

(No Model.)

E. FALES.
FURNACE.

3 Sheets—Sheet 1.

No. 505,452.

Patented Sept. 26, 1893.

Fig. 1.

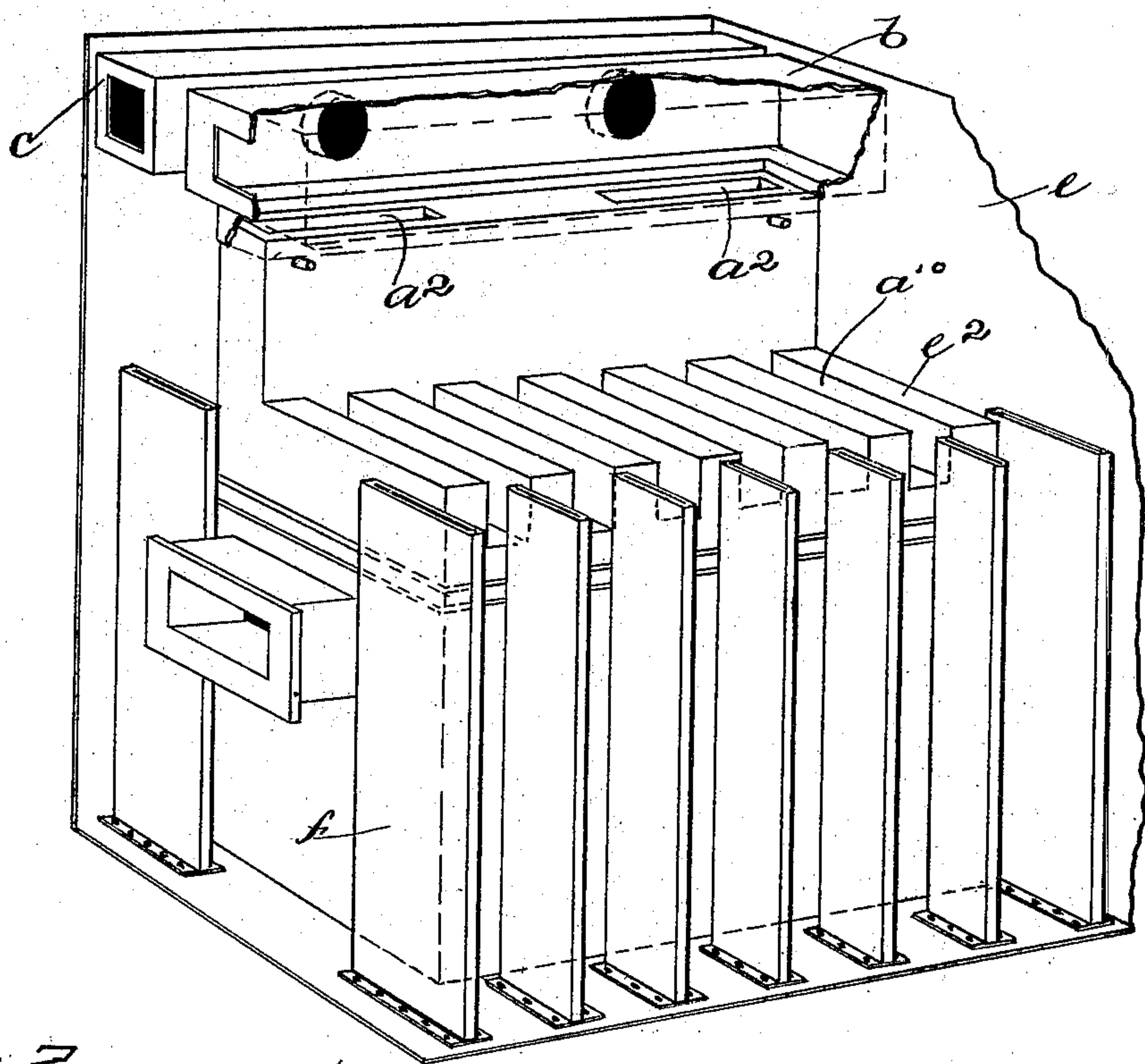
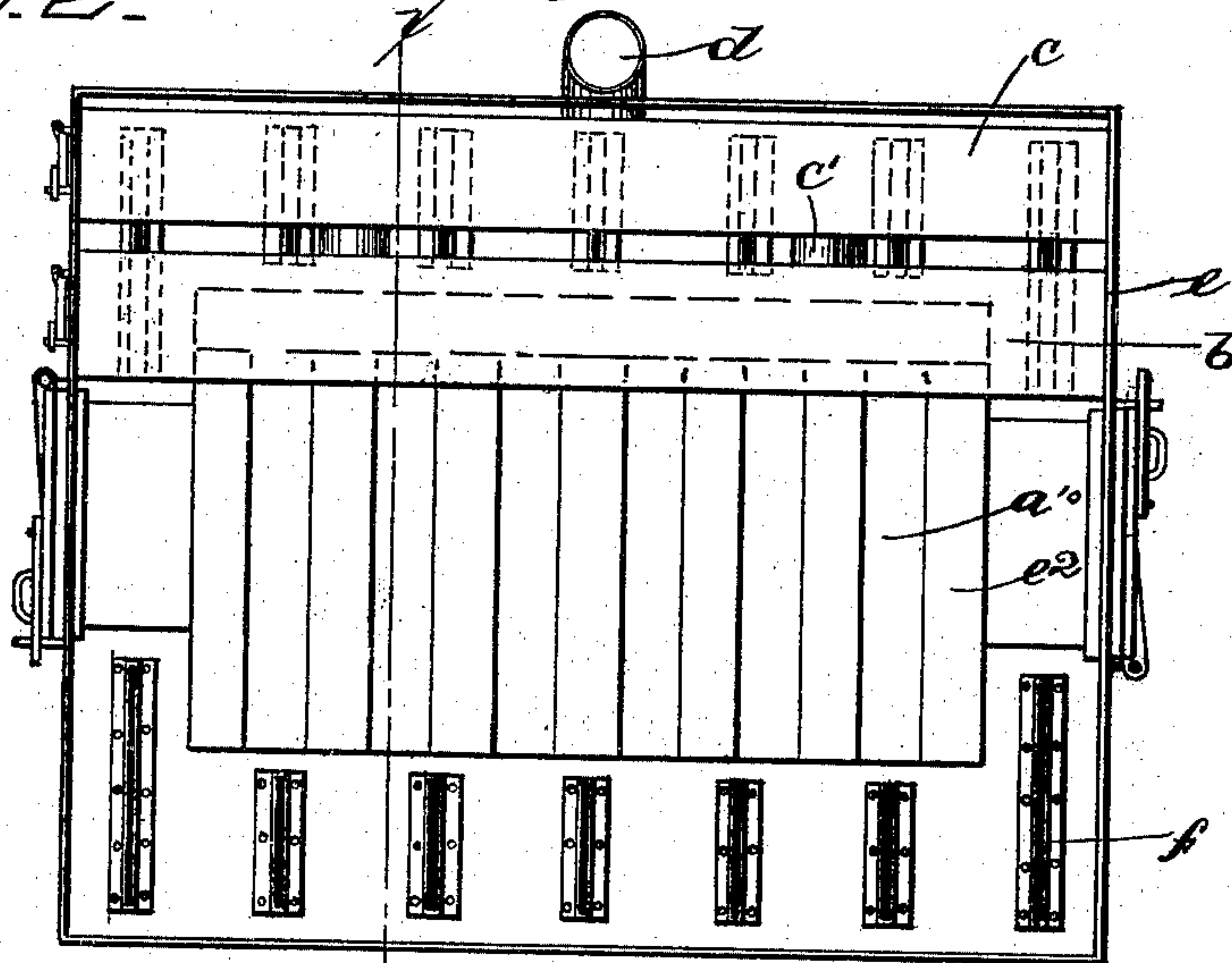


Fig. 2.



WITNESSES.
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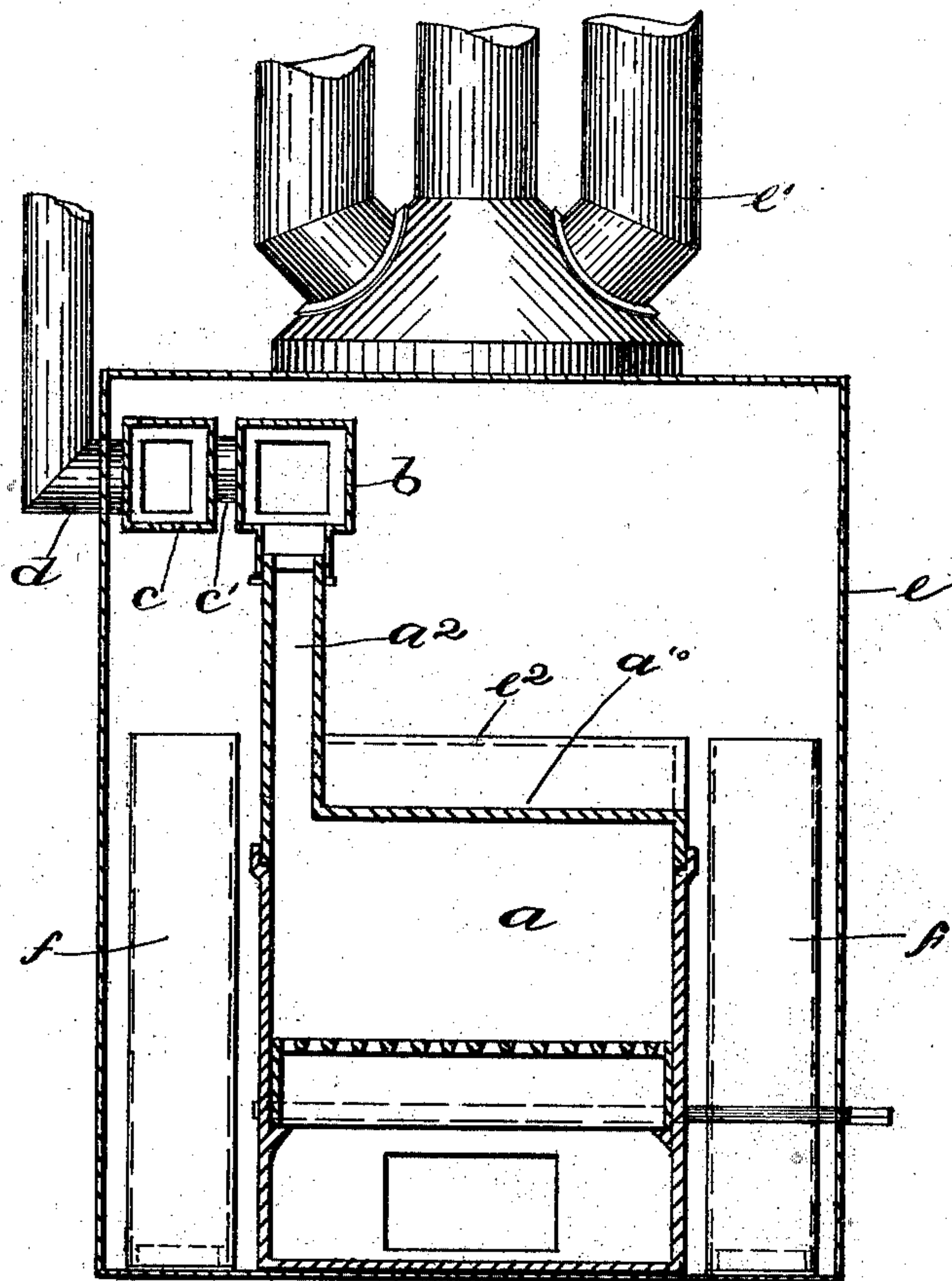
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Fig. 3.



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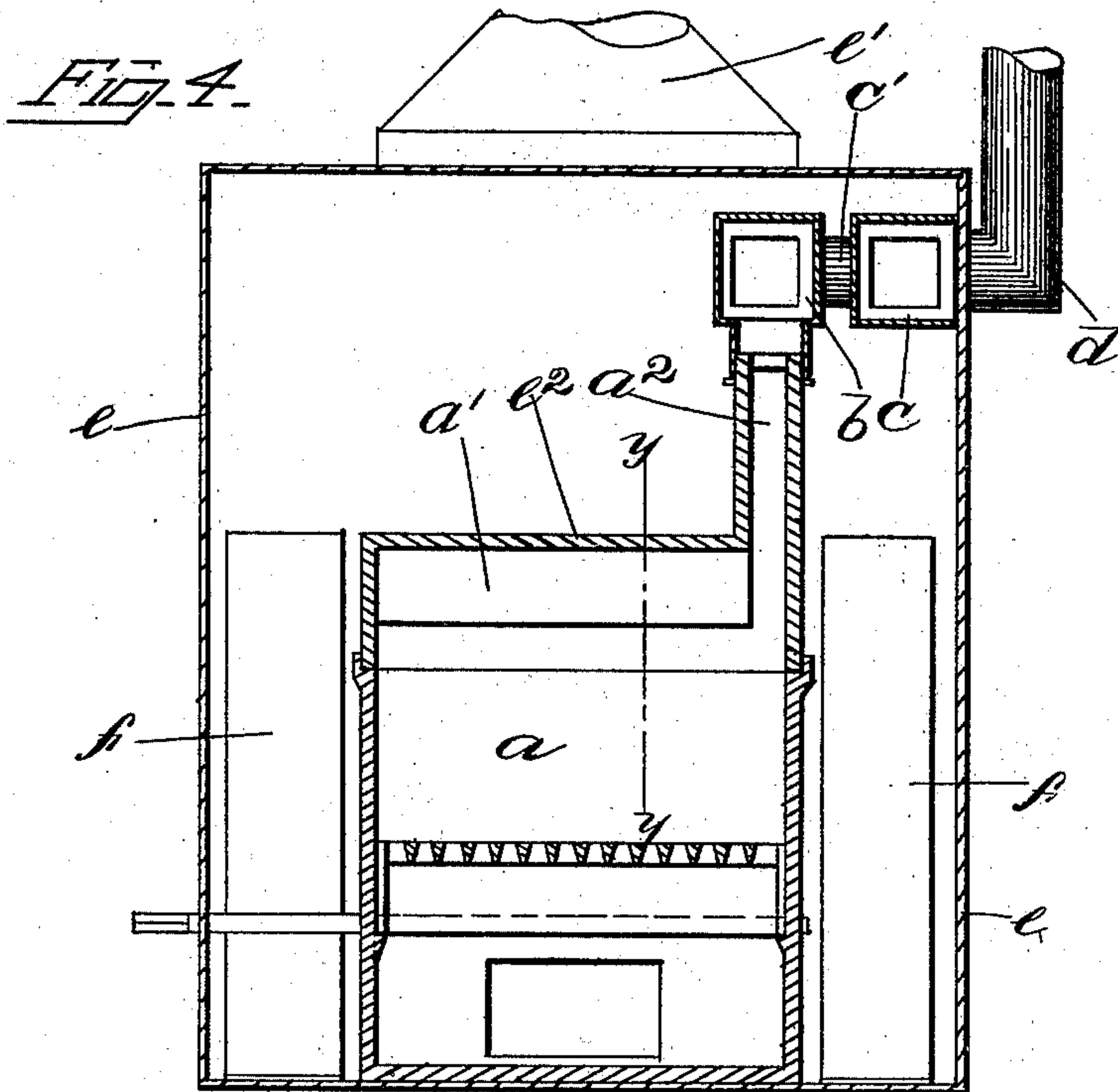
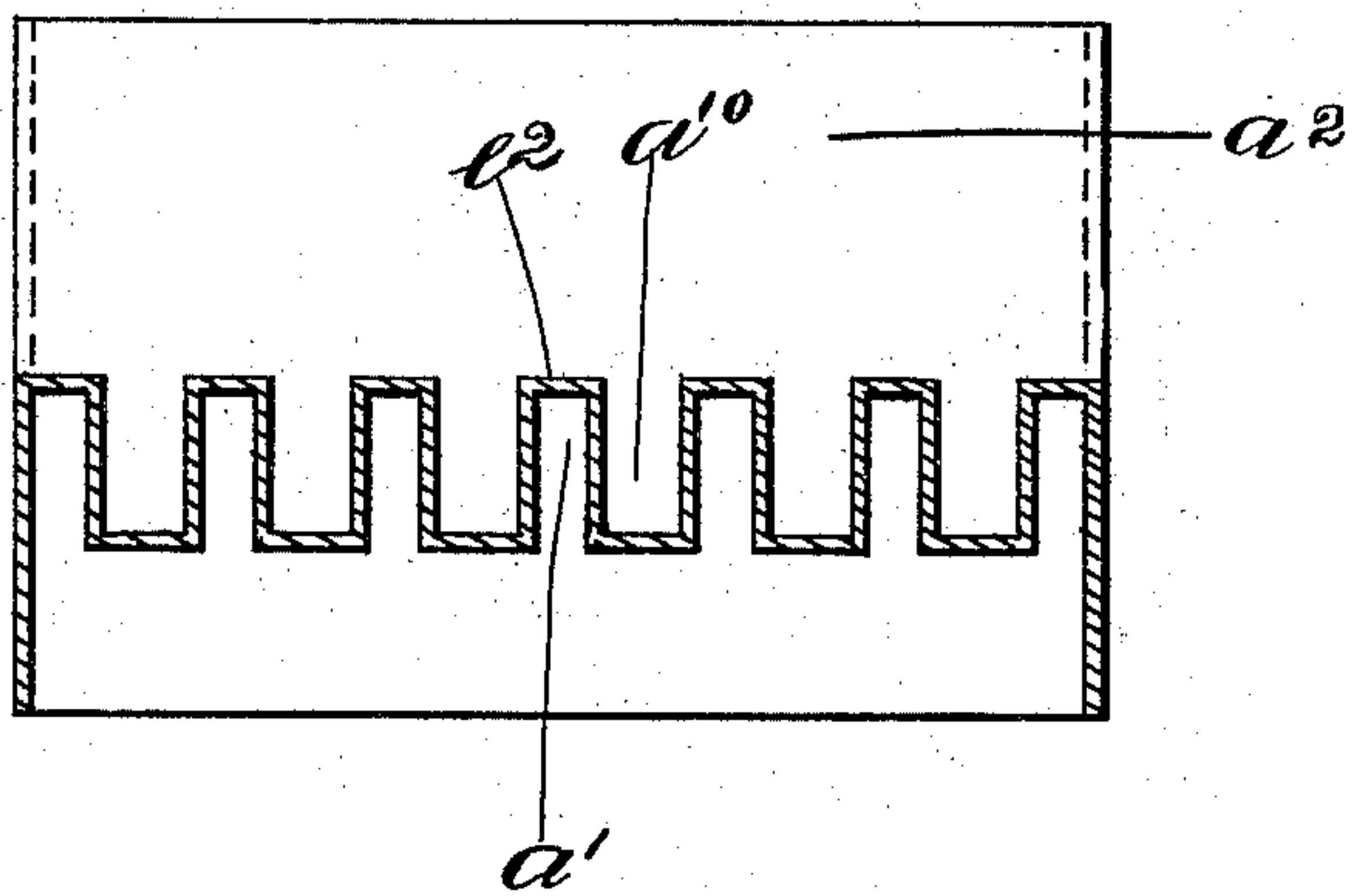


Fig. 5.



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UNITED STATES PATENT OFFICE.

EDWARD FALES, OF WINTHROP, MASSACHUSETTS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 505,452, dated September 26, 1893.

Application filed May 6, 1893. Serial No. 473,237. (No model.)

To all whom it may concern:

Be it known that I, EDWARD FALES, of Wintthrop, county of Suffolk, State of Massachusetts, have invented an Improvement in Furnaces, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to heating apparatuses, being especially applicable to hot air furnaces, and has for its object to improve the construction of the combustion chamber, whereby secondary combustion is produced, preventing the production of black smoke; and also to provide novel air inlets whereby the air may be admitted in thin streams or jets which are heated more or less previous to entering the chamber, said inlets being so constructed as to effectually prevent the exit of the heated air.

Figure 1, shows a perspective view of a hot air furnace embodying this invention, the jacket being broken away to expose the parts within; Fig. 2, a plan view of the furnace shown in Fig. 1, and Fig. 3, a vertical section of the furnace taken on the dotted line $x-x$ Fig. 2; Fig. 4, a vertical section of the furnace similar to Fig. 3, but taken on a transverse line through the secondary combustion chamber, and Fig. 5, a longitudinal section taken on the dotted line $y-y$, Fig. 4.

The combustion chamber a , of suitable shape, but herein shown as rectangular, has upon the under side of its top wall a series of transverse recesses a' , see Figs. 4 and 5, closed at one end and opening at the opposite end into a vertical flue or pipe a^2 . These recesses constitute guide passages for the flame and products of combustion, directing the same to the vertical passages a^2 , a^2 , and the walls of said recesses becoming very hot serve as secondary combustion chambers e^2 , burning the black end or head of the flame, and other unconsumed substances. The vertical passages a^2 , a^2 , are herein shown as made narrow and quite long, being separated for a short distance to thereby divide the passages, and better direct the flame and other products of combustion to the drum b , which is herein shown as made as a rectangular box like structure, and supported upon or above

the vertical portion containing the passages a^2 . The vertical passages a^2 , a^2 , with thick side walls also serve as secondary combustion chambers. Another similar drum c , is located beside the drum b , which is connected therewith by two short pipes c' , opposite the centers of the passages a^2 , and the smoke pipe d , leads from said drum c . The drums b , c , are each provided with an opening at the front end, supplied with a door, whereby the soot may be withdrawn.

A jacket e , incloses the combustion chamber, together with the vertical portion thereof containing the passages a^2 , and also the drums b , c , as well as the air inlets to be described. This jacket may be made of any suitable shape and construction, and provided at its top with flues e' for the exit of the hot air.

By forming transverse recesses a' , upon the inner side of the top wall of the combustion chamber, and by casting said top wall of substantially the same thickness of material, transverse recesses a^{10} , are formed upon the upper side of said wall to increase the heating surface. These recesses may be extended down upon either side for a short distance.

For the introduction of the air, I have provided several vertical pipes f , arranging them at suitable distances apart at each side of the combustion chamber, and within the jacket. The passages through these pipes f , are made quite narrow, and as long as required so that the air enters the hot air chamber in thin streams or jets, becoming partially heated during its passage through the pipes, the lower ends of said pipes opening through the bottom of the jacket, and connected with any suitable air supply, in any desirable way. The partially heated air upon entering the chamber is then reheated, or additionally heated, by the radiating heat from the primary and secondary combustion chambers. I have found that by providing these vertical pipes for introducing the air, the air may be partially heated before entering the hot air chamber, and the heated air will not be forced out or down through the pipes, but being expanded will be forced up through the exits, as if under pressure, drawing the fresh air continuously into said hot air chamber.

I claim—

1. In a heating apparatus, the combination of the combustion chamber a , having its top wall provided with interior elongated recesses a' , closed at one end, and open at the opposite end, and also provided with exterior elongated recesses a^{10} , arranged alternately with relation to the interior recesses, substantially as described.

2. In a heating apparatus the combination of the combustion chamber a , the interior of the top wall of which is provided with several parallel guide passages, vertical passages a^2 , a^2 , in open communication with said recesses, separated by a short division wall, and conducting the smoke to the smoke pipe, substantially as described.

3. In a heating apparatus, the combination of the combustion chamber, a , the interior of the top wall of which is provided with several parallel guide passages, vertical passages in open communication with said guide passages, and one or more drums in open communication with said vertical passages, and having entrances for the removal of soot, the jacket inclosing the combustion chamber and drums, and the smoke pipe, substantially as described.

4. In a heating apparatus, the combination of the main combustion chamber a , and secondary combustion chamber a^2 , consisting of a narrow chamber extending substantially from end to end of the main combustion chamber, and rising vertically therefrom, and in direct open communication therewith at its lower end, substantially as described.

5. In a heating apparatus, the combination of the main combustion chamber a , and secondary combustion chamber a^2 consisting of a narrow chamber extending substantially from end to end of the main combustion chamber, and rising vertically therefrom, and in direct open communication therewith at its lower end, and guide passage formed on the interior of the top wall of said main combustion chamber directing the flame to said sec-

ondary combustion chamber, substantially as described.

6. In a heating apparatus, the combination of the main combustion chamber a , and secondary combustion chamber a^2 consisting of a narrow chamber extending substantially from end to end of the main combustion chamber and rising vertically therefrom, and in direct open communication therewith at its lower end, and guide passages formed on the interior of the top wall of said main combustion chamber directing the flame to said secondary combustion chamber, and guide passages formed upon the exterior of the top wall of said main combustion chamber arranged alternately with relation to the interior guide passages, directing the air against the exterior of said secondary combustion chamber, substantially as described.

7. In a heating apparatus, the combination of the main combustion chamber a , and secondary combustion chamber a^2 consisting of a narrow chamber extending substantially from end to end of the main combustion chamber, and rising vertically therefrom, and in direct open communication therewith at its lower end, and guide passages formed on the interior of the top wall of said main combustion chamber, directing the flame to said secondary combustion chamber, and guide passages formed upon the exterior of the top wall of said main combustion chamber, alternately with relation to the interior guide passages, directing the air against the exterior of said secondary combustion chamber, a jacket and several air inlets made as narrow flattened pipes f , which admit the air in thin streams, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD FALES.

Witnesses:

BERNICE J. NOYES,
CHARLES B. CROCKER.