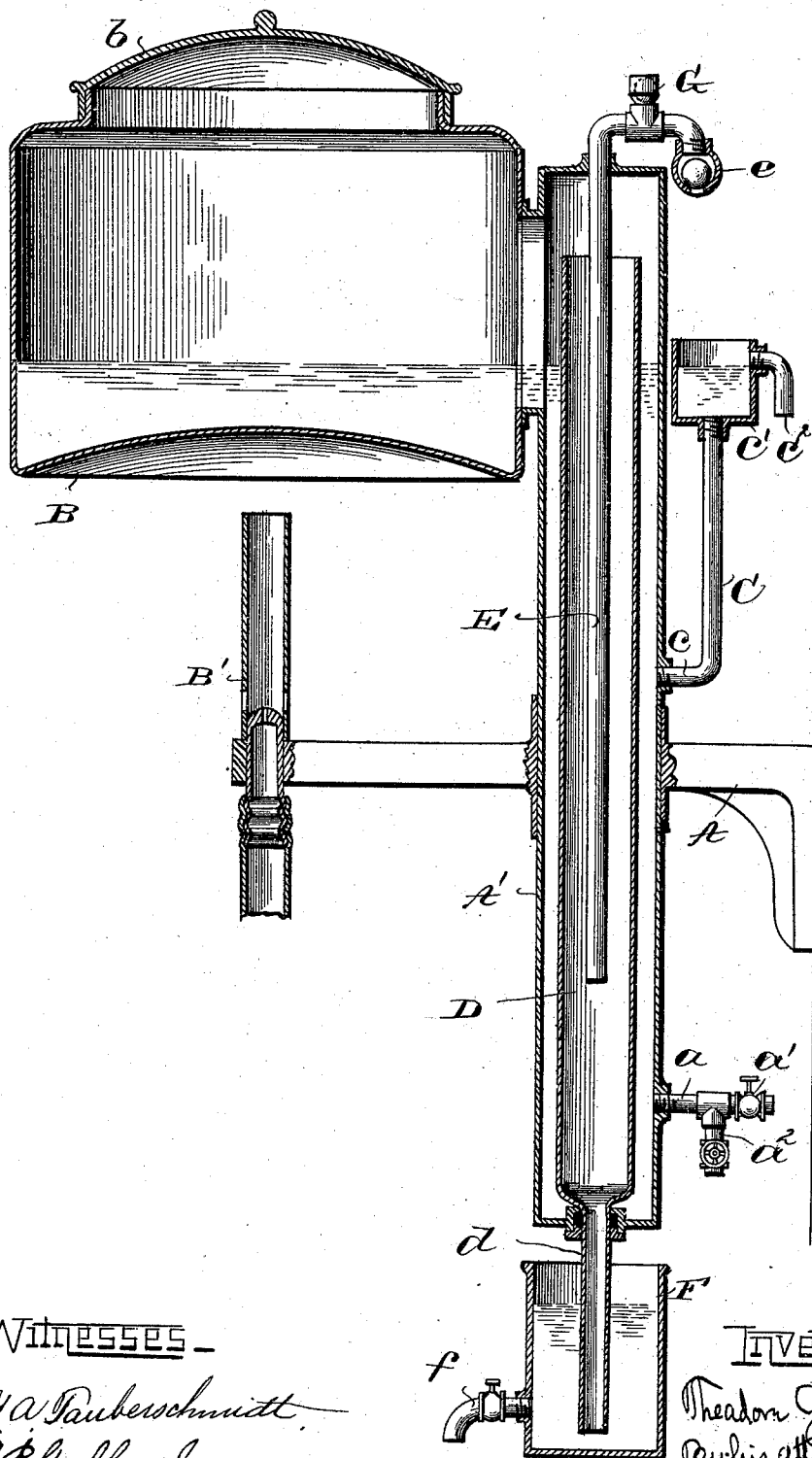


(No Model.)

T. G. SPRINGER.
APPARATUS FOR DISTILLING WATER.

No. 550,849.

Patented Dec. 3, 1895.



WITNESSES -

G. A. Taubenschmitt
C. K. Hubbard

INVENTOR -

Theodore G. Springer
By his attys
Whitaker & Brown

UNITED STATES PATENT OFFICE.

THEADORE G. SPRINGER, OF CHICAGO, ILLINOIS.

APPARATUS FOR DISTILLING WATER.

SPECIFICATION forming part of Letters Patent No. 550,849, dated December 3, 1895.

Application filed September 20, 1895. Serial No. 563,067. (No model.)

To all whom it may concern:

Be it known that I, THEADORE G. SPRINGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Distilling Water; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide an apparatus to effect the distillation of water for domestic and other purposes.

It consists in certain novel constructions and combination of parts which effect a more rapid and efficient distillation and forms an apparatus that is not liable to get out of repair and can therefore be left to the care of servants or other unskilled persons.

My said invention is illustrated in the accompanying drawing and disclosed in the following description and claims.

In the drawing my apparatus is illustrated in vertical section.

A is a bracket which may be secured to a wall or other support, and this bracket supports the entire structure.

A' is a pipe through which water is supplied to the boiler or still and which at the same time forms the cooling-tank for the condenser. This pipe is connected to the bracket so as to be firmly supported thereby.

B is the boiler, which is rigidly connected to the pipe A' and is supported therefrom. The bottom of the boiler is preferably made hollow or of a re-entrant form, so as to give a larger heating surface in contact with the water within the same. The bracket A, in this instance, extends outwardly beyond the pipe A', and at the outer end about centrally below the boiler a gas-burner B', of the Bunsen or other heating type, is located upon and supported by said bracket. The burner may, however, be supported by connection with the boiler or the pipe A', if preferred, and instead of a gas-burner a lamp or other form of oil-burner may be employed.

The boiler B is provided with a cover b, giving access to the interior of the same to enable the boiler to be kept clean.

The connection between the pipe A' and

the boiler, of the form of a slot, is along the line of the junction of the two and extends for some distance in a vertical direction. Water is supplied to the condenser - pipe A' by the inlet-pipe a, connected therewith near the lower end of pipe A'. The inlet-pipe a connects with some source of water-supply, preferably with a water-distributing system such as is common in most cities and large towns. This inlet is provided with the cock a', by which the amount of water to the pipe A' in the boiler is regulated. There is also provided the outlet a'', having a cock by which the water can be drawn from the boiler when it is desired to clean the same.

In order that the water in the boiler may be maintained at a uniform level, I provide the overflow device C, which consists, preferably, of the pipe c, connected with the pipe A' and extending upward to the cup c', with which an outlet or overflow pipe c'' is connected, which may be extended any desired length and conduct the overflow-water to any point preferred.

The condenser of the apparatus consists of the pipe D, located within the pipe A'. This pipe extends above the water-line of the boiler, and at its lower end it is preferably contracted and passes through a stuffing-box in the bottom of the pipe A'. This extension of the pipe D is the outlet of the condenser and is carried downward into a receiver F, where its lower end is sealed, preferably by the liquid in the receiver. In order to prevent the withdrawal of the liquid in the receiver to such an extent as to remove the seal, the receiver F is provided with a faucet f, located above the level of the lower end of the pipe d.

By distilling in an apparatus closed from the outer air I am enabled to form a partial vacuum in the boiler, which greatly facilitates the evaporation of the liquid acted upon. The reduction of the pressure within the apparatus should not be carried beyond a certain point. Otherwise the distilled liquid will be drawn up or held in suspension in the pipe D until the effectiveness of the condenser will become impaired. In order to prevent this I provide the air-pipe E, which extends from a point in the lower part of the pipe D upward through the top of the pipe A'. It then turns to one side and then downward, and to this

downwardly-extending portion is attached a valve-casing in which is located a ball or other pressure-governed air-inlet valve *e*. This valve is so adjusted that when the distilled liquid shall rise in the pipe *d* to nearly the pipe D the valve *e* will yield and admit a supply of air to the pipe D to restore the proper relation of pressures within and without the apparatus. The valve is placed in the position shown and described to prevent dirt or dust accumulating upon it in a position to be drawn into the apparatus.

A safety-valve G is secured to the pipe E, so as to permit the egress of air in filling the apparatus and to prevent undue internal pressure in the case of accidents preventing the proper operation of the device.

I prefer to make the pipe D and the air-inlet pipe E of glass or porcelain in order that the condensed water may be kept as pure as possible and free from objectionable flavors.

After the apparatus is filled the cock *a'* is turned so as to supply water to pipe A' faster than it can be evaporated and produce a constant small stream from the overflow-pipe *c'*. This is done in order that the water in the lower part of the pipe A' may be kept at so low a temperature as to produce rapid condensation in pipe D. This does not interfere with the evaporation in the boiler, as the circulation is only between the inlet-pipe *a* and outlet-pipe *c*.

I prefer to have the water in the boiler very shallow, covering the bottom not more than two or two and a half inches in order to secure rapid heating. In a short time after the lighting of the burner evaporation commences, driving the air downward in the pipe D, from whence it escapes through the safety-valve G or the water seal. As the boiler and condenser are closed from the outer air, the condensation of the steam will shortly result in a partial vacuum and the distilled water will rise in the pipe *d* to balance the pressure. Whatever air there is in the apparatus will find its way to the lower part of the pipe D, and the condensation always takes place in the presence of air. Should the disparity of pressures be increased above that provided for by the air-inlet valve, that valve will open and admit air to the lower part of the condenser-tube D, thereby keeping a supply of

air in the condenser, whereby the condensed water is more or less aerated, adding to its drinkable quality.

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

1. The herein described improvement in the art of distilling water which consists in continuously supplying the liquid to be distilled to the apparatus, heating the liquid so supplied and vaporizing and condensing the same, under less than atmospheric pressure and maintaining the desired pressure by the regulated admission of air to the condenser at the point of condensation, substantially as described.

2. In a water distilling apparatus the combination with the boiler, of the condenser, an air pipe discharging in the lower part of the condenser provided with a pressure regulated inlet valve, the condenser outlet and a receiver provided with a draw-off cock located to maintain a water seal for said outlet, substantially as described.

3. The combination with the supply pipe, the boiler and the condenser, of the overflow pipe for maintaining the liquid in the apparatus at a certain level, of an air inlet pipe extending within the condenser below the connection of the overflow pipe with the supply pipe, the condenser and the pressure regulated inlet valve for said air pipe, substantially as described.

4. In a water distilling apparatus, the combination with the condenser sealed from the outer air, of the air inlet pipe extending to near the bottom of the condenser, and the pressure regulated air inlet valve connected with said pipe, substantially as described.

5. In a water distilling apparatus, the combination with the boiler, the supply pipe, the condenser located therein and sealed from the outer air, of the air inlet pipe extending within the zone of condensation in the condenser and provided with pressure regulating inlet valve and the independent safety valve, substantially as described.

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

THEADORE G. SPRINGER.

Witnesses:

C. H. WHITAKER,
E. P. HUBBARD.