

C. M. GRANNIS.
Steam-Generator.

No. 218,521.

Patented Aug. 12, 1879.

Fig. 1.

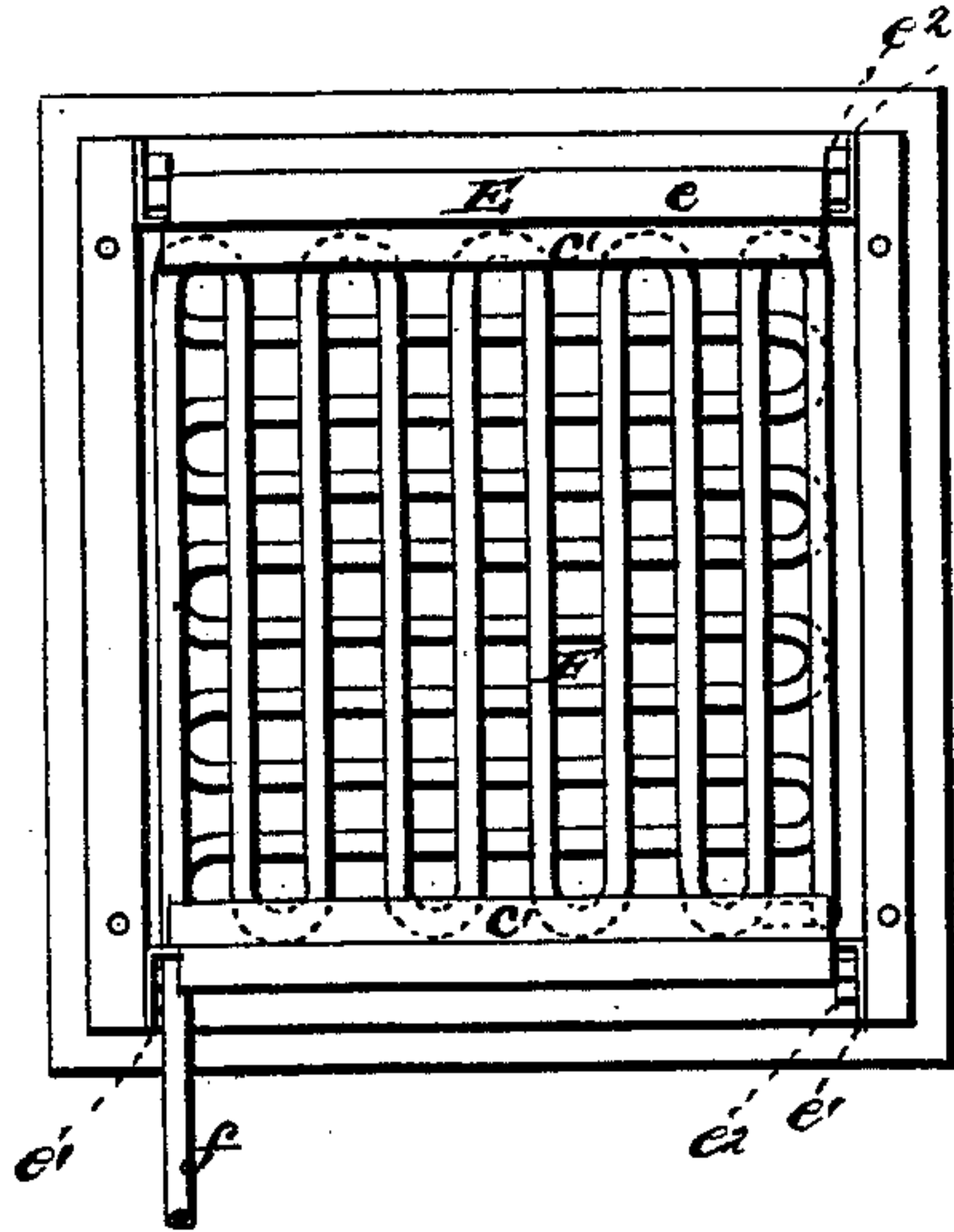


Fig. 4.

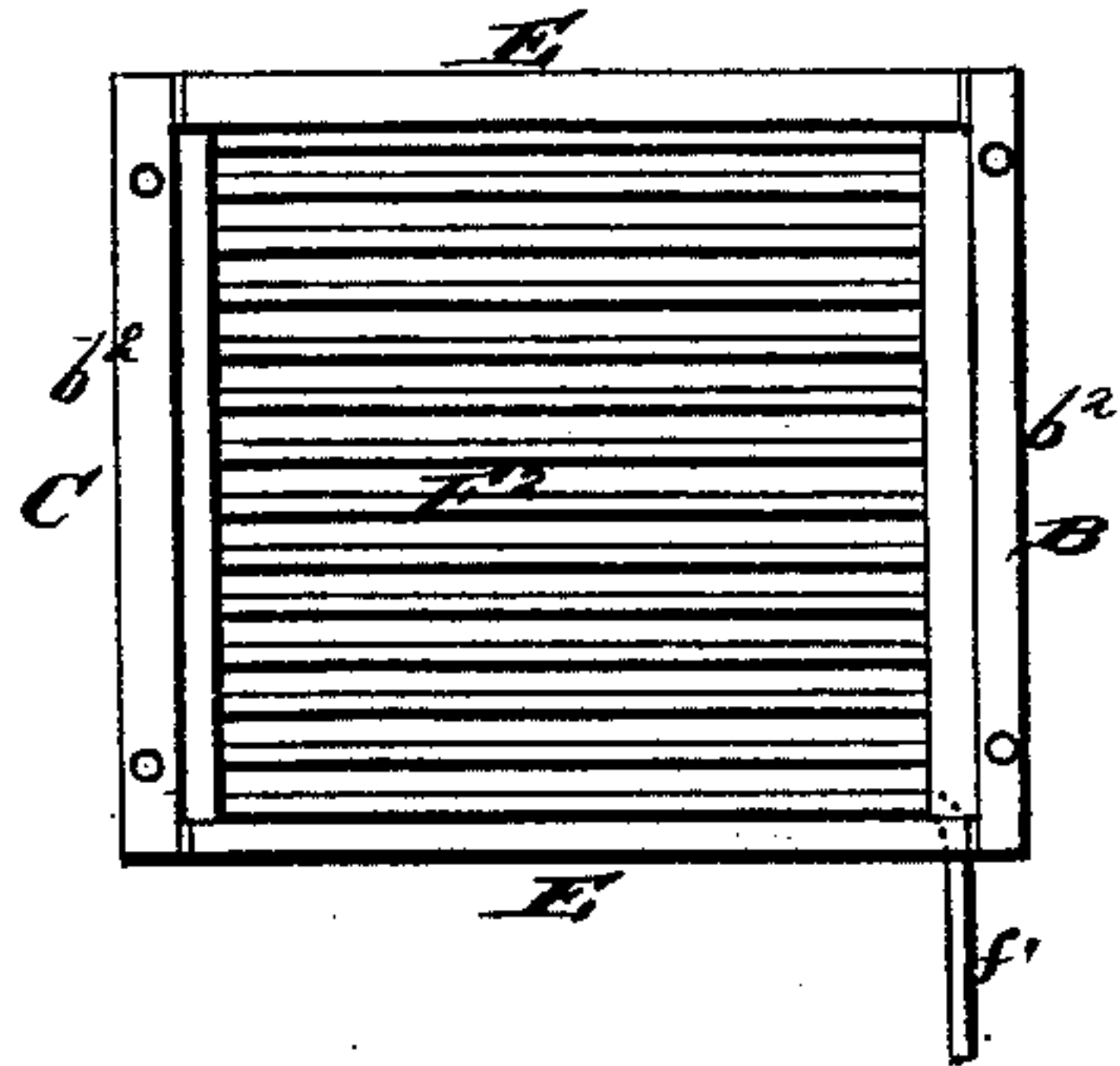


Fig. 2.

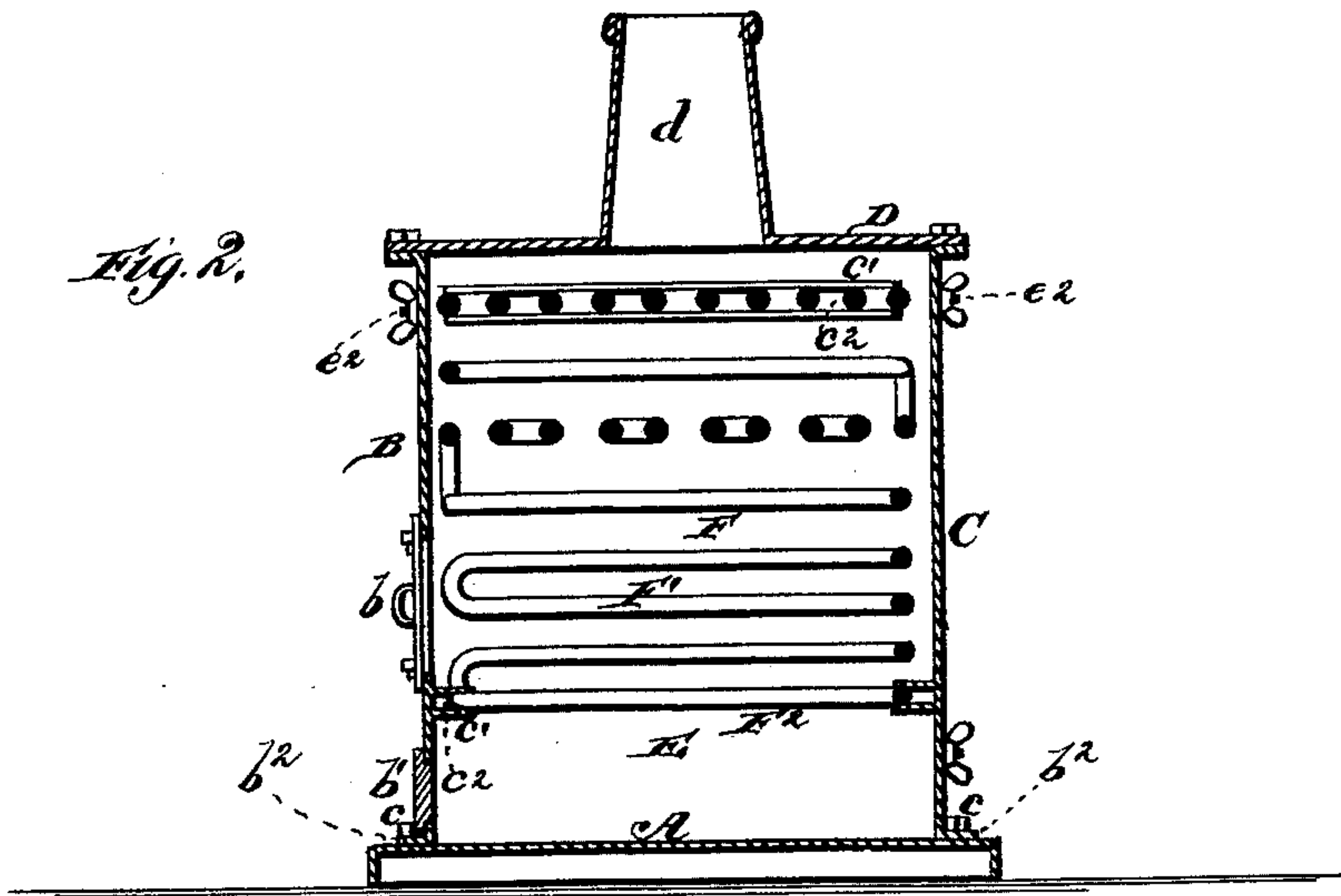
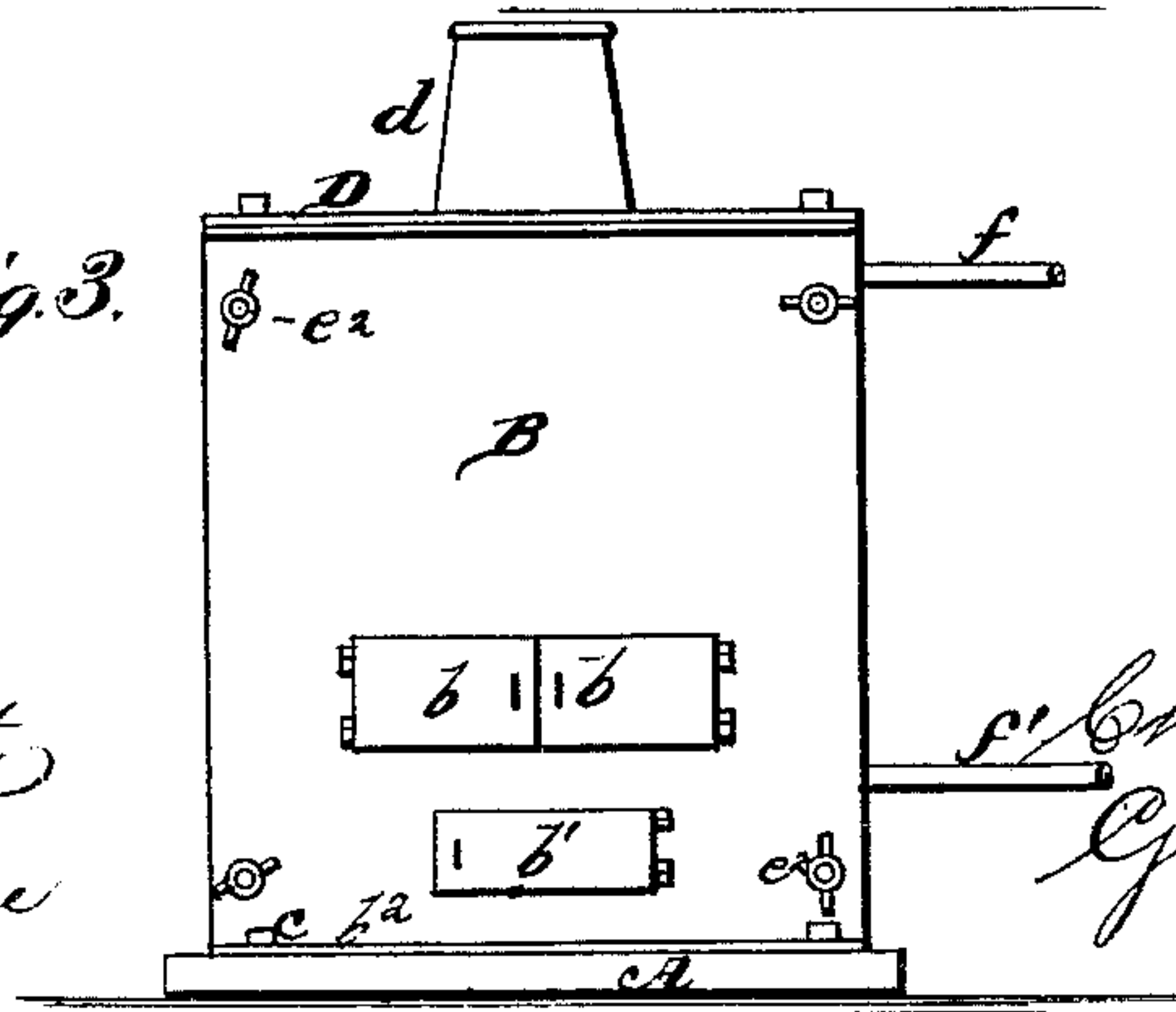


Fig. 3.



WITNESSES
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CHARLES M. GRANNIS, OF MORRISVILLE, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO JACOB A. GAUL, OF SAME PLACE.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **218,521**, dated August 12, 1879; application filed May 24, 1879.

To all whom it may concern:

Be it known that I, CHARLES M. GRANNIS, of Morrisville, in the county of Madison and State of New York, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a plan with the top removed. Fig. 2 is a vertical central sectional view. Fig. 3 is a face view. Fig. 4 is an under view with the bottom removed.

My invention relates to steam-generators; and consists in the improvements in the construction of the same hereinafter fully described, and particularly pointed out in the claims.

A is the base-plate of the generator. B is the front plate of the casing, provided with the fuel-doors *b b* and the ash-door *b¹*. C is the rear plate of the casing. These plates B and C are each provided with the flanges *b²*, and perforated with proper holes for receiving the cap-bolts *c*, by means of which the plates B and C are permanently attached to the base-plate A and top plate, D, which is provided with the smoke-stack *d*.

E E are the removable side plates of the casing, and are provided with the flanges *e*, which bear against the top and base plates, and the flanges *e¹*, which are suitably located to receive the bolts *e²*, which pass through the plates B and C, near their edges, thus retaining the plates E E in position. These plates B, C, and E E are also provided with the flanges *e¹*, forming the recesses *c²* between them, which recesses are of sufficient size and properly located to receive and retain the return-joints of the pipes F, to bear the weight of the same and hold them in proper position.

The space above the fire is occupied by the pipes F, which are connected and lie in reverse directions by series, and all connected by proper joints, forming one continuous pipe, supported by the recesses *c²*.

F¹ are coils of the same pipe, connected in like manner, and surrounding the fire-space, except upon the front or B-plate side. These pipes F¹ lie in vertical coils, whereas the F pipes lie in horizontal coils.

F² is a horizontal coil of the pipes, connected with, and supported in the same manner as, the coils F, and they serve as a fire-grate. One or more may be thus located, and a common fire-grate may be placed beneath them, if desired.

f is the water-induction, and *f'* the steam-eduction, pipe. If found preferable, the water may be forced in at *f'* and the steam passed out at *f*.

This construction and arrangement enable me to secure the maximum amount of heat for the generation of steam, and it also produces a generator not liable to dangerous explosion, and capable of sustaining a greater steam-pressure, in proportion as the pipes are smaller, than the generators in common use, and by means of the removable side pieces, E E, the pipes can be readily reached for cleaning.

For the purpose of preventing the radiation of the heat from the fire-space and preserving the metal casing, I place the fire-brick G, as a lining, upon the inner side of the casing. These fire-brick are provided with the slots *g*.

The plate H is provided with the flanges *h*, which enter the slots of the fire-brick and retain them in position.

The flanges *h* may be formed upon the separate plate H, which is to be of suitable size to be placed in position between the pipes and the casing; or they may be formed upon the inside of the plates B C and E E.

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

1. In a water-coil steam-generator, the plates B and C, provided with the flanges *b²* and bolts *c*, and doors *b b* and *b¹*, in combination with the base-plate A and top plate, D, and the side plates, E E, provided with the flanges *e e¹*, substantially as and for the purposes set forth.

2. In a water-coil steam-generator, the combination of the removable plates E E, provided with the shelves or flanges *e¹*, forming

recesses c^2 , and secured to the base A by bolts c , and to the plates B and C by the bolts c^2 , having thumb-screws, all arranged to operate as and for the purposes set forth.

3. In a water-coil steam-generator, the plates B and C, provided with the flanges b^2 , in combination with the removable plates E E, provided with the shelves or flanges c^1 and the connected series of coils of pipe F F¹ F², con-

structed and arranged substantially as and for the purposes set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

CHARLES M. GRANNIS.

Witnesses:

CHARLES M. SEYMOUR,

CHAS. F. GAUL.