Nov. 27, 1962 H. I. KEVES 3,065,775

LIQUID DISPENSING APPARATUS

Filed July 28, 1959 3 Sheets-Sheet 1

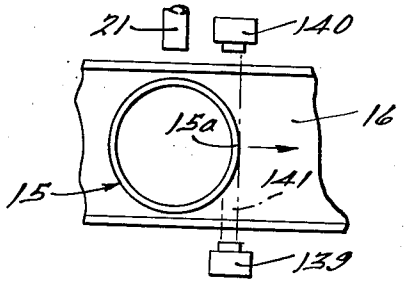


Fig. 5.

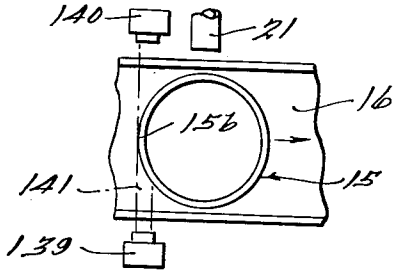


Fig. 6.

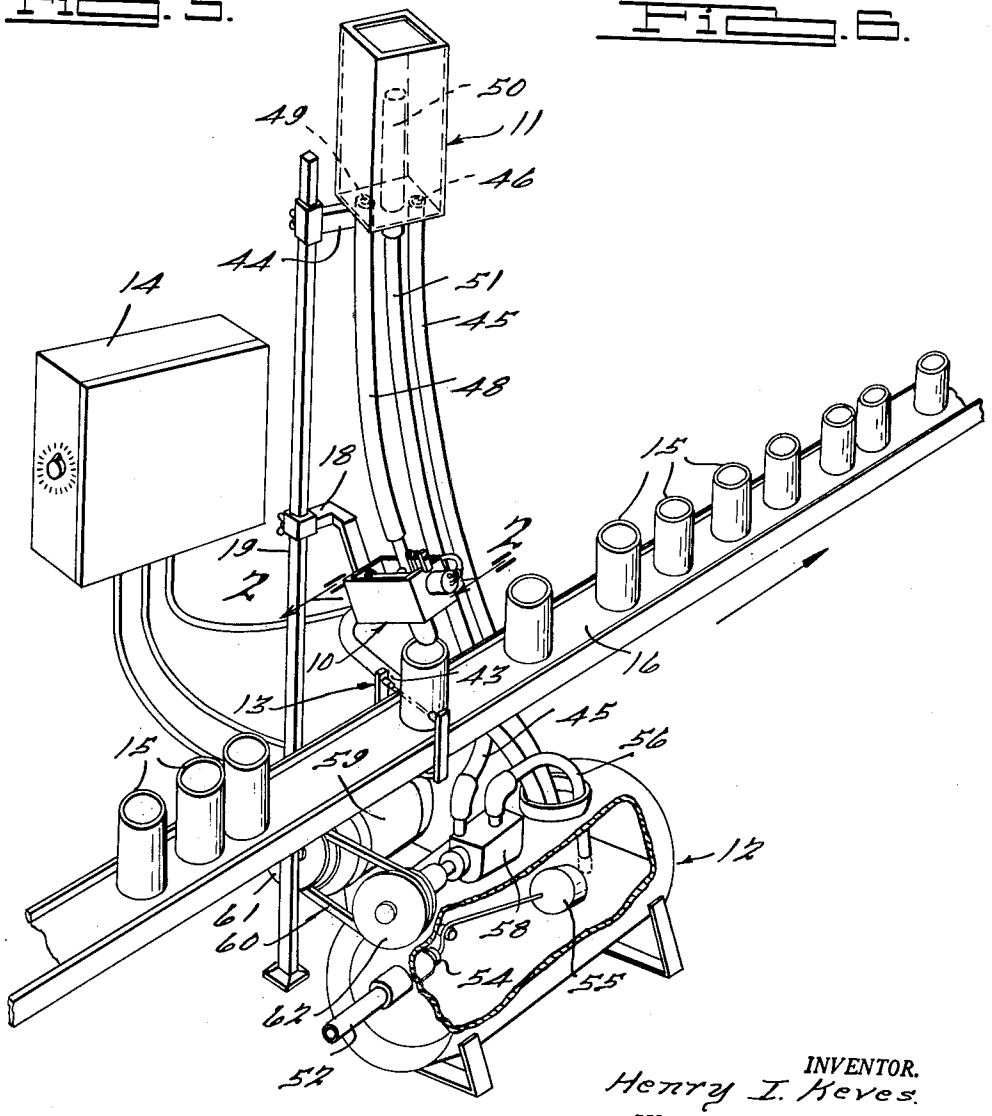


Fig. 1.

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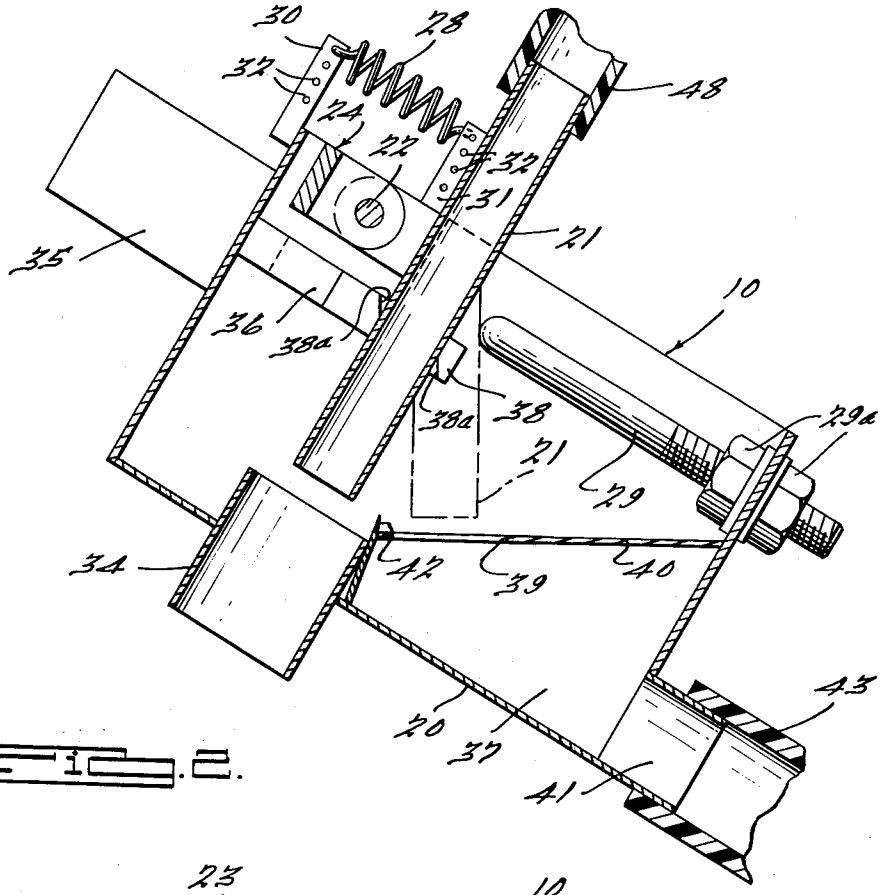


Fig. 2.

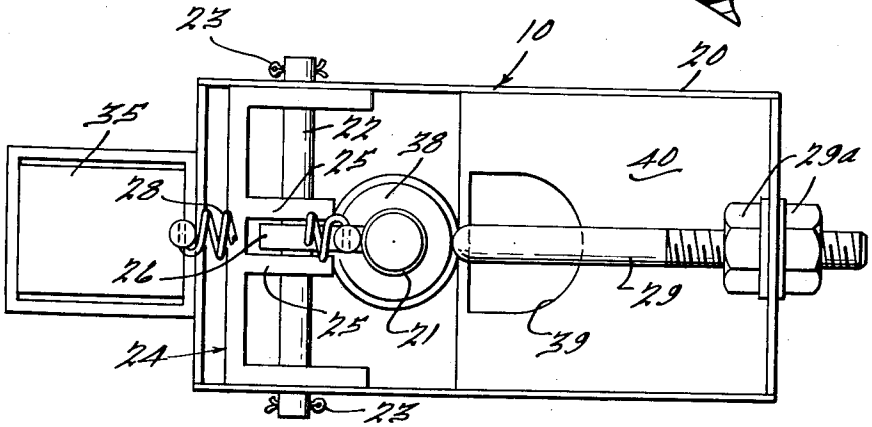


Fig. 3.

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LIQUID DISPENSING APPARATUS

Filed July 28, 1959 3 Sheets-Sheet 3

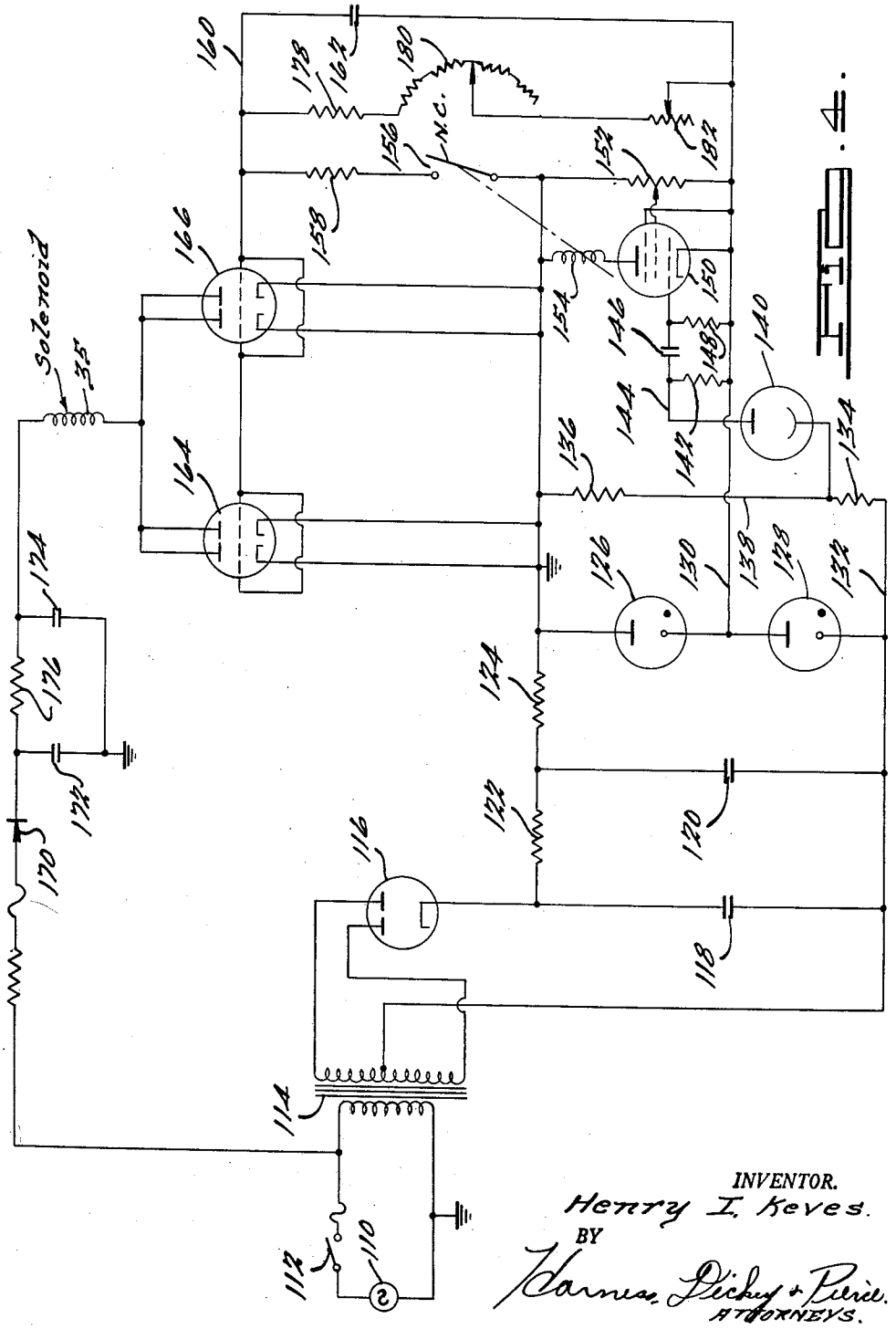


FIG. 4.

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LIQUID DISPENSING APPARATUS

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Filed July 28, 1959, Ser. No. 830,145
9 Claims. (Cl. 141—131)

This invention relates to a liquid dispensing apparatus for accurately dispensing a controlled volume of liquid into each of a series of moving receptacles.

The general object of the present invention is to provide a liquid dispensing apparatus of simple design and durable operation that is adapted to dispense a controlled volume of a variety of liquids into each of a succession of receptacles rapidly moving past the discharge nozzle.

Another object is to provide a liquid dispensing apparatus having a constant flow nozzle actuable in response to a sensing and timing system to accurately dispense a controlled volume of liquid into each of a series of receptacles conveyed past the discharge nozzle at unequally spaced intervals therebetween.

Still another object of this invention is to provide a liquid dispensing apparatus of a portable nature having a constant flow nozzle that is instantly movable between a dispensing position and a non-dispensing position and which apparatus may be conveniently installed at any point along the path of travel of the receiving receptacles.

Other objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of a liquid dispensing installation embodying the present invention and adapted to discharge liquid into containers transported along a conveyor belt;

FIG. 2 is a vertical sectional view of the spray head shown in FIG. 1 and taken along line 2—2 thereof;

FIG. 3 is a plan view of the spray head shown in FIG. 2;

FIG. 4 is a wiring diagram of the sensing means and timing control apparatus;

FIG. 5 is a fragmentary plan view of the relative position between the sensing means and the spray head, and;

FIG. 6 is a fragmentary plan view of an alternate position of the sensing means from that shown in FIG. 5.

Referring now in detail to the drawings and as may be seen to best advantage in FIG. 1, the liquid dispensing apparatus is comprised of a spray head **10**, a constant head tank **11**, a return tank **12**, a sensing device **13**, and timing control means **14**. The specific installation as herein illustrated is applicable to a canning operation wherein a variety of liquids such as brine, sugar solutions, oil and liquid fats, flavoring, coloring, vitamin and nutritional liquids and the like can be accurately dispensed in controlled quantities in each of a series of receptacles or containers **15** transported past spray head **10** by transfer means such as conveyor belt **16** at rates as high as 300 per minute. The unique operating characteristics of the spray head coupled with the sensing and timing controls provides rapid and accurate dispensing of liquids in each of the receptacles **15** in spite of irregular spaced intervals therebetween. Added flexibility is provided by the portable nature of each of the component elements enabling the installation to be quickly and simply moved to any selected position along the path of travel of the receptacles **15**. The dispensing apparatus is, of course, equally applicable for installation adjacent to arcuate conveyor sections as it is to the straight conveyor section shown in the drawing.

The spray head **10** is adjustably positionable above and

longitudinally of the path of travel of the open containers **15** by means of supporting bracket **18** adjustably secured to column **19**. The vertically slidable adjustable feature of bracket **18** enables spray head **10** to be positioned at the appropriate location above the containers to effect a precise discharge of the liquid therein. It is preferred to position the spray head **10** at an angle so that the liquid stream or spray is directed into the open top of the receptacle at an angle of about 30 degrees from the vertical to minimize splashing and spillage. As shown in FIGURES 2 and 3 spray head **10** is comprised of a rectangular three-dimensional outer housing **20** having a pair of side walls, a pair of end walls and a bottom. Tubular nozzle **21** is pivotly mounted on pivot pin **22** disposed between the upper side walls. Transverse bracket **24** of a general E-shaped configuration is disposed between and rigidly secured to the sides of outer housing **20** and through the depending flanges of which is journaled slidably removable pivot pin **22** held in position by suitable means such as cotter pins **23**. Inner depending flanges **25** of bracket **24** are disposed in spaced parallel relationship to provide lateral support and centering of pivot member **26** rotatably mounted on pivot pin **22** at one end and rigidly secured to nozzle **21** at its other end. By this pivoting arrangement, nozzle **21** is movable between a dispensing position wherein the continuous liquid stream is directed into one of the moving receptacles and a non-dispensing position wherein the nozzle is positioned as shown in phantom in FIG. 2 and the liquid stream is recirculated to the supply system. Nozzle **21** is maintained in the non-dispensing position by coil spring **28** and adjustable stop pin **29** in contact with the side of nozzle **21**. Coil spring **28** is connected at one end to pin **31** secured to nozzle **21**. Pins **30** and **31** are provided with a plurality of apertures **32** in which the ends of coil spring **28** may be selectively secured thereby enabling the selection of the resilient pivoting force applied to nozzle **21**.

Movement of nozzle **21** into the dispensing position wherein it is in axial alignment with orifice or cylindrical shroud **34** in the bottom of outer-housing **20** is achieved by solenoid **35** having a plunger **36** to the end of which is detachably secured annular ring **38** encircling nozzle **21**. Annular ring **38** is provided with chamfered portions **38***a* to permit nozzle **21** to pivot relative thereto into the non-dispensing position. Energization of solenoid **35** withdraws plunger **36** and annular ring **38** causing nozzle **21** to rotate from the non-dispensing position to the dispensing position in alignment with cylindrical shroud **34** and overcoming the tension of coil spring **28**. On de-energization of solenoid **35**, the plunger **36** is released and coil spring **28** causes nozzle **21** to pivot to its non-dispensing position wherein the liquid stream is directed into collecting chamber **37**. A satisfactory alternate modification comprises using a spring-loaded solenoid having a coil spring integrally mounted therein.

Replacement of nozzle **21** with a variety of different types and sizes is simply and quickly accomplished by disconnecting coil spring **28** from pin **31**, removing cotter key **23** and withdrawing pivot pin **22** until pivot member **26** is disengaged and the nozzle is withdrawn from annular ring **38**. A new annular ring having a diameter corresponding to the outer diameter of the replacement nozzle is installed on the end of plunger **36** in place of the existing ring **38** and the new nozzle is inserted therein and secured to pivot pin **22** and coil spring **28**.

The liquid to be dispensed is continuously supplied to the upper end of nozzle **21** as viewed in FIG. 2 through flexible tube **48** connected thereto. While nozzle **21** is in the non-dispensing position the liquid stream is directed through aperture **39** in splash shield **40** into collecting chamber **37** and drained therefrom through outlet port

41 by means of tube 43. The slope of the base portion of outer housing 20 toward outlet port 41 facilitates drainage of collecting chamber 37. Alignment of nozzle 21 with aperture 39 is achieved by stop pin 29 in abutting relationship with the side wall of nozzle 21 when in the non-dispensing position. The adjustability of stop pin 29 provided by lock nuts 29a enables alignment of other nozzles with aperture 39 having a diameter greater than or smaller than that shown in the drawing.

A distinct cleavage of the continuous liquid stream discharging from the nozzle 21 is achieved by knife-edge partition 42 disposed adjacent to cylindrical shroud 34 and comprising the forward edge of aperture 39 in splash shield 40. Accordingly, as nozzle 21 moves between a dispensing and non-dispensing position and vice-versa the liquid stream is distinctly divided between the dispensing position and recirculating non-dispensing position preventing splashing and dripping of the liquid from the shroud 34. The knife-edge partition 42 is equally effective when a spray nozzle is used in place of the solid stream nozzle as shown in the drawings.

A continuous flow of the liquid is supplied to nozzle 21 of the spray head 10 by the liquid supply system comprising the constant head tank 11 and return tank 12. Constant head tank 11 is comprised of a three-dimensional receptacle supported on bracket arm 44 which is slidably and adjustably mounted on column 19. Liquid pumped from return tank 12 up through tube 45 enters constant head tank 11 through inlet port 46 in the base thereof. A supply of liquid is supplied to spray head 10 by tube 48 connected to outlet port 49 in the base of constant head tank 11. A constant liquid level is maintained in constant head tank 11 by stand pipe 50 vertically disposed in the center of the tank. The supply of liquid to constant head tank 11 substantially exceeds that drawn off through tube 48 supplying the dispensing head 10. Accordingly, the excess liquid volume is drawn off at the open upper portion of stand pipe 50 and recirculated to return tank 12 by means of flexible tube 51.

When liquids are used having particles suspended therein which are susceptible to settling or when emulsifiable liquids are dispensed it is desirable to provide agitation in tank 11 to maintain a homogeneous liquid. Suitable immersion agitating equipment may be employed for this purpose or inlet port 46 may be baffled or inclined at an appropriate angle to cause turbulence of the liquid in constant head tank 11. Pressure of the liquid supplied to the nozzle of the spray head is regulated by positioning constant head tank 11 by means of bracket arm 44 at an appropriate vertical displacement above dispensing head 10.

Return tank 12 is comprised of a three-dimensional receptacle having liquid supplied to the interior thereof by main supply line 52, provided with valve 54 actuated by float mechanism 55. Float actuated valve 54 allows liquid to enter return tank 12 from main supply line 52 to make up that liquid which is dispensed by the dispensing head 10 and assures a substantially constant liquid level in the tank. Liquid is withdrawn from return tank 12 by suction line 56 connected to the inlet port of pump 58 and is discharged through the outlet port into tube 45 connected to the constant head tank 11. Pump 58 is driven by an electric motor 59 drivingly connected thereto by belt 60 extending around motor pulley 61 and pump pulley 62. As aforementioned in regard to the constant head tank 11 suitable agitation means may be incorporated in return tank 12 to assure homogeneous consistency of the liquid contained therein. The tubes interconnecting spray head 10, constant head tank 11, and return tank 12, are of a flexible synthetic material, preferably transparent to enable their visual inspection, and impervious to attack by the variety of liquids dispensed.

In operation, a supply of liquid is continuously pumped by pump 58 through tube 45 to constant head tank 11 from which a portion continuously flows at constant pressure to nozzle 21 of spray head 10. The excess fluid pumped to constant head tank 11 is drawn off at the top of stand pipe 50 and recirculated to return tank 12 by return tube 51. While dispensing nozzle 21 is in the non-dispensing position liquid flowing therethrough is recirculated back to return tank 12 by return tube 43 connected to outlet 41 of the spray head. When nozzle 21 is in the dispensing position liquid is directed through shroud 34 into a receptacle or container disposed therebelow.

The quantity of liquid dispensed is dependent on the pressure of the liquid supplied to the dispensing nozzle as determined by the elevation of constant head tank 11 relative to spray head 10, the diameter of the nozzle used, and the length of time that the dispensing nozzle 21 is maintained in the dispensing position. Accordingly, by varying either one, two, or all three of these variables, the quantity of liquid dispensed can be adjusted over a wide range. The rate of speed of the receptacles or containers 15 past the spray head controls the maximum period of time that the nozzle 21 can be maintained in the dispensing position. Moreover, when liquids are dispensed wherein the concentration thereof can be varied over a significant range such as brine solutions, the specific concentration of the particular solution must be considered along with the other variables to establish the correct metered quantity of liquid to be dispensed.

Energization of solenoid 35 or other suitable actuating means adapted to move dispensing nozzle 21 into the dispensing position is achieved by suitable sensing means such as photo-electric eye or a micro-switch actuated by the passage of a container, and disposed adjacent to the conveyor belt 16. The specific liquid dispensing apparatus shown in FIG. 1 is equipped with a photo-electric eye sensing device 13 disposed in spaced relationship at each side of conveyor belt 16 and actuable by containers 15 moving along the conveyor belt. The interruption of the light beam by a container and its re-establishment after the container has passed is transmitted by the photo-electric sensing device 13 to an electronic timing control system 14 which through electronic circuitry actuates and de-actuates solenoid 35. A typical wiring diagram of control system is shown in FIG. 4. The timing control system is energized from an alternating voltage source 110 which, upon the closure of switch 112, is connected across the primary winding of transformer 114. The resultant alternating voltage induced in the center tapped secondary winding of transformer 114 is full-wave rectified by means of dual diode 116, is filtered by the capacitor-input resistance-capacitance filter network including capacitors 118 and 120 and resistors 122 and 124 and is applied across a pair of serially interconnected gaseous discharge voltage regulating devices 126 and 128. The anode of device 126 is grounded, a regulated negative voltage appears at the cathode of device 126 and hence at conductor 130 and a more negative voltage appears at the cathode of device 128 and hence at conductor 132.

The negative voltage between conductor 132 and ground is developed across serially interconnected resistors 134 and 136 which constitute a voltage divider network, with the value of resistor 134 being less than that of resistor 136 so that the voltage at conductor 138, interconnecting resistors 134 and 136, is appreciably negative relative to the voltage on conductor 130.

A photo-electric tube 140 of sensing device 13 is physically disposed in a position in the path of a light beam so that it is energized, and hence in a low-impedance state, at all times except when the light beam impinging upon that phototube is interrupted as by a container 15 traveling on the conveyor 16 and passing, during its course of travel, through the light beam. The cathode of phototube 140 is connected to conductor 138 and the anode is connected to conductor 130 via conductor

144 and resistor 142. When the light beam impinges upon the phototube 140 so that its impedance is low, the potential at conductor 144 is quite negative relative to the potential at conductor 130 and approaches the potential at conductor 138. When the light beam is interrupted, phototube 140 assumes a high-impedance condition, that is, its resistance is high relative to that of resistor 142, little current flows through resistor 142 and the potential at conductor 144 is but slightly negative relative to the potential on conductor 130.

A serially interconnected capacitor 146 and resistor 148 are connected in parallel with resistor 142, and resistor 148 is connected between the control grid and cathode of an electron discharge device 150, which illustratively takes the form of a pentode vacuum tube. Screen grid bias for tube 150 is derived through a potentiometer 152 the resistive element of which is connected between conductor 130 and ground. The suppressor grid is connected to the cathode, and the anode is connected to ground through the winding of a plate relay 154 having a pair of normally closed contacts 156. Relay 154 has two stable states, energized and released, and contacts 156 have two stable states, open and closed, respectively.

With light having impinged upon phototube 140 for a period of time and equilibrium conditions having been reached, the potential at the right-hand electrode of capacitor 146 will be substantially equal to the potential on conductor 130 so that there is substantially zero bias on tube 150, and the left-hand electrode of capacitor 146 will be at a potential approaching the potential of conductor 138 so that capacitor 146 will be charged with its left-hand electrode negative with respect to its right-hand electrode. Tube 150 will, under zero bias conditions, conduct sufficient anode current to energize plate relay 154 so as to open the contacts 156, as shown. When the light beam is interrupted by a container phototube 140 is converted to a high- impedance condition, and conductor 144 tends instantaneously to change in potential toward the potential of conductor 130. Since the charge on capacitor 146 cannot change instantaneously, the right-hand electrode of capacitor 146 tends to be driven in a positive direction instantaneously, making the control grid of tube 150 positive relative to the cathode thereof. Since tube 150 is already conducting sufficiently to fully energize plate relay 154, this change will not effect the state of relay 154.

During the time that the light directed towards phototube 140 is interrupted, capacitor 146 will tend to discharge through resistors 142 and 148. With the parameters used in the constructed arrangement of the invention, the time constant of this circuit was but a few milliseconds and consequently in normal practice, capacitor 146 would tend to become substantially fully discharged during this interval and tube 150 would be returned substantially to a zero-bias condition.

When the impingement of the light beam upon phototube 140 is re-established, the potential on conductor 144 tends instantaneously to approach the potential on conductor 138 and, since capacitor 146 cannot change charge instantaneously, the right-hand electrode thereof and the control grid of tube 150 are instantaneously driven in a negative direction, establishing a substantial negative bias on tube 150 and driving that tube towards or to grid cutoff or at least to the point at which the anode current is insufficient to maintain relay 154 operated. As a result, contacts 156 close. Capacitor 146 will then commence to charge through resistor 148 so that the potential at the control grid of tube 150 will gradually become less negative relative to the cathode and, after a preselected short interval, the anode current of tube 150 will increase to the point where plate relay 154 will again operate to again open contacts 156. The closed period of contacts 156 is generally but a few milliseconds in duration.

When contacts 156 are closed, a circuit is completed from ground, through the closed contacts, charging resistor 158, conductor 160, capacitor 162, and to the negative voltage on conductor 130. As a result, capacitor 162 is charged with its upper electrode positive relative to its lower electrode. Conductor 160, connected to the upper electrode of capacitor 162, will change in potential during this charging period from a substantial negative value towards ground potential. In a constructed arrangement, the time constant of the circuit including resistor 158 and capacitor 162 was greater than the sum of the time constant of the RC circuit at the input of tube 150 plus the release and operate times of relay 154 so that the extent of the charge on capacitor 162 was determined primarily by the closed time of contacts 156. While conductor 160 does not reach ground potential during this period, it sufficiently closely approaches ground to bias tubes 164 and 166 quite substantially conductive.

Tubes 164 and 166 are illustrated as dual triodes with all four sections connected in parallel, with the control grids connected to conductor 160, with the cathodes connected to ground, and with the anodes being connected through the winding of solenoid 35 to a source of direct voltage comprising a half-wave rectifier 170 supplied from source 110 and a filter network comprising capacitors 172 and 174 and resistors 176, the anode to cathode voltage for tubes 164 and 166 being developed across capacitor 174.

When tubes 164 and 166 are rendered conductive, solenoid 35 is actuated. The delay between the re-establishment of the light beam and the instant of actuation of the solenoid may be adjustable if desired.

When contacts 156 open, the above described charging circuit for capacitor 162 is disestablished and that capacitor commences to discharge through a series network, including fixed resistor 178, variable resistor 180 and calibrating resistor 182, connected in shunt of capacitor 162. As a result of this discharge, the potential on conductor 160 and hence at the control grids of tubes 164 and 166 will gradually become more negative. After capacitor 162 is discharged to a preselected degree, the potential on conductor 160 will have become sufficiently negative to reduce the current in tubes 164 and 166 to the point where solenoid 35 will release permitting spring 28 to shift the nozzle to the non-dispensing position.

The time constant of the circuit including capacitor 162 and resistors 178, 180 and 182 is preferably substantially longer than the time constants of the circuit hereinbefore described so that the liquid may be ejected from the nozzle for an appreciable period. In the above noted constructed arrangement, time delays from a few milliseconds to a substantial period were provided.

It will be observed that the circuit is operated on a direct current basis and that the contacts 156 are only called upon to carry the small amplitude charging currents for capacitor 162 rather than the relatively large amplitude current (approaching an ampere) for energizing the solenoid 35.

The arrangement as above described produces actuation of the solenoid 35 in response to the re-establishment of the light beam following an interruption thereof, that is, the action is initiated or triggered in response to movement of the trailing edge of the container past a preselected point. It is also contemplated that the action may be triggered in response to the leading edge of the container, that is, in response to the interruption of the beam following a period of establishment of the beam. This can be accomplished, in one manner, by reversing the connections to the two electrodes of phototube 140 and correspondingly adjusting the direct voltages applied to those electrodes. For example, in the illustrated arrangement, correct operating potentials are applied to the electrodes of tube 140 by connecting the anode thereof. through resistor 142 to conductor 130, the potential of which is negative with respect to ground by the magnitude of the voltage across regulator 126, and by connecting the cathode to conductor 138. If resistors 134 and 136 were

equal (assuming tubes **126** and **128** to be identical) the potential at conductor **138** would equal that at conductor **130**. Consequently, as above noted, resistor **134** is selected to have a smaller value of resistance than resistor **136**, with those values being selected to apply a potential to the cathode of tube **140** which is negative relative to the potential at conductor **130** by a preselected amount. to modify the equipment to respond to the leading edge of the container, resistors **134** and **136** can be interchanged and the connections to the anode and cathode of tube **140** reversed. In a constructed embodiment, resistors **134** and **136** had values of 33,000 ohms and 100,000 ohms, respectively. For the changed mode of operation, resistors **134** and **136** would have representative values of 100,000 ohms and 33,000 ohms, respectively, the anode of tube **140** would be connected to the junction of resistors **134** and **136**, and the cathode of tube **140** would be connected to conductor **144**. No other circuit changes are necessary.

The relative position of the photoelectirc sensing means with respect to the spray head is shown in FIGURES 5 and 6 wherein moving container **15** is in the full position and adapted to receive the liquid stream from nozzle **21**. Positioning of the light source **139** and phototube **140** in transverse spaced relation to conveyor belt **16** as shown in FIGURE 5 is typical of the arrangement wherein the nozzle moving means is actuated to move nozzle **21** to the dispensing position the instant light beam **141** is interrupted by the leading edge **15***a* of moving container **15**. Positioning of light source **139** and phototube **140** as shown in FIG. 6 is alternately satisfactory and in which position nozzle **21** is moved to the dispensing position the instant light beam **141** is re-established when trailing edge **15***b* of moving container **15** moves out of the path thereof.

The unique operation of the constant flow pivotable nozzle **21** in conjunction with the sensing means **13** and electronic timing means **14** permits precise and accurate dispensing of metered quantities of liquids into containers passing the dispensing head at unequally spaced intervals at rates as high as 300 per minute without waste or spillage of the dispensed liquid.

While it will be apparent that the embodiments of the invention herein described are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the sub-joined claims.

What is claimed is:

1. A liquid dispensing apparatus including a spray head, said spray head comprising a housing having a wall member dividing said housing into a dispensing chamber and a collecting chamber, an aperture in said wall of said housing communicating with the interiors of said dispensing chamber and said collecting chamber, means for draining said collecting chamber, an orifice in the bottom of said dispensing chamber, a nozzle movably mounted in said housing and continuously discharging a stream of liquid, said nozzle movable between a dispensing position wherein said liquid stream is directed through said orifice and a non-dispensing position wherein said liquid stream is directed through said aperture into said collecting chamber, said nozzle resiliently biased to be normally in said non-dispensing position, power means mounted on said housing and associated with said nozzle operable to move said nozzle to the dispensing position, and cleavage means disposed between said aperture and said orifice and traversed by said liquid stream as said nozzle moves from and to said dispensing and said non-dispensing positions, said cleavage means adapted to distinctly divide said liquid stream between the dispensing and non-dispensing positions.

2. A liquid dispensing apparatus including a spray head said spray head comprising a three-dimensional housing having a wall member dividing said housing into a dispensing chamber and a collecting chamber, an aperture in said wall of said housing communicating with the interiors of said dispensing chamber and said collecting chamber, drainage means connected to said housing for draining said collecting chamber, an orifice in the bottom of said dispensing chamber, a nozzle pivotally mounted in said housing and continuously discharging a stream of liquid, said nozzle pivotable between a dispensing position wherein said liquid stream discharging therefrom is directed through said orifice and a non-dispensing position wherein said stream is directed through said aperture in said collecting chamber, resilient means associated with and biasing said nozzle into the non-dispensing position, a solenoid mounted on said housing having a plunger connected to said nozzle, said solenoid operable to pivot said nozzle to said dispensing position overcoming said opposing resilient means, and cleavage means disposed between said aperture and said orifice and traversed by said liquid stream as said nozzle moves to and from said dispensing and said non-dispensing positions, said cleavage means adapted to distinctly divide said liquid stream between said aperture and said orifice.

3. A liquid dispensing apparatus including a spray head, said spray head comprising a three-dimensional housing comprising two side walls, two end walls, and a bottom, a knife-edge partition extending upwardly from said bottom and transversely between said side walls, a splash shield extending from one of said end walls above said bottom between said side walls to said knife-edge partition and defining therewith a collecting chamber, an aperture in said splash shield disposed adjacent to said knife-edge communicating with the interiors of said collecting chamber and said housing, an outlet in said collecting chamber, said bottom of said housing inclined toward said outlet to facilitate drainage therefrom, an orifice in said bottom disposed adjacent to said knife-edge on the side opposite said collecting chamber, a cylindrical shroud fixedly mounted in said orifice, a tubular nozzle pivotally mounted in said housing continuously discharging a stream of liquid, said nozzle movable between a dispensing position wherein said stream discharging therefrom is directed through said shroud and a non-dispensing position wherein said stream is directed into said collecting chamber, said knife-edge partition traversed by said liquid stream as said nozzle moves to and from said dispensing and non-dispensing positions distinctly dividing said stream between said positions, resilient means associated with and urging said nozzle into said non-dispensing position, stop means coacting with said nozzle to restrict the pivoting motion thereof when in said non-dispensing position, and means connected to said nozzle for pivoting said nozzle into said dispensing position.

4. In an apparatus for successively dispensing a controlled quantity of liquid into each of a series of receptacles transported relative thereto by conveyor means, the combination comprising a liquid supply system, a spray head adjustably positionable longitudinally of the path of travel of said receptacles, said spray head comprising a collecting chamber having a top wall having an aperture therein, a nozzle movably mounted on said spray head and connected to said liquid supply system, said nozzle continuously discharging a stream of liquid and movable between a dispensing position wherein said liquid stream is directed into one of said receptacles, and a non-dispensing position wherein said stream is directed through said aperture into said collecting chamber and recirculated to said liquid supply system, cleavage means disposed adjacent to and defining a portion of said aperture and traversed by said liquid stream as said nozzle moves to and from said dispensing and non-dispensing positions, means associated with and adapted to move said nozzle to and from said positions responsive to motion of a receptacle into position to receive said stream discharged from said nozzle in said dispensing position.

5. In an apparatus for successively dispensing a con-

trolled quantity of liquid into each of a series of receptacles transported relative thereto by conveyor means, the combination comprising a liquid supply system, a spray head adjustably positionable longitudinally of the path of travel of said receptacles, said spray head comprising a three-dimensional housing having a collecting chamber and a dispensing chamber, a splash shield separating said collecting chamber from said dispensing chamber, an aperture in said plash shield communicating with the interiors of said dispensing chamber and said collecting chamber, drainage means connected to said housing for draining said collecting chamber, an orifice in the bottom of said dispensing chamber disposed adjacent to said collecting chamber, a nozzle pivotally mounted on said spray head and connected to said liquid supply system, said nozzle continuously discharging a stream of liquid and pivotable between a dispensing position wherein said liquid stream is directed through said orifice into one of said receptacles and a non-dispensing position wherein said liquid stream is directed through said aperture into said collecting chamber and recirculated to said liquid supply system, cleavage means disposed adjacent to and defining a portion of said aperture and traversed by said liquid stream as said nozzle moves to and from said dispensing and non-dispensing positions, resilient means associated with and biasing said nozzle into said non-dispensing position, a solenoid mounted on said housing having a plunger connected to said nozzle, said solenoid operable to pivot said nozzle to said dispensing position overcoming said opposing resilient means, said solenoid energizable to move said nozzle into said dispensing position in response to sensing means actuable by one of said receptacles moving into position to receive said liquid stream discharging from said nozzle, and control means for maintaining said nozzle in said dispensing position for a controlled period of time.

6. A liquid dispensing apparatus including a spray head, said spray head comprising a housing having a pair of end walls, a pair of side walls, a transverse wall and a bottom member, a collecting chamber and a dispensing chamber within said housing, said collecting chamber being separated from said dispensing chamber by a splash wall integral with said side walls and one of said end walls and extending from said transverse wall disposed intermediate said end walls angularly upwardly toward said one end wall, an aperture in said splash shield adjacent to said transverse wall, drainage means connected to said collecting chamber, an orifice in said bottom member in said dispensing chamber adjacent to said transverse wall and said aperture, cleavage means on said transverse wall between said aperture and said orifice, nozzle means in said dispensing chamber having its upper end connected to a liquid source, said nozzle means being pivotal between a normal position in which its lower end is aligned with said aperture and a dispensing position in which its lower end is aligned with said orifice, resilient means for maintaining said nozzle means in said normal position and power means connected to said nozzle for moving said nozzle to said dispensing position.

7. A liquid dispensing apparatus including a spray head, said spray head comprising a housing having a pair of end walls, a pair of side walls, a transverse wall and a bottom member, a collecting chamber and a dispensing chamber within said housing, said collecting chamber being separated from said dispensing chamber by a splash shield integral with said side walls and one of said end walls and extending from said transverse wall disposed intermediate said end walls angularly upwardly

toward said one end wall, an aperture in said splash shield adjacent to said transverse wall, drainage means connected to said collecting chamber, an orifice in said bottom member in said dispensing chamber adjacent to said transverse wall and said aperture, cleavage means on said transverse wall between said aperture and said orifice, nozzle means in said dispensing chamber having its upper end connected to a liquid source, said nozzle means being pivotal between a normal position in which its lower end is aligned with said aperture and a dispensing position in which its lower end is aligned with said orifice, resilient means for maintaining said nozzle means in said normal position, adjustable stop means for controlling the extent of motion of the lower end of said nozzle from said dispensing position toward said normal position, and power means connected to said nozzle for moving said nozzle to said dispensing position.

8. In an apparatus for successively dispensing a controlled quantity of liquid into each of a series of receptacles transported relative thereto by conveyor means, the combination comprising a liquid supply system, a spray head adjustably positionable longitudinally and vertically of the path of travel of said receptacles, said spray head comprising a three-dimensional housing having a pair of end walls, a pair of side walls, a transverse wall and a bottom member, a collecting chamber and a dispensing chamber within said housing, said collecting member being separated from said dispensing chamber by a splash shield integral with said side walls and one of said end walls and extending from said transverse wall disposed intermediate said end walls angularly upwardly toward said one end wall, an aperture in said splash shield adjacent to said transverse wall, drainage means connected to said collecting chamber, an orifice in said bottom member in said dispensing chamber adjacent to said transverse wall and said aperture, cleavage means on said transverse wall between said aperture and said orifice, nozzle means in said dispensing chamber having its upper end connected to a liquid source, said nozzle means being pivotal between a normal position in which its lower end is aligned with said aperture and a dispensing position in which its lower end is aligned with said orifice, resilient means for maintaining said nozzle means in said normal position and power means connected to said nozzle for moving said nozzle to said dispensing position, power supply means supplying power to said power means responsive to the movement of one of said receptacles into position beneath said orifice and for ceasing said supplying power after the passage of a predetermined time period.

9. An apparatus as claimed in claim 8 wherein said power supply means includes sensing means which supplies power only after sensing the motion of the leading and the trailing edges of one of said receptacles past said sensing means.

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