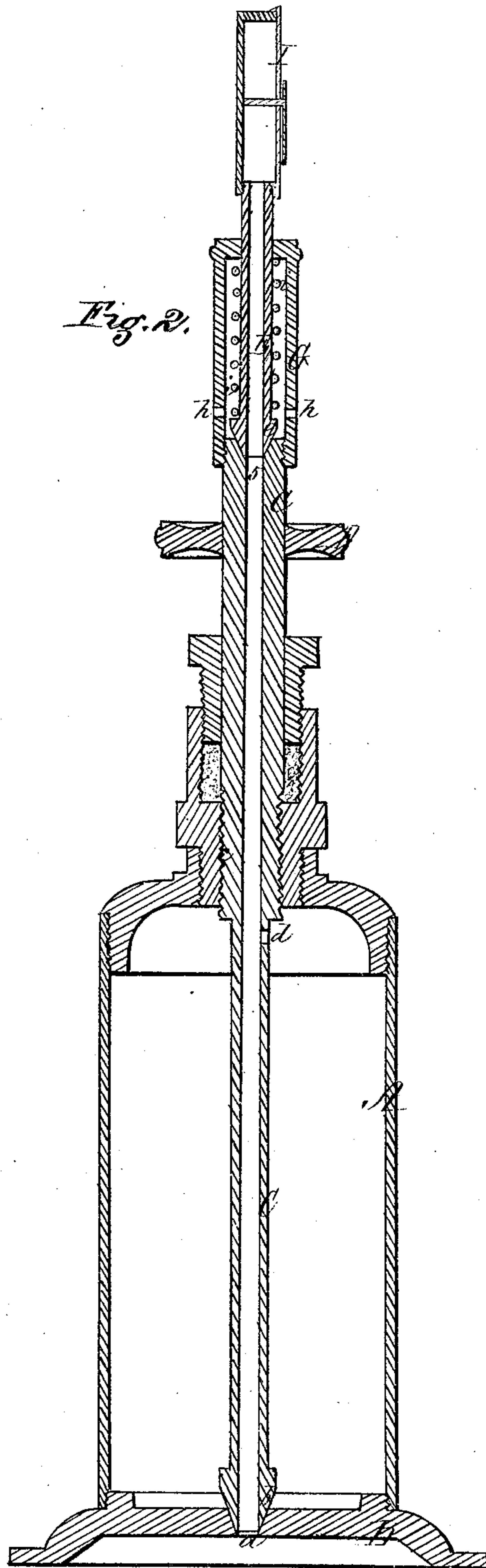
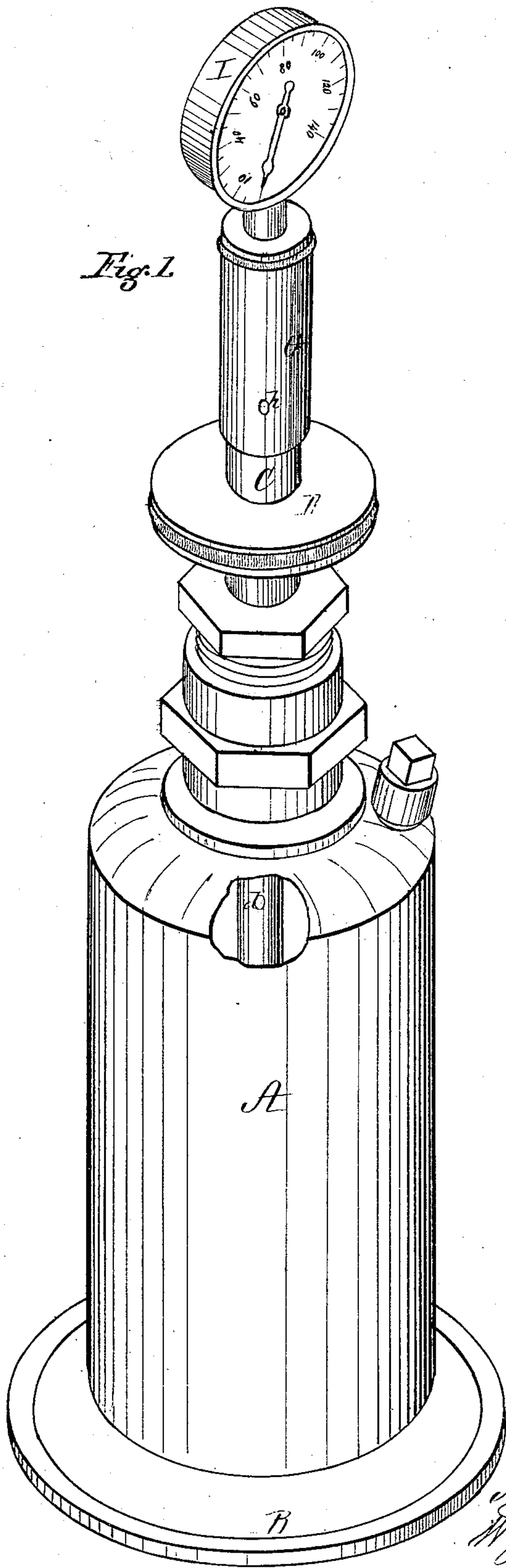


W. H. BATE.

APPARATUS FOR GENERATING CARBONIC ACID.

No. 110,190.

Patented Dec. 20, 1870.



Witnesses,  
*N. W. Stearns*  
*W. J. Cambridge*

Inventor,  
*Wallace H. Bate*



# United States Patent Office.

WALLACE H. BATE, OF EAST SOMERVILLE, MASSACHUSETTS.

Letters Patent No. 110,190, dated December 20, 1870.

## IMPROVEMENT IN APPARATUS FOR GENERATING CARBONIC ACID.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, WALLACE H. BATE, of East Somerville, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Apparatus for Generating Carbonic-Acid Gas for charging soda-fountains and for other purposes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a perspective view illustrating my invention.

Figure 2 is a vertical section through the center of the same.

In the apparatus ordinarily employed for generating carbonic-acid gas for charging soda-fountains the alkali-chamber and acid-chamber have been connected by a lead pipe extending outside from one to the other, to conduct the gas down upon the surface of the acid to equalize the pressure and insure its passage to the alkali-chamber, the acid being allowed to pass down to the alkali-chamber through a passage controlled by a valve operated by a solid spindle or rod extending through and above the acid-chamber. As the acid-chamber is screwed onto the alkali-chamber, and requires to be frequently removed and replaced, it is not always possible to bring the ends of the connecting-pipe into the same position or vertical plane originally given them, for the reason that the acid-chamber requires to be turned further around to make a tight joint as the washer becomes worn, and the pipe must consequently be bent and strained to make the desired connection, which soon renders it unfit for use; and, furthermore, the position of the pipe outside of the apparatus exposes it to injury from being accidentally struck. Again, the curved form of the said pipe is objectionable on account of the tendency to become clogged and the difficulty of clearing it when obstructed.

To remove these objections and to dispense with the exterior connecting-pipe is the purpose of the first portion of my invention, which consists in making hollow the valve-plug and spindle which passes up through and is operated outside the acid-chamber, an aperture being made in the side of the hollow spindle at a point above the level of the acid, by which arrangement the gas may be conducted to the acid-chamber as required.

The second portion of my invention has for its object to dispense with a separate pipe for connecting the pressure-gauge with the alkali-chamber, the lead pipe heretofore ordinarily employed for this purpose being liable, from its position outside the apparatus, to be bent or injured, and the passage through it obstructed so as to prevent the gauge from correctly indicating the pressure which thus increases the liability

of accident from explosion; and this part of my invention consists in combining the pressure-gauge with the hollow valve-plug and spindle, upon the top of which the gauge is placed, which construction is compact and free from the objections incident to the employment of a separate pipe placed outside.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawing—

A is the acid receptacle, which screws upon the top of the alkali-chamber B, a passage between the two being provided to allow of the acid flowing down into and mixing with the alkali contained in the alkali-chamber, for the purpose of producing carbonic-acid gas.

The passage *a*, between the acid-chamber and the alkali-chamber, is controlled by a valve-plug, *b*, at the lower end of a spindle, *C*, extending vertically up through the center of the acid-chamber and beyond the top thereof.

The upper portion of the spindle passes through a stuffing-box, and is provided with a screw-thread, *c*, which fits onto a corresponding thread in the top of the apparatus, and thus, as the spindle is turned by means of a wheel, *D*, the valve-plug *b* is raised or lowered to open or close the passage *a*.

The valve-plug is made hollow, and also the spindle, through its entire length, to allow the gas from the alkali-chamber to pass up the spindle, from which it escapes by an aperture, *d*, into the acid-chamber above the level of the acid contained therein, in order that a means may be provided for equalizing the pressure upon the acid to insure its passage into the alkali-chamber beneath, and as this spindle by which the gas is conducted is inclosed within the apparatus, it is protected from injury and free from the objections above enumerated incident to the connecting-pipe placed outside the apparatus.

In the opening 5, at the top of the hollow spindle, fits the lower end of a conical valve-plug, *e*, which is hollow, as also is its stem, *E*, which passes up through and above a cylindrical casing, *G*, the lower end of which is provided with openings *h*, and is screwed upon the top of the hollow spindle *C*, the stem of the valve-plug *e* being surrounded by a spiral spring *i*, the lower end of which bears upon the upper end of the valve-plug *e*, while its upper end bears against the under side of the cap of the cylindrical casing *G*, by which construction a safety-valve is formed, whereby, when the pressure of the gas is greater than that intended, it will raise the valve-plug *e*, and escape through the openings *h* until the pressure is reduced, after which the valve-plug *e* will drop upon its seat and close the opening 5, and the gas will pass up the



hollow stem E to a pressure-gauge, I, connected with its top for indicating the pressure exerted by the gas within the generator.

By this construction, which is exceedingly compact, the pipe which communicates with the gauge occupies a position within the apparatus where it is not liable to be bent or injured. Furthermore, the passage through this pipe being straight, it will not be liable to become clogged or obstructed so as to prevent the pressure from being correctly indicated by the gauge, and consequently the liability of accident from explosion is materially lessened. Should, however, any obstruction occur, the pipe may be readily cleared.

*Claims.*

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

1. A hollow valve-plug, *b*, and spindle *C*, with its aperture *d*, in combination with an acid-chamber, *A*, and alkali-chamber, *B*, operating substantially in the manner and for the purpose set forth.

2. The pressure-gauge *I*, in combination with a hollow valve-plug, *b*, and spindle *C*, acid-chamber *A*, and alkali-chamber *B*, substantially as and for the purpose described.

Witness my hand this 14th day of October, A. D. 1870.

WALLACE H. BATE.

Witnesses:

N. W. STEARNS,  
W. J. CAMBRIDGE.