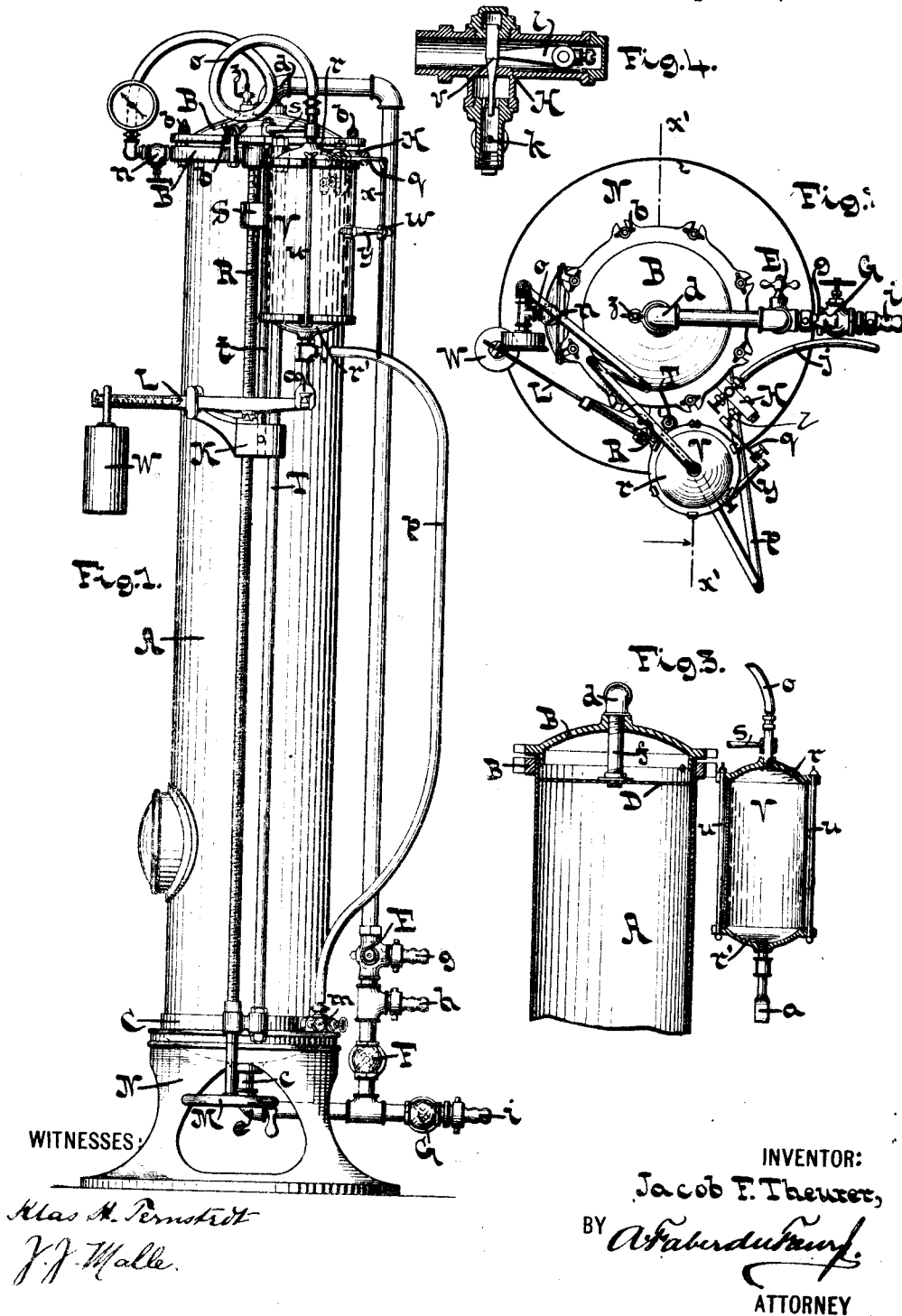


(No Model.)

J. F. THEURER.
APPARATUS FOR CHARGING LIQUIDS WITH CARBONIC ACID GAS.
No. 505,240.

Patented Sept. 19, 1893.



UNITED STATES PATENT OFFICE.

JACOB F. THEURER, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE UNIVERSAL CARBONATING COMPANY, OF NEWARK, NEW JERSEY.

APPARATUS FOR CHARGING LIQUIDS WITH CARBONIC-ACID GAS.

SPECIFICATION forming part of Letters Patent No. 505,240, dated September 19, 1893.

Application filed June 30, 1893. Serial No. 479,237. (No model.)

To all whom it may concern:

Be it known that I, JACOB F. THEURER, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Apparatus for Charging Liquids with Carbonic-Acid Gas, of which the following is a specification.

My invention consists in a new and improved carbonic acid charger to be used principally for the impregnation of beer and other malt liquors in connection with the method and apparatus referred to in United States Letters Patent No. 478,176, dated July 5, 1892, granted to John B. Stobaueus and Frederick C. Wackenhuth.

The nature of my said invention will be best understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a front elevation of the charger and connections. Fig. 2 is a plan view. Fig. 3 is a section on the line $x'x'$ Fig. 2, of the upper part of the charger and of the regulator. Fig. 4 is a sectional view of the regulating valve on an enlarged scale.

Similar letters of reference indicate corresponding parts throughout the several views of the drawings.

Referring now to said figures the letter A designates the charging vessel, which is made of sheet copper lined with tin.

The top end of the vessel A is provided with a brass flange B' riveted and soldered to the shell, and to this flange the brass head or cover B is removably secured by wing-nuts b . The lower end of the vessel A is closed by a brass head C riveted and soldered to the shell and resting upon a base N. The head C has a central hole into which is screwed a nipple c with elbow e .

The cover B has a central hole into which is screwed a pipe f (Fig. 3) projecting some distance down into the charging vessel and carrying at its lower end a foraminous disk D. To the upper end of the pipe f above the head B is screwed an elbow d connected with elbow e at the lower head C in the manner shown, with an interposed three-way cock E and gate-valve F, and with gate valve G on the horizontal lower branch.

g , h and i are hose-connections, and z is an air valve on head B of vessel A.

The flange B' has a lateral outlet to which is attached the globe valve n connecting with a pressure gage and with a flexible hose o ; the lower head C has a lateral outlet into which is screwed an angle valve m with hose p .

V is a glass regulating vessel with brass heads r and r' connected by rods u .

To the upper head r of the regulating vessel is connected a pipe to which the end of the hose o is coupled. To the lower head r' the end of the hose p is coupled, so as to establish free communication from the top of the charging vessel A to the top of the vessel V, and also from the bottom of vessel A to the bottom of vessel V, when valves n and m are open.

The regulating vessel V, is supported upon a vertically adjustable scale beam L, the lower end of the vessel V being provided with a fork a having a steel bearing resting upon a steel knife-edge on the right hand end of the scale lever L, while the pipe projecting from the upper end is guided in an arm s projecting from a vertical rod t . This rod t is attached to a block K and to a block S—and projects above the latter. The block K has a brass nut inserted through which passes the threaded rod R which turns in fixed bearings at the top and bottom of the charging vessel, its lower end projecting through the lower bearing and being provided with a hand wheel M. The block S slides freely on the threaded rod R.

The projecting arm of the block K carries a knife-edge bearing for the scale lever L.

Upon the left hand end of the scale lever is placed an adjustable weight W.

The blocks K and S are prevented from turning by a fixed rod T passing through them and secured at the top and bottom of the charging vessel. By turning the hand wheel M, the block K is moved up or down, carrying with it the scale lever L, supporting the vessel V, also the rod t with its projecting arm s which guides the top of the vessel V, allowing a limited independent vertical motion of the latter.

To a lateral opening in the flange B' of the charging vessel A is attached the carbonic

acid supply piece and regulating valve H shown in Fig. 4 in section on a larger scale. The carbonic acid supply regulated by a suitable valve enters this piece H through flexible tube *j* and opening K, the supply being further regulated by the conical valve *v* operated by lever *l*. To the shaft of this lever *l* is attached on the outside an arm *q* the end of which is pivoted to a rod *x*. An arm *y* is adjustably secured to one of the rods *u* of the regulating vessel V and pivoted in a block *w* adjustably secured on the rod *x*. By an increase in the contents of the vessel V the same is lowered, the arm *y* pulls down the rod *x* and arm *q* thereby opening the regulating valve *v*. On a decrease of the contents of vessel V, it is raised to close the valve *v*.

I will now proceed to describe the operation of the apparatus, assuming that beer is to be impregnated with carbonic acid. The water supply hose is attached to the hose coupling *i*, the cock E and valve F being closed, and water is admitted into the charging vessel A by opening the valve G and the air-cock *z*. As the water rises within the vessel the air is expelled through cock *z* and when the water commences to flow out through the cock *z*, the supply is shut off and cock *z* is closed. The water supply hose is now disconnected from the coupling *i* and the gas supply turned on, the weight W being so placed that the gas valve remains open. The valves E and F are opened so that any water in the pipe may flow out. The gas gradually displaces the water in the cylinder and connections and flows out through coupling *i*, and when the vessel A and connections are filled with gas the valve G is closed, the beer supply hose is connected at coupling *g* and the hose for carrying off the charged beer at coupling *h*. The valves E and F are then properly set. The vessel V is placed at the desired height by turning the hand wheel M and the weight W adjusted so as to obtain the proper degree of impregnation. Whenever through an increased resistance in the discharge of beer, the level of beer in the vessel A rises, the increased weight in the regulating vessel causes the same to descend and increase the opening of the carbonic acid valve *v*. The increased flow of carbonic acid increases the pressure in the charging vessel A so as to overcome the increased resistance to discharge. A fall of the level of the beer in the charging vessel A and regulating vessel V has the opposite effect.

By the means shown and described, in connection with the method and apparatus described in Patent No. 478,176, above mentioned, I am enabled to obtain a uniform impregnation of the beer.

My invention is not restricted to the means shown and described for supporting and adjusting the regulating vessel, or to the arrangement of the various connections, since these may be varied, as well as other details.

If desired the hose coupling *h* for the dis-

charge of the beer may be omitted and the coupling *i* used for the purposes of an inlet and outlet for water, and an outlet for the impregnated beer.

I do not in this application broadly claim the combination in a carbonic acid charger of a charging vessel with means for automatically operating the valve or valves for the admission of liquid or gas by the variation of the liquid level in the charging vessel, such a combination being claimed in my prior application filed January 24, 1893, Serial No. 459,590.

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

1. In a carbonic acid charger the combination of a stationary vertical charging vessel, a liquid supply pipe connected to said vessel at the top and projecting downward into the vessel, a carbonic acid supply pipe entering the vessel above the discharge orifice of the liquid supply pipe, a regulating valve for the gas, a regulating vessel vertically adjustable between the top and bottom of the charging vessel and supported upon a scale beam, flexible connections between the top of the charger and the regulating vessel and between the bottom of the charger and the bottom of the regulating vessel, and connections, substantially as shown and described, for operating the gas regulating valve through the rise and fall of the liquid in the regulating vessel, substantially as and for the purpose specified.

2. In a carbonic acid charger, a stationary vertical charging vessel A with heads B and C, a liquid supply pipe *f* entering said vessel at the top and projecting downward into the charger, connections between the top of said liquid supply pipe *f* and the bottom of the charger A, couplings *g*, *h* and *i* for the liquid to be impregnated and discharged and for water respectively, a regulating vessel V connected with the charger A by flexible hose *o* and *p*, a scale beam L supporting the regulating vessel, a block K vertically adjustable on a screw rod R and supporting the scale beam; a block S through which the screw rod R passes rigidly connected to the block K by a rod *t*, a guide rod T for the blocks K and S, an arm *s* connected to the upper end of the rod *t* and forming a guide for the upper end of the vessel V, a flexible carbonic acid supply pipe *o*, a gas regulating valve *v* operated by an arm *y* projecting from the regulating vessel, and a connection between the outlet of the valve *v* and the top of the charger, substantially as and for the purpose specified.

3. In combination with a stationary charging vessel and a fluid supply valve, of an external movable regulating vessel in communication with the top and bottom of the charging vessel for receiving fluid, and operated by variations in the liquid level, and an operative connection between said regulating vessel and the fluid supply valve, substantially as described.

4. In combination with a stationary charg-

ing vessel, of a liquid supply pipe, a gas supply pipe, an external regulating vessel in communication with the top and bottom of the charging vessel, and operated by variations in the liquid level, means for adjusting said regulating vessel, and an operative connection between the latter and the gas supply valve, substantially as described.

Signed at Milwaukee, in the county of Milwaukee and State of Wisconsin, this 22d day of June, A. D. 1893.

JACOB F. THEURER.

Witnesses:

FRED PABST, Jr.,
W. P. KENNY.