

Nov. 10, 1931.

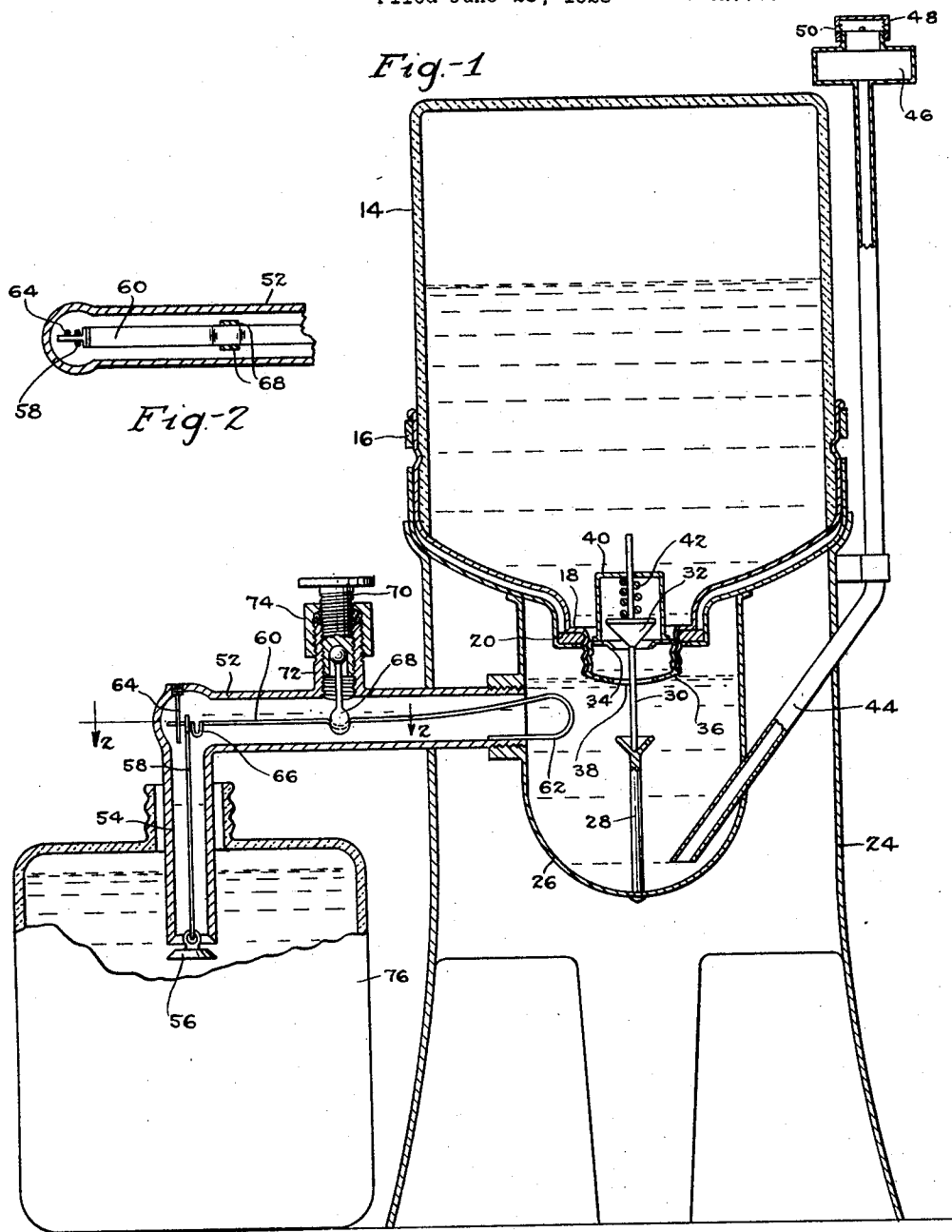
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1,831,028

APPARATUS FOR FILLING RECEPTACLES WITH LIQUID

Filed June 23, 1928

4 Sheets-Sheet 1



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Nov. 10, 1931.

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APPARATUS FOR FILLING RECEPTACLES WITH LIQUID

Filed June 28, 1928

4 Sheets-Sheet 2

Fig-4

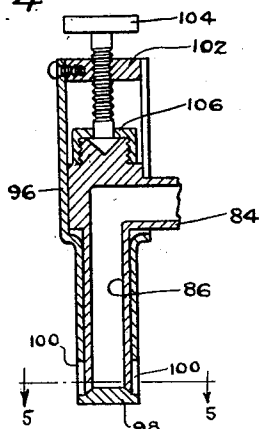


Fig-3

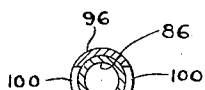
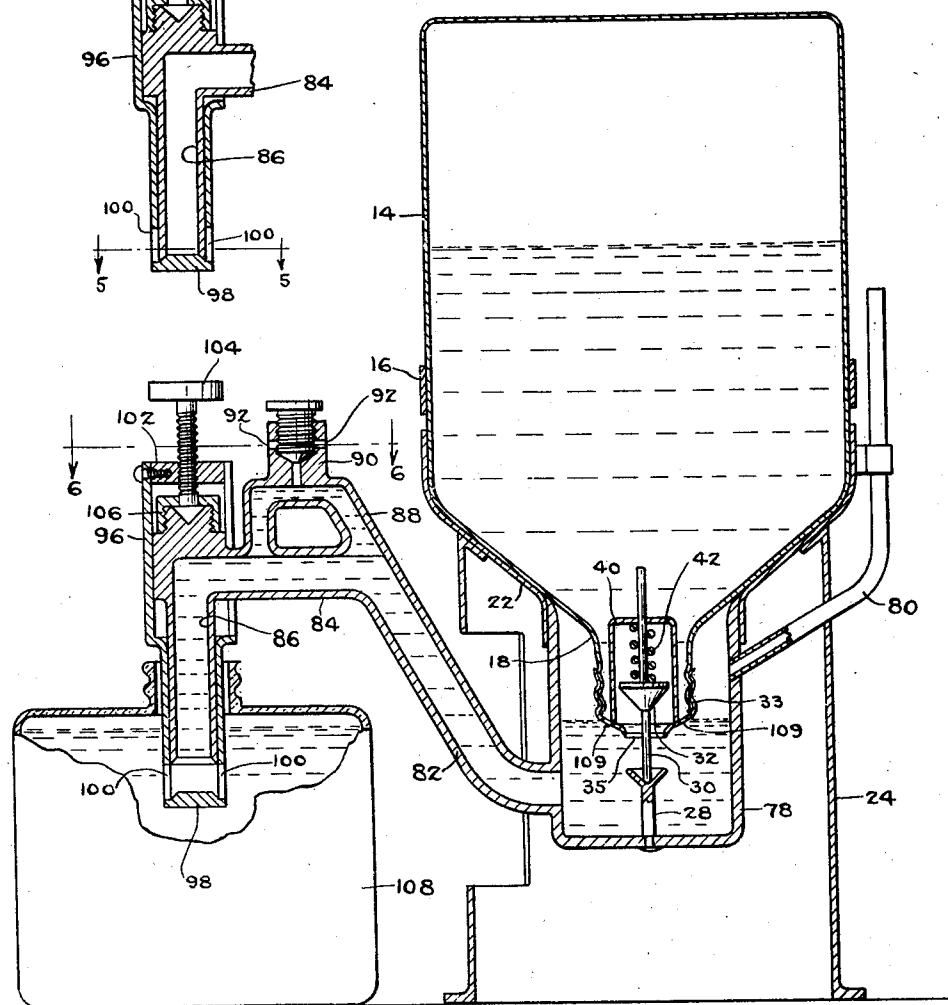


Fig-5

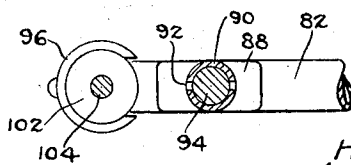


Fig-6

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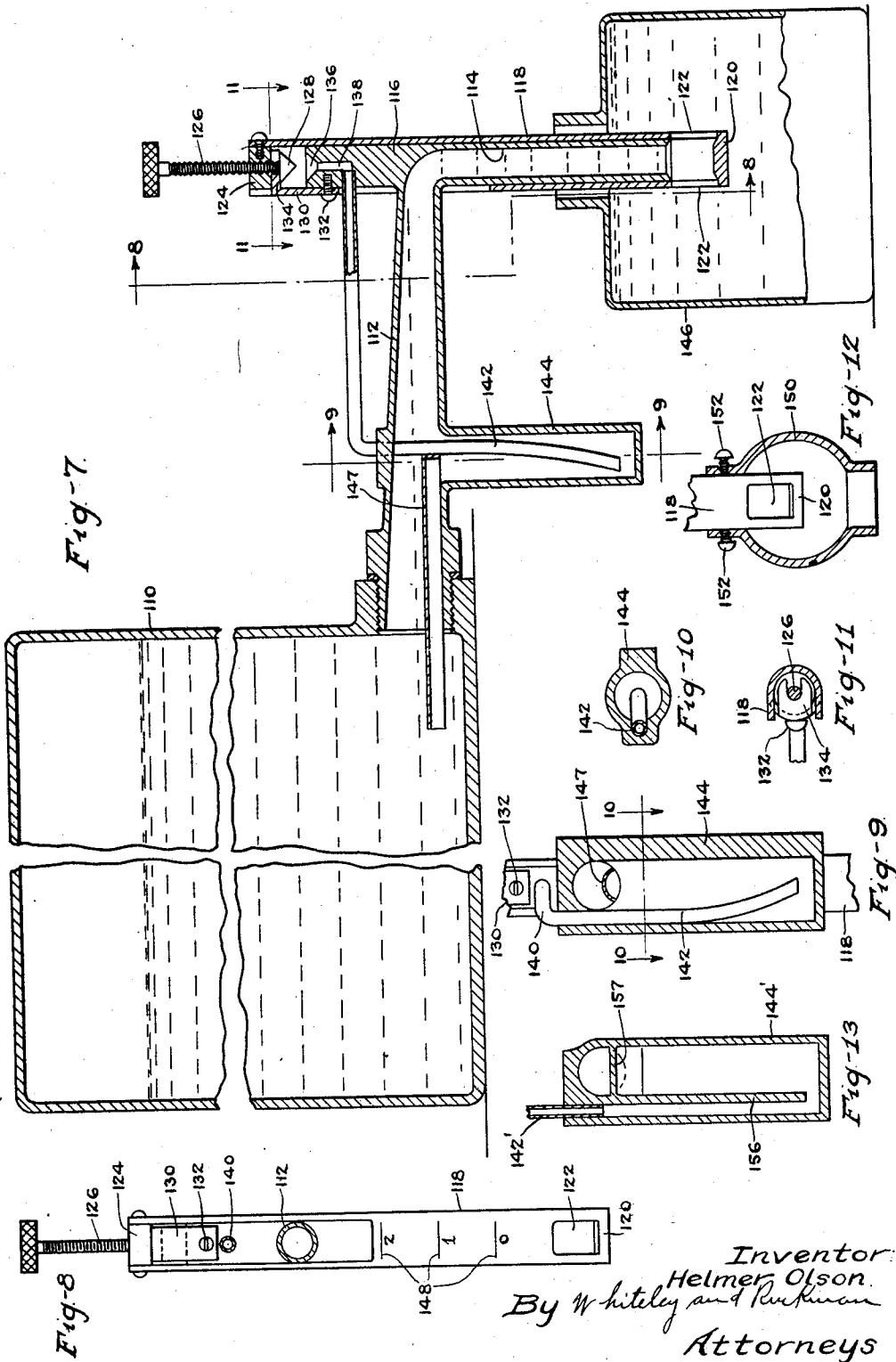
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1,831,028

APPARATUS FOR FILLING RECEPTACLES WITH LIQUID

Filed June 28, 1928

4 Sheets-Sheet 3



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Nov. 10, 1931.

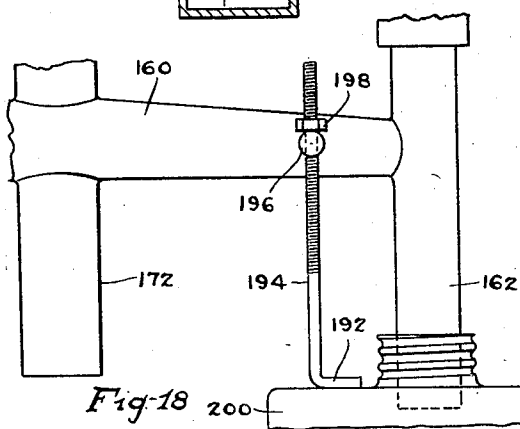
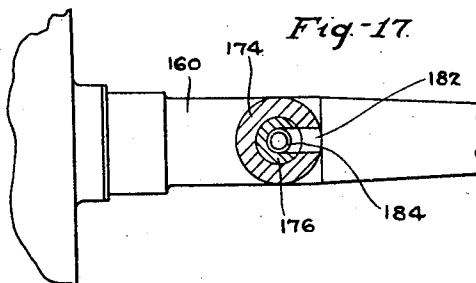
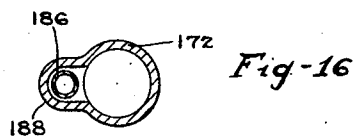
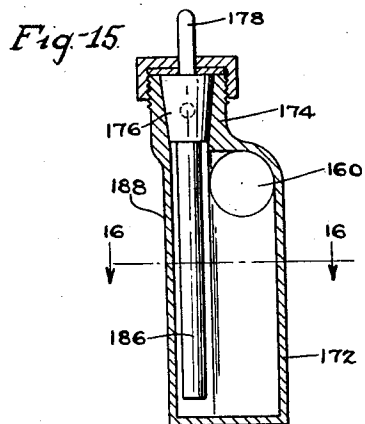
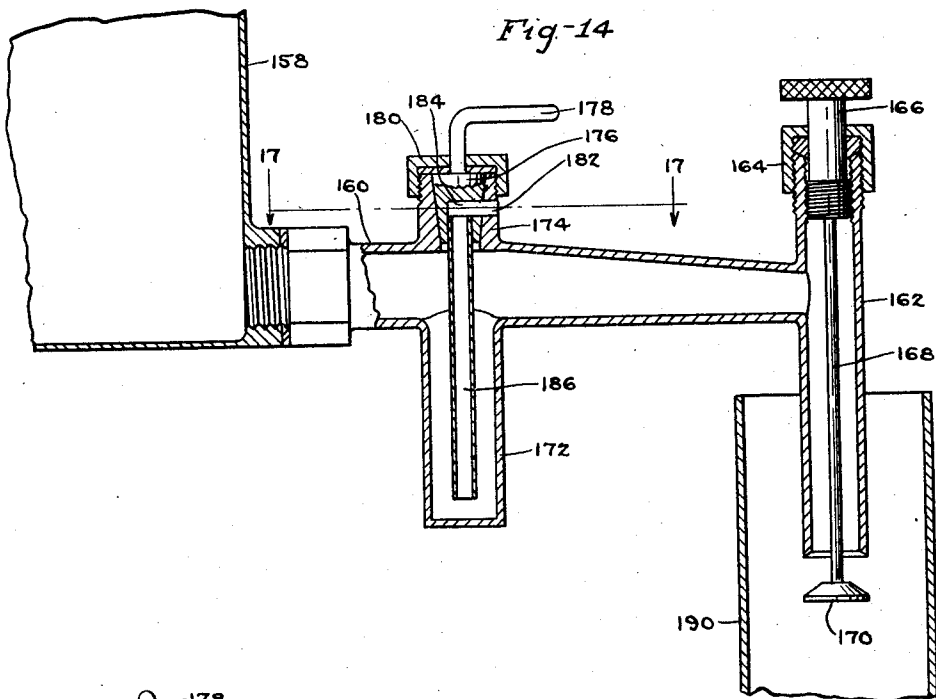
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APPARATUS FOR FILLING RECEPTACLES WITH LIQUID

Filed June 28, 1928

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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APPARATUS FOR FILLING RECEPTACLES WITH LIQUID

Application filed June 28, 1928. Serial No. 289,038.

My invention relates to apparatus for filling receptacles with liquid and an object is to provide for automatically stopping the flow of liquid when the level of liquid in the receptacle being filled reaches the desired height, thereby preventing overflow. Another object is to provide a device of this character by means of which comparatively small receptacles may be readily filled from a comparatively large supply receptacle. An example of the use of my apparatus is in filling lamps from a can containing a supply of oil sufficient for filling a plurality of lamps or for filling a lamp a plurality of times. It will be understood, however, that the apparatus may be employed for use with other liquids besides oil. I accomplish the objects of my invention by providing a combination which includes a supply receptacle, a well below the supply receptacle with which the lower end of the latter is connected, an air tube leading into the well, a delivery pipe leading from the well with its outer portion turned downwardly and adapted to extend into the top of the receptacle to be filled whereby the flow of liquid into this receptacle will be automatically stopped when the level therein reaches the level of the lower end of the air tube or the level of the air inlet to the liquid of the supply receptacle, and a manual shutoff device which is closed before the filled receptacle is removed.

The full objects and advantages of my invention will appear in connection with the detailed description thereof, and the novel features of my inventive idea will be particularly pointed out in the claims.

In the accompanying drawings which illustrate some of the forms in which my invention may be embodied,—

Fig. 1 is a sectional elevational view of one form of my apparatus. Fig. 2 is a view in section on the line 2—2 of Fig. 1. Fig. 3 is a sectional elevational view of another form of my invention. Fig. 4 is a fragmentary view showing a shutoff valve moved from the open position of Fig. 3 into closed position. Fig. 5 is a view in section on the line 5—5 of Fig. 4. Fig. 6 is a view in section on the line 6—6 of Fig. 3. Fig. 7 is a sectional elevational view of another form of my invention. Fig. 8 is a view in section on the line 8—8 of Fig. 7. Fig. 9 is a view in section on the line 9—9 of Fig. 7. Fig. 10 is a view in section on the line 10—10 of Fig. 9. Fig. 11 is a view in section on the line 11—11 of Fig. 7. Fig. 12 is a fragmentary view showing an attachment on the lower end of a tube shown in Fig. 7. Fig. 13 is a view corresponding to Fig. 9 but showing a slight change in construction. Fig. 14 is a sectional elevational view of another form of the invention. Fig. 15 is a sectional view of a part of Fig. 14 taken at right angles. Fig. 16 is a view in section on the line 16—16 of Fig. 15. Fig. 17 is a view in section on the line 17—17 of Fig. 14. Fig. 18 is a fragmentary view showing the application of a stop device.

Referring first to the construction shown in Figs. 1 and 2, the numeral 14 designates a supply receptacle which may be an oil can placed in inverted position and shown as provided with a bail attachment 16. The receptacle 14 has a neck portion 18 which rests upon a rubber ring 20 carried by a dished member 22 which is supported by a stand 24. A well 26 extends down from the member 22 while the bottom of this well has secured thereto an upwardly extending post or abutment 28. When the supply receptacle 14 is placed in position, a valve stem 30 strikes the abutment 28 so that a valve 32 carried by the stem is lifted from its seat 34 which is formed in the upper side of a hollow member 36 having an opening 38 in its lower side opposite the valve seat. The hollow member 36 is secured in the neck of the container 14 and carries a U-shaped strip 40, the base of which forms a guide for the valve stem 30. A coiled spring 42 interposed between the valve and the base of the strip 40 keeps the valve closed when the stem 30 is not engaged by the abutment 28. An air tube 44 passes through the wall of the well 26 with its lower end terminating shortly above the bottom thereof. In the embodiment as shown in Fig. 1, the tube 44 continues up alongside the supply receptacle and

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at its upper end is provided with an enlarged chamber 46 furnished with a screw cap 48 containing perforations 50 so that when this cap is partly unscrewed, the tube 44 is opened to air. The purpose of the enlargement 46 is to prevent overflow of the liquid in case some of the liquid should be forced up the tube 44 when the device stands in a warm room. A horizontal tube 52 leads from the well 26 at a place near the top thereof and the outer end of this tube is connected with a downturned portion 54 whose lower end is disposed at a lower level than the lower end of the airtube 44 and is adapted to be closed by a shutoff valve 56. This valve is secured to a stem 58 whose upper end is looped around the outer reduced end of a leaf spring 60 as will be understood from Fig. 2. The inner end of the spring 60 has a downwardly and backwardly bent portion 62 which is secured to the tube 52 by bolting, soldering or welding. The tension of the spring 60 normally holds the valve 56 closed and in order to hold the stem 58 in place, the outer portion of the spring 60 lies in engagement with a pin 64 while at the other side of the looped end of the stem 58, the spring 60 is provided with a downwardly bent portion 66. In order to open the valve 56 whenever desired, the spring 60 at an intermediate portion thereof is straddled by the notched end of an upwardly extending rod 68 whose upper end is formed into a ball which is received in a recess in the lower end of a screw bolt 70. This bolt has screw threaded engagement with the interior of a tubular extension 72 extending up from the tube 52, the upper end of this extension being closed by a packing gland 74. The supply receptacle is placed in the position shown in Fig. 1 with the valve 56 closed. A lamp bowl 76 or other receptacle to be filled is placed with its neck extending up outside of the lower end of the tube 54, it being understood that the neck is larger than the tube so that air can readily escape from the receptacle 76. Upon opening the shutoff valve 56 liquid starts to flow through the tubes 52 and 54 into the receiving receptacle 76. The cap 48 being in open position, air passes down the air supply tube 44 and bubbles up into the supply receptacle 14, thereby breaking the vacuum which tends to form at the upper portion thereof. It will be understood as a matter of course that if liquid has been forced up the tube 44 on account of the device standing in a warm room, the liquid in the tube 44 will immediately flow out as soon as the flow through the tube 52 started. Therefore when the filling operation is taking place, there is no liquid in the tube 44. Liquid will continue to flow into the receptacle 76 until the level therein reaches the level of the lower end of the tube 44. Thereupon a balanced condition occurs similar to that existing in so-called "fountain

ink stands" and drinking devices for poultry, the result being that no more liquid will flow into the receptacle 76. The operator, of course, closes the valve 56 before removing the receptacle 76. The apparatus is then ready for another filling operation whenever desired.

In the form of the invention shown in Figs. 3 to 6, a supply receptacle 14 rests directly upon a dished member 22 and the neck 18 of the receptacle is provided with a screwthreaded member 33 open at its lower end to form a valve seat 35 for engagement by a valve 32 similar to that previously described and adapted to be held open by a post 28 secured to the bottom of a well 78. This well corresponds in a general way to the well 26 shown in Fig. 1, but there is an air tube 80 leading to the upper part of the well. Furthermore, a delivery tube 82 leads out of the lower portion of the well instead of out of the upper portion thereof. The tube 82 extends upwardly in inclined position and merges into a horizontal tubular member 84 and the latter is connected to a downturned member 86. Connected with the tubular member 84 and positioned above the same, there is a chamber 88 having a tubular extension 90 containing perforations 92. The extension 90 is internally threaded to receive a screw plug 94 which when partly unscrewed allows air to pass out of the perforations 92. A sleeve member 96 slidably surrounds the tubular member 86. The lower end of the sleeve 96 is provided with a shutoff valve 98 above which are perforations 100 in the sleeve. The upper end of the sleeve 96 is provided with a disk 102 having a central threaded opening which is engaged by a screw 104 whose lower end is rotatably held by a cap 106 secured to a threaded extension on the tube 84. The member 33 has openings 109 through which air may pass upwardly. In first starting this form of the device, the screw plug 94 is partly unscrewed so that air can escape from the tubular members 82, 84, and 86 and from the chamber 88. Liquid is poured into the well 78 and when it reaches the level of the highest part of the chamber 88, the air in the faucet and chamber 88 will have been completely driven out. The screw plug 94 is then turned down and the faucet is opened to draw off liquid from the dished member 22 and well 78 until no more runs out. The device is now ready for filling of small receptacles. The supply receptacle 14 is put in position as shown, and a receiving receptacle 108 is placed with its neck extending up outside the lower end of the sleeve 96, the neck being larger than the lower end of the sleeve so that air in the receptacle 108 can readily escape. When the receptacle 108 is filled, liquid will stop flowing into this receptacle since a balanced condition will now

exist. The operator closes the valve 98 before removing the receptacle 108 and the apparatus is in condition for another filling operation, since the liquid will again start to flow upon opening the valve 98. It will be understood from Fig. 3 that the liquid is taken from below the lower end of the air inlet, but is raised above the same and passes on down so that the flow into the smaller receptacle is stopped at the level of the air inlet to the supply receptacle 14.

In the form of invention shown in Figs. 7 to 13, there is a supply receptacle 110 from the lower portion of which a tube 112 extends out horizontally and leads into a downturned member 114. A cylindrical extension 116 projects upwardly from the junction of the tubular members 112 and 114, this extension and the tubular member 114 being surrounded by a slidable sleeve 118. The lower end of the sleeve 118 is provided with a shutoff valve 120 above which are perforations 122. The upper end of the sleeve 118 is provided with a disk 124 having a central threaded opening which is engaged by a screw 126. A conical member 128 is secured to the lower end of the screw 126. A strip 130 is secured by a screw 132 so as to project up from the member 116. The upper end of the strip 130 is bent over at right angles to form a member 134 which is inwardly spaced from the sleeve 118 as shown in Fig. 11 so as to permit passage of air. The screw 126 passes loosely through the member 134. The upper end of the member 116 is provided with a conical seat 136 adapted to receive the conical member 128. The seat 136 extends into a bore 138 from which an air tube 140 extends horizontally and then has a downwardly bent member 142 which extends down nearly to the bottom of a well 144 with which the tube 112 is provided. From an inspection of Fig. 7, it will be understood that when the screw 126 is turned downwardly, the conical member 128 will first engage in the seat 136 and then upon continuing to turn the screw in the same direction, the sleeve 118 will be raised until the shut off valve 120 engages its seat at the bottom of the tube 114. With the valve in this position, a receiving receptacle 146 is placed with its neck extending up outside the lower end of the sleeve 118, the neck being larger than the sleeve so that air in the receptacle can readily escape. The screw 126 is then turned in the opposite direction from that previously referred to so as to open the air tube. When the conical member 128 reaches the member 134, the valve 120 will be moved into open position as shown in Fig. 7. Liquid now flows into the receptacle 146 while air passes down the tube 142 and up into the upper portion of the supply receptacle 110 to break the vacuum which tends to form therein. In order that air may readily pass up into the receptacle 110, a curved member

147 is placed in the bottom of the tubular member 112 between the receptacle 110 and the air tube 142 so as to form a passageway for air as will be understood from Fig. 9. The liquid will stop flowing into the receptacle 146 when the level therein reaches the level of the lower end of the tube 142 since a balance condition then exists in the manner previously stated. The operator closes the valve 120 before removing the filled receptacle. Fig. 8 shows the slidable sleeve 118 provided with graduations 148, the zero mark being at the same level as the lower end of the tube 142 when the sleeve is in lowered position. If a receptacle having no neck is to be completely filled, the top of such receptacle will be placed at the height of the zero mark. If a receptacle having no neck is to be filled except for the neck, then the top of the neck will be placed on a level with the graduation corresponding to the length of the neck. Fig. 12 shows an attachment for use when it is not desired to automatically stop the flow of liquid. In such case, the sleeve 118 does not extend down into the receptacle to be filled. Therefore, in order to direct the flow of liquid which comes out of the lateral perforations 122, a globular member 150 is secured to the lower end of the sleeve by set screws 152, the member 150 having an open lower end portion 154 which directs the liquid downwardly. Fig. 13 shows a slight modification in regard to the well construction. In place of the well 144 as before, a well 144' is provided having a vertical partition 156 near the inner wall thereof stopping short of the bottom. The air tube 142' leads into the top of the space cut off by the partition 156. A horizontal partition 157 takes the place of the curved member 147.

In the form of invention shown in Figs. 14 to 18, there is a supply receptacle 158 from the lower portion of which a tube 160 extends out horizontally and leads into a downturned member 162 which has an upper portion which is screwthreaded both internally and externally. The external threads serve for attachment of a packing gland 164. The internal threads are engaged by threads on a rotatable rod 166 which carries a stem 168 attached to the lower end of which is a shut-off valve 170 adapted to cooperate with a valve seat on the lower end of the tube 162. A well 172 extends down from the tube 160. Above the well 172 there is an upward hollow extension 174 provided with a tapered plug valve 176 having a handle 178 by which it may be rotated. The plug is held in place for rotative movement only, by a screw cap 180. The extension 174 is provided with a perforation 182 with which a passageway 184 in the valve may be made to register. From the passageway 184, an air tube 186 extends down nearly to the bottom of the well

172, the latter being preferably provided with a reduced portion 188 for containing the tube 186. With the valve 170 in closed position, a receptacle 190 to be filled is positioned so as to extend outside the lower portion of the tube 162. Upon opening the valve 176 and the valve 170, liquid will flow into the receptacle 190 while air passes down the tube 186 and up into the upper portion of the supply receptacle 158 to break the vacuum which tends to form therein. The liquid will stop flowing into the receptacle 190 when the level therein reaches the level of the lower end of the tube 186 since a balanced condition then exists. The operator closes the valve 170 before removing the receptacle 190 while the valve 176 may also be closed to prevent liquid from being forced up out of the tube 186. In Fig. 18, I show the provision of a stop 192 carried by the lower end of a threaded rod 194. This rod engages in a threaded hole formed in a lug 196 extending out from the tube 160. A lock nut 198 serves to hold the stop in its adjusted position. Upon loosening this lock nut, the stop 192 may be readily set at the desired height for engagement by a receptacle 200 which is to be filled.

In all of the forms of the invention which have been disclosed, there is an air inlet device which permits outside air to pass through the opening into the supply receptacle and bubble up through the liquid in said receptacle in combination with a delivery pipe leading from the well with its outer end turned downwardly and adapted to extend into the top of a receptacle to be filled whereby the flow of liquid into the last mentioned receptacle will be automatically stopped when the level of liquid therein reaches the level of the lowermost point of the air inlet device. Therefore a balanced condition will occur, the result being that no more liquid will flow into the receiving vessel, this condition being indicated to the operator by cessation of the sound of air bubbles in the supply receptacle.

I claim:

1. Apparatus for filling receptacles with liquid comprising a supply receptacle having an opening at its lower end only, a well connected with said receptacle through said opening, an air inlet device which permits outside air to pass through said opening and bubble up through the liquid in said receptacle, a delivery pipe leading from said well with its outer end turned downwardly and adapted to extend into the top of a receptacle to be filled whereby the flow of liquid into said last mentioned receptacle will be automatically stopped when the level of liquid therein reaches the level of the lowermost point of said air inlet device, and a manually operable shutoff device for said delivery pipe.

2. Apparatus for filling receptacles with liquid comprising a supply receptacle hav-

ing an opening at its lower end only, a well connected with said receptacle through said opening, an air inlet device which permits outside air to pass through said opening and bubble up through the liquid in said receptacle, a delivery pipe leading from said well with its outer end turned downwardly and adapted to extend into the top of a receptacle to be filled whereby the flow of liquid into said last mentioned receptacle will be automatically stopped when the level of liquid therein reaches the level of the lowermost point of said air inlet device, and a manually operable shutoff valve cooperating with the lower end of said downturned portion.

3. Apparatus for filling receptacles with liquid comprising a supply receptacle having an opening at its lower end only, a well connected with said receptacle through said opening, an air inlet device which permits outside air to pass through said opening and bubble up through the liquid in said receptacle, a delivery pipe leading from said well with its outer end turned downwardly and adapted to extend into the top of a receptacle to be filled whereby the flow of liquid into said last mentioned receptacle will be automatically stopped when the level of liquid therein reaches the level of the lowermost point of said air inlet device, a shutoff valve adapted to engage the lower end of said downwardly turned portion, a member to which said valve is attached extending lengthwise of said downwardly turned portion, and means for moving said member up and down.

4. Apparatus for filling receptacles with liquid comprising a supply receptacle having an opening at its lower end only, a well connected with said receptacle through said opening, an air inlet device which permits outside air to pass through said opening and bubble up through the liquid in said receptacle, a delivery pipe leading from said well with its outer end turned downwardly and adapted to extend into the top of a receptacle to be filled whereby the flow of liquid into said last mentioned receptacle will be automatically stopped when the level of liquid therein reaches the level of the lowermost point of said air inlet device, a sleeve surrounding said downturned portion, a shutoff valve carried by the lower end of said sleeve and adapted to engage the lower end of said downturned portion, and means for moving said sleeve up and down.

5. Apparatus for filling receptacles with liquid comprising a supply receptacle having an opening at its lower end only, an inwardly opening valve controlling said opening, a well connected with said receptacle through said opening, an abutment in said well which opens said valve when said receptacle is in place on said well, an air inlet device which permits outside air to pass

through said opening and bubble up through the liquid in said receptacle, a delivery pipe leading from said well with its outer end turned downwardly and adapted to extend into the top of a receptacle to be filled where-
5 by the flow of liquid into said last mentioned receptacle will be automatically stopped when the level of liquid therein reaches the lowermost point of said air inlet device, and a
10 manually operable shutoff device for said delivery pipe.

6. Apparatus for filling receptacles with liquid comprising a supply receptacle having an opening at its lower end only, a well con-
15 nected with said receptacle through said opening, an air inlet device which permits outside air to pass through said opening and bubble up through the liquid in said recep-
20 tacle, a delivery pipe leading from the bottom portion of said well and extending upwardly therefrom with its outer portion turned downwardly and adapted to extend
25 into the top of the receptacle to be filled whereby the flow of liquid into said last mentioned receptacle will be automatically stopped when the level therein reaches the level of the lowermost point of said air inlet device, and a manual shutoff device for said delivery pipe.

30 In testimony whereof I hereunto affix my signature.

HELMER OLSON.

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