

(No Model.)

J. U. LLOYD.
DEVICE FOR EVAPORATING LIQUIDS.

No. 433,528.

Patented Aug. 5, 1890.

FIG. 1.

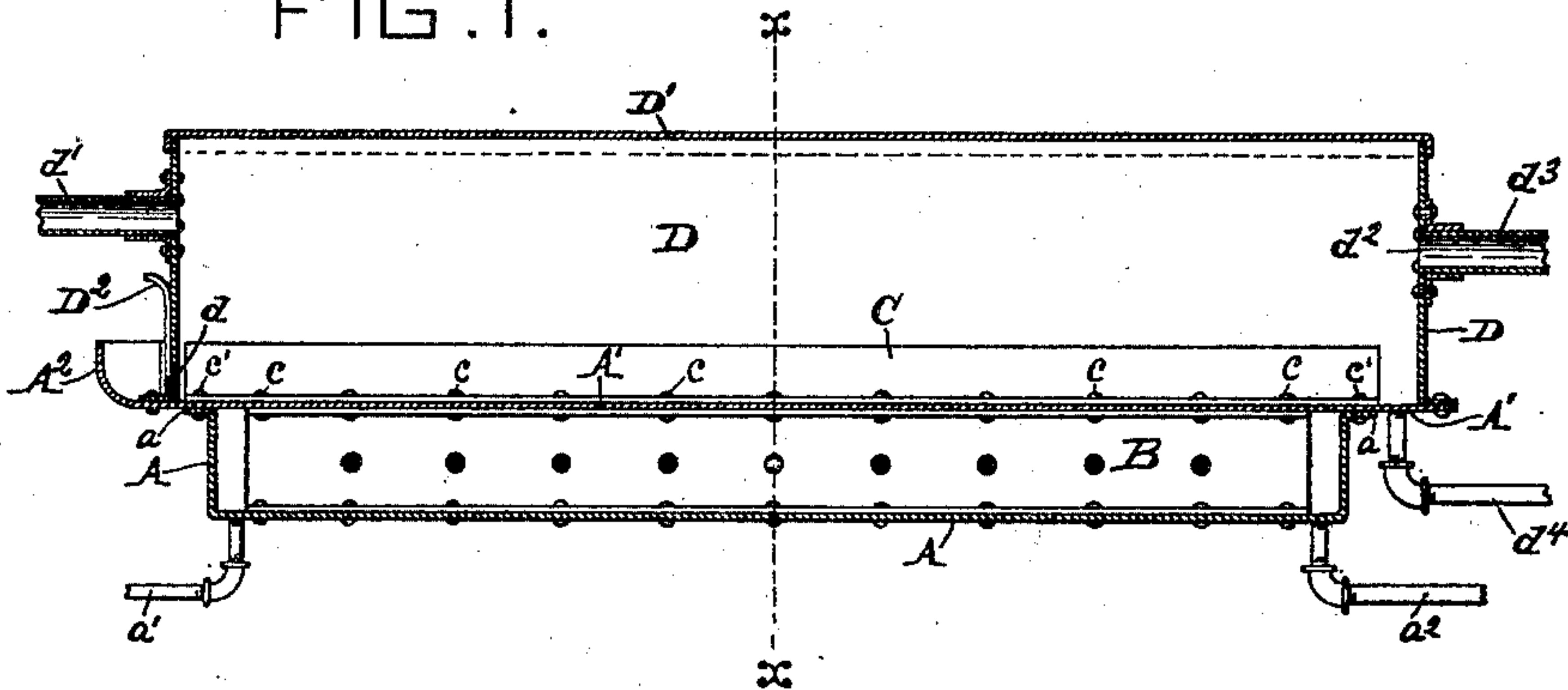
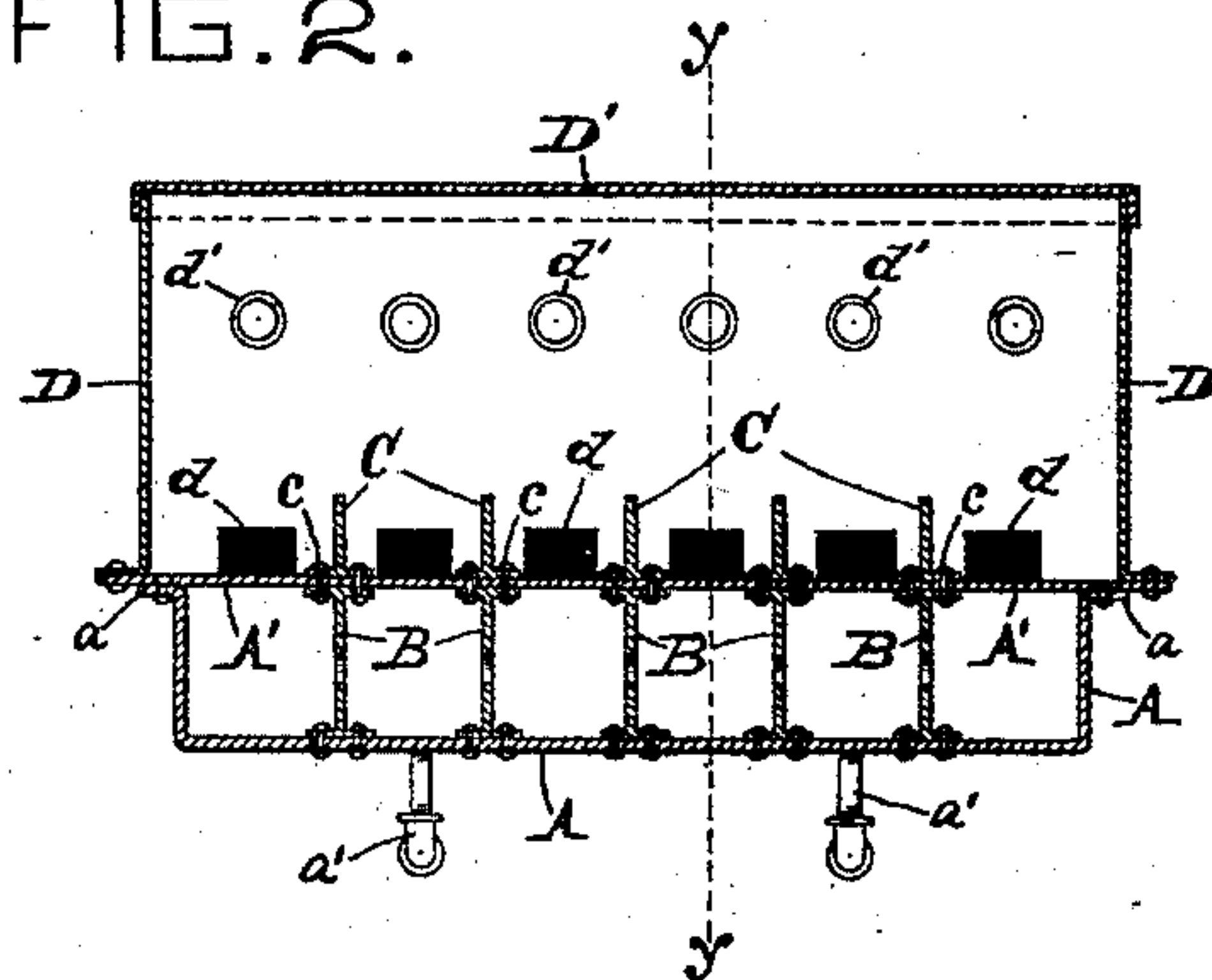


FIG. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN URI LLOYD, OF CINCINNATI, OHIO.

DEVICE FOR EVAPORATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 433,528, dated August 5, 1890.

Application filed October 26, 1889. Serial No. 328,309. (No model.)

To all whom it may concern:

Be it known that I, JOHN URI LLOYD, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Devices for Evaporating or Concentrating Liquids, of which the following is a specification.

The object of my invention is to provide an improved apparatus for evaporating and concentrating liquids whereby the process may be carried on more economically and safely than heretofore, all discoloration or alteration of the natural constituents of the liquid be prevented, and less care be required in carrying on the process.

The invention consists in the novel construction, arrangement, and combination of the parts, all of which will be first fully described in connection with the accompanying drawings, and will then be particularly referred to and pointed out in the claims.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the views, Figure 1 is a vertical longitudinal sectional view of my improved apparatus, taken on line *y y* of Fig. 2. Fig. 2 is a vertical transverse sectional view of the same, taken on line *x x* of Fig. 1.

The bottom, sides, and ends of the steam-box A, I form, preferably, of sheet-steel, and the top A' of thin sheet-copper, in order that the heat may be rapidly conveyed from the steam to the liquid passing over said top A'.

In order that steam at high pressure may be used without danger of explosion or of forcing or bulging the thin copper sheet A' upward, which would interfere with the even flow of the liquid, the top is firmly stayed in position by I-shaped iron or steel bars B, a number of which are securely riveted to the bottom of the box A through their outwardly-projecting flanges. The bottom A' rests upon the tops of these bars and above the bars B. Upon top of the sheet A' are inverted T-irons C. The sheet A' is clamped between the feet of the bars C and the tops of the bars B by bolts or rivets *c*. The bars B terminate a short distance from the ends of the box A to allow the steam to circulate freely through

the box, and the webs of said bars are also perforated for the same purpose, although these perforations are not essential. The ends of bars C extend over and rest above the upper flanged edge *a* of the box A, and are securely held by bolts or rivets *c'*, which pass through the flanges of bars C, the extended ends of the sheet A', and the flange *a*. The sheet A' is thus securely held parallel with the bottom of the steam-box.

The top A' extends over the edge of the box A to support the lower flanged edge of the light sheet-metal box D, which may be of galvanized iron or copper sheet. This box is preferably provided with a removable cover D' for convenience in cleansing the evaporating-chamber formed by it. The sheet A' is extended at the head end of the apparatus a sufficient distance to admit of its being turned up to form the trough A², into which the liquid to be evaporated is fed, and from which it passes through openings *d* in the receiving end of chamber D to the floor of the evaporating-chamber and into the channels formed by the bars C.

The flow of the liquid to the chamber D is regulated by gates D², which are fitted to slide vertically in guides secured to the outside of the box D. An independent gate is arranged to control each of the openings *d*. Steam is admitted to the box A through pipes *a'* and the water of condensation carried off through pipes *a*². The evaporated liquid is carried off through pipes *d*⁴.

To the head end of the box D are secured pipes *d'*, which are to be connected to an exhaust-fan to draw off the vapors from the chamber D. The opposite end of the box D is perforated at *d*² to admit air to the chamber when it is intended to simply draw a current of cold air through the evaporating-chamber to carry off the vapors; but if it be necessary to draw hot air or gases through the upper part of chamber D, then these openings *d*² may be fitted with pipes *d*³, which lead from a furnace or other source of supply for hot air or gas.

The device when set up for use is mounted upon suitable supports at each end, the support at one end being vertically adjustable, so that the device may be set at any desired

inclination to regulate the flow of liquid under treatment over the floor A'.

It is obvious that instead of the I-bars B and inverted T-bars C to stay and support the thin floor A' other forms of stays or stay-bars may be used, and that the bars C may be omitted and the floor A' firmly riveted or secured to the top edges of the bars B, and the floor may be divided into channels by light sheet-metal partitions. It is also obvious that the partitions B may be omitted by making the bars C heavy enough to prevent the thin plate A' from bulging upward by the pressure of steam, and that other mere mechanical changes may be made without varying the principle of my invention.

I claim—

1. In a device for condensing liquids, the combination of the heavy steam-box A, having outwardly-projecting flanges *a* around its top edge, the thin evaporating-plate A', covering said box extending beyond the flanges and secured to them, the chamber D, secured to the extended edges of said evaporating-plate, and the bars C, secured upon plate A' and having their opposite ends stopping short of the walls of chamber D and secured upon the flanges *a*, whereby open-ended channels are formed on the evaporating-plate and said plate is held securely to insure an even flow of the liquid over it, substantially as shown and described.

2. The combination, substantially as specified, of the box A, having outwardly-projecting flanges *a*, the evaporating-plate extending over, resting upon, and secured to said

flange, the bars B, secured to the bottom of the steam-box directly under the bars C, the rivets for clamping the plate A' between the feet of the bars C and tops of bars B, and the chamber D, secured to the extended edges of the plate A', the said bars C, in connection with plate A', forming channels for the liquid to be condensed.

3. The combination, substantially as hereinbefore set forth, of the steam-chamber, the evaporating-plate A', forming the top of said chamber and extending beyond it, the bars B, secured to the bottom of said chamber and to the evaporating-plate, the evaporating-chamber D, secured to the extended edges of plate A' and having openings *d* in one end for the liquid, the trough A² for supplying liquid to said openings, said trough being turned up from plate A', and the pipe for conducting the condensed liquid from said chamber.

4. The combination, substantially as hereinbefore set forth, of the steam-chamber, the evaporating-plate forming the top thereof, the bars B and C, arranged one above the other upon opposite sides of said plate to support it, the chamber D, having openings for the admission of the liquid, and openings for the admission of air to the upper part of said chamber, the pipes for drawing a current of air through said chamber, and the trough for supplying the liquid to be evaporated, and the gates to regulate the openings *d*.

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Witnesses:

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