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CARBONATING APPARATUS

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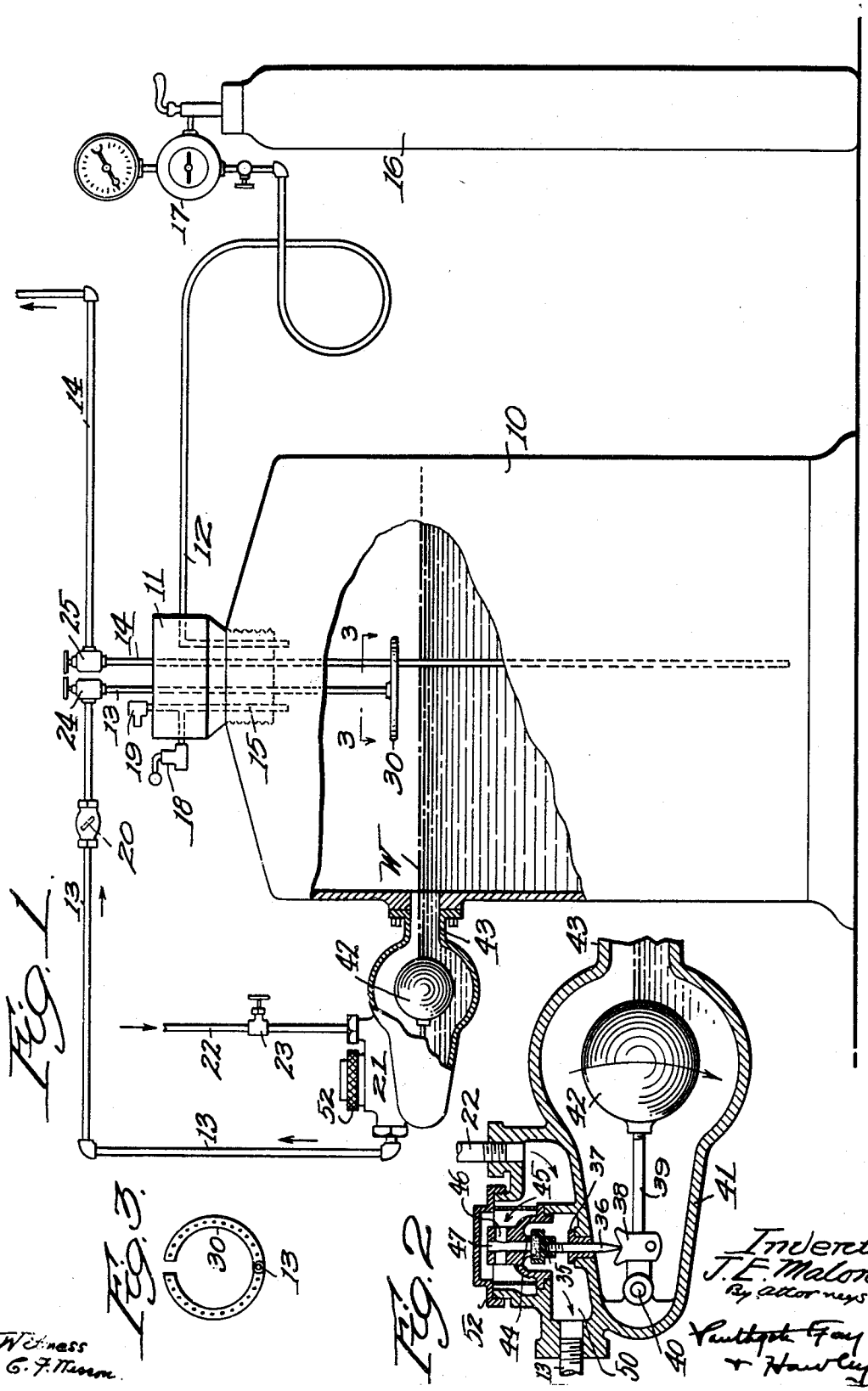


Fig. 1

Fig. 3.

Fig. 2

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CARBONATING APPARATUS

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This invention relates to apparatus for preparing carbonated water for use in soda fountains and for other similar purposes.

In the preparation of such carbonated water, it is customary to use high pressure tanks of carbonic acid gas, and to provide a mixing apparatus in which the gas and water is mechanically combined, or in other words, in which the water becomes charged with the carbonic acid gas.

It is the object of my invention to greatly simplify the construction and operation of such mixing apparatus, discarding substantially all movable parts, and providing an apparatus which is automatic in its operation and which will provide a constant supply of carbonated water so long as an adequate gas supply is maintained.

A further object of my invention is to provide an apparatus which may be operated directly by city water pressure and without requiring the application of any other form of power for the mixing operation.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings in which

Fig. 1 is a side elevation, partly in section, of my improved carbonating apparatus;

Fig. 2 is an enlarged sectional elevation of the control valve mechanism, and

Fig. 3 is a detail plan view, taken along the line 3—3 in Fig. 1.

Referring to the drawings, my improved carbonating apparatus comprises a closed tank 10 having a head 11 providing passages for a gas inlet pipe 12, a water inlet pipe 13, a discharge or outlet pipe 14 for the carbonated water, and a safety or vent pipe 15.

While these several pipes may be attached directly to the tank 10, it is found more desirable to connect the several pipes through passages in the single head 11, which is threaded or otherwise secured in the top of the tank.

The usual gas cylinder 16 is connected through a reducing valve 17 to the gas inlet pipe 12, which extends into the upper part of the tank 10. The discharge pipe 14 extends nearly to the bottom of the tank 10, and at its outer end is connected to a suitable faucet or tap at the soda fountain or wherever the carbonated water is to be used.

The vent pipe 15 is provided with a safety valve 18, which may be set to relieve the tank whenever a selected pressure is exceeded, and with a vacuum relief valve 19 which will prevent the collapse of the tank if a vacuum is accidentally formed therein.

The water supply pipe 13 is provided with a check valve 20, preventing reverse flow of water therethrough, and is connected through an automatic shut-off valve 21 and a pipe 22 to a suitable supply of water under pressure, such as a city water main. Shut-off valves 23, 24 and 25 are provided in the supply pipe 13 and discharge pipe 14, all of these valves being normally open.

A spray nozzle 30 is mounted within the tank 10 on the lower end of the water supply pipe 13, said pipe being of such length that the spray nozzle 30 is positioned above the level of the water W in the tank 10. This nozzle is preferably of substantially circular form, horizontally disposed, and with many small openings in its upper face.

The control valve 21 (Fig. 2) comprises a valve 35 mounted on the upper end of a valve rod 36 slidable in a suitable stuffing box or packing 37 and having its reduced lower end engaged by a V-shaped block 38 fixed on a float arm 39, pivoted at 40 in the casing 41 of the control valve 21.

A hollow ball or float 42 is mounted on the arm 39, and the casing 41 has a connecting passage 43 to the interior of the tank 10. When the water W in the tank 10 rises to a predetermined height, it raises the ball float 42, thus pushing the valve 35 upward against a port or seat 44 for the control valve 21.

The pipe 22 connects into a chamber 45 in the valve casing, which in turn is connected through passages 46 and 47 to the middle of the valve seat 44.

The pipe 13 is connected to a second chamber 50 into which water is discharged through the passage 47 in the port 44 when the valve 35 is lowered.

The parts of the valve are readily accessible by removing a cap 52, which covers and encloses the valve 35 and port 44.

The method of operation of my improved carbonating apparatus is as follows:

The reducing valve 17 is set to provide gas in the pipe 12 at a desired pressure and the connections to the tank 16 are opened, so that there is a constant supply of gas at the selected pressure in the upper part of the tank 10.

Water is admitted through the pipe 13 to the spray nozzle 30, and the water pressure in the pipe 13 is greater than the gas pressure in the pipe 12 or tank 10. Consequently, water issues through the spray nozzle into the upper part of the tank 10, which is already filled with gas, and the water in the form of fine spray takes up the gas and becomes fully charged therewith.

The charged or carbonated water collects in the lower part of the tank 10 and gradually rises therein until it reaches the level indicated in Fig. 1, when the float 42 is raised, closing the valve 35 and preventing further admission of water to the tank 10.

The tank is thus filled with carbonated or charged water and is under the pressure determined by the reducing valve 17. Whenever the tap or faucet in the discharge pipe 14 is opened, carbonated water will be forced therefrom by the gas pressure in the tank 10. This will lower the level of the water W in the tank, whereupon the float 42 will drop, opening the valve 35, and admitting additional water to be sprayed into the upper part of the tank and charged with gas. As soon as the water level is restored, the flow of water ceases.

I have thus provided an apparatus which is entirely automatic in its operation and in which no moving parts are used in the charging or carbonizing of the water. Furthermore, the full supply of charged water is maintained in the tank 10 so long as the supply of gas in the tank 16 is maintained, and otherwise the apparatus requires absolutely no attention from the operator or employee.

My improved carbonating apparatus is very much simplified over any apparatus for similar purposes with which I am familiar, is extremely reliable in operation on account of its simple construction and absence of moving parts.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. Carbonating apparatus comprising a closed mixing tank, an inlet thereto for gas under presure, a normally closed outlet for carbonated water, means to regulate the admission of water so as to automatically maintain a substantially constant water level in said tank, and below the top thereof, thereby to leave a space for gas and a spray device in said tank connected to said water supply and positioned above the constant water level, and in the path of gas entering said space.

2. Carbonating apparatus comprising a closed mixing tank, an inlet thereto for gas under pressure, a normally closed outlet for carbonated water, means to regulate the admission of water so as to automatically maintain a substantially constant water level in said tank, said water and gas inlets being above the constant water level and the outlet being below said water level, said water inlet being located in the path of gas from the gas inlet.

3. Carbonating apparatus comprising a closed mixing tank, an inlet thereto for gas under pressure, a normally closed outlet for carbonated water, means to control the admission of water to said tank, and means to relieve insufficient pressure in said tank.

4. Carbonating apparatus comprising a closed mixing tank, means to maintain a substantially constant water level therein, with a gas filled space above said water level, and means to spray water into said gas filled space, the operation of said spraying means being controlled by the water level in said tank, said tank having a detachable head provided with inlet passages for gas and water communicating respectively with said gas filled space and said spray means.

5. Carbonating apparatus comprising a closed mixing tank, means to maintain a substantially constant water level therein, with a gas filled space above said water level, a horizontally disposed spray nozzle positioned in said gas-filled space and provided with upwardly directed spray openings, and means to supply water under pressure thereto.

6. Carbonating apparatus comprising a closed mixing tank, an inlet thereto for gas under pressure, a normally closed outlet for carbonated water, means to control the admission of water to said tank, means to relieve excessive pressure in said tank, and means to relieve insufficient pressure in said tank.

7. Carbonating apparatus comprising a closed mixing tank and a detachable head therefor, said head having inlet passages for gas and water, means to maintain a substantially constant water level in said tank with a gas filled space above said water level, a horizontally disposed spray nozzle positioned in said gas filled space and provided with upwardly directed spray openings located adjacent said gas outlet passage, and means to supply water under pressure thereto.

8. Carbonating apparatus comprising a mixing tank, having an opening in the top thereof and an opening in the side thereof, a detachable head therefor effective to close said top opening and a detachable float cham-

ber effective to close said side opening, said head having inlet passages for gas and water, a discharge passage for water and a vent passage therein, and said float chamber having inlet and outlet passages for water, and means to connect said outlet passage of the float chamber to the water inlet passage of said head.

9. Carbonating apparatus comprising a mixing tank having an opening in the top thereof and an opening in the side thereof, a detachable head therefor effective to close said top opening and a detachable float chamber effective to close said side opening, said head having inlet passages for gas and water, a discharge passage for water and a vent passage therein, and said float chamber having inlet and outlet passages for water, means to connect said outlet passage of the float chamber to the water inlet passage of said head, said inlets for the gas and water in the detachable head being located above the level of water in the tank.

In testimony whereof I have hereunto affixed my signature.

JOSEPH E. MALONE.