

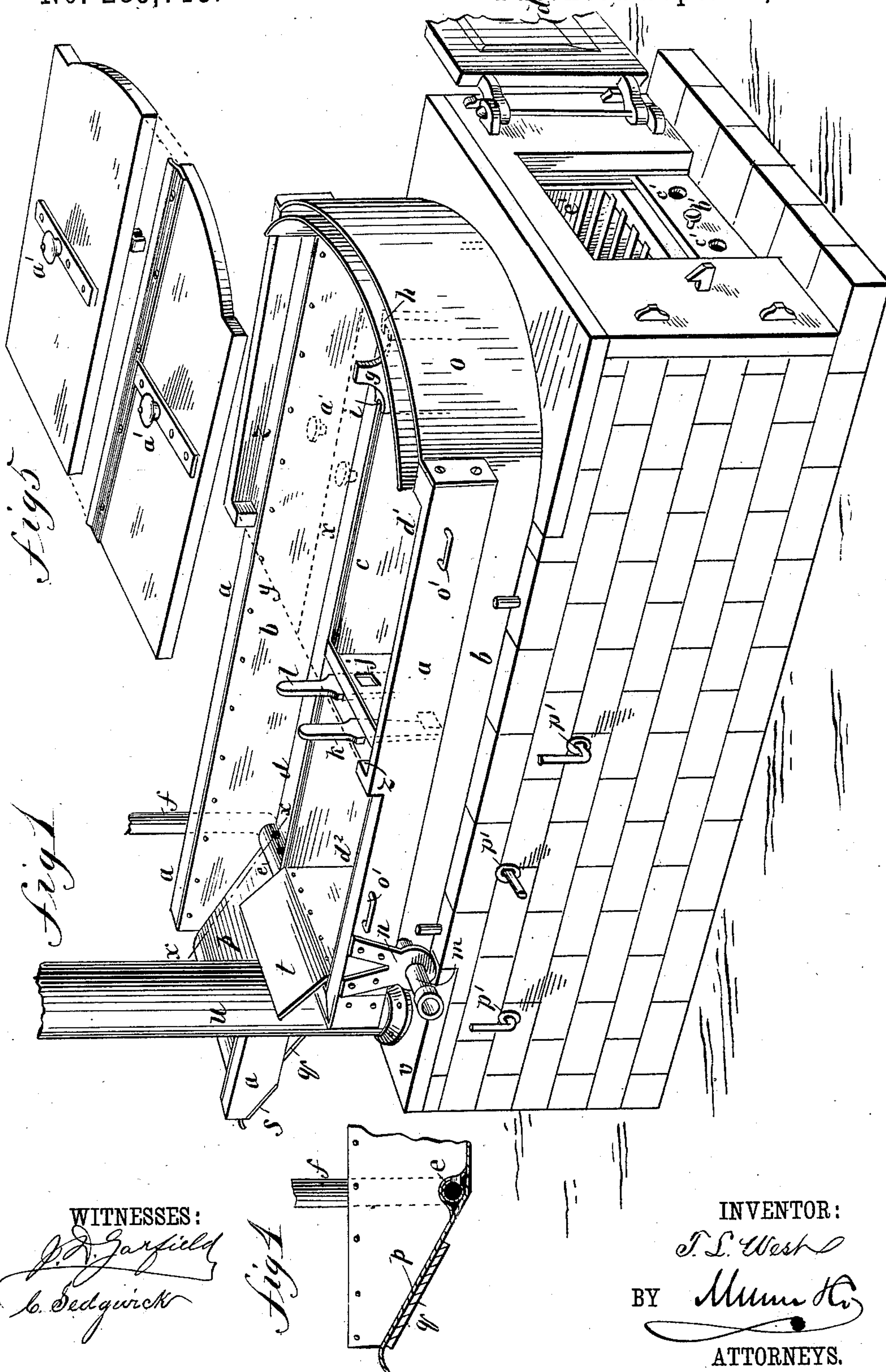
(Model.)

2 Sheets—Sheet 1.

T. L. WEST.
EVAPORATOR.

No. 285,713.

Patented Sept. 25, 1883.



WITNESSES:

J. D. Garfield
C. Sedgwick

INVENTOR:

T. L. West

BY

Mum & Co

ATTORNEYS.

(Model.)

2 Sheets—Sheet 2.

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Fig 2

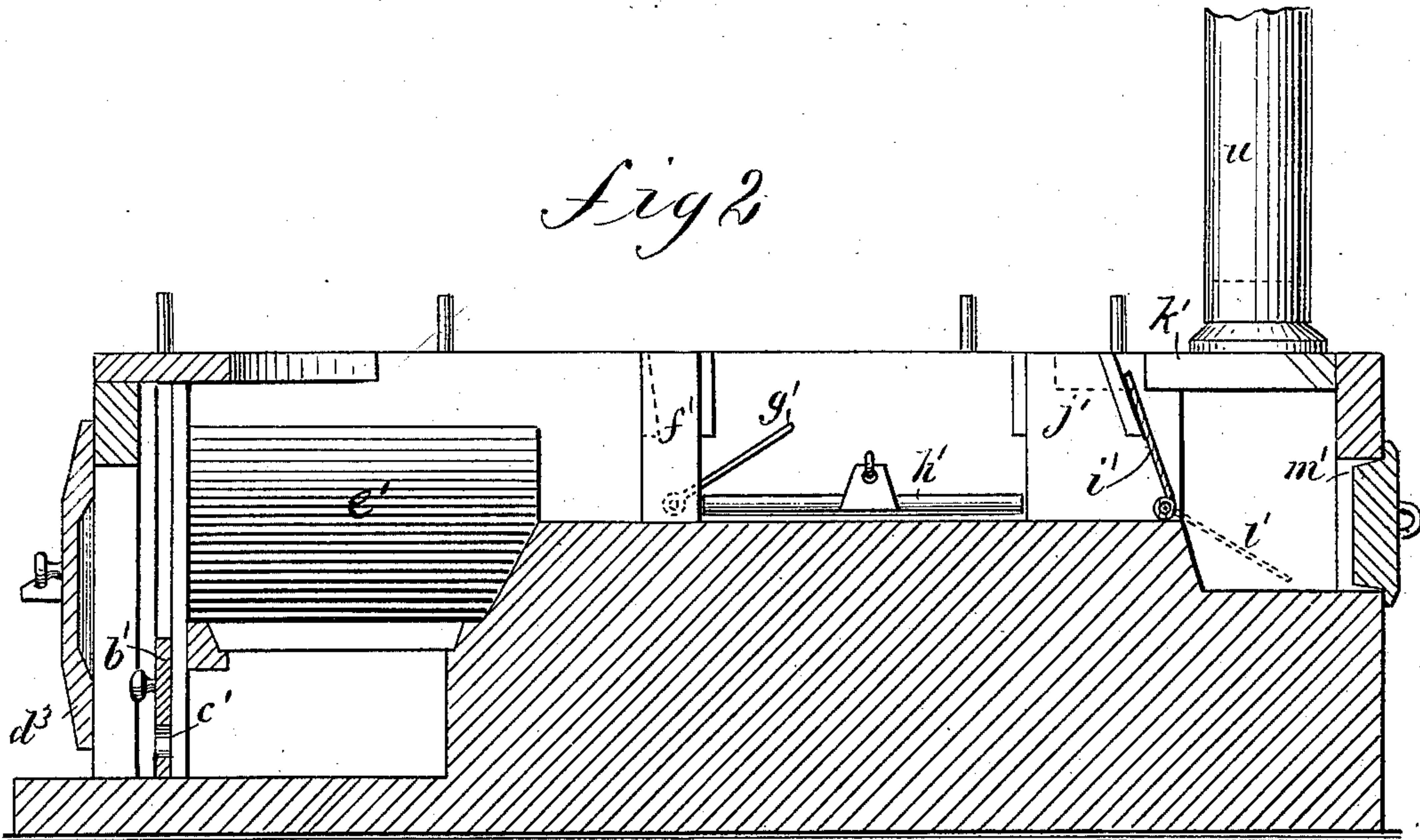
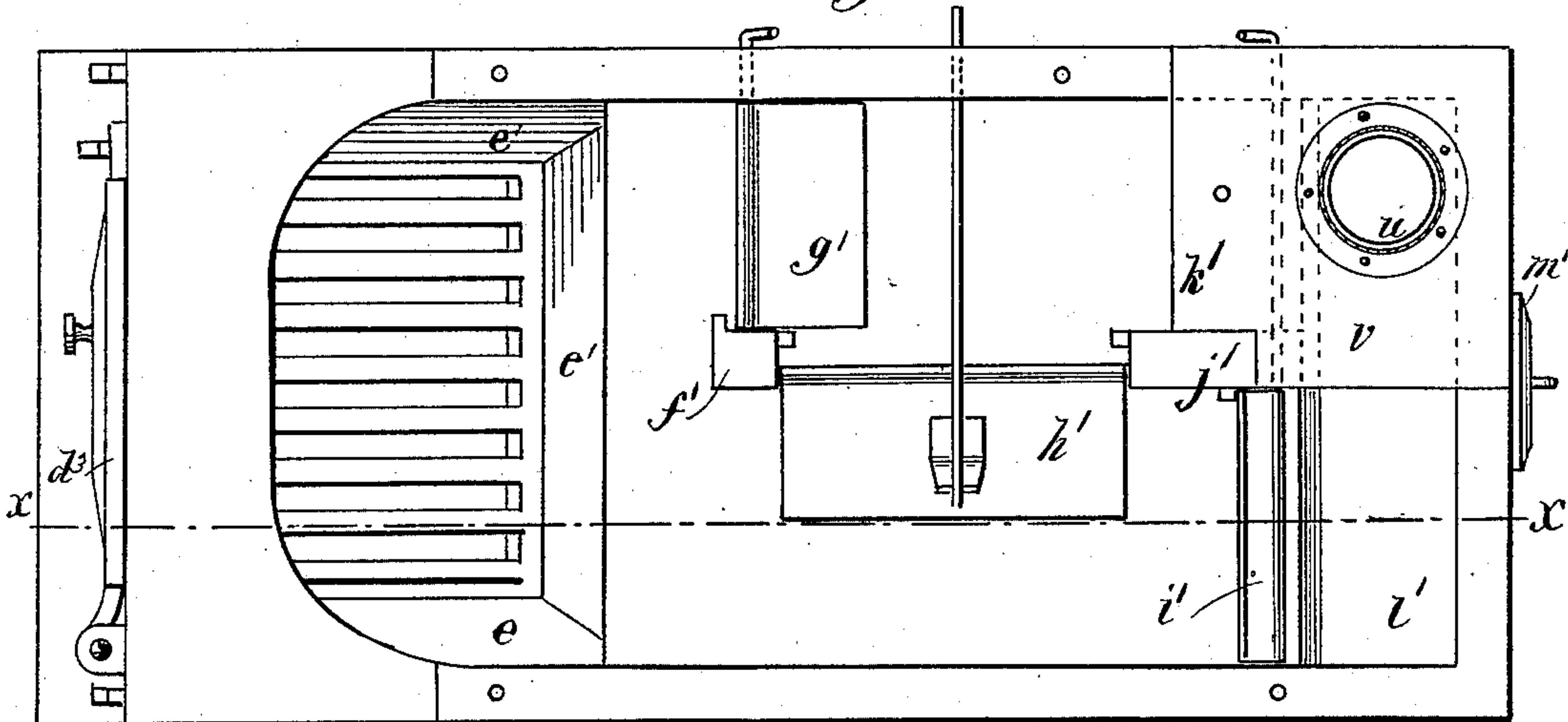


Fig 3



WITNESSES:

J. D. Garfield
L. Sedgwick

INVENTOR:

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UNITED STATES PATENT OFFICE.

THOMAS L. WEST, OF PALATINE, ILLINOIS.

EVAPORATOR.

SPECIFICATION forming part of Letters Patent No. 285,713, dated September 25, 1883.

Application filed April 30, 1883. (Model.)

To all whom it may concern:

Be it known that I, THOMAS L. WEST, of Palatine, in the county of Cook and State of Illinois, have invented a new and Improved
5 Evaporator, of which the following is a full, clear, and exact description.

My invention consists of improvements in the construction and arrangement of the evaporating-pan, the means of supplying the sirup
10 to the pan, the means of regulating and controlling the application of the heat in the pan and for the management and action of the sirup, the means of separating the sirup from the semi-sirup and discharging it from the
15 pan, and the means of effecting the most economical combustion of the fuel and best application of the heat to the pan, all as herein-after fully described.

Reference is to be had to the accompanying
20 drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of my improved evaporating pan and furnace. Fig. 2
25 is a longitudinal sectional elevation through the furnace, taken on the line $x x$ of Fig. 3. Fig. 3 is a plan view of the furnace. Fig. 4 is a detail of one of the ends of the pan, and Fig. 5 is a perspective view of the cover of
30 the pan.

I make the pan of copper throughout, except the wooden bands or ribs a , in preference to the common construction of the bottom portion of copper and flanges turned up at the
35 sides to be nailed onto wood sides, which is a defective arrangement, because the heat of the furnace conducted to the nails chars the wood and slackens the nails, so that they soon become loose, making the pan leaky, and causing
40 delay for repairs. In my pan the copper sides b and ends are extended to the top, and thus the liability of leakage by the above-mentioned cause is wholly avoided. I also make the center partition, c , of copper to the
45 top, and also make it double, with the edge of one part turned over the other to make a stiffening rib or band, by which the wood strip commonly employed for the purpose may be dispensed with.

50 At the back end of the receiving space or compartment d , I arrange a perforated pipe,

e , through which the sap is to enter from the pipe f , which connects with the sap-tank (not shown) located near the evaporator. The said
perforated pipe is located at the bottom, and
55 extends across the receiving-compartment, so that the sap entering the compartment through the perforations is spread out evenly on the bottom and flows gently to the front without a
ripple, instead of entering in one rapid stream, 60
as in the common arrangement, which produces a continuous commotion of the sap, interrupting defecation and causing the mixing of the scum that has risen with the fresh sap. Scum boiled in or in any other way mixed 65
with fresh sap will never rise again, but remains in the sirup, giving it a dark cloudy appearance and a strong biting flavor. My improved method of feeding the evaporator obviates this result, and enables effectual and
70 complete defecation to be secured.

At the front end of the pan is an open space between the partition c and the end of the pan, in which I fit a wooden gate, g , by means of a
grooved cleat, h , (dotted Fig. 1,) attached to
75 the front end of the pan, and a groove, i , in the edge of the gate fitting the end of the partition. This gate is to be used only when finishing off at night, and when making a division between different batches of sirup. 80

In the finishing-compartment d' d'' , I make a cross-partition, j , at or about the middle, with two gates, k and l , in it, the one, k , being
at the bottom, and is to be used when a batch
of semi-sirup is to be run into section d' of 85
said finishing-compartment. The other gate, l , which is higher up in the partition, is to be used only when it is required to let small additional quantities through. The boiling sap
at the front part of the pan rises higher than 90
at the back, so that any small additional quantities required may be so run through said upper gate, which is preferable to opening the lower one.

At the upper or back end of the section d'' 95
of the finishing side I attach a strong copper tube, m , adapted for inserting a sirup-gate in the end for drawing off the sirup, the said tube being supported by a strong bracket, n , attached to the wooden rib a , for protecting the 100
joint against damage by any person or thing falling or otherwise pressing against the outer

end, to which it is liable in consequence of projecting beyond the side of the pan.

At the front end of the pan I make a double wall by applying an exterior plate, *o*, to provide a dead-air space, the object of which is to prevent the chilling effect of cold air blowing against the end, which sometimes causes the boiling sap to drop very perceptibly, and thus maintain a uniform height of the boiling sap, which is very essential for obtaining the best results.

For the support of the sloping back end, *p*, of the compartment *d*, over which the scum is pushed, I employ a strong metal plate, *q*, placing it flat against the under side of said end and soldering it thereto at the lower edge, and providing it with extensions *s* of the ends of the upper edge, which I nail to the bevel under edges of the wood cleats or ribs *a*, making substantial support for the said sloping end *p*, that will not be affected by the heat of the furnace below.

At the back end of the finishing-compartment *d*², I make a sloping extension, *t*, of the end plate of the pan a suitable distance above the top of the pan to prevent the sirup and the scum from overflowing thereat, where it would fall upon the base of the smoke-pipe *u* and its supporting-plate *v*, by which it would burn and make disagreeable stench.

Over the front portion of the pan I arrange covers, (indicated by the dotted lines *x y* and shown in Fig. 5,) said covers being preferably made in two parts, which meet at *x* and rest on the partition *c* and on the top of the sides of the pan at *z*, each having a handle, *a'*, by which to lift them off when required. By resting on the top of the pan said covers are supported entirely above the boiling sap, and there is always a space of one to two inches between them and the sap, so that no scum can collect on the under side of the covers, from which to be again mixed with the sap, when, as in other evaporators, the covers rest on the boiling sap defecation is retarded, and much of the scum that has risen with the boiling mixes with the sap again.

The covers to my evaporator always being clear of the sap, and there always being a space between the covers and the sap, and the boiling sap always being higher under the covers than at any other point, an upper current is formed which passes through the open space between the partition and the front end of the pan, extending back nearly to where the sap enters the evaporator, and this current, which finds vent at the back end of the right-hand cover, carries the scum as fast as it rises to the extreme back end of the long compartment *d*, there packing it in a tough cream-like mass, from where it is pushed with the scum-pusher over the inclined end *p* to the scum-tank, this being all the skimming that is required, not more than one hour being required in a whole day to do the skimming, whereas with many other evaporators

from one to three hands must be constantly employed to do the skimming. The pusher which I use for thus pushing off the scum consists of a short piece of board about as long as the breadth of the compartment *d*, and attached to the end of a straight stick for a handle.

In the operation of this improved evaporating-pan the sap is to be let into the evaporator to the depth of about three inches, the supply being then cut off by means of a stop-cock to be provided in the supply-pipe. The fire is then started, and when the sap begins to boil the cock in the supply-pipe is partly opened to turn on a supply equal to the evaporation. When the sirup in the finishing-compartment is ready to be pushed out, I open the sirup-gate at *m*, place the pusher close to the partition *j* in the finishing-division, raise gate *k*, so that the semi-sirup can flow in, and then move the pusher slowly forward until the sirup is all out. Then I close gate *k*, and another batch is ready to finish in the section *d*² of the finishing-compartment.

When I wish to stop work at night, I shut off the sap, remove the scum, and when the semi-sirup in the long compartment *d* is ready to be pushed around I place the pusher at the back end, open gate, *g*, turn on water from a water-tank to be provided, then push forward to the front part of the finishing-compartment, and put in the front gate, *g*. Then I finish off the sirup in the finishing-compartment and discharge it, as above described, following it up with water by the use of the partitions and gates, the utility of which will thus be understood. The partitions and gates are also useful in keeping the proper separation of different batches of sirup, as when making sirup for patrons.

The sirup-pusher above referred to consists of a wood board or head, bordered on the ends and lower edge with corn-husks, slightly projecting lengthwise from the edges of the head, and forming a brush, that closely fits between the sides and bottom of the compartments.

The pan is provided with handles *o'*, by which to handle it conveniently when putting it on and off from the furnace.

In the furnace I propose to have a movable drop-slide, *b'*, to close the ash-pit, said slide having apertures *c'*, providing sufficient draft of air to consume the coal that drops from the grate for economizing the fuel. With this drop-slide I make the door *d*³ of the arch to allow a space of about three inches from the bottom, Fig. 2, for draft to the coal on the grate. The air, passing through this space against the drop-slide, turns upward and reaches the fire at the top of the grates, thus being quite hot when it reaches the fire, so as not to deaden it, as when the whole space of the ash-pit is left open. The arrangement of the door and drop-slide effect great saving of fuel, and materially increases the heating capacity of the furnace.

I propose to provide bevel sides *e'* to the furnace, which serve to draw the fuel together on the grate, and to let the flames spread at the top, striking the whole surface of the evaporator.

Back of the furnace I arrange a center post, *f'*, firmly supported in the brick-work for the support of the center of the bottom of the pan, also for support of the damper *g'*, which is to shut off the heat from under the back section of the finishing-compartment, and also for the support of the long damper *h'*, which is to increase or diminish the heat under said section when required. When the sirup is liable to brown by having boiled too much, I close dampers *g'* and *h'*, and when it does not boil fast enough in the finishing-compartment I open them and close the back damper, *i*. Back of the long damper *h'*, for its support, and also for the support of the pan, I have another post, *j'*, which, together with the bearing plate or bar *k'*, for the support of the smoke-pipe, I propose to make in one piece for simplicity, said post and bearing-plate, and also the post *f'*, being made of cast-iron. These posts and the long damper take the place of the back partition-wall commonly used in evaporating-furnaces.

At the rear end of the furnace I arrange a pit, *l'*, for the light ashes to fall into, to be removed through the hand-hole *m'*, the cover of which may be removed for a back regulator to the draft, when required, for quickly deadening the fire, which is often necessary. I propose to bush the furnace-walls where the damper-handles extend through them with metal bushings *p'*, to protect the walls from wear by the handles.

I am aware that it is not new to feed the sap into the pan through a pipe arranged along the bottom of the latter.

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

1. The perforated distributing-pipe *e*, combined with an evaporating-pan, and arranged for distributing the supply of sap along the bottom of the receiving-compartment, substantially as described.

2. The gate *g*, in combination with a grooved cleat, *h*, attached to the front end of the pan, and with the partition *c*, said gate having a groove, *i*, for said partition, substantially as described.

3. An evaporating-pan having a double front with a dead-air space for protection from the cooling effect of the wind, substantially as described.

4. The combination of the drop-slide *b'*, having apertures *c'*, with the fire-grate and ash-pit, substantially as described.

5. The combination of the drop-slide *b'* with the fire-grate, and the furnace-door *d'*, arranged for the draft to enter under the door and pass up between it and the drop-slide, substantially as described.

6. The center post, *f'*, in combination with the pan and the dampers *g'* and *h'*, substantially as described.

7. The combination of the back post, *j'*, and bearing-plate *k'* with the evaporating-pan and smoke-pipe, also with the dampers *h'* and *i'*, said post and bearing-plate being constructed substantially as described.

8. The combination of the dampers *g'*, *h'*, and *i'* with the evaporating-pan, having preparing and finishing compartments, substantially as described.

THOMAS L. WEST.

Witnesses:

JOHN W. SMITH,
HENRY BAKER.