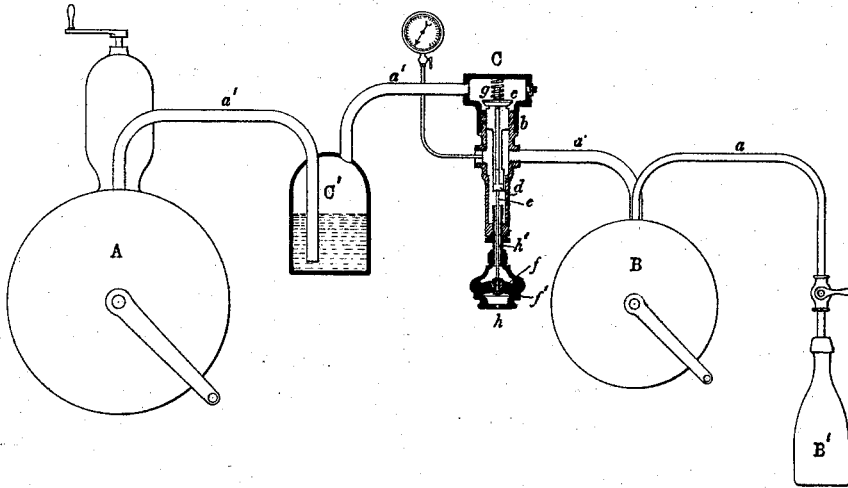


W. LOUGHRIDGE.
Soda-Water Apparatus.

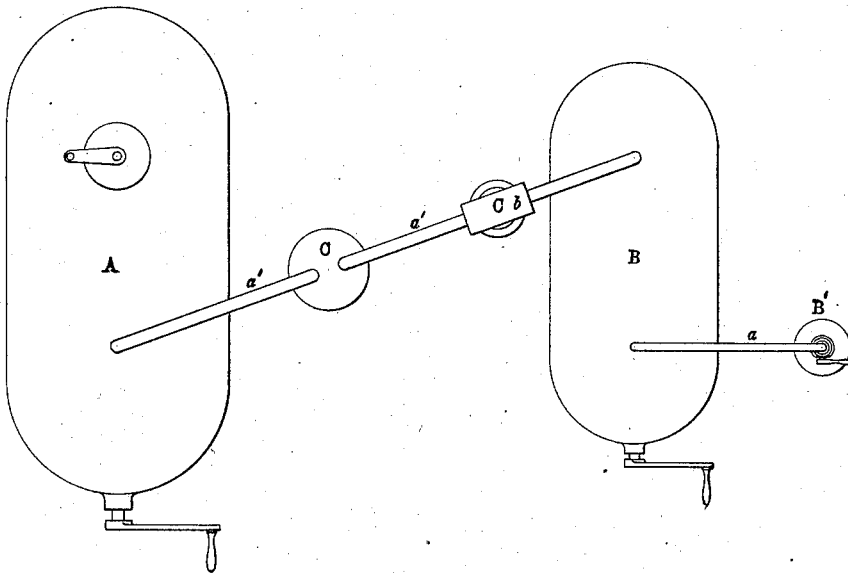
No. 165,343.

Patented July 6, 1875.

— FIG. I —



— FIG. II —



— WITNESSES. —

H. A. Daniels.
A. Moore

— INVENTOR. —

William Loughridge,
by L. H. W. J. Howard,
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM LOUGHRIDGE, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN SODA-WATER APPARATUS.

Specification forming part of Letters Patent No. **165,343**, dated July 6, 1875; application filed June 12, 1875.

To all whom it may concern :

Be it known that I, WILLIAM LOUGHRIDGE, of the city of Baltimore and State of Maryland, have invented certain new and useful Improvements in Soda-Water Apparatus, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention relates to the controlling of the flow of gas, or gas-impregnated liquids, from the generator in which the acid and alkali are combined, to the fountain to which the bottling-pipe is connected; and consists in combining, with the generator and fountain aforesaid, a cut-off or regulator, provided with a valve arranged to automatically close or open, to prevent a more than slight variation from the pressure fixed upon as that at which the gas, or gas-impregnated liquid, in the fountain is to be maintained, and which cut-off may be adjusted, by means of mechanism adapted for manipulation, to retain the gas or liquid in the said fountain at any pressure below that of the gas in the generator aforesaid.

In the manufacture of carbonated liquids it is usual to generate the gas in the generator to a higher tension than the bottles can, with safety, stand, and it frequently happens that, in bottling, the operator is injured by the bursting of bottles. My invention, as herein-after described, is designed to obviate this difficulty, by maintaining in the fountain a tension much below that in the generator. By this means the gas can be stored in the generator at a pressure greater than that which under other circumstances could be used; and the bottles filled with carbonated liquids at a safe tension.

In the further description of my invention which follows due reference must be had to the accompanying drawing, forming a part of this specification, and in which—

Figure 1 is a view, partly in section, of the principal parts of a generating and bottling apparatus, with a cut-off or regulator attached, according to my invention, and Fig. 2 a plan view of the same.

Similar letters of reference indicate similar parts in all the figures.

A is the generator, provided with the ordinary appliances for admitting the acid, and for agitating the contents to facilitate the generation of gas therein. B is the fountain in which the liquid to be carbonated is stored, and from which it is conveyed to the bottle B' by means of the pipe *a*. The generator and fountain are connected by means of a pipe, *a'*, in which is inserted the washer C'. The washer serves to break the direct communication between the generator and the fountain, the gas being obliged, in its course to the fountain, to pass through water contained therein. The object in washing the gas is to remove therefrom any impurities or particles of matter carried with it from the generator. C is the cut-off or regulator formed of the case *b*, having inlet and outlet nozzles to which the two parts of the pipe *a'* are connected. In the upper part of the case *b* is located a valve, *c*, with a stem, *d*, extending from the lower side thereof to a point in the case where it comes into contact with the upper end of a rod, *e*, secured to a flexible diaphragm, *f*. A spiral spring, *g*, confined between the upper side of the valve and the case, assists the valve to close rapidly when not sustained by the diaphragm. The diaphragm *f* is confined within a cup, *h*, the lower end of which is perforated to allow of the free ingress and egress of air as the diaphragm is elevated or depressed by the action thereupon of the gas, as hereinafter described. The diaphragm is sustained in a dished shape, as shown in the drawing, by means of a stiff spring, *f*, which bears against the under side thereof, and in area exposed to the action of the gas exceeds that of the valve. This excess in area in the diaphragm is found necessary to the proper combined movement of the diaphragm and valve. The cup *h*, with the diaphragm *f*, and rod *e*, are elevated or depressed independently of any action of the diaphragm consequent upon fluctuation in the gas-pressure, by means of the screw on the pipe *h'* connecting the cup to the case *b*, to increase or diminish the opening of the valve *c*, and to regulate the tension to be maintained in the fountain B, the opening of the valve being regulated to

give a certain tension in the fountain and one considerably below that in the generator. The regulating operation is as follows: A sudden excessive draft upon the fountain has a tendency to diminish the pressure therein, and also upon the convex surface of the diaphragm. The diaphragm is thus deprived of a portion of the weight counteracting the tendency of the spring *f'* to elevate it, and it rises and increases the opening of the valve, through the medium of the rod *e* and valve-stem *d*. This augmented area of opening of the valve admits a larger volume of gas to the fountain, and consequently places an increased pressure upon the diaphragm, when it is depressed, allowing the valve to be slightly closed by the resiliency of the spiral spring *g* and its own gravity, and the original pressure in the fountain re-established. In case of the hesitation or stoppage of the flow from the fountain the above-described operation is reversed, but the result, as regards the maintaining of a constant pressure in the fountain, is the same. As the ultimate object of the invention is to maintain a constant and reduced pressure in the pipe leading to the

bottle, in some cases it will be found convenient to place the regulator in the pipe *a*, or between the fountain and the bottle.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a soda-water apparatus, the combination of the generator A, fountain B, and cut-off or regulator C, substantially as described.

2. In the cut-off or regulator C, the valve *c*, adapted to be opened in the upward movement of the diaphragm *f*, and spring *f'* through the medium of the rod *e* and stem *d*, substantially as set forth.

3. The cup *h* and connections, made adjustable in height to regulate the position of the valve *c*, independently of any action of the gas, by means of the threaded pipe *h'*, substantially as specified.

In testimony whereof, I have hereunto subscribed my name this 10th day of June, in the year of our Lord 1875.

WILLIAM LOUGHRIDGE.

Witnesses:

WM. S. HOWARD,
JNO. S. MADDOX.