Feb. 10, 1925. 1,525,674

R. J. THOMAS

CARBONATING APPARATUS

Filed April 17, 1922 3 Sheets-Sheet 1

Fig. 1.

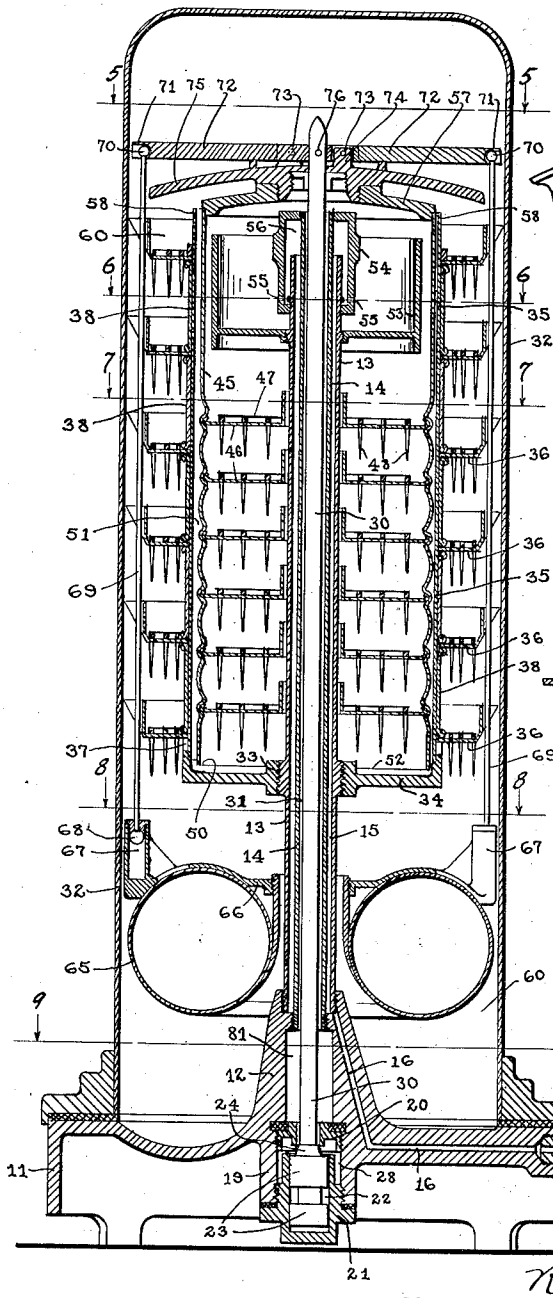


Fig. 2.

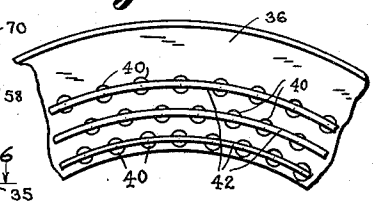


Fig. 3.

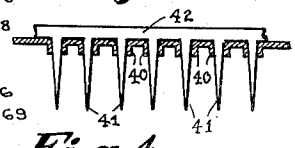
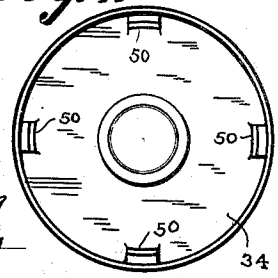


Fig. 4.



Inventor

Richard J. Thomas

By Morsell & Keeney

Attorneys

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Fig. 5.

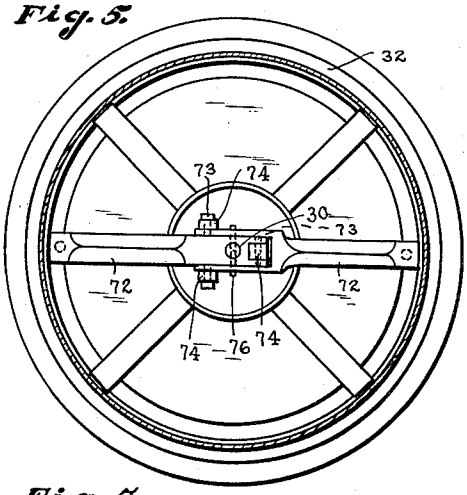


Fig. 6.

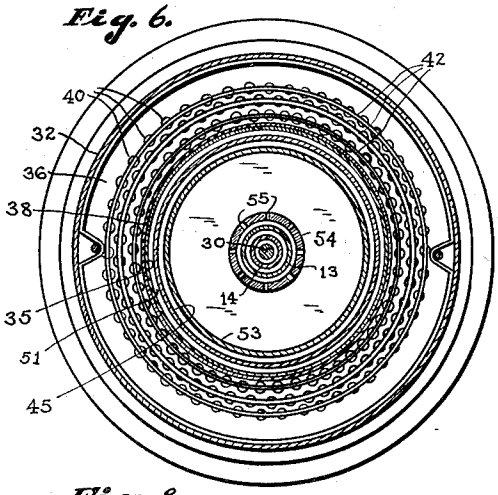


Fig. 7.

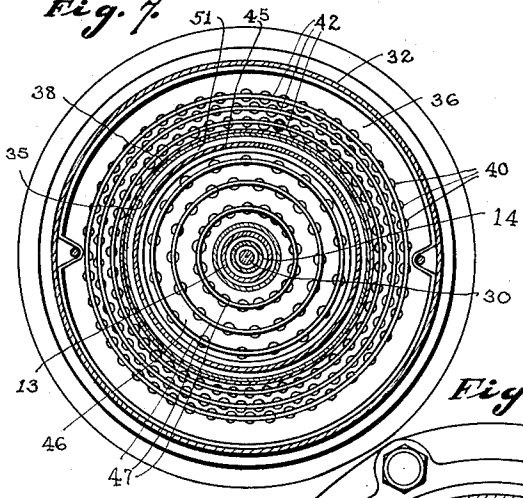


Fig. 8.

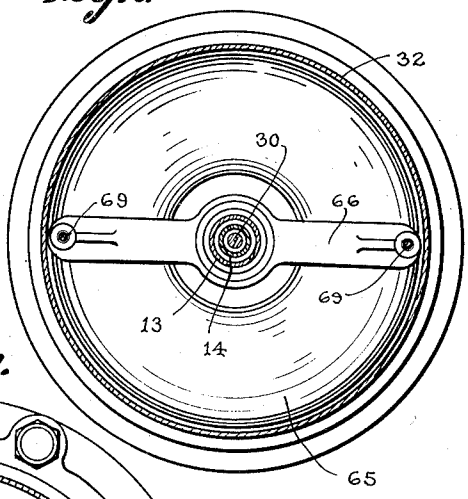
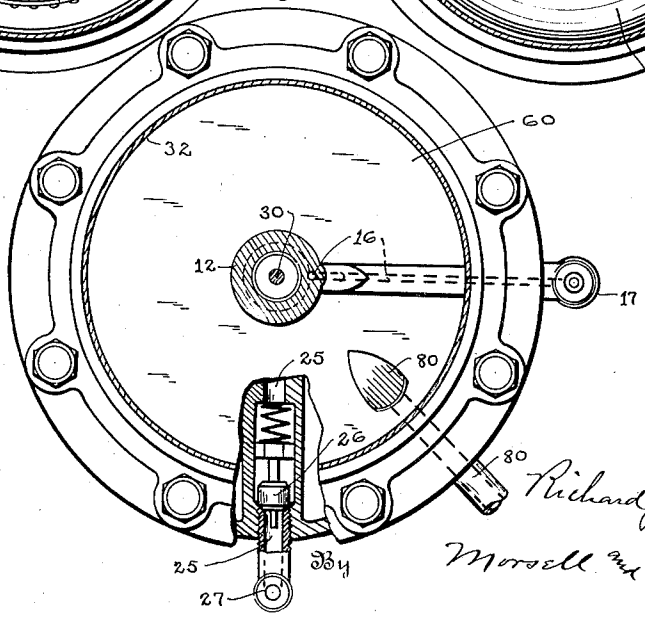


Fig. 9.



Inventor

Richard J. Thomas

By Morsell and Keeney

Attorneys

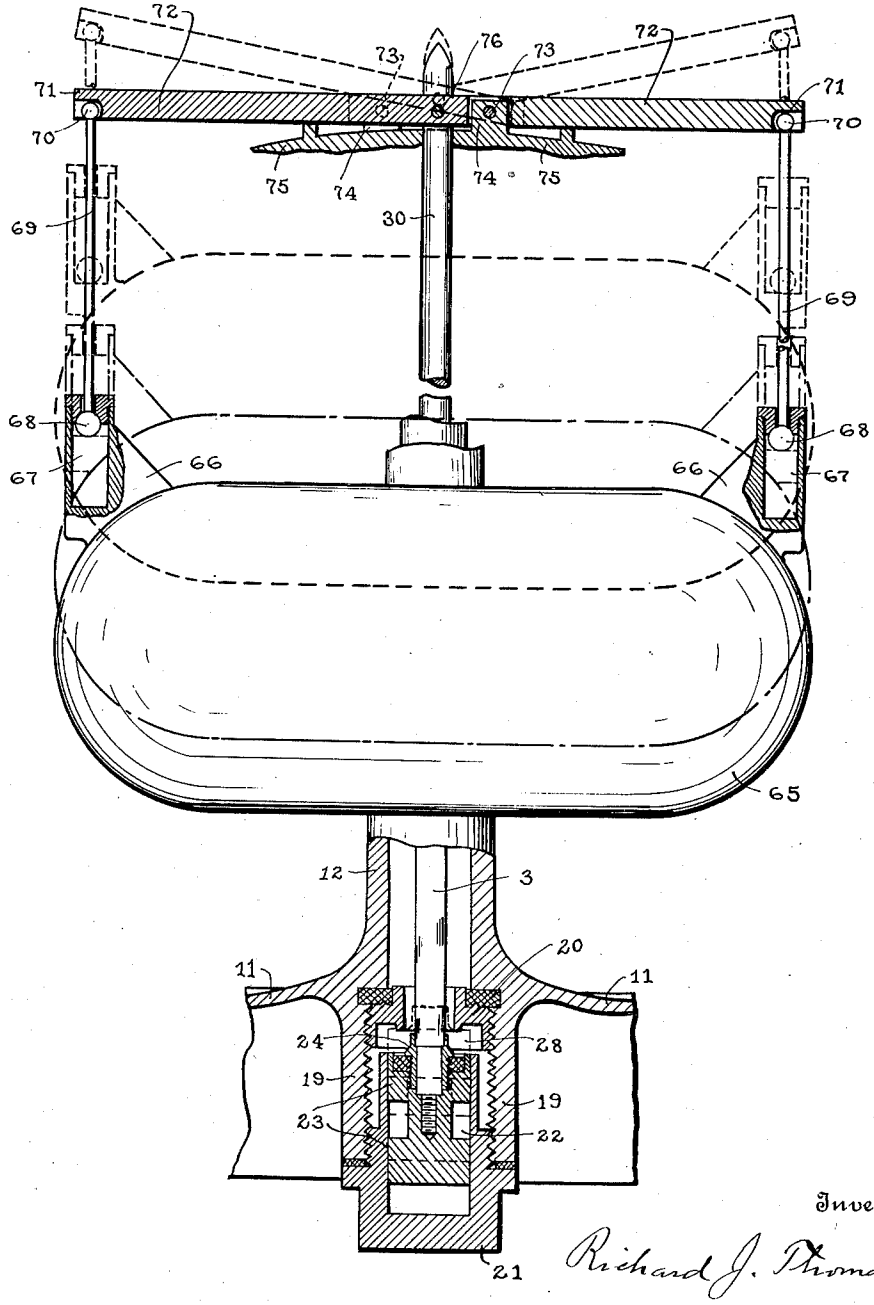
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Fig. 10.



Inventor

Richard J. Thomas

By Worsell and Keeney

Attorneys.

Patented Feb. 10, 1925. 1,525,674

UNITED STATES PATENT OFFICE.

RICHARD J. THOMAS, OF MILWAUKEE, WISCONSIN.

CARBONATING APPARATUS.

Application filed April 17, 1922. Serial No. 553,577.

To all whom it may concern:

Be it known that I, RICHARD J. THOMAS, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Carbonating Apparatus, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to carbonating apparatus and more especially to an apparatus of this character for carbonating water for soft drinks and other liquid refreshments, and has for its object to provide a device of this character which will be simple in construction, comparatively inexpensive to manufacture and more efficient in use than those which have been proposed.

A further object of the invention is to provide a device in which the CO_2 gas may be intimately and thoroughly mixed with the water in a more efficient manner than has been heretofore possible.

A further object of the invention is to provide a carbonating apparatus which will be entirely automatic in its operation, means being provided for automatically cutting off the water supply when a predetermined amount of carbonated water has accumulated within the apparatus, thereby preventing the flooding of the same with its attendant undesirable results.

A further object of the invention is to improve the construction described and claimed in Letters Patent No. 1,207,061, granted to George H. Maas on December 5, 1916, and entitled Carbonator and the like.

With these and other objects in view, which will appear as the description proceeds, the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the appended claims.

Referring to the accompanying drawings, in which like numerals designate like parts in all the views:

Figure 1 is a central vertical sectional view of an apparatus made in accordance with the present invention;

Fig. 2 is a fragmentary plan view of one of the horizontal shelves or baffle plates shown in Fig. 1, together with its associated comb members;

Fig. 3 is a fragmentary sectional view partly in elevation of the parts shown in Fig. 2;

Fig. 4 is a plan view of the disk member for supporting the interior shells and their associated parts, shown in Fig. 1;

Fig. 5 is a horizontal sectional view taken on the line 5—5 of Fig. 1, looking down;

Fig. 6 is a view similar to Fig. 5 taken on the line 6—6 of Fig. 1, looking down;

Fig. 7 is a view similar to Figs. 5 and 6, taken on the line 7—7 of Fig. 1, looking down;

Fig. 8 is a horizontal sectional view taken on the line 8—8 of Fig. 1, looking down;

Fig. 9 is a view similar to Fig. 8, taken on the line 9—9 of Fig. 1, looking down, a portion of the parts being broken away for the sake of clearness; and

Fig. 10 is an elevational view partly broken away and partly in section of the water inlet valve and its controlling parts.

Referring to the drawings, 11 indicates a base or supporting member preferably circular in form provided with a centrally disposed hollow cone 12, to the upper portion of which may be rigidly secured the concentric vertically disposed tubes 13 and 14, as will be clear from Fig. 1. The said tubes 13 and 14 are of such dimensions as to provide an annular space 15 therebetween, which space communicates at the bottom with the passage 16 formed within the cone 12 and base 11 and communicating by means of a connection 17 with any suitable source of supply of CO_2 or other suitable gas not shown. The said connection 17 may be provided with a spring-controlled valve 18 adapted to control the pressure of the gas which is fed through the passages 16 and 15 to the apparatus.

The base 11 is also provided with a downwardly depending boss 19 in axial alinement with the cone member 12, which boss is bored to receive the threaded washer member 20 as well as the cap member 21, as will be clear from Figs. 1 and 10. The said cap member 21 is provided with a cylindrical chamber 22 adapted to receive the cylindrical bearing portions 23 of a valve 24, which valve is adapted to co-act with the washer member 20 which acts as a seat therefor to control the water which is admitted to the apparatus; that is to say the base 11 is provided with a water inlet passage 25 having a spring-controlled check valve 26 (see Fig. 9) and leading from a

suitable source of water supply 27 to the bore or chamber 28 with which the boss 19 is provided.

The valve 24 is carried by a vertically extending valve stem 30 which extends upwardly through and concentric with the tube 14 above described. The said rod or valve stem 30 is of such dimensions as to provide an annular space 31 between the walls of the said tube 14 and the surface of the said stem 30 through which water from the supply pipe 27 may pass to be brought into contact with the CO_2 gas, as will presently appear.

Mounted upon the base 11 is a suitable casing or shell 32 which preferably takes the form of a hollow sheet metal cylinder closed at its upper end. The tube or pipe 13 is threaded as at 33 to engage and support a disk 34 upon which is mounted an inner casing 35 substantially as shown in Fig. 1. Surrounding the said casing 35 are a plurality of annular shelves or trays 36, the lowermost of which rests upon flange 37 with which the supporting disk 34 is provided, while the remaining trays 36 are suitably supported and spaced apart by means of the annular spacing rings 38, as will be clear from the drawings. The said annular trays 36 are provided with a plurality of perforations 40 preferably arranged in circular lines concentric with the opening in the said trays, which perforations are adapted to receive and be partially filled by the teeth 41 of the annular comb-like member 42 (see Figs. 2 and 3).

Also mounted upon the supporting disk 34 within the casing 35 and concentric therewith is a tubular member 45 of sheet metal or other suitable construction which acts as a support for the spaced horizontally disposed plates 46. The said plates 46 are perforated and provided with comb members 47 having teeth 48 projecting through the said perforations in a manner similar to the outer annular trays 36 just described.

The tubular member 45 rests upon the lugs 50 (see Figure 4) with which the supporting disk 34 is provided, which lugs serve to not only space the side walls of the said member 45 from the walls of the shell 35 to form an annular passage 51, but the said lugs also maintain the major portions of the lower edge 52 of the said member 45 out of contact with the surface of the supporting member 34, thereby providing communication between the interior of the tubular member 45 and the annular passage 51 formed on the outside thereof.

Secured to the upper end of the pipe or tube 13 in any suitable manner is a cup or receptacle 53 open at the top as is clearly illustrated in Fig. 1, and likewise rigidly secured to the upper end of the tube 14 is a hollow cylindrical member 54, the walls of which extend downwardly to surround and engage the walls of the tube 13 somewhat below its upper end. The side walls of the said member 54 are provided with perforations 55 near the bottom thereof, thereby affording communication between the chamber 56, formed within the said member 54, and the interior of the cup member 53, as will be readily apparent.

The upper end of the tubular member 45 is closed by a disk or plate 57 and the upper end of the shell 35 is open as is indicated at 58 (see Fig. 1), whereby communication may be had between the annular passage 51 and the annular chamber 60 formed between the said shell 35 and the outer casing 32.

In apparatus of this general type it is desirable to automatically control the incoming water in order to prevent the flooding of the device with its resulting inconvenience. The water after it has been carbonated may be withdrawn continuously or intermittently as desired and in the case of the intermittent withdrawal it sometimes happens that the discharge opening is cut off for such a period of time as to cause an excess of carbonated water to accumulate within the device.

In order to provide such an automatic control in the present instance I have provided a float 65 which preferably takes the form of a hollow ring surrounding the centrally disposed tubes 13 and 14 and adapted to slide vertically with respect thereto. The said float member is provided with a yoke 66 extending substantially diametrically thereof and having at its outer ends the sockets 67, as will be clear from Figs. 1 and 10, adapted to receive the enlarged ends 68 of the vertically extending rods 69. The upper ends of the said rods are likewise enlarged as at 70 and fit into recesses 71 formed in the ends of the pair of levers 72, which levers are pivotally connected, as at 73, to lugs 74 integral with the top cap member 75 (see Figs. 1, 5 and 10). The said levers 72 are also connected by means of a pin-and-slot connection 76 with the upper end of the valve stem 30, whereby they may be caused to actuate the said valve stem as will presently appear.

The carbonated water which has collected in the lower portion of the chamber 60 may be withdrawn therefrom either continuously or intermittently as desired through the outlet pipe or duct 80, leading through the base member 11 into the bottom of the said chamber.

The operation of the present invention will be clear from the foregoing, but it may be briefly summarized as follows:

The parts being in the positions illustrated in Fig. 1, the valve 24 will be unseated and water from the supply pipe 27

will pass through the inlet passage 25 around the check valve 26 and past the valve 24 into the chamber 81 provided in the conical extension 12 with which the base member 11 is provided. From the said chamber 81 the water will pass upward around the valve stem 30 into the annular passage 31 until it reaches the top of the said passage, whereupon it will flow over the top surface of the member 54 and down its sides into the interior of the cup of receptacle 53.

Carbonic acid gas being now admitted from any suitable source of supply to the connection 17 will pass the valve 18 and flow through the passages 16 and 15 into the chamber 56 within the member 54, from which chamber it will escape through the openings 55 into the interior of the said cup member 53. This latter member having been filled with water the said gas will bubble up therethrough and the said water will become impregnated therewith.

As was pointed out in the said prior Patent No. 1,207,061, it is desirable in order to accomplish a thorough impregnation of the water with the gas to break up the water into comparatively small drops or particles. This desirable result is attained in the present invention by permitting the water and its entrained gas to flow over the top of the walls of the vessel or receptacle 53 down onto the topmost plate member 46, from which the said water will then find its way in comparatively small drops through the partly filled perforations 40 in the said plate 46 and will pass down on the surface of the teeth 48 of the comb members 47, dripping therefrom onto the next lower plate 46, as will be readily apparent. This dripping action continues until the water and gas finally reach the upper surface of the supporting disk 34 whereupon the said water will pass beneath the lower edge 52 of the tubular member 45 and into the annular space 51. When the said space 51 has become filled the said water will pass over the top of the walls of the shell 35 as at the point 58 onto the uppermost annular plate member 36 whereupon the dripping action above described in connection with the plates 46 will be repeated. The water is thus broken up into a large number of relatively small drops or particles, thereby resulting in a complete saturation of the water with the CO_2 gas.

The carbonated water as it leaves the lowermost plate 36 drops into the lower portion of the chamber 60, from whence it may be withdrawn as desired through the outlet passage 80 which may be provided with a suitable controlling valve, not shown.

If the withdrawal of the carbonated water from the chamber 60 is continuous the valve 24 controlling the inflow of water will remain open continuously and the carbonating action will be carried on continuously. On the other hand if the withdrawal of the carbonated water through the outlet 80 is stopped for any reason the said water will accumulate within the lower portion of the chamber 60 until it reaches a level which causes the float member 65 to rise. The upward movement of the float member 65 will be transmitted through the rods 69 to the pivoted levers 72, which levers will in turn cause the upward movement of the valve stem 30, thereby causing the valve 24 to seat against the washer member 20 and cut off the flow of incoming water.

It will be noted that the sockets 67 which receive the enlarged ends 68 of the rods 69 provide for a certain amount of lost motion between the float 65 and the said rods 69. This lost motion permits the said float to rise and fall a predetermined amount before operating the water controlling valve 24 so that in case the withdrawal of the carbonated water is interrupted for only a relatively short period of time the carbonating process will not be stopped.

It will thus be seen that the present invention provides a relatively simple and efficient mechanism for securing a complete saturation of the water with the CO_2 gas, while at the same time making provision for the automatic control of the apparatus to prevent flooding thereof.

It is obvious that those skilled in the art may vary the details of construction as well as the arrangement of parts without departing from the spirit of the invention and therefore it is not wished to be limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. In a device of the class described the combination with a casing of a liquid passage within said casing; an elevated receptacle within said casing adapted to receive liquid from said passage; a second passage adapted to discharge gas directly into said receptacle; means below said receptacle for receiving said liquid therefrom by gravity and dividing the same into relatively small particles to assist in causing it to absorb said gas; and means for withdrawing the saturated liquid from said casing.

2. In a device of the class described the combination with a casing of a liquid passage within said casing; an elevated open topped receptacle within said casing adapted to be filled with liquid from said passage; a second passage adapted to discharge gas directly into said receptacle; means below said receptacle for receiving the liquid as it overflows therefrom and dividing the same into relatively small particles to assist in causing it to absorb said gas; means for withdrawing the saturated liquid from said casing, and means controlled by the with-

drawal of said saturated liquid for controlling the admission of fresh liquid to said receptacle.

3. In a device of the class described the combination with a casing of a liquid passage within said casing; an open topped receptacle supported adjacent the top of said casing adapted to receive liquid from said passage; a second passage adapted to discharge gas directly into the liquid within said receptacle; means comprising a plurality of perforated plates and comb members having teeth projecting through said perforations for dividing the liquid into relatively small particles to assist in causing it to absorb said gas; means for withdrawing the saturated liquid from said casing; and means controlled by the withdrawal of said saturated liquid for controlling the admission of fresh liquid to said receptacle.

4. In a device of the class described the combination with a supporting base and a casing of a liquid conducting tube secured to said base; a gas conducting tube also secured to said base and surrounding said liquid tube; a valve in said liquid tube provided with a valve stem extending through said tube; a float within said casing, the position of which is controlled by the level of the saturated liquid therein; connections between said float and said valve stem; a receptacle supported by one of said tubes adapted to receive liquid and gas therefrom; a plurality of perforated plates adapted to receive the commingled liquid and gas from said receptacle and to cause said liquid to be divided into relatively fine particles whereby it may be caused to more thoroughly absorb said gas; and means for withdrawing the mixed liquid from said casing.

5. In a device of the class described the combination with a supporting base and a casing of a liquid conducting tube secured to said base; a gas conducting tube also secured to said base and surrounding said liquid tube; a valve in said liquid tube provided with a valve stem extending through said tube; a float within said casing, the position of which is controlled by the level of the saturated liquid therein; connections between said float and said valve stem providing a predetermined amount of lost motion therebetween; a receptacle supported by one of said tubes adapted to receive liquid and gas therefrom; a plurality of perforated plates adapted to receive the commingled liquid and gas from said receptacle and to cause said liquid to be divided into relatively fine particles whereby it may be caused to more thoroughly absorb said gas; and means for withdrawing the mixed liquid and gas from said casing.

6. In a device of the class described the combination with a supporting base and a casing, of a liquid conducting tube rigidly secured axially of said base; a gas conducting tube rigidly secured to said base concentric with said liquid tube; a reciprocating valve adapted to control the passage of liquid through said liquid tube, said valve being provided with a stem extending axially through said tube; a float within said casing controlled by the level of the saturated liquid therein; connections between said float and said valve stem; a receptacle carried by said gas tube adapted to receive liquid and gas from said tubes and to cause a partial absorption of the latter by the former; means for dividing said liquid into relatively fine particles to assist in causing it to absorb said gas; and means for withdrawing the liquid and its absorbed gas from said casing.

7. In a device of the class described the combination with a supporting base and a casing, of a liquid conducting tube rigidly secured axially of said base; a gas conducting tube rigidly secured to said base concentric with said liquid tube; a reciprocating valve adapted to control the passage of liquid through said liquid tube, said valve being provided with a stem extending axially through said tube; an annular float within said casing concentric with said tubes, controlled by the level of the saturated liquid therein; connections between said float and said valve stem; a receptacle carried by said gas tube adapted to receive liquid and gas from said tubes and to cause a partial absorption of the latter by the former; means comprising a plurality of perforated plates, and comb members having teeth extending through said perforations for dividing said liquid into relatively fine particles to assist in causing it to absorb said gas; and means for withdrawing the liquid and its absorbed gas from said casing.

In testimony whereof, I affix my signature.

RICHARD J. THOMAS.