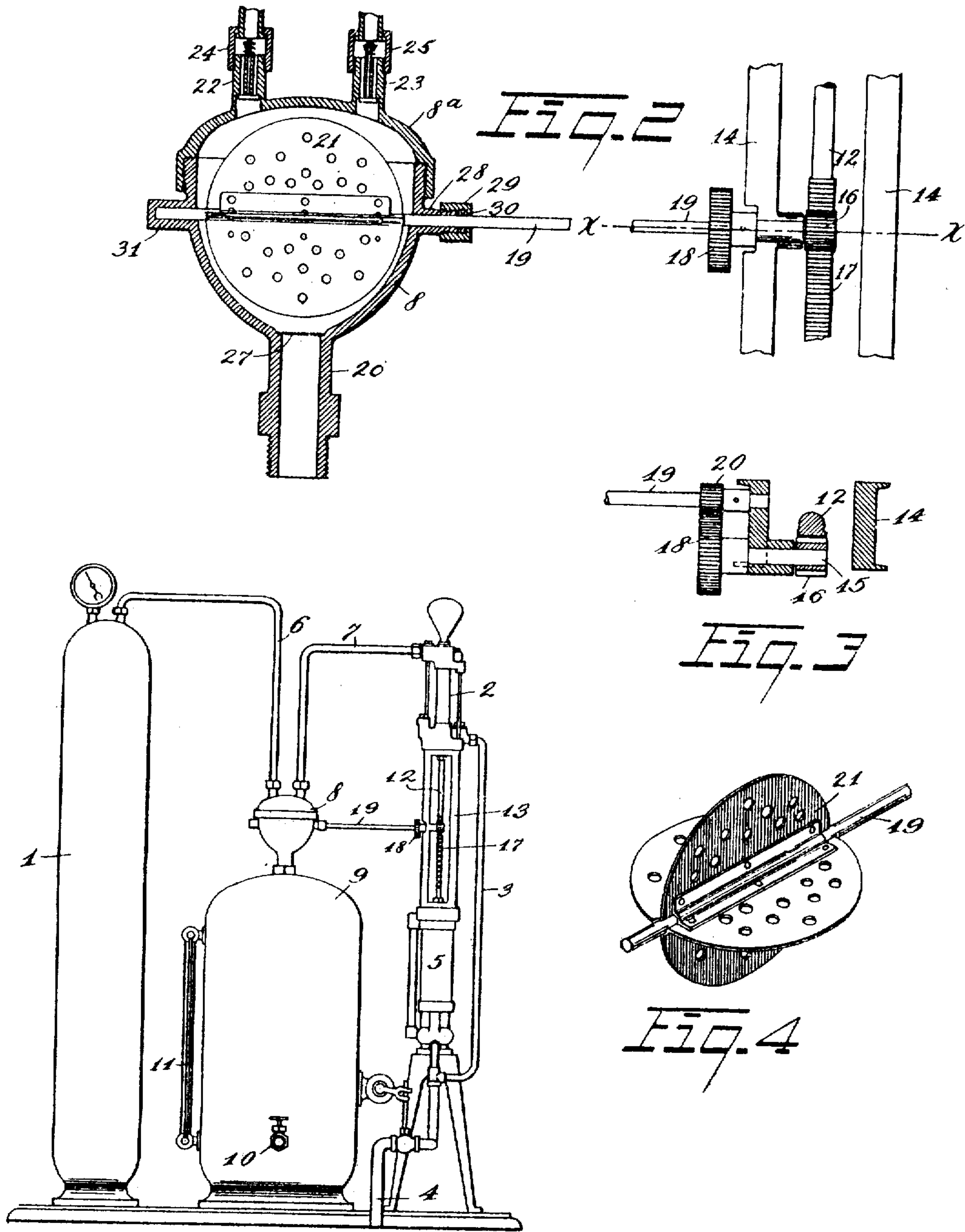


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 AGITATING DEVICE FOR MIXING CARBONIC ACID GAS AND WATER.
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944,717.

Patented Dec. 28, 1909.



Witnesses: *Fig. 1*
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UNITED STATES PATENT OFFICE.

LOUIS CAUL, OF CLEVELAND, OHIO.

AGITATING DEVICE FOR MIXING CARBONIC-ACID GAS AND WATER.

944,717.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed September 18, 1908. Serial No. 453,592.

To all whom it may concern:

Be it known that I, LOUIS CAUL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Agitating Devices for Mixing Carbonic-Acid Gas and Water, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to apparatus for impregnating water with carbonic acid gas and more particularly provides a device which is designed to thoroughly agitate the water and gas as they come into contact so as to secure a complete and intimate mixing of the same. Moreover, the device here shown and described secures a uniform mixture of the water and gas.

Generally speaking, the invention comprises the elements and combinations thereof set forth in the claims.

Reference should be had to the accompanying drawings forming a part of this application in which—

Figure 1 is a diagrammatic illustration in elevation of a complete apparatus embodying my invention for impregnating water with carbonic acid gas; Fig. 2 is a sectional elevation of the mixing chamber containing the agitating device and showing the operating mechanism for the agitator; Fig. 3 is a longitudinal section upon the line $x-x$ of Fig. 2; Fig. 4 shows a perspective view of the agitator.

In Fig. 1 is shown an assemblage of the various elements comprising the apparatus necessary to charge water with carbonic acid gas. In the drawing 1 designates a tank designed to hold carbonic acid gas under pressure. 2 designates a water pump which, by means of suitable pipes 3 and 4, is connected with a source of water supply. 5 designates the pump operating means.

Leading from the gas tank 1 and from the water pump 2 are pipes 6 and 7, which are adapted to convey the gas and water respectively to a receptacle 8 which I designate a mixing chamber. If desired, the water impregnated with the gas may be drawn directly from this chamber and passed into the iron cylinders employed to store the water charged with gas and to transport the same. These tanks are well known in the art. However, I prefer to employ in connection with the mixing recep-

tacle a storage or reservoir tank which is indicated at 9. The mixing receptacle 8 is connected with the tank 9 so that the water after being thoroughly mixed with the gas will pass into the said tank 9 and may be drawn therefrom, so as to fill the ordinary iron transportation tanks, through the valve 10. The gage 11 which communicates with the interior of the tank at points near the top and bottom thereof will indicate the height of the charged water within the tank 9.

The water pump and the engine for operating the pump are in alinement as is customary, and a piston rod 12 operated from the engine 5 extends between the engine 5 and pump 2 to operate the piston. The pump and engine are connected by means of a frame 13 which frame is cylindrical at top and bottom and is securely fastened to adjacent ends of the pump and engine, the top and bottom pieces being joined by vertical ribs 14, as shown in Figs. 2 and 3.

A shaft 15 is journaled in one of the side members 14 and extends on both sides thereof. Upon the inner side is secured a small gear 16 which meshes with a rack 17 which is carried by the piston rod 12. This rack may be formed as a part of the piston rod or may be separately formed and secured thereto. Upon the outer end of the shaft 15 is secured a gear 18.

A shaft 19 is journaled at one end in the same frame member as the shaft 15. The said shaft extends through the mixing receptacle 8 and is journaled at its opposite end in a lug projecting from said casing. The shaft 19 carries a gear 20 which is secured thereto and is in mesh with the gear 18. The gears 18 and 20 are removable from the shafts with which they are respectively engaged so that gears of different ratios may be substituted upon the shafts.

A mixing or agitating device is secured to that part of the shaft 19 which is comprehended between the walls of the mixing receptacle. This mixing device may be of any suitable form to thoroughly agitate the water and mix the same with the gas which is admitted to the interior of the mixing receptacle. The device which I have shown comprises four blades 21 mounted at right angles to each other and secured upon the shaft in any suitable manner. These blades are provided with perforations so as to more thoroughly mix the water and gas.

The mixing receptacle 8 is made in two parts, a lower part which is semi-spherical in shape and a cap 8^a. The cap and lower portion of the receptacle are in screw-threaded engagement so that they may be separated and access to the interior of the receptacle 8 be readily obtained. Upon the cap are two projecting nipples 22 and 23 which are screw threaded and engage with coupling members 24 and 25 by means of which they are joined to the pipes 6 and 7 respectively. The nipples 23 are provided with check valves so that the water and gas having once entered the chamber within the receptacle 8 may not be forced back through the pipes 6 and 7.

The lower portion of the bottom part of the receptacle 8 is formed in the shape of an outlet pipe 26 which is screw threaded at its lower end so that it may engage with a suitable union upon a pipe which may communicate with the ordinary transportation tanks, or, as in the instance shown, the pipe 26 may be connected directly with the reservoir 9. At the upper end of the part 26 is a reticulated member or screen 27, the meshes of which are formed fine enough so as to impede the flow of the water from the interior of the receptacle 8 through the pipe 26 thereby insuring that a certain amount of water will always be retained within the interior of the receptacle.

The shaft 19 extends through a nipple 28 formed upon one part of the receptacle 8, the said nipple being provided with an opening through which the shaft passes. This nipple is screw threaded upon its outer end to engage with a gland nut 29, which gland nut presses packing 30 tightly against the nipple 28 so as to form a water tight joint. The end of the shaft is accommodated within a projecting nipple 31 which is likewise recessed to accommodate the shaft, but the recess in said nipple does not extend entirely through the same.

The operation of the device is as follows: Gas is admitted from the cylinder 1 through the pipe 6, and enters into the interior of the receptacle 8, and likewise water is caused to flow through the pipe 7 to the interior of the receptacle 8, when the engine 5 and pump 2 are started. At such time, the piston rod 12 will reciprocate back and forth, which will cause the gear 16 to be rotated in one direction during the reciprocation of the piston rod in one direction and to be rotated in the opposite direction during the reciprocation of the piston 12 in its opposite direction. The motion of the gear 16 will be communicated to the gear 18 through the shaft 15 and the motion of the gear 18 will be transmitted to the gear 20 and to the shaft 19, which will cause the agitating device connected with the shaft to operate. The agitator will churn and agitate the water with-

in the receptacle 8 so that the water will be practically saturated with gas.

The shaft 19 and mixing device may be operated at a rate of speed slower or faster than the motion imparted to the gear 16, as may be desired, and this is accomplished by substituting for the gears 18 and 20 shown, other gears having varying numbers of teeth which will give the rate of rotation to the shaft 19 that may be desired.

It will be well understood that the shaft 19 may be driven directly by the reciprocations of the pump piston 12 if such be desired. However, as a rule, the speed of rotation imparted to the mixing device, when such direct connection is made, is not sufficient to secure the best results in mixing the gas and water, and therefore it is desirable to operate the mixing device at a higher rate of speed. This may be readily accomplished by the means which I have shown, that is, of employing gears 18 and 20.

I do not confine myself to the use of a storage tank in connection with the mixing chamber and agitator, it being obvious, as before stated, that the gas and water after passing through the mixing chamber may be used directly in a fountain or may be placed in the customary transportation tanks. Furthermore, it is within the scope of my invention to enlarge the capacity of the mixing chamber so that the same may retain within its interior any desired quantity of the fluids to be mixed. Moreover, any desired form of agitating device may be used.

Having thus described my invention, I claim:

1. In a device of the character described, the combination with a source of gas under pressure, of a pump for supplying water under pressure, said pump being provided with a piston rod, of a chambered mixing receptacle, an agitator within said mixing receptacle, a shaft for operating said agitator, and a rack and pinion connection between said pump piston and shaft whereby the agitator will be operated by the movement of the pump piston.

2. In a device of the character described, the combination with a source of gas under pressure, of a pump for supplying water under pressure, said pump being provided with a piston, of a chambered mixing receptacle, means connecting the interior of the chambered mixing receptacle with the source of gas supply and the pump, an agitating device within said receptacle, a shaft for operating the said agitating device, a gear upon said shaft, a frame, a shaft supported within said frame, a gear upon said shaft meshing with the gear upon the first mentioned shaft, a second gear upon the second mentioned shaft, a rack upon the pump piston cooperating with the last mentioned gear.

3. In a device of the character described,
the combination of a source of gas under
pressure, a pump for supplying water under
pressure, a piston for operating the pump,
5 a rack operated by said pump piston, a pin-
ion cooperating with the rack, a chambered
receptacle, an agitating device within said
chambered receptacle, a shaft for operating
said agitating device, and operative connec-
10 tions between the said shaft and the pinion.

4. In a device of the character described,
the combination with a source of gas under
pressure, and a pump having a piston for
supplying water under pressure, of a cham-

bered receptacle, a substantially horizontal 15
shaft journaled in the receptacle, agitating
devices mounted upon said shaft, a pinion,
operative connections between the pinion
and the horizontal shaft, a rack engaging
with said pinion and means for operating 20
said rack from the piston.

In testimony whereof, I hereunto affix my
signature in the presence of two witnesses.

LOUIS CAUL.

Witnesses:

A. J. HUDSON,
S. E. FOUTS.