(No Model.)

J. F. THEURER.

APPARATUS FOR CHARGING LIQUIDS WITH CARBONIC ACID.

No. 512,070. Patented Jan. 2, 1894.

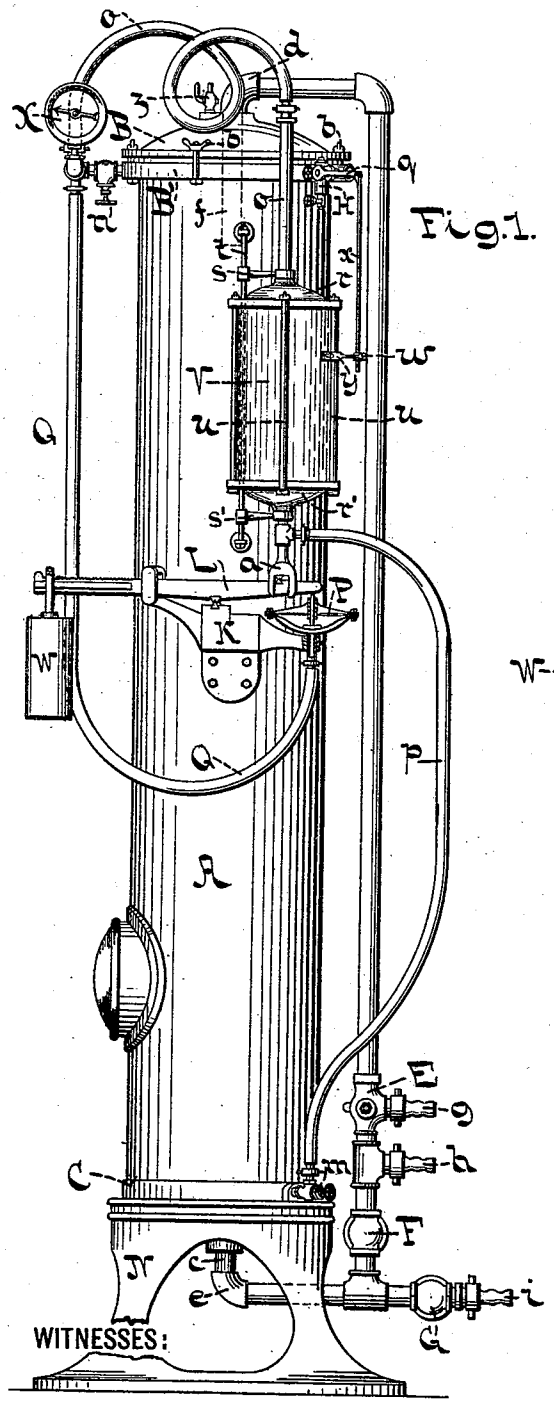

Fig. 1.

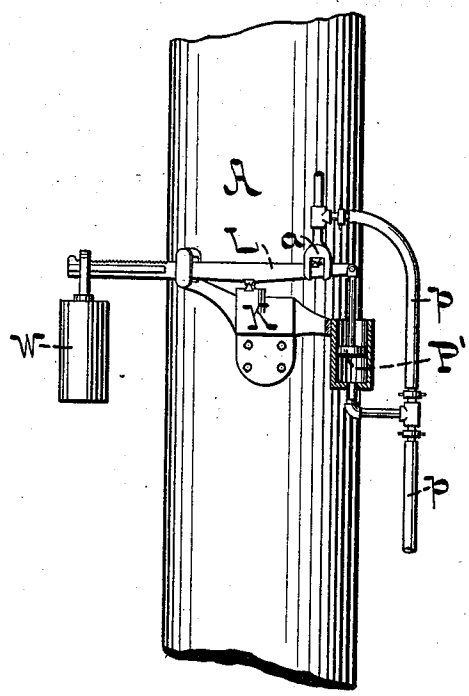

Fig. 2.

WITNESSES:

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APPARATUS FOR CHARGING LIQUIDS WITH CARBONIC ACID.

SPECIFICATION forming part of Letters Patent No. 512,070, dated January 2, 1894.

Application filed September 19, 1893. Serial No. 485,878. (No model.)

To all whom it may concern:

Be it known that I, JACOB FRED 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, of which the following is a specification.

My invention consists in improvements in carbonic acid chargers of the nature shown and described in my application for United States Letters Patent filed June 30, 1893, Serial No. 479,237, and it has for its object to dispense with the necessity of providing means for adjusting the regulating vessel at different heights, and to automatically regulate the gas pressure for varying depth of liquid in the charger, and vice versa.

The nature of my 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 partial front elevation of a modification.

Similar letters of reference indicate corresponding parts in the two views.

Referring now to said figures the letter A designates the charging vessel, the top end of which is provided with a brass flange B′ and to this flange the head or cover B is removably secured by wing nuts *b*. The lower end of the vessel A is closed by a head C 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 the liquid supply pipe *f* (shown in dotted lines) projecting some distance down into the charging vessel. 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 horizontal lower branch. *g*, *h*, and *i* are hose-connections, and *z* is an air valve on head C of vessel A. The flange B′ has a lateral outlet to which is attached the globe valve *n* connecting with a pressure gage X and with a flexible hose *o*; the lower head C has a lateral outlet into which is screwed a valve *m* with hose *p* attached.

V is a glass regulating vessel or lantern with heads *r r′* connected by rods *u u*. To the upper head *r* of the lantern V is connected a pipe to which the end of the hose *o* is coupled and to the lower head *r′* of the lantern 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 regulating vessel or lantern V and also from the bottom of the charger A to the bottom of the lantern V, when the valves *n* and *m* are open.

L is a scale beam supported on a bracket K attached to the charger A. The lower end of the lantern V is provided with a fork *a* having a steel bearing which rests upon a steel knife-edge on the right hand end of the scale beam L, while the pipe projecting from the upper end of the lantern is guided by arms *s*, *s′* and vertical rod *t* secured to the charger A.

To a lateral opening in the flange B′ of the charger A is attached the carbonic acid supply piece and regulating valve H, the latter operated by 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 lantern V and pivoted in a block *w* adjustably secured on the rod *x*. The lantern is free to move vertically to a limited extent sufficient to open and close the gas valve H.

P is a diaphragm apparatus of the usual construction, the space beneath the diaphragm being connected with the hose *o* by a hose Q as shown, while a pin projecting upwardly from the center of the diaphragm bears against the right hand end of the scale beam L or directly against parts connected with the lantern V. The diaphragm apparatus may be permanently fixed or adjustably secured. By this diaphragm apparatus an upward pressure is exerted on the right hand part of the scale beam L proportional to the pressure of the gas within the charging vessel.

Fig. 2 shows a modification of the means for causing the gas pressure to act upon the scale beam L. In this case the gas pressure is transmitted to a piston P′ connected with the outer end of the scale beam, the space beneath the piston communicating with the hose *p*, thus communicating to the piston the gas pressure and the pressure due to the dif-

erence of the level of the piston and the fluid in the charger. In the same manner the diaphragm apparatus P, Fig. 1, may be connected with the hose *p* instead of the hose *o*, the diaphragm and the piston being equivalents for the desired result.

Whenever from any cause the lantern V is lowered the arm *g* connected to the rod *x* will depress the arm *q*, thereby increasing the opening for admitting carbonic acid gas to the upper part of the charger A, and when the lantern V rises the reverse action will take place. The balance weight W being placed at a certain distance from the fulcrum of the scale beam L, it is evident that for balancing the lantern the pressure of gas within the charger must vary with the level of liquid within the charger and the lantern. If for any level of liquid and pressure of gas the lantern be balanced, any rise of level of liquid will depress the lantern, opening the gas valve, thus increasing the upward thrust of the diaphragm, until the liquid level and gas pressure again balance the lantern. By these means for a low level of liquid and consequently large gas space in the charger the liquid entering the charger will fall a great distance through gas of small pressure, while with a higher level of liquid it falls a smaller distance through gas of higher pressure, thus insuring substantially equal impregnation in all cases.

A change of the position of the balance weight W changes the gas pressure at which the lantern will be balanced for a fixed fluid level, or the fluid level corresponding to a fixed gas pressure. The length of the lantern must be sufficient for the possible variations of the liquid level in the charger under given conditions.

I do not herein broadly claim the external regulating vessel, this being claimed in the hereinbefore mentioned prior application.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. In a carbonic acid charger, a stationary charging vessel, an external regulating vessel resting upon a yielding support and connected at top and bottom with top and bottom of charger, and means substantially as described for operating said regulating vessel through the combined action of the fluid level and of the gas pressure in the charger.

2. In a carbonic acid charger the combination of a stationary charging vessel A, an external regulating vessel V resting upon a scale beam L and connected at top and bottom with the top and bottom respectively of the charging vessel A, a diaphragm apparatus, the chamber on one side of the diaphragm of which is connected with the charging vessel, while the diaphragm itself is so connected to the regulating vessel V as to transmit to the same an upward thrust proportional to the pressure in the charger A, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 31st day of August, 1893.

JACOB FRED THEURER.

Witnesses:
E. SCHUCHT,
C. SCHROEDER.