Feb. 5, 1952 M. KOEGLER 2,584,355

LIQUID DISPENSING AND FILLING MACHINE

Filed Dec. 9, 1946 4 Sheets-Sheet 1

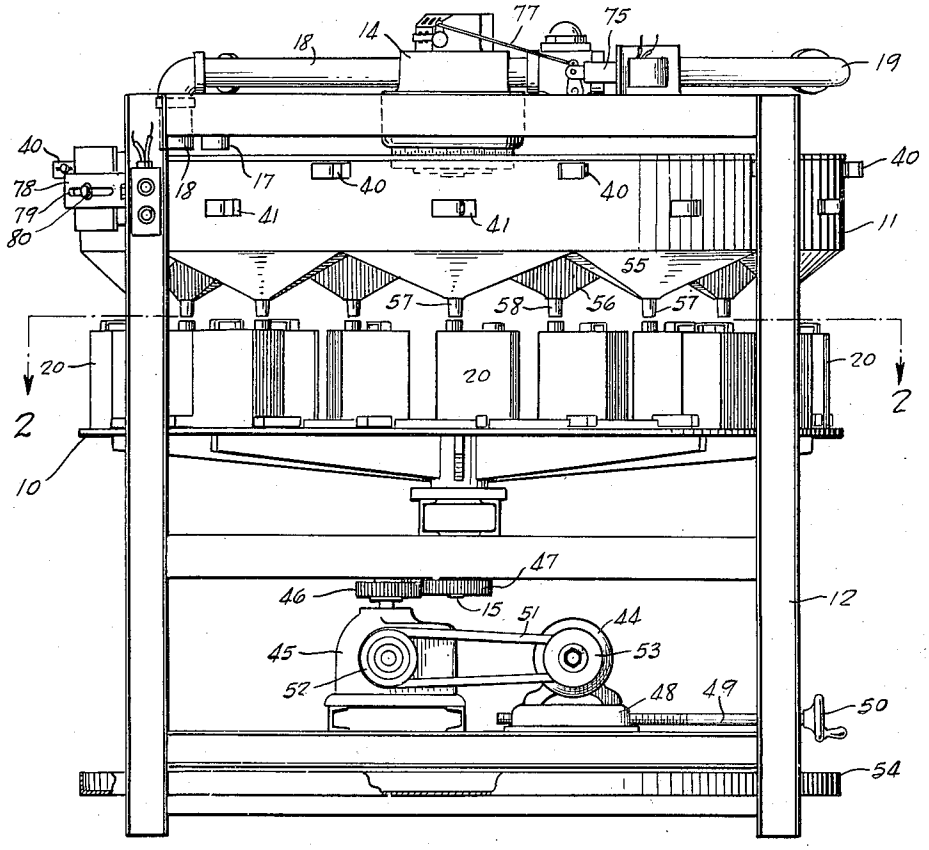


FIG. 1

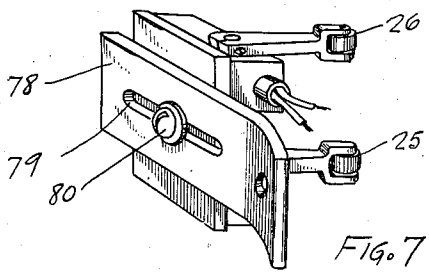


FIG. 7

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LIQUID DISPENSING AND FILLING MACHINE

Filed Dec. 9, 1946 4 Sheets-Sheet 2

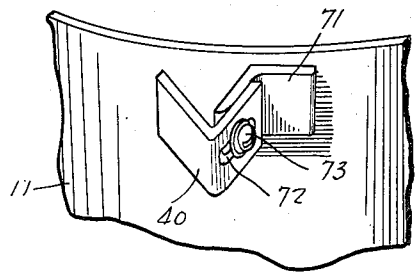


FIG. 4

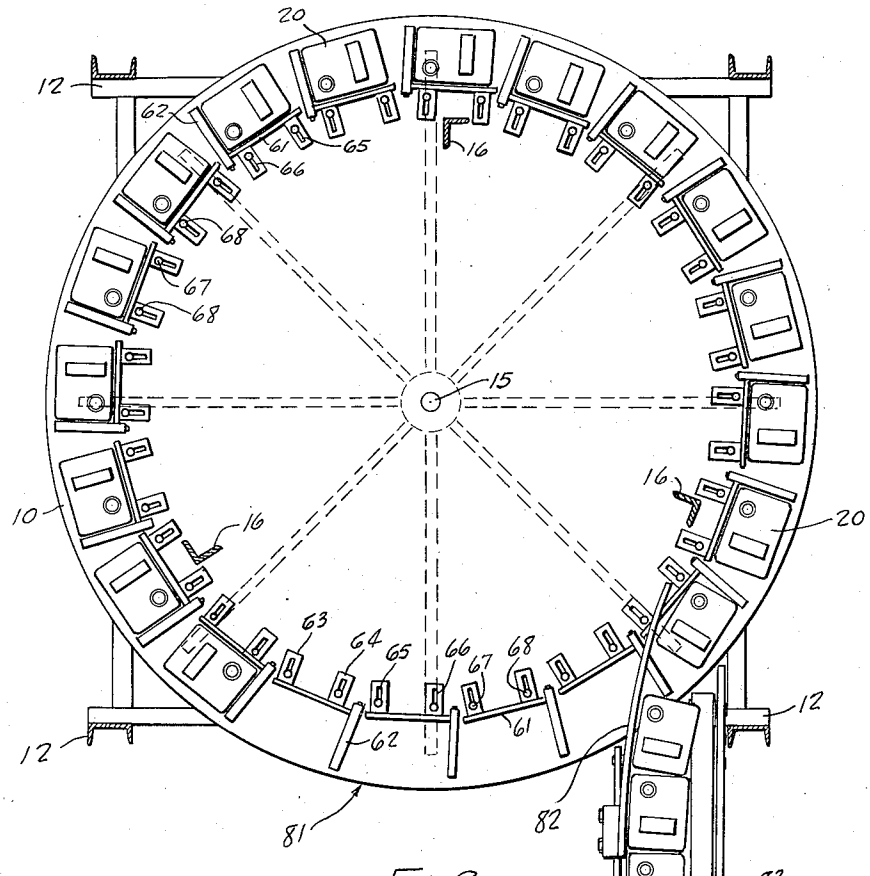


FIG. 2

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LIQUID DISPENSING AND FILLING MACHINE

Filed Dec. 9, 1946 4 Sheets-Sheet 3

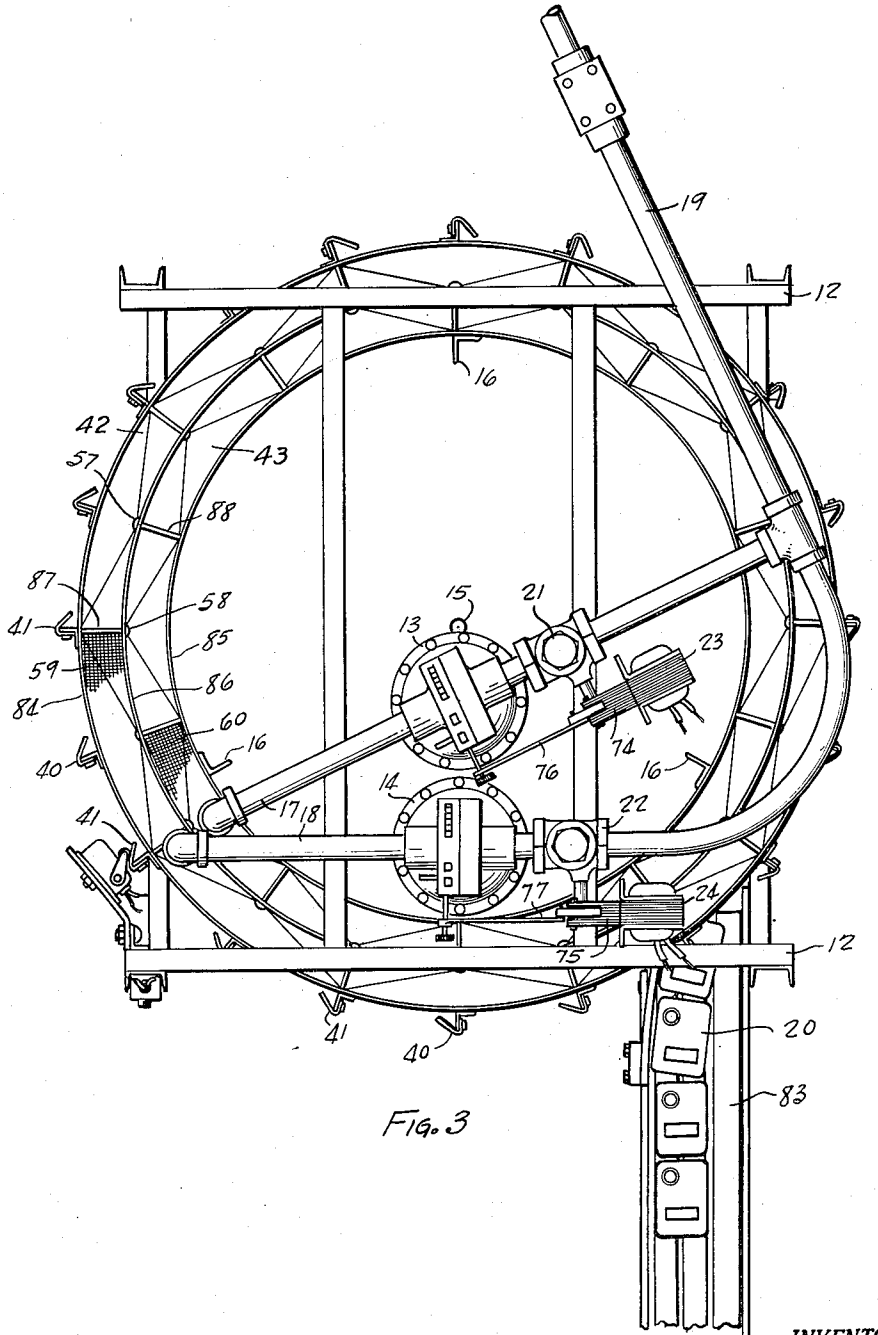


FIG. 3

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LIQUID DISPENSING AND FILLING MACHINE

Filed Dec. 9, 1946 4 Sheets-Sheet 4

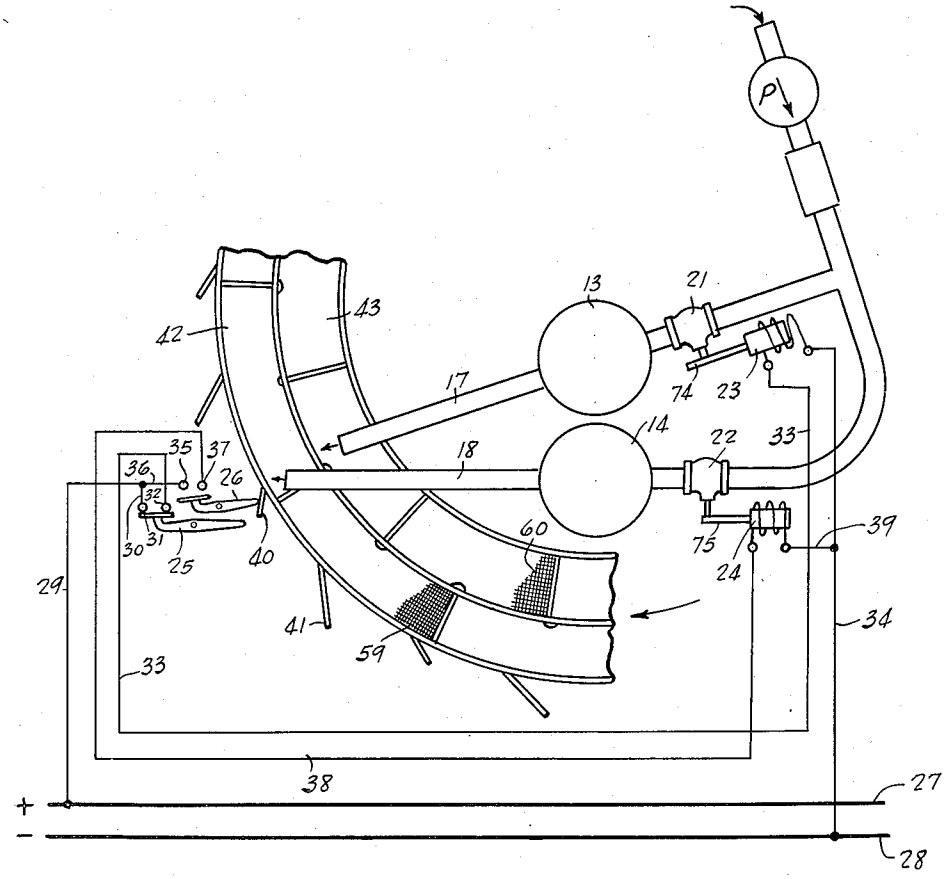


Fig. 8

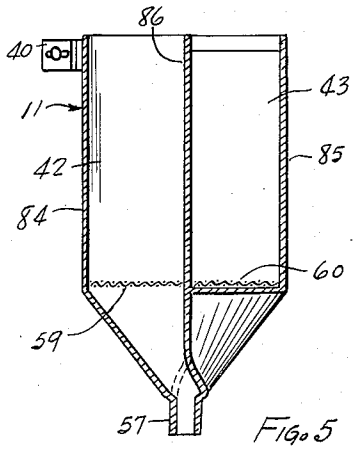


Fig. 5

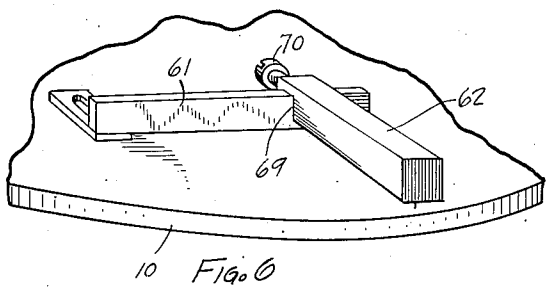


Fig. 6

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UNITED STATES PATENT OFFICE

2,584,355

LIQUID DISPENSING AND FILLING MACHINE

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Application December 9, 1946, Serial No. 715,051

3 Claims. (Cl. 222—127)

1

This invention relates to automatic filling machines, and particularly a machine for measuring, metering, and depositing pre-determined amounts of liquid in containers.

This application is a continuation in part of my application filed December 10, 1945, Serial Number 635,955, now abandoned, for Receptacle Filling Apparatus, and includes primarily means for increasing the capacity of the machine, and means whereby the sizes of containers into which the liquid is deposited may be varied.

The liquid filling machine of this invention includes a turntable with adjustable stops for positioning containers, continuous rows of hoppers positioned above the turntable with spouts under which containers may be placed, meters with tubular connections through which liquid may be measured and run into the hoppers, and adjustable trips for operating the meters.

Automatic filling machines for liquids are confronted with the problem of turning the liquid on and turning it off after a pre-determined amount has passed through the measuring means, and then provision must be made for the drip, which can not be instantaneously terminated.

To accomplish this purpose, the machine of this invention first deposits the liquid in intermediate hoppers which pass continuously under a spout, and then the hoppers deposit the liquid into containers in which the containers remain under the spouts of the hoppers long enough to receive substantially all of the drip from the hoppers.

To increase the capacity of a filling machine of this type, it would, therefore, be necessary to increase the size thereof, and this would obviously increase the area of valuable floor space.

To overcome this requirement, the machine of this invention contemplates a second series of hoppers in combination with the hoppers of the machine of the original application, with the additional hoppers staggered in relation to the former hoppers, and of substantially the same length and area.

In order that the same filling time of the hoppers and containers may be maintained, the invention also contemplates an additional meter for the second series of hoppers.

As the machine is operated by comparatively inexperienced help, it would be objectionable to place some containers in one line and some in another, and, therefore, in adding an additional series of hoppers, it has been found necessary to position the spouts of all hoppers in one line on a common radius from the center of the machine.

To further facilitate successful operation of the machine, it was also found desirable to provide adjustable trips for the filling instrumentalities,

2

and stagger these trips whereby the filling instrumentalities of the different series of hoppers operate independently, and at the same time, alternately.

The purpose of this invention is, therefore, to provide improvements in machines for filling containers with liquids, wherein the liquid deposited in each container may be accurately measured, and the number of operations thereof metered, and in which means is provided for preventing waste of the drip of the spouts from the meters, and also of spouts of intermediate hoppers.

In dispensing and filling machines of this type, in which the containers are necessarily comparatively accurately positioned under receiving spouts, the empty containers are placed upon the turntable by hand, and after liquid is deposited therein and sufficient time permitted for the drip, the containers are automatically removed from the turntable by an arm projecting into the path of travel. The arm causes the containers to slide in their upright positions from the turntable to a conveyor by which they are conveyed from the machine.

To properly time the operation thereof, adjustment is provided in the means for rotating the turntable so that it may be set to rotate at a greater or lesser speed, as may be desired. The speed of the turntable is obviously synchronized with that of the measuring and metering instrumentalities as these instrumentalities are set in motion by trips associated with the turntable.

The object of this invention is, therefore, to provide improvements in the construction of liquid dispensing and filling machines wherein the capacity thereof may be increased without interfering with the efficiency and successful operation of the machine.

Another object is to provide means for filling a greater number of containers on a machine of the same size, and at the same time providing the same length of time for drip.

Another object is to provide a turntable for containers for filling machines in which adjustable stops are provided so that containers of different sizes may be held thereon.

Another object is to provide a trip for dispensing liquids for filling containers, in which the position of the trip may be adjusted to synchronize dispensing instrumentalities with the movement of the containers.

A further object of the invention is to provide means for increasing the number of hoppers for receiving a liquid and depositing the liquid in containers without reducing the length of the hopper, and at the same time, centering spouts from the hoppers on a common radius.

With these and other objects in view, the

invention embodies a dispensing and filling machine having a turntable with adjustable container holding stops thereon, filling hoppers rotatable with and positioned above the turntable, in which the hoppers are provided with spouts centered on a common radius from the center of the turntable, a plurality of meters for dispensing and metering fluid to the hoppers, means removing containers from the turntable, means rotating the turntable, and means operating the dispensing instrumentalities associated with the turntable wherein the operation of the dispensing instrumentalities is synchronized with the movement of the turntable.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings, wherein:

Figure 1 is a view showing a front elevation of the machine with the container removing elements and conveyor omitted.

Figure 2 is a sectional plan on line 2—2 of Figure 1, showing the turntable and container removing elements.

Figure 3 is a plan view of the machine.

Figure 4 is a detail showing an adjustable lug for operating the trip mechanism that causes operation of the dispensing and filling instrumentalities.

Figure 5 is a typical cross section through the continuous rows of filling hoppers.

Figure 6 is a detail illustrating the adjustable stop elements which locate the containers on the turntable.

Figure 7 is a detail illustrating the trip mechanism.

Figure 8 is a diagrammatic view illustrating the wiring circuits associated with the trips and dispensers.

Referring now to the drawings wherein like reference characters denote corresponding parts, the dispensing and filling machine of this invention includes a turntable 10, a battery of intermediate hoppers 11, a frame 12, and metering elements 13 and 14.

The turntable 10 is rotatably mounted in the frame 12 on a shaft 15, and the hoppers 11 are supported above the turntable by vertical struts 16. The hoppers, therefore, rotate with the turntable, and in the operation of the machine, the hoppers pass below filling spouts 17 and 18 extending from the meters 13 and 14.

The liquid is supplied through a supply connection 19 to the meters 13 and 14, and from the meters, the liquid passes through the spouts 17 and 18 to the hoppers, from which it immediately passes to the containers which, in the design shown, are in the form of cans 20.

Associated with the metering elements 13 and 14 are valves 21 and 22 which are adapted to be operated by solenoids 23 and 24, as shown in Figure 8, the solenoids being energized for operation thereof by trip contacts 25 and 26.

In the diagram shown in Figure 8, current is provided through supply wires 27 and 28, and the wire 27 is connected by wires 29 and 30 to a terminal 31. When the trip 25 is operated, a circuit is completed to the terminal 32, and through a wire 33 to the solenoid 23, the opposite terminal of the solenoid 23 being connected by a wire 34 to the other supply wire 28.

The supply wire 27 is also connected through the wire 29 to the terminal 35 by a wire 36, and a corresponding terminal 37 positioned to be engaged by the trip member 26 is connected by a wire 38 to the solenoid 24, the opposite terminal of which is connected by a wire 39 to the supply wire 28 through the wire 34.

The trips 25 and 26 are positioned to contact lugs 40 and 41 respectively, wherein the lugs 40 operate the trip 26, which is associated with the solenoid 24, and the lugs 41 contact the trip 25 which operates the solenoid 23. The lugs 40 are, therefore, associated with the outer row 42 of hoppers wherein the valve 22, when operated by the solenoid 24, permits the liquid to flow through the meter 14, and the spout 18, to the outer row of hoppers. The lugs 41 are associated with the trip 25 and solenoid 23 wherein the valve 21 is operated thereby to permit liquid to flow to the meter 13, and from there through the spout 17, to the inner row 43 of hoppers. It will be understood that, should the number of rows of hoppers be increased, the lugs, trips and dispensing and metering instrumentalities would be increased accordingly.

The turntable 10 on the shaft 15 is rotated by a motor 44 through a speed reduction element 45 and gears 46 and 47. The motor is positioned on an adjustable block 48, which is slidably mounted in the frame and provided with an adjusting screw 49 with a hand wheel 50 on the end thereof. Between the motor and speed reduction element 45 is a variable speed element for varying the speed ratio, consisting of a belt 51 and changeable pulleys 52 and 53. The speed of the turntable may, therefore, be readily adjusted by moving the motor toward or away from the element 45 by the hand wheel 50.

Below the motor and turntable is a drip pan 54 that may be of any size, type, or design.

In the design shown, the hoppers 11 are provided in concentric rows 42 and 43, and below the body portions of the hoppers are sloping bottoms 55 and 56 with spouts 57 and 58 at their vertexes or lower-most points.

The spouts 57 and 58 are centered on the web dividing the two rows of hoppers wherein the centers of the spouts are on a common radius from the center of the machine. With the spouts positioned in a circle about the center of the machine, it is possible to adjust the stop or locating elements so that the containers being filled from both rows of hoppers will be positioned in line, and also on a radius from the center of the machine. The hoppers may also be provided with screens 59 and 60, as shown in Figures 5 and 8.

The containers are located by stops 61 and 62, the positions of which may readily be adjusted to compensate for containers of different sizes and shapes, wherein the positions of the containers may readily be adjusted to center or register the spouts or openings thereof directly under the spouts 57 and 58 of the hoppers. The stops 61 are provided with projecting lugs 63 and 64 with slots 65 and 66 therein, and these are adjustably held to the turntable by bolts 67 and 68 as shown. The stops 62 are formed with slots 69 that dovetail over the stops 61, whereby they may be slid along the member 61 and secured in position thereon by set screws 70.

As the machine operates, the lugs 40 and 41 contact the trips 25 and 26, and these hold the solenoids energized and the valves operated thereby open until the required amount of liquid has passed through the valves 21 and 22. In order to regulate the amounts of liquid passing through the valves, the lugs 40 and 41 may be adjusted so that the valves associated therewith

are held open for exact periods of time. The lugs 40 are mounted on projecting elements 71 through slots 72 and screws 73, as shown in Figure 4. The lugs 40 may, therefore, be adjusted inwardly or outwardly, as may be desired, to hold the trips in the position of energizing the solenoids for any desired period of time.

The solenoids are connected to the valves 21 and 22 by members 74 and 75, and these connections are also provided with rods 76 and 77 that actuate the meters 13 and 14 with each opening movement of the valve wherein the meters will record the number of charges passing therethrough to the containers, and this provides a record of all containers filled by the machine.

The lugs 40, 41 operating the trips 26, 25 are adjustably mounted on the hoppers wherein the opening and closing movements of the dispensing instrumentalities are synchronized with the hoppers so that liquid may be flowed into first the hopper of one row and then alternately the hopper of another row. To further facilitate accurate timing of the trip elements, the trips 25 and 26 are adjustably mounted on the frame 12 of the machine through a bracket 78, which is provided with a slot 79 through which a screw 80 extends that holds the trip elements.

The empty containers are placed on the machine at a point 81, as shown in Figure 2, and the liquid is deposited in the containers at points just beyond the point 81, as illustrated in Figure 3, and then the containers remain on the turntable with the spouts or opening thereof in registering position with the spouts 57 and 58 of the hoppers through movement of substantially 270 degrees of the turntable or until all of the drip passes into the containers. The containers are then removed from the turntable by an arm 82 associated with a conveyor 83, as shown in Figure 2, and as the containers engage the arm, they will be slid from the surface of the turntable to the conveyor by the movement of the turntable, and then conveyed from the machine.

The hoppers 11 may be of any suitable shape or design. In the design shown, they are formed in two rows 42 and 43 with an outer plate 84, an inner plate 85, and an intermediate web or plate 86. The areas between the plates are divided by transverse partitions 87 and 88 forming the hoppers 11. It will be noted in Figure 5 that the lower surfaces or bottoms of the hoppers slope toward the spouts 57 and 58 which are positioned below the web 86, also as shown in Figure 5. The size and number of hoppers and also the number of rows thereof may be varied to compensate for different materials handled or for different sizes of containers, as may be desired.

The construction of the machine will be readily understood from the foregoing description. In use, the empty containers are placed upon the turntable at the point 81 with the openings or spouts thereof in registering position with the spouts from the hoppers and as they pass the trips, their respective lugs actuate the valves associated with the different rows so that liquid is first flowed into a hopper in one row, and then into a hopper of another row, with the operation continuing as the machine operates. The liquid then passes directly through the spouts of the hoppers into the containers, and after the containers have been conveyed around the machine by the turntable until the drip is exhausted, they may be removed from the machine. The size of the hoppers, the positions of the containers on the turntable, and the speed of the machine may be regulated or adjusted, or changed to compensate for different materials handled.

While a preferred specific embodiment of the invention is hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact construction illustrated and described because various modifications of the details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a liquid dispensing and filling machine, in combination, a frame, a table rotatably mounted on said frame, a plurality of hoppers arranged in concentric rows and fastened to said table, power operated means for rotating said table, a plurality of containers disposed on the table and beneath the hoppers, liquid conveying and measuring instrumentalities arranged over the hoppers, valves connected to said liquid conveying means, electro-magnetic means for controlling said valves, a plurality of elements arranged on said hoppers, and tripping means actuatable by said elements and effective for completing a circuit through said electro-magnetic means at predetermined times.

2. In a liquid dispensing and filling machine, in combination, a frame, a table rotatably mounted on said frame, means on said table to adjustably position a plurality of containers thereon, a plurality of hoppers fastened to said table and arranged over said containers, a plurality of fixed liquid conveying means operatively positioned over said hoppers and effective to deposit liquid therein, meters connected to said liquid conveying means and effective to measure the quantity of liquid conveyed into the hoppers, valves associated with the liquid conveying means, and electro-magnetic means for controlling said valves at predetermined times, said last-mentioned means being actuated by instrumentalities connected to said hoppers and to said frame.

3. In a liquid dispensing and filling machine, in combination, a frame, a table turnably mounted on said frame and effective for adjustably retaining a plurality of containers thereon, hoppers arranged over said containers and in position to transfer liquid thereto, a plurality of fixed liquid conveying means arranged over said hoppers and effective for disposing liquid therein in sequence, a plurality of valves associated with said liquid conveying means, a plurality of solenoids controlling said valves, an electric circuit connected to each of said solenoids, and means mechanically connected to said hoppers and said frame and effective to complete the circuit through said solenoids to control the flow of liquid through said liquid conveying means.

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