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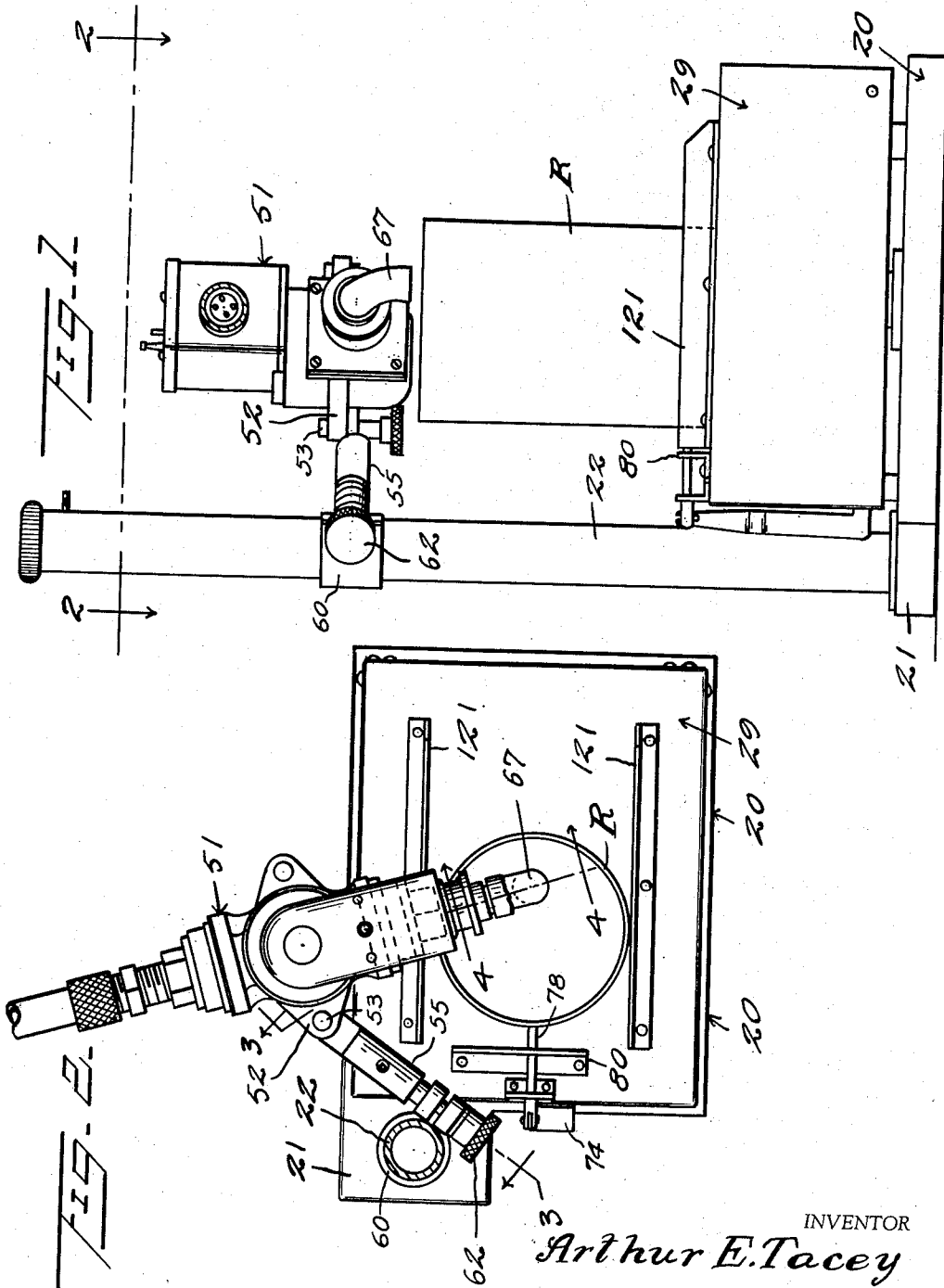
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2,692,111

RECEPTACLE FILLING MACHINE

Filed Nov. 6, 1950

6 Sheets-Sheet 1



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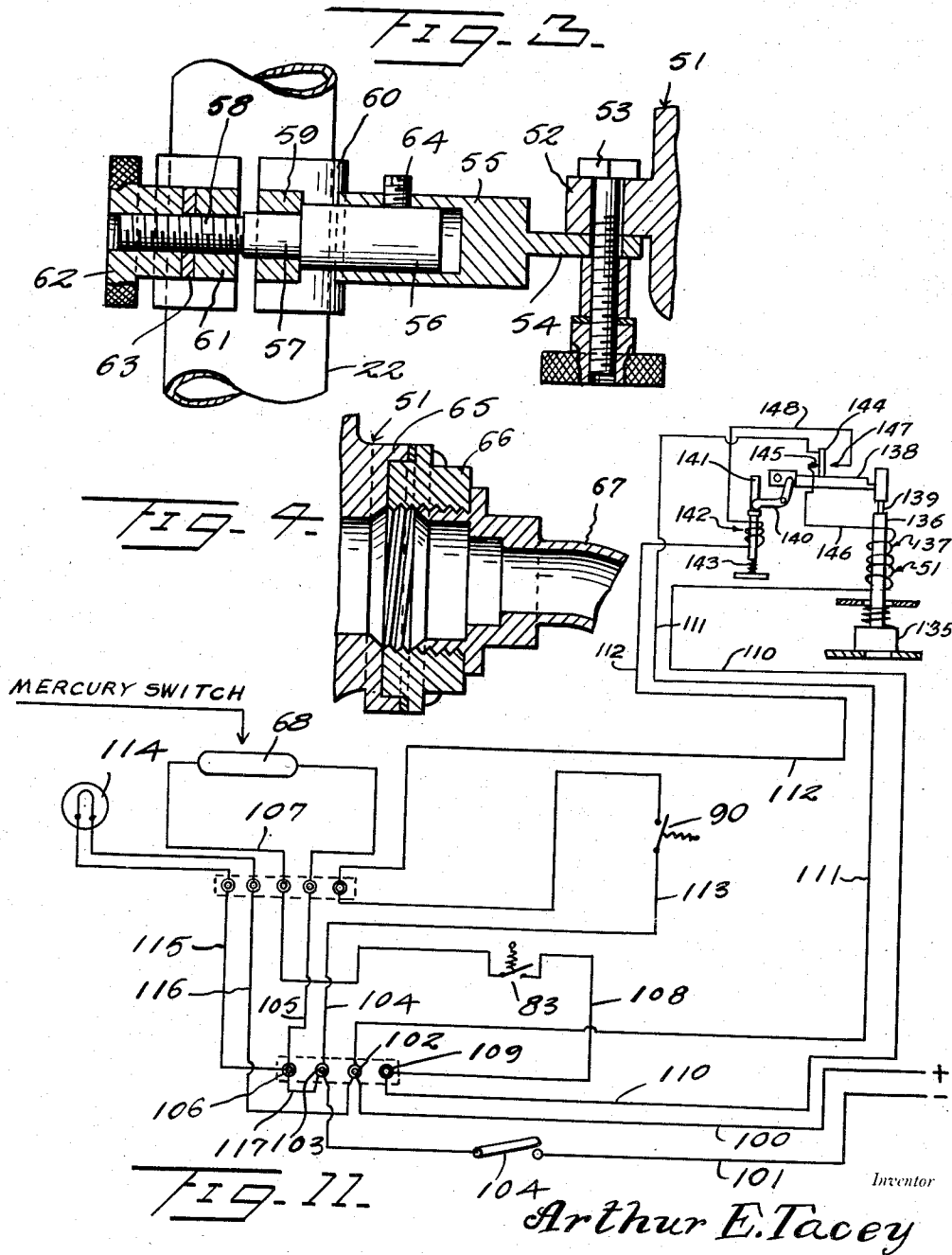
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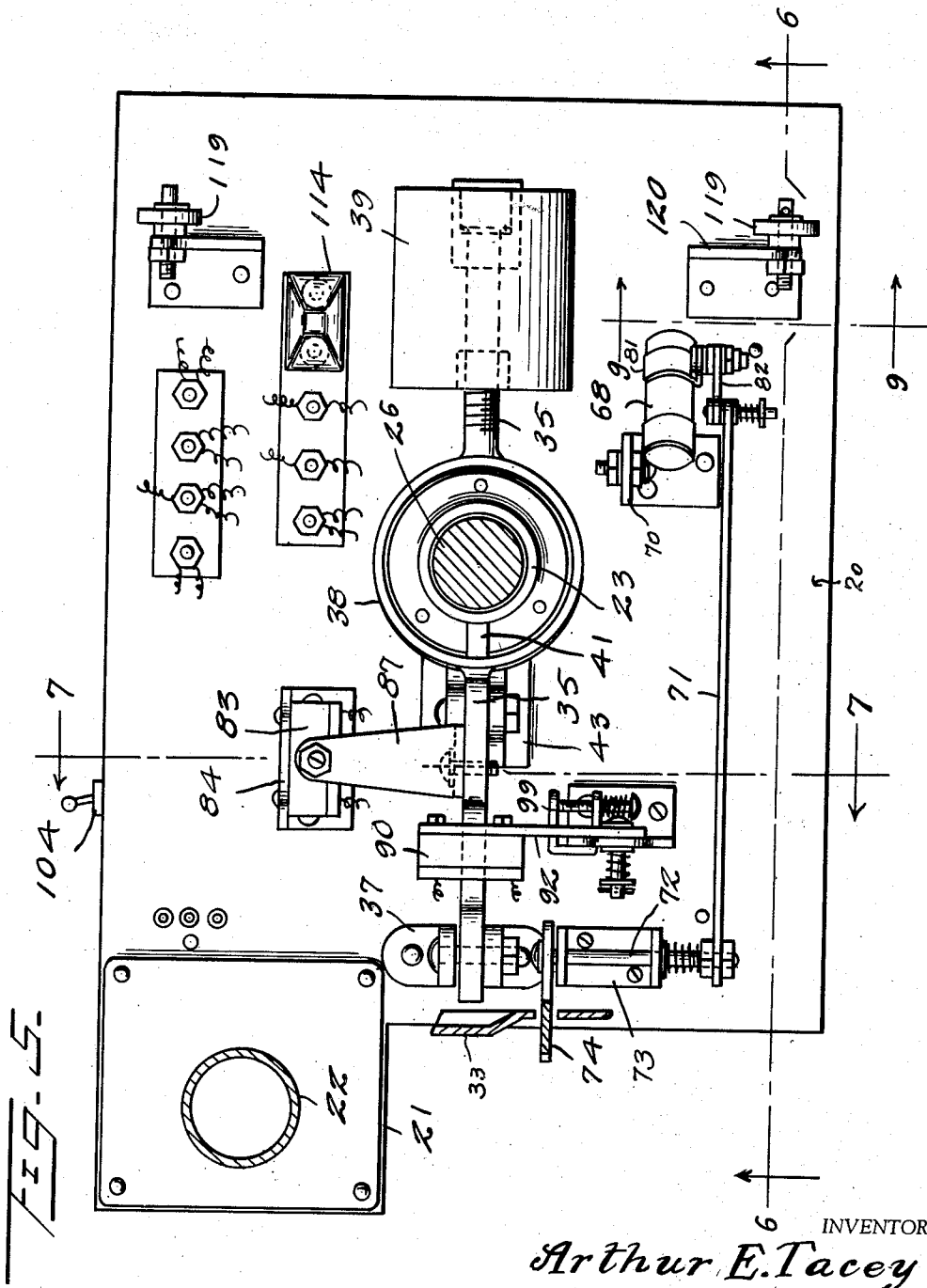
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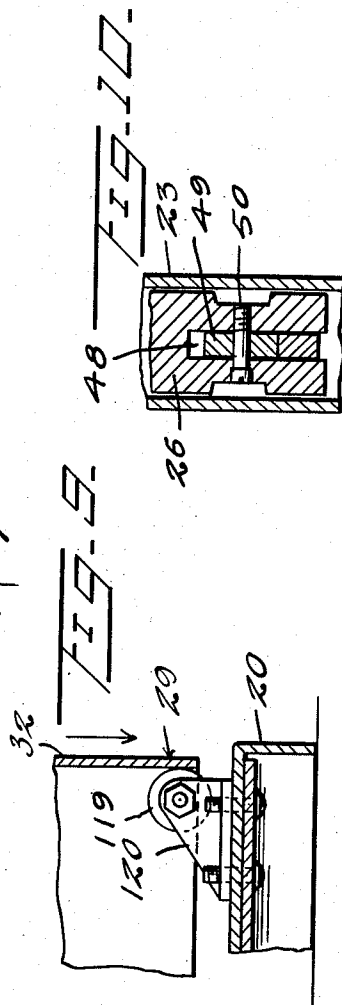
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Filed Nov. 6, 1950

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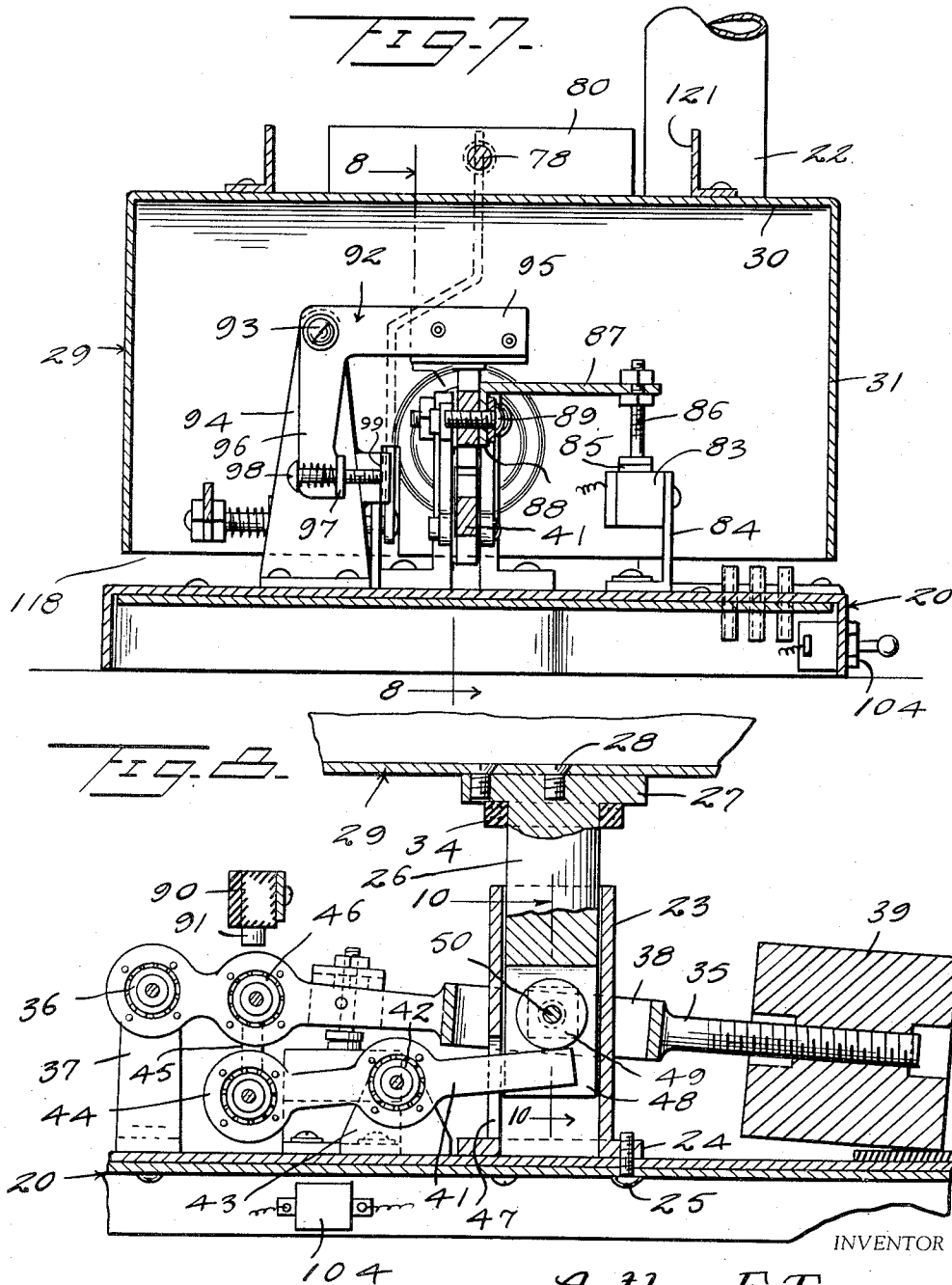
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RECEPTACLE FILLING MACHINE

Filed Nov. 6, 1950

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RECEPTACLE FILLING MACHINE

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UNITED STATES PATENT OFFICE

2,692,111

RECEPTACLE FILLING MACHINE

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Application November 6, 1950, Serial No. 194,240

2 Claims. (Cl. 249-63)

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This invention relates to a receptacle filling machine.

An object of this invention is to provide a machine for filling receptacles with liquids so that accurately measured quantities of liquids may be discharged into the receptacles.

Another object of this invention is to provide in combination with an electric valve, a weight operated means for actuating the valve to open or closed position so that accurately measured quantities of liquids may be discharged into receptacles.

A further object of this invention is to provide a machine of this kind which can be adjusted so as to provide for discharge of the desired quantity of material into a receptacle.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a detailed side elevation of a receptacle filling machine constructed according to an embodiment of this invention.

Figure 2 is a horizontal sectional view taken on the line 2-2 of Figure 1.

Figure 3 is a fragmentary vertical sectional view taken on the line 3-3 of Figure 2.

Figure 4 is a fragmentary vertical sectional view taken on the line 4-4 of Figure 2.

Figure 5 is a plan view partly in section of the device with the platform removed.

Figure 6 is a vertical sectional view taken on the line 6-6 of Figure 5.

Figure 7 is a vertical sectional view taken on the lines 7-7 of either Figure 5 or 6.

Figure 8 is a fragmentary vertical sectional view taken on the line 8-8 of Figure 7.

Figure 9 is a fragmentary vertical sectional view taken on the line 9-9 of Figure 5.

Figure 10 is a fragmentary vertical sectional view taken on the line 10-10 of Figure 8.

Figure 11 is a diagrammatic view showing the electric circuits embodied in this invention.

Figure 12 is a fragmentary side elevation of a modified form of this invention.

Figure 13 is a horizontal sectional view taken on the line 13-13 of Figure 12.

Figure 14 is a fragmentary side elevation partly in section of a modified form of delivery nozzle.

Figure 15 is a bottom plan view of the delivery nozzle shown in Figure 14.

Referring to the drawings, the numeral 20 designates generally a base member which has

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secured to an offset 21 thereof an upright tubular column or post 22. The base 20 has secured to the upper side thereof a tubular guide 23 having a lower flange 24 secured by fastening means 25 to the upper side of the base 20. A plunger 26 is slidable in the guide 23 and is formed with a flanged head 27 which is secured by fastening means 28 to a weighing platform generally designated as 29. The platform 29 comprises a top wall 30, opposite side walls 31, and opposite end walls 32 and 33.

A lubricating ring 34 is disposed about the plunger 26 and is adapted to maintain an oil film on plunger 26.

The platform 29 is constantly urged upwardly by gravity operated means which includes an elongated balance lever 35 pivotally mounted as at 36 on an upstanding support 37 carried by the base 20. The lever 35 is formed intermediate the ends thereof with a large loop or ring 38 which engages loosely about the guide 23. The lever 35 at its forward end has a weight 39 threadably mounted thereon. A rock lever 41 is rockably mounted between the ends thereof as at 42 on an upstanding support 43 secured to the base 20, and the rear end 44 of lever 41 has pivotally connected therewith a link 45 which is also pivotally connected as at 46 to weight carrier lever 35 at a point forwardly of the pivot 36 of lever 35.

The guide tube 23 is formed with a vertically elongated slot 47 through which the forward end of lever 41 engages and the lower end of plunger 26 is slotted as at 48 so that the forward end of lever 41 may loosely engage within the lower end of plunger 26 and contact with a roller 49 pivotally mounted on a pivot member 50 extending through the plunger 26 and across the slot 48. The upright post 22 has adjustably secured thereto an electric valve 51 which is substantially identical with the construction of the electric valve embodied in prior Patent 2,413,622 issued December 31, 1946. The electric valve 51 as disclosed in the above mentioned patent embodies a spring pressed main valve which is constantly urged to closed position and is moved to open position by an electromagnetic member. The valve 51 is latched in an open position and is released from the latch by a second electromagnetic member constituting a valve closing element.

The valve structure 51 embodies a laterally projecting ear 52 which is secured by an adjustable fastening means 53 to an ear 54 carried by a socket member 55. The socket member 55 has disposed therein a stud 56 which is formed with

a reduced smooth stud 57 and a further reduced diameter threaded stud 58. The stud 57 engages through one ear 59 of a split clamping ring 60 disposed about the post or support 22. The threaded stud 58 engages through a second ear 61 carried by the clamping ring or band 60, and knurled nut 62 is threaded on the stud 58 and is adapted to place the ears 59 and 61 under clamping pressure for holding the band 60 in vertically adjusted position and in circumferentially adjusted position on post or column 22.

A washer 63 is interposed between the inner end of nut 62 and the outer side of ear 61. Socket 65 is held in adjusted position with respect to stud 56 by means of a set screw 64. The valve structure 51 includes a discharge bushing 65 and a removable bushing 66 is mounted in bushing 65. A discharge nozzle 67 of substantially L-shape is threaded into bushing 66 and is adapted to have the outer discharge end thereof directed downwardly for discharging liquid or other material into a receptacle which is disposed on the upper side of platform 29.

In order to provide a means whereby the electric valve 51 may be moved to opened or closed position I have provided a mercury switch 68 which is secured to a rock member 69 pivotally mounted on a support 70 secured to the base 20. The mercury switch 68 is adapted to be rocked upwardly to circuit closing position by means of an elongated lever 71 secured to a rock shaft 72 rotatably engaging through bearing means 73 carried by the base 20. The lever 71 is adapted to be gravitatingly rocked downwardly and is rocked upwardly by means of an L-shaped lever 74 which is fixed to one end of rock shaft 72 projecting rearwardly through the rear wall 33 and projecting upwardly along the outer side of the wall 33.

The upper end of L-shaped lever 74 is provided with a slot 75 within which a pin 76 carried by the slotted rear end of a plunger shaft 77 loosely engages. The plunger shaft 77 includes a reduced diameter shaft 78 which is slidable through an upstanding bearing 79 and a second upstanding bearing 80. The bearing 80 is constructed in the form of an angle member which is fixed to the upper side of platform 29 and forms an abutment which is to be engaged by the receptacle R when the latter is moved rearwardly in its empty condition so as to move shafts 78 and 77 rearwardly. Rearward movement of shafts 78 and 77 will rock L-shaped lever 74 thereby raising lever 71 and rocking mercury switch 68 upwardly to a circuit closing position. The forward end of lever 71 is connected with a split clamp 81 disposed about mercury switch 68 by means of a link 82.

A normally open switch 83 is secured to a mounting 84 carried by the base 20 and includes a circuit closing button 85 which is adapted to be engaged by a vertically adjustable switch operating bolt 86 carried by an arm 87. The bolt 86 is vertically adjustable through the arm 87, and arm 87 is provided at its inner end with a right angle base 88 secured by fastening means 89 to the adjacent side of weight carrying lever 35.

At the time the weight 39 is in its lowermost position as shown in Figures 7 and 8, switch operator 86 is in contact with switch button 85 so as to hold switch 83 in circuit closing position. After a predetermined quantity of liquid or other material is discharged from valve 51 into receptacle R valve 51 is moved to a closed position by closing of a circuit in which a normally open switch 90 is interposed. The switch 90 includes

a button 91 disposed above the lever 35 adjacent the rear of the latter so that when the lever 35 is rocked upwardly by weight of the material, causing lever 41 to rock downwardly at its forward end and upwardly at its rear end, switch 90 will be moved to a circuit closing position.

Switch 90 is carried by a bellcrank lever or support 92 which is pivotally mounted as at 93 on an upstanding support 94 carried by base 20. The bellcrank lever 92 includes a substantially horizontally disposed upper arm 95 to which the switch 90 is secured and also includes a depending arm 96 having a laterally extending lug 97 through which a lever adjusting screw 98 is threadably disposed. The screw 98 is adapted to abut against a lug or abutment 99 carried by the support 94 so as to thereby limit the counter-clockwise rocking of bellcrank lever 92.

Referring now to Figure 11 there are disclosed the electric circuits embodied in this invention. A pair of supply conductors 100 and 101 are connected to terminal posts 102 and 103, respectively, and a manually operable cut-off switch 104 is interposed in supply conductor 101. A conductor 105 is connected at one end to another terminal 106 carried by the base 20, and the other end of conductor 105 is connected to one side of mercury switch 68. The other side of mercury switch 68 is connected by means of a conductor 107 to one side of switch 83, and the other side of switch 83 is connected by conductor 108 to a terminal 109.

Terminal 109 has connected therewith a conductor 110 which is connected to one side of the electric valve 51, and this one side comprises the valve opening electro-magnetic means so that closing of the circuits between switches 68 and 83 will energize valve 51 for moving this valve to open position. Valve 51 is connected by means of conductor 111 to terminal 102 which constitutes a common supply terminal. The valve closing electro-magnetic means of valve 51 is connected with switch 90 by means of a conductor 112. Conductor 112 is connected by means of a conductor 113 to supply terminal 103.

Signal light 114 is mounted within the platform 29 and is connected by means of a conductor 115 to terminal 106 and is connected by means of a conductor 116 to supply conductor 102. A bridging conductor 117 is connected between terminals 103 and 106. A signal light 114 is lighted so long as switch 104 is in circuit closing position, and the light rays from light 114 are adapted to escape in the space 118 between the lower end of the platform 29 and the upper side of the base 20.

In order to provide a means whereby the platform 29 is held against undue lateral movement, a pair of rollers 119 are mounted on supports 120 fixed to the upper side of the base 20 and are adapted to engage the inner faces of the side walls 31. The upper side of the platform 29 has secured thereto in spaced apart parallel relation a pair of longitudinally disposed angle members 121 which extend forwardly from the angle member 80.

Referring now to Figures 12 and 13 there is disclosed a modified form of discharge means for the material discharged from the valve 51. A plurality of right angularly related L-shaped discharge nozzles 122 are secured to right angularly related tubes 123 which are secured by the lower end of a vertical tube 124. The vertical tube 124 is secured to a bushing 125 having a groove 126 within which a set screw 127 is adapted to engage. The bushing 125 engages in a removable bushing 128 which is secured to the valve structure 51.

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As shown in Figure 13 there are four of these discharge nozzles 122 so that four receptacles R may be disposed on the upper side of platform 29.

Referring now to Figures 14 and 15 there is disclosed another modification of discharge nozzle which is adapted to eliminate dripping. The discharge nozzle shown in Figures 14 and 15 includes a tubular nozzle member 129 having an enlarged upper end 130 formed with a groove 131 within which the set screw 127 is adapted to engage. The lower end of the nozzle member 129 has mounted therein a cluster of reverted strips 132 which are radially arranged as shown in Figure 15. It will be understood that the nozzle members 122 and nozzle member 67 may also be provided with the anti-dripping means 132.

The electric valve 51, shown in Patent 2,413,622, supra, embodies a main spring-pressed valve plug 135 which is spring-pressed downwardly to a closing position, and the valve plug 135 is carried by a solenoid core 136. The core 136 is slidable within the coil 137, and core 136 is adapted to be latched in an upper open position by means of a latching bar 138. The latching bar 138 is engageable in an annular keeper groove 139 formed in the core 136. The latching bar 138 is spring-pressed to a latching position by means of an L-shaped crank 140, which has one arm thereof engaging the latching bar 138 and the other arm engages the core 141 of a valve releasing solenoid having a coil 142 within which the core 141 slidably engages. The core 141 is spring-pressed upwardly to a latching position by means of a spring 143 and spring 143 through crank 140 constantly urges latching bar 138 to the right or to latching position. Wire or conductor 144 is connected to a movable bridging contact 144 carried by the latching bar 138, and in the released position of latching bar 138, contact 144 engages a stationary contact 145 which is connected by a conductor 146 to one end of the main valve operating solenoid 137. A second fixed contact 147 is disposed in confronting position to bridging contact 144 and is connected by a conductor 148 to coil 142. The switch structure embodying contacts 144, 145 and 147 provides a means whereby the solenoid coils 137 and 142 will be only momentarily energized, and when coil 137 is initially energized, latching member 138 will move to the right so that contact 144 will engage contact 147 and thereby close a circuit to the valve releasing solenoid coil 142. In this manner, when switch 90 is closed to the valve releasing solenoid 142, the latter will be energized and latching member 138 will be withdrawn from the keeper groove 139 so that valve plug member 135 may be moved downwardly by its spring to a normally closed position.

There are three switches for operation of the valve plug 135, one being switch 83 which is connected to the valve opening solenoid 137, the second, which is switch 90, is connected to the valve releasing solenoid 142, and the third is switch 68, which in the present instance is liquid switch 68 and which is interposed between the first switch 83 and the valve opening solenoid 137. The third switch 68 is the control switch for operating the valve structure 51 as, when the platform 29 is uppermost, switch 83 will be closed so as to place the opening solenoid 137 in circuit with the supply source. However, the solenoid 137 is not energized until a receptacle is placed on the platform and presses against the plunger 78 on the platform so as to thereby close the third or liquid switch 68.

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It will be understood that the first solenoid 137 is only momentarily energized and the valve plug 135 is latched in open position by spring-pressed latch 138 so that no energy will be required to maintain the valve plug 135 in an open position.

In the use and operation of this device switch member 104 is initially moved to circuit closing position. When the receptacle R is mounted on platform 29 the receptacle is pushed rearwardly so as to move shaft 77 rearwardly and through levers 74 and 71 together with link 82 to rock mercury switch 68 upwardly to a circuit closing position.

When the receptacle R is initially empty, weight 39 will be disposed at its lowermost position shown in Figures 6 and 8. At this time switch 83 will be held in circuit closing position by bolt 86 so that the material in liquid form will be discharged from valve 51 through nozzle 67 into receptacle R. As receptacle R fills with the liquid the weight of the receptacle and the liquid therein will move platform 29 downwardly, and at the same time plunger 26 which engages the forward end of lever 41 will raise lever 35 and weight 39.

When a predetermined quantity of liquid has been discharged into receptacle R, lever 35 will be raised to a point where switch button 91 of switch 90 will be engaged by lever 35 in order to move normally open switch 90 into a circuit closing position. When switch 90 is in circuit closing position the electro-magnetic release means of valve 51 will be energized so that valve 51 will be automatically moved to cut-off or closed position. This filling device will provide a means whereby an accurate and predetermined amount of liquid may be discharged into a receptacle of predetermined size.

It will be understood that as disclosed in Patent 2,413,622 supra, electric valve 51 embodies an electro-magnetic valve opening means, and an electro-magnetic valve release means whereby the valve plug which is spring-pressed to closed position may be released from the holding latch which maintains the valve plug in open position. The valve 51 is also so constructed that the circuits to the opening and closing means will be broken automatically as soon as the valve plug 135 has moved to closed position.

Where a plurality of receptacles are to be filled the plural nozzle assembly shown in Figures 12 and 13 will be secured to the valve structure 51. Any variation in the weight of the material of one receptacle or a plurality of receptacles can be adjusted by means of the adjusting screw 98 so that the single or plurality of receptacles will be filled with a predetermined amount of material.

What is claimed is:

1. A receptacle filling machine comprising a base, a movable platform above said base, a balance lever rockably carried at one end on said base, a balance weight on the other end of said lever, a tubular column carried by said base having a slot in the lower portion thereof, a depending plunger fixed to said platform and slidably engaging in said column, said plunger having a slot in the lower portion thereof, a roller in said plunger slot, a rock lever pivotally mounted between the ends thereof on said base, one end of said rock lever projecting through the slot in said column and the slot in said plunger, said roller engaging on the upper side of said rock lever, a link pivotally connected between the other end of said rock lever and an intermediate point of said

balance lever, an electrically operated valve above said platform, said valve including a valve plug spring-pressed to closed position, electromagnetic means for moving said plug to open position, spring-pressed latching means for holding said valve in open position, electromagnetic release means connected with said latching means, a normally open switch carried by said base connected with said first-named electromagnetic means, means carried by said balance lever engageable with said switch when said balance lever is in a lower position for closing the circuit to said first-named electromagnetic means, a second switch connected between said first-named switch and said first-named electromagnetic means and normally disposed in circuit breaking position, means including an L-shaped lever carried by said platform engageable by a receptacle on said platform and connected with said second switch for moving the latter to circuit closing position, a third normally open switch carried by said base connected with said second electromagnetic means, and means supporting said third switch in a position to be engaged by and closed by said balance lever when said balance lever is in substantially balanced position to thereby release said valve for movement to closed position.

2. A receptacle filling machine comprising a base, a movable platform above said base, balance means supporting said platform from said base, a valve above said platform, means supporting said valve for discharge in the direction of said plat-

form, and means connected between said base and said balance means and also connected with said valve for moving said valve to open or closed position with movement of said platform, said latter means including a mercury switch, means rockably mounting said switch on said base beneath said platform, an L-shaped lever, a rock shaft carried by said base and fixed to one arm of said lever, the other arm of said lever extending upwardly on the outer side of said platform, a receptacle engaging plunger shaft slidably carried by said platform and connected to the upper end of said other lever arm, a linkage connected between said shaft and said switch mounting means whereby contact of a receptacle with said plunger will rock said switch to circuit closing position to thereby initiate operation of said valve to open position, and means connected with said valve engageable with said platform when said platform is lowered by the weight of material thereon for moving said valve to closed position.

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