

(No Model.)

3 Sheets—Sheet 1.

E. FALES.
STEAM BOILER OR OTHER FURNACE.

No. 584,815.

Patented June 22, 1897.

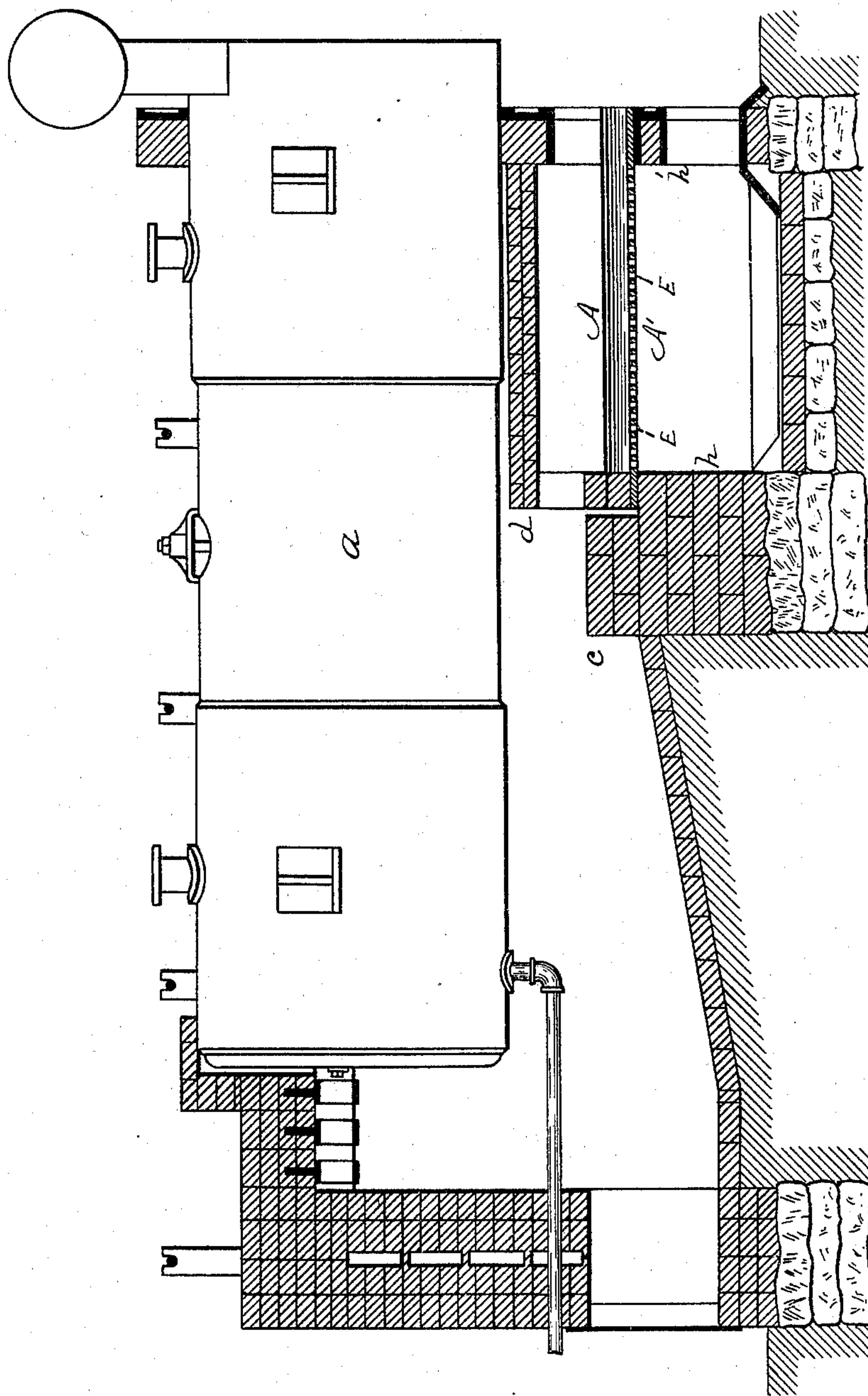


FIG. 1.

WITNESSES

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INVENTOR

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By his Atty

Henry Williams

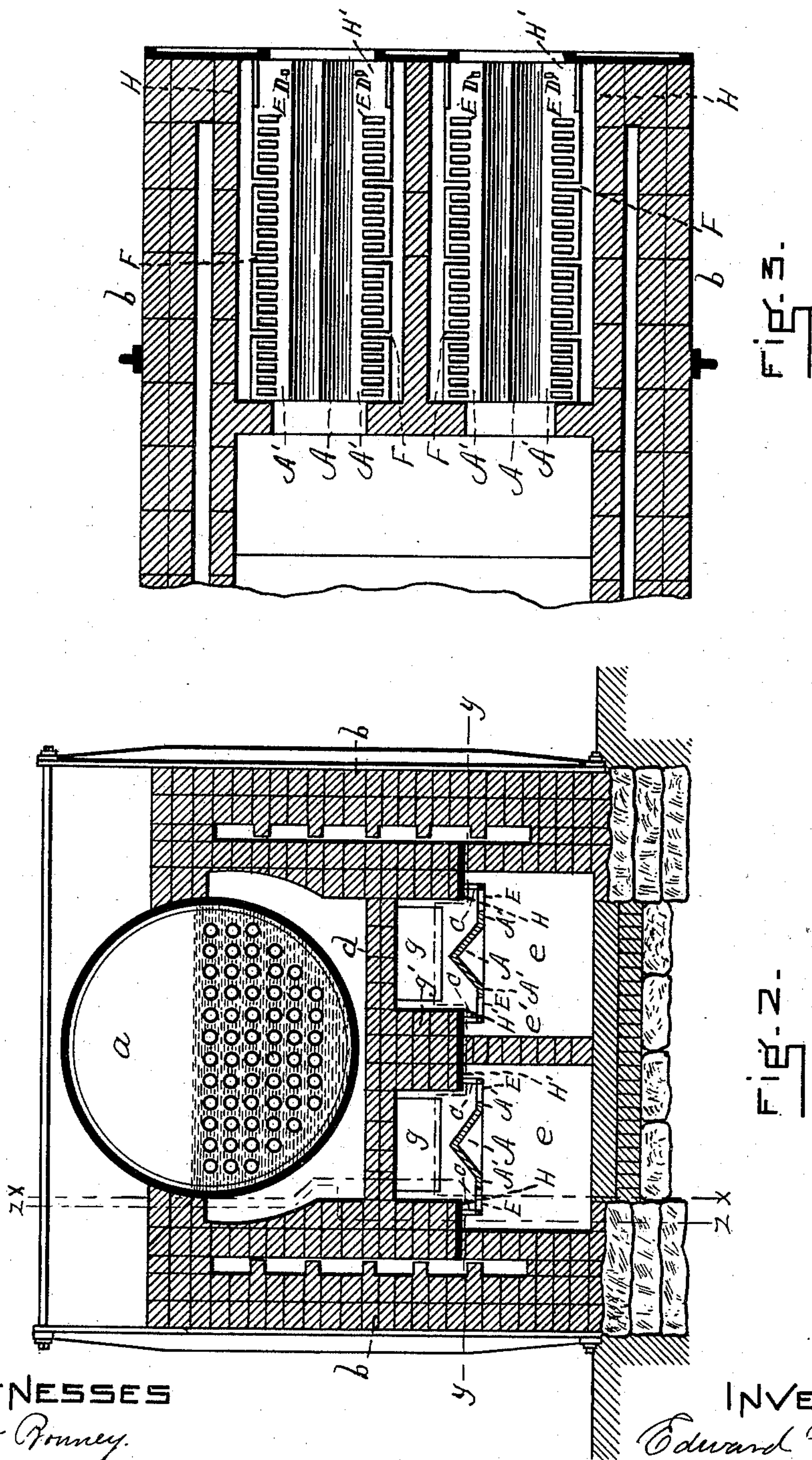
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3 Sheets—Sheet 3.

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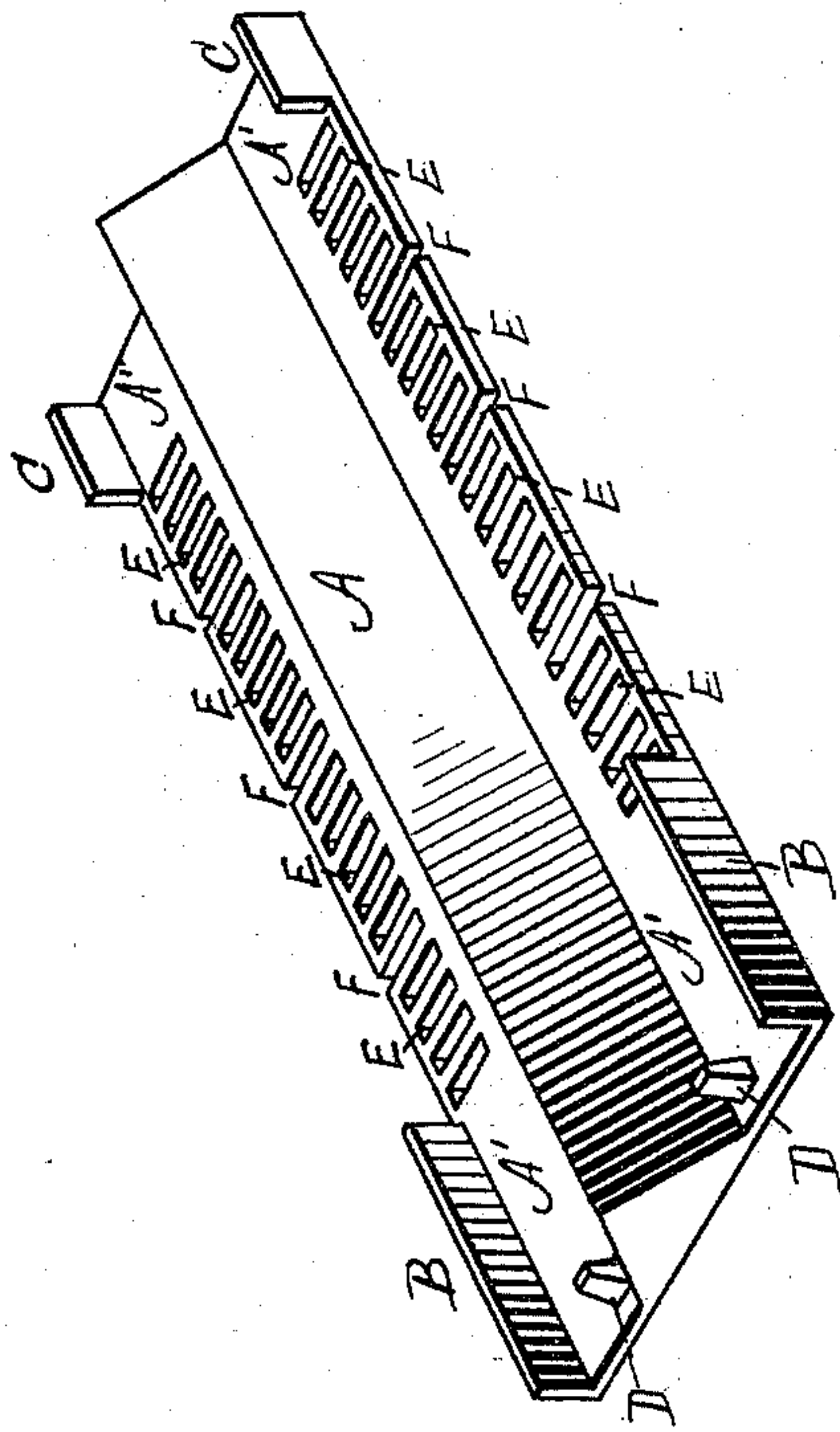


Fig. 5 -

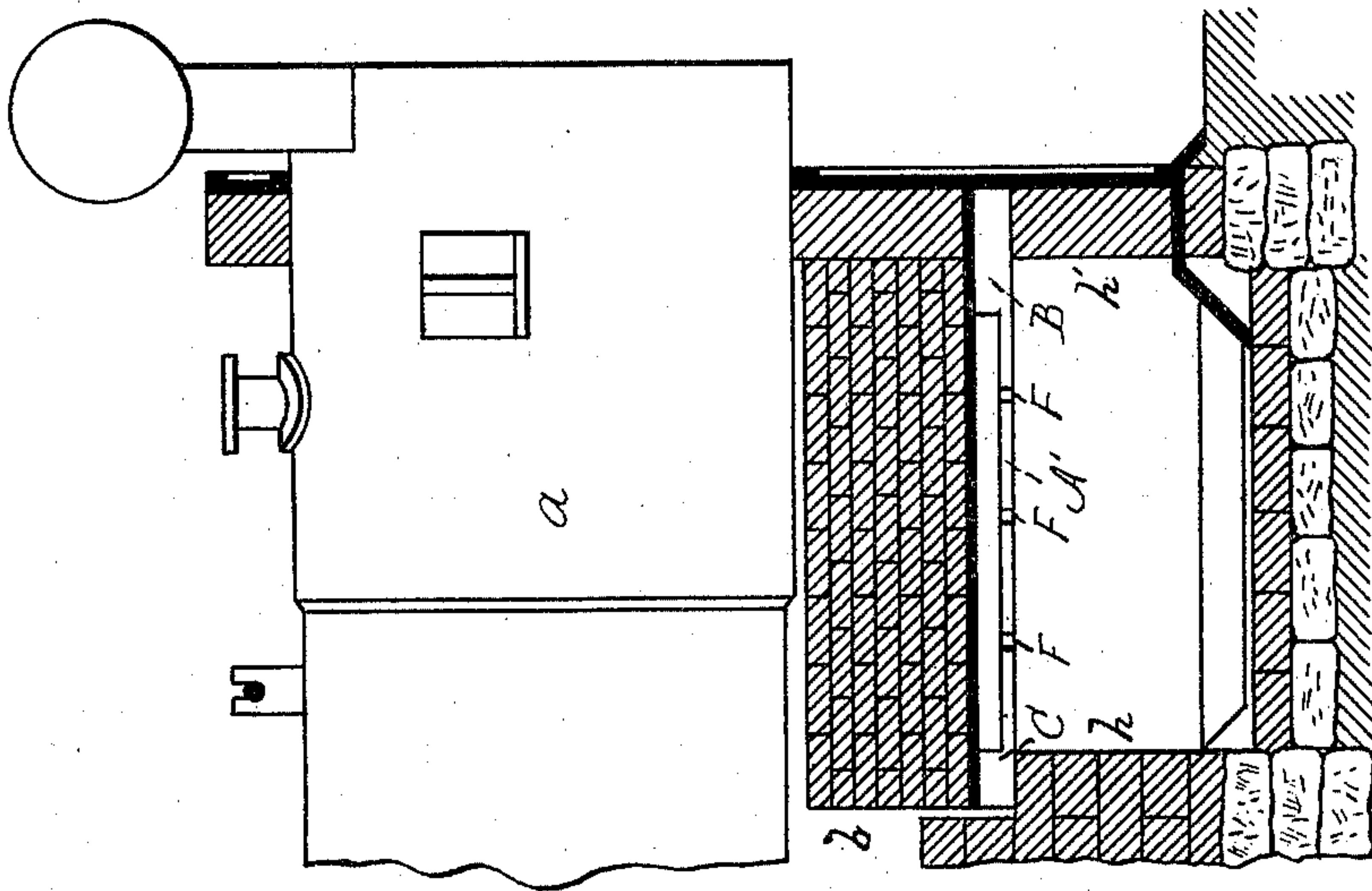


Fig. 4 -

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UNITED STATES PATENT OFFICE.

EDWARD FALES, OF WINTHROP, MASSACHUSETTS.

STEAM-BOILER OR OTHER FURNACE.

SPECIFICATION forming part of Letters Patent No. 584,815, dated June 22, 1897.

Application filed February 27, 1897. Serial No. 625,276. (No model.)

To all whom it may concern.

Be it known that I, EDWARD FALES, a citizen of the United States, residing in Winthrop, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Steam-Boiler or other Furnaces, of which the following is a specification.

This invention relates particularly to the fuel-supports of steam-boiler and other furnaces; and the improvement, while intended to be applied in any heating apparatus where it may be of service, is particularly adapted to steam-boiler furnaces.

The invention has for its object to produce a more perfect combustion with a minimum amount of smoke.

In carrying out my invention or improvement I provide one or more—usually two—substantially solid or imperforate fuel-supports. These fuel-supports are usually set longitudinally with the boiler and their central portions are raised and substantially triangular in form or gable-shaped, while the sides or bases, which are integral with the imperforate central portions, consist of flat horizontal wings, which may be provided with a suitable number of slots or openings to furnish draft-space. This construction guides the draft through the support near its opposite edges, causing the draft-currents to converge above and unite centrally over the highest point or apex of the imperforate central portion of the fuel-support, with the effect that the body of fuel, which is, of course, shallowest in the center or next the highest point of the fuel-support, burns evenly from the top down, resulting in the more nearly perfect combustion above mentioned. Furthermore, provision is made for preventing fracture of the fuel-support and for preventing the coal from dropping between the horizontal portions or wings of the fuel-support and the masonry into the ash-pit.

The nature of the invention in detail is fully described below and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section taken on line X, Fig. 2, of a steam-boiler furnace embodying my invention. Fig. 2 is a transverse vertical section of the same, taken through the fuel-supports and combustion-

chambers. Fig. 3 is a substantially horizontal section taken on line Y, Fig. 2. Fig. 4 is a longitudinal section taken on line Z, Fig. 2. Fig. 5 is a perspective view of one of the fuel-supports removed.

Similar letters of reference indicate corresponding parts.

a represents the boiler; *b*, the side walls of the furnace; *c*, the bridge-wall, and *d* the protecting or deflecting wall, which is set over the combustion-chambers.

e e are two ash-pits, separated by the wall *e'*, and *g g* are the two combustion-chambers, separated by the wall *g'*.

Supported at its opposite ends by the portions *h h'* of the masonry on each side of the dividing-wall *e'* is my improved fuel-support. This consists of a metallic plate, longer than it is wide and preferably rectangular in shape, set usually longitudinally with the boiler, such plate consisting of a central longitudinal triangular-shaped or gable-shaped portion A, horizontal side portions or wings A', preferably integral with and extending from the side edges of the raised triangular portion A, and upwardly-projecting portions B, C, and D, the objects of which are below described.

The side portions or wings A' may be provided with slots E next their outer edges, such slots being in practice usually smaller in proportion than is shown in the drawings. The outer edges of these wings are notched at intervals, as at F, in order to allow contraction and expansion of the metal without danger of fracture. When the fuel-supports are set in position, the outer edges lie under the overhanging portions H and H' of the masonry, the former extending from the sides *b* and the latter from the central portion *g'*. The upturned lips or portions B and C extend from the sides or wings A' up toward or against the under surfaces of the portions H and H', such under surfaces being suitably underlaid with metallic plates.

When the coal is in position upon the fuel-supports and within the combustion-chambers *g*, it is prevented from dropping down into the ash-pits *e* by the overhanging portions H H', and in addition thereto at the front and rear ends of the fuel-supports by the upturned edges or guards B C. The draft

passes from the ash-pit up through the slots E and through the spaces between the outer edges of the wings A' and the masonry, and the two currents of air converge and unite above the body of coal along the line of the longitudinal center of the fuel-support—that is to say, directly over the ridge or apex of the triangular-shaped or gable-shaped central imperforate portion A. As the depth of the bed of coal along the line of the central portion of the fuel-support is less than at the sides the converging currents of hot air attack that portion so that it burns from the top down, and tend to render the effect upon the coal at that portion equal to the effect of the drafts upon the deeper body of coal upon the horizontal portions or wings A'. Thus the combustion is equalized, so that the shallow coal over the gable and the deep coal over the wings are consumed equally and the combustion rendered very nearly perfect, so that the gases are consumed as soon as they are liberated from the coal, there being practically no loss of combustible gas and no clinkers.

During the operation of the apparatus there are three distinct kinds of zones within the combustion-chamber—namely, two outside solid-fuel-burning zones, one intermediate gas-generating zone, and one gas-burning zone situated just above the others. Air for supporting combustion within the two fuel-burning zones is admitted through the side openings, and the heat from these two zones passes into the fuel within the gas-generating zones and produces destructive distillation of the said fuel. The longitudinal draft of the furnace acting upon the currents produced by the air admitted at the sides of the fuel-support results in a helical movement of the gases which tends toward the rear of the combustion-chamber and results in a perfect diffusion and combustion of the elements.

Rests or guides D are formed near the front edge of the fuel-support (see Fig. 5) for bearing the poker against when it is thrust into the fire, thus holding it steadily and preventing any injury from slipping.

The draft-holes E may be much smaller than is shown in the drawings or may be entirely omitted if desired, in which latter case the draft will pass between the outer edges of the fuel-support and the masonry and between the front and rear lips or guards B and C.

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

1. The combination of a furnace, a fuel-support therein, of greater length than width, and means for admitting air only at or near the side edges of the fuel-support.

2. The combination of a furnace, a fuel-support therein, of greater length than width, and means for directing the major portion of the air around and over the side edges of the fuel-support.

3. In a furnace, the combination with the side walls having overhanging ledges, of a fuel-support having a longitudinally-arched central portion and side flanges, which set under said overhanging ledges, substantially as specified.

4. In a furnace, the combination with the side walls having overhanging ledges, of a fuel-support having longitudinally-arched central portion and side flanges, which set under said overhanging ledges, and means for admitting air around and over the side edges of the fuel-support.

5. In a furnace, the combination with the side walls having overhanging ledges, of a fuel-support having a longitudinally-arched imperforate center and perforated flanges, which extend under said overhanging ledges, substantially as specified.

6. In a furnace, the combination with the side walls having overhanging ledges, of a fuel-support having a longitudinally-arched imperforate central portion and perforated side flanges, which set under said overhanging ledges, there being air-inlets between the flanges and ledges, substantially as specified.

7. In a steam-boiler or other furnace, the side walls b provided with the overhanging, inwardly-projecting portions H; the dividing-wall e' provided with the overhanging, outwardly-projecting portions H'; and the fuel-supports consisting of the central, raised gable portions A and horizontal wings A' extending from the opposite sides of said central portions, said fuel-supports being sustained by the furnace and having their edges extend under said overhanging portions H, H', substantially as described.

8. A combustion-chamber having narrow and contiguous gas-generating and solid-fuel-burning zones, a superjacent zone for the combustion of the gases, means for admitting air to the free side of the solid-fuel-burning zone, and means for producing a draft longitudinal of the zones, substantially as described.

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Witnesses:

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