(No Model.)

P. BONTE.

ACIDOMETER.

No. 383,433. Patented May 29, 1888.

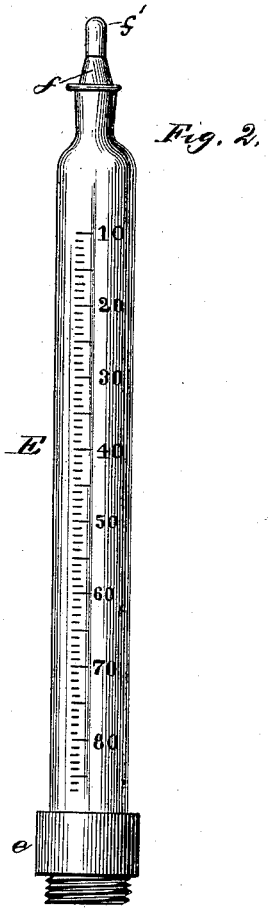
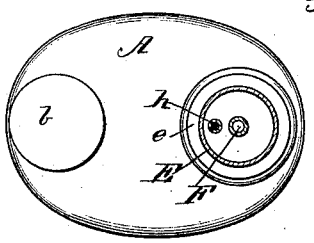


Fig. 2.

Fig. 1.

Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

PHILIPP BONTE, OF CHICAGO, ILLINOIS.

ACIDOMETER.

SPECIFICATION forming part of Letters Patent No. 383,433, dated May 29, 1888.

Application filed July 16, 1887. Serial No. 244,461. (No model.)

To all whom it may concern:

Be it known that I, PHILIPP BONTE, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Acidometers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has for its object to provide a device for determining the amount of acid in any acid-containing liquid, as vinegar, &c., by measuring the amount of carbonic-acid gases generated by adding to such fluid a carbonate that will neutralize the free acid therein.

Therefore my invention consists in the novel devices and combinations of devices hereinafter described, and specifically claimed.

In the accompanying drawings, Figure 1 represents a vertical section through the center of the apparatus; Fig. 2, an elevation of the graduated tube detached, and Fig. 3 a sectional plan on line *x x* in Fig. 1.

Corresponding letters in the several figures of the drawings designate like parts.

A denotes the gas-generating flask, being oval, with a mouth, *a*, at one end closed by a glass stopper, *b*, and having a neck, *c*, on its opposite end, upon which is hermetically cemented an internally screw-threaded sleeve, *d*.

E is a glass tube, the bottom end of which is hermetically cemented in the socket of a screw-plug, *e*, that enters and fits the screw-thread in sleeve *d* and forms a hermetic joint therewith. The upper end of glass tube E is bottle-mouthed, and is closed by a perforated stopper, *f*, forming part of a tube, F, that extends centrally downward in tube E to near the plug *e*, and which has a downwardly-curved spout-like projection, *f'*, above stopper *f*. One end of a small size glass or metal tube, *h*, is inserted and hermetically connected into the cement filling *e'*, which forms the head of plug *e*, projecting therethrough and extending upward to near the top of tube E. This glass tube E is graduated at one side with downwardly-increasing figures that indicate and denominate the quantity of the gases generated. The bottom of flask A has an offset, *i*, at near its middle, forming below mouth *a* a shelf, *j*, that is inclined toward the end of the flask.

The operation is as follows, to wit: Pour a certain quantity of the liquid to be tested into the generating-flask A through the neck *c* after disconnecting the tube E, and through the mouth *a* drop upon the shelf *j* the required amount of a carbonate—as, for example, bicarbonicum potassium. Next fill the tube E through its top mouth with water, as much as it will hold, and then insert tube F, with its stopper portion *f* closing the mouth. After the tube E has been thus filled screw its plug *e* into the sleeve-coupling *d* to form a close joint with the flask A and insert the stopper *b*. Now, by shaking the apparatus the carbonate will be mixed with the liquid, when at once the acid contained in the liquid will commence to generate carbonic-acid gas, which gas will rise through the tube *h* into tube E, and by its pressure it will displace the water in such tube E, and will force it through the tube F and discharge it through the spout *g* in proportion as gases are generated. After all the acid has been neutralized the amount of water displaced in the tube E by the gas generated is indicated by the graduations on the tube E, and will point out the proportion of acid that was contained in the liquid.

This apparatus, as will be seen, is very simple in its construction and convenient and reliable in its use.

In place of a screw-coupling for connecting the tube E to the flask A, a clamp-coupling or any other well-known coupling device may be applied, or the two may be detachably connected by a rubber hose, and in place of the shelf *j* in the flask A a simple partition or any other well-known device may be applied that will keep the carbonate separated from the liquid and that will afford the mixing of the same by shaking the flask, and therefore I do not desire to be restricted to the particular construction shown and described.

What I claim is—

1. An acidometer consisting of a generating-flask, and a graduated glass tube detachably secured thereto, and provided with two small glass tubes projected into the graduated tube from opposite ends to extend nearly the entire length thereof in a manner that water filled in said tube will be displaced by the carbonic-acid gases generated, substantially as set forth.

2. An acidometer consisting of a generat-

ing-flask arranged to hold a carbonate and liquid separated, and adapted to be mixed by shaking, and of a graduated tube detachably connected with such flask and provided with two small tubes projected into the graduated tube from opposite ends to extend nearly the entire length thereof, substantially as and for the purpose set forth.

3. An acidometer consisting of a generating-flask, A, and of a graduated glass tube, E, removably secured to flask A by a screw-coupling, and having small-sized tubes F and *h* projected into the tube E from opposite ends to pass each other, the whole being constructed and arranged substantially as set forth, to operate as specified.

4. An acidometer consisting of generating-flask A, provided with shelf *j*, mouth *a*, with stopper *b*, and with neck *c* and screw-sleeve *d*, in combination with graduated glass tube E, having screw-plug *e*, tube *h*, and detachable tube F, forming the stopper *f*, the whole being constructed and arranged substantially as set forth, to operate as specified.

In testimony whereof I affix my signature in presence of two witnesses.

PHILIPP BONTE.

Witnesses:
WILLIAM H. LOTZ,
OTTO LUBKERT.