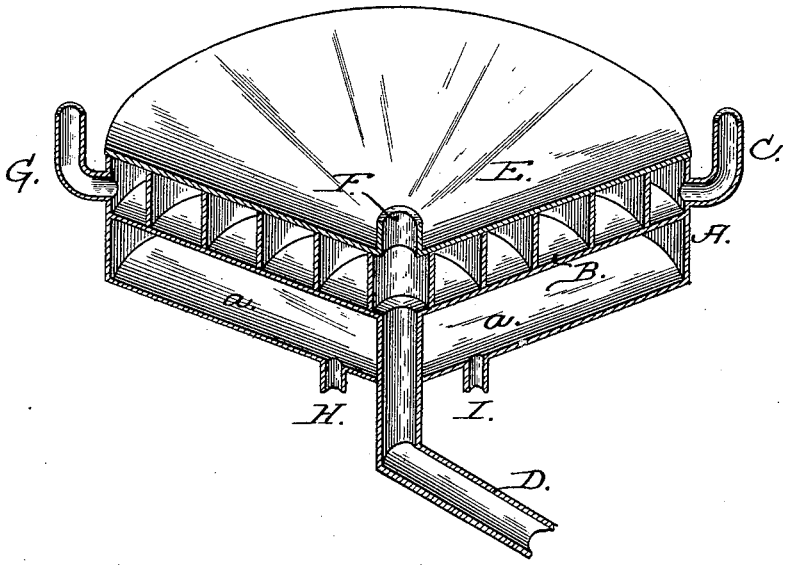
(No Model.)

J. U. LLOYD.

APPARATUS FOR EVAPORATING LIQUIDS.

No. 385,939. Patented July 10, 1888.



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UNITED STATES PATENT OFFICE.

JOHN URI LLOYD, OF CINCINNATI, OHIO.

APPARATUS FOR EVAPORATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 385,939, dated July 10, 1888.

Application filed December 1, 1887. Serial No. 256,655. (No model.)

To all whom it may concern:

Be it known that I, JOHN URI LLOYD, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Apparatus for Evaporating Liquids; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to letters of reference marked thereon, which form a part of this specification.

My present invention relates to improvements in apparatus for evaporating or concentrating liquids and solutions, the object being to provide an apparatus that will be simple and inexpensive in its construction, efficient and reliable in its operation, and which will be capable of ready manipulation to secure the best possible results.

To these ends my improvements consist, essentially, of a receptacle provided with a worm, coil, or helically-arranged ribbon-plate open at the upper surface and adapted to receive a removable lid or cover to close the same, the said receptacle being provided with means for drawing a current of hot or cold air through the worm or coil and with supply and exit pipes for the liquid that is to be treated, as will be hereinafter fully described, and specifically pointed out in the claim.

In the accompanying drawing the figure illustrated represents a vertical longitudinal section of an apparatus embodying the salient features of my invention.

Referring to the said drawing, the letter A indicates a suitable frame or receptacle for supporting the worm, coil, or helically-arranged ribbon-plate B, which is open upon the upper surface, as shown, and provided at its upper part with a supply pipe or pipes, C, for feeding the liquid through the coil, and with an exit-pipe, D, at its lower end for the escape of the undistilled portion of the liquid, the said coil or ribbon-plate having its upper surface provided with a removable lid or cover, E, attached to and covering the entire mouth of the receptacle in any suitable manner, to confine the current of hot or cold air that is drawn or blown through the said coil in a direction opposite to the current of liquid that is to be treated, a suitable pipe, F, being provided in the said lid or cover for the air-blast, and an exit-pipe, G, to one side of the coil or ribbon-plate for the escape of the air.

A suitable steam-space, *a*, is provided between the lower surface of the worm or coil and the bottom of the receptacle A, and pipes H and I open into said space for the admission of steam and the discharge of condensed water, as shown, so as to afford means for heating the said worm or coil if desired.

In the operation of my improved apparatus the liquid to be evaporated enters at the pipe C and circulates in the channel formed by the ribbon or open coil to the exit D. The air enters at the opening F and circulates in the opposite direction to that of the liquid to the exit G. Either air, or air mixed with gas, may be employed. In some instances a little sulphurous-acid gas is of advantage in preventing coloration of the product.

The air or gas may be either hot or cold, dry or moist, and is preferable in many instances when drawn from over glowing charcoal or hard coal, whereby absence of oxygen and the presence of carbonic-acid gas and great drying powers are obtained.

The air or gas may be either drawn from the exit G, thus by suction circulating through the helix, or by blast that forces itself into the pipe F, or both principles may be combined.

By means of my improvements I am enabled to provide an apparatus which is simple and compact in its nature, presenting a great area of evaporating-surface, and the cover of which being readily removed to enable the operator to examine the liquid at any time, or to remove the residuent products of the evaporated liquid, or to cleanse the apparatus.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In an apparatus for evaporating liquids or solutions, the combination of the shell A, the worm or helix closed at its bottom and open upon the top, supply-pipe C, outlet-pipe D, with removable cover E, having air-entrance F and air-outlet G, a steam-space, *a*, being provided beneath said worm or helix and supplied with suitable inlet and outlet pipes for the entrance and discharge of steam, substantially as and for the purpose specified.

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

JOHN URI LLOYD. [L. S.]

Witnesses:
W. J. MILLER,
HENRY HOFFMAN.