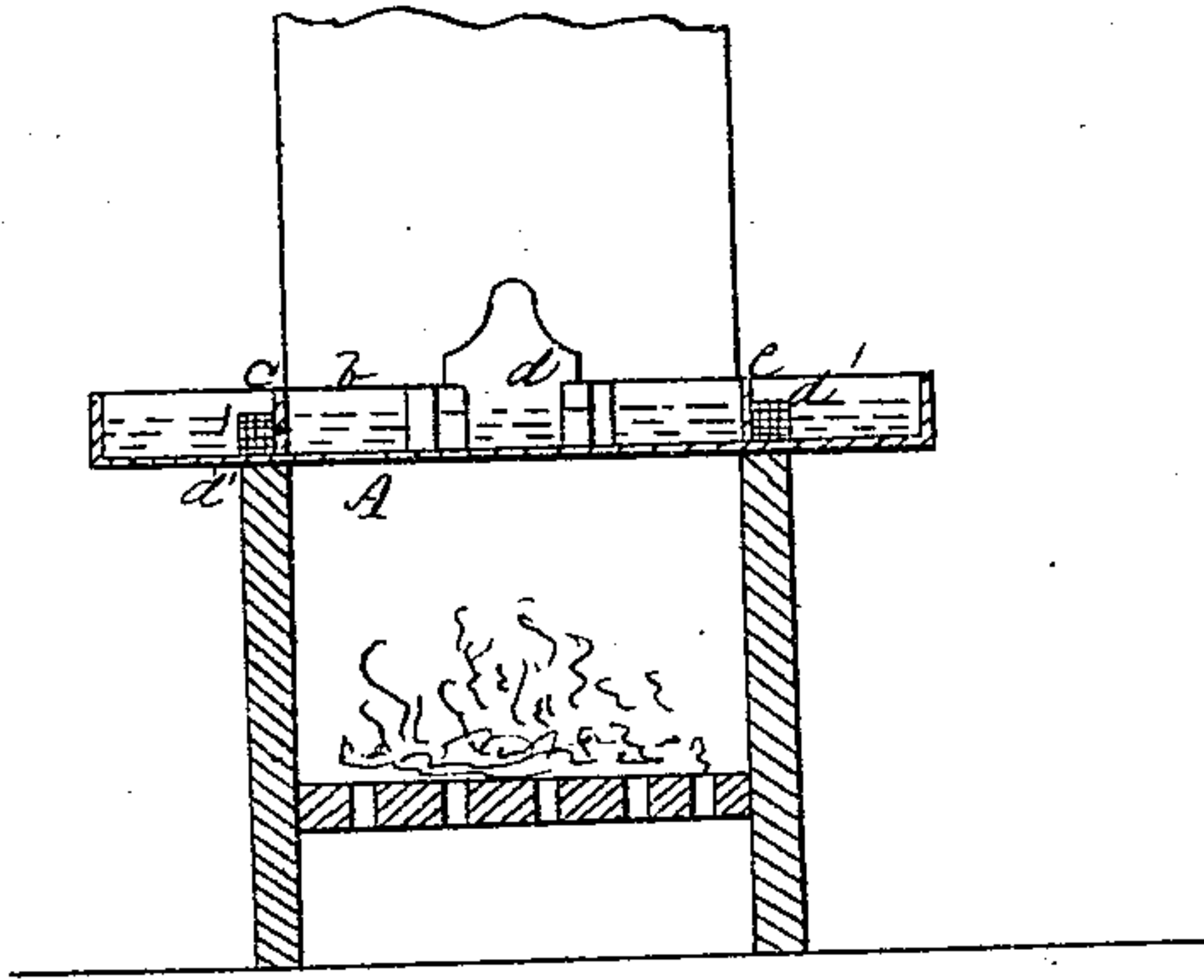


*F. L. Stewart.*  
*Sugar Evaporator.*

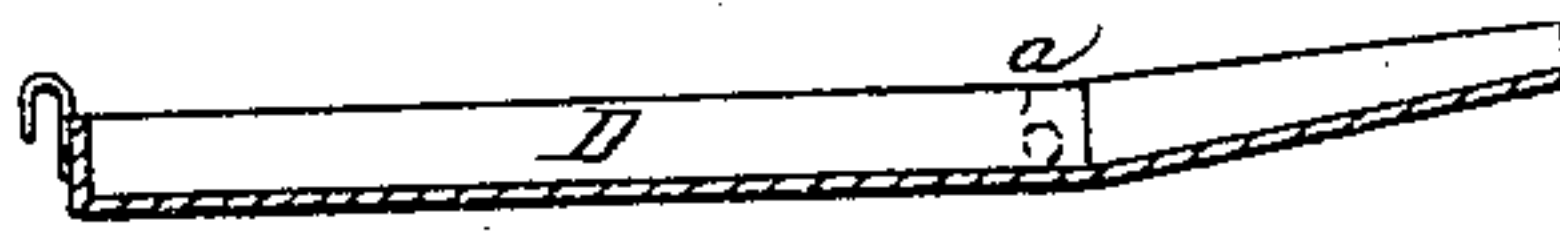
*N<sup>o</sup> 41106.*

*Patented Jan. 5. 1864.*

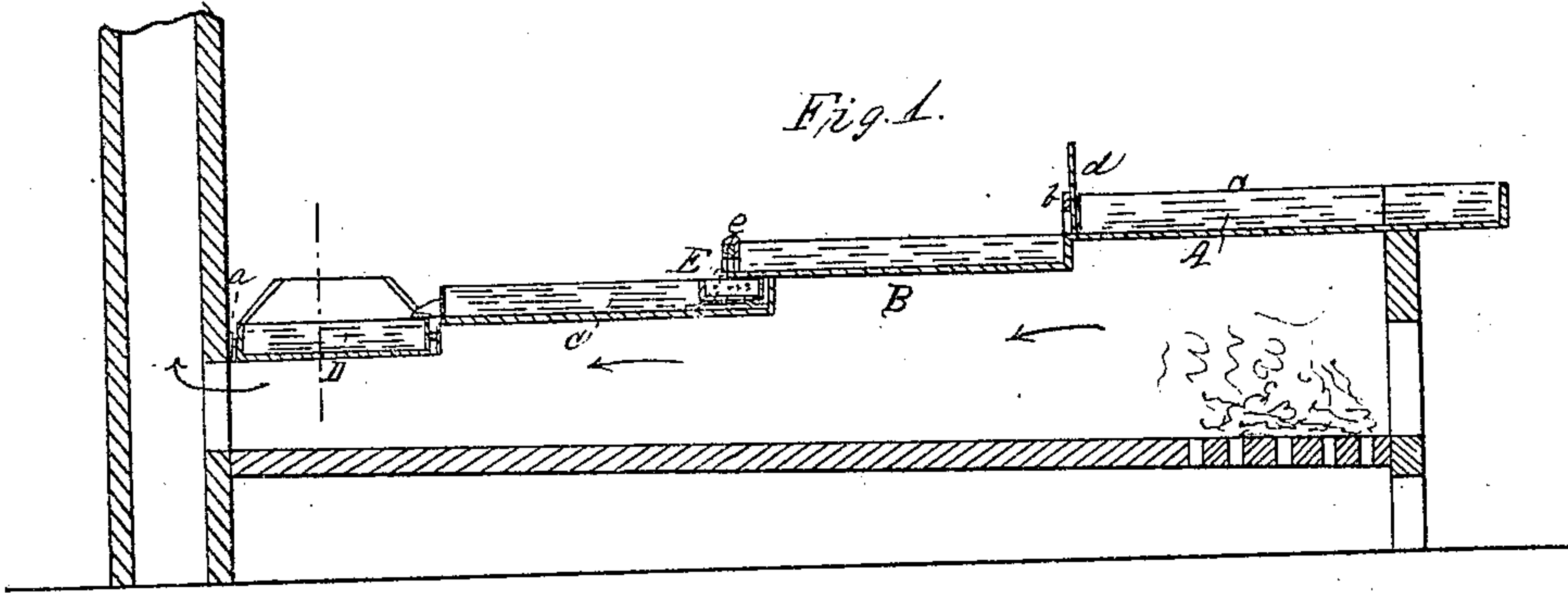
*Fig. 2.*



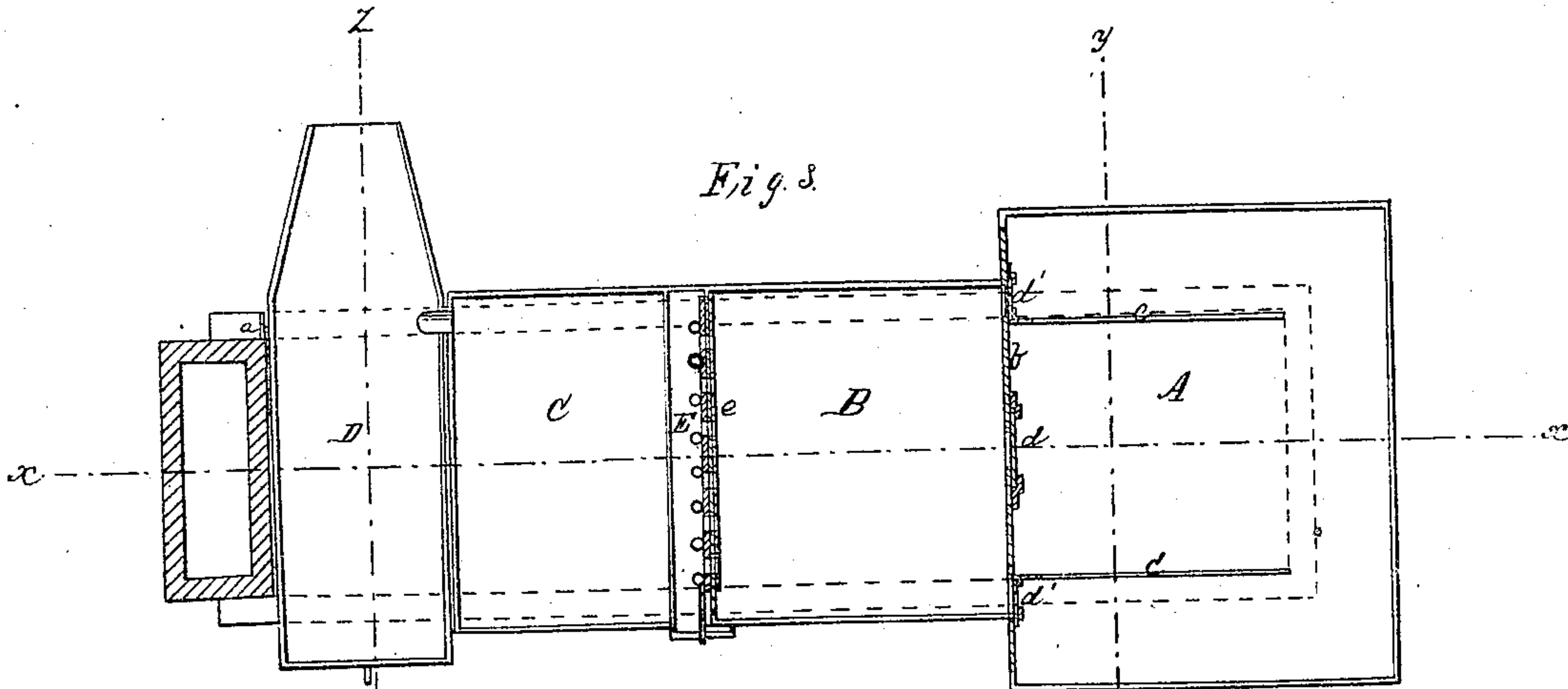
*Fig. 4.*



*Fig. 1.*



*Fig. 3.*



*Witnesses.*

*J. Coombs*  
*G. Reed*

*Inventor.*

*F. L. Stewart*  
*Per Munn & Co.*  
*Attorneys*



# UNITED STATES PATENT OFFICE.

FRANCIS L. STEWART, OF MURRYSVILLE, PENNSYLVANIA.

## IMPROVED SUGAR-EVAPORATOR.

Specification forming part of Letters Patent No. 41,106, dated January 5, 1864.

*To all whom it may concern:*

Be it known that I, FRANCIS L. STEWART, of Murrysville, in the county of Westmoreland and State of Pennsylvania, have invented a new and Improved Evaporator for Saccharine Liquids, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention, taken in the plane indicated by the line *x x*, Fig. 2. Fig. 2 is a transverse vertical section of the same, the plane of section being indicated by the line *y y*, Fig. 3. Fig. 3 is a plan or top view of the same. Fig. 4 is a transverse vertical section of the finishing-pan, the line *z z*, Fig. 3, indicating the plane of section.

Similar letters of reference in the several figures indicate corresponding parts.

This invention consists in the arrangement of two abutments extending from the inner toward the outer end of the first compartment or division of a range of sugar-pans just over the side walls of the furnace and terminating at points over the end wall, leaving spaces at the end and on each side of the pan in such a manner that the scum rising in the middle or hottest portion accumulates behind these abutments and becomes separated from the clear juice, and that said scum can easily and conveniently be removed from the pan.

The invention consists, further, in the arrangement of a filtering-drawer placed under a series of openings which lead from the second to the third compartment or division, and which can be closed or adjusted by a sliding gate in such a manner that the juice or sirup can be run through a stratum of bone-black or other suitable material, and that the wild or green taste of the sirup can be removed before the sirup is finally boiled down in the finishing-pan.

To enable others skilled in the art to make and use my invention, I will proceed to describe it.

My pan consists of four divisions or compartments, A B C D, each of which may be considered either as a separate pan placed on a flue in the proper position, as shown in the

drawings, or the first three may be regarded as compartments of one pan, while the fourth is separate and movable upon a horizontal axis or gudgeons, *a*. They may all be made either of sheet iron or copper, or the pans may have wooden sides. They are shallow and flat, and placed in a descending range, the pan A immediately over the fire-place being the highest in the range, as clearly shown in Fig. 1 of the drawings.

From the partition *b*, which separates the pans A and B, two ledges or abutments, *c*, extend along the bottom of this compartment for more than two-thirds of its length toward the front. The pan A projects over the sides and end of the furnace-wall, and the abutments are so placed that they stand directly over the side walls and terminate just over the end wall of the furnace, as clearly indicated in Fig. 3 of the drawings. That portion of the pan A, therefore, which is situated between the abutments is exposed to the full heat from the fire, and the remainder is left comparatively cool. The pan A communicates by three gates, *d d' e*, with the second pan, B. When the gates are closed, and a batch of raw juice is admitted, it spreads over the bottom of the pan between the abutments and soon rises in rapid ebullition throughout the space between said abutments, and the scum is all thrown toward the front end, whence it quietly subsides into the cool recesses at the sides of the pan. There it lodges and becomes impacted, and is thus in a fit condition to be removed expeditiously at suitable intervals, either by a skimmer or by an opening in the bottom of the pan. As fast as defecated, the clear juice is suffered to pass through the central gate into the second compartment or pan, B. When there is much scum impacted in the side recesses of the pan A, its great density prevents the accumulation of any considerable amount of clear juice under it; but at all times any juice that may have collected there is easily withdrawn by opening the gates *d'* at the sides, the escape of the scum being entirely prevented by the wire-gauze drawn across the openings. The time and labor saved by this arrangement when properly managed is very great and superior to any other sugar-pan now in use.

The pan or compartment B is simply a flat



shallow pan placed at a little lower level than the pan A. Here the clarified juice is reduced to a density of 15° to 20°. It is then withdrawn at the back part of this division by moving a sliding gate, *e*, through several openings at once into a shallow cistern or drawer, E, of a length equal to the width of a pan and filled with animal-charcoal. Through this stratum of bone-black, not exceeding six inches in depth, the juice passes rapidly into compartment C, the forward end of which extends under the filter. As the hot sirup percolates through this stratum of bone-black, it is freed from the wild acid taste so peculiar to the sorghum-juice, and at the same time partial decolorization takes place. By this simple attachment the sirup is refined and no further refining process is needed. After the juice has thus been refined it is finally boiled down in the pan C, and then passed into the last or tilting pan, D. This pan is shallow, with a long beak or lip, and may be easily turned upon its axis by means of a lever or cord and pulley, and successive batches of sirup, directly upon arriving at the proper density to secure perfect crystallization, are dumped into a cooler below. A damper meanwhile is slid in underneath to shut off the flame until the pan is replaced and a fresh portion of sirup admitted.

It will be observed that, to prevent scorching, none of the other divisions of the apparatus must at any time be completely emptied,

and the process is continuous, each compartment being replenished from the preceding one as fast as exhausted.

I am aware that the principle of using cool sides or side bays to raise the scum in evaporators is not new. I therefore do not wish to be understood as laying any claim to such invention; but

What I claim as new, and desire to secure by Letters Patent, is—

1. Separating the side bays or that portion on either side of the pan A not over the fire from that portion directly over it by ledges *c c*, which extend from the partition *b* to a point immediately over the front wall of the furnace, leaving a space between them and the front end of the pan A for the scum, which is by ebullition thrown toward either side of the pan to pass behind the ledges, whereby it is prevented from being boiled into the sirup, as described.

2. The shallow filtering-drawer E, arranged within and extending across the front end of the pan C and under the rear end of the pan B, in combination with the sliding gate or register *e*, constructed and operating in the manner described.

FRANCIS L. STEWART.

Witnesses:

WM. MILLIKIN,  
WILLIAM LAIRD.