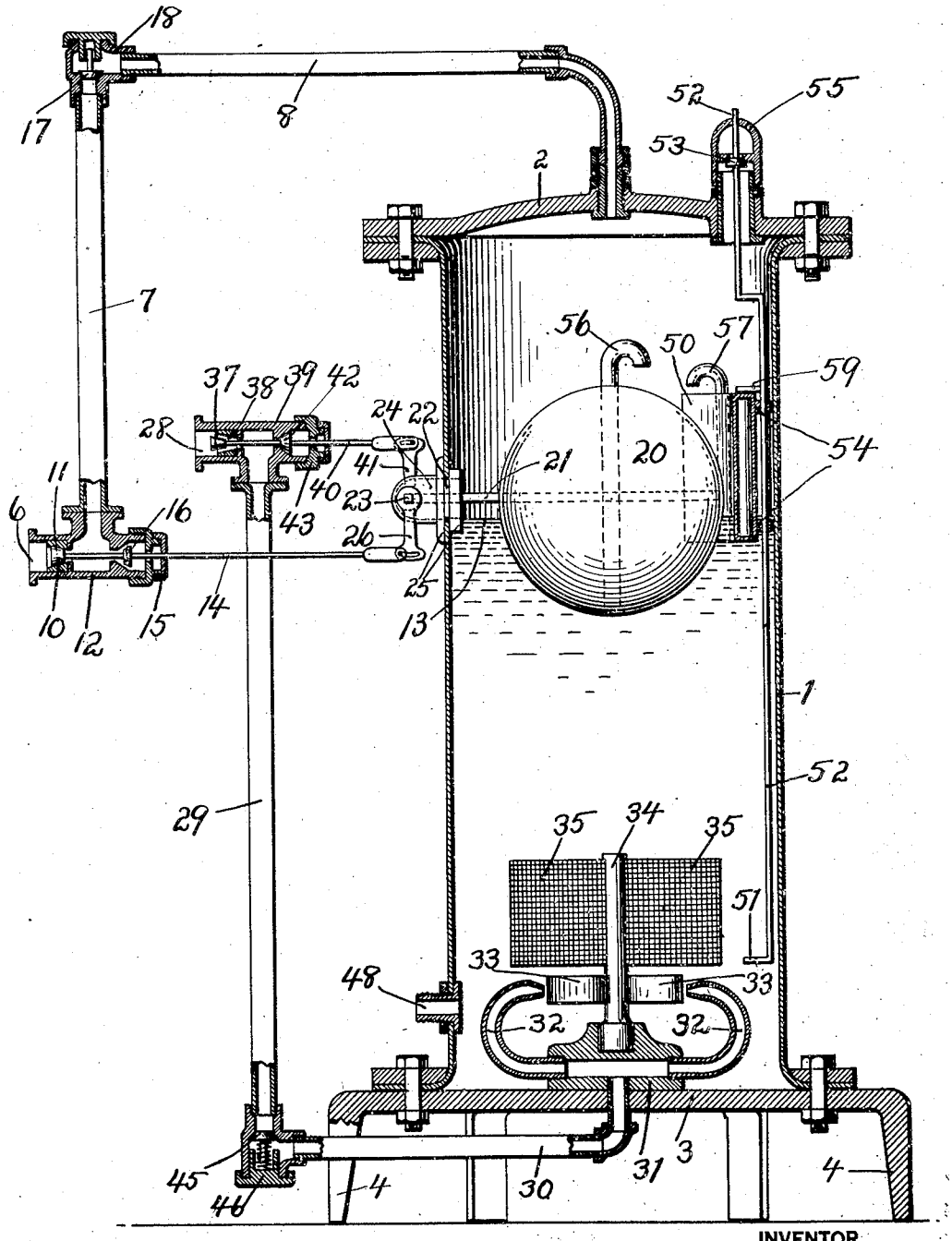
Aug. 19, 1924. 1,505,204

T. J. KIERNAN

CARBONATOR

Filed March 16, 1922



INVENTOR

Thomas J. Kiernan

BY

Archibald Coy

his ATTORNEY

Patented Aug. 19, 1924. 1,505,204

UNITED STATES PATENT OFFICE.

THOMAS J. KIERNAN, OF ARLINGTON, MASSACHUSETTS.

CARBONATOR.

Application filed March 16, 1922. Serial No. 544,275.

To all whom it may concern:

Be it known that I, THOMAS J. KIERNAN, a citizen of the United States, residing at Arlington, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Carbonators, of which the following is a specification.

The invention relates to carbonators. The object of the invention is to improve upon the construction and arrangement of the parts of a carbonating apparatus in order that the process of charging water or other liquids with carbon dioxide or other gases may be performed more efficiently than is possible with carbonators as at present constructed. With this object in view, the invention consists in the improved carbonator hereinafter described and particularly pointed out in the appended claims.

The preferred form of the invention is illustrated in the accompanying drawing in which the figure is a vertical sectional view of the improved carbonator. As illustrated in the drawing, the carbonator comprises an upright cylindrical tank 1 closed at the top by a cover 2 and at the bottom by a base plate 3 from which depend legs 4 which support the carbonator in position. The water or other liquid is supplied to the tank through a liquid inlet 6 and pipes 7 and 8. A valve 10 arranged to close against the valve seat 11 located in the inlet casing 12 is adapted to shut off the supply of liquid when the liquid in the tank 1 reaches substantially the point 13. While the valve 10 is open, permitting liquid to flow into the tank, leakage around the valve stem 14 is prevented at the stuffing box 15 by means of a second valve 16 mounted on the valve stem 14 and arranged to function opposite to the valve 10. That is to say, when the valve 10 is open, the valve 16 is closed preventing the escape of liquid through the stuffing box 15; and when the valve 10 is closed, the valve 16 is open. To prevent the escape of gas through the stuffing box 15 when the valve 16 is open a check valve 17 is provided, located in the elbow 18 at the joint between the pipes 7 and 8.

When the liquid has risen in the tank to substantially the point 13, a float 20 operates to close the valve 10. The float 20 is supported on the end of a lever arm 21 which passes through a slot 22 formed in the side of the tank and is pivotally mounted at 23 on a bracket 24 secured to the exterior of the tank. Internally and externally arranged plates 25 seal the joint where the lever arm 21 pierces the tank. The stem 14 of the valve 10 is articulated by means of a pin and slot connection with an arm 26 secured to the pivot upon which the float 20 fulcrums. When the rise of liquid to the point 13 lifts the float, the latter causes the arm 26 to swing in a counter-clockwise direction and pull the valve stem 14 to the right to seat the valve 10, thereby shutting off the supply of liquid.

The carbon dioxide or other gas is supplied to the tank through a gas inlet 28 and pipes 29 and 30. The pipe 30 discharges into a manifold 31 located in the bottom of the tank. Two discharge nozzles 32 connected with the manifold 31 direct the gas against two curved blades 33 secured to a vertically arranged shaft 34 journaled in the top of the manifold 31. On the upper end of the shaft 34 are fixed wire mesh blades 35. The general arrangement and construction of these parts may be as usual. The construction is such that the impingement of the gas against the curved blades 33 causes the shaft 34 and the blades 35 to rotate, thereby stirring or agitating the liquid and causing the gas and the liquid to be thoroughly mixed.

The supply of carbon dioxide or other gas to the tank is controlled by a valve 37 arranged to close against a seat 38 located in an inlet casing 39. The valve 37 is fixed on the outer end of a valve stem 40 articulated by a pin and slot connection with an arm 41 secured to the pivot pin 23. The arms 41 and 26 and the pivot pin 23 constitute a rocker arm construction. When the float 20 rises to shut off the supply of liquid to the tank by closing the valve 10, the arm 41 is swung to move the valve stem 40 to the left to unseat the valve 37 to permit the gas to enter the tank. While the valve 37 is unseated a valve 42, also supported on the valve stem 40, is closed against its seat to prevent gas from escaping through the stuffing box 43. The escape of gas through the valve 42 and stuffing box 43 when the valve 37 is seated is prevented by means of a check valve 45 located in an elbow 46 at the joint between the pipes 29 and 30.

When the liquid in the tank has been sufficiently charged with carbon dioxide or other gas, the charged liquid is drawn off

through an outlet 48 located near the bottom of the tank. The lowering of the level of the liquid causes the float 20 to drop, thereby seating the gas control valve 37 and opening the liquid control valve 10. Although the liquid control valve is now open, no liquid can enter the tank because of the pressure therein. The charged liquid is withdrawn from the tank until a semicircular float 50 settles down on the offset end 51 of a vertically arranged rod 52 and thereby unseats a valve 53 which controls a vent 55. The float 50 is provided with ears 54 which loosely engage the rod 52, so that the rod 52 acts as a guide for the float 50. The rod 52 also serves as a valve stem for the valve 53. When the weight of the float 50 unseats the valve 53 the tank is reduced to atmospheric pressure through the vent 55 so as to permit the pressure of the liquid to unseat the check valve 17. The floats 20 and 50 are provided with the pressure equalizers 56 and 57, respectively.

The operation of the improved carbonator is as follows: The liquid control valve 10 being unseated the water or other liquid flows through the pipe 7, unseats the check valve 17 and passes into the tank through the pipe 8. When the liquid has risen in the tank to the predetermined level 13, the float 20 is lifted and through the connections between it and the valves 10 and 37 the former is closed, whereas the latter is opened to permit the carbon dioxide or other gas to enter the tank. The gas enters the tank through the pipe 29 and the pipe 30, the pressure of the gas being sufficient to unseat the check valve 45. As the gas enters the tank through the discharge nozzles 32, it impinges upon the curved blades 33, thereby rotating the shaft 34 upon which the mesh blades 35 are fixed. The rotation of the blades 35 agitates the liquid sufficiently to cause a thorough mixing of the liquid and the gas. When the liquid has become sufficiently charged with the gas, it is drawn off through the outlet 48. The fall in the level of the water causes the float 20 to drop and thereby close the gas control valve 37 and open the liquid control valve 10. The pressure of the gas in the tank, however, prevents the liquid from unseating the check valve 17, so that no liquid enters the tank until the latter is substantially empty. When the charged liquid has been drawn off sufficiently to permit the float 50 to settle unto the offset end 51 of the rod 52 and thereby unseat the valve 53, the interior of the tank is reduced to atmospheric pressure. This permits the flow of liquid to unseat the check valve 17 and flow into the tank. When the liquid has risen to its predetermined level 13, the float 50 is lifted against a pin 59 secured to the rod 52. The engagement of the float 50 with the pin 59 lifts the rod 52 and thereby closes the valve 53. During the closing of the valve 53, the float 20 has operated to close the valve 10 and open the gas valve 37 to permit a fresh supply of gas to enter the tank.

Having thus described the invention what I claim as new is:—

1. A carbonator comprising a tank having a liquid inlet and a gas inlet, a liquid control valve in the liquid inlet, a gas control valve in the gas inlet, a float located in the tank and having a pivotal mounting outside the tank, and connections between the pivot of the float and the valves whereby, when the float rises and falls, one valve is opened and the other valve is closed.

2. A carbonator comprising a tank having a liquid inlet and a gas inlet, a liquid control valve in the liquid inlet, a gas control valve in the gas inlet, rocker arms mounted on the tank, connections between the rocker arms and the valves arranged so that one valve closes as the other valve opens, a lever arm secured to the pivot of the rocker arms and projecting into the tank, and a float supported on the lever arm within the tank.

3. A carbonator comprising a tank having a liquid inlet, a gas inlet and a liquid outlet, means for controlling the supply of liquid and gas to the tank, said means consisting of a valve in the liquid inlet, a valve in the gas inlet, a float in the tank, connections between the valves and the float, whereby when one valve is open the other valve is closed, a check valve to prevent liquid from passing into the tank when charged liquid is withdrawn therefrom, a vent, a valve for closing the vent, a float for opening the vent control valve when the charged liquid has been withdrawn from the tank to a predetermined point to permit a fresh supply of liquid to pass into the tank, said float operating to close the vent control valve when the liquid has reached a predetermined level in the tank.

4. A carbonator comprising a tank having liquid and gas inlets and means for controlling the admission of liquid and gas to the tank, each inlet consisting of a casing, a valve stem mounted to slide in the casing and surrounded by a stuffing box, a valve mounted on the stem to open and close the inlet, and a second valve mounted on the stem and adapted to prevent leakage through the stuffing box when the valve is open.

5. A carbonator comprising a tank having liquid and gas inlets, a valve in each inlet, means connected with the valves for operating them according to the level of the liquid in the tank, each inlet consisting of a casing, a valve stem located in each casing upon which the valves are mounted, and auxiliary valves on the valve stems to prevent leakage around the valve stems.

THOMAS J. KIERNAN.