

March 17, 1953

R. W. WOODWARD
LIQUID DISPENSING DEVICE

2,631,755

Filed April 9, 1947

2 SHEETS—SHEET 1

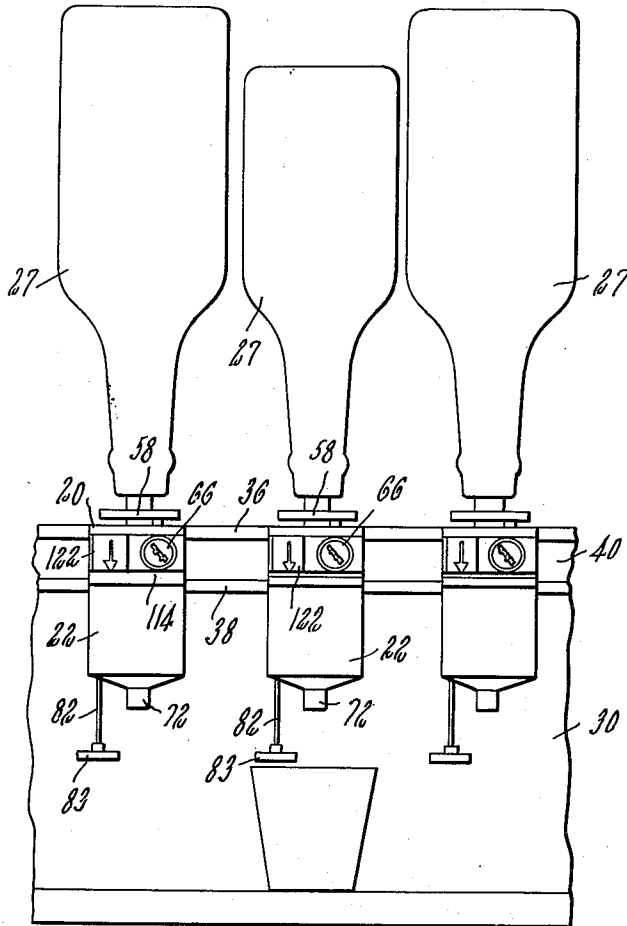


Fig. 1.

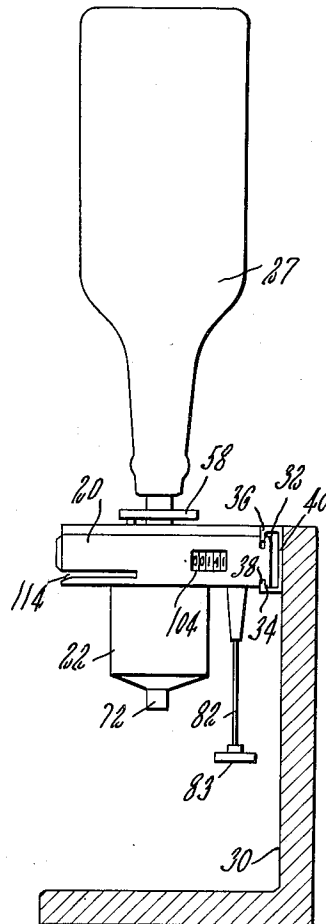


Fig. 2.

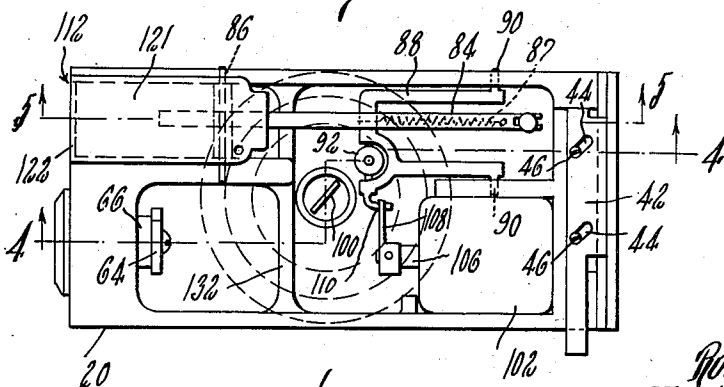


Fig. 3.

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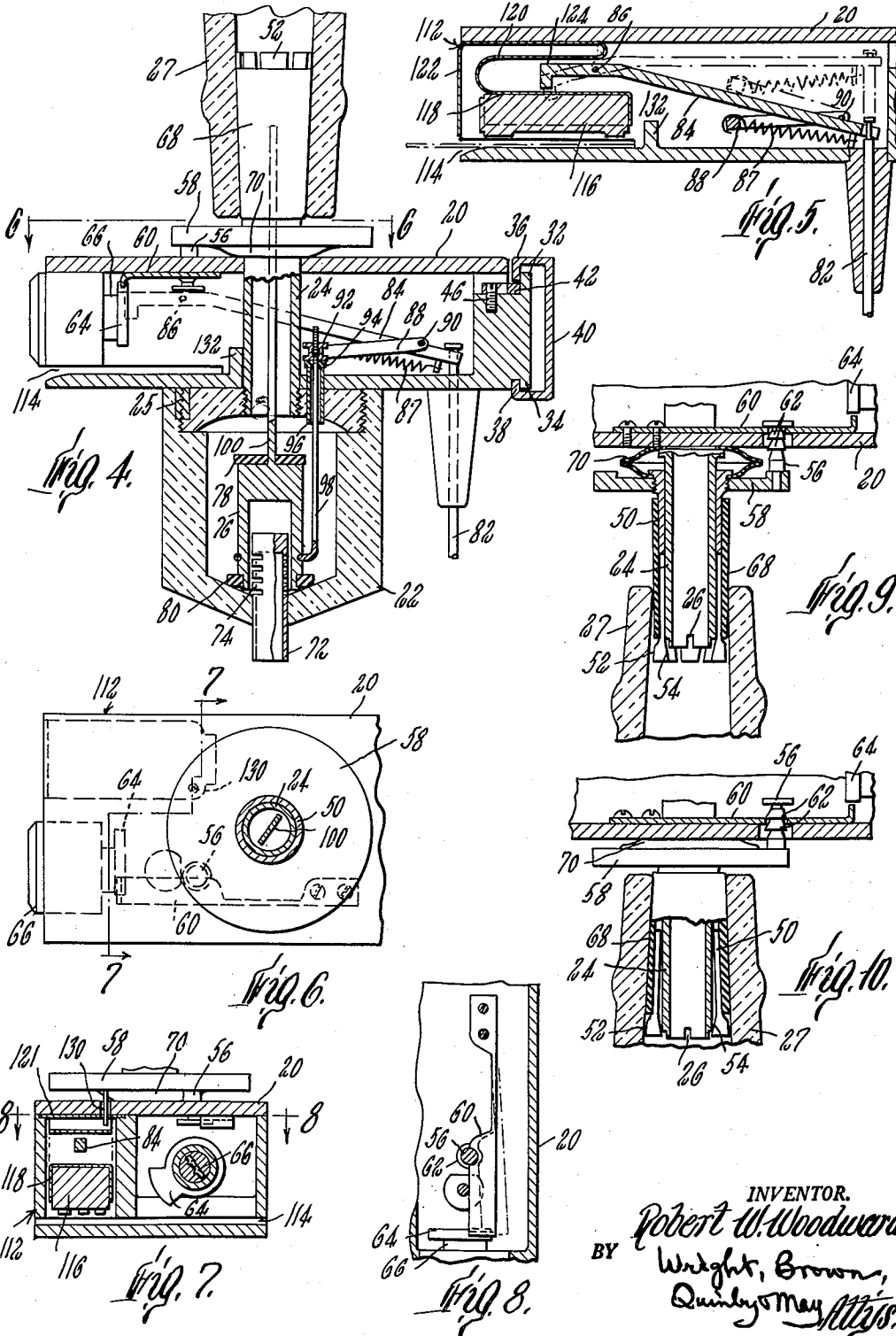
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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LIQUID DISPENSING DEVICE

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12 Claims. (Cl. 222—28)

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This invention relates to a mechanism for controlling and recording the quantities of liquid dispensed from an inverted bottle or equivalent container. More particularly, the invention is designed and intended for controlling the dispensing of beverages. In many beverage dispensing centers, such as hotel bars, the owner or proprietor is necessarily absent most of the time and employees are apt to resort to practices which wrong the proprietor or customer or both. For example, an expensive beverage in a labelled bottle may be replaced by a cheaper grade so that the customer does not get what he pays for. Furthermore, the beverages offered for sale are subject to test at any time by federal agents. The discovery of substitution or dilution of such beverages renders the proprietor liable to severe penalties. It is an object of the present invention to provide a device which can be locked to the neck of a bottle, which prevents the insertion of any liquid into the bottle or the unrecorded removal of liquid therefrom, and which can be operated to dispense the contents of the bottle in measured doses. The device registers the number of doses dispensed, prints desired indicia such as price figures on tickets, and discharges each dose in such a manner as to prevent any subsequent drip from the discharge outlet.

The present invention includes improvements over the invention illustrated and described in application Serial No. 699,730, filed September 26, 1946, now abandoned, by Earle F. Thompson and Robert W. Woodward for a device designed for somewhat similar purposes.

Various other advantageous features will be apparent to one skilled in the art from the following description of the invention and from the drawings, of which:

Figure 1 is an elevational view of a series of devices embodying the invention shown in position for use;

Figure 2 is a side elevation of one of these devices, the supporting frame being shown in section;

Figure 3 is a plan view of one of the devices with the top cover removed;

Figure 4 is a section on the line 4—4 of Figure 3, this figure also including the cover of the device and the elements above the cover;

Figure 5 is a section on the line 5—5 of Figure 3;

Figure 6 is a section on the line 6—6 of Figure 4;

Figure 7 is a section on the line 7—7 of Figure 6;

Figure 8 is a section on the line 8—8 of Figure 7;

Figure 9 is a fragmentary sectional view of the device in an inverted position, showing how it is inserted in the neck of a bottle;

Figure 10 is a fragmentary view in partial section showing the device in inverted position secured to a bottle.

The invention is embodied in a device which

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consists of a rectangular housing 20 to the bottom of which is secured a measuring chamber 22 and from the top of which projects a tubular member 24 adapted to be inserted into the neck of a bottle 27 so as to provide a passage through the housing 20 into the measuring chamber 22. The housing 20 is preferably made of a suitable material such as aluminum and contains operating mechanism hereinafter described in detail. As indicated in Figure 4, the chamber 22 may be in the form of a cylindrical cup of transparent material such as a synthetic resin or glass, screw threaded to a cover plate 23 and secured thereto by a Dutchman 25, the plate 23 being secured to the bottom of the housing 20 by screws (not shown) which extend down through the bottom of the housing and into the plate. The plate has a central aperture into which the lower end of the tube 24 is screw-threaded. The upper end of the tube 24 is notched as at 26 to receive a tool by which it is rotated to screw it into engagement with the chamber top 23. The upper end of the tube 24 is thrust into the neck of an upright bottle 27, the device being inverted in the manner illustrated in Figures 9 and 10, and is locked therein. The bottle is then inverted with the device attached thereto and the device is secured to a suitable support 30 by means of a pair of ears 32 and 34 which extend along one end of the housing 20 and are adapted to engage behind the inturned flanges 36 and 38 of a channel member 40 of indeterminate length which is secured horizontally on the support 30. The ears 32 and 34 are so related to the flanges 36 and 38 as to permit the ear 32 to be pushed up behind the flange 36 a sufficient distance to permit the ear 34 to clear the flange 38 and enter the channel. The housing is then moved down to catch the ear 34 behind the flange 38. In order to secure the housing against accidental removal, a locking member 42 (Figures 3 and 4) is pushed into position under the flange 36. This locking member may consist of a slide having two slots 44 inclined with respect to an edge thereof, these slots having pins 46 projecting therethrough from the housing wall to cam the locking member 42 sideways into locking position when it is pushed longitudinally. The slide can be retracted to permit a quick and easy mounting and dismounting of the device on the channel 40.

Figures 9 and 10 illustrate the means by which the device is secured to a bottle and locked in place. The device is shown inverted in these figures, so that the terms "upper" and "lower" as applied to the parts refer to their position as illustrated in Figure 4. For securing the device to a bottle the upper portion of the tubular member 24 which projects from the top plate or cover of the housing is surrounded by a collet member 50 of springy material such as brass which is slidably fitted thereon. The upper portion of the collet member is split by a number of longitudinal slots which permit the upper end of the collet to expand. The extremity of the collet is made

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with an enlarged exterior diameter as at 52 and with a converging interior wall as at 54. Thus, when the collet member 50 is moved down toward the housing 20, the converging interior wall surfaces 54 are cammed by the upper end of the tubular member 24 so as to expand the collet. If this is done after the tubular member 24 and collet member have been inserted into the neck of a bottle, as illustrated in Figure 10, the expansion of the collet within the neck of the bottle prevents retraction of the collet and tube from the bottle until upward movement of the collet member relative to the tube 24 permits the collet to contract.

In order to secure the collet in an expanded position as shown in Figure 10, a suitable means is provided comprising a ratchet element 56 which is secured to and extends downward from a disk or flange 58 on the lower end portion of the collet member 50. The ratchet element 56 projects through a small hole in the top of the housing 20 and is laterally engaged by a spring latch 60 which is secured to the under surface of the top cover. The ratchet element 56 is provided with a number of teeth 62 which are arranged to catch successively upon the latch 60 when the ratchet element is pushed downward on the tube while the collet progressively expands until its entire circumference engages the inside of the bottle neck at a point where the interior diameter is greater than at the mouth of the bottle. Two teeth 62 are shown on the ratchet member illustrated in Figures 9 and 10, but a greater number may be provided to accommodate bottle necks of various interior diameters at a distance from the mouth equal to the length of the collet member 50. The spring latch 60 thus effectively prevents reverse movement of the ratchet element 56 relative to the tube 24 so that the collet is maintained in its expanded condition until the latch is pushed aside to disengage it from the ratchet element. For this purpose, a dog 64 is provided on a rotatable lock barrel 66 (Figure 7) which can be rotated only by the use of a key which fits the lock. Thus, while the device can be readily secured to a bottle by thrusting the tubular member 24 and collet into the neck of the bottle and then pressing on the flange 58 to expand the collet within the bottle neck, a suitable key is required for the release of the collet member so as to permit the removal of the device from the bottle. In order to prevent leakage from the bottle when it is inverted, as shown in Figures 1 and 4, the collet member is surrounded by a suitable sleeve 68 of rubber or other soft material and a boot 70 is provided between the lower end of the collet member 50 and an adjacent portion of the exterior surface of the tubular member 24. Thus, if there is any seepage downward between the tube 24 and the collet member 50, it will be caught within the boot 70. This boot may be made of any suitable flexible material such as a Vinylite resin.

As shown in Figure 4, the tubular member 24 extends down through the housing 20 and communicates with the chamber 22 in which quantities of liquid from the bottle 27 are measured. At the bottom of the chamber 22 is an outlet member 72 which, as shown, may be in the form of a hollow cylinder closed at its upper end. This cylinder projects through the bottom of the chamber 22, the closed upper portion being within the chamber, the open lower portion serving as a discharge spout. The upper portion of the cylinder within the chamber is provided with

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a plurality of lateral slots 74 which are sufficient in number to permit liquid in the chamber to flow out through the spout at a suitable rate of delivery but which do not permit the insertion of a tool within the chamber 22 for the purpose of tampering with any mechanism within the chamber.

For controlling the flow of liquid into and out of the chamber 22, a valve member 76 is provided. This valve member is preferably an inverted cup in the form of a hollow cylinder which is closed at the top and which is adapted to telescope loosely over the portion of the outlet member 72 which is within the chamber. On the top of the member 76 is a valve element 78 which is arranged to seat in the orifice at the lower end of the tubular member 24 to close the passage through the tube and thus to control the flow of liquid from the bottle into the chamber 22. At the lower end of the valve member 76, that is, the rim of the inverted cup, is a valve element 80 which is annular in form and which is adapted to seat against the bottom of the chamber 22 surrounding the outlet 72 so as to cut off the flow of liquid from the chamber. Thus when the valve member 76 is raised to its upper position, the passageway from the bottle into the chamber 22 is shut off and liquid already in the chamber 22 is allowed to flow out through the outlet 72. When the valve member 76 is moved to its lower position shown in Figure 4, the outlet 72 is closed and the passageway through the tube 24 is opened to permit the chamber to be refilled from the bottle. The valve member 76 is manually operated by means of mechanism including a plunger 82 which extends through the bottom of the housing 20 so that a portion thereof is accessible for operation, the outside end having a handle or knob 83 thereon. The upper end of the plunger 82, which is within the housing 20, is mechanically connected to the valve member 76 by means which includes a snap-action mechanism within the housing. The plunger 82 is connected at its upper end to the end of a lever 84 which is pivoted at 85 so as to rock within the housing. This lever is connected by a tension spring 87 to a U-shaped member 88 (Figure 3) having trunnions 90 near its ends journaled in the walls of the housing to provide a rocking axis. The transverse portion of the U-shaped member 88 is pivotally attached to a valve member 92 having a valve element 94 adapted to close the upper end of a tube 96 which extends from the chamber 22 to the interior of the housing 20 and serves as a vent. The valve member 92 is also attached to a vertical rod 98 which extends loosely through the tube 96 and is attached to the valve member 76 so that when the U-shaped member 88 swings upward so as to elevate the member 92, the valve member 76 is also moved to its upper position and the vent through the tube 96 is opened. When the U-shaped member 88 swings down, it moves the valve member 76 down to its lower position and simultaneously closes the vent through the tube 96. As is evident from Figure 4, the ends of the spring 87 are so related to the axis of the trunnions 90 that when the plunger 82 is pushed upward the spring moves laterally past the rocking axis of the member 88. When this takes place, the spring causes an abrupt upward movement of the valve member 92 and consequently of the valve member 76. In like manner when the plunger 82 is allowed to descend, the spring 87 acts not only to press the plunger 82 downward but also to snap the

U-shaped member 88 downward when the spring passes the rocking axis of this member. Thus it is impossible to operate the external portion of the plunger 82 in such a manner as to hold the valve member 76 in an intermediate position which would permit the contents of the bottle supported by the device to trickle out through the passageway in the tube 24 and through the outlet 72 at the same time. By this snap-action mechanism therefore the end of the tube 24 is shut or the outlet 72 is shut except for the brief instants during which the valve member 76 snaps up or down.

The vent in the tube 96 admits air from the housing 20 into the chamber 22 when the outlet 72 is open so as to prevent the contents of the chamber from becoming air bound when the outlet 72 is open for the discharge of the same. The valve 94 closes the vent when the outlet 72 is closed so that there is no leakage when the chamber 22 is refilled from the bottle. In order to ensure positive and rapid refilling of the chamber after the valve member 76 has been moved down to open the passage from the bottle to the chamber, a vertical partition 100 is provided. This may be conveniently in the form of a thin blade mounted on the upper end of the valve member 76 and projecting up through a considerable part of the interior of the tube 22. This blade is almost as wide as the interior diameter of the tube 24 so that it fits loosely in the tube 24 and extends diametrically across it, dividing the passage into two substantially equal passages of semicircular cross section. When the valve 76 moves down to open the lower end of the tube 24, the tube is then full of liquid since the upper end of the tube is constantly open and in communication with the interior of the bottle. There are thus two columns of liquid in the tube, one on each side of the partition member 100. Any balance which there may be in the liquid in these columns when the valve element 76 leaves its seat is unstable and is immediately disturbed by turbulence created by the downward movement of the valve and the partition member attached thereto, and the unbalance is quickly augmented by a downward flow of liquid in the heavier column and an upward flow of air on the other side of the partition. Thus a counter flow is promptly established on the two sides of the partition, the liquid flowing down on one side without being obstructed by bubbles and the air flowing up on the other side of the partition without being obstructed by down flowing liquid until it reaches the upper end of the partition. This arrangement avoids the use of vents of small cross-section which are apt to become inoperative by reason of the surface tension of any liquid which may get into the vent.

As shown in Figure 3, the housing 20 contains a counter or tally register 102 which is inserted in a compartment in the housing before the top cover is secured in place. The counter is arranged in such a way that the window of the counter which exhibits the numerals shows through an aperture 104 in a side wall of the housing as indicated in Figure 2. The counter is operated by a rock shaft 106 to which is attached a lever 108 having a forked end. A finger 110 on the U-shaped member 88 engages in the fork 108 so that when the member 88 is rocked upward, the shaft 106 is rocked by the snap-action movement of the member 88 so as to register an additional unit on the counter. Thus, the counter operates to record an additional unit each time

the plunger 82 is pushed up sufficiently to open the discharge outlet 72.

In another compartment of the housing 20 is a printing unit 112 which is arranged to print any desired indicia on a card or ticket inserted in a slot 114 in the end wall of the housing. As shown in Figure 5, the printing unit 112 may comprise a block 116 in the nature of a woodcut with raised figures thereon adapted to make impressions on the card or ticket thrust into the slot 114. The block 116 is preferably of absorbent material which can be saturated with ink so as to make a considerable number of impressions before it is necessary to replenish the ink supply. For this purpose I may employ wood from which the lignin has been dissolved leaving a porous structure capable of holding a considerable supply of suitable ink. The block 116 may be frictionally supported in a receptacle 118 of sheet copper or the like, the bottom of the block being exposed so as to make impressions on the card or ticket in the slot 114 when the block is depressed. The top portion of the receptacle 118 may be continued as an extended strip 120 which is reversely bent into an S form, the top portion 121 being widened so that its margins enter grooves in the housing as shown in Figure 7, the end portion 122 being bent down vertically to form an end wall for the printing unit flush with the end wall of the housing 20. The S-shaped portion 120 of the strip is resilient so that the block 116 is resiliently supported above the slot 114 and can readily be pushed down to make impressions. This is conveniently done by an end 124 of the lever 84 which engages the block and presses it down when the lever is rocked by an upward push of the plunger 82. Since the upward movement of the plunger also serves to open the discharge 72, it is evident that a printing operation occurs every time a discharge from the chamber 22 is permitted.

The printing unit is adapted to be inserted into the housing through an aperture of suitable size which is closed by the end portion 122 of the copper strip. When the printing unit is in place it can be locked therein by a pin 130 which projects downward from the flange 58 of the collet member through the top cover plate of the housing 20. When the collet is in its elevated position and thus insertable into or removable from the neck of a bottle the pin 130 is sufficiently elevated to permit the insertion or removal of a printing unit in the housing 20. When, however, the flange 58 is depressed so as to expand the collet and thus to lock it within the neck of the bottle, the pin 130 moves downward into a corresponding hole in the top portion of the S bend 120 so that the printing unit cannot be removed from the housing until the collet member is released and moved upward. Thus as long as the housing is locked to the bottle in which the collet has been inserted, the printing unit cannot be removed from the housing. If, however, it is desired to remove the whole housing from the bottle and transfer it to another bottle containing a beverage of different price, the printing unit can be readily exchanged for another adapted to print the other price.

The bottom of the housing may be made with a transverse interior rib 132 on its bottom. In case any liquid leaks past the sleeve 68 or boot 70 into the housing, the rib 132 keeps it away from any card or ticket which may be inserted in the slot 114 and causes the liquid to escape through

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the hole in the bottom of the housing through which the plunger 32 extends.

The operation of the device will be evident from the foregoing description of the parts thereof. It is inverted as indicated in Figures 9 and 10 for the insertion of the tubular member and collet into the neck of the bottle from which the liquid contents are to be dispensed in measured doses. When the tube and collet have been suitably inserted, and the desired printing unit has been inserted in the housing, the flange 58 is manually pushed toward the housing to expand the collet within the bottle neck and thus to prevent the removal of the device from the bottle until the locking ratchet 56 is released by means of a suitable key in the lock barrel 66. The bottle with the device attached thereto is now inverted so as to bring the device into an upright position beneath the inverted bottle. It is then attached to the supporting channel portion and is ready for operation. Sufficient liquid flows down from the bottle to fill the chamber 22 and the passageway through the tube 24. The device is now ready for dispensing of the liquid contents of the bottle. This is done by pushing the plunger 32 up to rock the lever 34. This operates the printing unit 112 and the snap-action mechanism. The latter operates the counter 102, opens the discharge valve 80 and closes the passage through the tube 24. At the same time the vent through the tube 96 is opened so that the measured liquid within the chamber 22 quickly flows out through the outlet 72 while the plunger 32 is manually held in its upper position. The emptying of the chamber can be watched through its transparent wall. When the plunger is released, it is moved down by gravity and by the spring 31 which also operates the snap-action mechanism to move the valve member 76 quickly downward, opening the passage through the tube 24 and closing the outlet 72. The quick telescoping movement of the valve member 76 over the upper part of the outlet member 72 results in momentarily compressing the air within the hollow interior of the valve member 76, this momentary compression causing a puff through the outlet 72 immediately after the valve 80 has seated. This puff blows out the remaining drop of liquid from the outlet 72, thus avoiding any subsequent drip. The chamber 22 quickly refills, and the device is ready for the next dispensing operation.

I claim:

1. In a device for dispensing liquid from an inverted bottle or the like, an expansible member having a passage therethrough and adapted to be inserted in the neck of a bottle, means for expanding the inserted end of said member to prevent removal thereof from the bottle, key-operated means in said device for preventing unauthorized contraction of said expansible member when expanded in a bottle neck, a measuring chamber communicating with said passage, said chamber having an outlet, and valve means operable to open said outlet and to shut off the chamber from said passage.

2. In a device for dispensing liquid from an inverted bottle or the like, means for securing said device to a bottle, means for locking said securing means, a measuring chamber having an inlet communicating with the interior of said bottle and a discharge outlet, a valve member movable to two operative positions in one of which the inlet is open and the outlet is closed, and in the other of which the inlet is closed and the outlet is open, an exterior handle operable to move said

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valve back and forth between said two positions, and a spring snap-action mechanism connecting said handle and valve member whereby whenever said handle is moved far enough to start the valve member from either position, the valve member is quickly moved by the spring mechanism to the other position.

3. In a device for dispensing liquid from an inverted bottle or the like, a housing, a tubular member projecting upward from said housing and adapted to enter the neck of a bottle, a collet slidably fitted on said tubular member, said collet having a split upper end portion with an inwardly tapering inner wall whereby downward movement of the collet on the tubular member causes expansion of the split upper end thereof, a ratchet member secured to said collet and projecting through the top of said housing, and locking means within said housing cooperating with said ratchet member to prevent upward movement of the collet relative to said tubular member to contract the upper end portion thereto.

4. In a device for dispensing liquid from an inverted bottle or the like, a housing, a measuring chamber secured to said housing, a tubular member extending upward from said chamber and having one upper portion adapted to be inserted in the neck of a bottle, a collet member slidably on said upper portion of said tubular member, said collet member having a split upper end portion with a converging inner wall surface engageable by the upper end of the tubular member to expand the split end of the collet, said collet member having a flange at its lower end above said housing, a ratchet member projecting down from said flange through the top of said housing, a spring latch within said housing engaging said ratchet to lock said ratchet against upward movement, a key-operable dog within said housing adapted to retract said latch to release said ratchet, valve means within said measuring chamber for controlling the discharge of liquid from the bottle, and means including a snap-action mechanism within said housing for operating said valve means.

5. In a device for dispensing liquid from an inverted bottle or the like, a tubular member adapted to be inserted into the neck of a bottle, a tubular collet slidably fitted on said member and split at its upper end, said collet having a converging inner wall at its upper end engageable by the upper end of said tubular member to expand the collet, a sleeve of soft resilient material fitted on said collet member, and a boot of liquid-tight material extending from the lower end of the collet member to the adjacent portion of the tubular member to prevent escape of liquid otherwise than through such tubular member.

6. In a device for dispensing liquid from an inverted bottle or the like, a housing, a tubular member projecting from said housing and adapted to project into the neck of a bottle, said tubular member having a passage for the discharge of liquid from said bottle, means partially within said housing for securing said member within a bottle neck, key-operable means within said housing for releasing said securing means, a valve member movable to open and close said passage, a lever pivoted at one end within the housing and operatively attached to the valve member at the other end, an operating lever pivoted within the housing and having an end portion arranged to swing back and forth past the rocking axis of the first said lever, a tension spring extending from the swinging end of one said

lever to the swinging end of the other lever, and means extending from said operating lever to the exterior of the housing for rocking said operating lever.

7. In a device for dispensing liquid from an inverted bottle or the like, a tubular member having an upper portion adapted to be inserted into the neck of a bottle to provide a passage for the escape of liquid therefrom, a valve at the lower end of said tubular member operable to open and close said passage, and means in said passage for facilitating the outflow of liquid and inflow of air, said means consisting of a blade extending laterally diametrically across the passage and extending longitudinally from said valve a substantial distance toward the upper end of this passage.

8. In a device for dispensing liquid from an inverted bottle or the like, a tubular member having an upper portion adapted to be inserted into the neck of a bottle to provide a passage for the escape of liquid therefrom, a measuring chamber communicating with the lower end of said passage, said chamber having an outlet, a vertically movable valve member in said chamber with upper and lower valve elements arranged to close said passage or said outlet according to the position of the valve member, operating means for moving said valve member up and down, and means attached to said valve member for facilitating outflow of liquid from said bottle and inflow of air, said means consisting of a blade extending up from said valve member through said passage for a substantial portion of the length thereof and extending diametrically across said passage to divide it into two substantially equal passages.

9. In a device for dispensing liquid from an inverted bottle or the like, a tubular member adapted to be inserted into the neck of a bottle to provide a passage for the escape of liquid therefrom, a chamber secured to the lower end of said tubular member and communicating with said passage, said chamber having an outlet member consisting of a hollow cylinder open at its lower end only, the upper portion of said cylinder having a plurality of small lateral apertures opening into said chamber, a valve member vertically movable within said chamber and consisting of a hollow cylinder having its upper end closed and its lower end open to telescope loosely over the upper portion of the outlet member, said valve member having a valve element at its upper end adapted to close said passage when the member is moved up and a second valve element at its lower end adapted to close said outlet when the valve member is moved down, and snap-action means attached to said valve member operable to move it abruptly up or down.

10. In a device for dispensing liquid from an inverted bottle or the like, a housing having a slot to receive a card, a measuring chamber secured to the bottom of said housing, a tubular member extending up from said chamber through said housing and having an upper portion adapted to be inserted into the neck of a bottle to provide a passage for the discharge of liquid from the bottle, means for locking said device to the bottle after the insertion of said tubular member into the neck thereof, a printing element movable in said housing to print indicia on a card inserted in said slot, a lever rockably mounted in said housing and having a portion operatively engaging said movable printing element, a manually operable plunger attached to said lever and projecting out from said housing, a valve member in said measuring chamber movable to con-

trol the discharge of liquid through said passage, a tally register mounted in said housing, and a snap-action mechanism operatively connecting said lever with said valve member and said tally register.

11. In a device for dispensing liquid from an inverted bottle or the like, a rectangular housing having a slot and an aperture in an end thereof for the admission of a card to be printed and for the reception of a printing device, a tubular member having a portion projecting up from said housing for insertion into the neck of a bottle to provide a passage for the discharge of liquid from the bottle a collet member slidably mounted on said tubular member and expandible at its upper end by downward movement relative to the tubular member, a flange secured to the lower end of said collet member, a ratchet member projecting from said flange downward into said housing, a spring latch within said housing engaging said ratchet to prevent upward movement of said collet member, a printing device inserted into said housing through said aperture, and a locking pin projecting down from said flange and engaging said printing device to prevent the removal thereof from the housing when the collet member has been moved downward to expand the upper end thereof.

12. In a container for liquid having an outlet in the bottom thereof, a short tube extending upward from said outlet within the container, said tube being closed at its upper end and having lateral apertures for the escape of liquid there-through, to the outlet, an inverted cup movable from a raised position above said tube to a lowered position loosely telescoping said tube, said cup having a valve element on its rim engaging the bottom of the container on a continuous line around said outlet when the cup is in its lowered position, and means for rapidly moving said cup from its raised to its lowered position.

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