

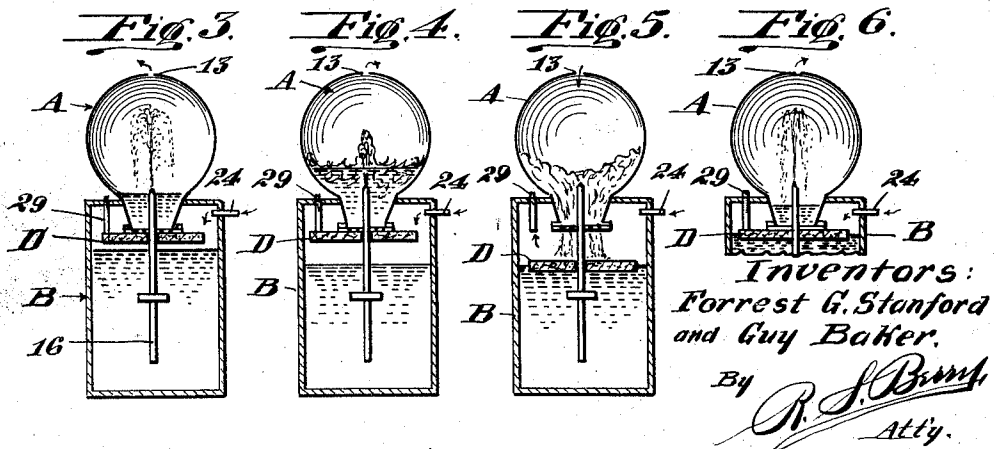
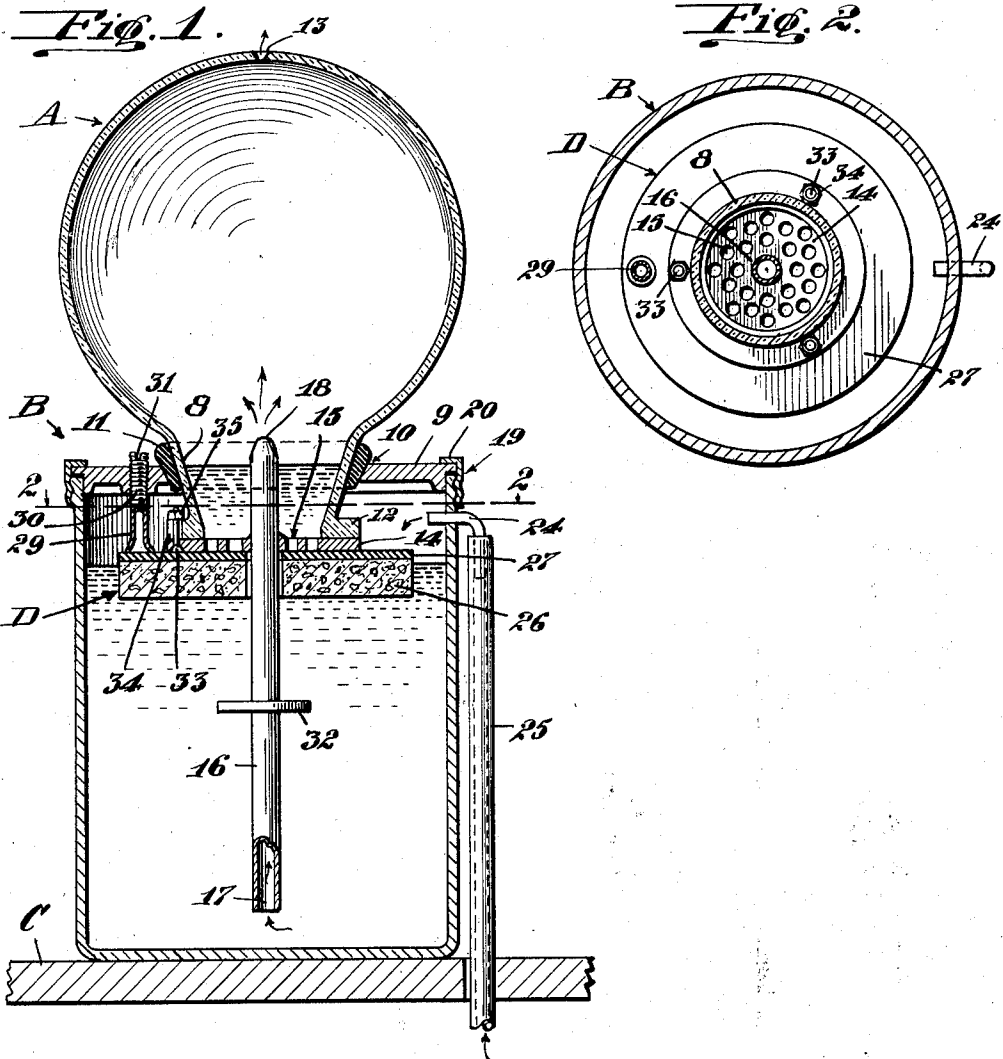
Nov. 25, 1930.

F. G. STANFORD ET AL

1,782,943

LIQUID DISPLAY APPARATUS

Filed Sept. 9, 1929



# UNITED STATES PATENT OFFICE

FORREST G. STANFORD AND GUY BAKER, OF LOS ANGELES, CALIFORNIA; SAID BAKER  
ASSIGNOR TO GEORGE H. HYLAND, OF LOS ANGELES, CALIFORNIA

## LIQUID-DISPLAY APPARATUS

Application filed September 9, 1929. Serial No. 391,444.

The hereinafter described invention relates to liquid display apparatus and deals more particularly with apparatus of the class used to attract attention by displaying turbulent liquid within a transparent container.

Our invention in its entirety contemplates an advertising medium, wherein a liquid, preferably colored, is intermittently forced from a container reservoir into and out of a transparent container. One intention of this invention is to further heighten the effectiveness of this display by causing the liquid to be agitated during substantially the entire cycle of operation. We are aware that certain types of display apparatus of this character cause the liquid to be agitated during a part of the cycle of operation, but, insofar as we know, there is no apparatus handling a liquid in the way we contemplate that does not have a prolonged quiescent period during a certain part of the cycle of operation. Accordingly, it is an object of this invention to provide an apparatus of the foregoing character wherein the agitation of the liquid is practically constant during the entire period of operation of the device.

Another feature of this invention resides in the means of actuating the device; the means in this instance contemplating continuously operated fluid pressure means. It is well known in the art of dispensing liquids that fluid pressure actuating means is available in a great many places where other means, such as vacuum actuating means, is not. Therefore, in order to take full advantage of the customary equipment in beverage display establishments it is an object of this invention to provide an apparatus that may be actuated by fluid pressure.

Since this invention contemplates an advertising medium that is intended to be operated practically continuously, it is proposed to provide an apparatus having few moving parts, and these of the simplest and most rugged construction commensurate with the purpose and use of the device.

In utilizing fluid pressure as an actuating means we are enabled to provide an apparatus of few parts and in this invention we intend to have no outside valves, nor timing

mechanism of the sort sometimes employed in vacuum actuated apparatus. It is, therefore, an object of this invention to incorporate all valves and controlling parts into a single piece of apparatus and thus have but one outside connection; that is, the pressure connection for actuating the apparatus.

Our invention is carried into effect by the provision of a container reservoir for liquid to be displayed and a transparent display container with means by which liquid is forced from said reservoir by fluid pressure into said display container and operable to allow the liquid to return to said reservoir; the organization being arranged in a manner to provide agitation of the liquid substantially throughout the entire operation of the device.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed and illustrated by way of example in the accompanying drawings, in which:—

Fig. 1 is a vertical cross section of the apparatus;

Fig. 2 is a horizontal section as seen on line 2—2 of Fig. 1;

Fig. 3 diagrammatically shows the operation of the device in its first stage or just as the display container is starting to fill;

Fig. 4 shows the same in the second stage with the liquid turbulent;

Fig. 5 shows the same in the third stage as the display container is emptying;

Fig. 6 shows the same at the end of the cycle and as functioning preliminary to the first stage operation shown in Fig. 3.

Referring to the drawings more specifically, A indicates a display container and B denotes a reservoir carried upon a suitable support C. The form and shape of the reservoir is not material to this invention, consequently this invention is intended to include reservoirs of all shapes and suitable materials, as well as display containers of all shapes and of any suitable material that is sufficiently transparent to suit our purpose.

The display container A is here shown as comprising a globular jar having an open ended neck 8 invertedly mounted over and projecting into the reservoir B; the latter being provided with a removable top 9 formed with a central opening 10, through which the neck 8 extends, thus affording a means for permitting insertion of the neck 8 of the container A into the reservoir B and affording a support for the display container.

As a means of insuring a leak-proof connection between the container A and the reservoir B, a soft rubber ring 11 is wedged into the opening 10 around the neck 8 of the container. The opening 10 is made of sufficient size to admit a flange 12 on the neck of the container A being passed there-through, and the rubber ring is formed of such thickness as to fill the space between the neck 8 and the margin of the opening 10 and to seal the connection.

The container A is provided with a small vent aperture 13 preferably located in the top of the container for the purpose of relieving entrapped air as the container fills which aperture may be very small and it is preferably made as a V-shaped opening with the apex of the V penetrating the interior of the container; the purpose of this arrangement being to prevent liquid from escaping through the vent aperture by occasional splashes of the turbulent liquid within the container. Mounted on the neck 8 of the container A, is a plate 14 having apertures 15 and extending through the plate 14 and affixed thereto is a vertical tube 16, the lower portion of which extends downwardly to within a short distance of the bottom of the reservoir B and opens to the latter at 17, and the upper portion of which projects upwardly into the display container and opens thereto at 18.

The reservoir top 9 is in the form of a cover which is here shown as seated on the upper margin of the receptacle and as secured in place thereon by a ring 19 which is screwed on the receptacle and has an intumed marginal flange 20 which engages the cover or top 9 to hold the latter in place. The pressure actuating medium, in this instance air under pressure, is admitted to the top portion of the closed reservoir B through an inlet 24 which is shown connected to a flexible hose 25 that leads to a suitable source of air supply, under pressure. Since the source of air supply does not enter into this invention no means of providing the same is shown. It is obvious that if no local source of air under pressure is available a small compact unit may be installed to supply any desired quantity.

Means are provided for alternately closing and opening the apertures 15 in the plate 14 operable to automatically control the delivery of liquid from the reservoir to the con-

tainer which means comprises a float valve D here shown as embodying a cork float 26 reciprocally mounted on the tube 16 and having a gasket 27 of suitable material mounted on the upper surface adapted to seat on the underside of the plate 14.

Extending through the top 9 closely adjacent the external circumference of the flange 14 is a vent tube 29 communicating with the atmosphere. The lower end of the vent tube 29 is arranged to extend to the plane of the underside of the plate 14 and the float valve D is designed and adapted to close the lower end of the vent tube 29 simultaneously as it seats on the plate 14 and closes the mouth of the container A. The vent tube 29 is mounted for vertical adjustment on the top 9 so that its lower end may be positioned in proper alignment with the underside of the plate 14 for which purpose the vent tube 29 has a threaded portion 30 at its upper end screwed into engagement with an internally threaded opening in the top 9; the upper end of the vent 29 being formed with a kerf 31 for the reception of a screw driver or similar tool for effecting rotation of the vent tube 29 to advance or retract the latter on the top 9. As a means for confining the travel of the float valve D to a portion of the length of the tube instead of substantially the entire length thereof a stop 32 comprising a spider is affixed in the reservoir B and through which the tube 16 slidably extends. This arrangement also operates to prevent the float valve D from descending to the lowermost end of the tube 16 and obviates any possibility of the float valve becoming locked over the lower end of the tube.

The apertured plate 14, with the tube 16 affixed thereto, is here shown as demountably attached to the lower end of the neck 8 of the container by bolts 33 which have their heads countersunk in the plate 14 and have their threaded shanks extending through marginal slots 34 formed in the flange 12; nuts 35 being screwed on the bolts and seating on the upper face of the flange 12 in such manner as to clamp the plate 14 against the neck of the container. By this construction the container with the apertured plate and the tube 16 may be removed from the reservoir by lifting the display container therefrom.

In the operation of the invention the reservoir B is filled with a suitable liquid to a level at which the float valve closes the mouth of the container A and the tube 29. After inserting the container A in its inverted position, air under pressure is delivered into the reservoir above the liquid therein through the hose 25 and the inlet 24. The pressure forces the liquid up through the tube 16 into the container A in the form of a fountain as illustrated by Fig. 3. When the liquid accumulating in the container reaches a level above the upper end of the tube 16, the liq-

uid is agitated and rendered turbulent by the incoming stream. The liquid continues to ascend into the container A until the level of liquid in the reservoir B reaches the lower end of the tube 16 whereupon air rushes into the container and relieves the pressure previously imposed on the underside of the float valve, and in effect transfers the pressure from the underside to the upper side of the float valve which causes it to drop immediately and release the liquid which then flows back through the aperture 15 into the reservoir B.

During this stage it is observed that the vent tube 29 is open to the atmosphere and that the pressure entering from the inlet 24 is spent without being confined to any work. The liquid perforce of gravity drains out of the container A and in so doing is rendered turbulent by air rushing in through the neck of the jar A to fill in part the space left by the evacuating liquid. Mention is made of the aperture 13 which is provided to release entrapped air as the container is filled, but which is not great enough to supply a sufficient amount of air during the emptying of the container. As the container A empties, the liquid rises in the reservoir B until the float valve D again closes the mouth of the container A and the vent tube 29, and the cycle of operation starts again.

In Fig. 3 is diagrammatically illustrated the start of the filling stage, and in Fig. 4 an intermediate condition of the filling stage, while in Fig. 5 is shown an intermediate stage of emptying of the display container and in Fig. 6 the beginning of the refilling stage. It will be observed that in the filling and emptying stages the turbulence occurs; that in Figs. 3 and 4 it is caused by intruding liquid, but that in Fig. 5 the turbulence is caused by intruding air.

While we have shown a specific embodiment of our invention we are aware that certain modifications and refinements may be made therein. We therefore reserve the right to make such alterations as do not depart from the scope of the specification nor the purview of the appended claims.

We claim:

1. In a liquid display apparatus, a reservoir adapted to contain a liquid, a display container invertedly communicable with said reservoir, float valve controlled means operable by liquid in said reservoir for causing intermittent flow of a liquid from said reservoir to said container when fluid pressure is developed in said reservoir, and means controlled by said valve for developing fluid pressure in said reservoir.

2. In a liquid display apparatus, a reservoir adapted to contain a liquid, a display container invertedly communicable with said reservoir, float valve controlled means operable by the rise and fall of liquid in said

reservoir for causing an alternate flow of liquid to and from said reservoir and said container when fluid pressure is alternately developed and negatived in said reservoir, and means controlled by said valve for alternately creating and exhausting fluid pressure in said reservoir.

3. In a liquid display apparatus, a reservoir adapted to contain a liquid, a display container invertedly communicable with said reservoir, means for admitting fluid under pressure to said reservoir, means for exhausting fluid pressure from said reservoir and valve means for automatically controlling the flow of liquid back and forth between said reservoir and said container when fluid pressure is alternately developed and negatived in said reservoir, and means controlled by said valve whereby fluid pressure is alternately developed and negatived in said reservoir; said valve being actuated by rise and fall of liquid in said reservoir and container.

4. In a liquid display apparatus, a reservoir adapted to contain a liquid, a display container having an opening leading downwardly into said reservoir, a tube having an open end in said container and the opposite open end in said reservoir, a float valve associated with said container opening for covering and uncovering said opening and for causing liquid to flow through said tube into said container when said valve is in position to cover said container opening and when fluid pressure is applied to said reservoir, means for directing fluid pressure to said reservoir and a vent in said reservoir normally closed by said float valve.

5. In a liquid display apparatus, a reservoir, a display container having an opening leading downwardly into said reservoir, a tube extending from said reservoir into said display container, a float valve reciprocally mounted on said tube arranged to close the lower opening of said display container at a predetermined level of liquid in said reservoir, means for directing air under pressure into said reservoir, and a vent controlled by said float valve for exhausting air pressure from said reservoir.

6. In a liquid display apparatus, a reservoir having a fluid pressure inlet and a vent communicating with the atmosphere exteriorly of the reservoir, a display container having an opening leading downwardly into said reservoir, a valve arranged to close said opening and said vent on liquid in said reservoir reaching a predetermined level and a tube leading from said reservoir into said container through which liquid from the reservoir may be delivered to the container on fluid pressure being directed into the reservoir and said tube serving when liquid in the reservoir falls below the lower end thereof to equalize pressures in the container and reservoir.

70

75

80

85

90

95

100

105

110

115

120

125

130

7. In a liquid display apparatus, a reservoir, a display container having an opening leading downwardly into said reservoir and having a vent aperture, a vertically adjustable vent tube in said reservoir, a vertical tube affording communication between said reservoir and said container, a float valve guided on said vertical tube arranged to simultaneously close said opening and said vent tube, and means for directing air under pressure into said reservoir.

8. In a liquid display apparatus, a reservoir, a cover thereon having a central opening, a vent tube projecting downward through said cover, a display container having an open ended neck, said container being disposed with said neck extending through the opening in said cover and communicating with said reservoir, a vertical tube carried by said container extending upwardly into the container and downwardly into the reservoir, a float valve guided on said vertical tube arranged to close said vent tube and the open ended neck of the container, said reservoir being formed with a fluid pressure inlet and said container being formed with a vent.

FORREST G. STANFORD.  
GUY BAKER.

30

35

40

45

50

55

60

65