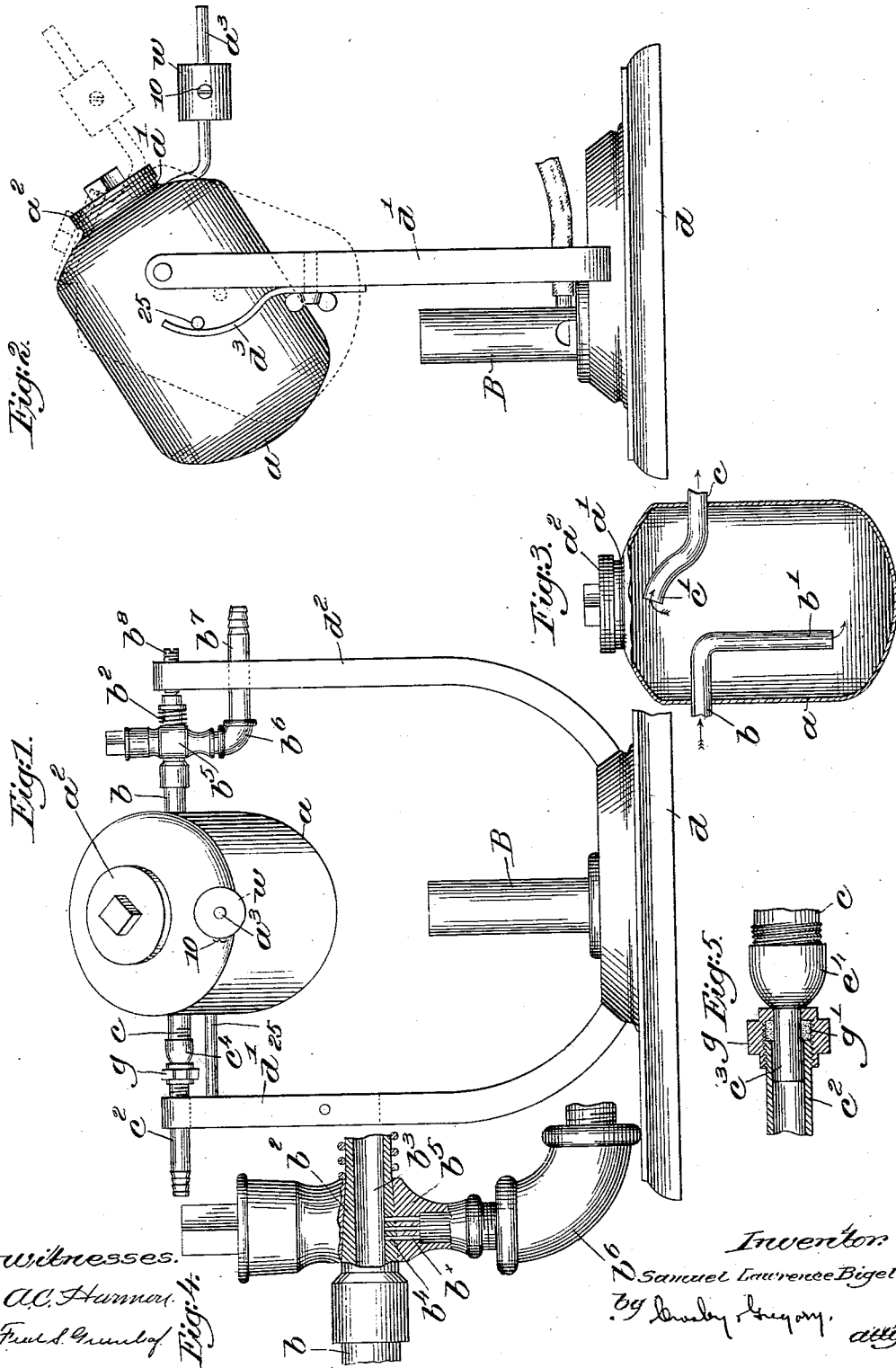


(No Model.)

S. L. BIGELOW.
SELF REGULATING DISTILLING APPARATUS.

No. 564,734.

Patented July 28, 1896.



UNITED STATES PATENT OFFICE.

SAMUEL LAWRENCE BIGELOW, OF BOSTON, MASSACHUSETTS.

SELF-REGULATING DISTILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 564,734, dated July 28, 1896.

Application filed May 22, 1895. Serial No. 550,162. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL LAWRENCE BIGELOW, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Self-Regulating Distilling Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object the production of a self-regulating distilling apparatus whereby continuous distillation may be carried out without the care or attention of an attendant, the weight of the fluid to be distilled as it is contained in the receiver or converter controlling the inlet or admission valve automatically, whereby, when a portion of the fluid has been converted into vapor, the valve will be opened to admit a fresh quantity of the fluid from the source of supply.

In accordance therewith my invention consists in a self-regulating distilling apparatus constructed and arranged substantially as will be hereinafter described, and particularly pointed out in the claims.

Figure 1 is a front view of a distilling apparatus embodying one form of my invention, the converter being shown in the position assumed when empty. Fig. 2 is a left-hand side view of the apparatus shown in Fig. 1, looking toward the right, the position of the converter when properly filled being shown by dotted lines. Fig. 3 is a vertical sectional view of the converter, showing the location of the inlet and outlet passages. Fig. 4 is an enlarged detail, partly in section, of the inlet-valve shown in Fig. 1; and Fig. 5 is an enlarged detail, also partly in section, of the outlet and its bearing.

I have herein shown the apparatus as comprising a body or converter *a*, of copper, brass, or other suitable material, having at its upper end a suitable boss *a'* to receive a closure *a''*, whereby access can be had to the interior of the converter for cleaning or other purposes.

The converter *a* has secured thereto at opposite sides hollow journals or trunnions *b* and *c*, forming a fluid-inlet and a vapor-outlet, respectively, the inner end of the journal *b* being bent downward within the converter and extended to its lower end, as at *b'*, Fig.

3, while the inner end of the journal *c* is extended toward the upper portion of the body, as at *c'*.

A suitable base *d* is provided with upturned standards *d'* *d''* to provide supports for the journals or trunnions of the converter, the arm *d'* having secured thereto a tubular bearing *c''* in alinement with and to receive the outer end *c''* of a nipple *c'*, (shown in Figs. 1 and 5 as threaded onto the journal *c*,) or the journal may project directly into the bearing. By this connection between the journal *c* and its bearing *c''* a pipe or tube (not shown) may be connected to the latter to conduct the vapor to a suitable condenser, the stationary bearing *c''* preventing twist of the connecting-pipe.

I have shown herein a simple form of plug-valve for controlling the inlet of the fluid to be distilled to the converter, whereby movement of the converter on its trunnions will open or close the valve.

Referring to Figs. 1 and 4, the hollow journal or trunnion *b* has secured thereto or forming a part of it a conical valve *b''*, having therein a longitudinal passage *b'''* (see Fig. 4) and transverse openings *b'''*, the valve being rotatably mounted in a valve-casing *b''*, rigidly secured to the standard *d''* by an elbow *b''*, which is provided with a nipple *b'''*, to which a pipe or tube connecting with the source of fluid supply may be attached. Openings *b''* in the valve-casing establish communication between the source of fluid supply and the inlet-trunnion *b* when the valve-passages *b''* are made to register therewith. The closed outer end of the valve is preferably recessed to receive the pointed end of a bearing-screw *b''*, extended through the standard *d''*, as shown in Fig. 1, whereby the rotative movement of the trunnions can be adjusted and wear compensated for.

From the foregoing description it will be obvious that partial rotation of the converter *a* on its axis will move the valve *b''* in its seat to close or open to a greater or less extent, so that the movement of the converter will perfectly control the entrance of the fluid to be distilled.

The converter has secured thereto an arm *a''*, on which a counterbalancing-weight *w* is adjustably held, as by a set-screw 10, Fig. 2, the trunnions being so attached to the con-

verter that the counterbalance will be at one side thereof and the center of gravity of the fluid in the converter will be at the other side.

5 When the proper quantity of fluid is in the converter, its weight will overcome the counterbalance and turn the converter into dotted-line position, Fig. 2, when a projection or lug 25 thereon will bear against the standard d' ,
10 or any other fixed object, limiting the oscillation, the movement into such position also closing the inlet-valve b^2 and preventing the admission of more fluid.

As the fluid is heated by means of a Bunsen burner B, or any source of heat, Figs. 1 and 2, it will be more or less vaporized, the vapor passing off through the journal or trunnion c and its bearing c^2 to the condenser, and as the weight of the fluid is thus
20 diminished the counterbalance w will tend to turn the converter a toward the full-line position, Figs. 1 and 2, opening the valve b^2 sufficiently to admit enough fluid from the source of supply to again return the converter to dotted-line position, shutting the
25 valve.

In practice the converter will assume a position between the dotted and full line positions, (shown in Fig. 2,) corresponding to the
30 rate of evaporation, so that the fresh fluid will be supplied as fast as a portion in the converter is vaporized.

To prevent the converter from turning too far when empty, I have mounted a stop d^3
35 on the standard d' , to engage the lug 25, as shown in full lines, Fig. 2, the stop being preferably secured by a thumb-nut d^4 , whereby it can be turned out of the way when desired.

40 As it is sometimes desirable to discharge the vapor into a condenser under pressure I have provided the bearing c^2 with a stuffing-box g , containing suitable packing g' , Figs. 1 and 5, which prevents escape of the vapor
45 at the joint made by the journal c and the bearing c^2 .

The inlet-valve is so arranged that it will be shut when the converter is in dotted-line position, Fig. 2, and completely open when
50 in full-line position.

The counterbalance w may be adjusted according to the weight of the particular fluid to be distilled.

While I have shown a convenient shape for
55 the converter, my invention is not restricted thereto, nor to the particular valve shown, for it will be obvious that any valve may be interposed between the inlet b of the converter and the source of supply provided it
60 is controlled by the movement of the converter when in operation.

The apparatus is adapted for the distillation of water or any other fluid, and if desired the vapor may be discharged in a vacuum.

65 Instead of supporting the journals or trunnions b and c in fixed bearings substantially as shown, it is obvious that the journals them-

selves might extend through suitable apertures in the standards d' and d^2 , if desired.

I claim—

1. In a self-regulating distilling apparatus, a support, a converter movably mounted thereon, and immediately adjacent to the source of heat provided therefor, a fluid-inlet and a vapor-outlet in direct communication with said converter, a valve in the inlet, to control the entrance of the fluid to be distilled, and means to actuate the valve by movement of the converter, caused by the vaporization of the fluid, substantially as described.

2. In a self-regulating distilling apparatus, a converter to receive the fluid to be distilled, a fluid-inlet extended thereinto and terminating near the lower end of the converter, a vapor-outlet communicating with the upper end of said converter, a valve in said inlet to regulate the entrance of the fluid, means controlled by the weight of the fluid in the converter to actuate the said valve, and stops to limit the extreme movement of the valve, substantially as described.

3. In a self-regulating distilling apparatus, a support, a converter movably mounted to oscillate thereon, a counterbalance therefor, a fluid-inlet and a vapor-outlet in constant communication with and forming journals for the converter, a valve in the inlet comprising two members, one of which is movable relatively to the other, to regulate the entrance of the fluid to be distilled, one of said members being rigidly connected to, and controlled by said oscillatory movement of the converter due to the weight of the fluid therein, whereby the entrance of the fluid to be distilled is regulated, substantially as described.

4. In a self-regulating distilling apparatus, a support, a converter provided at either side with a suitable journal pivotally mounted in said support, a fluid-inlet and a vapor-outlet communicating with the converter, an inlet-valve to regulate the entrance of the fluid, and means forming part of and controlled by axial movement of one of said journals to actuate the valve, substantially as described.

5. In a self-regulating distilling apparatus, a support, a converter provided with hollow journals forming fluid-inlet and vapor-outlet passages therefor, a tubular bearing for the outlet-journal, a stationary valve-case, a valve on the inlet-journal movable in the valve-case, whereby oscillation of the converter regulates the passage of fluid thereinto, and a counterbalance for the converter, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL LAWRENCE BIGELOW.

Witnesses:

JOHN C. EDWARDS,
AUGUSTA E. DEAN.