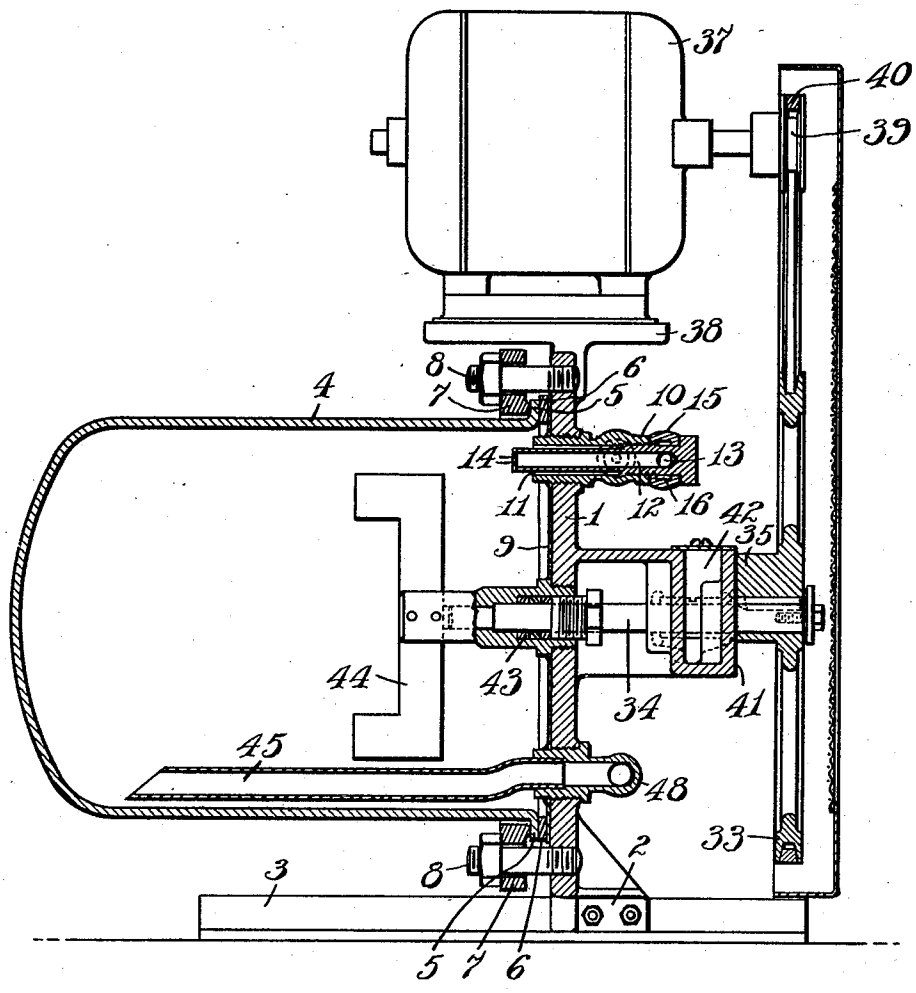
June 7, 1932. J. KANTOR 1,862,089

CARBONATOR

Filed March 9, 1929 2 Sheets-Sheet 1

Fig. 1.



Inventor
James Kantor,

By Hood & Hahn.
Attorneys

June 7, 1932. J. KANTOR 1,862,089

CARBONATOR

Filed March 9, 1929 2 Sheets-Sheet 2

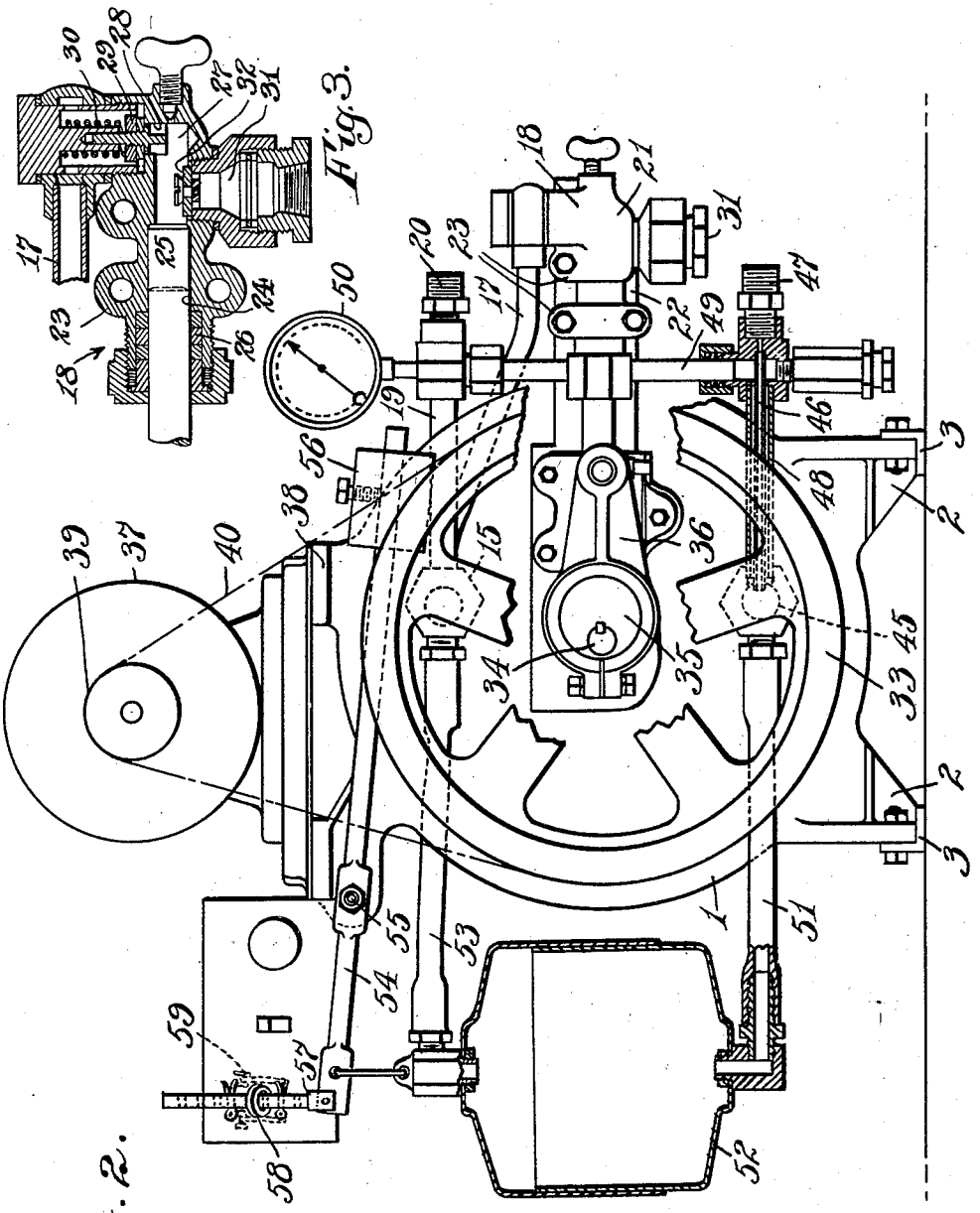


Fig. 2.

Fig. 3.

Inventor
James Kantor,

By Hood & Hahn.
Attorneys

Patented June 7, 1932 1,862,089

UNITED STATES PATENT OFFICE

JAMES KANTOR, OF CHICAGO, ILLINOIS, ASSIGNOR TO LIQUID CARBONIC CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

CARBONATOR

Application filed March 9, 1929. Serial No. 345,696.

My invention relates to improvements in apparatus for saturating and partially saturating water with carbon-dioxide gas to produce what is commonly known in the commercial art as carbonated water.

It has for one of its objects, the construction of a carbonator which may be embodied in a small structure adapted to occupy a minimum of floor space; which may be simply and cheaply manufactured and operated; which will be quiet in its operation and which will be entirely automatic.

Another object of my invention is to provide a carbonator in which the present type of carbonator body or cylinder may be dispensed with. According to the present commercial practices the carbonator body is formed of cast iron, cast steel or the like, and due to the fact that this material is readily attacked by water and by the carbon-dioxide gas, the tank or carbonator is lined with tin. One of the objections to a tin lined tank is, not only that it is expensive, but if the lining by any chance has a small pin hole or blow hole therein the carbon-dioxide gas will attack the lining at this point and due to the frequent changes of pressure within the carbonator body will tend to loosen the lining until its effectiveness has been destroyed.

My present type of carbonator contemplates the use of a cylinder or carbonator body which is constructed of a material which in itself is resistant to the action of water, the action of the carbon-dioxide gas, and of the two mixed together.

For the purpose of disclosing my invention, I have illustrated one embodiment thereof in the accompanying drawings in which;

Fig. 1 is a longitudinal section of a carbonator embodying my invention;

Fig. 2 is a front elevation partly in section; and

Fig. 3 is a detailed sectional view of the pump used in connection with my carbonator.

In the embodiment of the invention illustrated, I provide a vertical plate 1 preferably circular in form and having at its lower edges a pair of feet 2 to which are attached angle bars 3 forming the base or support for the entire structure. This plate 1 may be formed of cast iron and provides a cover plate for the carbonator body. The carbonator body 4 which may be cylindrical is secured to one face of the plate 1. To this end the body 4, at its forward end, is provided with an annular flange 5 seating against the face of the plate and having interposed therebetween and the plate a gasket 6 for making a tight seal between the two. The body 4 is secured in position by means of a clamping ring 7 engaging the rear face of the flange 5 and held in position on the plate by bolts 8. This cylindrical carbonator body is formed from a single sheet of metal drawn into cylindrical form and having its interior highly polished. I have discovered that metal comprising a mixture of nickel 7–10%, chromium 18–20%, phosphorus .025%, sulphur .025%, silicon .50%, manganese .50%, carbon .20% and the balance iron is impervious to attack by the water, is also impervious to any destructive effect of the carbon-dioxide gas. Furthermore, I have discovered that even when the water and gas are mixed and agitated, this metal is impervious to attack thereby. In order to render the plate 1 likewise impervious to attack, this plate is coated with a lining of tin as at 9.

The apparatus for supplying the carbonator body with water, including the pump; for supplying the carbonator with gas, including the valve and lead ins and the apparatus for controlling the operation of the device are all mounted upon and supported by the plate 1, being mounted on the face of the plate opposite the carbonator body. For supplying the body with gas and water, I provide a nozzle 10 having a gas discharge opening 11 formed axially therein and having extending through this opening, a water spray nozzle 12 which is screw threaded into the end of the nozzle body 10 and provided at its inlet end with suitable ports 13. The opposite end of the water nozzle 12 projects beyond the gas nozzle opening 11 and is provided with suitable spray openings 14.

This spray nozzle is surrounded by a hub 15 having a supply opening 16 and formed on

the end of the water inlet pipe 17, the opposite end of which is connected to the discharge end of the pump 18. The gas supply nozzle is connected to the supply pipe 19 which is provided on its end with a connection nipple 20 adapted to be connected with the gas supply.

The water is supplied to the carbonator through the pipe 17 by means of the pump 18. This pump comprises the casing 21 which is bolted to a supporting plate 22 forming a part of the front plate casting 1, by means of ears 23. The pump is provided with a cylinder 24 in which operates a piston 25, the piston being adapted to operate through a suitable packing gland 26. This cylinder 24 discharges into a head 27 having a discharge port 28 controlled by a check valve 29 and is connected through this valve with the water supply pipe 17. This valve 29 is spring seated by a coil spring 30. The head 27 also communicates with the intake side 31 of the pump and this side is provided with a check valve 32. This valve is of the rubber flapper type. I have found that this type of valve is particularly advantageous for this class of carbonator. The valve opens readily under the influence of the inrush of the water, closes promptly with no noise on the discharge stroke of the piston. Furthermore, this type of valve is particularly advantageous in this type of apparatus as the pump is of the high speed type and with this particular type of valve, the slippage is reduced to a minimum.

The pump is driven from the drive wheel 33 mounted on a shaft 34. The hub of this wheel is provided with an eccentric 35 which is connected with the pump plunger by an eccentric strap and the connecting rod 36. The drive wheel is keyed on the shaft 34 so that, the shaft will rotate with the wheel and this wheel is driven from an electric motor 37 mounted on a platform 38 supported on the top of the plate 1. This motor is provided with a grooved pulley 39 which is connected by a V type rubber belt 40 with the drive wheel 33.

This shaft 34 is mounted in a bearing 41 supported in an oil cup 42 formed integrally with the plate 22. This cup comprises an oil pack for the shaft so that, the shaft may be run for long periods without re-oiling. The shaft extends through the face plate 1 through a suitable packing gland 43 and has mounted on its inner end within the carbonator body 4 an agitating paddle 44.

The discharge from the carbonator body is from the lower end through a discharge pipe 45 which lies close to the bottom of the carbonator and extends through the front plate 1, being connected with a discharge pipe 46, in turn connected with an outlet nipple 47. This pipe is surrounded by a second pipe 48 connected through a suitable gauge pipe 49, with a pressure gauge 50, whereby a certain portion of the carbonated water passing out of the carbonator is by-passed to the pressure gauge so that, the operator may at any time observe the pressure maintained in the carbonator body.

The discharge outlet from the carbonator body also has a by-pass through the flexible connections 51 with a bucket or container 52, the upper end of which is connected by a conduit 53 with the nozzle 12 so that, the pressure in the balancing bucket will coincide with the pressure in the carbonator. This arrangement permits of the bucket to fill with carbonated water to the same extent that the carbonator becomes filled. This bucket is supported from one end of a lever 54, supported on a pivot pin 55 extending from the front plate 1, and the opposite end of the lever carries a counter-balancing weight 56. The bucket and lever are connected through a suitable lost motion connector rod 57 with a switch handle 58 of a snap switch 59 adapted to control the circuit through the electric motor 37, the connection being such that when the bucket 52 is in its lowermost position, the circuit through the motor will be opened and when the bucket is raised to its highest position, the circuit through the motor will be closed.

In operation the carbon-dioxide gas is admitted to the inlet nozzle through the inlet pipe 19. This gas is delivered from the carbon-dioxide container at an extremely high pressure, but the pressure is reduced to approximately 100 pounds pressure before it passes into the carbonator. At the same time water is delivered through the spray nozzle and it is to be noted that the nozzle arrangement is such that the spray of water issuing into the carbonator is surrounded by a cone of gas so that the water rapidly absorbs the gas and due to the rotation of the agitator 44, the gas and water are thoroughly mixed until the water reaches the saturation point. The carbonator gradually fills with the carbonated water, unless it is drawn off at the same time, and during this filling operation, the bucket 52 likewise becomes filled with water until by the time the desired water level is reached in the carbonator, the weight of the water of the bucket 52 will over-balance the carbonator weight 56 causing the bucket to drop and operate the switch 59 to shut off the motor. This shuts off the pump and the operation of the machine until sufficient water has been withdrawn from the carbonator and the bucket to permit the weight of the counter-balancing weight 56 to overcome the weight of the bucket and thus start the motor to operate.

I claim as my invention:

1. In a carbonator, the combination with a vertically disposed closure plate having a supporting base, of a horizontally disposed

carbonator body secured to one face of said plate and supported thereby, gas and water supply nozzles extending through said plate into said body, and a pump for supplying water to said water nozzle mounted on the opposite face of said plate and supported thereby.

2. In a carbonator, the combination with a vertically disclosed closure plate having a supporting base, of a horizontally disposed carbonator body mounted upon one face of said plate and supported thereby, and supply connections for said carbonator mounted on the opposite face of said plate and supported thereby.

3. In a carbonator, the combination with a closure plate having a supporting base, of a carbonator body mounted on one face of said plate and supported thereby, a pump for supplying water to said body mounted upon the opposite face of said plate, and means for driving said pump also mounted on said opposite face.

4. In a carbonator, the combination with a closure plate having a supporting base, of a carbonator body mounted on one face of said plate and supported thereby, a shaft extending through said plate, a mixing paddle mounted on said shaft within said body, driving means for said shaft on the opposite face of said plate, and a pump for supplying water to said body mounted on said opposite face and driven from said driving means.

5. In a carbonator, the combination with a cover plate, having a supporting base, a carbonator body mounted on one face of said plate and supported thereby, a pump for supplying water to said body mounted upon said plate, a motor for operating said pump exterior of the carbonator supported by said plate, and means supported by said plate responsive to the water level in said body for controlling the operation of said motor.

6. In a carbonator, the combination with a cover plate having a supporting base, a carbonator body mounted on the face of said plate and supported thereby, a pump mounted on the opposite face of said plate for supplying water to said body, a motor for driving said pump, and a floating tank for controlling the operation of said water, communicating with said carbonator and adapted to be supplied with water in proportion to the quantity of water accumulated in said body.

7. In a carbonator, the combination with a carbonator body, of a tubular gas nozzle for delivering carbonating gas to said body, a tubular water spray nozzle projected through said gas nozzle and having its discharge end extending beyond the discharge end of the gas nozzle said gas nozzle being of greater diameter than the water nozzle to provide a passage surrounding said water nozzle.

8. In a carbonator, the combination with a cover plate having a supporting base, a carbonator body secured to one face of said plate, an inlet nozzle including a water spray nozzle and a carbonating gas nozzle surrounding said spray nozzle, extending through said cover plate at the top of the body, and an outlet for said carbonator body extending through said plate at the bottom of the body.

9. In a carbonator, the combination with a cover plate having a supporting base, of a carbonator body secured to one face of said plate and supported thereby, and an inlet nozzle extending through said cover plate at the top of said body and including a water supply nozzle and a gas supply nozzle surrounding said water supply nozzle, a discharge outlet extending through said cover plate at the bottom of said body, and an agitating paddle operating in said body and disposed between said inlet and outlet.

10. In a carbonator, the combination with a carbonator body, of means of supplying carbonating gas to said body, means for supplying water to said body including a pump, an electric motor for driving said pump, said body having a discharge outlet, a vertically movable tank biased toward raised position, a by-pass connection between said tank and said discharge outlet, whereby said tank will become filled with water in proportion to the filling of the carbonator body and will be emptied in proportion with the emptying of the carbonator body, and means operated by the rising and falling movement of said tank for controlling the operation of said motor.

11. In a carbonator, the combination with a cover plate having a supporting base, of a carbonator body secured to one face of said plate and supported thereby, an inlet nozzle extending through said cover plate at the top of said body and including a gas supply nozzle and a water supply nozzle, an agitator paddle operating in said body below the point of discharge of said nozzles and a discharge pipe extending through said plate at the bottom of said body and having its inlet point in proximity to the end of the body and beyond the plane of operation of said agitating paddle.

In witness whereof, I, JAMES KANTOR, have hereunto set my hand at Chicago, Illinois, this 28th day of February, A. D. one thousand nine hundred and twenty nine.

JAMES KANTOR.