No. 780,714. PATENTED JAN. 24, 1905.

H. S. FERRY.

APPARATUS FOR CARBONATING LIQUIDS.

APPLICATION FILED NOV. 15, 1902.

2 SHEETS—SHEET 1.

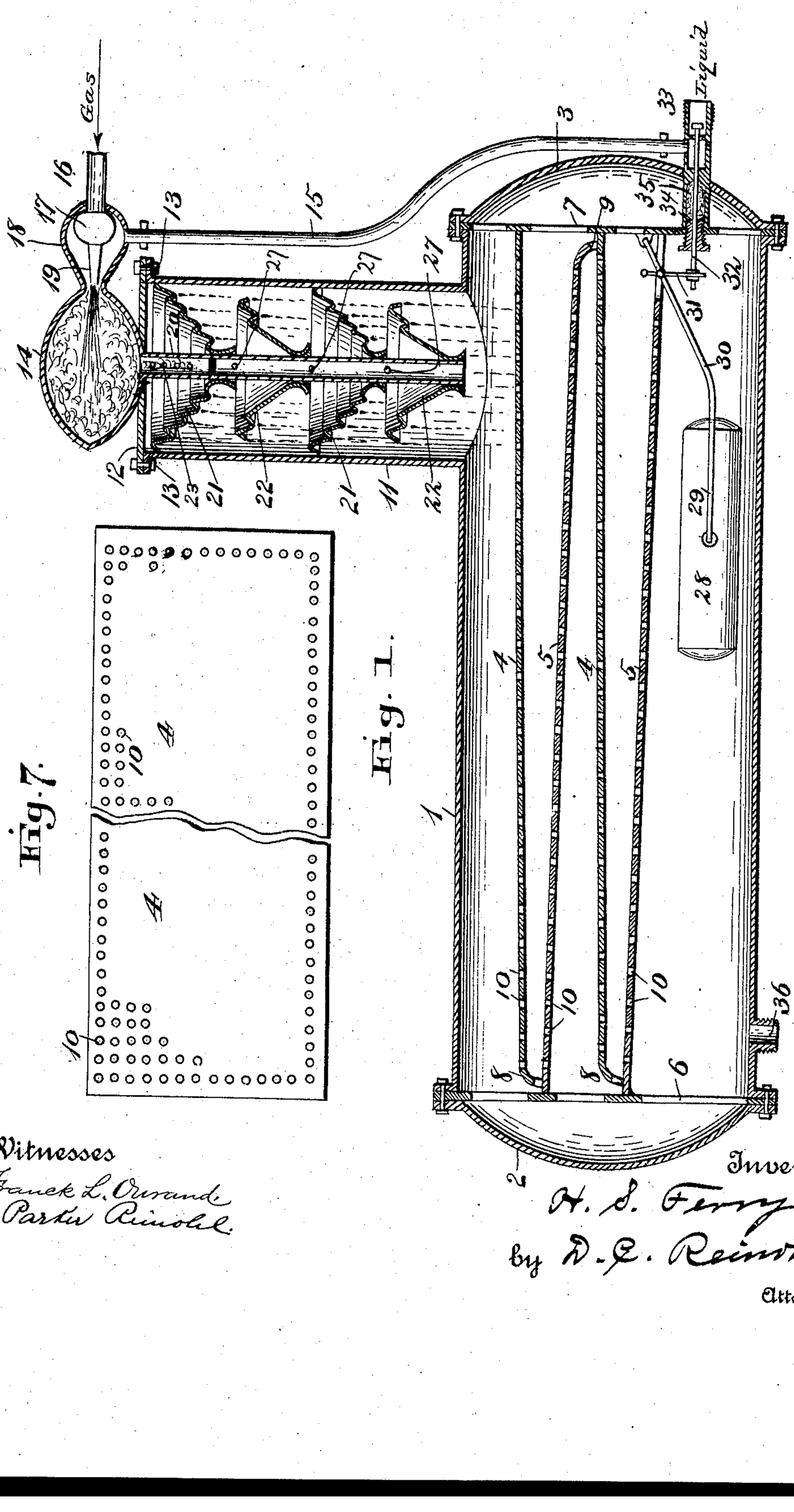

Fig. 1.

Fig. 7.

Witnesses
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2 SHEETS—SHEET 2.

Fig. 4.

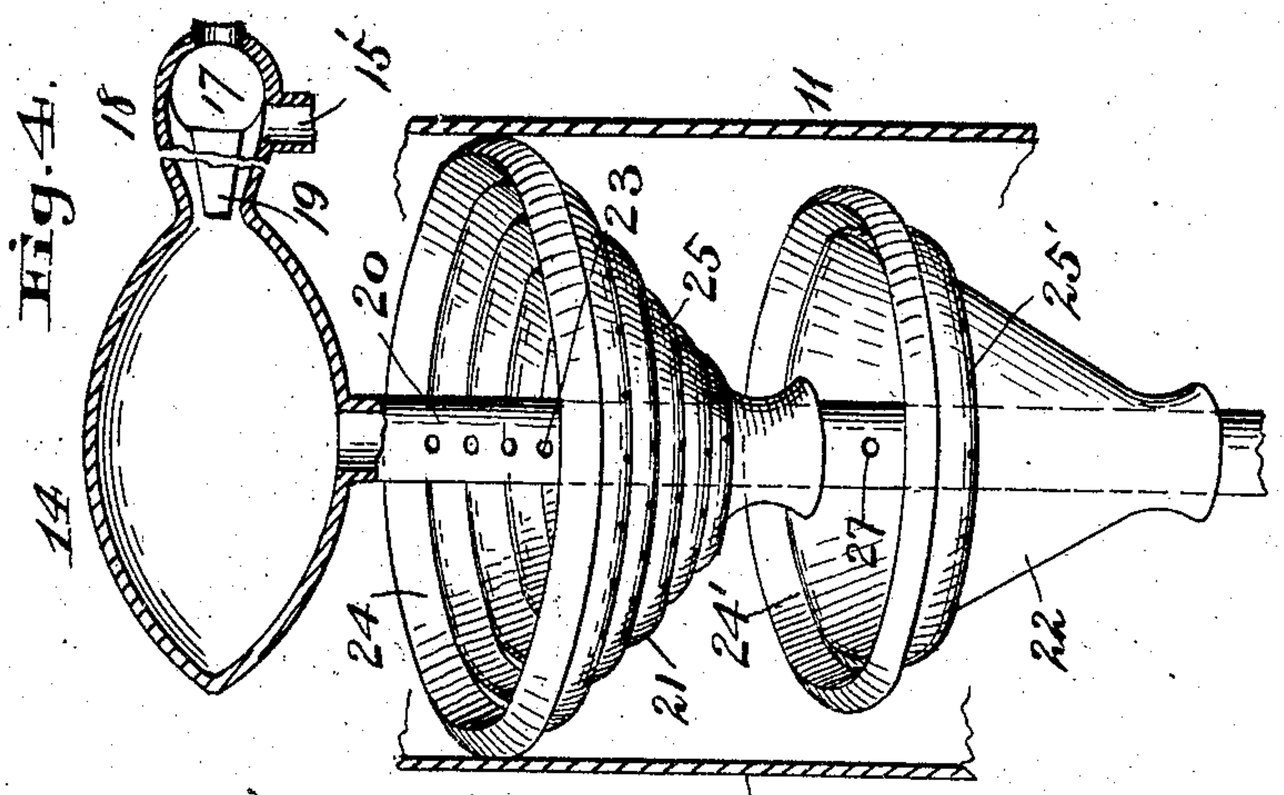
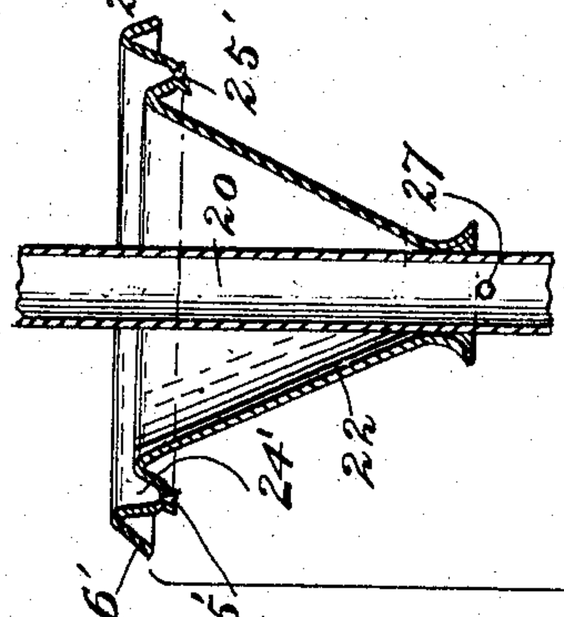


Fig. 3



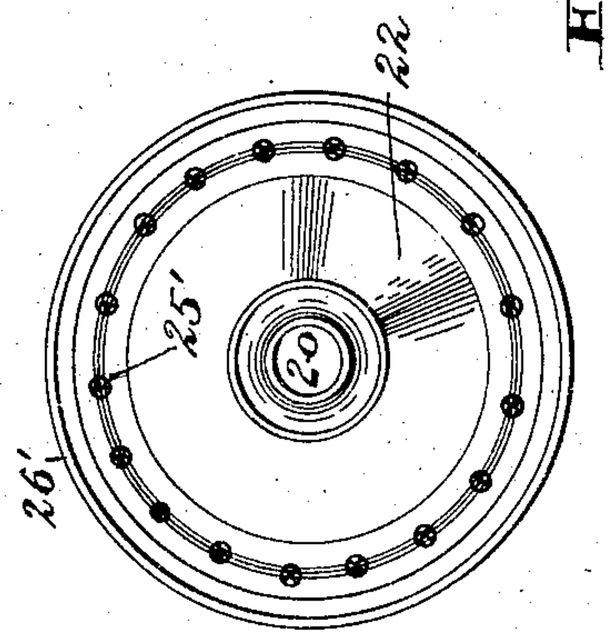


Fig. 6.

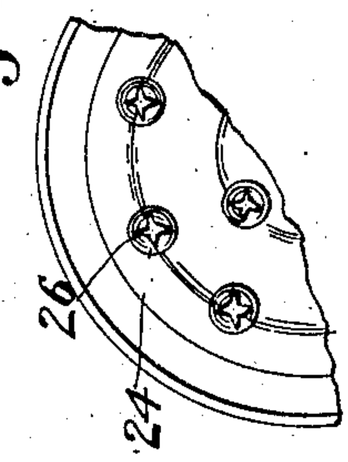
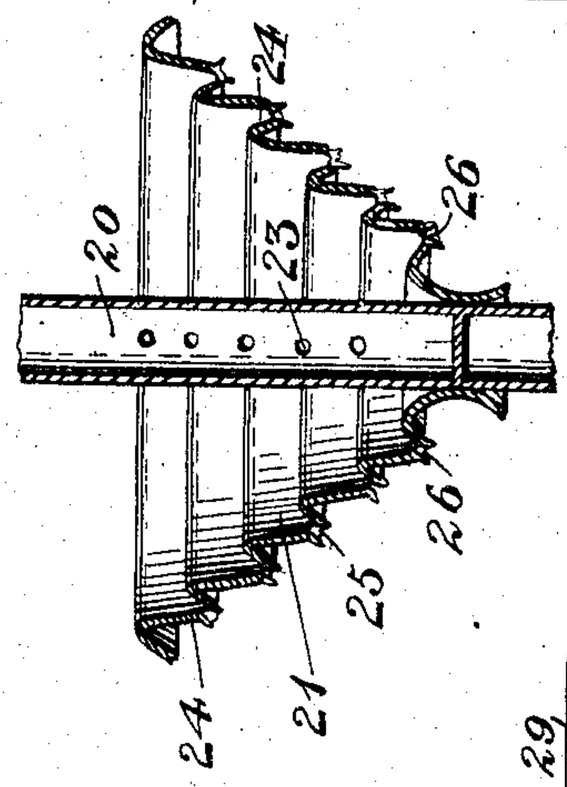
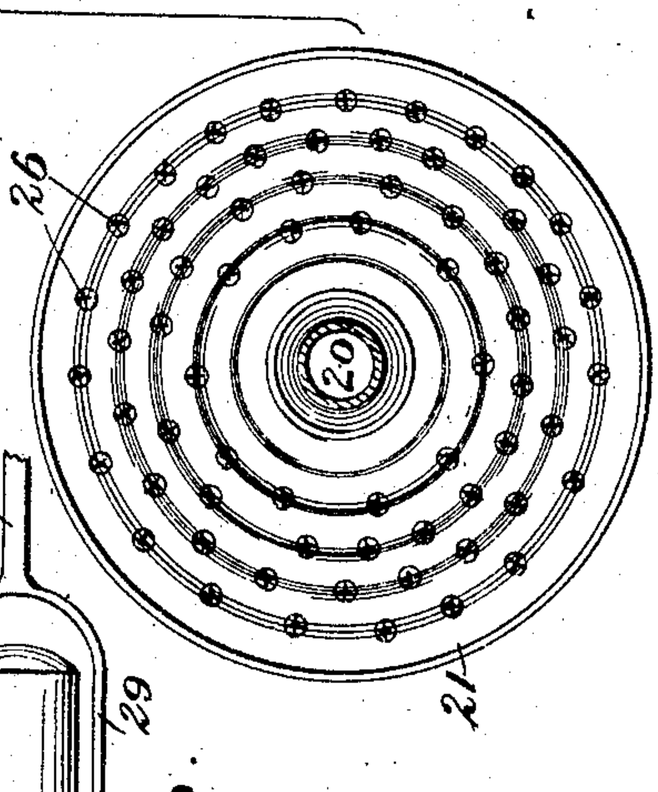


Fig. 2.





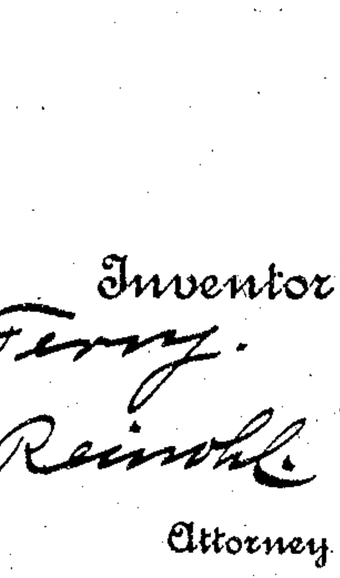


Fig. 5

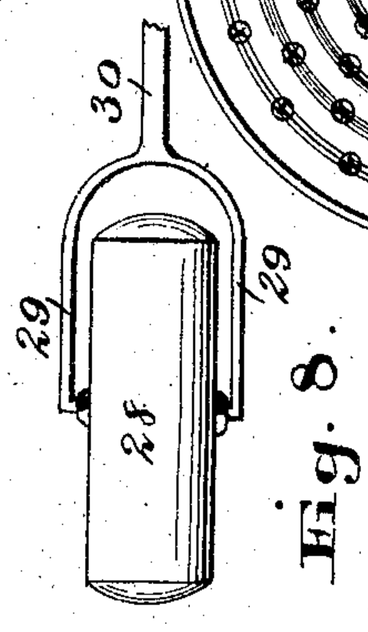


Fig. 8.

Witnesses

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No. 780,714. Patented January 24, 1905.

UNITED STATES PATENT OFFICE.

HARVEY S. FERRY, OF MOUNT VERNON, NEW YORK.

APPARATUS FOR CARBONATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 780,714, dated January 24, 1905.

Application filed November 15, 1902. Serial No. 131,595.

To all whom it may concern:

Be it known that I, HARVEY S. FERRY, a citizen of the United States, and a resident of the city of Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Apparatus for Carbonating Liquids, including malt liquids, so that they will be perfectly carbonated and can be bottled without that extreme amount of foaming that is so common in handling malt liquors, of which the following is a specification.

My invention has relation to an apparatus for the carbonating and bottling of malt and similar liquids whereby the foaming and loss of liquid is prevented and the action is performed simply and in such general connection it relates to the construction and arrangement of such an apparatus.

The invention consists in certain improvements in construction, which will be fully disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a vertical longitudinal section of my improved carbonator; Fig. 2, a vertical transverse section and a top plan view of one of the distributing-cones; Fig. 3, a like view of one of the receiving-cones; Fig. 4, a view showing the commingling-chamber in vertical section and the cones in perspective; Fig. 5, a vertical section of one of the distributing-cones on an enlarged scale; Fig. 6, an enlarged detail showing the under side of the discharge-opening in the cones; Fig. 7, a top plan view of one of the perforated plates in the carbonator, and Fig. 8 a top plan view of the float and its connection with the float-rod.

Reference being had to the drawings and the designating characters thereon, 1 indicates the body of the carbonator, provided with detachable heads 2 3 and having oppositely-inclined perforated plates 4 5 arranged therein and removable from the body from opposite ends for the purpose of cleaning the plates. These plates may be secured to a spider or skeleton 6 7 and are preferably bent downward at their ends 8 9. The perforations 10 in the plates allow part of the liquid to pass through the plates and travel along the plates, on both sides thereof, in a thin strata or sheet, thus exposing the liquid to the free gas in the carbonator while it is traveling along the surfaces of the plates. The liquid flowing down the under side of the plates is held thereto by adhesion. The body 1 is preferably cylindrical in form and made of drawn sheet metal.

From the body 1 extends a cylindrical neck 11, provided with a head 12, secured thereto by bolts 13 or in any preferred manner, and on the head is a dome or spheroidal reverberatory commingling-chamber 14, in which the liquid and the gas are commingled as they are received, respectively, from the liquid-pipe 15 and from the gas-pipe 16. The gas-pipe is provided with an ejector having an enlarged chamber 17, contained in a liquid-chamber 18, which forms an extension of the chamber 14, and the nozzle 19 of the ejector terminates at the juncture of the chambers 14 and 18. By this construction the chamber 17 supplies gas in a steady stream, the liquid surrounds the ejector, and the end of the nozzle forms a vacuum and induces or draws the gas through the ejector. From the bottom or lower side of the chamber 14 extends a pipe 20, on which are arranged one or more preferably conical distributing-cones 21 and one or more receiving-cones 22, and the liquid is discharged from the pipe 20 into the upper distributing-cone through a series of perforations 23. The distributing-cone is provided with a series of concentric chambers 24 in different horizontal planes approximately V-shaped in cross-section, the outer wall of the chambers being higher than the inner wall, and in the bottom of each chamber are numerous perforations 25, formed by driving a punch through the metal to force it downward and split or rupture the flange of metal and form a plurality of ragged edges 26, as shown in Fig. 6, over which the liquid passes and by which it is separated or broken into fine particles or drops, with which the gas readily mixes and thoroughly charges the liquid. The liquid discharged in fine particles falls into the receiving-cone 22, which becomes filled, is constantly agitated by the falling particles, and is still further commingled with the gas in the carbonator. The receiv-

ing-cone 22 is provided with a chamber 24′, provided with perforations 25′ to afford an exit for part of the liquid in fine particles, and with a flange 26′, over which the liquid flows in a fine sheet or film, in which condition the liquid is further subjected to the gas. The pipe 20 is also provided with openings 27, through which gas rising from the chamber in the body 1 is discharged and commingles with the liquid passing down through the cones in the extension or neck 11.

The supply of liquid is controlled by an elongated float 28, pivotally connected to the arms 29 29 of the rod 30, which is pivotally secured to the spider 7 and has connected or attached thereto a rod 31, which engages the inner end of a rod 32, having a valve 33 on the outer end thereof, and said rod extends through a gland 34 of a stuffing-box 35. The float is contained in the body 1, is elongated, and is pivotally connected in its longitudinal center to the float-rod to maintain a level or horizontal position and to allow the slight rise and fall thereof in a contracted space to afford sufficient throw of the rod to open and close the valve 33 as the liquid rises and falls in the carbonator.

36 indicates the discharge for carbonated liquid from the body 1.

The liquid is subjected to repeated disintegrations and comminglings with the gas from the time it is discharged from the supply-pipe into the reverberatory chamber 14, through the cones 21 22 in the neck 11, and through and over the perforated plates 4 5 in the body 1.

Having thus fully described my invention, what I claim is—

1. A liquid-distributing cone for carbonators having discharge-apertures in different horizontal planes, and each aperture surrounded by split flanges on the discharge side thereof, forming a plurality of ragged edges for disintegrating the bodies of liquid in their passage through the apertures.

2. A carbonator provided with a liquid-distributing cone having a plurality of V-shaped chambers in different horizontal planes, said chambers provided with discharge-apertures in the bottom thereof, and having ragged edges for disintegrating the bodies of liquid in their passage through the apertures.

3. A carbonator provided with a spheroidal commingling-chamber having a liquid-chamber at one end and in open communication therewith, means for supplying liquid to said liquid-chamber, and means within said liquid-chamber for supplying gas to the commingling-chamber; in combination with a liquid-distributing cone.

4. A carbonator provided with a spheroidal commingling-chamber having a liquid-chamber at one end and in open communication therewith, a liquid-supply pipe, and a gas-supply pipe having an enlarged chamber contained within said liquid-chamber, and a nozzle within the liquid-chamber communicating with said enlarged chamber, concentrically arranged in the liquid-chamber and terminating approximately at the juncture of said commingling and liquid chambers; in combination with means for distributing the liquid.

5. A carbonator having a commingling-chamber, and means for supplying liquid and gas thereto; in combination with a liquid-distributing cone communicating with said chamber and provided with a plurality of chambers in different horizontal planes, and having discharge-apertures in the bottom of the chambers provided with ragged edges.

6. A carbonator provided with a liquid-distributing cone having chambers in different horizontal planes, provided with discharge-apertures in the bottom of said chambers and having ragged edges for disintegrating the bodies of liquid in their passage; in combination with a receptacle under the distributing-cone provided with removable heads, and perforated inclined plates.

7. A carbonator having a commingling-chamber, and means for supplying liquid and gas thereto; in combination with a liquid-distributing cone connected with said chamber and provided with a plurality of chambers in different horizontal planes, and a pipe between the commingling-chamber and the distributing-cone having lateral discharge-openings in the planes of the several chambers in the said cone.

8. A carbonator having a commingling-chamber, and means for supplying liquid and gas thereto; in combination with a liquid-distributing cone connected with said chamber and provided with a plurality of chambers in different horizontal planes, and having discharge-apertures in the bottom of the chambers provided with means for separating the liquid into fine particles, and a pipe between the commingling-chamber and the distributing-cone having lateral discharge-openings in the plane of the several chambers in said cone.

9. A carbonator having a commingling-chamber, and means for supplying liquid and gas thereto; in combination with a liquid-distributing cone connected with said chamber and provided with a plurality of chambers in different horizontal planes, and having discharge-apertures in the bottom of the chambers provided with means for separating the liquid into fine particles, and a pipe between the commingling-chamber and the distributing-cone having lateral discharge-openings in the planes of the several chambers in said cone, and openings in said pipe below said cone for supplying gas from the liquid-chamber to the liquid from the distributing-cone.

10. A carbonator having a horizontal body provided with detachable heads, longitudinal and oppositely-inclined perforated plates bent downward at their lower ends, and removable through the opposite ends of said body, and

means for supporting said plates at their outer ends, and the inner ends of the plates supported by the opposite plates near their outer ends.

11. A carbonator having a horizontal body provided with detachable heads, longitudinal and oppositely-inclined perforated plates, spiders attached to and supporting said plates at their outer ends, the plates and the spiders being removable through the opposite ends of the body, and the free ends of one set of plates supported on the opposite plates near the spider.

12. A carbonator having a horizontal body provided with detachable heads, longitudinal and oppositely-inclined perforated plates removable through the opposite ends of said body, a vertical neck extending from the body and provided with a detachable head, distributing-cones within said neck and supported by said head, a commingling-chamber supported on the head of said neck, and means for supplying liquid and gas to the commingling-chamber and to the carbonator.

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