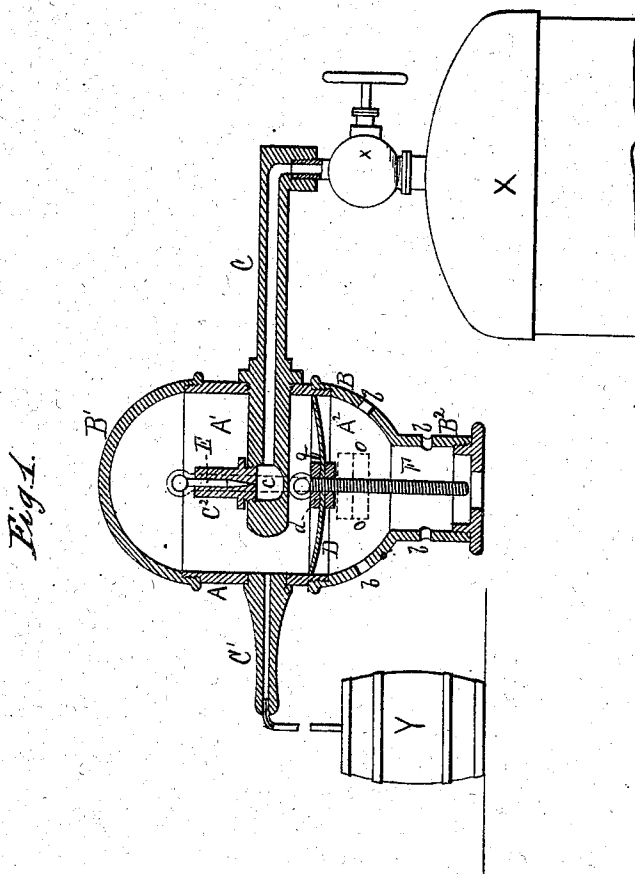


F. W. WIESEBROCK.
Gas-Regulators.

2 Sheets--Sheet 1.

No. 158,767.

Patented Jan. 12, 1875.



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Fig. 2.

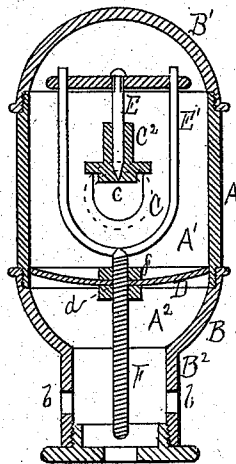
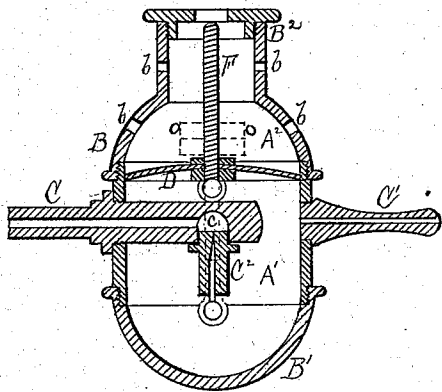


Fig. 3.



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UNITED STATES PATENT OFFICE.

FREDERIC W. WIESEBROCK, OF BROOKLYN, NEW YORK, ASSIGNOR TO
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IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **158,767**, dated January 12, 1875; application
October 15, 1874.

To all whom it may concern:

Be it known that I, FREDERIC W. WIESEBROCK, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Gas-Regulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, and the letters of reference marked thereon, making part of this specification, in which—

Figure 1 is a vertical sectional view of the gas-regulator when attached to the gas-receiver and the beer-keg. Fig. 2 is a vertical sectional view of one form of the gas-regulator. Fig. 3 is a vertical sectional view of the gas-regulator illustrated in Fig. 1 reversed.

The nature of my invention consists in securing, in a suitable shell or casing provided with air-openings and an induction and education pipe, an elastic diaphragm, and to which is secured, by suitable gearing, a valve arranged to automatically open and close an opening or orifice in the supply-pipe through which the gas is supplied to the interior chamber of the shell.

The valve must be so arranged in connection with its seat as to act directly through the adverse pressure on the opposite sides of the diaphragm, as the respective degrees of pressure alternately predominate, and entirely irrespective of the pressure of gas in the gas-containing vessel or supply-vessel; and to accomplish this purpose—and herein lies the very essence of the invention—the opening in the valve-seat or the discharge-orifice of the supply-pipe must be so exceedingly small that, while it will readily supply the gas when occasion requires, or when the valve, through pressure, is opened, at the same time to render it impossible, when said opening is closed by the valve, through the pressure of gas acting on the diaphragm, that the pressure of the gas in the gas-containing-vessel shall in any manner have the effect to open said valve.

The construction and operation of my invention are as follows:

A is the case or shell, and while the body of the same is represented in the accompany-

ing drawing to be of a cylindrical form, yet, if desired, it may be constructed of any other form, and out of any suitable material. The body of the shell A is provided with arched or dome-shaped end pieces B B¹, and which are screwed or otherwise attached to the cylinder. The end piece B¹ is formed in one piece, and without any openings, and is the dome or convex base, according to the position in which the apparatus is used, of the section of the cylinder which incloses the gas compartment or chamber A¹. The end piece B is formed with a cylindrically-inclosed opening or throat, B², through which passes and works the valve-rod, and is provided, as well as its throat B², with numerous small orifices or openings, b b. Through this throat B² and the numerous smaller openings sufficient air to secure the desired atmospheric pressure to open the valve, when occasion requires, is readily admitted. This end piece B forms the dome or convex base, as the case may be, of the air-chamber A². The body of the shell A is provided with two openings, a a, and to which are secured the lateral pipes C C¹. The first of these pipes enters the gas-chamber A¹ of the shell A, and is provided with a small opening, c, and in which enters and registers the opening of the valve-seat C². This pipe C supplies the carbonic-acid gas from the generator or receiver X, and is connected immediately therewith, as clearly shown in Fig. 1. This generator or receiver X is provided with a stop-cock, x, by means of which the supply of gas can be cut off entirely, when occasion requires. The pipe C¹ is a coupling or supply-connection pipe, and leads directly and is attached to the barrel or keg y, in connection with which the apparatus is to be temporarily used. D is the diaphragm, and is constructed of any suitable elastic material, and is secured between the body of the shell A and its end piece B. This diaphragm D, when secured in the case or shell, divides the interior of the same, as it were, into two compartments, viz., a gas-chamber, A¹, and an atmospheric chamber, A². Into the first of these leads the pipes C C¹, and into the latter the opening in the throat B² and the air-openings b b. The diameter or dimensions of this diaphragm are designed to be relatively

such, in connection with that of the small opening *c* in the gas-supply pipe *C*, that no matter how great the pressure of the gas in the vessel *X* may be, it shall be powerless to affect or control in any manner the action of the valve or valve-stem *E*. This valve or valve-stem *E* is connected, by means of a yoke, *E'*, to the valve-rod *F*. The parallel arms of this yoke *E'* work on the opposite sides of the pipe *C*, and hold the valve-stem in position to insure its proper action, in connection with its seat *C'* and the small opening *c*, in the gas-supply pipe *C*, and through which the carbonic gas passes to the chamber *A*¹. The valve-rod is provided with a screw-thread, and passes through a small central opening, *d*, in the diaphragm *D*, and is securely connected therewith by screw-nuts or washers *f f*.

The degree of pressure which the diaphragm may resist may be regulated by means of weights *o*, as clearly shown in Fig. 3, and which will aid the atmosphere in opening the valve, and cause a greater pressure of gas to overcome the same and close the valve; and when the apparatus is used in this position—that is, as illustrated in Fig. 3—the weights *o* on the rod *F* can be so adjusted or regulated as to charge the beer with carbonic-acid gas to any required pressure, while the apparatus, when used in the position shown in Figs. 1 and 2, is in position to charge the beer with carbonic-acid gas without any pressure—that is, the apparatus, when in this position, will just admit sufficient gas to fill the vacuum in the barrel or keg occasioned by the drawing off of the liquor in the vessel, and does enter the same so driven or impelled by any pressure.

From the foregoing description the operation of my apparatus will be readily understood. The barrel or keg, and which is represented in miniature at *Y*, Fig. 1, containing ale, beer, or any other liquid which it is designed to charge with carbonic-acid gas, having been tapped and ready for use, the pipe or coupling *C'* is connected therewith, and the pipe *C* is secured to the vessel *X* containing the carbonic-acid gas. The gas-chamber *A*¹ in the receiver *A* being empty, no resistance is offered to the action of the air, and consequently, through atmospheric pressure, the diaphragm *D* is readily lifted, and which, carrying the valve-rod *F* with it through the yoke *E'*, withdraws the valve from its seat, leaving the opening *c* in the pipe *C* free to discharge the gas. The stop-cock *a* is now opened, and the gas pours into the chamber *A*¹, and should there be any unoccupied space in the barrel or keg *Y*, from the chamber *A*¹, by the pipe *C'*, into said keg or barrel. So soon as the barrel or keg is charged, and the chamber *A*¹ is filled, the pressure of the gas, overcoming that of the atmosphere, depresses the diaphragm *D*, and which carries with it the valve-rod *F*, and, through the yoke *E*, draws down the stem *E*, so as to close the valve, and which, for the time being, effectually shuts off all further admission of gas.

So soon, however, as any of the liquid is drawn from the barrel or keg, the carbonic-acid gas rushes from the chamber *A*¹, through the pipe *C'*, into the vessel *Y*, filling the space which the liquid just displaced occupied; but this transferring of the gas from the chamber *A*¹ to the vessel *Y* necessarily leaves a partial vacuum in said chamber, which, acting in conjunction with the atmospheric pressure, lifts the diaphragm, and which opens the valve for the ingress of more gas, and the valve remains open until the pressure or weight of the gas overcomes the force of the atmospheric pressure and depresses the diaphragm, which closes the valve; and thus it will be seen that carbonic gas is supplied to the barrel or keg in connection with which the apparatus is used precisely in the degree in which a vacuum is created therein by the displacement of the liquid, and practical experience has fully demonstrated the fact that this apparatus so supplies the gas that, no matter how slow the process of emptying the barrel, the ale or beer does not become flat or have a stale flavor. On the contrary the last glass drawn is just as lively, and has as rich and fresh a taste, and froths precisely the same, as the first glass drawn.

The operation herein just described has particular reference to the apparatus when used in the position illustrated in Figs. 1 and 2 of the accompanying drawing, and in which the gas passes to the liquid-vessel simply through its natural escape by the pipe *C'*, the gas not being driven or impelled under any pressure. Therefore, when it is desired to charge the beer or other liquid with a high degree of gas, the apparatus should be reversed and the rod *F* weighted, so as to control the pressure of gas which the diaphragm will resist, and which can readily be regulated at pleasure.

The operation of the apparatus when in the position shown in Fig. 3 is in all respects substantially similar to that of Figs. 1 and 2, the simple difference being in Fig. 3 the atmosphere is aided by the weight of the valve-connections in keeping the valve open, and the degree of the pressure of gas that the diaphragm will resist before closing the valve by the application of weights *o* on the rod can be regulated at pleasure.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A shell or case, *A*, provided with air-openings, diaphragm *D*, valve *E*, and pipe *C*, having an opening or valve-seat, *c*, the same being combined and arranged as shown, whereby the valve is automatically opened and closed by the adverse pressure of the atmosphere and gas acting directly on the diaphragm, and entirely irrespective of the varying degree of pressure which the gas-supply vessel may contain, substantially as described.

2. In combination with a suitable shell or case having air-openings and lateral openings for the inlet and egress of gas, an elastic diaphragm, *D*, valve-rod *F*, yoke *E'*, and valve

E, the latter being arranged as shown, whereby the discharge-opening *c* of the inlet-pipe shall be automatically opened and closed by said valve through the adverse pressure of the atmosphere and gas acting on the elastic diaphragm, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

F. W. WIESEBROCK.

Witnesses:

EDWIN JAMES,
JOS. T. K. PLANT.