

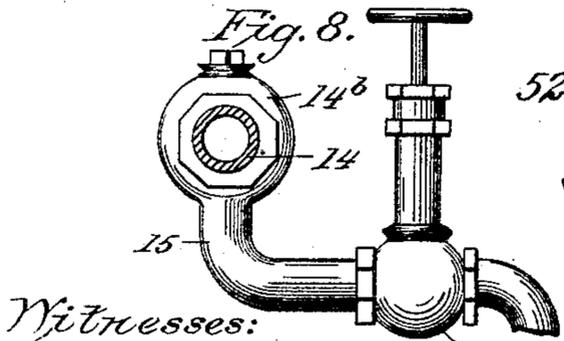
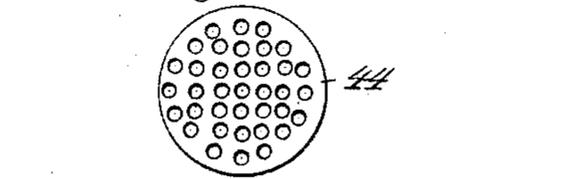
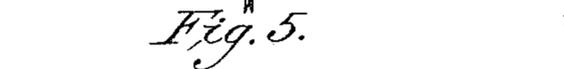
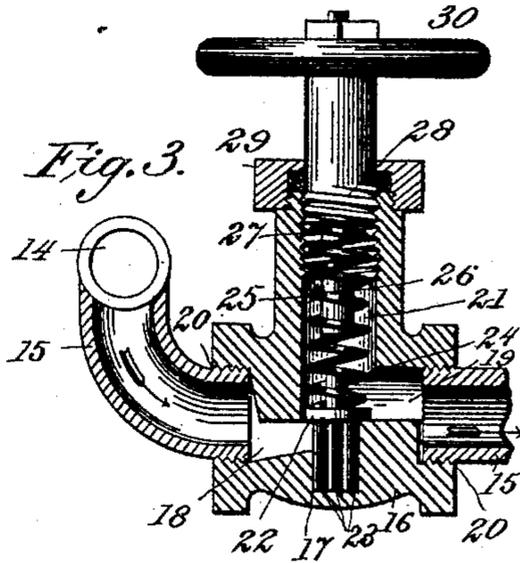
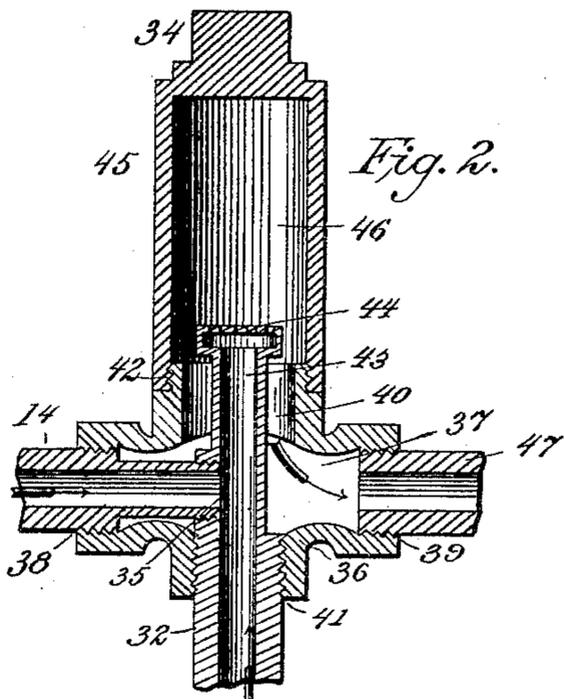
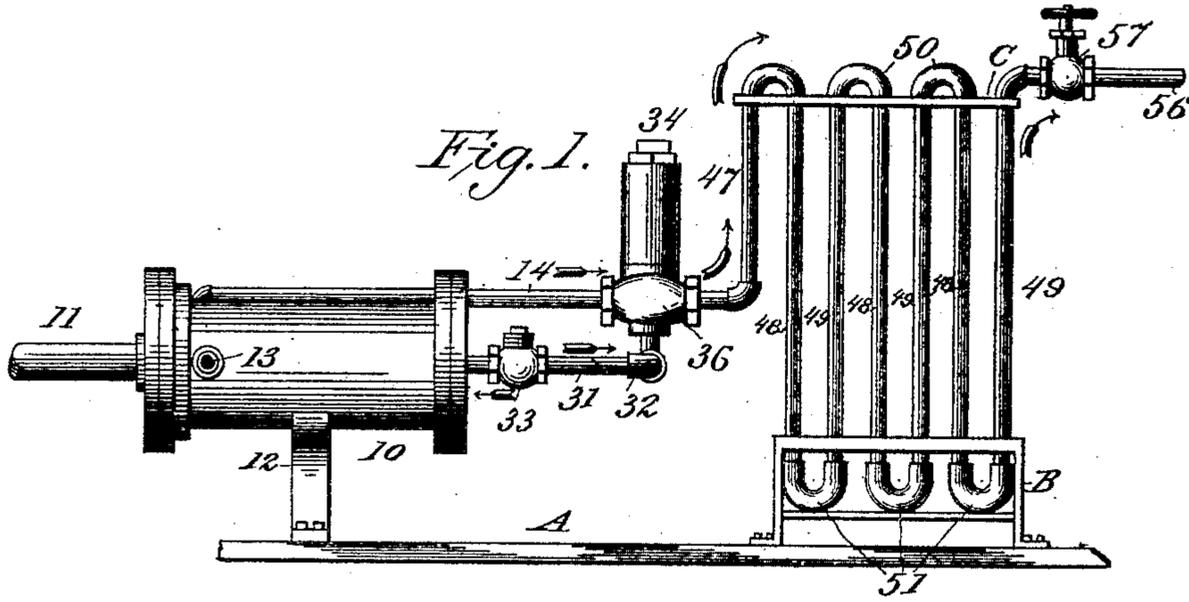
(No Model.)

H. CARSE.

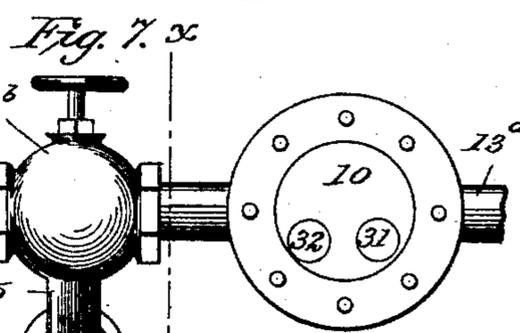
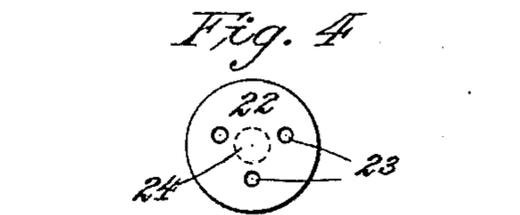
APPARATUS FOR MAKING CARBONATED BEVERAGES.

No. 467,916.

Patented Feb. 2, 1892.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

HENRY CARSE, OF ROCK ISLAND, ILLINOIS.

## APPARATUS FOR MAKING CARBONATED BEVERAGES.

SPECIFICATION forming part of Letters Patent No. 467,916, dated February 2, 1892.

Application filed March 7, 1891. Serial No. 384,183. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY CARSE, a citizen of the United States, residing at the city of Rock Island, in the county of Rock Island and State of Illinois, have invented a new and useful Soda-Water Apparatus, of which the following is a specification.

My invention relates to what is known as the "continuous" system of making carbonated beverages, where the mixture is stored in a closed reservoir under pressure to be drawn off in bottles or other vessels; but the particular part in the process to which my invention relates is uniting the fluid and gas, applying pressure thereto, and mixing the same; and the objects of my invention are, first, to use one pump-cylinder for pumping the fluid and gas at alternate strokes of the piston, the fluid reducing the heat of the cylinder, which would otherwise be produced by the gas alone entering such cylinder; second, to discharge the fluid and gas while under a state of pressure, in one common receiving-chamber, connected with another chamber by a series of fine perforations through which the fluid and gas is forced and mixed; third, to continue the passage of the fluid and gas thus mixed through a pipe having at intervals within such pipe perforated thimbles or disks, the passage through such perforations causing further agitation and mixing of the fluid and gas, and, fourth, to arrange valves forced against the valve-seat by spring-pressure, with means for increasing and decreasing the degree of pressure of the spring against the valve, whereby the passage of the fluid, whether mixed or unmixed with the gas, may be regulated. I accomplish these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view of my apparatus in elevation, the inlet fluid-pipe, its chuck-valve, and the air-chamber being removed from the pump-cylinder. Fig. 2 is a vertical sectional view of the chambers for receiving the fluid and gas and the perforated passage-way between the same, such view being enlarged. Fig. 3 is a vertical sectional view of a regulating-valve enlarged. Fig. 4 is a plan view, inverted and enlarged, of the disk used in the regulating-valve. Fig. 5 is a plan view, enlarged, of the perforated connection between the chambers illustrated in Fig. 2. Fig. 6 is a vertical sectional view of the pipe and

perforated thimble. Fig. 7 is a view of the front end of the pump-cylinder, the head and piston being removed, and also showing a portion of the inlet and outlet water or fluid pipe, the chuck-valve in such outlet-pipe and the relief-valve and pipe attached thereto; and Fig. 8 is a view taken on the line  $x x$  of Fig. 7, showing the chuck-valve in the outlet-fluid pipe and the connection of the relief-pipe and relief-valve therewith.

Similar letters and figures refer to similar parts throughout the several views.

10 is a pump-cylinder; 11, its piston-rod provided with a suitable piston within the cylinder, which is not shown, and it will be understood that the piston-rod is connected with a suitable cross-head and with connecting-rods and driving-crank from a motor, which are not shown in the drawings. The pump-cylinder 10 is secured in any suitable manner—as, for instance, by the frame 12—to the bed-plate or floor A, and is provided with a fluid-inlet pipe, which is fitted and secured water-tight in the perforation 13 of the cylinder, which perforation may be in the end or in the side near an end of such cylinder. Such inlet-pipe is not shown in the drawings, except at 13<sup>a</sup> in Fig. 7, as its construction is well understood and common to all pumps. So, too, the inlet-pipe is provided with a chuck-valve or other suitable valve and air-chamber, neither of which are shown in the drawings, as their use in general in pumps and their construction and operation are well understood. A perforation similar to 13 is made in the opposite side of the cylinder, into which is fitted the fluid-outlet pipe 14 water-tight, such pipe also being provided with a chuck-valve or other suitable valve. This portion of the said pipe and its valve are not shown in the drawings, except at 14<sup>b</sup> of Figs. 7 and 8, for the same reasons which I have stated relating to the fluid-inlet pipe. Connected to said outlet-pipe and its chuck-valve is a relief-pipe 15, which is provided with the regulating-valve 16.

I will now describe the construction of the regulating-valve 16, which is provided with a well 17, horizontal inlet passage-way 18, and horizontal outlet passage-way 19, the latter being above or out of line with the former, the outer ends of the passage-ways terminating in the cylindrical formed threaded apertures 20 for the reception of the threaded ends of

the relief-pipe. A vertical cylindrically-formed aperture 21 communicates with the well and horizontal passage-ways. A disk 22 has attached upon its under side three vertical legs 23 at points equidistant from each other, and attached to the upper side of said disk centrally is a vertical pivot 24. The legs of the disk enter the well and rest upon the bottom thereof, while a lower portion of the bottom of the disk rests upon the floor of the horizontal passage-way 19, and the remaining view of such disk adjoins the wall of the aperture 21. The coil-spring 25 is placed within the vertical aperture 21, the bottom of the coil resting upon the disk and surrounding its pivot 24, the interior of such coil-spring being provided midway with a short brass or metal core 26, of size and form to be tightly grasped and held by its surrounding coils. The upper portion of the vertical aperture 21 is threaded, as at 27, which aperture receives the threaded follower-stem 28, and to prevent leakage of gas such stem is surrounded by a stuffing-box 29, attached to the wall of the vertical aperture 21, and the follower-stem is provided with a handle 30 for screwing or unscrewing such stem. At the end of the cylinder opposite to the end where the fluid is admitted and ejected are two pipes 31 and 32, entering such cylinder and fitted therein gas-tight. The pipe 31 is the gas-inlet pipe, which admits the carbonic-acid gas from a flask or receiver (not shown in the drawings) to the cylinder, and the other pipe 32 conveys the carbonic-acid gas from the cylinder to the common receiving-chamber, and the pipe 14 also conveys the fluid to the same common receiving-chamber. The inlet gas-pipe 31 and the outlet-pipe 32 are each provided with chuck-valves 33, or other suitable valves, the construction and use of such valves being well understood without further description or explanation. The receiving-chamber is connected with another by a series of fine perforations, the object being to mingle the fluid and gas together in the common chamber, and by means of the pressure exerted from the pump to force such mass from the common chamber through the perforations into the adjacent chamber for the purpose of mixing the gas with the fluid, and to designate this part of my device as an entirety I will denominate it a "mixing-vessel" 34.

Various forms of constructing my mixing-vessel may be made; but I prefer, however, to embody it in the form which I will now describe: I connect the extreme ends of the fluid-outlet pipe 14 and the gas-outlet pipe 32 at right angles to each other, as at 35, by a suitable joint. I use a base 36, having a horizontal aperture 37 through it, the ends of which are interiorly threaded, as at 38 and 39, and it is also provided with a cross vertical registering perforation, as at 40. At the intersection of the horizontal perforation 37 and vertical perforation 40 the chamber is enlarged, and the lower and upper portions of the vertical

perforation 40 are threaded, as at 41 and 42. The intersecting parts of the fluid-outlet pipe 14 and the gas-outlet pipe 32 are located within the chamber formed in the base by the intersection of the horizontal perforation 37 with the vertical perforation 40, while the fluid-outlet pipe 14 and the gas-outlet pipe 32 are each exteriorly threaded at the point of connection with the base, so as to form tight joints or connections with such base. The outlet gas-pipe 32 is continued vertically above the point of intersection with the fluid-outlet pipe 14, forming the common receiving-chamber 43, the top of which chamber is covered with a cap 44, finely perforated. I place on the upper part of the base an inverted cup 45, threaded to engage with the threads 42 of the upper portion of the vertical perforation of the base, so as to make a tight joint or connection therewith, the interior of which cup forms the additional chamber 46, connected with the common receiving-chamber 43 by the perforations through the cap 44, separating the chambers. The end of the outlet-pipe 47 from the mixing-vessel is exteriorly threaded to make a tight joint or connection with the threaded portion of the horizontal aperture 37 through the base 36.

For the purpose of further agitating and mixing the fluid and gas I conduct the mass through a series of vertical pipes parallel to each other and connected, forcing the same at intervals through fine perforations in obstructions placed in such pipes. I prefer to embody this portion of my invention in this form; but it will be understood that many modifications and changes may be made without departing from the scope of my invention.

I will now describe the method which I prefer. The series of vertical pipes 48 and 49 are connected in pairs by semicircular pipes 50 and 51 at top and bottom, the interior ends of the semicircular pipes and the exterior ends of the vertical pipes being suitably threaded to make such connections gas-tight. The portion of the semicircular pipe 51, which receives an end of vertical pipe 49, is provided interiorly with a shoulder 52. The thimble 53 is provided with a perforated cap 54 and also perforated in its sides, and its opposite end is provided with a flange 55. The thimble is placed with its flange upon the shoulder 52 of the semicircular pipe 51, and the end of the vertical pipe 49 is then screwed in said pipe 51, thus firmly securing the thimble within such pipe, as shown in Fig. 6. Each vertical pipe 49 is thus provided with a thimble, and the number of series of vertical pipes may be as desired. To the last vertical pipe of the series I connect an exit-pipe 56, which leads to the flask or receiver, which is not shown in the drawings, and in this pipe I also connect a regulating-valve 57, which is of similar construction to the regulating-valve 16 illustrated in Fig. 3, but is not connected with a relief-pipe. The horizontal pipes may

be secured to the floor or bed-plate A by a frame B C or in any other suitable manner.

In operation—as, for instance, in the manufacture of soda-water—the water is pumped 5 in the cylinder by an inlet-pipe communicating with such cylinder through the orifice 13, and carbonic-acid gas is also pumped into the cylinder by means of the inlet gas-pipe 31, while such water is ejected from the cylinder 10 through the pipe 14 and the gas through pipe 32. The forward stroke of the piston pumps water into the cylinder and at the same time ejects the gas from such cylinder, and the return or backward stroke of the piston 15 pumps gas into the cylinder and ejects the water therefrom. If it is found that too much water is being pumped into the mixing-ves- 20 sel, the same may be regulated through the regulating-valve 16 by unscrewing the stem 28, so as to relieve the disk 22 from great pressure from the coil-spring, or the pressure may be increased when desired by screwing down such stem. The gas and water, when 25 so pumped, are discharged into the chamber 43 of the mixing-vessel, and the pressure from the pump causes such gas and water to pass through the perforations in the cap 44 into the chamber 46, thus mingling the gas and water together, and the continuation of the 30 pressure forces the same through the aperture 37 in the base and through the outlet-pipe 47 and down pipes 48 and up pipes 49 and through the exit-pipe 56 to the flask or receiver.

In the passage of the gas and water from the mixing-vessel by reason of the continued pressure the same is caused to pass through the perforated thimble in each vertical pipe 49, thus causing further mixing of the gas 40 and water.

The valve 57 may be regulated in the same manner as already described as to valve 16, through which means the discharge of the water and gas through the exit-pipe may be 45 controlled.

It will be understood that many modifications and changes may be made in my device without departing from the scope of my invention, and from the description given persons skilled in the art will understand the 50 construction and use of my device.

I am aware that it is old in a carbonating apparatus to combine with a receiver and a pump for supplying liquid and gas thereinto 55 a series of incorporator-vessels, with a pipe in each incorporator-vessel leading upward therein, the pipes being of gradually-decreasing size from the inlet to the outlet end of the series, so that the liquid and gas delivered by the pump are discharged through the pipe in the first incorporator-vessel and fall from the top to the bottom of such vessel, such liquid and gas being thence delivered to a second incorporator-vessel in the same manner, and so on 60 through all the series until it is finally delivered into a receiver.

I am also aware that it is old in an apparatus

for charging liquors with gases to combine with a tank and a tube delivering gases there- in an inverted cup or receiver so located 70 and fixed upon a shaft revolving within said tank and operated by power from without as to revolve with said shaft and receive the gases delivered by said tube, such inverted cup or receiver having rigidly fixed radially- 75 projecting perforated tubes with open external ends, and also to provide two or more similarly-arranged tanks connected by systems of pipes, whereby the gases and liquors may pass from an upper tank to a lower tank 80 through a connecting liquor-discharging pipe prolonged within said lower tank near its top in any convenient direction, the part within said lower tank being formed with perfora- 85 tions. I do not claim such combinations, broadly.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a soda-water apparatus, the combination, with a pump and pipes for discharging 90 liquid and gas therefrom, of the mixing-vessel provided with the chambers 43 and 46 and the finely-perforated cap between such chambers and connecting the same, said liquid and gas discharging pipes from said pumps enter- 95 ing into the chamber 43, and the outlet-pipe leading from said chamber 46, substantially as described.

2. In a soda-water apparatus, the combination, with a pump and passage-way through 100 which liquid and gas are discharged while mixed, of a series of vertical pipes connected by semicircular pipes in alternate pairs at top and bottom, each upper semicircular connect- 105 ing-pipe being interiorly provided with a rigidly-fixed perforated thimble for the passage of the liquid and gas, the first of such vertical pipes of the series connected with said passage-way through which such liquid and gas are discharged while mixed, and the last 110 of such vertical pipes of the series connected with the exit-pipe, substantially as described.

3. In a soda-water apparatus, the combination, with the pump, of the liquid-outlet pipe 14, the relief-pipe 15, the regulating-valve 16, 115 the gas-outlet pipe 32, said outlet-pipes leading from the pump to the chamber 43 of the mixing-vessel, the mixing-vessel composed of the chambers 43 and 46 and connected by the perforated cap 44, the outlet-pipe 47, leading 120 from the chamber 46 to the series of vertical pipes, the series of vertical pipes 48 and 49, connected in alternate pairs by the semicircular pipes 50 and 51 at top and bottom, the perforated thimble located within each semi- 125 circular pipe 51, and the exit-pipe 56, leading from the last vertical pipe of the series, and such exit-pipe provided with the regulating-valve 57, for the purposes stated, and substantially as described.

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Witnesses:

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