July 27, 1954 F. HUNTAR ET AL 2,684,804

CONTAINER FILLING MACHINE WITH IMPROVED FILLING DEVICES

Filed Dec. 21, 1949 5 Sheets-Sheet 1

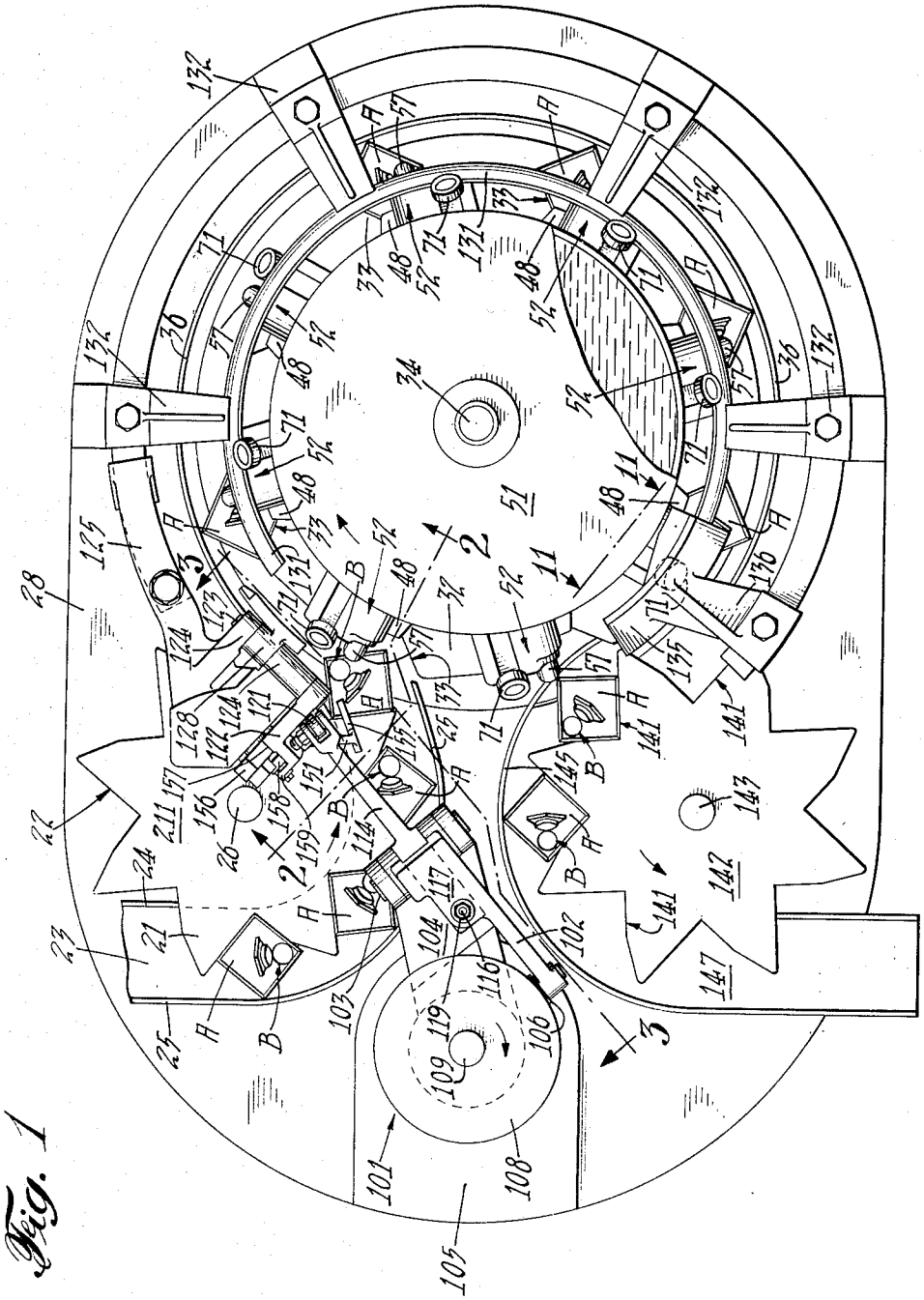


Fig. 1

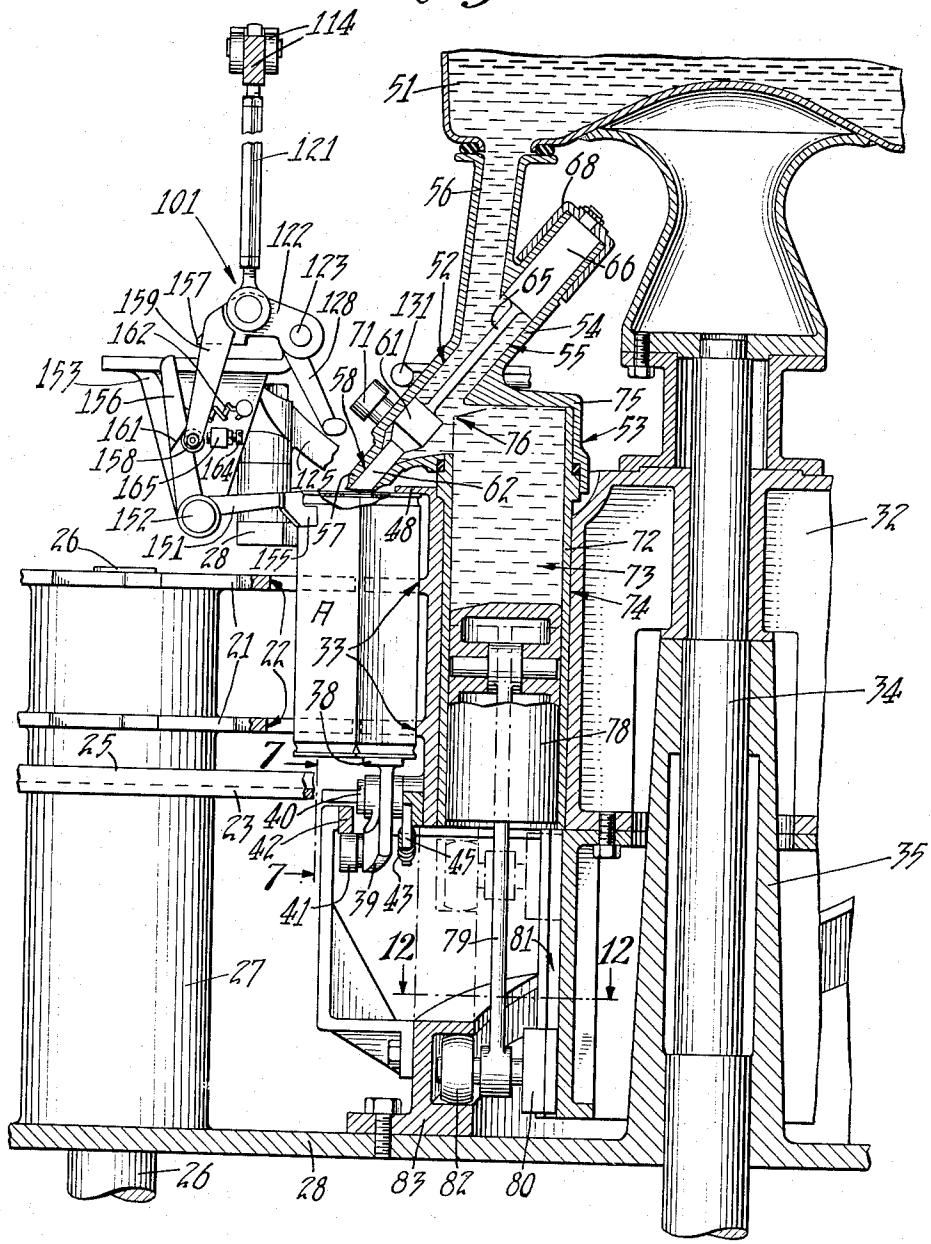
INVENTORS.
Felix Huntar
William Pecky
BY Charles H. Hunt
Ivan D. Thornburgh
ATTORNEYS

July 27, 1954 F. HUNTAR ET AL 2,684,804

CONTAINER FILLING MACHINE WITH IMPROVED FILLING DEVICES

Filed Dec. 21, 1949 5 Sheets-Sheet 2

Fig. 2



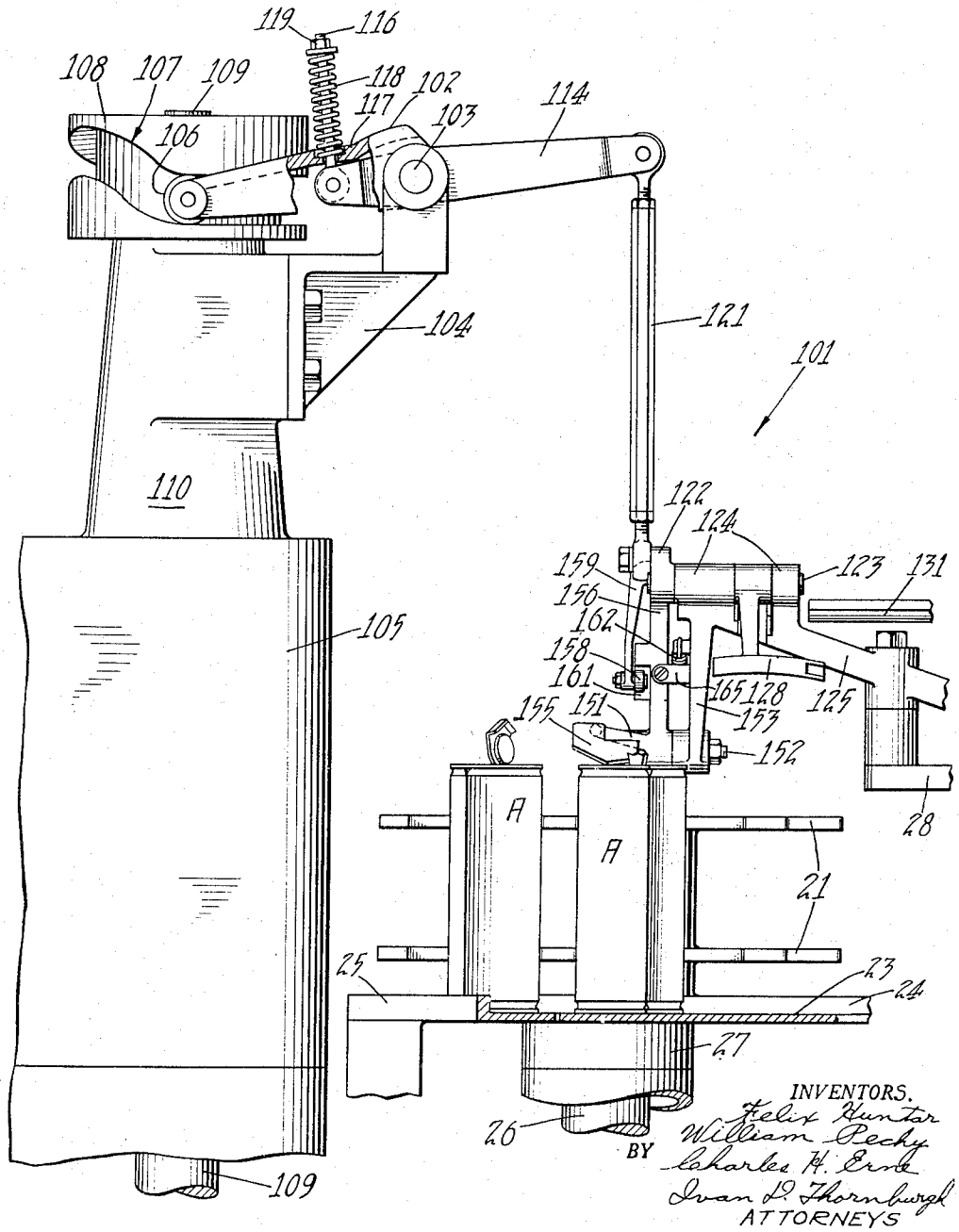
INVENTORS.
Felix Huntar
William Pecky
BY Charles H. Esch
Ivan D. Thornburgh
ATTORNEYS

July 27, 1954 F. HUNTAR ET AL 2,684,804

CONTAINER FILLING MACHINE WITH IMPROVED FILLING DEVICES

Filed Dec. 21, 1949 5 Sheets-Sheet 3

Fig. 3



INVENTORS.
Felix Huntar
William Pecky
Charles H. Ernst
Ivan D. Thornburgh
BY
ATTORNEYS

July 27, 1954 F. HUNTAR ET AL 2,684,804

CONTAINER FILLING MACHINE WITH IMPROVED FILLING DEVICES

Filed Dec. 21, 1949 5 Sheets-Sheet 4

Fig. 5

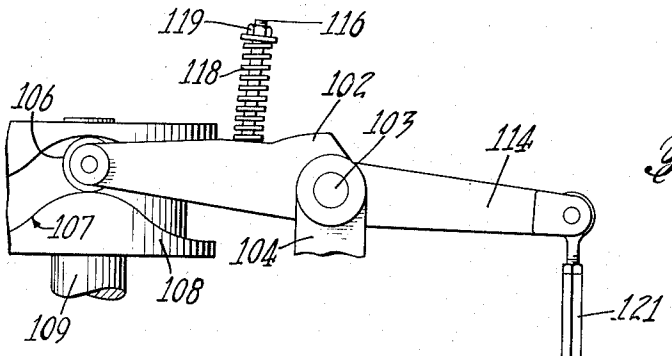


Fig. 4

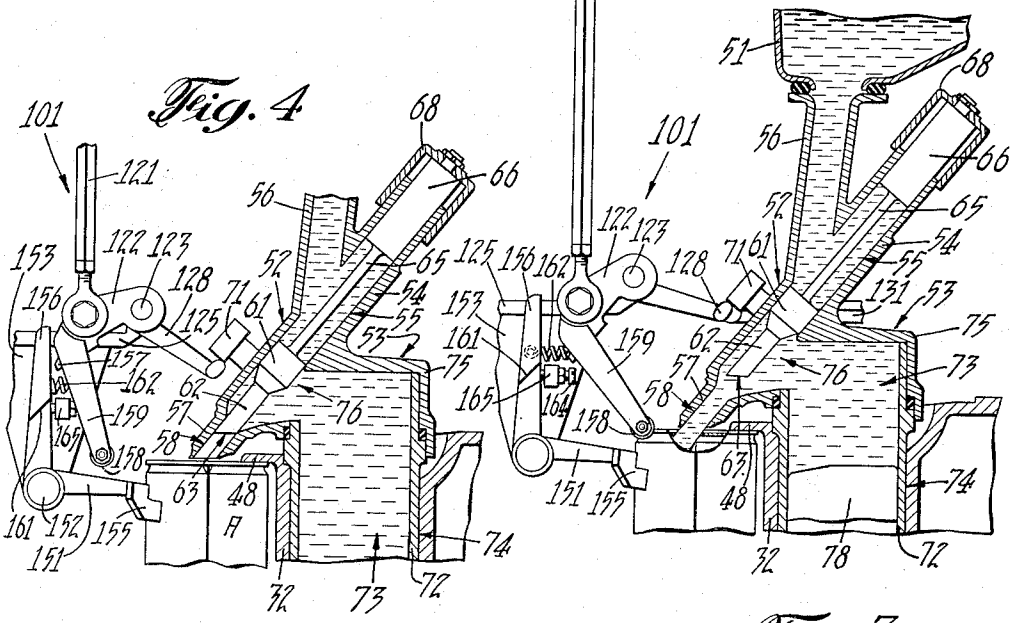


Fig. 6

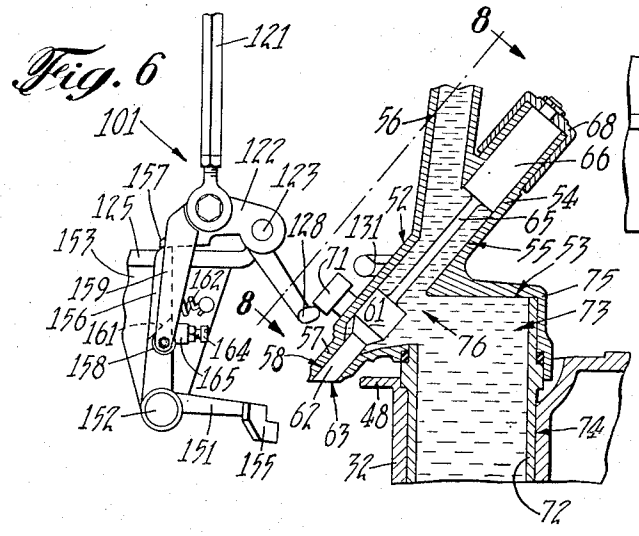
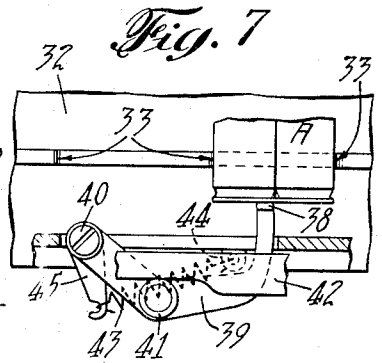


Fig. 7



INVENTORS.
Felix Huntar
William Pecky
Charles H. Burt
Ivan D. Thornburgh
BY
ATTORNEYS

July 27, 1954 F. HUNTAR ET AL 2,684,804

CONTAINER FILLING MACHINE WITH IMPROVED FILLING DEVICES

Filed Dec. 21, 1949 5 Sheets-Sheet 5

Fig. 8

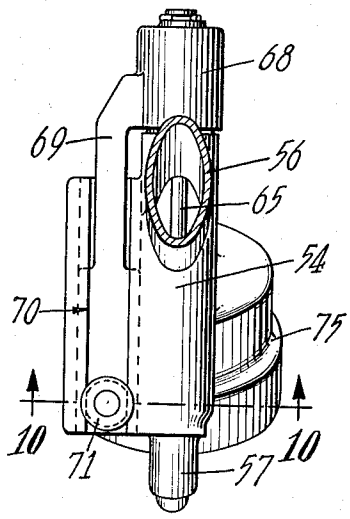


Fig. 9

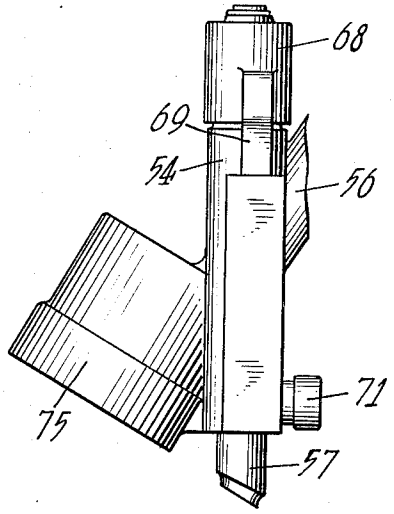


Fig. 10

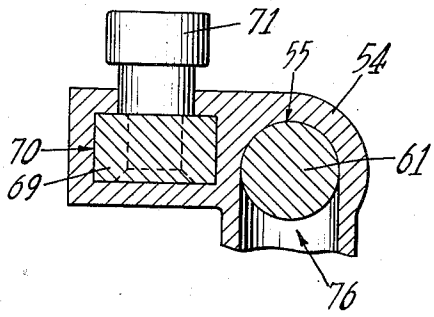


Fig. 11

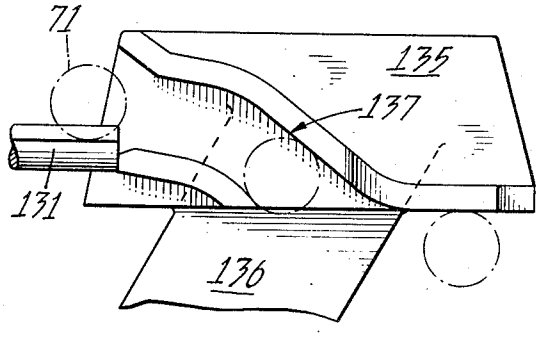
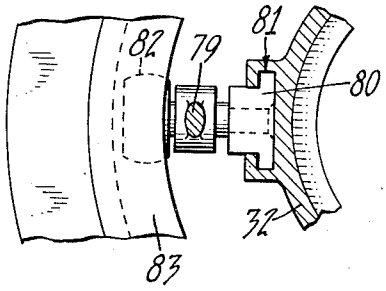


Fig. 12



INVENTORS.
Felix Huntar
William Becky
Charles H. Erhe
Ivan D. Thornburgh
BY
ATTORNEYS

Patented July 27, 1954

2,684,804

UNITED STATES PATENT OFFICE

2,684,804

CONTAINER FILLING MACHINE WITH IMPROVED FILLING DEVICES

Felix Huntar, Livingston, and William Pechy, Manasquan, N. J., assignors to American Can Company, New York, N. Y., a corporation of New Jersey

Application December 21, 1949, Serial No. 134,284

7 Claims. (Cl. 226—96)

1

The present invention relates to a machine for filling liquids into containers or cans and has particular reference to improvements in the filling devices.

In the filling of some liquids, such as milk, fruit juices, brines, syrups, canning liquids, carbonated beverages or the like into containers, the agitation of the liquid results in the formation of considerable foam which affects the accuracy of the ultimate weight or volume of the contents of the container. To offset this tendency of foaming numerous attempts have been made to introduce the liquid into the container in a manner which causes the liquid to engage the interior walls of the container and thereby flow gently along the walls and gradually build up from the container bottom. This manner of filling containers has been satisfactory in a great many cases.

However in order to fill containers in this manner a nozzle is provided which usually must be inserted into the container so that the liquid can be readily projected against the interior wall of the container. In many types of filling machines this insertable nozzle is impractical.

The instant invention contemplates overcoming this difficulty by the provision of an improved liquid filling nozzle which is noninsertable or need not be inserted into a container and which is disposed in an angular position for introducing liquid into the container without creating appreciable foam. The invention further contemplates a novel nondrip type of filling nozzle and an improved no-container-no-fill device which is particularly adapted to an inclined type nozzle.

An object, therefore of the present invention is the provision in a liquid filling machine of improved filling devices wherein the filling nozzle is disposed in an inclined position relative to a container to be filled so that a stream of liquid may be directed from the nozzle through a filling opening in the container and projected against an interior wall thereof without inserting the nozzle into the container, for gently filling the container with the liquid while minimizing the formation of foam.

Another object is the provision of such improved filling devices wherein all liquid, at the termination of a container filling operation, is forced out of the nozzle outlet to avoid dripping of the liquid on the top of the container adjacent its filling opening while the container remains under the nozzle or is being removed from filling position.

2

Another object is the provision in such a filling machine of improved nozzle actuating devices which are particularly adapted for use with an inclined nozzle and wherein continued operation of the nozzle or a plurality of such nozzles may be had as long as the containers are properly placed in filling position under the nozzle or nozzles, the actuating devices being rendered inoperable when no container is in place, so that the particular nozzle will remain closed with the result that waste of the liquid and contamination of the machine will be prevented.

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 top plan view of a container filling machine embodying the instant invention, with parts broken away and with containers shown at different stations in the machine;

Figs. 2 and 3 are enlarged sectional views taken substantially along the broken lines 2—2, 3—3 in Fig. 1, with parts broken away;

Figs. 4 and 5 are fragmentary sectional views similar to Fig. 2 and showing certain of the moving parts in different positions as an incident to opening the filling nozzle, the upper portion of Fig. 5 being similar to Fig. 3 and rotated through ninety degrees for better illustration;

Fig. 6 is a sectional view similar to Fig. 4 and showing certain of the moving parts in locked position as when no container is received for filling;

Fig. 7 is an enlarged sectional detail taken substantially along the vertical line 7—7 in Fig. 2, with parts broken away;

Fig. 8 is an enlarged sectional view taken substantially along the line 8—8 in Fig. 6;

Fig. 9 is an elevational view of the parts shown in Fig. 8 as viewed from the left in that figure;

Fig. 10 is an enlarged sectional view taken substantially along the line 10—10 in Fig. 8, with parts broken away;

Fig. 11 is an enlarged sectional detail taken substantially along the line 11—11 in Fig. 1, with parts broken away; and

Fig. 12 is an enlarged sectional detail taken substantially along the line 12—12 in Fig. 2, with parts broken away.

As a preferred and exemplary embodiment of the instant invention the drawings illustrate a liquid filling machine for filling milk or other foam producing liquids into square fibre empty

containers A having a circular filling and dispensing opening B in their top end, such as the container disclosed in United States Patent 2,085,979 issued July 6, 1937 to John M. Hothersall on Container, although the invention is equally well adapted to filling other containers also.

The empty containers A to be filled are fed into the machine in an upright position and in a substantially continuous procession, preferably by an intermittently rotated feed turret 21 comprising a pair of vertically spaced and parallel turret wheels (Figs. 1 and 2) having spaced peripheral pockets 22 which engage and advance the containers in spaced and timed order. The containers are supported on a curved table 23 and they are retained in the turret pockets by inner and outer guide rails 24, 25 disposed adjacent the periphery of the turret. The turret is mounted on the upper end of a vertical shaft 26 journaled in a bearing 27 (Fig. 2) formed in a frame 28 which constitutes the main frame of the machine. The shaft may be rotated intermittently in any suitable manner.

A container A advanced by the feed turret 21 is transferred, for the filling operation, to a filling turret 32 having a plurality of pockets 33 spaced around its outer periphery for the reception of the containers. The filling turret 32 is mounted on a vertical drive shaft 34 journaled in a bearing 35 (Fig. 2) formed in the machine frame 28. The shaft 34 is rotated preferably intermittently, in any suitable manner in time with the feed turret shaft 26 so that the feed turret pockets 22 move into register consecutively with the filling turret pockets 33 as the two turrets rotate.

Transfer of the containers A from the feed turret pockets 22 to the filling turret pockets 33 is effected preferably by the inner guide rail 24 which at the point of transfer curves outwardly toward the outer periphery of the feed turret and thus pushes the containers out of the pockets 22 into the pockets 33 as the pockets move into register. A guide rail 36 forming a continuation of the guide rail 24 curves around the outer periphery of the filling turret 32 and holds the containers in their pockets.

As a container A moves into a pocket 33 of the filling turret 32 it is received on a lifter pad 38 (Figs. 2 and 7). The pad 38 is formed on one end of a lifter lever 39 mounted on a pivot pin 40 secured in the filling turret 32. There is one of these lifter levers 39 for each turret pocket 33 and they are disposed below the pockets. Each lifter lever 39 carries an actuating roller 41 which operates against a stationary cam rail 42 disposed adjacent and extending around the outer periphery of the filling turret 32. A tension spring 43 keeps the roller in engagement with the cam rail. One end of the spring is connected to a lug 44 formed on the filling turret while the opposite end of the spring is secured to an arm 45 formed on the lifter lever 39.

The cam rail 42 is shaped so as to hold the lifter lever 39 and its lifter pad 38 in a depressed position while the container is being transferred into the filling turret pocket 33 and then as soon as the container is in position, to permit the spring 43 to raise the lifter pad and the container. This lifting of the container raises it and clamps or locks it in place against a clamping or locking lug 46 (Figs. 1 and 2) which projects out from the filling turret 32 above its pocket 33 and which engages the container at its upper edge as best shown in Fig. 2. There is one of these locking lugs 46 for each turret pocket 33.

A container A received and clamped in a filling turret pocket 32 is located with its filling opening B in proper position for filling of the container. This filling is effected with a measured charge of the liquid taken from a reservoir 51 (Figs. 1 and 2) which is mounted on top of and rotates with the filling turret 32. For this purpose each pocket 33 of the filling turret 32 is equipped with an adjacently located filling device 52 and a connecting measuring device 53.

Each filling device 52 includes a tubular housing 54 (Figs. 2, 4, 5, 8 and 9) which is located between the reservoir 51 and the filling turret 32 and which is disposed in a radial position and at an angle sloping downwardly and outwardly from the reservoir toward its associated filling turret pocket. The housing 54 is formed with an interior longitudinal tubular passageway 55. Near its upper end the housing is formed with a tubular upright conduit 56 which is secured to the bottom of the reservoir 51 and which provides communication between the reservoir and the passageway 55 in the housing.

The lower end of the housing 54 (Fig. 5) terminates in a nozzle 57 having an angular outer face which is substantially flush with the lower face of the container locking lug 46 so that the face of the nozzle will be closely adjacent but not quite touching the horizontal top of a container A clamped in position for filling as best shown in Fig. 2. This nozzle end of the housing is formed with a long reduced diameter outlet 58 which at its inner end communicates with and is concentric with and in axial alignment with the passageway 55 and which at its outer end is disposed so that it will substantially align with the filling opening B in the positioned container for filling the liquid into the container.

A cylindrical slide valve 61 is slideably disposed within the passageway 55 of the housing 54 and is slightly smaller in diameter than the passageway to facilitate easy sliding movement. The lower end of the valve is formed with a plunger 62 which is slightly smaller in diameter than the nozzle outlet 58 and which terminates in an angular face 63 which is similar to the angular face of the nozzle 57 for cutting off the flow of liquid from the nozzle without dripping as will be hereinafter explained.

The slide valve 61 at its upper end is formed with a long small diameter stem 65 which terminates in a guide block 66 slightly smaller in diameter than the passageway 55 to seal the upper open end of the passageway, to facilitate sliding movement therein and also to serve as a guide for the valve 61. This guide block 66 is secured to an actuating sleeve 68 (see also Figs. 8 and 9) which surrounds the outside walls of the upper portion of the housing 54. The sleeve is formed on a flat slide 69 (see also Fig. 10) which is disposed exteriorly of the housing 54 and which operates in a slideway 70 formed on the housing in parallel relation to the housing passageway 55. The slide is actuated by a roller 71 which is carried on the slide and which is operated as will be hereinafter explained to control the flow of liquid from the reservoir 51. The slide valve 61 also controls the flow of liquid into the measuring device 53.

The measuring device 53 for each filling turret pocket 33 includes a vertically disposed round measuring sleeve 72 (Fig. 2) which defines a

measuring chamber 73 open at its upper and lower ends. This sleeve is secured in an opening 74 in the filling turret 32 adjacent the pocket 33. The upper end of the sleeve extends up into a cap 75 formed as an integral part of the filling housing 54. This cap defines the upper end of the measuring chamber 73 and is formed with a channel 76 which provides communication between the measuring chamber 73 and the filling housing passageway 55, the channel entering the passageway between the conduit 56 and the nozzle outlet 58 as best shown in Fig. 2.

The measuring chamber 73 houses a vertically movable piston 78 the top of which defines the lower end of the measuring chamber 73. This piston is pivotally connected by a piston rod 79 to a slide block 80 which operates in a vertical slideway 81 formed in a lower skirt portion of the filling turret 32 (see also Fig. 12). The slide block carries a cam roller 82 which operates in a stationary cam track 83 secured to the machine frame 28 and encircling the skirt portion of the filling turret 32. The track is shaped to lift and lower the piston 78 as the cam roller traverses the track with the rotation of the filling turret 32. This measuring device is in a conventional device similar to that disclosed in United States patent 1,506,851 issued September 2, 1924, to T. Martin et al. on Filling Machine.

In the operation of the machine through a filling cycle, a filling turret pocket 33 moves into container receiving position upon a partial rotation of the turret 32, with the measuring device piston 78 in a lowered position in the lower end of the measuring sleeve 72 and with the valve plunger 62 disposed in and closing the nozzle outlet 58 as shown in Fig. 2. In this position of the piston and the plunger, the slide valve 61 is disposed in but does not close the channel 76 in the measuring chamber 73 and thus there is no obstruction between the reservoir 51 and the measuring chamber 73. Therefore the liquid flows freely from the reservoir 51, through the conduit 56, connecting passageway 55 and channel 76 into and fills the measuring chamber 73, the liquid within the measuring chamber 73 and the channel 76 constituting a measured charge to be filled into a container A.

The measured charge of liquid can be filled into a container only by the opening or lifting of the valve plunger 62 and this is effected only upon condition that a container A is in position in its filling turret pocket 33 to receive the charge of liquid. For this purpose there is provided an improved container detecting and valve opening device 101 (Figs. 1, 2, 3 and 5) which includes a cam lever 102 mounted on a pivot pin 103 carried in a stationary bracket 104 secured to a column 105 of the machine frame 28. The cam lever 102 carries a cam roller 106 which operates in a cam groove 107 of a continuously rotating barrel cam 108 mounted on a vertical shaft 109 journaled in a bearing 110 formed integrally with the column 105. The shaft may be rotated in any suitable manner in time with the other parts of the machine so that the cam makes one revolution for each partial rotation of the intermittently rotated filling turret 32.

The cam 108, through the cam lever 102, actuates a rocker lever 114 which intermediate its ends is mounted on the pivot pin 103. One end of the rocker lever 114 extends alongside the cam lever 102 and is yieldably connected thereto by a flexible connection. This flexible connection includes an eye bolt 116 which is pivotally connected to the adjacent end of the rocker lever 114 and which extends up through an opening in a laterally projecting lug 117 of the cam lever 102. Between the lug 117 and the end of the bolt 116, a compression spring 118 surrounds the bolt and is held in place by a washer and a lock nut 119.

The outer end of the rocker lever 114 is pivotally connected to a depending link 121. The lower end of the link 121 is pivotally connected to a rockable, valve actuating member 122 which is disposed adjacent the place where the containers A enter the filling turret pockets 33 and which is secured to a short rocker shaft 123 (Figs. 3 and 5) rotatably carried in a pair of spaced bearings 124 formed on a stationary bracket 125 bolted to the machine frame 28. Between the spaced bearings 124, the rocker shaft 123 carries a valve opening shoe 128 which moves with the rocker shaft and the actuating member 122.

The valve opening shoe 128 normally extends adjacent and slightly below the circular path of travel of the valve actuating rollers 71 of the filling devices 52 as the latter are carried around with the rotation of the filling turret 32. The shoe 128, however, is movable through an upwardly extending arc as it moves with the rocker shaft 123, to engage under and lift the actuating rollers 71 to open the slide valves of the filling devices. The shoe is so located that its forward end is adjacent the actuating roller 71 of its associated filling device when the filling turret 32 is at rest between its intermittent rotations and a filling turret pocket 33 and its associated filling device is in position to receive a container A to be filled, as best shown in Figs. 1 and 2.

As a container A is being transferred from the feed turret 21 to the properly located filling turret pocket 33, the barrel cam 108 through its cam lever 102 and rocker lever 114, is just starting a rocking movement of the valve actuating member 122 and the shoe 128 begins its upward arcuate travel. During this upward travel of the shoe 128 it engages under and lifts the actuating roller 71 and this raises the valve slide of the filling device. By the time the container is fully seated in its filling turret pocket, the slide valve has moved up into the position shown in Fig. 4 where the plunger 62 is still in the nozzle outlet 58 and holding it closed, and where the valve 61 has moved up far enough in the passageway 55 of the filling housing 54 to block off communication between the reservoir 51 and the measuring chamber 73. This action segregates the measured charge of liquid in the measuring chamber from the liquid in the reservoir.

As the shoe 128 continues to lift the roller 71, it withdraws the plunger 62 from the nozzle outlet 58 and thereby opens the outlet for the delivery of the liquid into the container. This position of the slide valve is shown in Fig. 5, the shoe 128 being at the top of its stroke. As soon as the shoe has reached this position, the filling turret 32 advances one step through a partial rotation of the turret and during this advancement and while the shoe is holding the slide valve open, the roller 71 travels along the shoe and rides off its farthest end onto a stationary holding rail 131 (Figs. 1, 2 and 5). This holding rail 131 extends partially around the outer periphery of the filling turret and is supported on brackets 132 which are secured to the machine frame. The rail holds the slide valve open while the filling turret moves through its partial rotations.

During these partial rotations of the filling turret 32, the measuring chamber piston 78, op-

erating under the action of the stationary cam 83, moves up in the measuring chamber 73 and forces the measured charge of liquid from the chamber, through the channel 76 and open nozzle outlet 58, into the container. The nozzle being at an angle to the container, directs the stream of liquid through the opening B in the container and projects it against the interior side wall of the container as hereinbefore explained.

Near the end of the cycle of operation of the filling turret 32, when all of the liquid has been forced out of the measuring chamber by the piston 78 reaching the top of its stroke, as shown in dot and dash lines in Fig. 2, the slide valve is closed and the piston returns to its lowered original position. Closing of the slide valve is effected by a stationary closing cam 135 (Figs. 1 and 11) which is disposed adjacent the terminal end of the holding rail 131 and which forms a continuation of this rail. The cam is supported on a bracket 136 secured to the machine frame 28.

Hence when a roller 71 of the filling devices 52 reaches the terminal end of the holding rail 131 it rides off the rail and into the cam 135 as shown best in Fig. 11. This cam is formed with a downwardly curved cam groove 137 which forces the roller 71 downwardly into its original position. This lowering of the roller shifts the slide valve downwardly, moving the plunger 62 down into and closing the nozzle outlet 58 and also moves the valve 61 down into position adjacent the channel 76 of the measuring chamber. This action permits the measuring chamber 73 to be refilled with liquid from the reservoir 51 for a subsequent container A.

The plunger 62 in moving down through the nozzle outlet 58 continues to move until its outer angularly disposed face 63 is at least flush with the outer angular face of the nozzle 57 and preferably projects slightly beyond the nozzle face. During this travel of the plunger 62 it forces any residual liquid completely out of the outlet to a point beyond the outer angular face of the nozzle and thereby leaves nothing to subsequently drip from the nozzle. The plunger remains in this position until opened for a subsequent container so as to insure against uncovering any internal surface of the nozzle and thereby prevents any dripping of liquid.

After closing of the slide valve of the filling device, the filled container A is engaged in a pocket 141 (Fig. 1) of a discharge turret 142 disposed adjacent the filling turret 32. This turret 142 is mounted on a vertical shaft 143 journaled in a suitable bearing formed in the machine frame 28. The shaft is rotated intermittently in any suitable manner in time with the filling turret 32 so as to effect proper register of the pockets of the two turrets for the transfer of the filled containers from one to the other.

A guide rail 145 disposed adjacent the outer periphery of the discharge turret 142 engages the containers while still in the filling turret pockets 33 and effects the transfer of the containers and holds them in place in the discharge turret pockets 141. The containers rest on a curved table 147 disposed adjacent the discharge turret and are propelled along this table by the turret to any suitable place of deposit. This completes a filling cycle of the machine.

As hereinbefore mentioned, provision is made for preventing the opening of the slide valve in case no container is advanced into place in a filling turret pocket 33 to receive the charge of liquid which is measured out in the measuring chamber 73. For this purpose the valve opening device 101 is provided with a container detector finger 151 (Figs. 1, 2 and 3) which is disposed in a substantially horizontal position and which is mounted on a pivot shaft 152 carried in a depending lug 153 of the bracket 125. The outer end of the finger is formed with a detector plate 155 having tapered edges which project into the path of travel of the containers A as the latter are being delivered from the feed turret 21 to the filling turret 32.

The inner end of the detector finger 151, adjacent the pivot shaft 152, is formed with a substantially upright locking finger 156 which terminates adjacent a stop lug 157 formed on the valve actuating member 122. The stop lug 157 moves vertically with the valve actuating member 122. During this movement of the actuating member the locking finger 156 is normally held out of the path of travel of the stop lug 157 by a roller 158 which is carried on a depending arm 159 of the actuating member 122. The roller normally engages against a sloping cam face 161 on the locking finger 156 as best shown in Fig. 2. A spring 162 keeps the locking finger against the roller. One end of the spring is secured to the finger while the opposite end is pinned to the lug 153. A stationary stop screw 164 adjustably secured in a boss 165 of the lug 153 is provided to limit the travel of the locking finger 156 under the tension of the spring 162.

Under normal operation of the machine as when containers follow each other in properly spaced and timed order, the containers pass under the detector plate 155 and lift it, with the result that the locking finger 156 is rocked outwardly away from the path of travel of the stop lug 157 as the latter moves down with the actuating member 122. It is this action that permits lifting and opening of the slide valve as explained above.

When no container is advanced by the feed turret 21 for transfer into the filling turret 32, the detector plate 155 remains unsupported. Hence, when the actuating member 122 moves down, the roller 158 on the arm 159 rides along the cam face 161 of the locking finger 156 and permits the tension spring 162 to draw the locking finger 156 inwardly under the stop lug 157 until the locking finger engages the stop screw 164. With the locking finger thus disposed in the path of travel of the stop lug 157, the actuating member 122 can move down until the stop lug engages the upper end of the locking finger as best shown in Fig. 6. The locking finger then arrests further downward movement of the actuating member 122 and the excess movement supplied by the cam 108 is taken up by compression of the spring 118 of the flexible connection between the levers 102, 114 (see Fig. 3). The movement of the actuating member 122 required to effect this locking operation is insufficient to raise the roller 71 on the filling devices 52. Hence the slide valve remains unopened.

During subsequent partial rotations of the filling turret 32, the filling device roller 71 passes under the holding rail 131, the rail serving as a stop to prevent inadvertent opening of the slide valve during rotation of the filling turret. The locking of the slide valve in closed position, maintains the communication between the reservoir 51 and the measuring chamber 73. Hence the measured charge of liquid in the chamber is returned to the reservoir as the measuring piston 78 moves up through its regular cycle of operation, the liquid returning to the measuring cham-

ber for a subsequent container, as the piston moves down to its original position.

Since the actuating member 122 moves through a down or valve actuating stroke and thence up through a return stroke for each partial rotation of the filling turret 32 and the feeding turret 21, the return stroke of the member moves the arm 159 and its cam roller 158 outwardly against the locking finger 156 and thus forces the finger outwardly to raise the detecting plate 155 to a position where it may be properly engaged by the next advancing container. If a container is in place in the line to be transferred to the filling turret, it engages and lifts the detector plate 155 as explained above to permit filling of the container, otherwise the actuating member 122 is again locked against opening the slide valve as explained above.

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.

We claim:

1. In a machine for filling liquids into containers having a top wall with a filling opening therein, the combination of support means for receiving a container in upright position, a clamping lug horizontally disposed above the top wall of said container, means for lifting said support means and the container thereon to clamp its top wall against said clamping lug in a predetermined position for filling, a liquid filling nozzle extending longitudinally at an acute angle to the horizontal, said nozzle terminating in an angular face disposed in a horizontal plane closely spaced above the level of the clamping surface of said lug and immediately above the top wall of the supported container and having a tubular outlet aligning with the filling opening in said top wall for projecting a stream of liquid angularly through said opening and into said container against a side wall thereof to minimize foaming of the liquid, a valve plunger reciprocable within said nozzle outlet and terminating in an angular face normally substantially flush with said angular face of the nozzle for opening and closing said nozzle to control the flow of liquid therefrom, and valve actuating devices for withdrawing the valve from said nozzle outlet to fill the container and for closing and completely ejecting all liquid from the nozzle outlet by a reversed movement of said valve.

2. In a machine for filling liquids into containers having a wall with a filling opening therein, the combination of support means for holding a container in a predetermined position for filling, a liquid filling nozzle disposed adjacent said support means and located at an angle to the horizontal, said nozzle terminating in an angular face disposed in a horizontal plane close to the filling opening wall of the supported container and having an outlet aligning with the filling opening of said supported container for projecting a stream of liquid through said opening and into said container against a side wall thereof to minimize foaming of the liquid, a valve plunger slideably disposed in said outlet for opening and closing said outlet to control the flow of liquid therefrom, said plunger terminating in an angular face disposed parallel to said nozzle face, valve actuating devices for shifting said plunger into said outlet, said actuating devices in closing said outlet, shifting said plunger face into a position at least in alignment with said nozzle face to force all residual liquid from said outlet to eliminate dripping of liquid from said nozzle after a filling operation, and detector means moved by engagement of a container in proper filling position for making effective said valve actuating devices.

3. In a machine for filling liquids into containers, the combination of support means for holding upright containers to be filled, a liquid filling nozzle disposed adjacent said support means and located at an angle to the horizontal for projecting a stream of liquid into said container and against a side wall thereof to minimize foaming of the liquid, a slide valve movable inside and longitudinally of said nozzle for opening and closing said nozzle to control the flow of liquid therefrom, a movable lifter shoe engageable with said slide valve when in raised position for opening said valve, actuating means for normally raising and lowering said shoe, a spring moved locking finger for preventing raising of said lifter shoe in the absence of a container to be filled, detector means movable by a properly held container for holding said locking finger against movement while said valve is opened, holding means engageable with said opened valve for retaining it in open position for the filling operation, and closing means engageable with said opened valve for closing it after said filling operation.

4. In a machine for filling liquids into containers, the combination of support means for a container to be filled, a liquid filling nozzle disposed adjacent said support means and located at an angle thereto for projecting a stream of liquid into said container and against a side wall thereof to minimize foaming of the liquid, a slide valve disposed within said nozzle for opening and closing said nozzle to control the flow of liquid therefrom, a movable lifter shoe engageable with said slide valve for opening said valve, actuating means for said shoe, detector means engageable with a container to be filled, and locking means operable by said detector means and against said shoe actuating means for holding said shoe inoperable against said slide valve when no container is presented to be filled.

5. In a machine for filling liquids into containers, the combination of a rotatable filling turret having pockets for receiving containers to be filled, means for feeding containers in spaced and timed order into said pockets, a reservoir rotatable with said filling turret for holding a supply of liquid, a measuring device connecting with said reservoir adjacent each turret pocket for measuring a charge of the liquid, means for moving said measuring device for delivering the measured liquid into a received container, a hollow valve housing between said reservoir and each measuring device, said housing having a nozzle with an outlet disposed above each turret pocket and extending at an angle to the horizontal for projecting the measured charge of liquid delivered by said measuring device into said container against a side wall thereof at an angle thereto to minimize foaming of the liquid, a slide valve disposed within each housing for controlling the flow of liquid from said reservoir into said measuring device and having a plunger movable into and out of said nozzle outlet for controlling the flow of liquid from said measuring device, and

valve actuating devices for positioning said valve to interrupt communication between said reservoir and said measuring device and to close said nozzle outlet to cut off the measured charge of said liquid, said valve actuating devices also cooperating with said measuring device delivery to continue blocking communication between said reservoir and said measuring device while opening said nozzle outlet thereby filling said container with measured liquid.

6. In a machine for filling liquids into containers, the combination of a rotatable filling turret having pockets for receiving containers to be filled, means for feeding containers in spaced and timed order into said pockets, a reservoir rotatable with said filling turret for holding a supply of liquid, a valve housing connecting with and providing communication with said reservoir, said housing having a nozzle with an outlet disposed adjacent said turret pocket and located at an angle thereto for projecting a stream of liquid into said container against a side wall thereof at an angle thereto to minimize foaming of said liquid, a slide valve disposed within said housing and having a plunger movable into and out of said nozzle outlet for controlling the flow of liquid into said container, a movable lifter shoe disposed adjacent said turret and engageable with said slide valve for withdrawing said plunger from said outlet, actuating means for said shoe, a holding rail disposed adjacent the periphery of said turret and extending partially therearound for receiving said shifted slide valve from said shoe and for retaining said valve in its open position as the turret rotates to continue the filling of said container, and cam means disposed adjacent the terminal end of said holding rail for shifting said slide valve to close said nozzle outlet with said plunger.

7. In a machine for filling liquids into containers, the combination of means for supporting an upright container to be filled, a reservoir for holding a supply of filling liquid, a liquid measuring device below said reservoir, a tubular housing located between said reservoir and measuring device with the lower end of the housing directed toward the top of the container and the axis of the housing disposed at an acute angle thereto, said housing having a nozzle outlet formed at its lower end for directing fluid angularly into the container and a passageway formed in the upper portion of the housing and extending longitudinally from said outlet through the upper end of the housing, said passageway at an upper portion communicating through a lateral supply opening with said reservoir and at a lower portion communicating through a channel with said measuring device, a valve within said passageway and movable therein to control the flow of liquid through said passageway between said supply opening and said channel, a plunger on the lower end of said valve and movable into said nozzle outlet for controlling the flow of liquid therethrough, a block slideable and closely fitted in the upper end of said passageway and connected by a stem to said valve, said block thus serving as a guide for said valve and as a liquid seal for the upper end of said passageway, and means for moving said integrated plunger, valve and block in one direction to close said outlet and to permit liquid to flow from the reservoir to the measuring device, and to move them in the opposite direction to stop the flow from the reservoir and to permit the liquid to flow from the measuring device through said outlet and angularly into said container.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
765,552	Bucklin	July 19, 1904
1,001,977	Newland	Aug. 29, 1911
1,499,366	Hansen	July 1, 1924
2,144,628	Hothersall	Jan. 24, 1939
2,222,617	Hothersall et al.	Nov. 26, 1940
2,299,003	Baldwin	Oct. 13, 1942