

No. 662,874.

Patented Nov. 27, 1900.

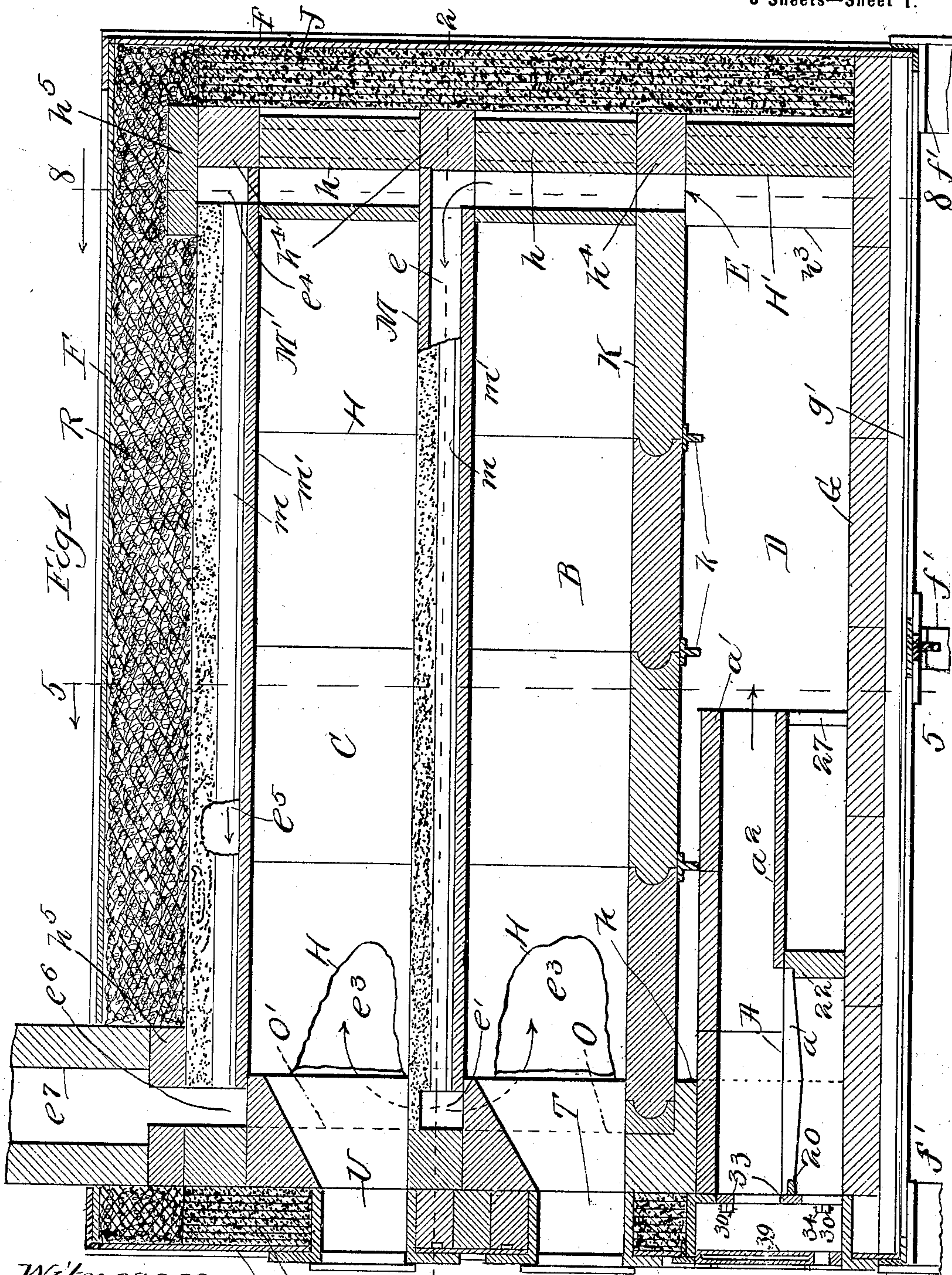
J. I. MARSHALL & J. FAULDS.

BAKE OVEN.

(Application filed Mar. 11, 1899.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses  
W. C. Coolidge  
Wm. Geiger

Inventors  
John I. Marshall  
John Faulds

By Louis K. Green Att'y



No. 662,874.

Patented Nov. 27, 1900.

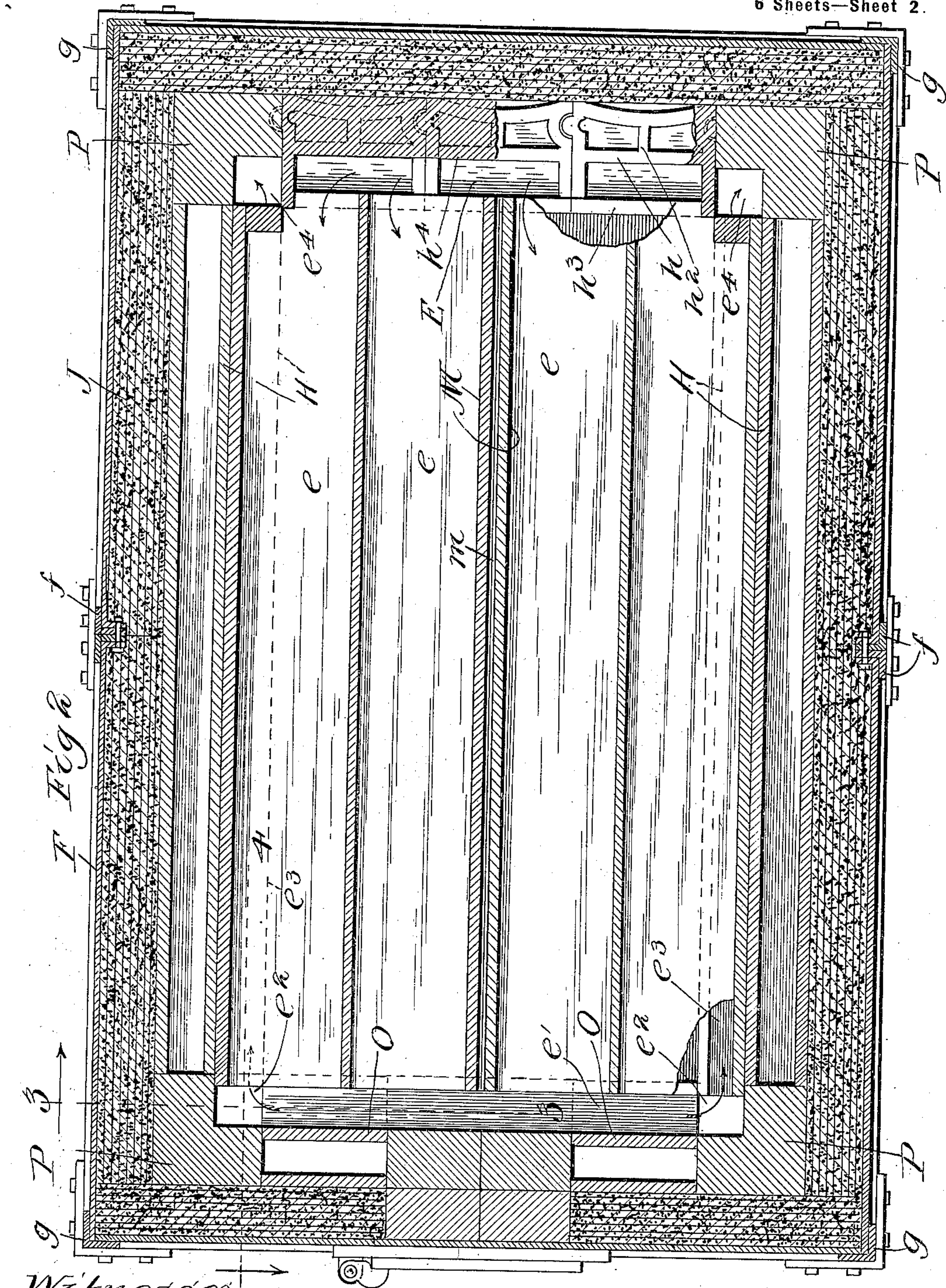
J. I. MARSHALL & J. FAULDS.

BAKE OVEN.

(No Model.)

(Application filed Mar. 11, 1899.)

6 Sheets—Sheet 2.



Witnesses  
W. C. Cochran  
Wm. Geiger

Inventors  
John I. Marshall  
John Faulds  
By Louis K. Gleason Atty



No. 662,874.

Patented Nov. 27, 1900.

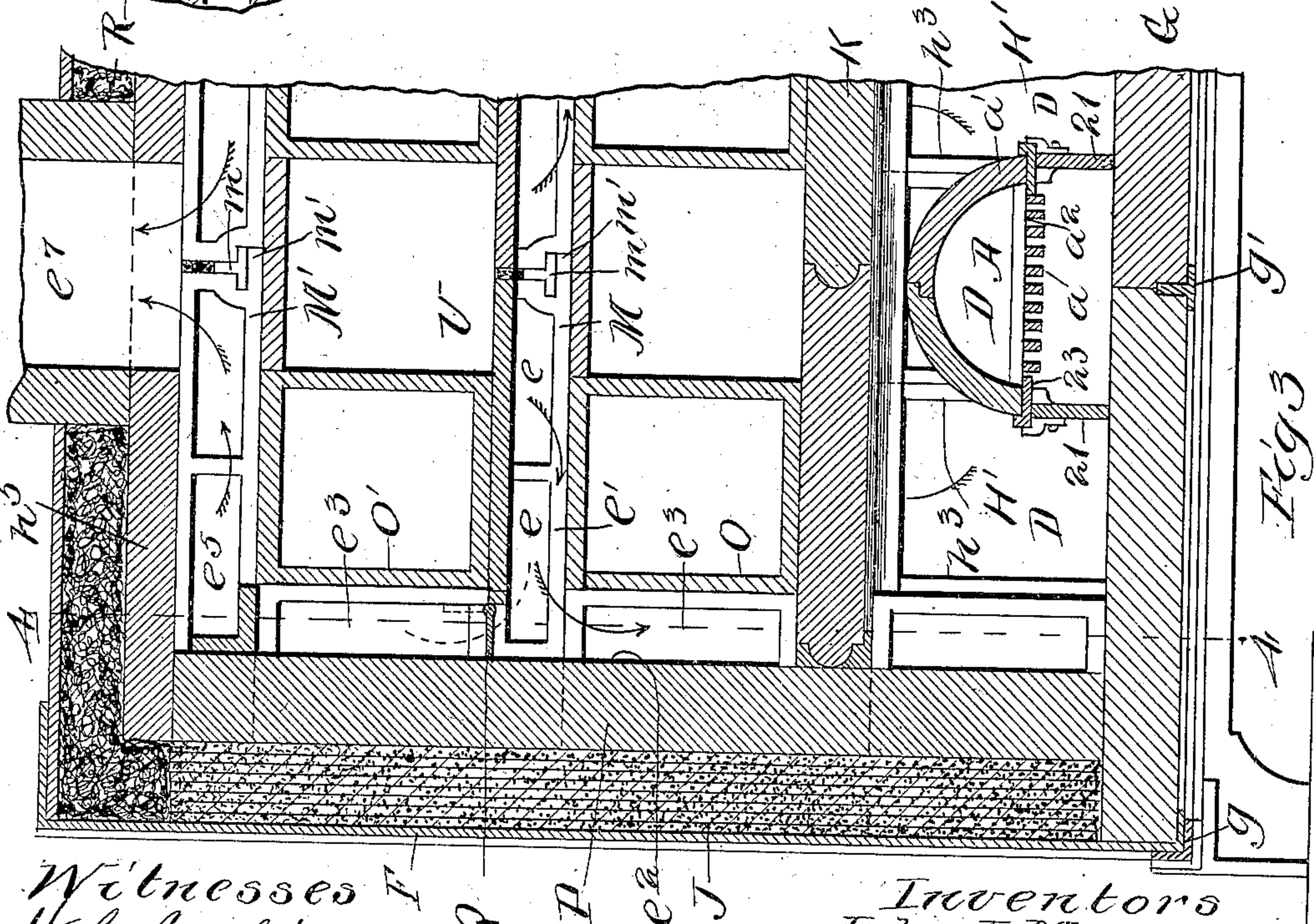
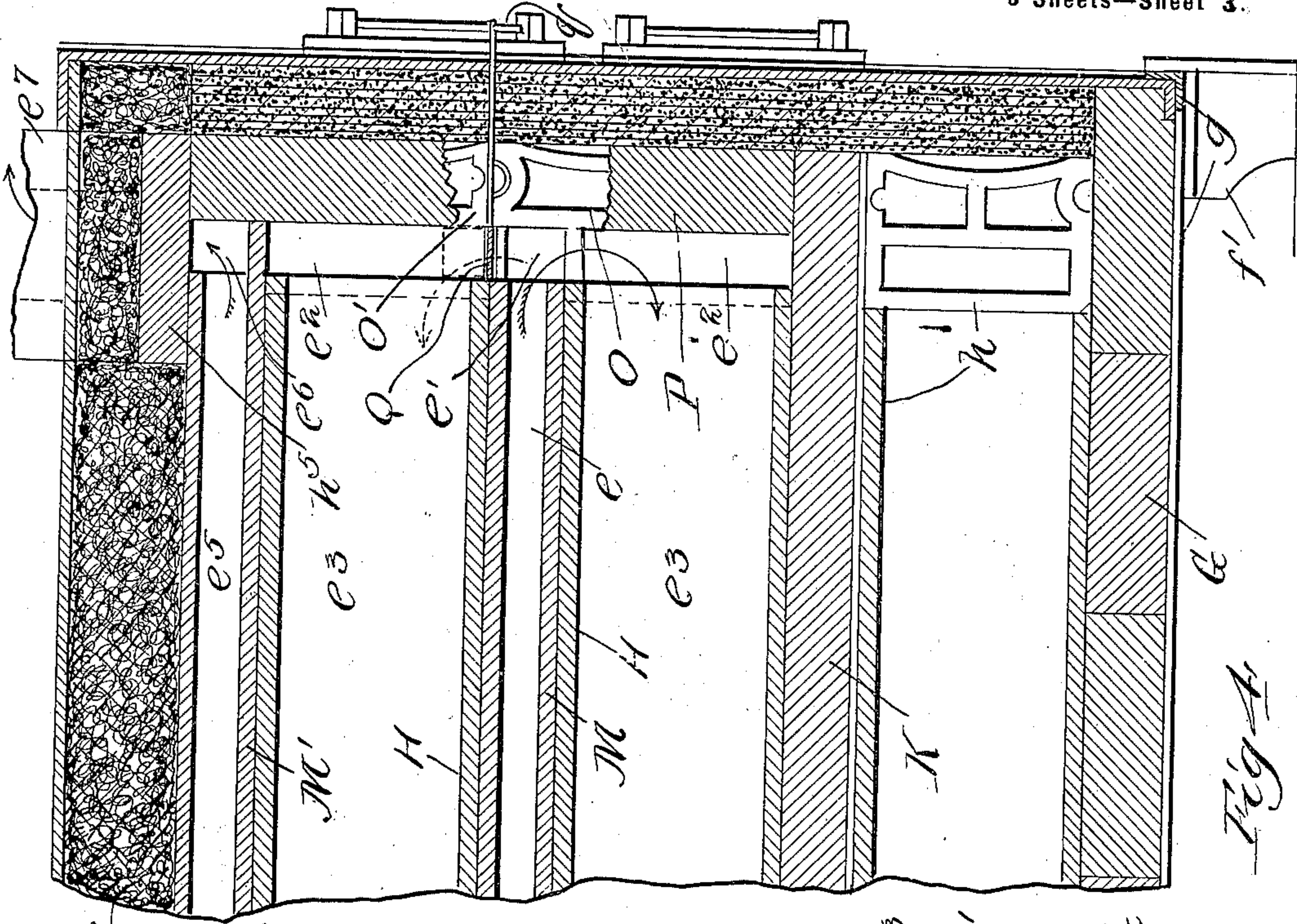
J. I. MARSHALL & J. FAULDS.

BAKE OVEN.

(No Model.)

(Application filed Mar. 11, 1899.)

6 Sheets—Sheet 3.



Witnesses  
W. C. Cooley  
Wm Geiger

Inventors  
John I. Marshall  
John Faulds

By Louis R. Green Atty



No. 662,874.

Patented Nov. 27, 1900.

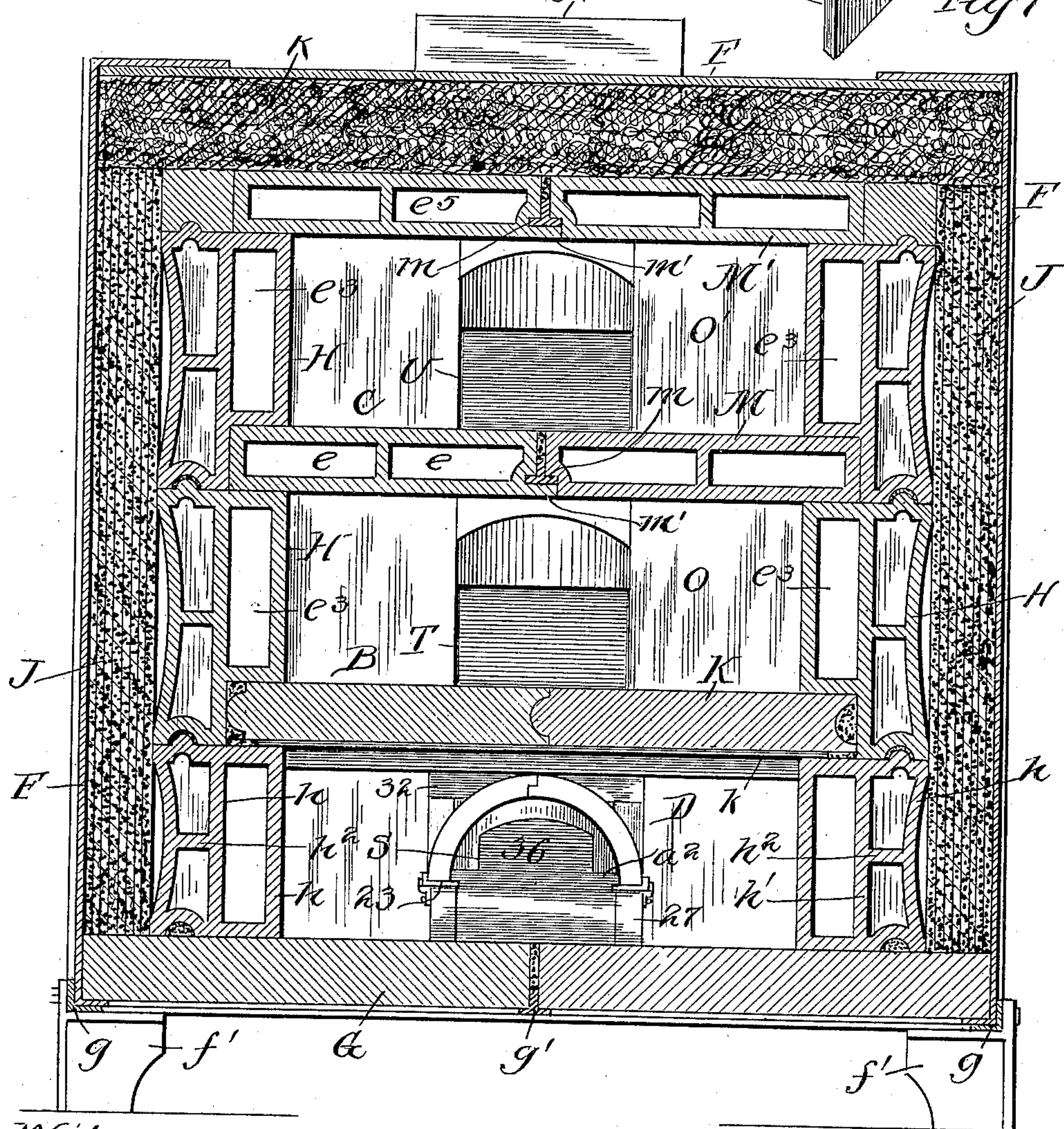
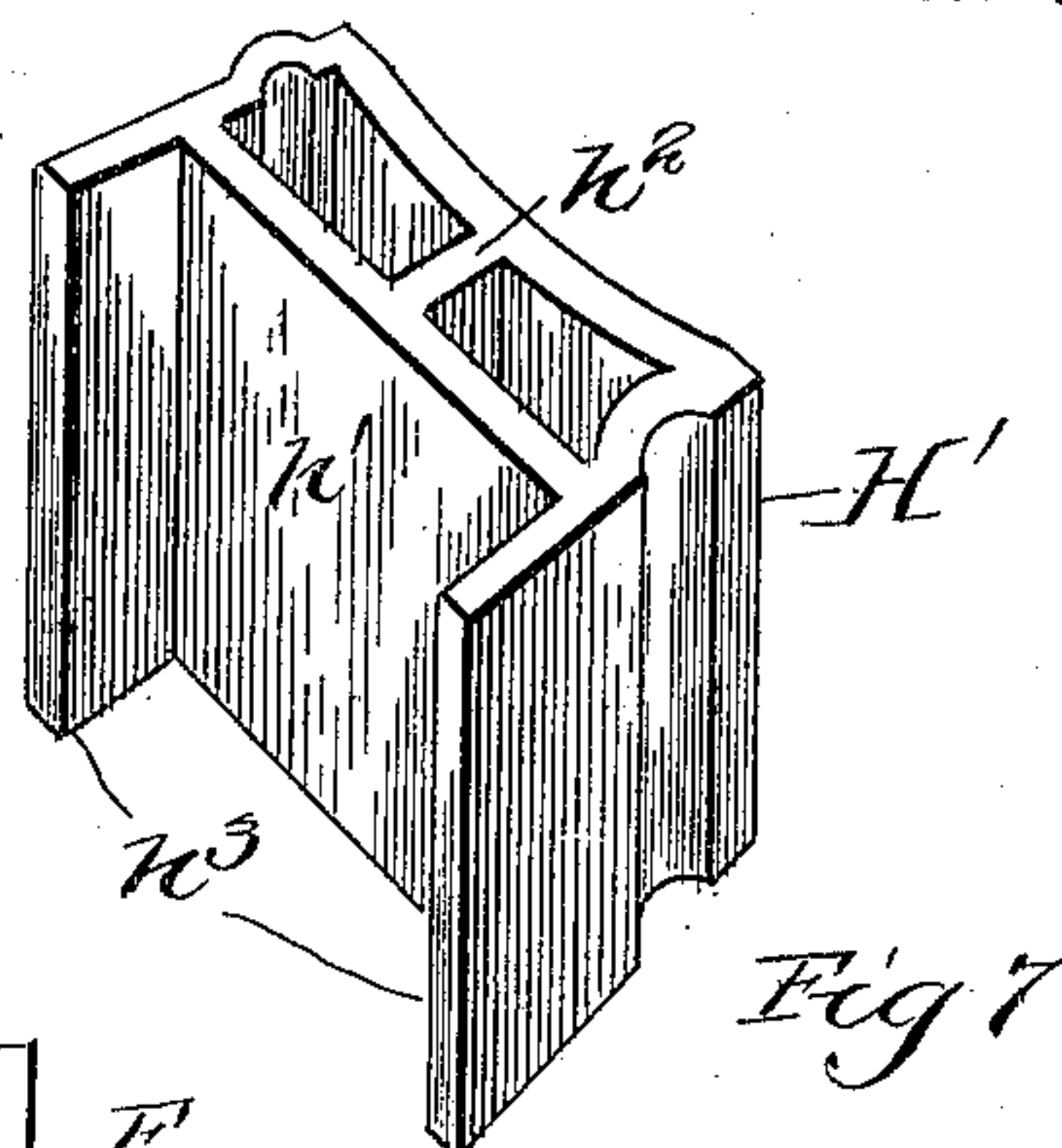
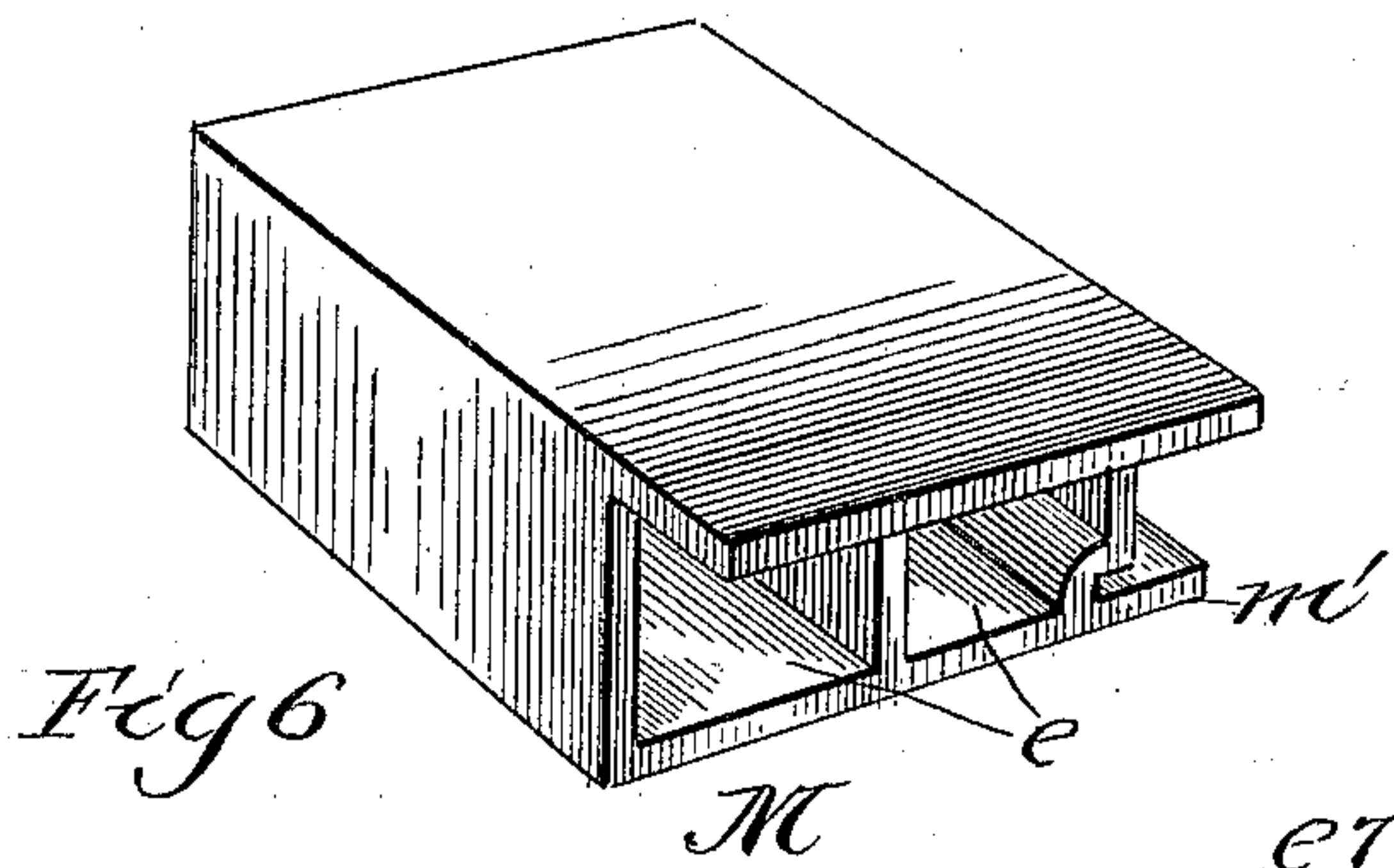
J. I. MARSHALL & J. FAULDS.

BAKE OVEN.

(No Model.)

(Application filed Mar. 11, 1899.)

6 Sheets—Sheet 4.



Witnesses  
W. C. Bodley  
Wm. Geiger

Fig 5

Inventors  
John I. Marshall  
John Faulds

By Louis K. Gilson Atty



No. 662,874.

Patented Nov. 27, 1900.

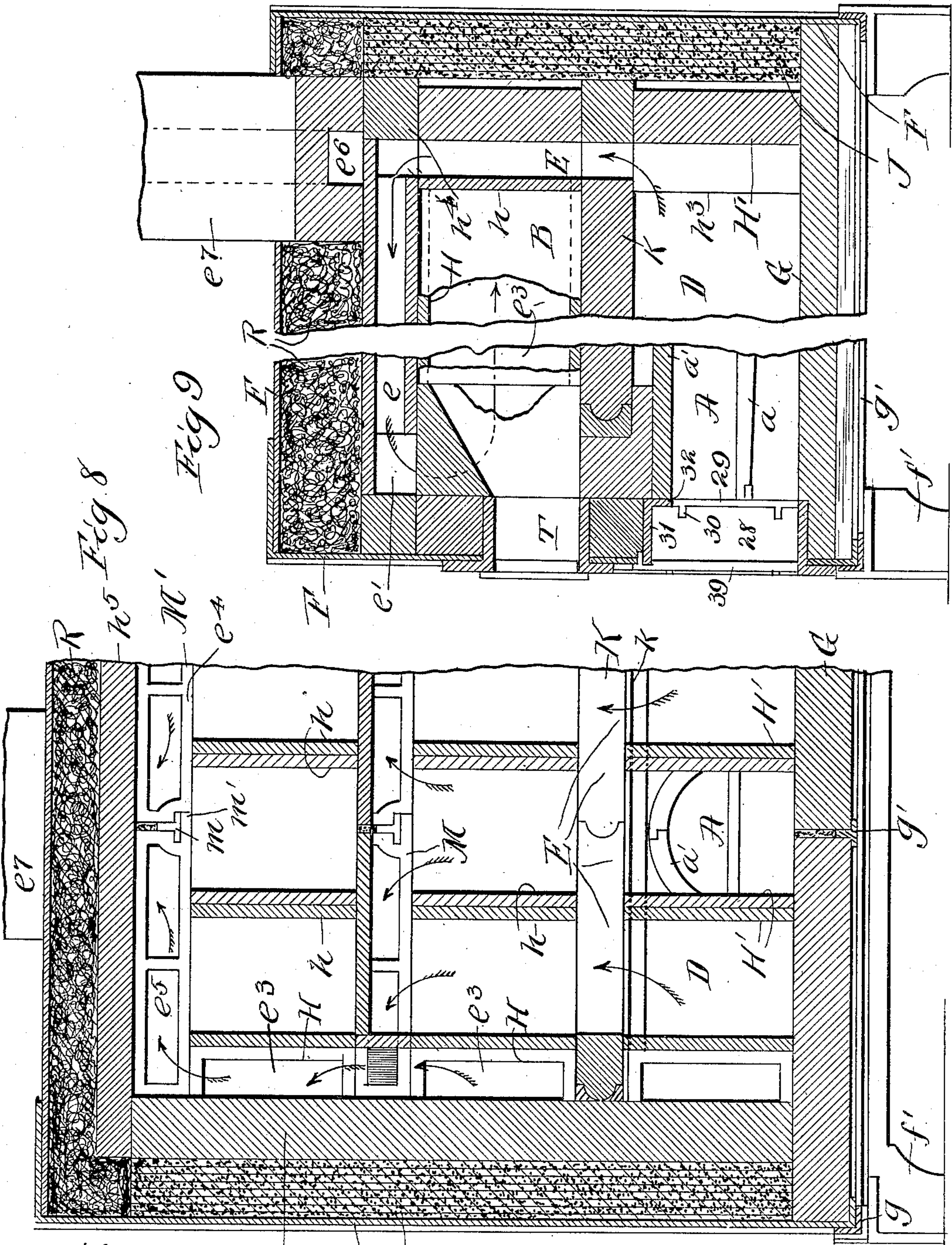
J. I. MARSHALL & J. FAULDS.

BAKE OVEN.

(Application filed Mar. 11, 1899.)

(No Model.)

6 Sheets—Sheet 5.



Witnesses  
W. C. Collier  
Wm. Geiger

Inventors  
John I. Marshall  
John Faulds

By Louis K. Gleason Atty



No. 662,874.

Patented Nov. 27, 1900.

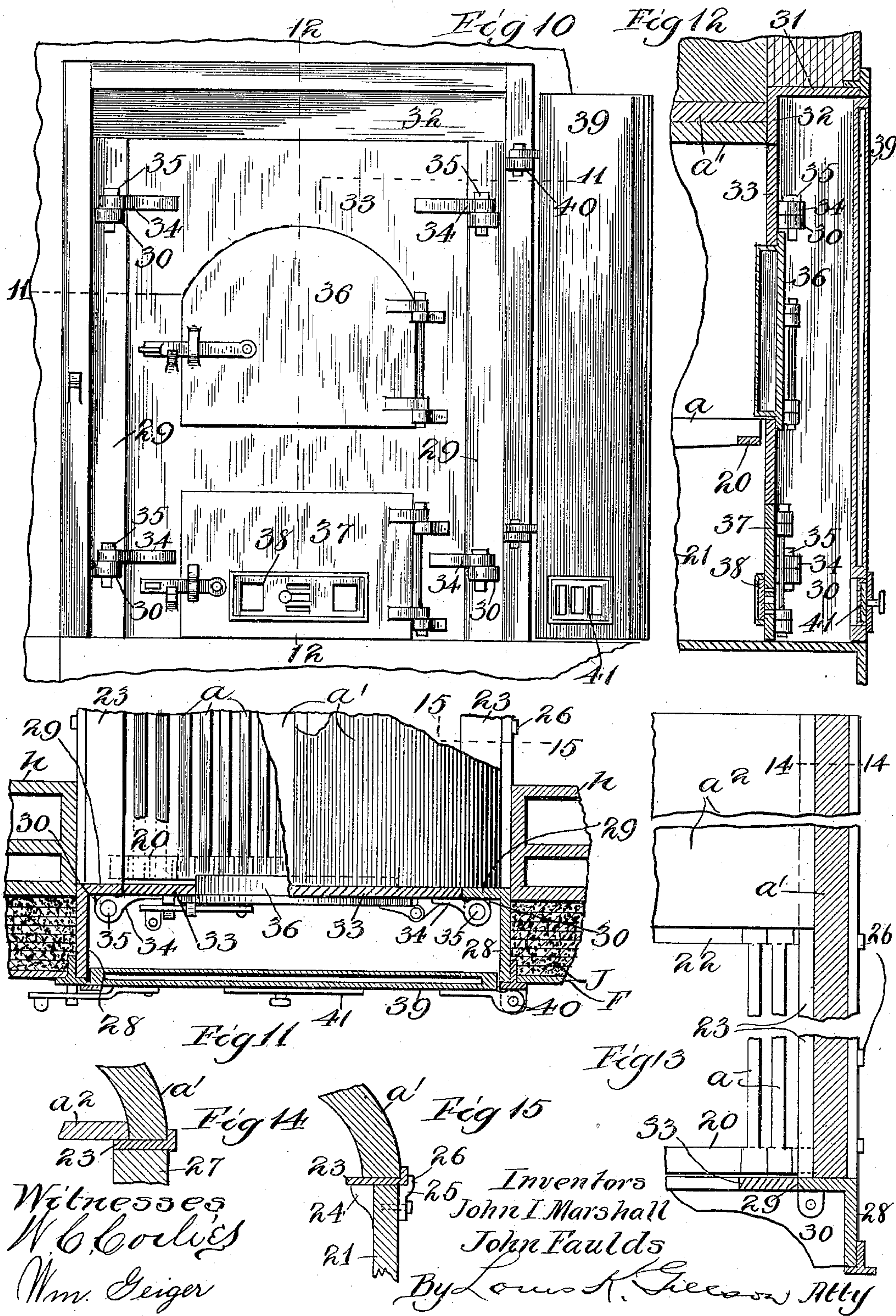
J. I. MARSHALL & J. FAULDS.

BAKE OVEN.

(No Model.)

(Application filed Mar. 11, 1899.)

6 Sheets—Sheet 6.



Witnesses  
W. B. Collier  
Wm. Geiger

Inventors  
John I. Marshall  
John Faulds  
By Louis K. Green Att'y



# UNITED STATES PATENT OFFICE.

JOHN I. MARSHALL AND JOHN FAULDS, OF CHICAGO, ILLINOIS.

## BAKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 662,874, dated November 27, 1900.

Application filed March 11, 1899. Serial No. 708,783. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN I. MARSHALL, a citizen of the United States, and JOHN FAULDS, a citizen of the United Kingdom of Great Britain, and residents of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Bake-Ovens, of which the following is a specification, and which are fully illustrated in the accompanying drawings, forming a part thereof.

This invention relates particularly to what are known as "portable continuous-baking ovens"—that is to say, ovens which may be transported in a knockdown form and may be readily taken to pieces for moving and which may be fired while the baking is proceeding.

The objects of the invention are to secure in ovens of this type higher efficiency and simplicity and cheapness of construction.

The invention consists in the parts and arrangement of parts, as hereinafter fully described, and which are illustrated in the accompanying drawings, in which—

Figure 1 is a central longitudinal vertical section of the oven. Fig. 2 is a plan section on the line 2 2 of Fig. 1. Fig. 3 is a sectional view on the line 3 3 of Fig. 2. Fig. 4 is a sectional view on the lines 4 4 of Figs. 2 and 3. Fig. 5 is a sectional view on the line 5 5 of Fig. 1. Figs. 6 and 7 are details in perspective of certain tiles used in the construction of the oven. Fig. 8 is a sectional view on the line 8 8 of Fig. 1. Fig. 9 is a similar view, Fig. 1 showing a modified construction. Fig. 10 is an elevation of the furnace-front. Fig. 11 is a sectional view on the broken line 11 11 of Fig. 10. Fig. 12 is a sectional view on the line 12 12 of Fig. 10. Fig. 13 is a detail plan section on the plane of the grate. Fig. 14 is a detail section on the line 14 14 of Fig. 13; and Fig. 15 is a detail section on the line 15 15 of Fig. 11, Figs. 10 to 15 being drawn to a larger scale than the remaining figures.

Heretofore continuous-baking portable ovens have in practice invariably been made mainly of metal. Unsuccessful efforts have been made to utilize tiling in the construction of the walls; but the loss of heat by radiation, together with the difficulty of prop-

erly distributing the heat to the interior of the oven, have made them failures. We believe we are the first to build the walls of an oven of this type of hollow tiling, utilizing some of the chambers of the walls as smoke-flues for carrying the heat to the parts of the oven, so as to properly distribute it, and using the remaining wall-chambers as dead-air spaces to prevent loss by conduction and radiation. The advantage of this construction is found largely in the fact that tiling is far superior to metal in conserving the heat, thereby avoiding fluctuations of temperature due to variations in the intensity of the fire. By the use of the hollow tiling in the walls we are able to secure at once the advantages of proper distribution of heat, the conservation of heat so desirable in such ovens, and the protection against loss by radiation, while avoiding complications in construction and consequent increased cost.

The oven is provided with a furnace A, which opens directly into a commodious flue D, above which there is located an oven B, a second oven C being added, if desired. When two baking-chambers B C are used, the line of draft is traced as follows: from the flue-chamber D upwardly through flues E at the rearward end thereof to flues-spaces  $e$ , leading forwardly immediately above the oven B to a transverse flue-space  $e'$  at the forward end of the oven, thence to a vertical flue  $e^2$  and backwardly through flues  $e^3$  at the sides of the chambers B C to vertical flues  $e^4$  at the rearward corners of the oven, and again to the forward end of the oven through flues-spaces  $e^5$ , over the top of the chamber C, and thence to a chimney-flue  $e^6$ , thereby entirely surrounding the baking-chambers with smoke-flues except at their forward ends. When but a single baking-chamber is used, as shown in Fig. 9, the chimney-flue is located at the rearward end of the oven, and the draft is directly from the side return-flues  $e^3$  thereto.

The extreme outer shell F of the oven is preferably of sheet metal, the several plates being secured together by means of angle-bars  $f$  and the corners of the oven being bound by similar angle-bars  $g$ , those at the bottom



angles resting, if desired, upon suitable chairs or feet  $f'$ . The bottom of the oven is of solid tiling G, supported by the angle-bars  $g$  and by cross T-rails  $g'$ . The inner side walls of the oven are formed of hollow tiles H  $h$ . The lowest course of these tiles  $h$  forms the side walls of the flue-chamber D, which is of the same area in cross-section on horizontal plane as the chamber B and within which is located the furnace A. The tiles  $h$  are oblong rectangular in cross-section and rest upon one of their side edges—that is to say, their flue-spaces extend horizontally. These tiles are provided with a vertical partition  $h'$ , separating their interiors into inner and outer chambers, and for the purpose of securing added strength a web  $h^2$  is thrown across these chambers. The outer face of each of these tiles is preferably hollowed, the simpler form of construction being to make it concave, as shown. The upper courses H H of the hollow tiling forming the side walls are similar in form to the tiling  $h$ , except that along their lower inner angles they are rabbeted so as to receive the solid tiling K, forming the floor of the chamber B, and the hollow tiling M, forming the roof of this chamber and the floor of the chamber C. The tiling K is supported by the tile  $h$  and cross-bars  $k$ , resting thereupon. The tiling M and similar tiling M', forming the roof of the chamber C, are carried by the tiles H H and by suitable cross T-beams  $m$ , which are preferably entirely inclosed by the tiles M M', the stem portion of these bars being located between adjacent tiles and the cross portion fitting within suitable recesses in their adjacent faces, one of the tiles being provided with a projecting lip  $m'$  to cover the cross member of the bar. Like the tile  $h$  the tiles H have their outer faces hollowed, and the front and rear inner walls of the oven are built of the same form of tiling, having the same hollowed outer faces.

Between the outer shell F and the inner walls of the oven there is interposed a filling J, consisting, preferably, of a plurality of sheets of asbestos, this filling lying against the margins of the outer faces of the tiling, so that a dead-air space is inclosed between each tile and the asbestos.

The rearward wall of the flue-space D is formed of tiles H' of the same style as the tile  $h$ , but standing on end. The inner face of these tiles, however, is broken out, as shown at  $h^3$  in Fig. 7 and elsewhere. The rearward walls of the chambers B C are also made of these tiles  $h$  standing on end, but without the mutilation shown in the tile H'. The rearward tile K of the floor of the chamber B rests upon the forwardly-extended flanges  $h^3$  of the tile H', a flue-space being left behind them in register with the forward chamber of the tile  $h$ , forming the rear wall of the chamber B. A piece of solid tile or brick  $h^4$  is placed upon the top of the tiling H' to sup-

port the outer portion of the tile  $h$  at the back of the oven, and a similar piece of brick is placed upon the upper end of these tiles  $h$ .

The tiles M, forming the roof of the chamber B, are oblong rectangular in form and are hollow, so as to form the flues  $e$ , these flues extending, as already stated, from the rear to the front of the oven. The rearward course of the tiles M overlap the inner chamber of the tiles  $h$ , forming the rearward wall of the chamber, and in order to connect the flues E with the flues  $e$  the lower wall of the tile forming this course is cut away, as plainly shown in Fig. 1.

The front wall of the oven-chamber B consists of a tile O, identical in form with the tile H, but overturned, so that its rabbeted portion is across its upper and inner angle. The forward course of the tiling M terminates in line with the inner face of the inner wall of the tile O. The front wall of the oven-chamber C consists of tiling O' identical in form with the tiling O, and resting upon the latter. By this construction it will be seen that the forward cross-flue  $e'$  is formed, Figs. 1 and 4, which flue is in communication entirely across the front of the oven with the flue-passages  $e$ .

At each corner of the oven, immediately at the side of the front wall formed of the tiling O O', as already described, there is built up upon the lower course  $h$  of the inner side walls an L-shaped column P P, the inner angles of which form the vertical flue-spaces  $e^2$ , which are open to the cross-flue  $e'$  and to the return-flues  $e^3$ , the latter being the inner chamber of the tiling H, forming the side walls of the oven-chambers B C, so that the smoke issuing from the cross-flue  $e'$  may return through either the upper or lower or both of the side flues  $e^3$ . As the natural course of the draft will be through the upper of these side flues and as it may not always be desired to use the upper oven, we place a simple flat damper Q in the vertical flues  $e^2$ , controlling the same by means of a rock-spindle  $q$ , projecting forwardly through the front wall of the oven and by means of which communication between the cross-flue  $e^2$  and the upper return-flues  $e^3$  may be entirely cut off.

The rearward wall of the oven-chamber C is formed of tiling  $h$ , like the side walls of the chamber D. A course of solid tile  $h^4$ , of the same form as the similar courses laid across the outer portions and on top of the rearward walls of the flue-space D of the oven-chamber B, is laid across the rearward wall of the oven-chamber C. The roof of the oven-chamber C is composed of hollow tile M' of the same form as the tiling M, the rearward end of this roof resting upon the inner wall of the tiling  $h$ , so that a cross-flue is formed between the rearward end of this roof and the solid tile  $h^4$  last referred to, which cross-flue is in connection with the side flues  $e^3$  through a vertical corner flue in the same



manner as the vertical flues  $e^2$  at the front of the oven. The flues  $e^5$  open to a similar cross-flue at the forward end of the oven formed by the rabbeted portion of the tiling  $O'$ , and from this cross-flue  $e^6$  the chimney-flue  $e^7$  opens. The top of the rearward cross-flue  $e^4$  is covered by a course of ordinary brick  $h^5$ , and the forward cross-flue connecting the flues  $e^5$  and  $e^6$  is similarly covered.

10 A layer of filling material R, either of mineral wool or asbestos, is interposed between the tile  $M'$  or M (when but one of the baking-chambers is used) and the top of the outer casing F.

15 We show at S the furnace-door, at T the door of the oven-chamber B, and at U the door of the oven-chamber C. There is nothing novel about the two last appurtenances of the oven, and we have not deemed it necessary to illustrate or describe in detail the arrangement of the tiling for the accommodation of the openings to the oven, inasmuch as the arrangement of these features can be easily provided for by the artisan who constructs the oven.

25 It will be seen that as to the flue-chamber D, into which the vapors of combustion are discharged from the furnace, we have the advantage of not only very thick walls, but of triple dead-air spaces, and as to the walls through which the flues pass there are two dead-air spaces outside of the flues, so that the loss of heat by conduction is very small.

30 While we have shown the outer casing to be of metal, there is no reason why it may not be of masonry, if the user prefers.

The furnace A, preferably used in connection with the oven, consists of the grate-bars  $a$  and the inclosing arch  $a'$  of tile. The front ends of the grate-bars are carried by a chair 20, resting upon the side walls of the ash-box, their rearward ends being carried by the rearward wall 22 of the ash-box. The arch  $a'$  rests upon a pair of angle-bars 23, the forward ends of which are supported by the side walls 21 of the ash-box and suitable lugs 24 25, attached thereto, the outer lugs 25 being shown as bolted to the wall 21 to obviate the practical difficulty of casting and as having upstanding lugs 26 to prevent the upward lateral movement of the bars 23 and the consequent spreading of the arch  $a'$ . The arch  $a'$  is extended backward a suitable distance beyond the grate-surface  $a$  for the purpose of forming a retort-flue, the supporting-bars 23 being prolonged in order to carry it, their rearward ends being supported by suitable piers 27. The floor  $a^2$  of the combustion-flue thus formed is of flat tiling and supported by the bars 23. This combustion-flue opens directly into the heating-chamber D of the oven and its arch of massive tiling serves to conserve the heat and maintain the necessary high temperature essential to complete combustion of vapors distilled from the fuel, thereby promoting economy in fuel consump-

tion and the steadiness of temperature within the chamber D.

The furnace-front is formed with a deep reveal, its frame comprising the side plates 28, which have at their inner edges instand- 70 ing flanges 29, each provided with a pair of hinge-lugs 30. The top of the frame consists of a similar plate 31, having a depending flange 32 at its rearward edge. The furnace-front proper, 33, fits within the flanges 29 32 and is provided with hinge-lugs 34, a pair projecting beyond each of its side edges to coöperate with the hinge-lugs 30, with which they are united by pintles 35, thus holding 80 the front 33 securely in place, but allowing it to be swung upon hinges in either direction by simply removing the pintles 35 at one side or to be entirely removed by first taking out all of the pintles.

85 The front plate 33 is provided with a feed-door 36 for the admission of fuel and an ash-pit door 37, which has a suitable damper 38 for the admission of air.

A shield or screen-door 39 is hinged across 90 the furnace-front in the plane of the front of the oven, as shown at 40, and this door may be made of sheet metal and may be hollow and packed with mineral wool or similar material and is provided with a damper 41 for 95 the admission of air. The office of this outer screen is to protect the baker from the extreme heat when at his work.

It will be seen that this arrangement of furnace and furnace-front provides for easy access to the interior of the oven for the purpose of repair, it being necessary only to swing open or entirely remove the front plate 33 and then take out the arch  $a'$  and the grate-bars, thus providing ample space for entry into the 105 chamber D.

We claim as our invention—

1. A bake-oven having its walls and baking-chamber ceiling formed of hollow tiles arranged so that their chambers form smoke- 110 flues leading upwardly at the back of the oven, forwardly through the baking-chamber ceiling, and backwardly through side walls of the baking-chamber.

2. A bake-oven having its walls and baking-chamber ceiling formed of hollow tiles arranged to constitute smoke-flues running through an end, and the sides and the ceiling of the baking-chamber. 115

3. A bake-oven having its walls formed of hollow tiles having inner and outer chambers, such tiles being so arranged that the inner chambers of certain of them constitute smoke- 120 flues, the outer chambers of the tiles forming dead-air spaces. 125

4. A bake-oven having its walls formed of hollow tiles having inner and outer chambers, their outer faces being concave, such tiles being so arranged that the inner chambers of certain of them constitute smoke-flues, the 130 outer chambers of the tiles forming dead-air spaces.



5. In a bake-oven, in combination, a heating-chamber, and a furnace located within such chamber and comprising an ash-box, a grate supported thereby, a pair of bars supported by the side walls of the ash-box and extending back of such box and having an upstanding flange at their outer edges, an arch carried by such bars; such arch inclosing

the grate and extending back thereof to form a combustion-flue, and a floor for such flue. 10

JOHN I. MARSHALL.  
JOHN FAULDS.

Witnesses:

LOUIS K. GILLSON,  
HESTER B. BAIRD.