(No Model.) 4 Sheets—Sheet 1.

W. S. GILMORE.

EVAPORATING PAN AND FURNACE FOR OPERATING THE SAME.

No. 441,001. Patented Nov. 18, 1890.

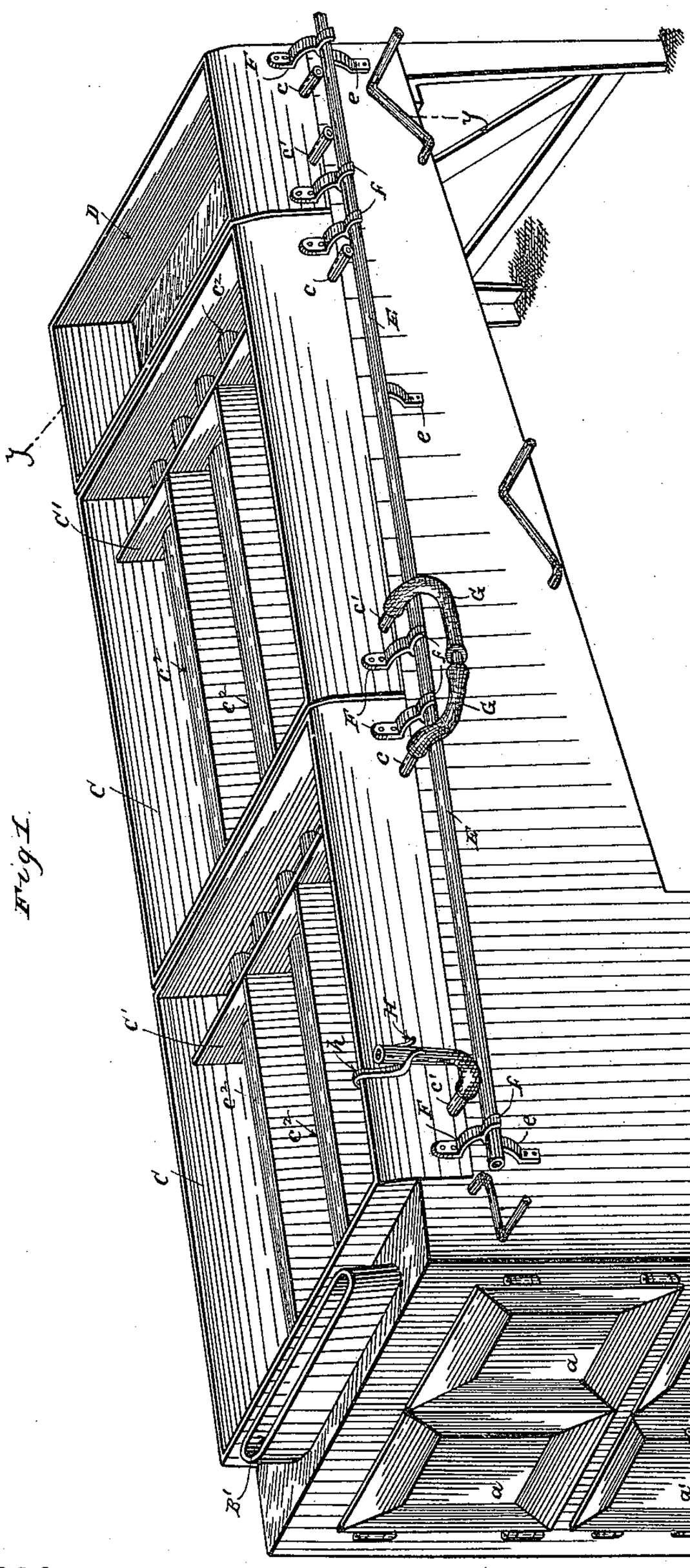

Fig. 1.

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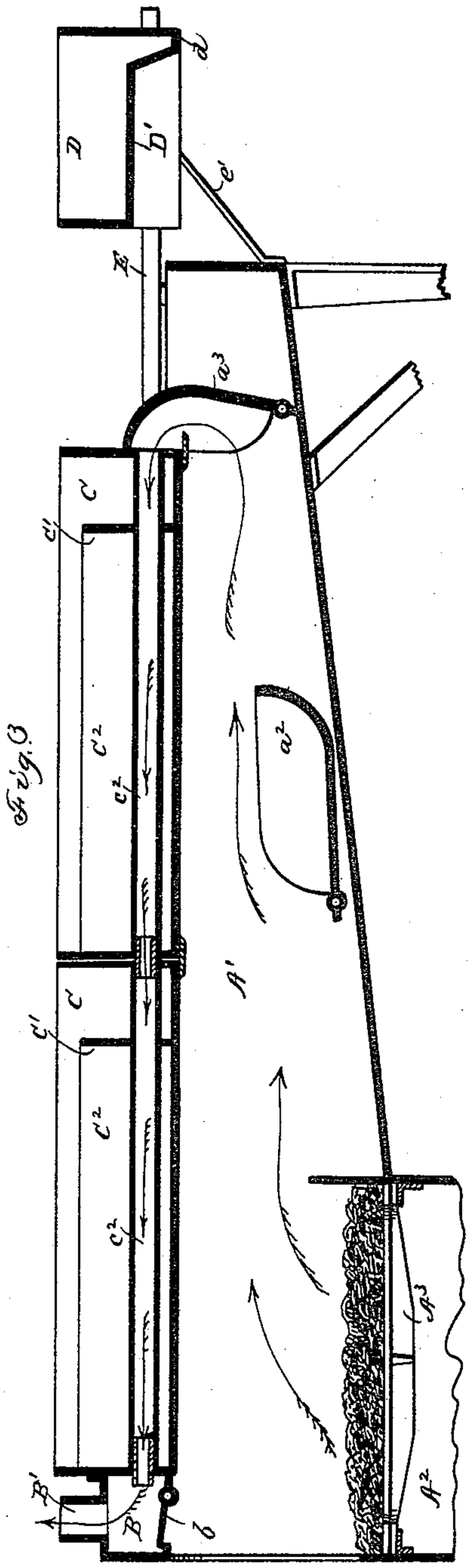

Fig. 3.

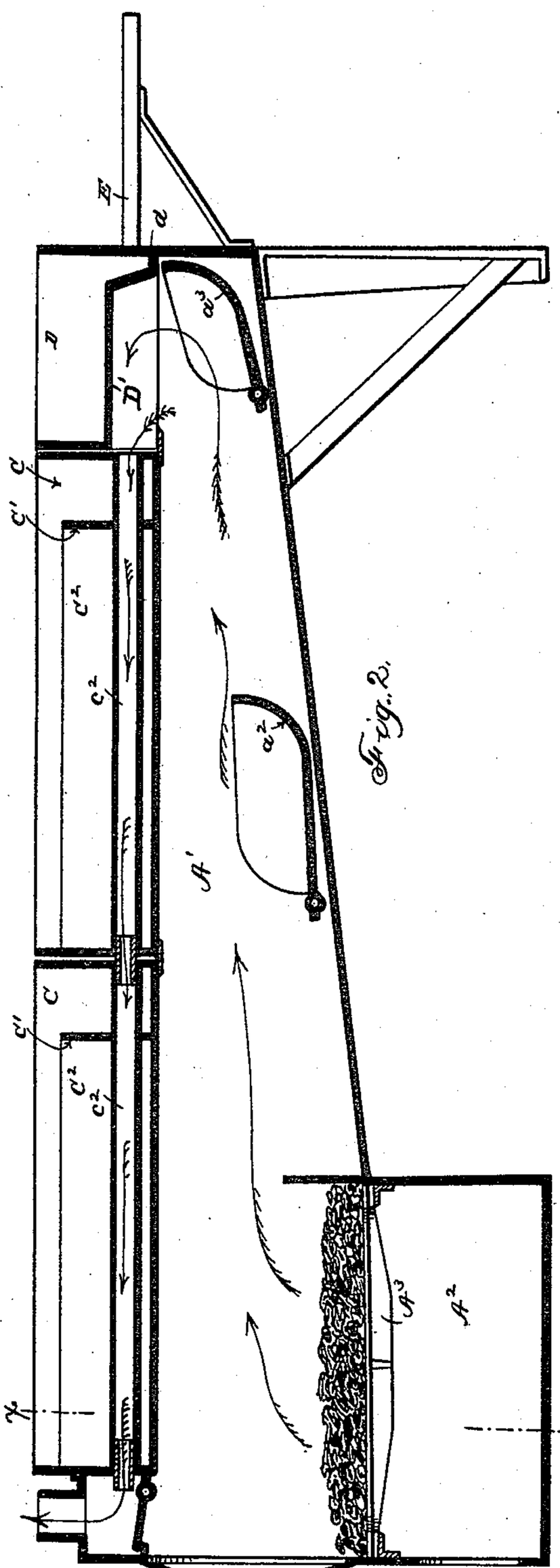

Fig. 2.

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EVAPORATING PAN AND FURNACE FOR OPERATING THE SAME.

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Fig. 3.

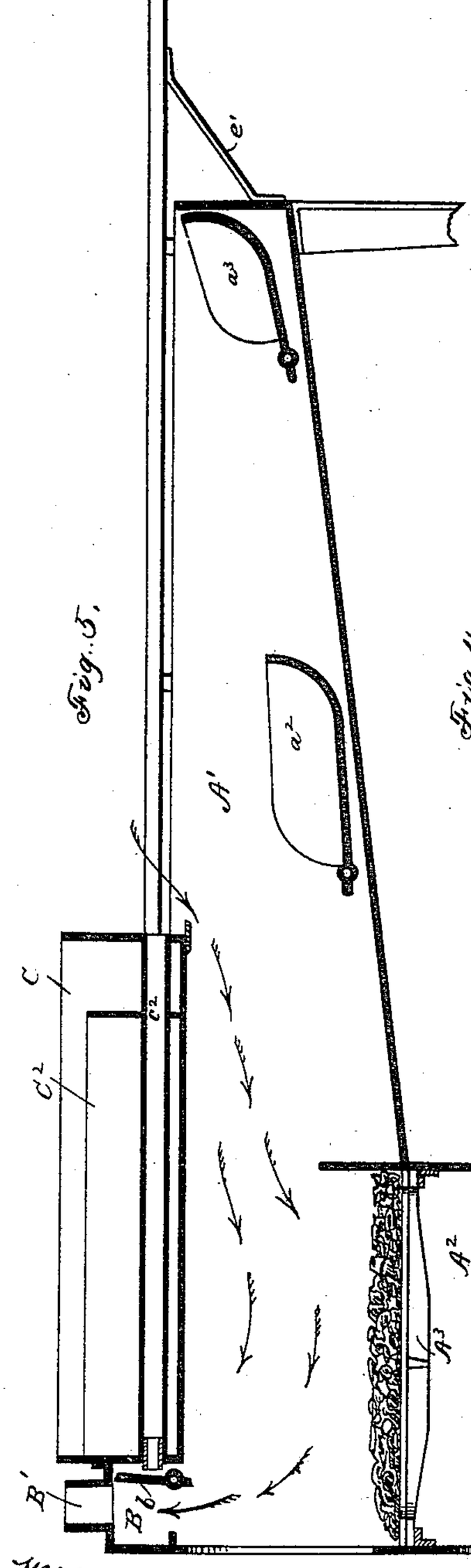
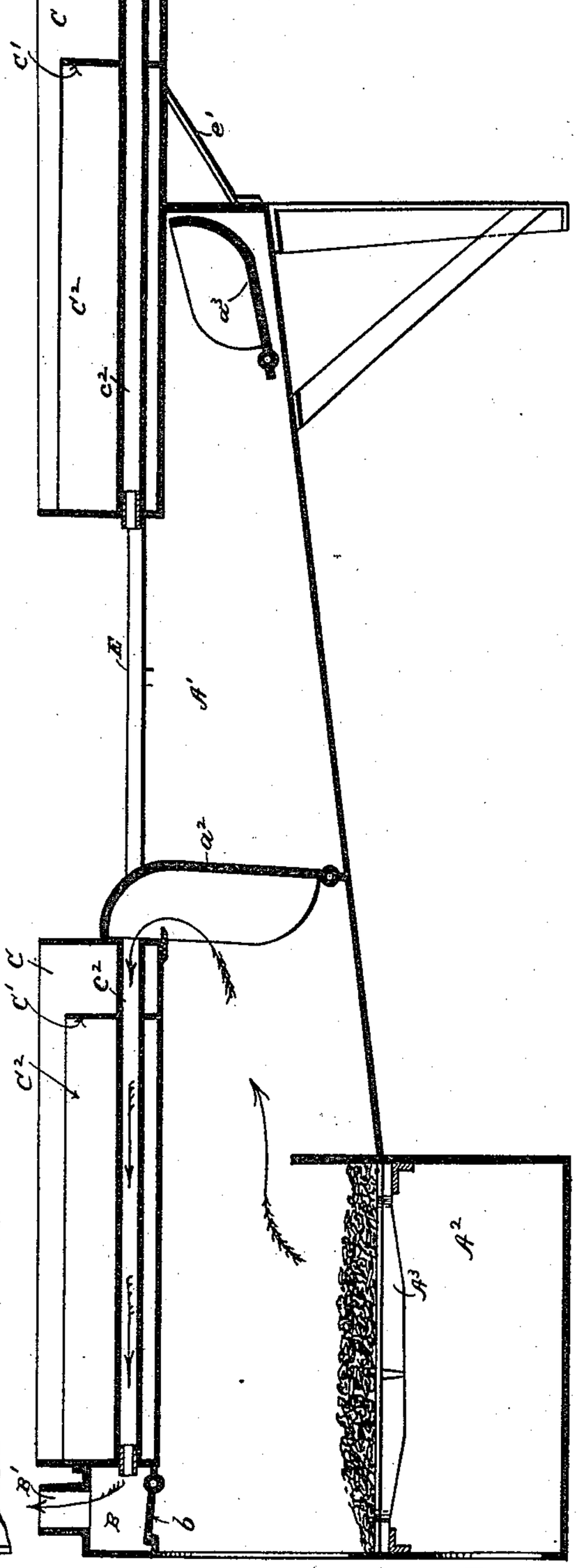


Fig. 4.



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EVAPORATING PAN AND FURNACE FOR OPERATING THE SAME.

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Fig. 8.

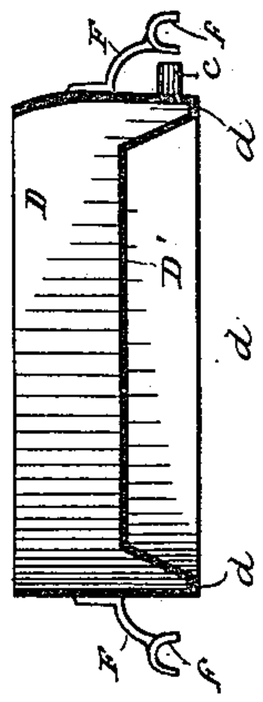


Fig. 9.

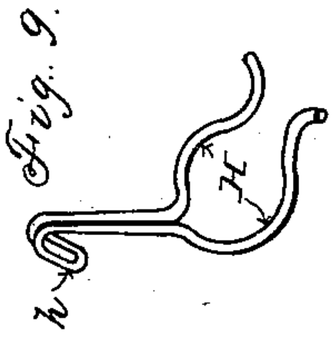


Fig. 7.

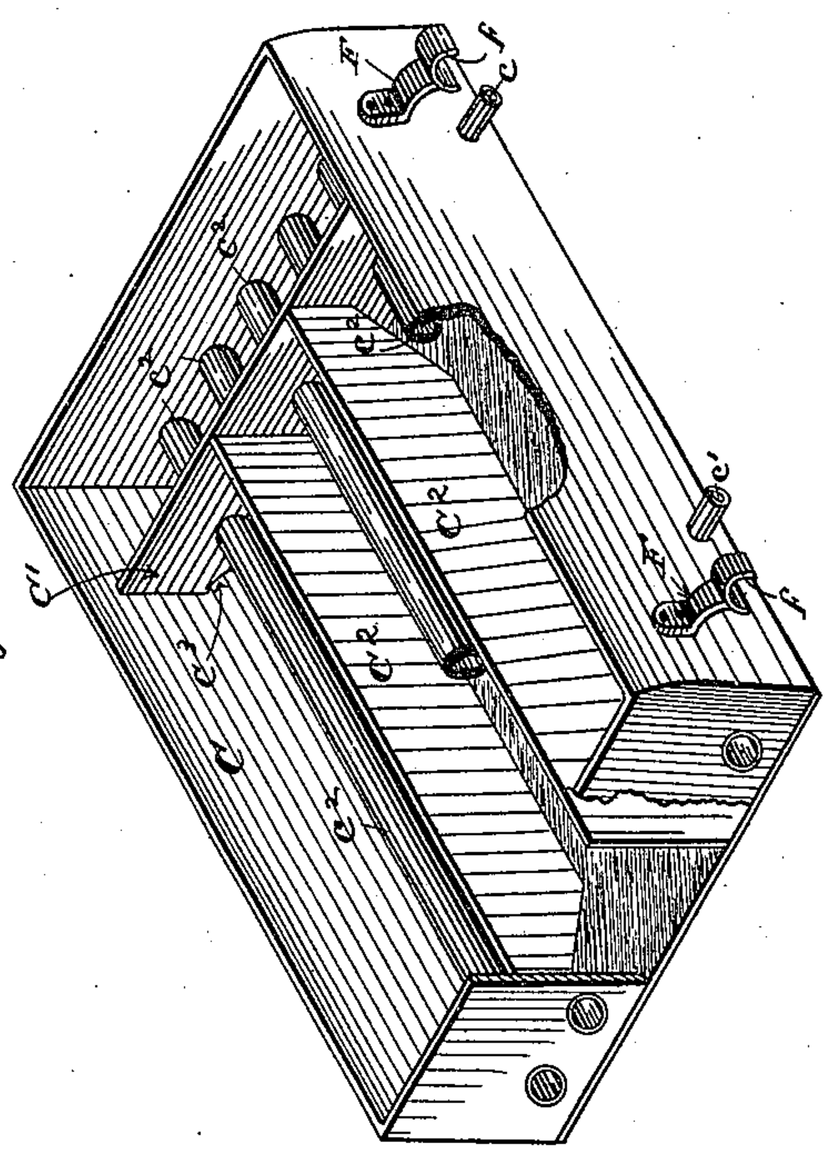
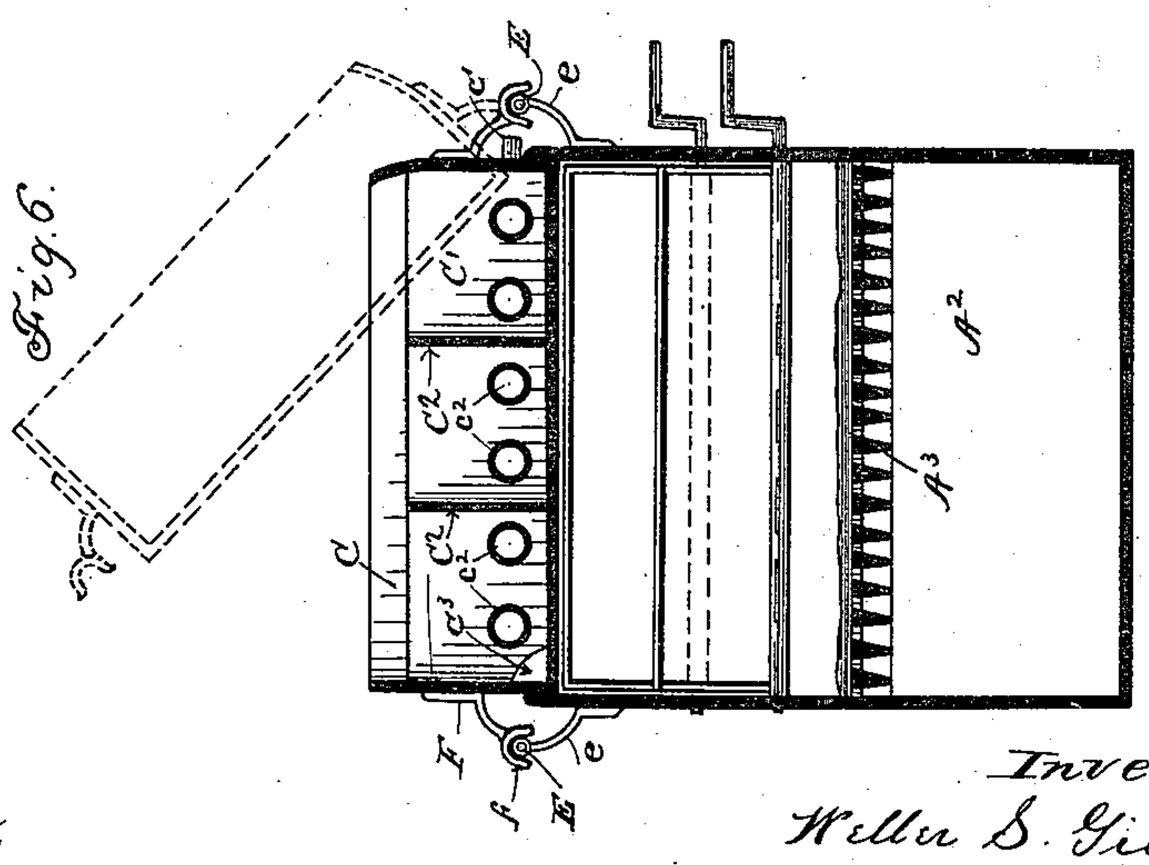


Fig. 6.



Witnesses
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O. S. Lacey.

Inventor.
Weller S. Gilmore
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Attys

UNITED STATES PATENT OFFICE.

WELLER S. GILMORE, OF CHESTER CROSS ROADS, OHIO.

EVAPORATING-PAN AND FURNACE FOR OPERATING THE SAME.

SPECIFICATION forming part of Letters Patent No. 441,001, dated November 18, 1890.

Application filed March 24, 1890. Serial No. 345,014. (No model.)

To all whom it may concern:

Be it known that I, WELLER S. GILMORE, of Chester Cross Roads, in the county of Geauga and State of Ohio, have invented certain new and useful Improvements in Evaporating-Pans and Furnace for Operating the Same; 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 pertains to make and use the same.

My invention relates to improvements in evaporating-pans and furnace for operating the same; and it consists in certain features of construction and in combinations of parts hereinafter described and pointed out in the claims.

In the accompanying drawings is shown a portable furnace; but my improvements are just as well adapted to a stationary furnace constructed of brick or other suitable material.

Figure 1 is a view in perspective of my complete apparatus. Figs. 2, 3, 4, and 5 are elevations in longitudinal section of the same, showing different working positions of the parts. Fig. 6 is a vertical transverse section of the same on line *x x*, Fig. 2. Fig. 7 is a view in perspective of one of the larger evaporating-pans detached. Fig. 8 is a vertical transverse section on line *y y*, Fig. 1, showing the construction of the smaller or rearward pan. Fig. 9 is a view in perspective in detail.

A represents a portable furnace provided in the usual manner with combustion-chamber A′, ash-pit A^2, grates A^3, doors *a a* for firing, and ash-pit door *a′ a′*. This is also provided at the forward end of the furnace a smoke-box B, smoke-pipe B′, and damper *b*, the latter being located, as shown, in the smoke-box. In the combustion-chamber of the furnace are located dampers a^2 and a^3, arranged approximately as shown and hereinafter more fully described.

C C are the larger evaporating-pans, that are supposed to be alike, and hence are interchangeable.

D is a small pan located at the rear of the furnace, and is designed more especially for finishing the sirup or other product. Each pan C has a transverse partition C′ near the rear end thereof, and joining the latter with the other end of the pan are longitudinal partitions C^2, the different partitions having openings C^3, as shown, whereby the liquid fed into the forward end of the compartment shown in the foreground in Fig. 1 may circulate through the different compartments in reaching the discharging-nozzle *c*, with which each pan is provided. The forward end of each pan is provided with a similar nozzle *c′* for induction. Each pan C is provided with a series of tubes c^2, slightly elevated from the bottom of the pan and extending lengthwise of the pan, the forward ends of these tubes protruding slightly beyond the pan, and these protruding ends are reduced in size, so that the forward ends of the tubes of one pan may enter the rear ends of the tubes of the next forward pan. The bottom plate D′ of pan D is elevated above the line of the tubes of pans C C. Pan D is provided with so-called "water-legs" *d* at the sides and rear, so that this pan closes down on the walls of the furnace the same as the other pan; but by reason of the elevated bottom of this pan the products of combustion may return through the tubes of pans C C to the smoke-box and thence to the smoke-pipe, in which case damper *b* is turned to the position shown in Figs. 2, 3, and 4, thereby cutting off direct communication between the fire-box and smoke-box. By turning up this damper to the position shown in Fig. 5 the return-tubes are closed and the products of combustion may pass directly from the fire-box to the smoke-box and thence to the smoke-pipe.

E E are side bars located approximately as shown and supported by brackets *e* and braces *e′*, projecting from the walls of the furnace, these side bars extending preferably some little distance rearward of the furnace-walls for the purposes hereinafter mentioned. These side bars should be circular in cross-section, or at least the upper section thereof should be rounded, and for combining stiffness and lightness these side bars should be constructed of wrought-iron tubing. The different pans are provided with arms F, the latter having forked ends *f*, adapted to fit the top portion of the side bars, so that the pans

may be moved forward or rearward along these side bars, or the pans may be tilted, the arms of the pans and the side bars in such case serving as hinges for the purpose. Nozzles *c c'* of adjacent pans are connected by means of flexible tubes G. The forward nozzle *c'* and the rearward nozzle *c* of the series of pans may be provided with plugs for closing the same, or these nozzles may be provided with flexible tubes that may be turned up and fastened to the respective pans. Any pan of the series may at any time be tilted to the position shown in Fig. 6 for discharging the contents thereof into the next adjacent pan or pans, in which case the flexible connecting-tube will twist enough to allow such tilting.

In operating the apparatus the pans are placed as shown in Figs. 1 and 2, and are supplied with sufficient sap to at least cover the return-tubes. The liquid may be fed slowly into the forward pan, and the finished material may be from time to time drawn off from the rearward pan D. At the end of the "run," when the supply of sap is all in the pan, or at other times, if need be, pan D may be tilted to return the contents thereof into the next forward pan, after which the flexible tube connecting the two pans may be removed from the nozzle of pan D, this tube being turned up by the side of pan C, to which it is attached and fastened in such position, the free end of the tube being sufficiently elevated to prevent the escape of liquid from the pan.

A suitable device for fastening the flexible tubes with their ends turned up alongside of the pan is shown in Fig. 9, comprising an elastic wire bent approximately, as shown, to form jaws H for grasping the flexible tube and having a hook *h*, adapted to engage the edges of the pan. With such construction no valves are required, and as the liquid in the pans is only a few inches in depth the pressure on these flexible tubes is very slight and they may readily be attached or detached from the nozzles, and light rubber hose is well adapted to the purpose. Next, pan D is moved rearward along the side bars to the position shown in Fig. 3, so as to be out of the way of damper a^3. This damper is then turned upward and forward to engage the rear end of the rear pan C, as shown in Fig. 3, whereby the products of combustion are returned through the tubes of this pan C. When the material is still further reduced in quantity, the rearward pan C may be tilted to run the contents thereof into the forward pan. The rearward pan C may then be uncoupled and returned to its horizontal position, after which it is moved rearward and damper A^2 is turned to the position shown in Fig. 4, whereby the products of combustion are returned through the tubes of the forward pan. When the contents of the forward pan shall have been so reduced in volume that it will not sufficiently cover the tubes, or for other reasons if it is desired to reduce the heat of the furnace engaging this pan, damper a^2 is turned down and damper *b* is turned up, as shown in Fig. 5, whereupon by closing the doors in front of the furnace the cold air enters from the rear and passes under the pan and thence passes up into the smoke-box and smoke-pipe. Any of the pans that may have been disconnected and moved rearward may at any time be removed from the furnace for cleaning, repairs, or other purposes. (See Figs. 4 and 5.) Also any disconnected pan may be tilted in either direction on the side bars, which is found to be a great convenience in cleaning the pans, as these pans are likely to be so wide that it is much more convenient to tilt the pans first in the one direction and then in the other in cleaning. The flexible tubes G, that connect two pans, may be in two pieces connected, for instance, by a short tube *g*, adapted to enter the opposing ends of tubes G, by means of which opposing tubes G may be uncoupled by pulling the one tube off from the connecting-pipe *g*.

In the way of modifications I may remark that the smoke-pipe may be so constructed that the lower end thereof will serve as a smoke-box.

What I claim is—

1. The combination, with a series of movable and interchangeable evaporating-pans, each pan divided into sections of unequal size by a transverse partition, and a series of longitudinal partitions located in one of said sections and extending from the transverse partition to one end of the pan, the said partitions being provided with openings arranged substantially as indicated for the circulation of the fluid throughout the pan, of pipe-connections leading from the smaller section of one pan to the larger section of the next adjacent pan, substantially as set forth.

2. The combination, with a furnace and side bars, of a series of evaporating-pans having arms adapted to engage the side bars, whereby the pans may be tilted on the side bars and moved endwise thereof, and with eduction and induction nozzles and flexible tubes or hose connecting the nozzles, substantially as set forth.

3. The combination, with a furnace, of a series of evaporating-pans, the furnace being provided with side bars and the pans being provided with forked arms adapted to engage such side bars, whereby the pans may be tilted on the side bars or moved endwise thereof, substantially as set forth.

4. The combination, with a furnace, a smoke-box and a smoke-pipe located at the forward end of the furnace, and a damper operating in such smoke-box, of evaporating-pans having return-tubes adapted to discharge into such smoke-box, such pans being separable the one from the other, and dampers located in the combustion-chamber of the furnace, each damper in its elevated position being adapted to engage the rear end of the opposing pan

above the return-tubes of such pan, substantially as set forth.

5. The combination, with a furnace and a smoke-pipe located at the front end of the furnace, of evaporating-pans having return-tubes adapted to discharge into such smoke-pipe, such pans being separable the one from the other, and dampers located in the combustion-chamber of the furnace, each damper in its elevated position being adapted to engage the rear end of the opposing pan above the return-tubes of such pan, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 26th day of February, 1890.

WELLER S. GILMORE.

Witnesses:
CHAS. H. DORER,
WILL B. SAGE.