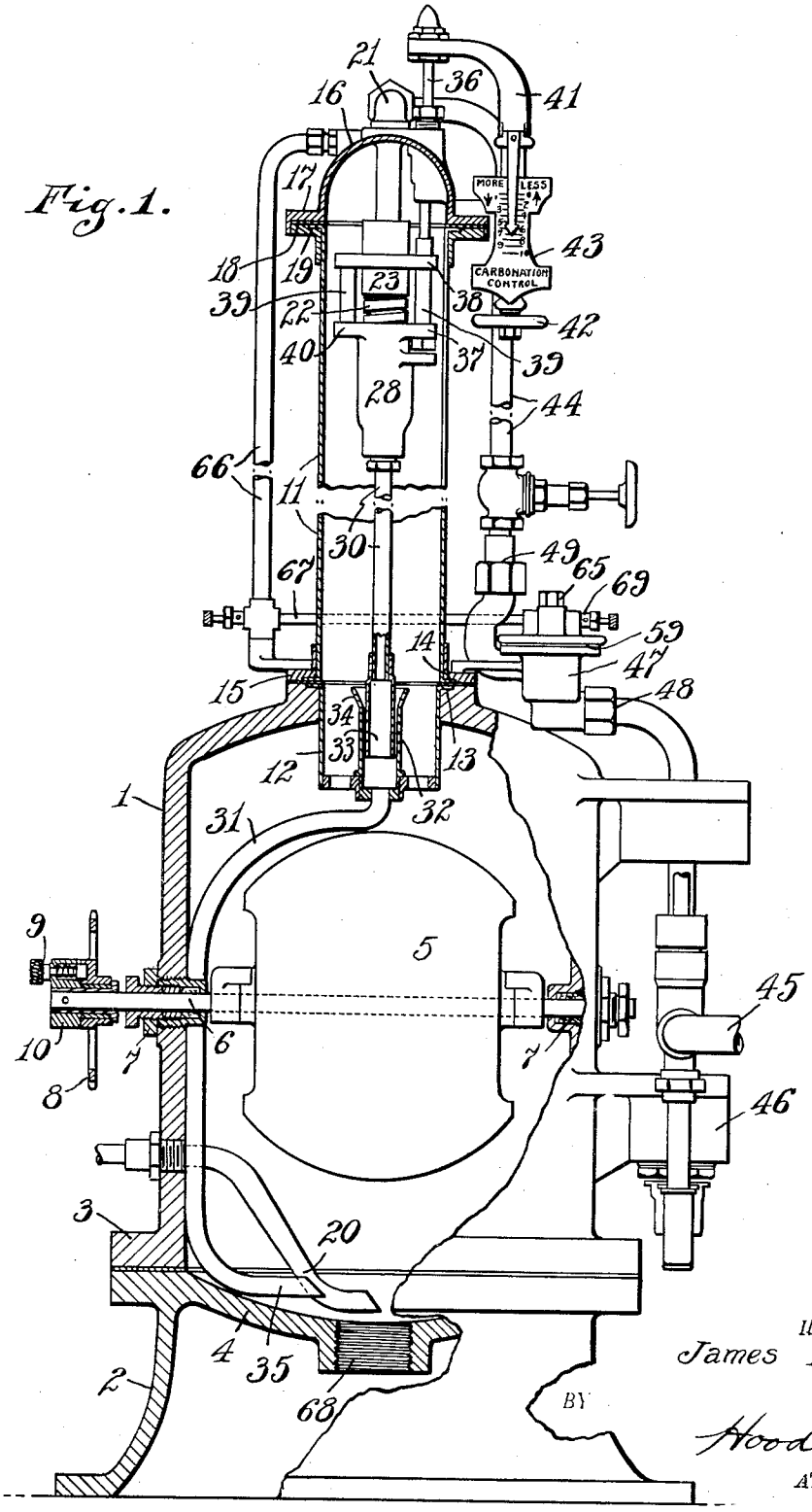
Oct. 10, 1933. J. KANTOR 1,929,948

CARBONATOR

Filed March 9, 1929 2 Sheets-Sheet 1

Fig. 1.



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Filed March 9, 1929 2 Sheets-Sheet 2

Fig. 2.

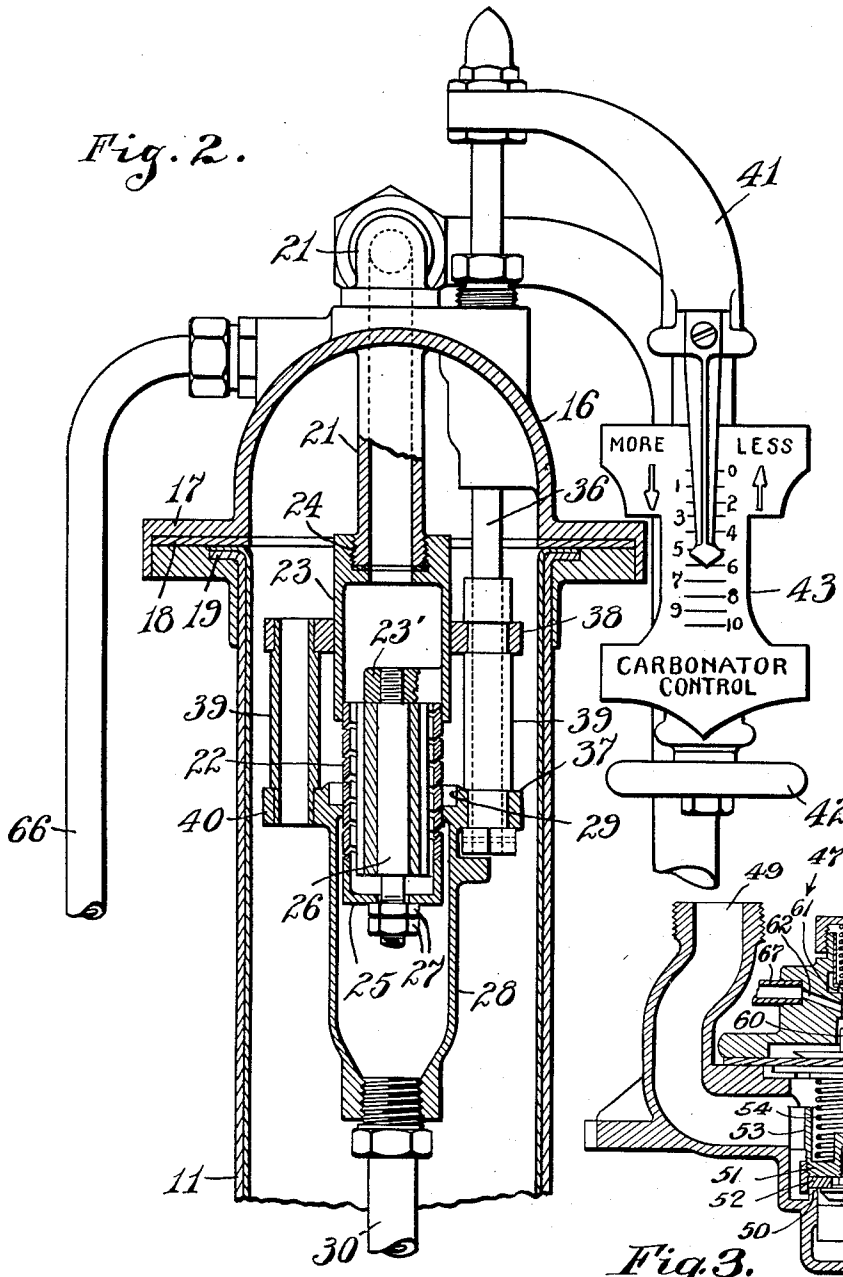


Fig. 3.

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Patented Oct. 10, 1933 1,929,948

UNITED STATES PATENT OFFICE

1,929,948

CARBONATOR

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Application March 9, 1929. Serial No. 345,695

16 Claims. (Cl. 261—28)

My invention relates to improvements in apparatus for carbonating water. It is particularly applicable to apparatus for saturating, or partially saturating, water with carbon-dioxide gas to produce what is commonly known in the art as carbonated water.

It is one of the objects of my invention to provide a carbonator which will thoroughly mix gas with the water in an effective manner and which will provide an apparatus by which the degree of saturation may be effectively controlled.

Further objects and advantages of my invention will appear more fully in the accompanying specification and appended claims. For the purpose of disclosing my invention, I have illustrated one embodiment thereof in the accompanying drawings in which;

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

Fig. 2 is a detailed section of the water spray head and;

Fig. 3 is a detailed section of the water inlet check valve.

In the embodiment illustrated, I provide a preferably cylindrical carbonator body 1 which is mounted on a base or stand 2, the body being provided with an annular flange 3 by which it may be bolted or otherwise secured to the base. The top 4 of the base provides the bottom of the carbonator body.

This body has rotatably mounted therein a mixer 5 which may be in the form of a paddle mounted on a shaft 6, extending through sides of the carbonator, through suitable stuffing boxes 7. The shaft is driven from any suitable source of power and to this end is provided with a sprocket wheel 8 loosely mounted on the shaft and adapted to be connected to the shaft by a spring pressed pin 9 mounted in a hub 10 keyed on the shaft. This arrangement permits of the disconnection between the drive and the shaft so that when desired the mixer may be allowed to remain stationary.

Extending upwardly from the top of the carbonator body is a cylindrical neck 11, formed in a plurality of sections. The lower section 12 extends into a body 1 and at its upper end is provided with an annular flange 13 abutting an annular flange 14 on an intermediate section. The two flanges are clamped beneath a ring 15 secured on a seat at the top of the carbonator body.

The top section 16 of the neck is dome shaped and is provided with a flange 17 in which is secured a clamping ring 18 for the top flanged portion 19 of the intermediate section. This dome shaped top section provides a head for supporting the spray head of the carbonator which will more fully be hereinafter described. The carbonator body is provided with a gas inlet tube 20 which takes into the body near the lower end thereof and which is curved downwardly and discharges in close proximity to the bottom 4 of the carbonator.

The water to be carbonated is admitted to the carbonator through the inlet pipe 21, passing through the head 16 and delivering to a spray head. This spray head comprises a helical coil 22, the upper end of which is secured to a cylindrical supporting head 23 by soldering, or otherwise, and this supporting head, at one end, is screw threaded as at 24 upon the lower end of the pipe 21. A web 25 extends across the mouth or the lower end of the supporting head 23 and this web is adapted to screw threadly receive a bolt or rod 26, the lower end of which passes through the cup like bottom 25 of the helix 22 and is adapted to receive adjusting nuts 27 by which the extent of the opening between the coils of the helix may be adjusted.

Surrounding the spray nozzle 22 is an elongated cup 28, the upper end of which receives the lower end of the spray nozzle and is provided with an annular groove 29 which forms a water seal around the spray nozzle. The lower end of this cup is connected with a water pipe 30 extending downwardly to the inlet pipe 31 in the carbonator. These pipes are in effect a single pipe connected together by a slip joint comprising an outer tubular member 32 in which telescopes the inner tubular member 33. The outer tubular member is flared as at 34 to form a water seal at the junction at the two sections. The pipe 31 is bent horizontally after it passes out of the neck 12 and follows down one side of the carbonator to the bottom where it is bent substantially horizontal as at 35 to deliver water as close to the bottom of the carbonator as is practical.

The cup 28 and its associated pipe are supported from an adjusting rod 36 which is secured at its lower end to an offset lug 37 on the cup 28. A cross head 38 is slidably mounted on the hollow head 23 and this cross head is provided with openings in which tubular spacer members 39 fit. The lower end of these tubular guide members take, one in the lug 37, and the other in a corresponding lug 40 on the opposite side of the cup 28.

The adjusting rod 36 extends through the dome 16 and is carried by an adjustable arm 41, sup-

ported on the exterior of the neck and raised and lowered by a suitable operating hand wheel 42, an indicating plate 43 being provided for indicating the extent to which the cup 28 is raised or lowered by this mechanism.

Water is delivered to the inlet pipe 21 by the delivery pipe 44 having an intake 45 and provided with a pump 46. This intake pipe delivers through a water check valve 47 comprising a casing having the inlet 48 and the discharge 49. Within this casing is provided a valve seat 50 on which seats the check valve 51 having a preferable leather or other soft face 52. The upper portion of this valve is cup shaped as at 53 to receive a coil spring 54, fitting over a stud 55 and having its upper end bearing on a perforated wall plate 56. This spring biases the valve toward closed position against water pressure entering through the inlet port 48. However, under normal conditions, the water pressure delivered through the inlet 48 is sufficient to unseat the valve to permit the passage of water to the spray head. This wall 56 forms one wall of a chamber 57 formed in a recess in the top 58 of the valve casing. A diaphragm 59 operates in this chamber and is connected to a stem 60 operating a valve 61 controlling a port 62 which in turn communicates with an outlet port 63. In operating the valve 61 the stem 60 is adapted to raise the valve 61 which is biased toward closed position by a spring 64, the tension of which is controlled by an adjustable cap 65.

The port 62 is connected by the pipe 66 and the pipe 67 with the top of the neck 11.

In operation, water to be carbonated is admitted to the pipe 44 and under the influence of the pump 46 is delivered to the spray head, whence it passes through the helical coil 22 and passes down through the neck 12 into the carbonator body. At the same time carbon-dioxide gas is admitted to the bottom of the carbonator body through the pipe 20 and rises upwardly into the carbonator body and into the neck, so that as the water is sprayed downwardly it becomes saturated with the gas. At the same time the agitator 5 is operated to agitate the water and gas to cause a thorough co-mingling of the two.

In some instances, it is desired that less than complete saturation of the water be obtained and under these circumstances, the cup 28 is adjusted on the spray head to the point desired, so that a certain proportion of the water will be bypassed through the pipe 30 and delivered to the bottom of the carbonator. This pipe delivers water, without having first come in contact with the gas, to the bottom of the carbonator and in such a manner that the water will be delivered to the carbonated water with as little disturbance to the carbonated water as possible, thus avoiding liberating of the gas already absorbed by the sprayed water.

The carbonated water is drawn off through a suitable draw-off opening 68 in the bottom of the carbonator.

In the admission of the water to the carbonator, this water carries with it a certain amount of air part of which is liberated when the water is sprayed, and the other when the water is carbonated. Carbon-dioxide due to its great solubility in water drives the air out of the water. This air accumulates in the top of the neck and, due to the fact that the carbon-dioxide gas is heavier than the air lies in a stratum on the top of the carbon-dioxide gas. Due to this fact it may be drawn off from the top of the neck without drawing off the gas. Therefore as water is admitted to the carbonator through the check valve 47, the water passes into the chamber 57 beneath the diaphragm 59 and, exerting a pressure on the diaphragm 59 opens the valve 61 thus opening to the atmosphere, the top of the neck 12 by way of the pipes 66 and 67 and through the "snift" valve 69 in port 63. This permits of the escape of air from the top of the neck during the period when water is being admitted to the carbonator. As soon, however, as the supply of water is shut off the valve is again closed so that, a continuous escape from the top of the neck is prevented.

I claim as my invention the following:

1. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body, a spray head for delivering water to be carbonated to said body, means for by-passing a portion of the water delivered by said spray head and feeding the same to the carbonated water without having it come in contact with the carbonating gas.

2. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body, a spray head for delivering water to be carbonated to said body, means for by-passing a portion of the water delivered by said spray head and feeding the same to the carbonated water without having it come in contact with the carbonating gas, and means for adjusting said by-passing means to vary the quantity of water by-passed.

3. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body, a spray head having delivery openings, a cup adapted to surround said openings into which a part of the spray is delivered, and a conduit from said cup for delivering the water therefrom to the body of the carbonated water.

4. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body, a spray head for delivering water to be carbonated to said body and having delivery openings, a cup adapted to surround said openings into which a part of the spray is delivered, a conduit from said cup for delivering the water therefrom to the body of the carbonated water, and means for causing a relative adjustment between said spray head and said cup.

5. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body, a spray head for delivering water to be carbonated to said body including a helical coil having delivery openings between the helices, a cup adapted to surround the coil to receive a portion of the water therefrom, and means for delivering the water from said cup to the body of the carbonated water.

6. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body, a neck extending upwardly from said body, a spray head at the top of said neck for delivering water thereto, a receptacle in said neck for receiving said water from said spray head, and a pipe extending from said receptacle to the bottom of the carbonator body.

7. In a carbonator, the combination of a carbonator body, of means for delivering carbonating gas to said body, a neck extending upwardly from said body, a spray head at the top of said neck for delivering water thereto, a receptacle in said neck for receiving water from said spray head, a pipe extending from said re-

ceptacle to the bottom of the carbonator body, and means for controlling the quantity of water delivered to said receptacle.

8. In a carbonator, the combination with a carbonator body, of means for delivering water and carbonating gas thereto, said carbonator body having a relief opening in the dome thereof, of a valve for controlling said opening adapted to be opened by the water delivered to said body and closed when the water supply is cut off.

9. A carbonator comprising a carbonator body having a neck extending upwardly therefrom, a spray head mounted in the upper part of said neck for delivering water to said carbonator body, said neck having an air relief opening in the top thereof and means controlled by the admission of water to said spray head for controlling said relief opening.

10. In a carbonator, the combination with a carbonator body of a neck extending upwardly from said body, a spray nozzle mounted in the upper portion of said neck, a receptacle in said neck adapted to receive a portion of the water delivered by said spray nozzle, a conduit extending from said receptacle to the bottom of said carbonator and a rotating mixer mounted in said body beneath said neck.

11. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body, a neck extending upwardly from said body, a water spray head at the top of said neck for delivering water thereto, and means for causing a portion of said spray to be delivered to the carbonator body without coming into contact with the gas in said neck.

12. In a carbonator, the combination with a carbonator body, of means for delivering carbonating gas to said body a neck extending upwardly from said body, a spray head at the top of said neck for delivering water thereto and adjustable means for diverting a portion of said water and delivering it to the body without permitting it to come into contact with the gas in said neck.

13. A carbonator having means for delivering water and carbonating gas thereto and having a normally closed escape opening therein and means operated by the water delivered to said carbonator for maintaining open said escape opening during the delivery of water to said carbonator.

14. In a carbonator, the combination with means for delivering water and carbonated gas thereto, of means for uninterruptedly drawing the air from said body operated by the water delivered to said body during the delivery of water to said carbonator.

15. In a carbonator having a normally closed air escape opening, a water supply line to said carbonator, a check valve arranged in said supply line and means operated by the opening of said check valve by the passage of water therethrough for opening said air escape opening.

16. In a carbonator, the combination with a snift valve, means for normally closing said snift valve, a diaphragm connected with said snift valve and subject to the flow of water into said carbonator for operating said diaphragm to open said snift valve and maintain the same open as long as water is passing to said carbonator.

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