S. COOPER.

LIQUID DISPENSING APPARATUS.

APPLICATION FILED DEC. 2, 1915.

1,236,912.

Patented Aug. 14, 1917.

3 SHEETS—SHEET 1.

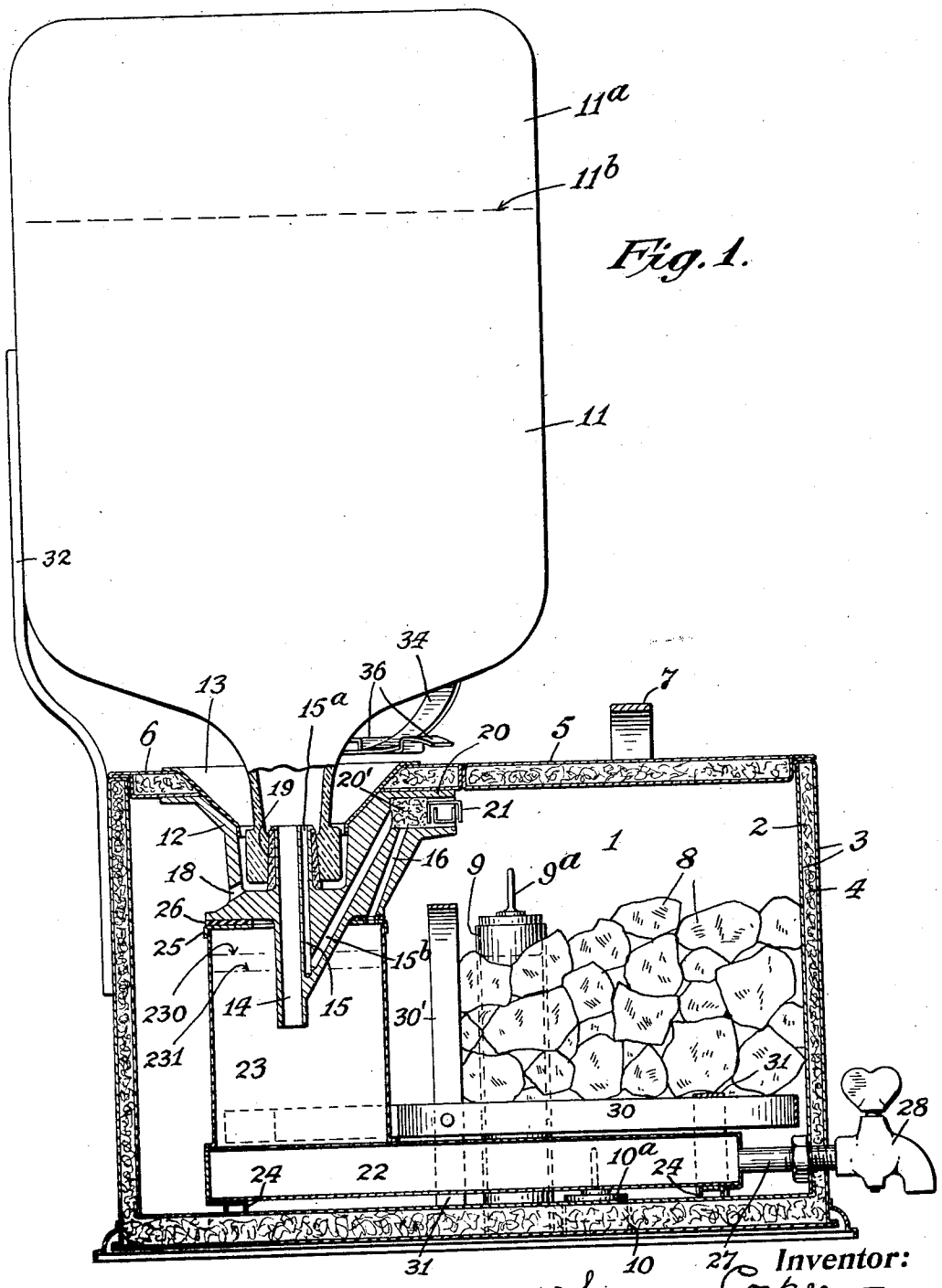

Fig. 1.

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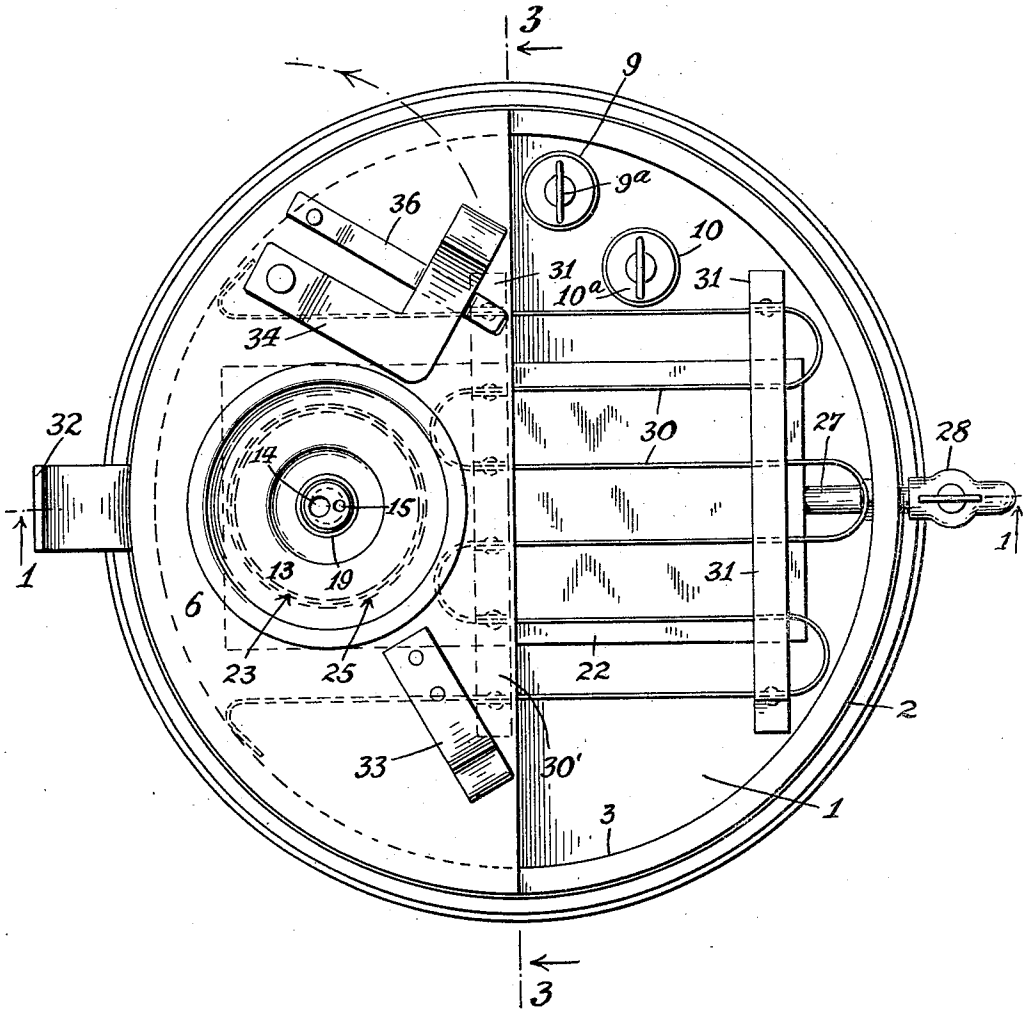
Fig. 2.



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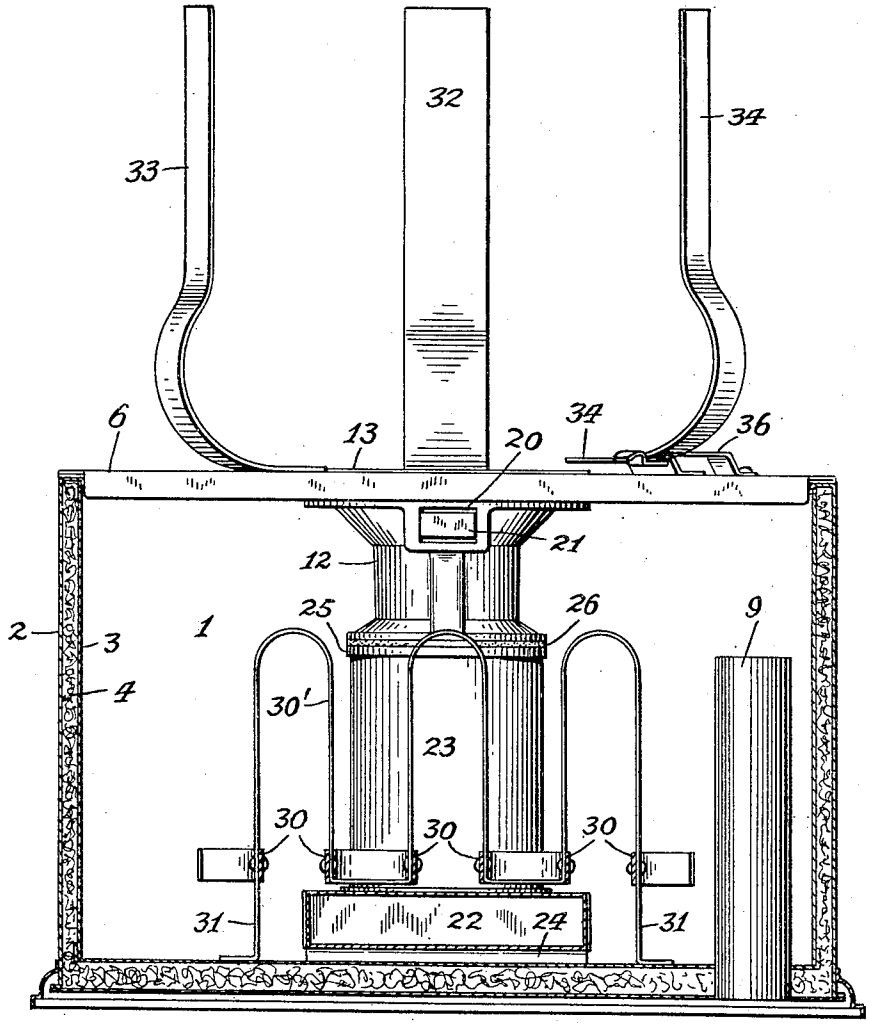
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

SIMON COOPER, OF NEW YORK, N. Y., ASSIGNOR TO PINE HILL CRYSTAL SPRING WATER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

LIQUID-DISPENSING APPARATUS.

1,236,912. Specification of Letters Patent. **Patented Aug. 14, 1917.**

Application filed December 2, 1915. Serial No. 64,633.

To all whom it may concern:

Be it known that I, SIMON COOPER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Liquid-Dispensing Apparatus, of which the following is a specification.

This invention relates to dispensing apparatus for liquids and some features of the invention render it particularly applicable to a type of water cooler in which the water or other liquid is held in an inverted receptacle. In such a cooler, as the liquid is drawn off from time to time the air space or air chamber in the upper part of the receptacle increases in volume and the air which passes into the receptacle, drawn as it is, from the air in the room or hall where the cooler stands may contain impurities or bacilli noxious to human life. This disadvantage is aggravated under some circumstances for the reason that frequently the receptacle is of such a large size that considerable time elapses before the liquid is entirely consumed. During all this time the surface of the liquid is exposed to the air in the air chamber and the receptacle which is generally of glass may be placed in the sunlight, producing conditions which are highly favorable to the propagation of bacilli or bacteria. Furthermore, such apparatus is often constructed in such a way that the exterior of the mouth of the receptacle comes in direct contact with the water, or other liquid which is to be drunk. Such an apparatus as this described is evidently very unsanitary.

Among the objects of my invention is to provide a very simple dispensing apparatus which will be sanitary and which will operate in a very simple manner to permit the liquid to be drawn off as may be desired, and further to provide means for sealing the liquid so that where air must come in contact with it, this air will be purified, and if desired, rendered substantially sterile. I effect this result in a very simple manner and without the necessity of the use of valves having moving parts, except the usual faucet or other means for drawing off the liquid; and in order to carry out my purpose more completely the apparatus is preferably constructed so as to prevent any possibility of the liquid which is to be drunk, from coming in direct contact with the exterior of the mouth of the receptacle. In addition to this it is my object to provide improved means for effecting the cooling of the liquid before it is consumed.

My invention includes the method and the apparatus by which I accomplish the general purposes of my invention.

In the drawing, Figure 1 is a central vertical section partly in elevation taken on the line 1—1 of Fig. 2; Fig. 2 is a plan view with certain parts removed; Fig. 3 is a central vertical section taken on the line 3—3 of Fig. 2.

The apparatus which is described hereinafter is an embodiment of my invention and may comprise a refrigerating compartment 1 formed within a case 2 having double walls 3 which may be packed with a suitable heat non-conducting packing 4. The case 1 may have two removable cover sections 5 and 6 which are of semi-circular form so as to form a suitable cover or lid for the case 1 which is represented for example, as of circular form. The cover section 5 may have a handle 7 rendering it easily removable to give access to the interior which may receive a refrigerating substance such as ice, indicated at 8; and the interior of the refrigerating compartment preferably has an overflow tube 9 with a removable stopper or closure 9^a. By removing the plug 10^a at the bottom of the case the refrigerating compartment may be completely drained through the outlet 10.

The cover section 6 is preferably constructed to support an inverted receptacle such as the receptacle or large bottle 11, and the parts are so arranged as to prevent contact of the liquid within the bottle and the exterior of the mouth of the bottle before the liquid is consumed. In order to accomplish this the cover section 6 is preferably provided with a funnel-shaped depression 13 supported on a housing 12 and this housing has an upwardly extending closure or plug 19 which fits into and will seal the mouth of the receptacle or vessel. The closure has a liquid duct 14 which extends downwardly through the same and an independent air inlet or duct 15 composed of two branches 15^a and 15^b. I provide means for effecting a hydrostatic seal for normally pre-

venting the liquid from flowing out from the receptacle and for normally preventing air from leaking in through the air duct 15, and into the air chamber 11[a] in which a partial vacuum exists above the liquid level indicated by the line 11[b] of the receptacle. I also construct the parts so as to prevent the exterior of the mouth of the receptacle from touching the liquid. To accomplish this I provide a delivery chamber 23 to receive liquid from the receptacle through the duct 14 and to contain a hydrostatic sealing bath, the level of which is normally maintained at about the position of the dotted line 230, see Fig. 1. This delivery chamber preferably has an extension 22 which projects toward the front of the cooler and is provided with a delivery pipe 27 which may have means such as a faucet 28 for drawing off the liquid from the delivery chamber. The delivery chamber is preferably elevated by means of cleats 24 above the bottom of the refrigerating compartment so that the refrigerating water will pass or circulate on all lateral sides of and on the under side of the delivery chamber. This gives a very good cooling effect.

The lower portion of the housing 12 seats on a gasket 26 on a cover 25 of the delivery chamber 23 so as to form a substantially air-tight connection and prevent the entrance of air to the air chamber in which air is confined above the level of the liquid in the delivery chamber 23. The receptacle is inverted and put in place, and then the liquid flows down the duct 14 and partially fills the delivery chamber 23, normally mounting to and maintaining a level therein at about the point indicated by the line 230, which is sufficiently above the lower end of the duct to produce equilibrium in the liquid columns in the delivery chamber and in the receptacle 11.

When a condition of equilibrium exists, the liquid in the chamber 23 at about the level indicated by the line 230, forms a liquid supply column which, together with the atmospheric pressure upon its upper surface, forms a counterbalancing column for counterbalancing the column of liquid in the duct 14, the receptacle 11 and the air in the air chamber 11[a].

And, likewise, during this condition of equilibrium, liquid stands in the branches 15[a] and 15[b] of the air duct, so that the liquid column in the branch 15[b] together with the atmospheric pressure upon its upper surface forms a counterbalancing column to counterbalance the column of liquid in the duct 15[a], the receptacle 11 and the air in the air chamber 11[a].

When a quantity of liquid is withdrawn at the faucet 28 the level of the sealing bath in the delivery chamber 23 will drop to a lower level such as indicated by the line 231. This reduces the liquid column in the chamber 23 and disturbs the equilibrium. The first effect of this is to break the seal which is formed in the air duct, and causes the admission of air to the interior of the receptacle 11. This effect is the first effect produced on account of the fact that the column of liquid in the duct 15[a] and the receptacle is shorter than the column of liquid in the duct 14 and the receptacle. The next effect is a downward flow of liquid through the duct 14 into the chamber 23, and this downward flow will continue until the faucet 28 is closed and equilibrium of the liquid columns is reëstablished.

No air passes up the duct 14 to the liquid supply column.

This admitted air is preferably purified or sterilized by passing it through a purifier, sterilizer or filter 20 which may contain a removable wad 20′ of absorbent material preferably held in place by a baffle-form closure 21 through which the air may pass in. This admitted air is preferably taken from the interior of the refrigerating compartment, and I prefer to provide an air duct 16 for leading a portion of the purified air to the air chamber in the delivery chamber 23 (from which all other air is excluded) in the upper portion of which air is confined above the sealing bath.

Any liquid spilled in placing the receptacle 11 in position drains through a duct 18 into the refrigerating compartment.

As the cover section 5 does not make an air-tight closure for the refrigerating compartment, the air ducts 15 and 16 are in communication with the atmosphere, but by utilizing the air from the interior of the refrigerating compartment to replace the volume of liquid withdrawn from receptacle 11, the admitted air in the receptacle will have been refrigerated; and furthermore this cool air exerts a cooling effect on the liquid as it bubbles up through it. This bubbling up of the air will continue until equilibrium of the hydrostatic columns occurs.

The ice 8 is preferably supported upon a removable grid 30 having bent cross bars 31, forming legs and having upwardly extending loops 30′ for retaining the ice.

The receptacle 11 may be conveniently held in a rudimentary crib formed of fixed standards 32 and 33, and a movable standard 34 which may be pivoted to permit its being swung out of the way when the receptacle is being put in place. And a latch 36 may be provided for holding the movable standard in its holding position.

By reason of the fact that the air duct is effectually sealed by the liquid itself, this air duct may be made large enough to admit the air in such quantity as to cause a very uniform outward flow of the liquid. The

trap formed by the two tubes 15^a and 15^b is an important part of the invention, and the hydrostatic seal contained therein is controlled by the relation between the supply column in the bottle and the delivery column 23. When these two columns are in equilibrium, there is a seal in the trap, but as soon as this equilibrium is disturbed by the drawing off of water from the delivery column the consequent increased vacuum in the space 11^a causes air to pass in through the tube 15^b, displacing the water in the trap, which backs up into the bottle, and the necessary quantity of air then passes on through the bottle into this space 11^a, to restore a condition of equilibrium between the vacuum and the atmospheric pressure. The path of the air through the tubes 15^b and 15^a is the shortest path, and consequently there is no tendency for the air to pass through the delivery column 23 and thence up through the tube 14.

It is understood that the embodiment of the invention set forth herein is only one of the many embodiments or forms the invention may take, and I do not wish to be limited in the practice of my invention nor in my claims to the particular embodiment set forth.

I claim:

1. A liquid-dispensing apparatus comprising the combination of a receptacle having a closed air chamber above the liquid therein, a liquid duct for conducting the liquid from said receptacle, an air duct independent of said liquid duct having its outlet arranged at the mouth of the receptacle for conducting atmospheric air into said receptacle, sealing means for normally forming a hydrostatic seal for said ducts to prevent liquid from flowing from or air flowing into said receptacle, consisting of a delivery chamber stationarily arranged below said receptacle to receive the liquid from said receptacle and to maintain a hydrostatic sealing level for the liquid in said delivery chamber, and means for drawing off the liquid from said sealing means operating to break said seals and cause a flow of the liquid from the receptacle and a flow of air into the receptacle to replace the liquid withdrawn.

2. A liquid-dispensing apparatus comprising the combination of a receptacle having a closed air chamber above the liquid therein, a plug in the mouth of the receptacle having a liquid duct formed therein for conducting the liquid from said receptacle, an air duct formed in the body of the plug independent of said liquid duct for conducting atmospheric air into said receptacle, sealing means for normally forming a hydrostatic seal for said ducts to prevent liquid from flowing from or air flowing into said receptacle, means for drawing off the liquid from said sealing means operating to break said seals and cause a flow of the liquid from the receptacle and a flow of air into the receptacle to replace the liquid withdrawn, and means in the air duct for purifying the air that flows into the receptacle.

3. A liquid-dispensing apparatus comprising the combination of a receptacle having a closed air chamber above the liquid therein, a liquid duct, an air duct, independent of said liquid duct for conducting atmospheric air into said receptacle, sealing means for normally forming a hydrostatic seal for said ducts to prevent liquid from flowing from or air flowing into said receptacle consisting of a delivery chamber to receive the liquid from said receptacle and to maintain a hydrostatic sealing level for the liquid in said delivery chamber, said air duct having a branch passing downwardly to hold a liquid column exposed to atmospheric pressure, and a branch passing upwardly into said receptacle, and means for drawing off the liquid from said delivery chamber and thereby breaking said seals and causing an outward flow of liquid from said receptacle and an inward flow of air thereto.

4. A liquid-dispensing apparatus comprising the combination of a receptacle having a closed air chamber above the liquid therein, a liquid duct, an air duct independent of said liquid duct for conducting atmospheric air into said receptacle, sealing means for normally forming a hydrostatic seal for said ducts to prevent liquid from flowing from or air flowing into said receptacle consisting of a delivery chamber to receive the liquid from said receptacle and to maintain a hydrostatic sealing level for the liquid in said delivery chamber, said air duct having a portion passing down and maintaining a liquid-sealing level, and means for drawing off the liquid from said delivery chamber and thereby breaking said seals and causing an outward flow of liquid from said receptacle and an inward flow of air thereto, means for admitting air to said delivery chamber, and means for purifying the air that passes into said delivery chamber and into said duct.

5. A liquid-dispensing apparatus comprising the combination of an inverted receptacle, a closure for the mouth thereof having a liquid duct, a delivery chamber receiving liquid from said receptacle to maintain a hydrostatic balance and sealing level above the level of the mouth of said liquid duct, an air duct communicating with the atmosphere having a branch passing down, and a communicating branch passing up through said closure, normally containing a quantity of the liquid and forming a hydrostatic balance and seal to prevent air from leaking through the said duct into the receptacle, and means for drawing off the liquid from said delivery chamber and

thereby causing an inward flow of air to the receptacle and an outward flow of liquid therefrom.

6. A liquid-dispensing apparatus comprising the combination of an inverted receptacle, a closure for the mouth thereof having a liquid duct, a delivery chamber receiving liquid from said receptacle to maintain a hydrostatic balance, and sealing level above the level of the mouth of said liquid duct, an air duct communicating with the atmosphere having a branch passing down, and a communicating branch passing up through said closure, normally containing a quantity of the liquid and forming a seal to prevent air from leaking through the said air duct into the receptacle, means for drawing off the liquid from said delivery chamber and thereby causing an inward flow of air to the receptacle and an outward flow of liquor therefrom and means for purifying the air that flows in through said air duct.

7. A cooler comprising the combination of a support for an inverted liquid receptacle having a plug in the mouth of said receptacle provided with a liquid duct communicating at its upper end with the mouth of the receptacle, a delivery chamber to hold a quantity of the liquid with its level normally maintained above the lower end of said duct and thereby form a hydrostatic balance and seal for the mouth of the receptacle, a casing for the delivery chamber, means for drawing off liquid from said chamber, an air duct formed in the body of said plug said air duct having its inlet communicating with the interior of the casing and its outlet extending into the liquid receptacle, and means for purifying the air that passes in through said air duct.

8. A cooler comprising the combination of a support for an inverted liquid receptacle having a liquid duct communicating at its upper end with the mouth of the receptacle, a delivery chamber stationarily arranged below said receptacle to hold a quantity of the liquid with its level normally maintained above the lower end of said duct and thereby form a hydrostatic seal for the mouth of the receptacle, means for drawing off liquid from said chamber, an air duct independent of said liquid duct to conduct atmospheric air into the interior of the receptacle, said air duct being bent so as to hold a portion of the liquid and form a hydrostatic seal to prevent air normally passing into said receptacle.

9. A cooler comprising the combination of means for supporting an inverted receptacle, a delivery chamber, a closure supported on said chamber having a liquid duct extending into the receptacle, for conducting the liquid from said receptacle to said delivery chamber, said closure having a housing for embracing the neck of the receptacle, a funnel shaped member supported on the housing, a case inclosing said delivery chamber and housing and forming a refrigerating compartment surrounding said delivery chamber on its lateral sides and underside.

10. A cooler comprising the combination of means for supporting an inverted receptacle, a delivery chamber, means for conducting the liquid from said receptacle to said delivery chamber, a case inclosing said delivery chamber and forming a refrigerating compartment surrounding said delivery chamber, means for drawing off the liquid from said delivery chamber, and a branch passageway extending in a downward and outward direction from the inverted receptacle, said passageway being arranged between the receptacle and delivery chamber and having its inlet extending into the receptacle and its outlet extending into the interior of the case, for admitting air from said refrigerating compartment to the interior of said receptacle.

11. A cooler comprising the combination of means for supporting an inverted receptacle, a delivery chamber stationarily arranged below said receptacle, a plug in the mouth of the receptacle having a duct for conducting the liquid from said receptacle to said delivery chamber, a case inclosing said delivery chamber and forming a refrigerating compartment surrounding said delivery chamber, means for drawing off the liquid from said delivery chamber, a duct in the plug for admitting air from said refrigerating compartment to the interior of said receptacle, and means for purifying the air as it flows from the refrigerating compartment into the receptacle.

12. A cooler comprising the combination of means for supporting an inverted receptacle, a delivery chamber, means for conducting the liquid from said receptacle to said delivery chamber, a case inclosing said delivery chamber and forming a refrigerating compartment surrounding said delivery chamber, means for drawing off the liquid from said delivery chamber, independent means extending into the receptacle, the refrigerating compartment and the delivery chamber for admitting air from said refrigerating compartment to the interior of said receptacle and delivery chamber, means for purifying the air as it flows from the refrigerating comparement into the receptacle and into the interior of said delivery chamber.

13. A cooler comprising the combination of an inverted receptacle with a support for the receptacle having a housing provided with a plug for fitting into and sealing the mouth of said receptacle, said plug having a duct, a delivery chamber receiving the liquid from said duct and arranged to support

said plug, means for drawing off the liquid from said delivery chamber, a refrigerating compartment inclosing said delivery chamber and housing, and means for preventing the liquid that passes into said delivery chamber from coming into contact with the exterior of the mouth of the receptacle.

14. A cooler comprising the combination of an inverted receptacle with a support for the receptacle, a refrigerating compartment provided with an opening to receive the mouth of said receptacle, a housing arranged in said opening, a plug on the housing having a liquid and air duct leading into the receptacle, a duct in the housing leading into the refrigerating compartment and a delivery chamber in the refrigerating compartment arranged below said ducts for receiving the liquid from said receptacle.

In testimony whereof I affix my signature.

SIMON COOPER.