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W. S. JOSEPHSON

CARBONATOR

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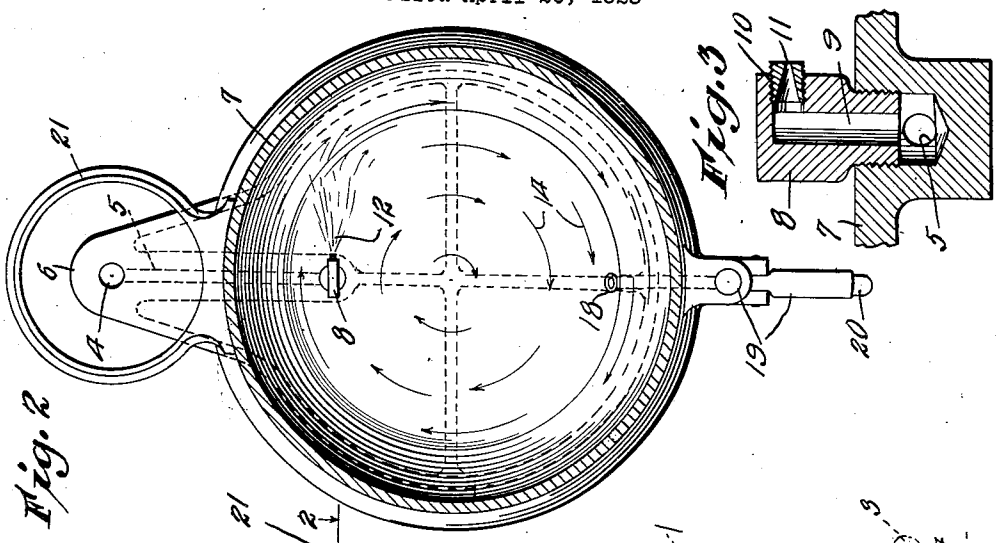


Fig. 3

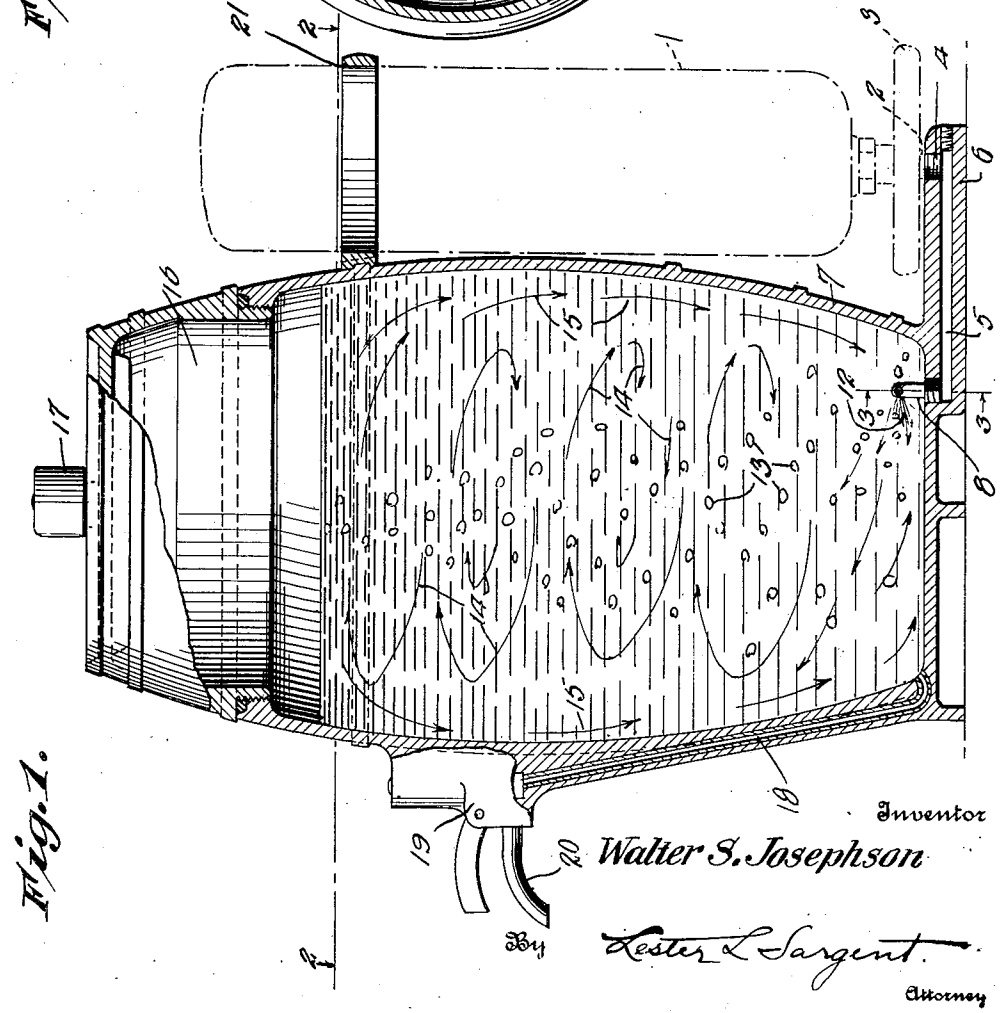


Fig. 2

Fig. 1.

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UNITED STATES PATENT OFFICE.

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CARBONATOR.

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The object of my invention is to provide an improved carbonator for carbonating liquids with gas obtained from a standard carbon dioxide container and to provide novel means for thoroughly carbonating the liquid while the receptacle is stationary. It is also my object to provide, in combination with the carbonator, an automatic relief valve. It is further an object of my invention to provide a carbonator of normal shape, including means for supporting the carbon dioxide container in operative inverted position; and to provide the novel combination and arrangement of parts disclosed in the accompanying drawings, in which—

Figure 1 is a vertical section of my invention;

Fig. 2 is a horizontal section on line 2—2 of Fig. 1; and

Fig. 3 is an enlarged detailed sectional view on line 3—3 of Fig. 1.

Like numerals indicate like parts in each of the several views.

Referring to the accompanying drawings, a standard carbon dioxide container 1, having the usual valve hand wheel 3 and threaded nozzle 2, detachably engaging the threaded opening or passage 4 in base extension 6, is supported in operative position by a suitable bracket 21 carried by the liquid container 7. Base extension 6 is provided with a channel 5 terminating in an upright nozzle 8. The channel 9 in nozzle 8 opens into a lateral discharge passage 10, the liquid carbon dioxide escaping through the restricted opening 11, as indicated in Figs. 1 and 3.

Liquid container 7 is provided with a detachable cap 16 in which is mounted a suitable relief or safety valve 17. The container has a discharge pipe 18 terminating in the spigot 20, the outflow of the liquid being regulated by the valve 19, which is manually operated.

In operation, the liquid carbon dioxide from container 1 is released by handwheel valve 3 and flows through passage 4 and channel 5 under full pressure from container 1. The liquid carbon dioxide flows through channel 5 in base extension 6 and thence to passage 10 through nozzle 8 and discharges through the restricted opening 11 in a conical spray 12, thence pursuing a spiral upward course as indicated by the arrows 14. As the carbon dioxide is in liquid form when it passes through channel 5 to nozzle 8 and changes to a gas and snow as it leaves nozzle 8 through opening 11 at 12, the latent heat of vaporization of the liquid carbon dioxide is absorbed and refrigerates as well as carbonates the contents of tank 7. The force of discharge from high pressure through channels 5 and 10 and restricted opening 11 causes a whirling motion of the contents of the carbonator; also charging the contents with a volume of atomized bubbles of carbon dioxide. The carbon dioxide gas bubbles being much lighter than the liquid in the carbonator will be driven to the center of rotation by centrifugal force acting on the heavier liquid and thereby effect an upward flow of the carbon dioxide gas through center of carbonator simultaneous with the circular or spinning motion of the contents of the carbonator, which causes a downward flow as indicated by arrows 15.

The unrestricted passage through members 4, 5 and 10, permitting approximately full pressure of container 1 to reach the restricted passage 11, removes the tendency of freezing from the valve in container 1, and through this passage to the point of actual expansion of gases at restricted passage 11, or completely within the contents of the carbonator, thus giving the greatest refrigerating effect to the contents of carbonator.

This circulating means starting at the bottom of carbonator and pushing its central contents upward and the outer or exterior contents downward simultaneous with a whirling effect brings each individual portion or ounce of water contained in the carbonator directly to the nozzle where it receives its proportionate charging of carbon dioxide, eliminating the need of rocking, shaking or stirring the contents of carbonator to get it to absorb the carbon dioxide.

Many charges of liquid in tank 7 will be carbonated from a single container 1 of liquid carbon dioxide without removing it. Upon emptying the liquid in tank 7 after the last charge from container 1, the empty container will be removed and replaced by a full one. No check valve, therefore, is needed in the passage 5.

I claim:

1. In a carbonator, the combination of

a carbonating circular tank for liquid, means for supporting a standard container of liquid carbon dioxide in communication with the interior of the tank, and a nozzle extending up into the bottom of the tank but spaced apart a substantial distance from the side wall thereof, said nozzle having a tangentially directed restricted opening, whereby the carbon dioxide will escape into the liquid in the carbonating tank reverting to a gaseous state and travelling in a direction to produce a whirling motion and effect a thorough impregnation of the contents of the tank with carbon dioxide.

2. In a carbonator, the combination of a tank for liquid having a base extension, said extension having a channel extending therethrough, said channel terminating at its outer end in a threaded opening of suitable size to receive the nozzle of a standard container of carbon dioxide, the channel at its inner end terminating in a nozzle extending into the interior of the tank, near the bottom thereof, said nozzle having an abruptly restricted opening for the escape of carbon dioxide partly in a gaseous and partly in a solid state on pressure being released as it flows from the aforesaid channel through the restricted opening in the aforesaid nozzle into the bottom of the tank to efficiently and simultaneously charge and refrigerate the contents of the tank.

3. In a carbonator, the combination of a tank for liquid having a base extension, said extension having a channel extending therethrough, said channel terminating at its outer end in a threaded opening of suitable size to receive the nozzle of a standard container of carbon dioxide under high pressure, the channel at its inner end terminating in a nozzle in the tank near the bottom thereof, said nozzle having a restricted opening, the nozzle being positioned at one side of the tank and near but substantially spaced away from and directed approximately parallel with the adjacent wall of the tank to allow the carbon dioxide to produce a swirling motion of the contents of the tank containing the liquid to be carbonated.

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