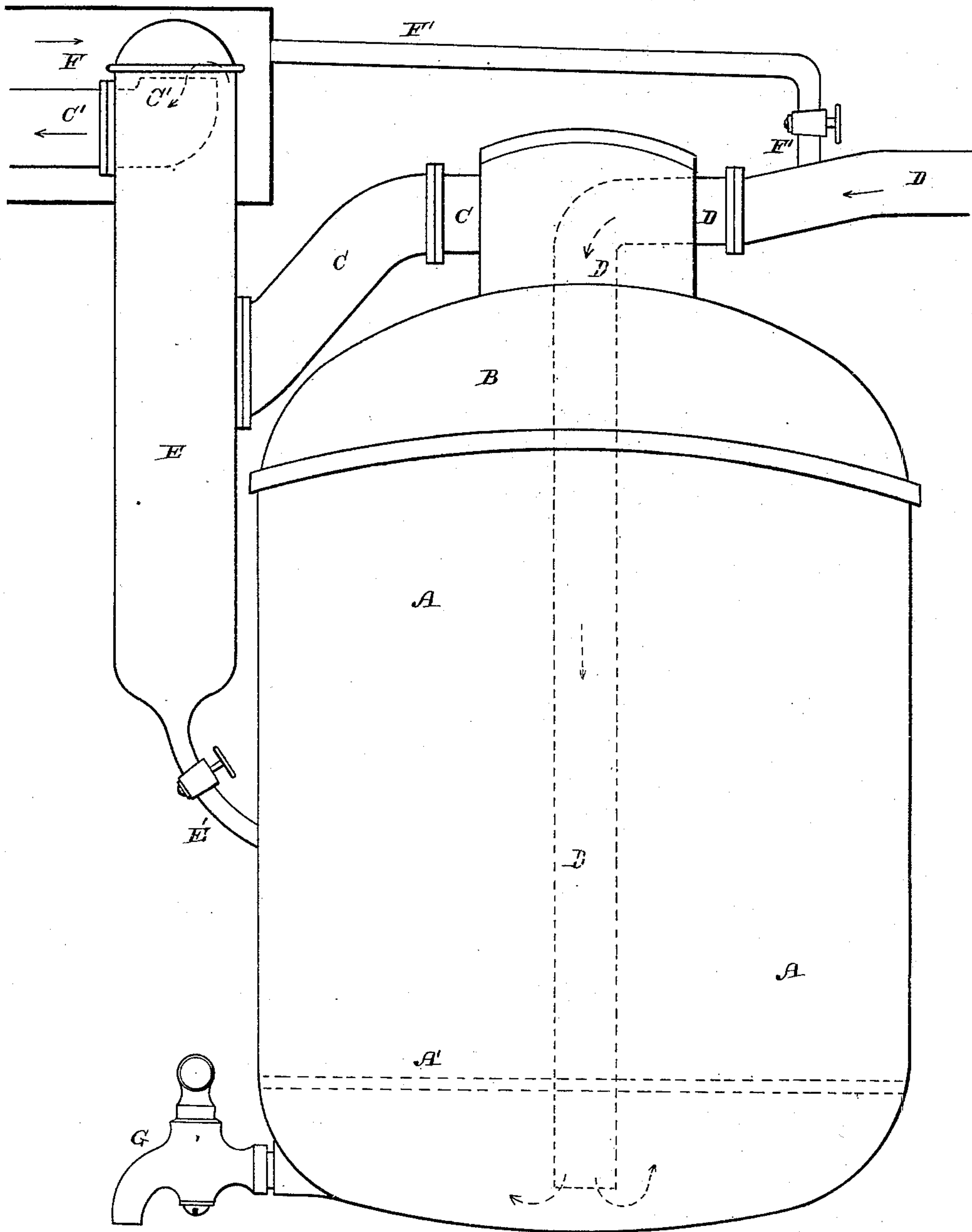


(No Model.)

P. LABERIE.  
EVAPORATING APPARATUS.

No. 378,598.

Patented Feb. 28, 1888.



WITNESSES

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INVENTOR

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By *his* Attorneys

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# UNITED STATES PATENT OFFICE.

PIERRE LABERIE, OF PARIS, FRANCE.

## EVAPORATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 378,598, dated February 28, 1888.

Application filed June 23, 1887. Serial No. 242,301. (No model.) Patented in France August 14, 1886, No. 177,956; in England August 26, 1886, No. 10,911; in Spain August 28, 1886, No. 9,624, and in Belgium February 5, 1887, No. 76,241.

*To all whom it may concern:*

Be it known that I, PIERRE LABERIE, a citizen of the Republic of France, residing at Paris, France, have invented a new and useful Improvement in Evaporating Apparatus, (for which I have received Letters Patent in France, No. 177,956, dated August 14, 1886; in Great Britain, No. 10,911, dated August 26, 1886; in Spain, No. 9,624, dated August 28, 1886; and in Belgium, No. 76,241, dated February 5, 1887,) of which the following is a specification.

The object of my invention is to rapidly and economically evaporate beet-juice, cane-sugar juice, and other liquors and juices to be concentrated.

The details of construction and novel features of my invention appear from the following description and claims.

The accompanying drawing shows the apparatus arranged in a suitable and desirable manner for carrying out the objects of my invention.

A represents an ordinary vacuum-pan, which may be heated in any suitable manner by steam or otherwise. A pipe, D, is shown as entering the cap or cover B of the pan and extending nearly to the bottom thereof. This pipe is in suitable connection with some source of hot-air supply. A pipe, C, connects with the dome of the cap or cover B and also with a vertical condenser, E, as clearly shown. The bottom of the condenser is connected by a pipe, E', with the vacuum-pan, the pipe being provided with a suitable stop-cock. In the upper end of the condenser E is an exhaust-pipe, C', which may be connected with any suitable exhaust apparatus. Surrounding the upper part of the condenser E and the exhaust-pipe C' is a jacket or casing, F, in which the juice or fluid to be supplied to the evaporating-pan is contained. This case F is connected by a pipe, F', having a suitable stop-cock therein, with the pipe D, which serves for the introduction of the hot air.

The hot air is preferably introduced into the bottom of the evaporating-pan below a slatted or perforated false bottom.

The operation is as follows: The action of the exhaust apparatus connected with the pipe C' tends to form a vacuum in the pan and causes the hot air from the pipe D to rush into the pan.

The air, leaving the pipe D near the bottom of the evaporating-pan, bubbles up through the matter therein, thoroughly agitating it, and passes off by way of pipe C, condenser E, and exhaust-pipe C'. Any particles of sugar which may be carried through the pipe C by the draft will settle in the bottom of the condenser E, and may be readmitted into the evaporating-pan by opening the stop-cock in the pipe E'. The air and steam passing through the condenser and exhaust-pipe C' heat the feed or supply fluid contained in the jacket or casing F, and the heated fluid is conveyed by the pipe F' to the hot-air-induction pipe D, through which it is carried into the vacuum-pan by the draft of the hot air.

The stop-cock in the pipe F' may be adjusted so as to feed a constant supply of fluid to the pan. As the densest part of the concentrated juice will fall to the bottom of the pan A, it can be run off through a discharge-tap, G, without stopping the running of the apparatus. By such an organization I am enabled to run the apparatus continuously and economically, as all the heat developed is utilized to the best advantage.

I am aware that it is not broadly new to introduce hot air at the bottom of a concentrating-pan and draw it off by means of an exhaust. I am also aware that, broadly speaking, the hot air and steam carried off by the exhaust apparatus have been utilized to heat a fluid being operated upon, and do not, therefore, broadly claim such subject-matter.

I claim as my invention—

1. The combination of the vacuum-pan, the hot-air-induction pipe D, the fluid-supply vessel, the pipe F, leading from the supply-vessel into the hot-air pipe, the eduction-pipe C, the condenser, the exhaust-pipe connected with the condenser, and a connection between the bottom of the condenser and the pan, whereby such particles of sugar, &c., as are carried by the draft into the condenser may be returned to the pan.

2. The combination, with a vacuum-pan, of the hot-air-induction pipe, the eduction-pipe C, an exhaust-pipe by which the steam and hot air are drawn from the pan, a fluid-chamber, F, through which the exhaust-pipe passes, and a pipe-connection between the fluid-chamber



and the hot-air-induction pipe, whereby the heated fluid from the chamber F may be supplied to the pan through the hot-air-induction pipe, substantially as set forth.

5 3. The combination of the vacuum-pan, the hot-air-induction pipe, an eduction-pipe, C, an exhaust-pipe through which the hot air and steam are withdrawn from the pan, a fluid-supply vessel through which the exhaust-pipe  
10 passes, a pipe-connection, F', between the fluid-supply vessel and the induction-pipe D, and a cock in the pipe F', whereby the heated supply-fluid may be fed to the pan in a regulated quantity through the hot-air-induction pipe D.

15 4. The combination of the pan, the hot-air-induction pipe D, the eduction-pipe C, the condenser with which the pipe C communicates, an exhaust-pipe, C', communicating with the top of the condenser, the fluid-supply vessel F,

through which the exhaust-pipe passes, and 20 the pipe-connection F' between the fluid-supply vessel and the hot-air-induction pipe D, substantially as set forth.

5. The combination of the pan, the hot-air-induction pipe, an eduction-pipe, an exhaust- 25 pipe through which steam and air are withdrawn from the pan, the fluid-supply vessel through which the exhaust-pipe passes, a pipe-connection, F', between the fluid-supply vessel and the hot-air-induction pipe D, and the tap 30 G, arranged at the bottom of the pan, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

PIERRE LABERIE.

Witnesses:

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ROBT. M. HOOPER.