21 is provided with a horizontal web section 171 (Fig. 1) on which an electric motor 172 is mounted. Motor 172 is suitably geared as at 173 to a gear 174 mounted on a horizontal drive shaft 175. The drive shaft extends into a suitable gear reduction box 176 also mounted on the web.

The gear reduction box 176 contains the usual conventional gears to provide for an output shaft 177 which rotates at a slower speed than the input shaft 175. Shaft 177 (see also Figs. 2 and 9) carries a constantly rotating friction disc 178 which is keyed to the shaft. This disc is a movable part of a friction drive, the driven parts of which remain inactive on the rotating shaft until a can A is brought into proper position on the platform 45 and is pushed back into guide blocks 179 (Figs. 1 and 2) which are carried on the platform. These guide blocks stop the can from being pushed back too far.

The driven parts of this friction drive comprise a barrel cam 181 (see also Fig. 9) which is loosely mounted on the shaft 177. The end of the shaft extends out beyond the cam (to the right in Fig. 2). A compression spring 185 is carried on the shaft where it projects beyond the cam and is interposed between a friction disc 186 adjacent the outer face of the cam and a washer 187 which is held in place by locknuts 188.

The spring 185 tends to force the cam 181 against the constantly rotating friction disc 178. The cam will rotate in unison with the disc if it is not held against rotation. However, a locking device is provided for holding the cam against rotation until the cam A is brought into exact position for the beginning of the filling cycle whereupon one complete filling cycle takes place after which the cam is locked again. This feature now will be explained.

The cam 181 carries a pin 191 which is radially disposed and which projects a slight distance beyond the periphery of the cam as best illustrated in Fig. 9. During the time that a container A is being brought into filling position, the pin 191 is held in a locking position by a second pin 192 which is mounted on a lever arm 193 which in its turn is pivoted on a stud 194. The stud 194 (see also Fig. 2) is carried in a support lug 195 which projects upwardly from the gear housing 176.

The lever arm 193 is formed with an L-shaped extension 196, the outer end of which is connected to the upper end of a vertically disposed spring 197. The lower end of the spring is fixed to the gear housing 176. The spring 197 tends to hold the lever arm 193 normally in a lowered position so that the pin 192 provides a stop for the pin 191 carried by the cam 181. This is the position shown in Fig. 9.

The lever 193 also carries a setscrew 198 which, when the lever is in its lowered position, strikes against a stationary lug 199 formed on the support lug 195. This is an adjustment and determines the lower position of the lever arm.

The release of the locking pin 192 to set in motion the operating parts for a filling cycle is accomplished through a control device best illustrated in Figs. 1, 9, 10 and 11. Such a control device comprises a sliding rod 201 which slides in a bearing 202 formed in the housing frame 21 and in a bearing block 203 mounted upon the top of the gear reduction box 176.

The forward end of the rod 201 carries a spring finger 204 which extends up alongside of but is spaced from the nozzle 38. This finger is engaged by the top of a can A when the can is placed on the platform 45 and is pushed back against guide blocks 179. The upper end of the finger 201 is guided in a support 206 formed in the frame 21. A depending lug 207 alongside of the support limits the rearward movement of the finger.

When the can A engages the finger 204 and pushes it back, a spring 208 carried on the rod 201 is compressed. This spring is a light spring and allows the rod to be held back even by the empty can. Spring 208 is interposed between the front vertical wall of the frame 21 and a head 209 formed at the forward end of the rod 201. This spring holds the rod 201 in its forward position as long as the platform is empty and in this normal forward position the finger 204 is in the path of the can A when the latter is placed into position for filling.

When the rod 201 moves back under pressure of

the can and slides within its bearings 202, 203, a spring finger 211 (Figs. 9, 10 and 11) is released to start the filling cycle. Finger 211 is radially disposed on a release disc 212 which is carried on a shaft 213 which in turn is supported at the free end of the lever arm 193.

The control rod 201 is transversely slotted at 215 to a depth of about one-half the diameter of the rod. One wall of the slot 215 is inclined as at 216 and the opposite wall is cut back in a curved clearance section which forms a shoulder 218. It is against this shoulder that the spring finger 211 is normally held.

This is the position shown in Figs. 10 and 11 of the control rod and the spring finger. In this normal or inoperative position the control rod is furthest toward the left and as long as the platform 45 does not have a can, the rod remains in its described position. When the control rod 201 is moved in, toward the left in Fig. 1 or toward the right in Figs. 10 and 11, the support shoulder 218 is moved out from its holding position where it supported the spring finger 211 which thereupon moves out through the slot 215 to begin the filling cycle. Such a movement is upwardly, as viewed in Figs. 9 and 10.

As soon as spring finger 211 is released, the disc 212 carrying the finger starts turning in a clockwise direction. The inclined wall 216 engaging the finger assists in such a movement. It will be observed by reference to Fig. 9 that the release disc 212 is not a true circle but is oblong in shape. On the rear, the disc is formed with a greater mass as at 219 (Fig. 2) so that the disc is weighted to rock on its shaft 213 in a clockwise direction as viewed in Fig. 9.

As soon as the spring finger 211 is released, this excess weight on the release disc drops that side of the disc. The weighted side is also greater in diameter so that it engages the rotating friction disc 178 immediately therebelow.

The outer periphery of the disc 212 is knurled as at 220 and the outer periphery of the friction disc 178 is correspondingly knurled as at 221. The result is that the release disc is rotated positively and by reason of the shape of this disc, the disc center, that is, the shaft 213, is lifted. This action also lifts the lever arm 193 on its pivot shaft 194 and unlatches the locking pin 192 from its locking position.

The cam 181 is held no longer and it immediately rotates in unison with the rotating shaft 177. It will be recalled that the spring 185 tends to force the cam 181 against the friction disc 178. A friction ring 222 (Fig. 1) preferably is secured to the face of the disc 178 to assist in this friction engagement with the cam. The disc 212 being of lesser diameter than the disc 178 soon makes a complete rotation while the larger disc is still rotating. Provision is made therefore for stopping rotation of the disc 212 after it has made one complete rotation while the filling cycle continues.

This is accomplished by the spring finger 211 striking against the control rod 201. Since at such a time the can A is still on the platform, the control rod 201 is still held in its depressed position. At such time the spring finger strikes against the rod at the base of the inclined wall 216 of the slot 215.

The shape of the release disc 212 is such that by the time the spring finger 211 nears the rod 201 the lever arm 193 is lowered again to the position shown in Fig. 9. Disc 212 is cut away as at 223 so that even though the lever arm 193

is down, the knurled surface 220 of the disc 212 clears the knurled surface 221 of the disc 178. The finger 191 carried by the cam 181 is not near the pin 192 at such a time so that the cam continues to rotate to carry out the various movements incident to the filling operation. It will be evident, however, that the locking pin 192 will be in position to engage the pin 191 carried on the cam when the latter completes its rotation and comes again into the position shown in Fig. 9.

As soon as the filled container A is removed from the platform, the spring 208 slides the control rod back into normal position and the spring finger 211 thereupon snaps back into the slot 15 and lodges against the shoulder 218.

It will be recalled that detailed description of the movement of the valve member 121 was postponed until the driving mechanism was explained. Such an explanation has now been made and the connection between the valve movement and the actuating cam 181 can be given at this time.

Cam 181 is formed with a peripheral cam groove 225 (Figs. 2 and 9) in which operates a cam roller 226. This cam roller is carried on an arm 227 which is secured to one end of a short rock shaft 228. Shaft 228 is journaled in a bearing 229 formed in the frame 21.

Outside of the frame shaft 228 carries a lever arm 231 (see also Figs. 1 and 3) which is connected by a link 232 with a stud 233 carried on a projection 234 of the extension lug 127 on the valve 121.

Accordingly, as the rotating cam 181 rocks the shaft 228, the resulting oscillation of the arm 231 causes the valve member 121 to rotate within the measuring cylinder 26 so that the milk which has been measured out in the filling chamber 124 during the rest period of the cam 181, is discharged through the nozzle 38 into the raised container A.

This flow of milk from the filling chamber at such a time through the passageway 165 and the aligned valve opening 167 is the result therefore both of the rotary motion of the valve member and its slight longitudinal movement which is brought about by action of the cam groove 128 riding over the pin 133 which has been described fully.

When the filling of the can A has been completed but just as the cam 181 is completing its single rotation with the rotating shaft 177, the platforms 45 and 51 are lowered. This is accomplished by a sliding forward of the rod 107 carrying its cam plate 106 and an actuation of the bell crank lever 98.

The rod 107 carries a block 235 (Figs. 1 and 2) on which a cam roller 236 is mounted. Just as the cam 181 brings its pin 191 against the stop pin 192 a projection 237 on the cam rides against the roller 236. This moves the cam plate 106 to its forward position and the platforms 45, 51 are lowered. This completes the filling cycle. The filled can is then removed by hand and an empty can is placed on the platform 45 for filling.

The present machine, as has been intimated, is also arranged for closing the filled can. Accordingly, a can which has been filled is slid from the platform 45 onto the platform 51.

The can resting on the platform 51 is directly below a closing head 241 (Fig. 3) which is mounted in the semi-circular saddle 35. Such a closing head may be of any suitable construc-

tion, the Hothersall United States Patent 2,170,821, issued August 29, 1939, giving in detail a satisfactory head for this purpose. The actuation of such a head may be effected in suitable manner merely by the lifting of the platform 51. This detail of a closing head is not a feature of the present invention and further description is deemed unnecessary.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. An apparatus for filling liquid into positioned containers of varying heights, comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a rotary valve in said measuring chamber for opening communication with said reservoir to withdraw a predetermined quantity of liquid from the reservoir supply, a platform located beneath said cylinder for supporting a container to be filled, actuating devices made effective upon the placing of a container in proper position on said platform for rotating said valve to transfer the measured charge of liquid into the container on said platform, and means for securing said platform in a plurality of spaced vertical positions relative to said measuring chamber to maintain the top of a selected container at a uniform distance beneath said chamber.

2. An apparatus for filling liquid into positioned containers comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a rotary valve in said measuring chamber for opening communication with said reservoir to withdraw a predetermined quantity of liquid from the reservoir supply, a platform located beneath said cylinder for supporting a container to be filled, and actuating devices made effective upon the placing of a container in proper position on said platform for rotating said valve to transfer the measured charge of liquid into the container on said platform, and means connected to said valve and operative when the latter is moved into discharge position to lessen the capacity of said measuring chamber and thereby to apply pressure on the measured charge of liquid therein to facilitate the filling operation.

3. An apparatus for filling liquid having a tendency to foam into positioned containers, comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a vent passage leading from said chamber to a position above said reservoir, a rotary valve in said measuring chamber for opening communication with said reservoir to withdraw a predetermined quantity of liquid from the reservoir supply to cause any foam created in the liquid as it is withdrawn from said reservoir to enter said vent passage, a platform located beneath said cylinder for supporting a container to be filled, and actuating devices made effective upon the placing of a container in proper position on said platform for rotating said valve to transfer the measured charge of liquid into the container on

said platform, and means for moving said valve longitudinally during rotation thereof to force the foam from said vent passage back into said reservoir as an incident to the liquid transfer into the container by reason of a diminution in volume of the measuring chamber caused by the longitudinal movement of the valve.

4. An apparatus for filling liquid into positioned containers of varying heights, comprising a reservoir for holding a supply of liquid, a cylinder for receiving liquid from said reservoir, a movable displacement cylinder located in said first mentioned cylinder for forming measuring chambers of varying capacity, a rotary valve in said chamber for opening communication with said reservoir to withdraw a predetermined quantity of liquid from the reservoir supply as determined by the position of said displacement cylinder, a platform located beneath said cylinder for supporting a container to be filled, actuating devices for rotating said valve to transfer the measured charge of liquid into the container on said platform, a trip control unit operated by the placing of a container on said platform in proper position for making effective said actuating devices, and means for securing said platform in a plurality of spaced vertical positions relative to said measuring chamber to maintain the top of a selected container at a uniform distance beneath said chamber.

5. An apparatus for filling liquid into positioned containers comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a valve having a closed end located in said measuring chamber and having rotative and longitudinal movement relative to said measuring cylinder, a discharge nozzle formed on said measuring cylinder and providing an outlet for said chamber, a platform located beneath said measuring cylinder for supporting a container to be filled, and actuating devices for lifting said platform and for inserting said nozzle in the raised container, said devices rotating said valve to discharge the measured charge of liquid into the container on said platform and also sliding the valve longitudinally to facilitate the filling operation by exerting pressure on the liquid in said chamber.

6. An apparatus for filling liquid into positioned containers comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a valve located in said measuring chamber, a closing head mounted adjacent said measuring cylinder, a platform located beneath said measuring cylinder for supporting a container to be filled, a second platform located beneath said closing head for supporting a filled container for closing, actuating devices made effective upon the placing of a container in proper position on the first of said platforms for raising both of the platforms and for transferring the measured charge of liquid into the container on the first of said platforms, automatic means for depressing both of said platforms at the completion of one filling cycle, and means for manually lowering the platforms separately or in unison.

7. An apparatus for filling liquid into positioned containers comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a rotary valve located in said measuring chamber, a platform located beneath

said cylinder for supporting a container to be filled, a continuously moving driving mechanism, a driven cam mechanism, a clutch for connecting said cam with said driving mechanism, actuating devices made effective upon the placing of a container in proper position on said platform for operating said clutch to rotate said cam, the rotation of said cam being effective to rotate said valve for filling the measured charge of liquid into the container, timing means for terminating movement of the cam after one rotation to terminate a single filling cycle, and means actuated by said cam mechanism for depressing said supporting platform after said container has been filled.

8. An apparatus for filling liquid into positioned containers, comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a rotary valve in said measuring chamber for opening communication with said reservoir to withdraw a predetermined quantity of liquid from the reservoir supply, constantly operating driving instrumentalities, a platform located beneath said cylinder for supporting a container to be filled, a trip control unit adapted to be moved by the placing of a container in proper position on said platform to connect said valve with said driving instrumentalities, means actuated by said driving instrumentalities for elevating said platform to place the container into filling position, and means actuated by said driving instrumentalities for rotating said valve to transfer the measured charge of liquid into the container on said platform.

9. An apparatus for filling liquid into positioned containers, comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a rotary valve located in said measuring chamber for withdrawing liquid from the reservoir into said measuring chamber, a discharge nozzle formed on said cylinder and providing an outlet for said chamber, a platform located beneath said cylinder for supporting a container to be filled, means for holding said platform in a lowered container receiving position, actuating devices made effective upon the placing of a container in proper position on said platform to release said platform from said holding means, means rendered effective by the release of said platform to elevate the latter to position the supported container over said nozzle, and means for rotating said valve to transfer the measured charge of liquid into the container on said elevated platform.

10. An apparatus for filling liquid into positioned containers, comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, a rotary valve located in said measuring chamber for transferring liquid from said reservoir into said chamber, a discharge nozzle formed on said cylinder and providing an outlet for said chamber, a platform located beneath said cylinder for supporting a container to be filled, a cam for holding said platform in a lowered container receiving position, actuating devices made effective upon the placing of a container in proper position on said platform for moving said cam to release said platform, means for elevating the released platform so that the container is raised over said nozzle, said devices also moving said cam to rotate said valve for transferring the measured charge of liquid

through said nozzle and into the container on said platform, timing means for terminating certain machine movements after completion of one filling cycle, and cam actuated means for depressing said platform after completion of said filling cycle to bring the filled container into said lowered position.

11. An apparatus for filling liquid into positioned containers, comprising a reservoir for holding a supply of liquid, a cylinder enclosing a measuring chamber for receiving liquid from said reservoir, said chamber having a dispensing nozzle and a vent, a rotary valve having a closed end located in said measuring chamber, a platform located beneath said measuring cylin- 15

der for supporting a container to be filled, a continuously moving driving mechanism, an intermittently moving driven mechanism, a clutch for connecting said driving and said driven mechanisms, and actuating devices made effective upon the placing of a container in proper position on said platform for operating said clutch so that the container is raised over said nozzle, said actuating devices being effective to rotate said valve, and means operative upon the rotation of said valve for moving the same longitudinally to apply pressure on and to transfer the measured charge of liquid into the container on said platform.

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