

[54] **BEVERAGE DISPENSING APPARATUS
HAVING ADJUSTABLE PISTON
STROKE**

[72] Inventor: **Raymond E. Gust**, Spring Valley, Calif.

[73] Assignee: **Courtesy Products Corporation**, San
Diego, Calif. /

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[52] U.S. Cl. **222/16, 222/275, 222/309,**
222/383, 417/415

[51] Int. Cl. **B67d 5/30**

[58] Field of Search 222/16, 17, 21, 41, 43, 76,
222/275, 309, 383; 74/30; 417/415; 92/13

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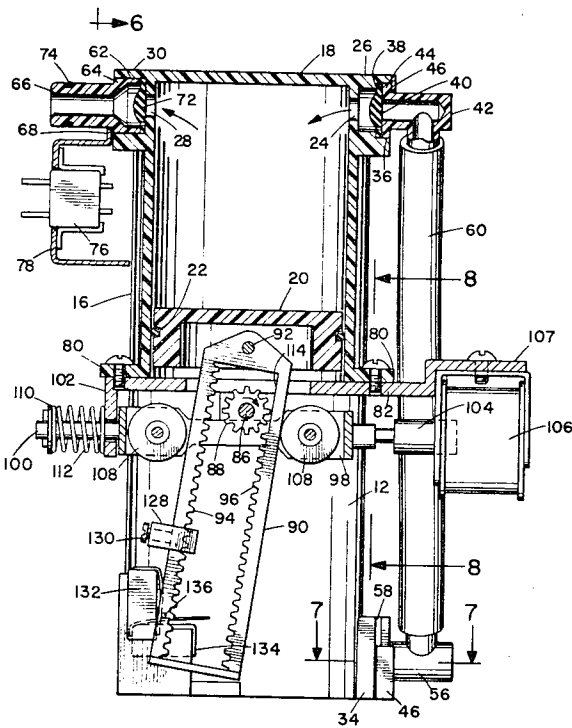
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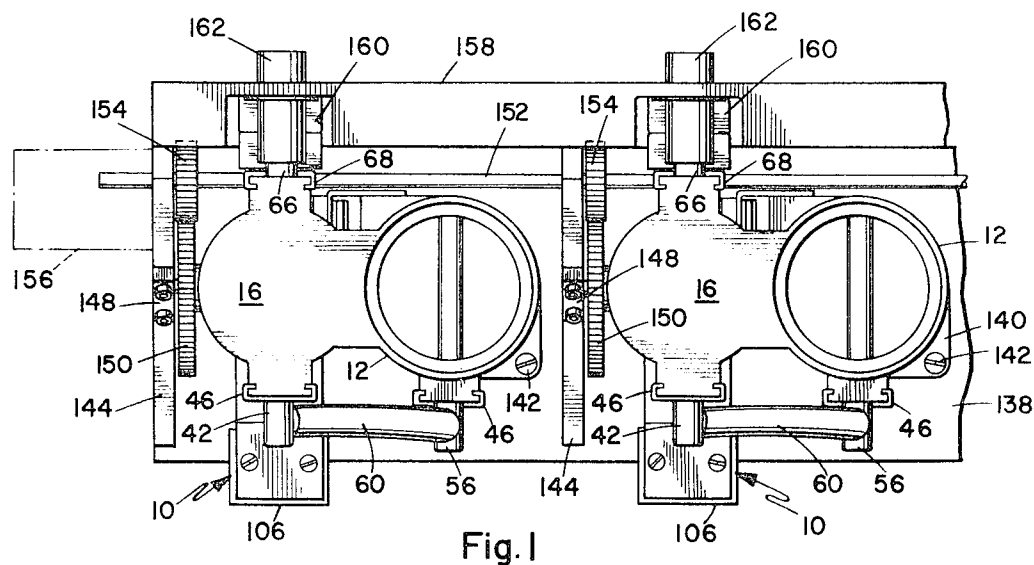
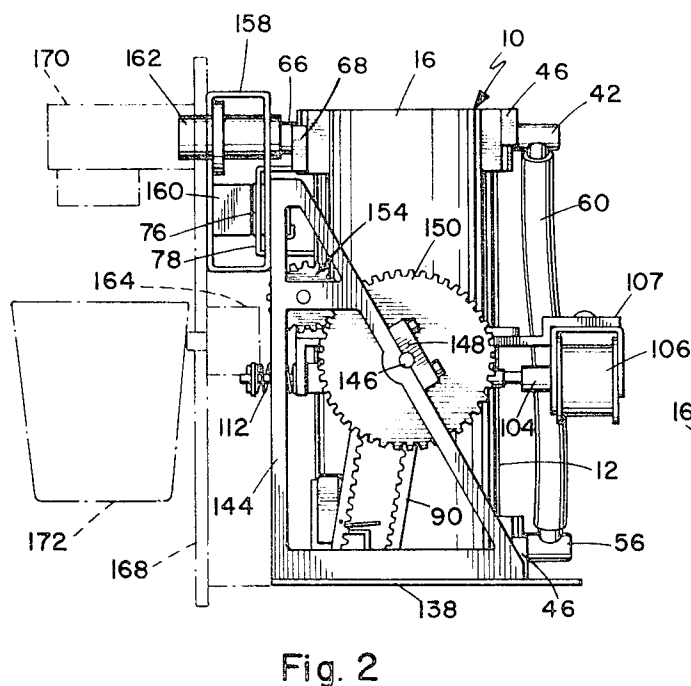
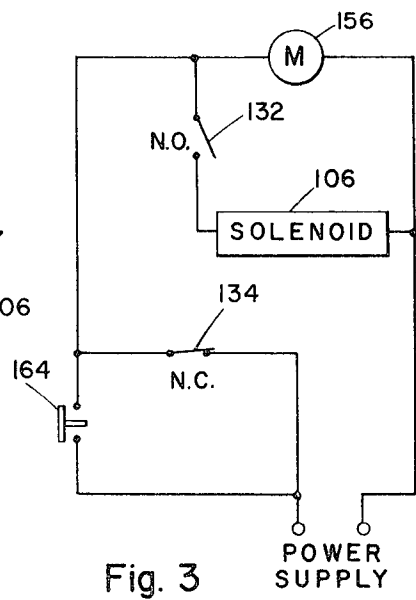
Primary Examiner—Robert B. Reeves
Assistant Examiner—David A. Scherbel
Attorney—Carl R. Brown

[57] **ABSTRACT**

Beverage dispensing apparatus having an adjustable stroke, positive displacement pump unit, coupled to a reservoir which holds an inverted beverage bottle. The pump unit is adaptable to installation in an assembly of several units in rack form, with a single drive motor, each unit being selectively operable. Single or multiple units can be connected to a variety of actuating means and delivery spout or nozzle arrangements, each unit being readily removable for servicing. When actuated, the pump drive mechanism completes a single cycle to drive the selected pump through a preset dispensing and recharging stroke, and is capable of delivering the liquid for a considerable distance to an outlet.

5 Claims, 10 Drawing Figures





INVENTOR.
RAYMOND E. GUST
BY *Carl R. Brown*
ATTORNEY

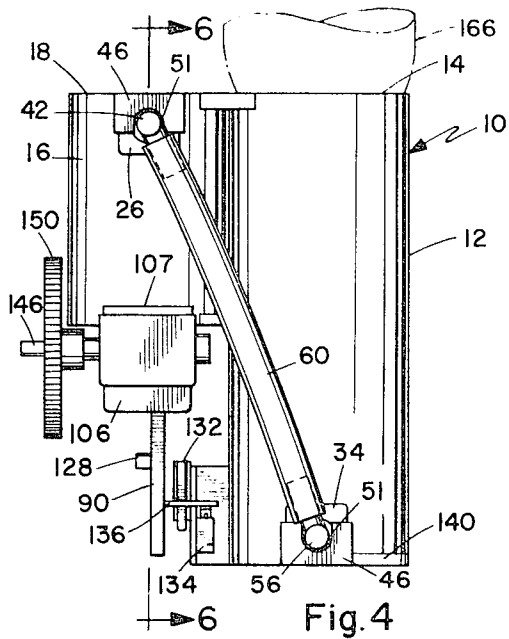


Fig. 4

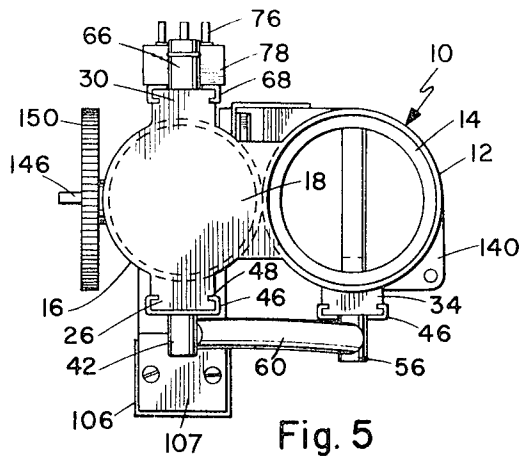


Fig. 5

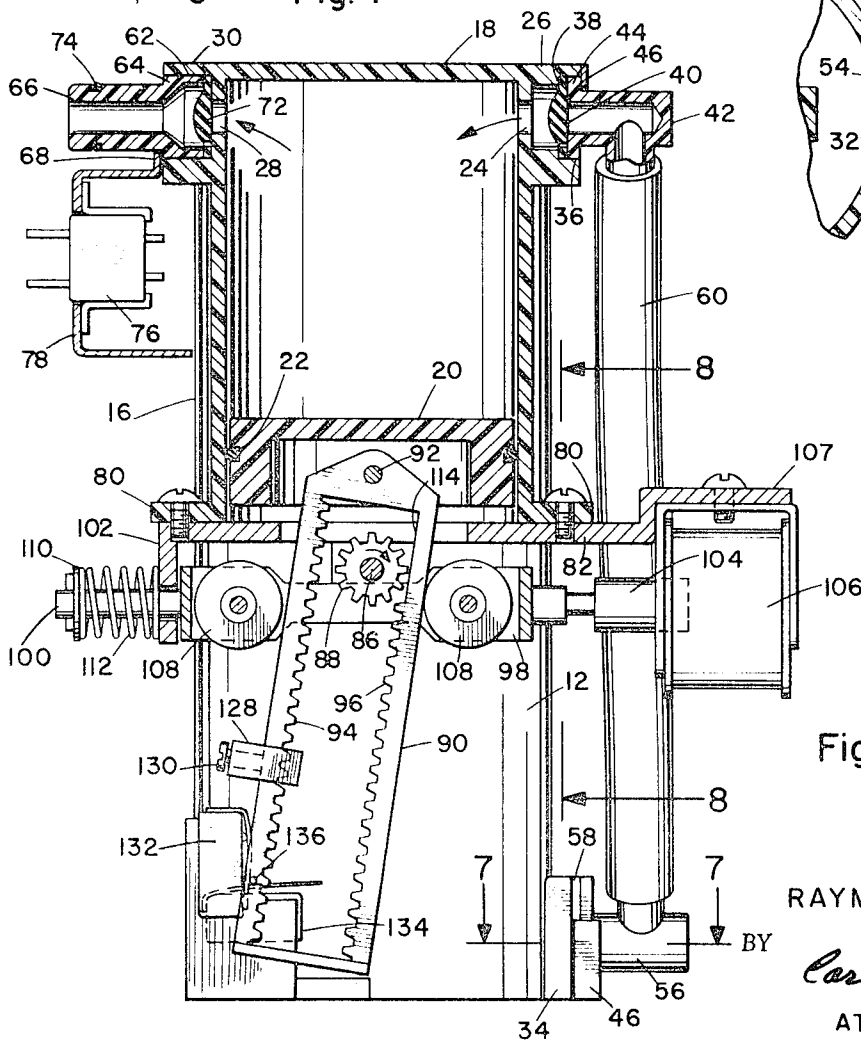


Fig. 6

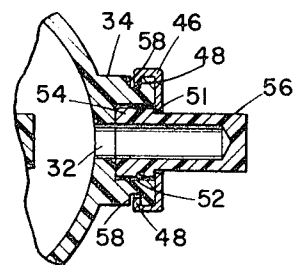
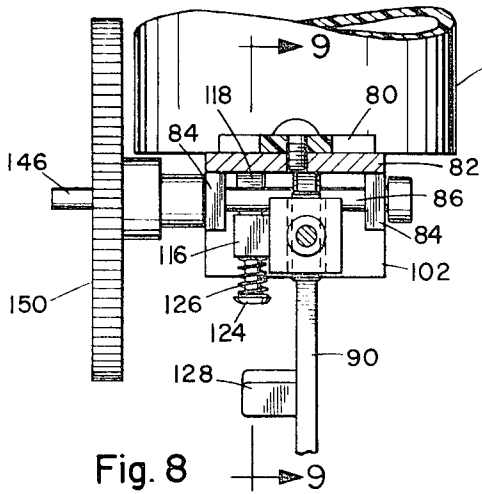
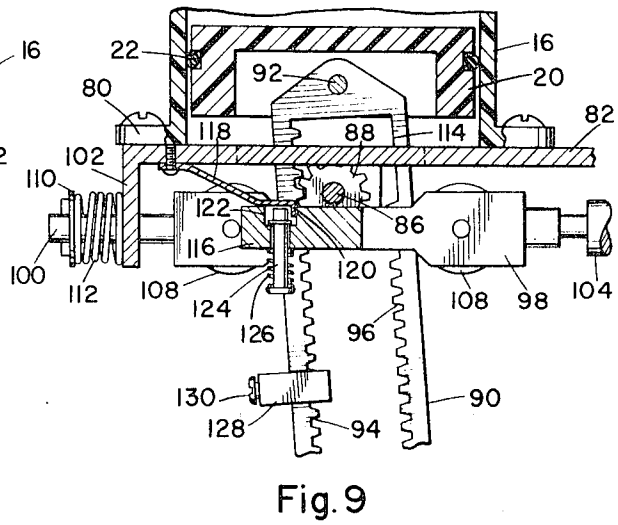
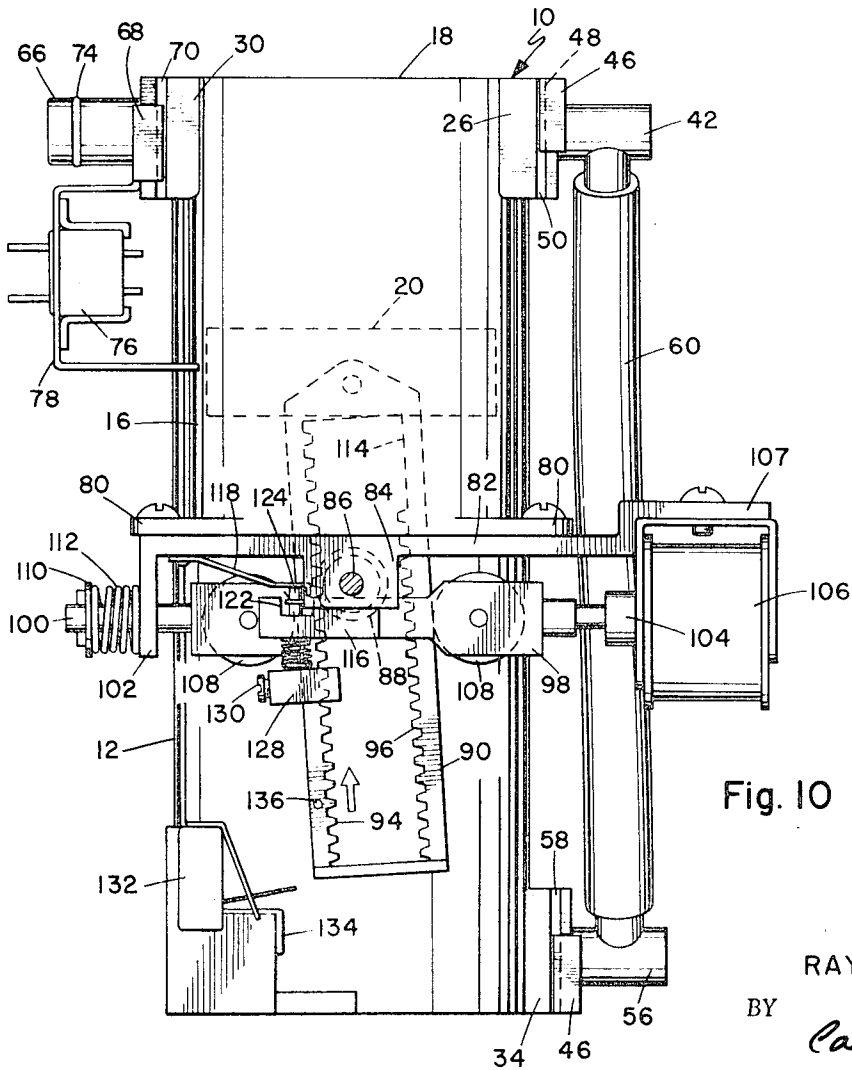


Fig. 7

INVENTOR.
RAYMOND E. GUST

BY

Carl R. Brown
ATTORNEY



INVENTOR.
RAYMOND E. GUST
BY *Carl R. Brown*
ATTORNEY

BEVERAGE DISPENSING APPARATUS HAVING ADJUSTABLE PISTON STROKE

BACKGROUND OF THE INVENTION

Beverage dispensing apparatus for dispensing measured quantities of liquids can be actuated by various means. Gravity fed types must be installed at the area of use, since the effective delivery distance is limited. Pressurized types are not suitable for many beverages, due to the entrapment of bubbles of the pressurizing gas in the liquid. Pump actuated types, particularly those using suction pumps have limited delivery range. In all types the means for varying the quantity of liquid delivered at one time is usually difficult to adjust, and not particularly accurate. In an installation such as a cocktail bar, it is desirable to have the mechanism and beverage supplies out of sight and capable of operation with a minimum of attention. For some purposes, direct delivery from a spout is desirable, but hose delivery to a nozzle with beverage selection means is also used.

SUMMARY OF THE INVENTION

The beverage dispensing apparatus described herein utilizes a self-contained pump and reservoir unit, adapted to plug into a rack with other such units and couple to a common drive means. The pump is a positive displacement type having a simple drive mechanism which, when actuated, will make a complete delivery and refill stroke, then shut off. Stroke adjustment means is provided for precise control of the volume of liquid dispensed, the positive displacement making it possible to deliver the liquid for a considerable distance, such as through a hose. The mechanism has few moving parts and is particularly easy to service.

The primary object of this invention, therefore, is to provide a new and improved beverage dispensing apparatus.

Another object of this invention is to provide beverage dispensing apparatus utilizing self-contained, selectively operable, positive displacement pump units mounted in a rack with common drive means.

A further object of this invention is to provide beverage dispensing apparatus adaptable to a variety of installations and delivery means.

Other objects and many advantages of this invention will become more apparent upon a reading of the following detailed description and an examination of the drawings, wherein like reference numerals designate like parts throughout and in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a portion of a rack with two pump units installed.

FIG. 2 is an end elevation view of the rack assembly.

FIG. 3 is a simplified wiring diagram of a single unit.

FIG. 4 is a rear elevation view of a pump unit.

FIG. 5 is a top plan view of a pump unit.

FIG. 6 is an enlarged sectional view taken on line 6—6 of FIG. 4.

FIG. 7 is a sectional view taken on line 7—7 of FIG. 6.

FIG. 8 is a sectional view taken on line 8—8 of FIG. 6.

FIG. 9 is a sectional view taken on line 9—9 of FIG. 8.

FIG. 10 is a side elevation view of the pump unit, showing the return stroke release of the drive mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The self-contained pump unit 10 comprises an upright cylindrical reservoir 12 with an open upper end 14, and a pump 16 attached in any suitable manner to the side of the reservoir adjacent the upper end. Pump 16 has a closed upper end 18 and contains a vertically slidable piston 20, with an O-ring seal 22. On opposite sides of pump 16, at the upper end, are an inlet 24 with an external connecting block 26, and an outlet 28 with an external connecting block 30. At the lower end of reservoir 12 is an outlet 32 with an external connecting block 34.

The connecting block 26 has a socket 36 with an internal shoulder 38, on which is seated a one way inlet valve 40, shown as a simple flap valve in FIG. 6. The valve is held by an elbow connector 42, having an enlarged plug portion 44 which fits closely in socket 36. Elbow connector 42 is retained by a saddle clip 46, which has inwardly turned opposed flanges 48 to fit slidably in grooves 50 in the connecting block 26. The saddle clip has a notch 51 to fit over the elbow connector 42, outside the enlarged plug portion. Connecting block 34 has a socket 52 to receive the enlarged plug portion 54 of an elbow connector 56, which is retained by another saddle clip 46 slid into grooves 58 in the connecting block, as in FIG. 7. Elbow connectors 42 and 56 are interconnected by a pick-up hose 60.

Connecting block 30 has a socket 62 to receive the enlarged plug portion 64 of an outlet connector 66, which is held by a saddle clip 68, similar to saddle clip 46, secured in grooves 70 in the connecting block. An outlet valve 72, shown as a flap valve in FIG. 6, is held between plug portion 64 and the inner end of socket 62. Outlet connector 66 is a short cylindrical stub to be plugged into a dispensing connection and is fitted with an external O-ring 74. Below the outlet connector is an electrical plug 76 secured to a bracket 78, which is shown as being integral with saddle clip 68, but could be a separate element.

At the lower end of pump 16 are projecting lugs 80, to which is secured an elongated frame 82 extending diametrically across the open end of the pump cylinder. On opposite side of frame 82 are downwardly extending side plates 84, in which is journaled a shaft 86 carrying a pinion 88 positioned substantially at the axis of the pump. The piston 20 is driven by a rack frame 90 pivotally connected to the piston by a pin 92 and extending downwardly through an elongated slot in frame 82. Rack frame 90 is a generally rectangular element with inwardly opposed toothed racks 94 and 96 on opposite sides of pinion 88, and spaced so that only one rack at a time can engage the pinion. The rack frame is shifted by a yoke 98 longitudinally slidably mounted on frame 82, one of the yoke being supported by a guide pin 100 sliding through an end plate 102 on the frame. The other end of yoke 98 is secured to the slidable armature 104 of a solenoid 106, mounted on an extension 107 of frame 82. Rack frame 90 passes through the yoke between a pair of rollers 108 for smooth sliding action. A washer 110 is fixed to the outer end of guide pin 100, and a return spring 112 between the washer and end plate 102 biases the yoke toward the end plate, with armature 104 substantially withdrawn from solenoid 106. In this position, which is the end of stroke or bottom position of piston 20, pinion 88 is at a smooth portion 114 of rack 96, so that there is no driving connection.

With solenoid 106 energized, the yoke 98 pulls rack frame 90 so that rack 94 is engaged with the pinion 88, as in FIGS. 9 and 10. Pinion 88 is rotated clockwise, as indicated by the directional arrow in FIG. 6, causing the piston 20 to be driven upward. To hold the yoke in this position, a latch block 116 is attached to one side of the yoke, and a spring latch 118 secured on frame 82 has a prong 120 which drops into a notch 122 in the latch block, as in FIG. 9. Mounted in the latch block 116 is a vertically slidable release pin 124, which projects into notch 122 to lift and release the latch 118 when the release pin is pushed up. A spring 126 biases the release pin 124 down to allow the latch to engage. Release is provided by a stop 128 slidably mounted on rack 94 and secured by a lock screw 130, the stop being positioned to set the length of stroke of the pump. When the upper limit of the stroke is reached, as in FIG. 10, stop 128 pushes release pin 124 up and releases latch 118, allowing return spring 112 to pull the yoke back.

Mounted on the lower portion of reservoir 12 are two microswitches 132 and 134, the purpose of which will be described in the operation of the unit. A holding pin 136 fixed on rack frame 90 holds both microswitches in one position in the end of stroke position shown in FIG. 6.

The single unit thus far described may be operated by itself, but is primarily intended for multiple installation in a rack. A

typical structure is shown in FIGS. 1 and 2, in which the pump units are mounted on a base plate 138. At the bottom of the reservoir 12 is a lug 140, through which is a screw 142 securing the unit to the base plate. Fixed to base plate 138 are upright supports 144, one support being adjacent the pump of each unit. Shaft 86 has an extension 146 which is held on the adjacent support 144 by a trunnion block 148, a gear 150 being secured to the shaft. Along the front of the assembly is a common drive shaft 152, journaled in the supports 144 and having drive gears 154 thereon engaging each gear 150. A drive motor 156 is coupled to drive shaft 152 in any suitable manner.

Secured to the upper portions of the supports 144 is a longitudinal channel member 158 on which are mounted electrical sockets 160 to receive plugs 76, and outlet sleeves 162 into which outlet connectors 66 fit. Each pump unit is thus plugged into the rack structure and is easily removable.

The electrical circuit for one unit is shown in FIG. 3. Motor 156 is connected to a suitable power supply through a normally open push button switch 164. Solenoid 106 is connected in parallel with the motor through microswitch 132, which is normally open but is held closed by holding pin 136. Microswitch 134 is connected as a bypass across push button switch 164 and is normally closed but held open by holding pin 136.

When push button switch 164 is actuated for a selected unit, solenoid 106 is energized through switch 132, which is held closed at that time. The solenoid pulls yoke 98 and swings rack frame 90, so that the holding pin 136 is pulled away from the microswitches. This allows switch 132 to open and de-energize the solenoid, but latch 118 is now engaged to hold the yoke. Switch 134 is allowed to close, providing power to motor 156. Since rack 94 is engaged with the pinion 88, the piston will be driven up, forcing liquid out through outlet valve 72, it being assumed that the system is primed. Although a common drive motor is used, only the selected pump will operate, since the units with non-energized solenoids will not have a drive connection due to the smooth portion of the rack adjacent the pinion. At the present upper limit of the stroke, latch 118 is released and return spring 112 pulls the yoke and rack frame back until rack 96 engages pinion 88. Continued rotation of the pinion in the same direction pulls the piston down to draw in more liquid through inlet valve 40 and maintain a constant supply in the pump. At the bottom of the stroke, as the pinion reaches the smooth portion 114 of the rack, holding pin 136 engages the microswitches and opens switch 134 to shut off the motor, leaving the circuit reset for the next operation. It should be noted that the circuit is exemplary and could be modified to include indicator lamps, counting means and the like. In a multiple pump assembly subjected to heavy use, the drive motor could operate continuously, the

pumps being individually actuated by energizing the respective solenoids.

In normal use, each reservoir will be charged by an open beverage bottle inverted in the reservoir, as indicated at 166 in FIG. 4. A typical dispensing arrangement is shown in broken line in FIG. 2, in which a face plate 168 is attached to the front of the assembly and a nozzle or faucet 170 is attached to each outlet sleeve 162. Push button switch 164 is mounted on the face plate below the faucet, so that a cup or glass 172 pressed against the push button is in position to receive the dispensed liquid. Other arrangements may be used to suit the particular installation.

Having described my invention, I now claim.

1. Beverage dispensing apparatus, comprising,
 - a pump unit including a positive displacement pump having an inlet and an outlet and a movable piston therein,
 - a reservoir attached to said pump, said reservoir having an outlet
 - drive means including an elongated rack frame pivotally attached to said piston and having inwardly opposed longitudinal toothed racks,
 - a driven pinion mounted on said pump within said rack frame, said toothed racks being spaced apart for individual engagement with said pinion,
 - actuating means for swinging said rack frame to engage said racks alternately with said pinion,
 - stroke length adjusting means adjustably mounted on said rack frame for operating said actuating means,
 - a support rack for holding at least one pump unit,
 - said pump outlet having an extended connector element, and said support rack having a dispensing outlet member to receive said connector element with a plug-in fit.
2. Beverage dispensing apparatus according to claim 1, wherein said actuating means includes a yoke through which said rack frame passes, a solenoid coupled to said yoke to pull one of said racks into engagement with said pinion, and a return spring coupled to the yoke to pull the other rack into engagement with the pinion.
3. Beverage dispensing apparatus according to claim 2, and including a latch engaging said yoke in the solenoid energized position,
 - said stroke length adjusting means comprising a latch releasing stop adjustably mounted on said rack frame.
4. Beverage dispensing apparatus according to claim 3, and including a normally open switch controlling said solenoid, said rack frame having holding means holding said switch closed in the solenoid de-energized position of the frame.
5. Beverage dispensing apparatus according to claim 2, wherein said rack frame has a smooth rack portion adjacent said pinion in the solenoid de-energized position of the frame.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,666,142 Dated May 13, 1972

Inventor(s) Raymond E. Gust

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 18, after "outlet" insert

--connected to said pump inlet,-

Signed and sealed this 12th day of September 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents