

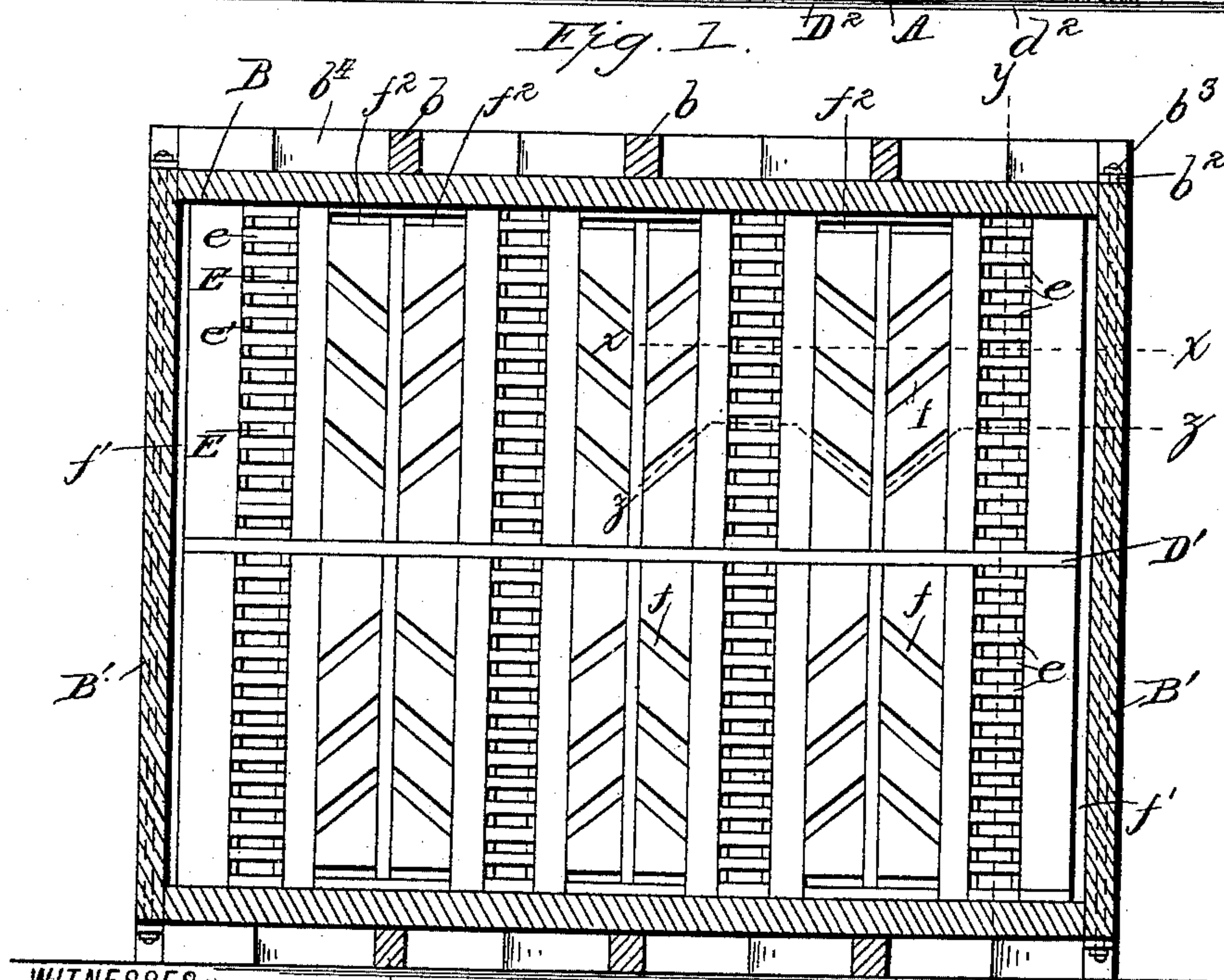
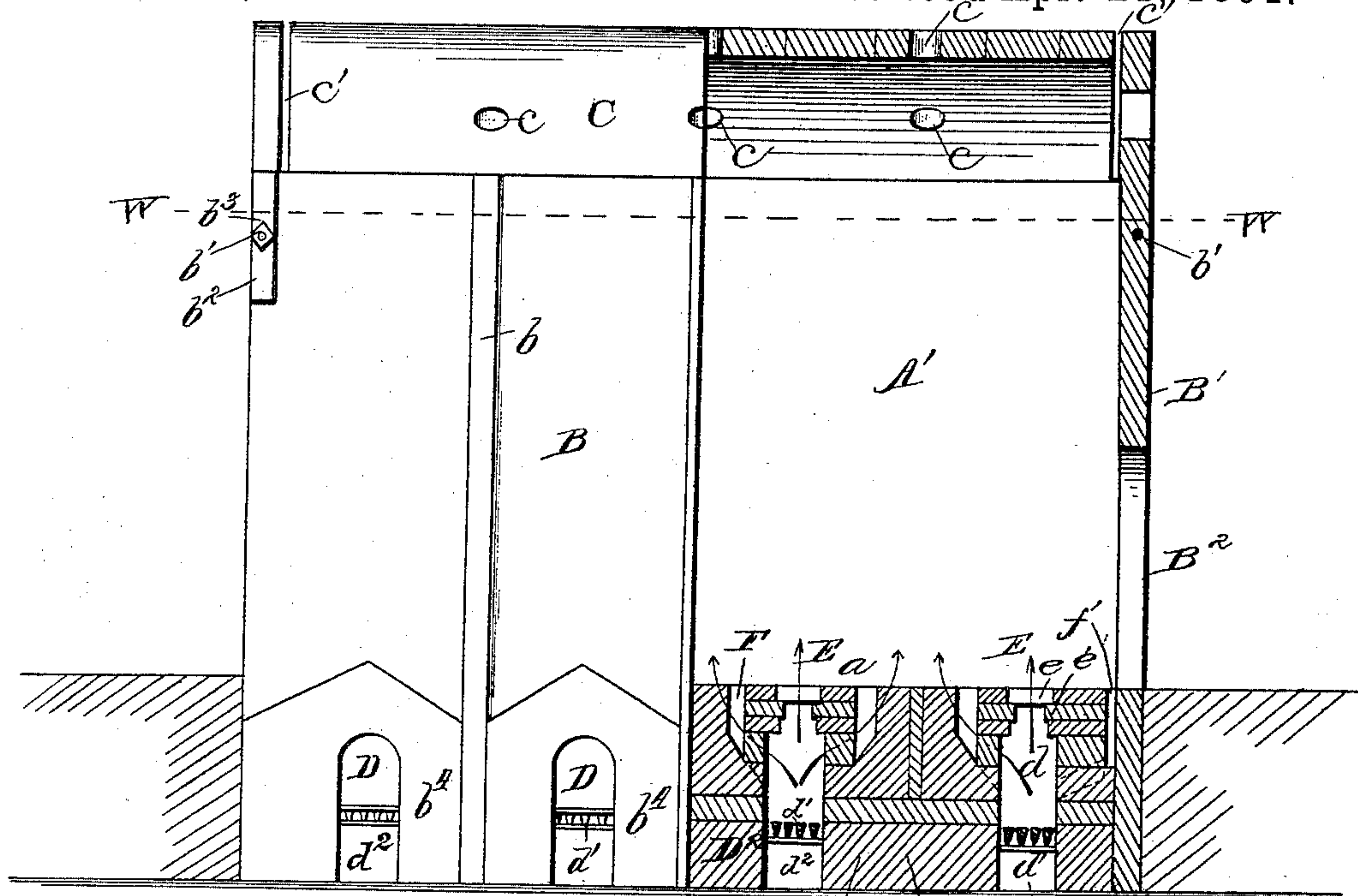
(No Model.)

3 Sheets—Sheet 1.

J. NECZASEK.  
BRICK KILN.

No. 450,772.

Patented Apr. 21, 1891.



WITNESSES:

*A. J. Schwartz*  
*E. B. Clark*

INVENTOR

*Joseph Neczasek*  
BY *Max Engel*  
his ATTORNEY.

(No Model.)

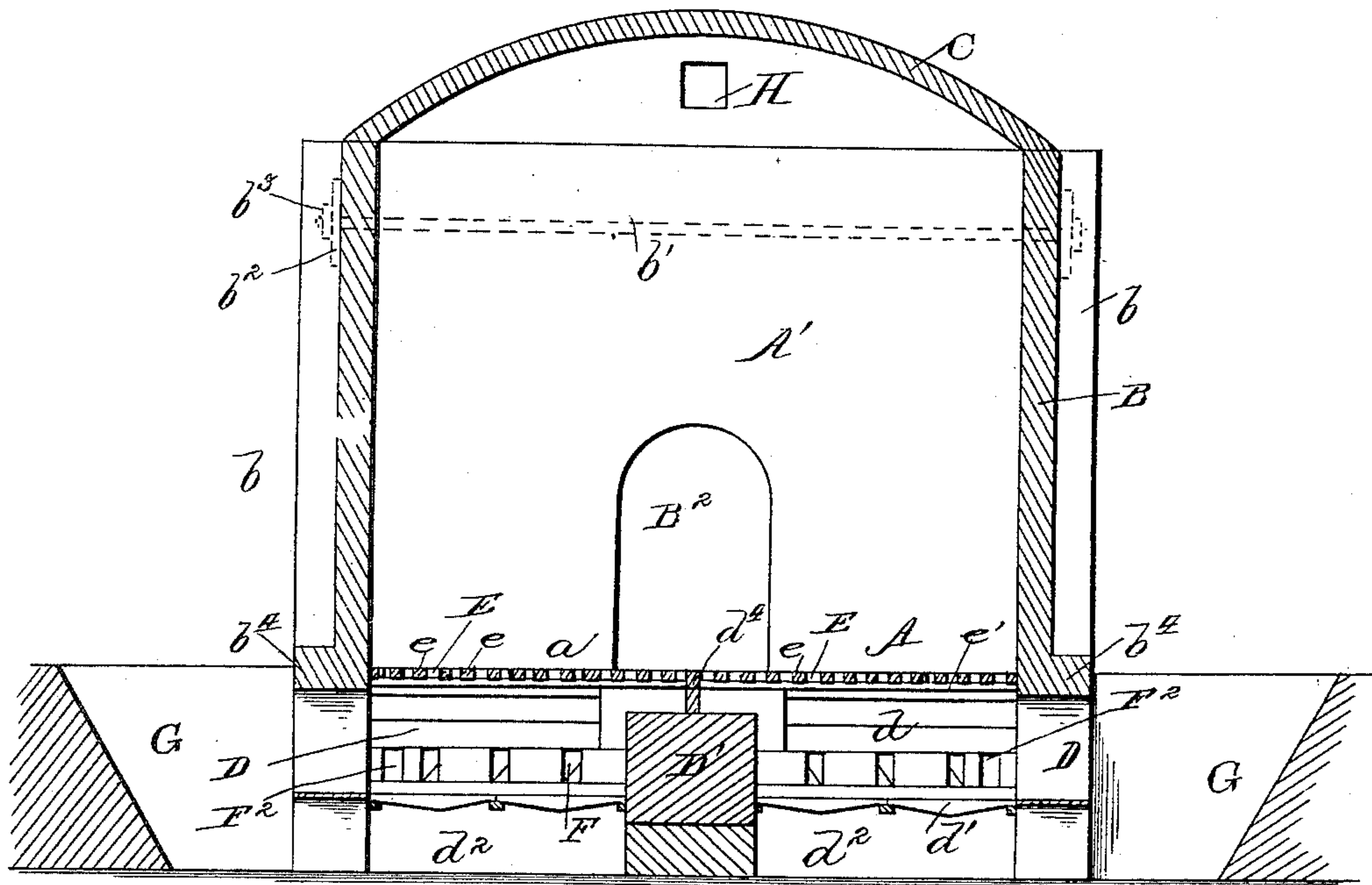
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J. NECZASEK.  
BRICK KILN.

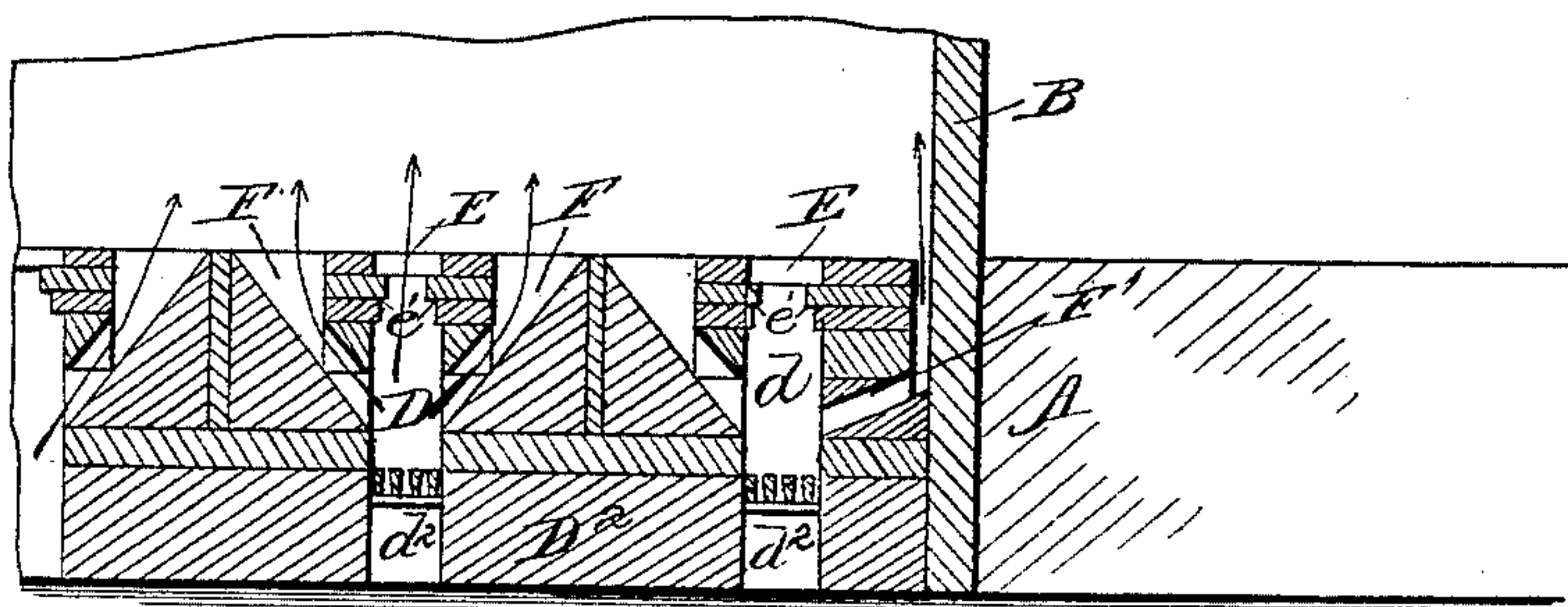
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*Fig. 3.*



*Fig. 4.*



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(No Model.)

3 Sheets—Sheet 3.

J. NECZASEK.  
BRICK KILN.

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Fig. 5.

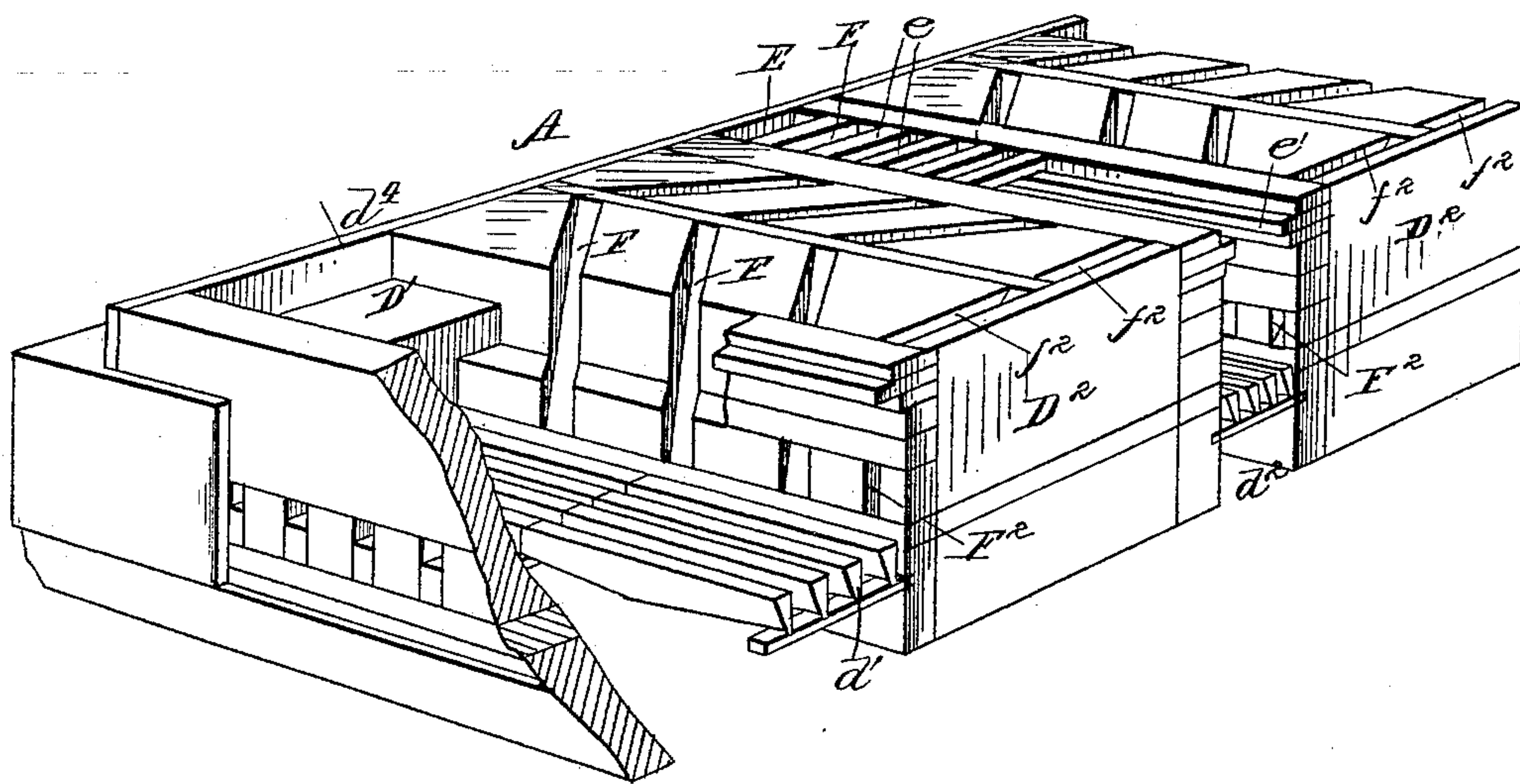
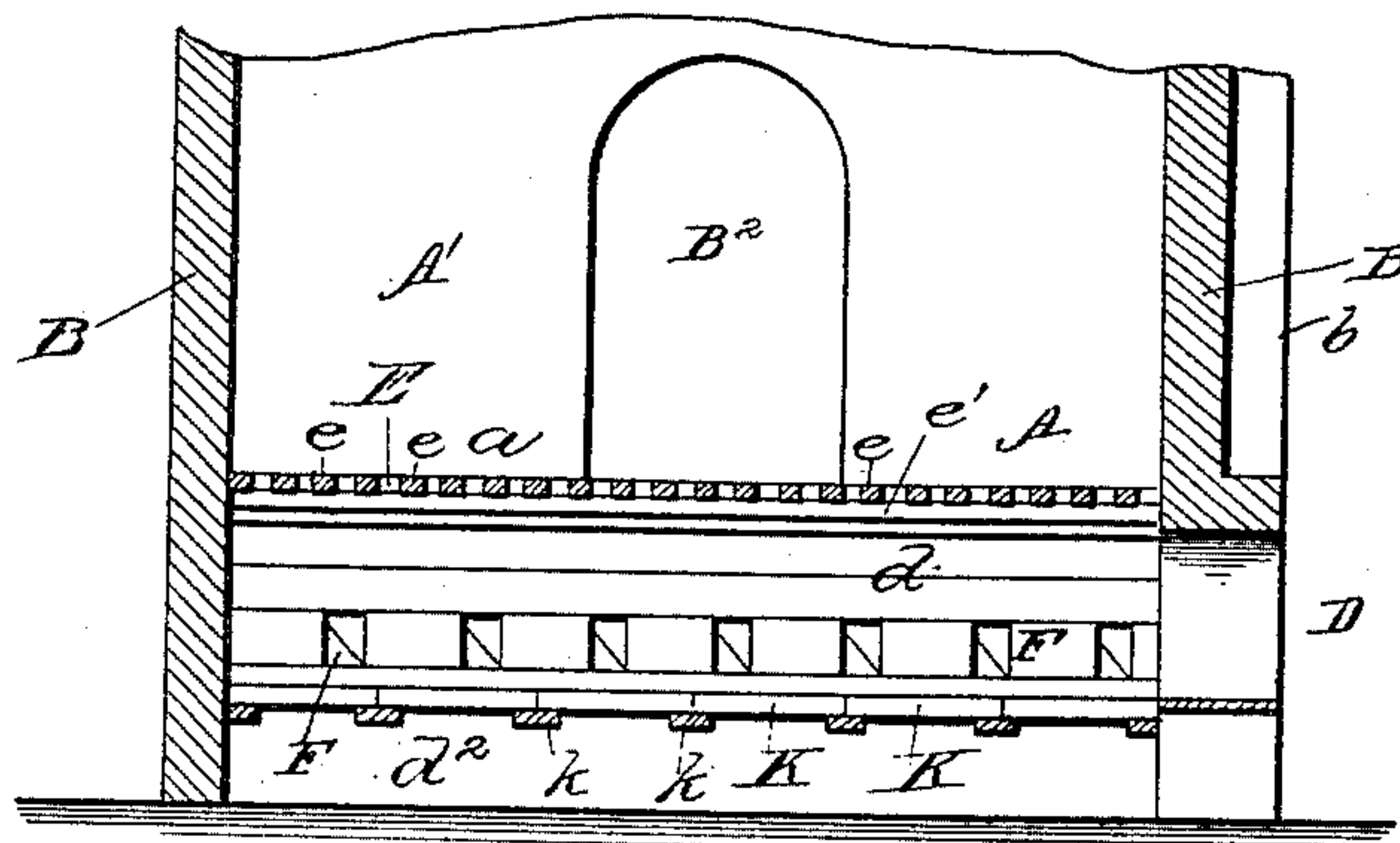


Fig. 6.



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# UNITED STATES PATENT OFFICE.

JOSEPH NECZASEK, OF GALESBURG, ILLINOIS.

## BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 450,772, dated April 21, 1891.

Application filed January 28, 1891. Serial No. 379,434. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH NECZASEK, a citizen of Austria-Hungary, residing at Galesburg, in the county of Knox and State of Illinois, have invented certain new and useful Improvement in Brick-Kilns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to brick-kilns, and mainly to what is known as the "permanent base" of a brick-kiln, whereby is meant a system of furnaces, flues, together with the floor, permanently arranged to receive the pile of bricks to be burned, as contradistinguished from the ordinary arrangement in which such flues, floors, &c., are formed from the bricks to be burned themselves.

It is the object of my present invention to so arrange these furnaces and flues and to so construct the floor upon which the bricks to be burned are to be piled that the greatest economy of heat and of time is effected, while at the same time the heat is evenly distributed over the entire inner space of the kiln so that the bricks will be evenly burned throughout said kiln. It is also my object to so arrange the floor that the kiln may be readily cleaned after the burning has been completed and before introducing a new set of green bricks to be burned.

For this purpose my invention consists essentially in providing the floor of the kiln with preferably-slotted openings communicating with the furnace or other source of heat distributed over the entire floor and at short intervals, which slotted openings are preferably arranged in part directly over the fire-chambers or fire-boxes of the furnaces and in part form the exits of inclined or oblique flues extending from both sides of the furnaces; and my invention, moreover, consists in such further features, details, and combinations of parts as will be set forth below and covered in the claims.

In the accompanying drawings I have shown a brick-kiln embodying my invention in what I consider its preferred form, though the same may be greatly modified without departing from my said invention.

In the drawings, Figure 1 represents a side elevation, partly in vertical longitudinal section on line  $x x$ , Fig. 2; Fig. 2, a sectional plan of the same; Fig. 3, a vertical transverse section on line  $y y$ , Fig. 2; Fig. 4, a section on line  $z z$ , Fig. 2; Fig. 5, a perspective view of a portion of the permanent base with parts broken away to more completely show the arrangement; Fig. 6, a vertical transverse section of a modified form of kiln.

In all the views the same characters of reference are applied to the same parts.

In the drawings, A represents the base of the kiln, and B B' B' the walls thereof, which walls are preferably strengthened in two opposite sides by the piers  $b$ , and which may be further strengthened by props to counteract the strain of the arched roof C, and the expansive or bulging tendency of the flames in the kiln. The walls may be further strengthened by the tie-rods  $b'$  passing through the length of the walls B' and anchor-plates  $b^2$ , between which the walls are clamped at the corners, and which are held in position by the nuts  $b^3$ ; or the tie-rods may be secured in any other convenient or suitable manner.

I preferably arrange the permanent base A of the kiln entirely below the surface of the ground, as shown in Figs. 1, 3, and 4, so as to leave the top or floor  $a$  thereof flush with the same, so as to facilitate the introduction of the green bricks into the kiln and the removal of the burned bricks therefrom through the doorway B<sup>2</sup> by trucks, wheelbarrows, or otherwise. It is in the peculiar construction of this base A in which my invention mainly resides. I preferably arrange a number of furnaces on two opposite sides of the base and located entirely within the kiln and below the kiln proper A' thereof. The furnaces on the opposite sides are separated by the partitions D' of brick or other masonry extending the entire length of the base, as shown, and the furnaces on the same side of the base are separated by the thick partitions D<sup>2</sup>, also of masonry.

The partition-walls D', which are preferably reduced near the top, as shown at  $d^4$ , are of great importance, inasmuch as they prevent the draft from passing through the two abutting furnaces, which would seriously in-



terfere with their operation and the generation of the proper amount of heat in the kiln, especially when sudden gusts of wind should strike the same from one or the other side.

5 These furnaces are formed by the vaulted or arched passages  $d$ , divided at a suitable point by the grates  $d'$  into a combustion-chamber or fire-box and an ash-pit and air-inlet  $d^2$ . The openings for the furnace-doors  
10 are formed in an enlarged or re-enforced portion  $b^4$  of the walls B, in order to add strength to the walls and to remove the furnace-doors away sufficiently from the intense and destructive heat in the interior of the furnaces.  
15 The part of the base A below the grates  $d'$  may be constructed of ordinary brick, but all of the said base above said grates must be made of fire-brick or other material sufficiently refractory to the intense heat of the  
20 furnaces.

The heat and products of combustion are conducted directly from the fire-boxes into the kiln proper A' through a series of straight flues and passages, terminating in preferably  
25 slotted exits distributed at small intervals over the entire floor  $a$  of the kiln and preferably running in different directions, as shown. These passages and flues extend through the top and both sides of each of the arched passages  $d$  at short intervals lengthwise of the  
30 same, as shown best in Figs. 1, 4, and 5. The vertical passages E are preferably formed, as shown, by the arrangement of fire-bricks  $e$ , laid transversely across the vaulted passages  $d$  of the furnaces, and resting on ledges  $e'$ , as  
35 shown. The lateral flues F extend from the fire-boxes or fire-chambers of the furnaces through the side walls of the arched passages  $d$ , and their preferred arrangement is best shown in Figs. 1, 2, 4, and 5. These lateral  
40 flues are inclined upwardly and preferably also laterally inclined toward the middle longitudinal line of the kiln, so as to extend obliquely to the floor and preferably  
45 terminate in enlarged and elongated slotted exits  $f$ . It follows from the preferred arrangement of the flues E and F and slotted exits E  $f$ , that the floor  $a$  presents the appearance of lattice-work, as best shown in Fig. 2,  
50 comprising transverse rows of longitudinally-arranged slots  $e$  alternating with transverse rows of diagonal slots  $f$ . The flues F', extending from the outer walls of the outermost furnaces, are, however, only upwardly inclined  
55 and terminate in a single narrow slot  $f'$  for each end wall B' B', running preferably the entire length of the said end walls B' B' of the kiln-floor. I moreover preferably arrange upwardly but not laterally inclined flues F<sup>2</sup>  
60 in the side walls of the arched passages along the side walls B, as shown, which also terminate in the elongated exits  $f^2$ .

It will be noted that the flues F F' F'' all begin at a point about from six to eight inches  
65 above the grates  $d'$ , so that they will not be choked up by the fuel on the said grates.

This is clearly indicated in the drawings in Figs. 1, 3, 4, and 5.

In order to produce the proper draft, I provide the roof C, which may be arched or otherwise, with the draft-openings vents or chim-  
70 neys  $c$ . These openings are preferably arranged above points midway between adjoining furnaces, as the draft through the passages E might otherwise be so strong as to  
75 interfere with the proper draft through the inclined flues F. I also provide slotted openings  $c'$  between the end walls B' and the roof C, so as to insure a thorough circulation of  
80 hot gases from the slotted openings  $f'$  along these walls and promote the proper burning of the green bricks arranged along these walls.

Inasmuch as the base A is entirely below the surface of the ground, I provide ditches of proper dimensions, extending in front of  
85 the furnace-doors to enable the stokers to attend to the same and large enough to accommodate a suitable supply of fuel.

In the top of the end walls I preferably arrange the ports or openings H, which facilitate the escape of the moisture from the  
90 green bricks in the first stages of the burning.

The operation of the kiln thus described will be manifest from the foregoing. The  
95 bricks are conveyed into the kiln through the doorway B<sup>2</sup> and piled up in the same in the usual or any desired manner, care being taken always that the exits or openings  $e$ ,  $f$ ,  $f'$ , and  $f^2$  are in no way obstructed. When  
100 the kiln has been charged, the doorway B<sup>2</sup> is walled up in the usual way and the fires are started in the furnaces D. The heated products of combustion now pass directly up from the fire-boxes through the vertical and  
105 inclined flues E and F, and are thoroughly and evenly disseminated throughout the entire space of the kiln, whereby a thorough burning of all of the bricks is effected. The hot gases passing up through the slotted openings  $f'$   
110 and  $f^2$  from the inclined flues F' and F<sup>2</sup>, and along the walls of the kiln serve, to remove any chilling effect which the said walls might otherwise have on the bricks arranged in their  
115 proximity, and therefore greatly assist the even burning of all the bricks. My kiln thus solves two problems which have heretofore never been solved together in any kiln within  
120 my knowledge—to wit, the even and sufficient burning of all the bricks and the greatest possible economy of fuel and time.

Two plans of burning have heretofore been principally resorted to. Under the first plan the fire was made directly under the bricks,  
125 which were arranged so as to form vaulted furnaces themselves. Under this arrangement a great saving of time and fuel was effected, it is true; but a great portion of the bricks was overburned, while those arranged  
130 about the sides and top of the kiln were imperfectly burned. Under the second plan the fire-boxes and fire-chambers of the furnaces



were not arranged directly below the bricks, but partly outside of the kiln, and did not extend under the entire kiln. The heated gases were conveyed into the kiln by indirect and tortuous passages and flues, and thereby pretty evenly distributed throughout the kiln; but under this method a great portion of the produced heat was dissipated in passing from the furnace to the kiln, and hence there resulted a great waste of fuel and of time. Under my construction both of the advantages of these two systems are united in one kiln without any of their drawbacks.

With my kiln I am able to burn two charges of green bricks in the time and with the same amount of fuel needed under the best form of kiln known to me to burn one charge.

When the kiln has been in operation for from fifteen to twenty hours and the moisture from the green bricks has passed off, the ports or openings H are walled up and the burning is then continued to completion.

When the burning has been completed, the doorway B<sup>2</sup> is again opened and the bricks are removed. The floor is then swept, and here another advantage of my peculiarly-arranged base arises, inasmuch as all the rubbish and debris may be swept directly into the furnaces through the flues *e* and *f*, and thence pass into the ash-pit *d*<sup>2</sup>, thereby obviating the necessity of carting off such rubbish through doorway H. Another great economy in labor is thus effected. It will be noted, also, that my arrangement of the flues E and F is such that they may be easily cleaned, inasmuch as they are all without bends or elbows and extend straight down from the floor into the fire-boxes or fire-chambers of the furnaces. The bricks *e* are preferably laid loosely on the ledges *e'*, so as to be easily removed to obtain access to the furnaces below and replaced when injured in any way.

In Fig. 6 I have shown a modified form of kiln, which differs from the one already described in dispensing with the grates *d'* in the furnaces and substituting in their stead a bank of bricks K, laid over the transverse iron bars *l*, as shown. In this form the kiln may be used to burn with wood as a fuel, while the form of kiln shown in the remaining figures is designed for burning coal.

The kiln represented in Fig. 7 also differs from that first described, in that the furnaces therein extend from one side only and entirely through the base. In other respects the construction is identical with that already described.

While I have herein shown the floor of a brick-kiln having rows of longitudinally-ar-

anged openings alternating with rows of diagonally-arranged openings, either alone or in connection with a roof provided with vents between the rows of longitudinally-arranged openings, I do not wish to be understood as claiming such features in this application, inasmuch as I propose to claim the same in my application, Serial No. 386,771, filed March 28, 1891; nor do I desire to herein claim a kiln having furnaces arranged directly below the floor and provided with ledges, as *e'*, in combination with bricks laid transversely at intervals, either loosely or permanently, to form vertical openings between the furnace and the kiln, although these features are shown and described in this application, inasmuch as I propose to claim these also in the said other application.

It is manifest that the kiln hereinbefore described may be modified in many particulars without departing from my invention. I do not, therefore, desire to be confined to the precise details shown and described.

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

1. In a brick-kiln, a base comprising a series of furnaces whose fire-chambers are arranged directly below the floor of the kiln and provided with vertical flues extending directly upward to the floor and upwardly and inwardly inclined flues extending obliquely from both sides of the furnaces to the floor, substantially as set forth.

2. In a brick-kiln, a base comprising a series of furnaces arranged directly below the floor of the kiln, the outermost furnaces being provided at their outer walls with upwardly-inclined flues, in combination with a single narrow slot, as *f'*, running along the end walls of the kiln, substantially as set forth.

3. In a brick-kiln, the combination, with a base comprising a series of furnaces and upwardly-inclined flues for conveying the heated gases up along two opposite walls of the kiln, of a roof having slots extending along the said walls, substantially as set forth.

4. In a brick-kiln, the combination, with a base comprising furnaces and upwardly-inclined flues extending from the outer walls of the outer furnaces to a slotted exit running the length of two opposite walls, of a roof having slotted openings over the aforesaid slotted exits, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH NECZASEK.

Witnesses:

E. B. CLARK,  
D. G. STUART.