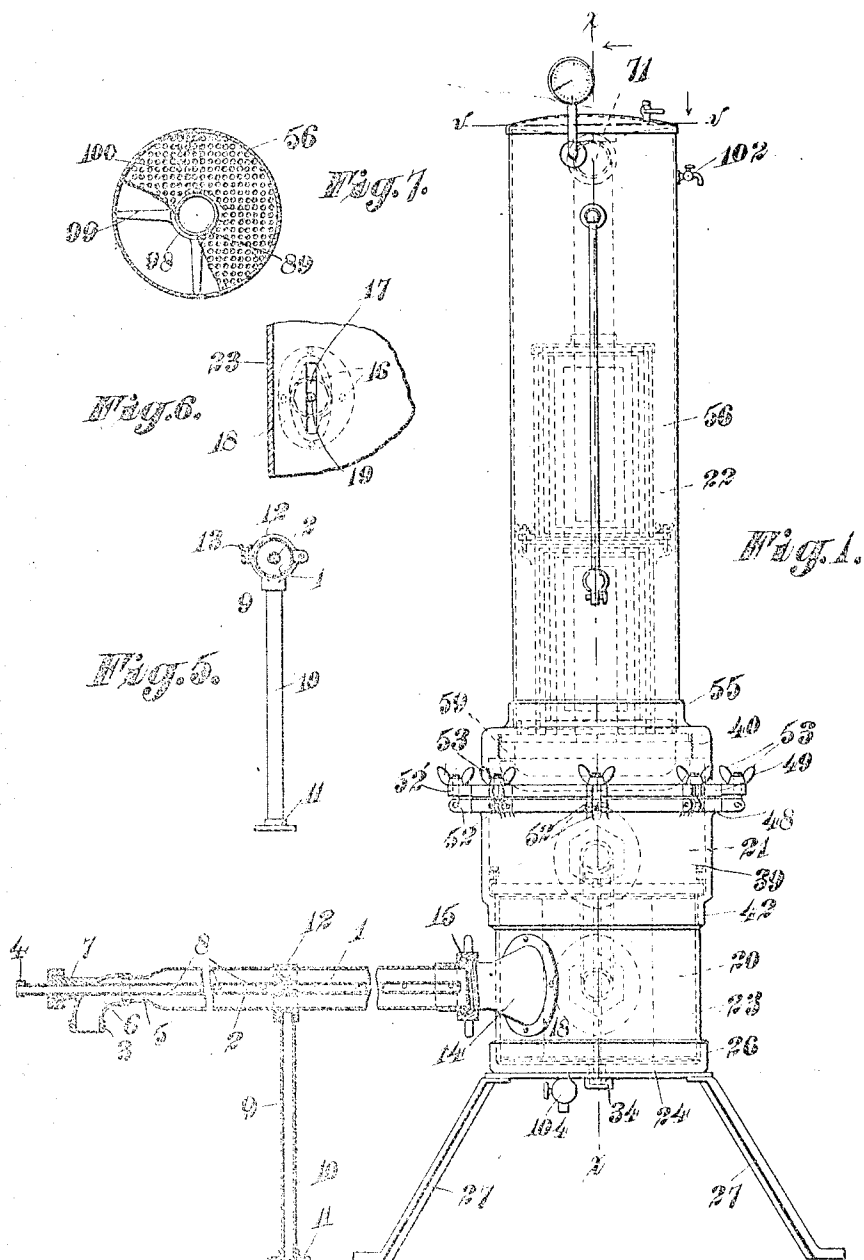


E. MAREK.
CARBONATING APPARATUS.
APPLICATION FILED MAR. 18, 1908.

918,567.

Patented Apr. 20, 1909.
3 SHEETS—SHEET 1.



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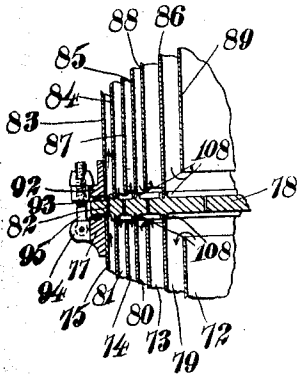
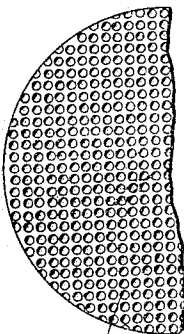


Fig. 8.



68
Fig. 9.

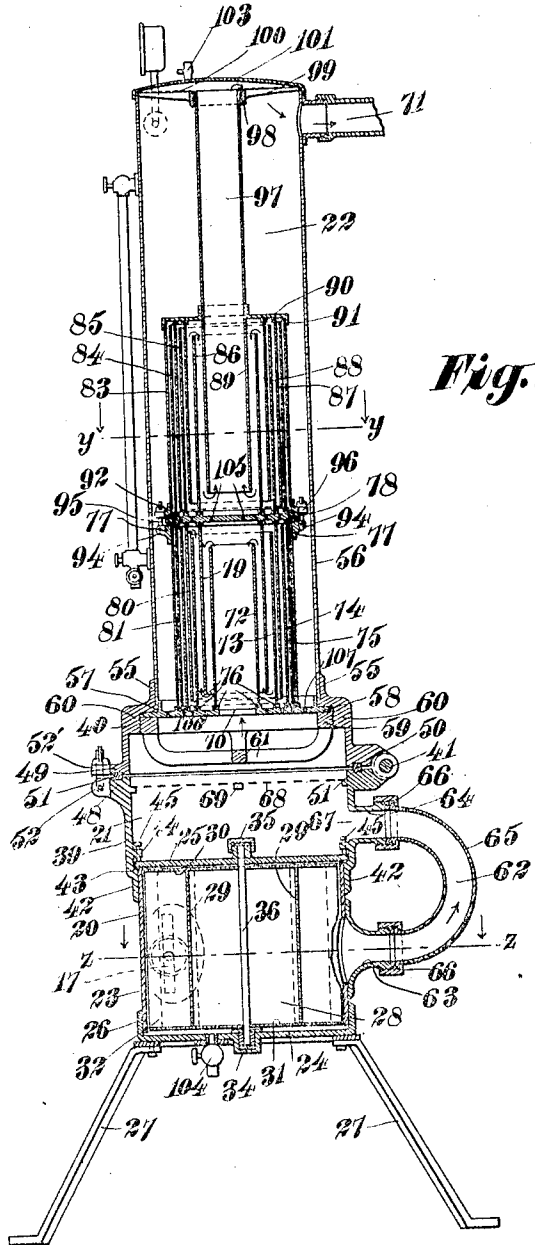


Fig. 2.

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3 SHEETS—SHEET 3.

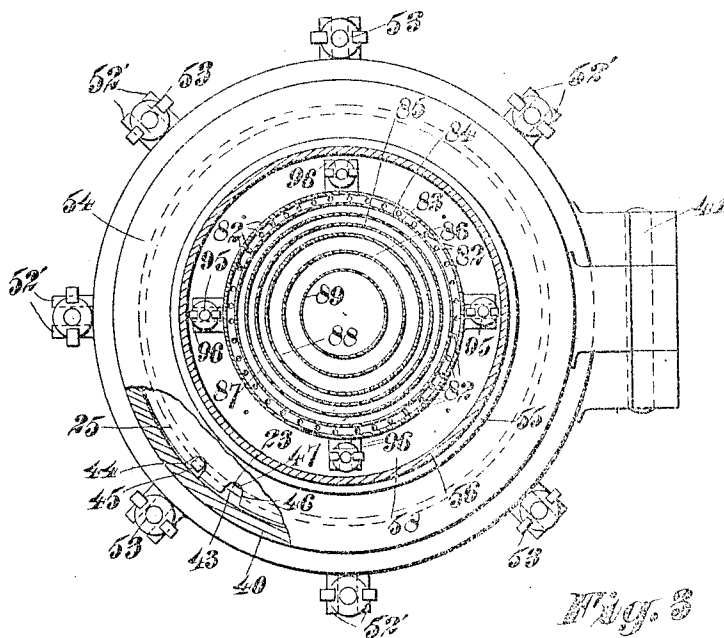


Fig. 3

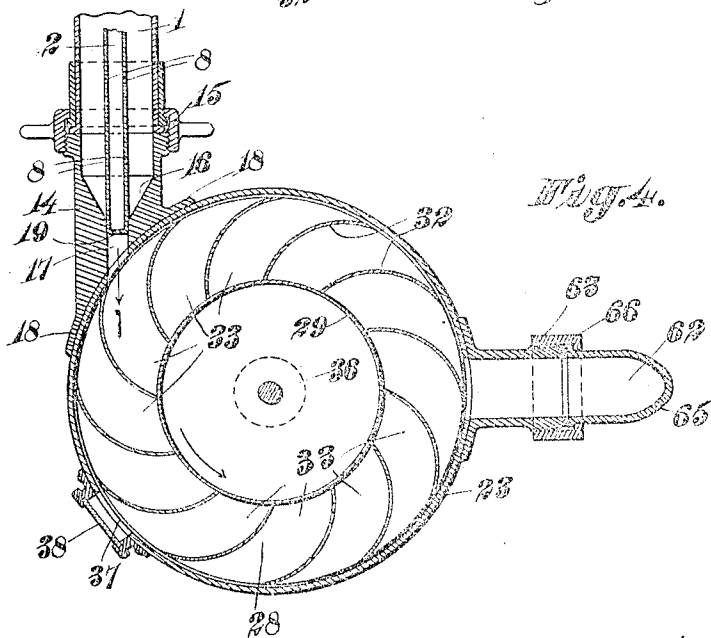


Fig. 4.

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UNITED STATES PATENT OFFICE.

ERNEST MAREK, OF CHICAGO, ILLINOIS.

CARBONATING APPARATUS.

No. 918,567.

Specification of Letters Patent.

Patented April 20, 1909.

Application filed March 16, 1908. Serial No. 421,369.

To all whom it may concern:

Be it known that I, ERNEST MAREK, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Carbonating Apparatus, of which the following is a specification.

My invention relates to carbonating apparatus, that is to devices for charging beverages with carbonic acid gas.

The object of my invention is to provide an improved carbonating apparatus which shall operate under low pressure to thoroughly saturate or charge a beverage with the gas.

A further object of my invention is to provide a carbonating apparatus which may be readily and quickly taken apart to thoroughly clean the same.

A further object of my invention is to provide a carbonating apparatus which may be perfectly drained with but little trouble, to prevent the liquid or any portion thereof remaining therein to become stale after the operation of the device has ceased.

Other objects will appear hereinafter.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a side elevation of a carbonating apparatus embodying my invention in its present preferred form, Fig. 2 is a vertical section on the line $x-x$ of Fig. 1, Fig. 3 is a horizontal section, upon an enlarged scale taken on the line $y-y$ of Fig. 2, Fig. 4 is a horizontal section on the line $z-z$ of Fig. 2, Fig. 5 is a detail of the support for the inlet pipe, Fig. 6 is a detail of the inlet nozzle or port, Fig. 7 is a section on the line $r-r$ of Fig. 1, Fig. 8 is an enlarged detail sectional view illustrating the manner of connecting certain portions of the mixer, and Fig. 9 is a fragmentary detail view of one of the strainers.

My invention, although applicable to carbonating various beverages, is particularly designed and adapted for carbonating beer, and in the following description I shall so mention it.

In carrying out my invention the beer and gas are admitted through concentric pipes, that carrying the gas being within the other. The pressure on the beer is very low and at of the gas a little greater, and the pipe

supplying the gas is perforated at intervals, hence the gas will be injected and partially mixed with the beer before it reaches the body of the apparatus. The combined beer and gas is injected tangentially into a cylindrical chamber and suitable means are provided therein for churning the mixture. The beer thence passes into and through a straining chamber and into a mixing chamber where it is moved rapidly in opposite directions to complete the mixture and thoroughly incorporate the gas with the beer. The beer is then further strained and conducted through a pipe to a suitable receptacle.

In the device embodying my invention I prefer to arrange the several chambers one above the other, and inject the beer into the lower one and withdraw it from the top of the apparatus.

Referring now to the drawings 1 indicates the beer inlet pipe and 2 the gas inlet pipe each connected to a suitable source of supply by the coupling members 3 and 4 respectively. The outer end of the pipe 1 is reduced in diameter as at 5 and the reduced end is provided with an elbow joint 6 upon which is formed the coupling member 3. The elbow 6 is provided with a stuffing box 7 through which the pipe 2 extends, the pipe 2 being arranged concentrically within the pipe 1. The pipe 2, between the reduced portion 5 and the body of the apparatus, is provided with a plurality of small holes 8 which form nozzles through which the gas is injected or sprayed into the beer. The nozzles being in advance of the reduced portion 5, the increased pressure due to the injection of gas tends to force the beer forwardly into the apparatus instead of retarding its passage through the pipe. 9 indicates a support for the pipe. This comprises a vertical arm 10, preferably formed of pipe, and having a base 11 by which it is secured to the floor. Upon the upper end of the pipe 10 is arranged a clamp for the pipe 1. The clamp comprises a two-part ring 12, the parts of which are hingedly connected and provided with the clamp screw 13.

The pipe 1 is connected to the injecting nozzle 14 by a coupling 15. The nozzle 14 at its outer end is circular to correspond with the pipe 1 and the passageway therethrough is contracted laterally as at 16 and flared or increased vertically, terminating in the nar-

row vertically disposed discharge opening 17. The nozzle 14 is provided with a flange 18 by which it is secured to the body of the apparatus. It should be noted that the end of the pipe 2 extends within the opening 17 and is provided in its end with a small aperture or nozzle 19. The opening 17 is substantially the same width as the pipe 2, hence the beer and gas must pass above and below the same in entering the lower mixing chamber. As the gas is injected laterally from the pipe 2 into the beer contained in the pipe 1, it will be partially mixed therewith before entering the body of the apparatus. The shape of the nozzle 14 tends somewhat to check the free flow of the beer and gas, and it is to counteract this tendency to drive the beer backwardly in the supply pipe, as well as for the purpose before mentioned, that the beer pipe is provided with the reduced portion 5.

The body of the apparatus comprises the three chambers 20, 21 and 22 arranged one above the other. The lower chamber 20 is necessarily cylindrical and the superimposed ones preferably so. The chamber 20 constitutes the churning chamber and it is into this that the inlet discharges, the nozzle 14 being secured to the walls thereof and arranged to discharge tangentially, therinto. The chamber 20 is defined by the vertically disposed cylindrical member 23 the bottom 24 and the top plate 25. The bottom 24 is formed of a circular casting having an annular flange 26 within which the cylindrical member or shell 23 is soldered. The member 24 also constitutes the bottom of the apparatus and is supported upon the legs 27.

Mounted within the chamber 20 is a rotary wheel or churn 28. This substantially fills the chamber and is arranged to rotate upon a vertical axis. The churn comprises a central, vertical cylindrical portion 29 of substantially half the diameter of the shell 23, and concentric therewith, the top and bottom plates 30 and 31 respectively, and a plurality of veins 32. The plates 30 and 31 are circular and extend almost into contact with the walls of the chamber 20, that is the shell 23 and the veins are arranged between the outer portions of the plates which extend beyond the cylinder 29. The plates close the cylindrical portion of the churn and the veins are soldered or otherwise secured to the plates and to the portion 29 forming a plurality of pockets 33. The beer is injected tangentially of the chamber into the pockets 33 as shown in Fig. 4 which causes the churn to rapidly rotate, mixing the beer and the gas. The churn is mounted in bearings 34 and 35 in the plates 24 and 25 respectively, 36 indicating the shaft. The front wall of the chamber is provided with an aperture 37 closed by a glass 38 through which the operation of this portion may be observed.

The chamber 21 is formed of two cylindrical castings 39 and 40 hingedly connected as at 41. The member 39 is slightly larger in diameter than the member 23, but the lower portion thereof is reduced forming a depending flange 42 by which it is soldered to the cylinder 23. By reducing the lower portion of the member 39 a shoulder 43 is formed, flush with the upper end of the member 23 and upon which the plate 25 rests. Slightly above the level of the plate 25 the inner face of the casting 39 is provided with a plurality of lugs 44 through which are threaded set screws 45. These impinge against the upper face of the plate 25 near its edge and hold it firmly in position. The plate is provided with a plurality of notches 46 in its periphery corresponding in number and position to the lugs 44. The plate may be readily placed in position, the notches passing over or past the lugs after which the plate is turned to bring an unnotched portion of the periphery beneath the set screws. It should be noted at this point that the notches 46 are sufficiently large to extend a trifle beyond the inner face or edge of the member 23 forming a number of very small apertures 47, the purpose of which will appear hereinafter.

The member 40 is of substantially equal diameter of the member 39 to which it is hingedly connected as before mentioned. The members 39 and 40 are provided with the peripheral flanges 48 and 49 upon their upper and lower edges respectively. The adjacent faces of the flanges 48 and 49 are provided with the annular grooves 50 to receive a rubber gasket 51. The flange 48 is provided with a plurality of ears or lugs 52 to which are hingedly connected clamp screws 53. The flange 49 is provided with a number of split or bifurcated lugs 52' to receive the screws 53. It is obvious that by loosening the screws 53 and turning them down, the chamber 21 may be opened. The top of the member 40 turns inwardly a short distance as at 54 and is provided with an annular vertically disposed flange 55 to which the shell 56 of the upper chamber 52 is connected, preferably by soldering, the inner edge of the portion 54 being formed with an annular rib 57 forming a shoulder upon which the bottom edge of the shell 56 rests.

58 indicates a plate forming a horizontal partition between the chambers 21 and 22. This is larger in diameter than the shell 56 and is held against the underface of the portion 54 by an annular nut 59, the upper end of the member 40 being thickened and threaded as at 60 to receive said nut. The nut 59 comprises a ring the internal diameter of which is substantially equal to that of the chamber 22 and provided with the spider 61 by means of which it is inserted or removed. The chambers 20 and 21 communicate with each other through a passageway 62 ex-

terior of the body portion. To this end the shell 23 and the member 39 are provided with the nipples 63 and 64 respectively to which are secured the ends of a return bend 5 65 by means of the detachable couplings 66. The passageway 62 discharges into the lower portion of the chamber 21, that is just above the plate 25 as at 67, and above the discharge opening 67 is arranged a horizontal plate or 10 diaphragm 68 supported upon the lug 69. The plate 68 is perforated and serves to strain the beer as it passes therethrough. From the chamber 21 the mixture passes through an aperture 70 in the center of the plate 58, 15 into the upper chamber 22 where it is passed rapidly back and forth through a mixer which I shall designate a shaker and thence through a similar superimposed shaker finally discharging into the body portion of the 20 chamber 22 from the top of which it is withdrawn by a pipe 71. Each shaker comprises a plurality of concentric tubes arranged between end plates to which alternate tubes are secured forming a tortuous passageway for 25 the mixture.

Referring now to the drawings 72, 73, 74 and 75 indicate a plurality of concentrically arranged and vertically disposed tubes secured at their lower ends to the plate 58, the 30 upper face of said plate being provided with the grooved annular ribs 76 into which they are soldered, and each tube is somewhat longer than the next adjacent tube, the inner tube being the shortest and the outer tube 75 the longest. The outer tube 75 is provided 35 with an annular flange 77 at its upper end, the function of which will appear hereinafter. 78 indicates a plate or disk resting upon and closing the upper end of the tube 75. From 40 the under face of the plate 78 depend the concentric tubes 79, 80 and 81 which telescope between the several tubes 72 to 75 forming a tortuous passageway for the beer and gas. The inner tube 79 is the shortest of 45 the three and the others are each somewhat longer. As the inner tubes which are the smallest in diameter do not approach as close to the opposite plates as the larger ones the difference in their lengths, compensates for 50 their diameter and maintains a passageway of substantially uniform diameter throughout. As the mixture passes rapidly up and down between the several tubes it is well shaken. The mixture follows the course indicated by the arrows in Figs. 2 and 8, and 55 as it rises between the tubes 75 and 81 it passes through apertures 82 in the plate 78 into a similar mixer or shaker formed of the concentric tubes 83, 84, 85 and 86, extending 30 upwardly from the plate 78, and the tubes 87, 88 and 89 depending from a plate or disk 90 intermediate or alternately with the tubes 83 to 86.

In the drawings, the apertures 82 are 35 shown the proper size and the other aper-

tures in the plate 78 are illustrated as small as possible to properly illustrate the same. While the latter apertures are perhaps smaller than the apertures 82, this is not an absolute necessity as there are a great number 70 of the apertures 82 and but a small number of the other apertures, perhaps three or four to each compartment or merely enough to drain the machine when standing inoperative overnight or other considerable 75 length of time. The small amount of beer which would pass through these apertures would make no perceptible difference in the carbonating. The lengths of the several tubes 83 to 89 are varied similar to those of 80 the lower shaker and for a like purpose. The plate 90 is provided with an annular depending flange 91 on its periphery by means of which it is secured to the outer tube 83 of the upper shaker and the tube 83 is provided 85 with an annular flange 92 at its lower edge between which and the flange 77 the outer edge of the plate 78 is secured.

93 indicate rubber gaskets interposed between the plate 78 and the flanges 77 and 92. 90 The flange 77 is provided with a plurality of lugs or ears 94 to which are pivotally secured the clamp screws 95, and the flange 92 is provided with a corresponding number of split or bifurcated lugs 96 to receive said screws. 95

The tube 89 extends considerably above the plate 90 as at 97 substantially to the top of the chamber 22 and is provided at its upper end with a flange or collar 98 from which 100 extend the radial arms 99.

100 indicates a perforated plate resting upon the arms 99. The carbonated beer rises through the pipe 89 and passes out of the upper end thereof beneath the closure 101 of the chamber 22, down through the 105 strainer 100 into the body portion of said chamber from whence it is drawn off through the pipe 71.

102 indicates a small cock at the upper end of the chamber for drawing off portions of 110 the beer for testing.

In operating the device it is completely filled with the beer, all air being excluded, and to this end the upper closure 101 is provided with an air valve 103 to draw off the 115 air as the machine is filled.

It is well known that if the beer is allowed to stand for any length of time it soon becomes stale, and it is one of the objects of my invention to provide a machine of the character under consideration from which all of 120 the beer in the machine may be readily withdrawn when the operation of the machine is stopped. To this end I provide a draw-off valve 104 in the bottom 24 of the device. It 125 is obvious that the beer in the chambers 20 and 21 may be readily withdrawn in this manner, that above the level of the opening 67 readily passing through the passageway 62 into the lower chamber. The beer below 130

the level of the opening 67 gradually drains off through the apertures 47 hereinbefore described, into the chamber 20.

105 indicate small apertures extending 5 through the plate 78 for draining the pockets formed by the vertical tubes of the upper shaker and 106 indicate similar apertures in the plate 58 for a like purpose. The plate 58 is also provided with several small apertures 10 107 for draining the upper chamber 22. The several drain apertures above mentioned, are not of sufficient size or number to interfere with the operation of the machine.

The device may also be readily taken apart 15 for cleaning, every portion thereof being accessible. To dismember the machine the binding screws 53 are loosened and thrown back after which the upper portion of the machine may be turned back on the hinge 41. 20 The screws 45 may then be loosened and the plate 25 removed, after which, the wheel or churn in the lower chamber may be removed. The nut 59 is then unscrewed and the shakers together with the strainer 100 is withdrawn. 25 It should be noted at this point that the plate 58 and the shakers are securely fastened together. The clamping screws 95 are then loosened after which, the shakers are ready to be taken apart, the tubes attached to the 30 plates 58, 78 and 90 readily telescoping from within each other. It will be seen that every part of the machine is thus accessible for thorough cleaning. The plates 78 and 90 are each provided with the grooved annular 35 ribs 108, similar to the ribs 76 and for a like purpose.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

40 1. In a carbonating apparatus, a cylindrical chamber in combination with a rotary churning device therein, said device comprising a cylindrical member substantially filling said chamber and provided with a plurality of peripheral pockets, a combined beer and gas 45 inlet for injecting the beer and gas tangentially into said chamber and an outlet, substantially as described.

2. In a carbonating apparatus, a chamber 50 in combination with a rotary churning device arranged therein, a beer inlet pipe arranged to discharge tangentially into said chamber, a gas inlet pipe arranged within said beer pipe and adapted to inject the gas into the 55 beer before entering said chamber, and an outlet for said chamber, said churning device being arranged to turn upon a vertical axis and said beer inlet being laterally reduced and vertically elongated, substantially as 60 described.

3. In a carbonating apparatus, a chamber provided with a rotary churning device in

combination with an inlet for admitting beer and gas thereto, a straining chamber arranged above the churning chamber and a 65 mixing chamber arranged above said straining chamber and an outlet, said chambers being separated by horizontal partitions and said partitions being provided with drain openings and the bottom chamber with a 70 drain valve, substantially as described.

4. In a carbonating apparatus, a mixer comprising a pair of end plates and a plurality of concentric tubes arranged between 75 said plates, the alternate tubes being attached to the opposite plates forming a tortuous passage, and the outer tube extending from plate to plate forming a casing and the other tubes being radiated to length as they approach the center, in combination with 80 means for supplying beer and gas thereto and an outlet, substantially as described.

5. In a carbonating apparatus, a chamber provided with a churning device in combination with means for supplying beer and 85 gas thereto, a chamber arranged above the first said chamber and in communication therewith, a mixing chamber arranged above said second chamber and divided therefrom by a horizontal partition, a plurality of concentric tubes extending vertically upward 90 from said partition and each of a different height, the outer tube being the tallest, a plate resting on the top of the outer tube and clamped thereon, a plurality of concentric 95 tubes depending from said plate and arranged intermediate of the first said tubes forming a tortuous passageway between them, a drain cock in the bottom of the device and the partitions between each of said chambers being 100 provided with minute drain openings, and certain of said openings being arranged at the bottom of the pockets formed between said concentric tubes, substantially as described. 105

6. In a carbonating apparatus, a bottom churning chamber provided with a beer and gas inlet, a second or straining chamber arranged above the churning chamber and a 110 mixing chamber arranged above said straining chamber; said straining chamber being formed of a pair of castings hingedly connected and provided with suitable fastenings, in combination with removable plates forming partitions between said chambers, substantially as described. 115

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST MAREK.

Witnesses:

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