

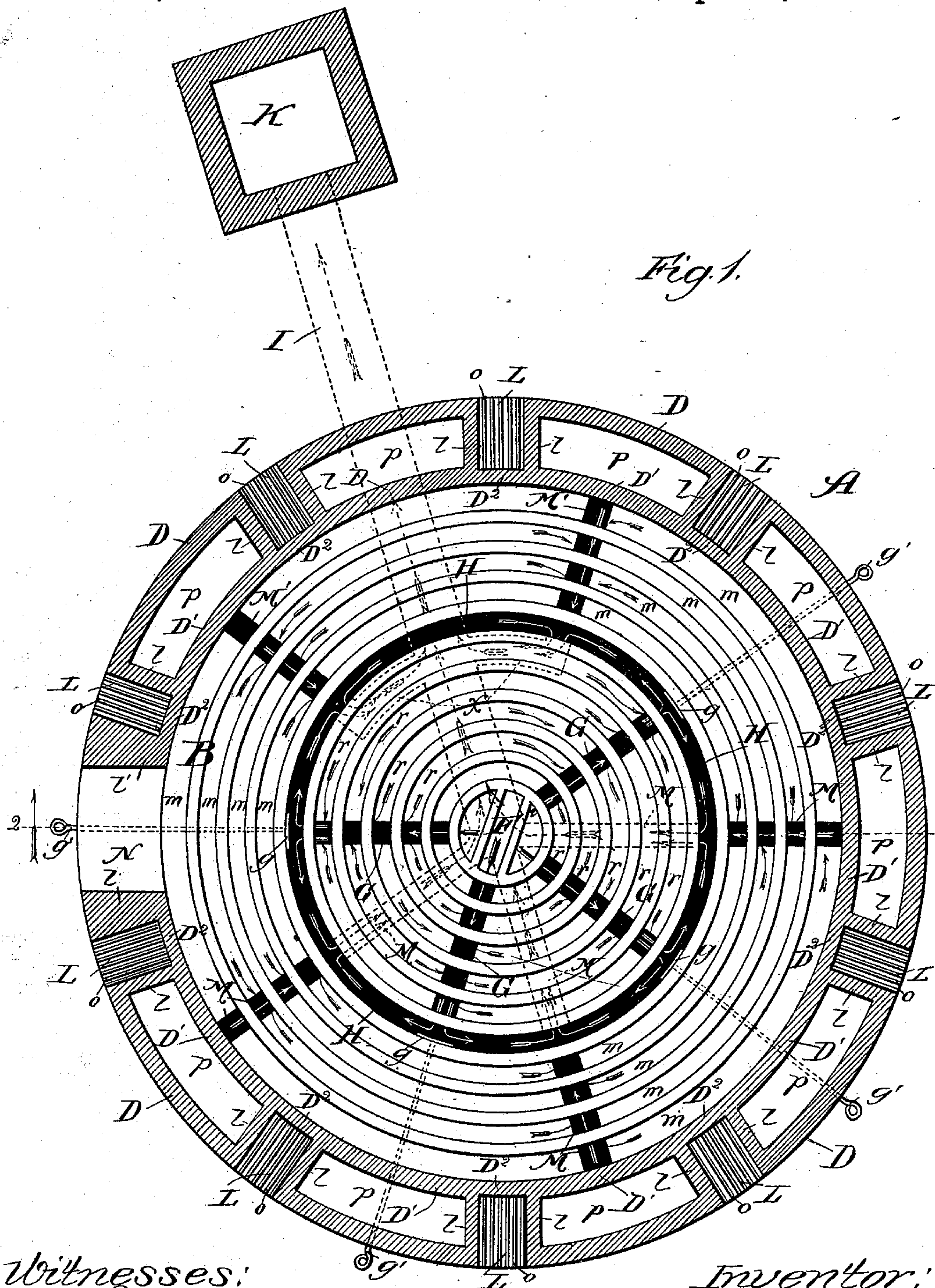
(No Model.)

2 Sheets—Sheet 1.

E. VON OVEN.  
BRICK KILN.

No. 402,369.

Patented Apr. 30, 1889.



Witnesses:  
Chas. Gaylord,  
J. H. Dyrenforth.

Inventor:  
Ernest von Oven,  
By Dyrenforth & Dyrenforth  
Attys—



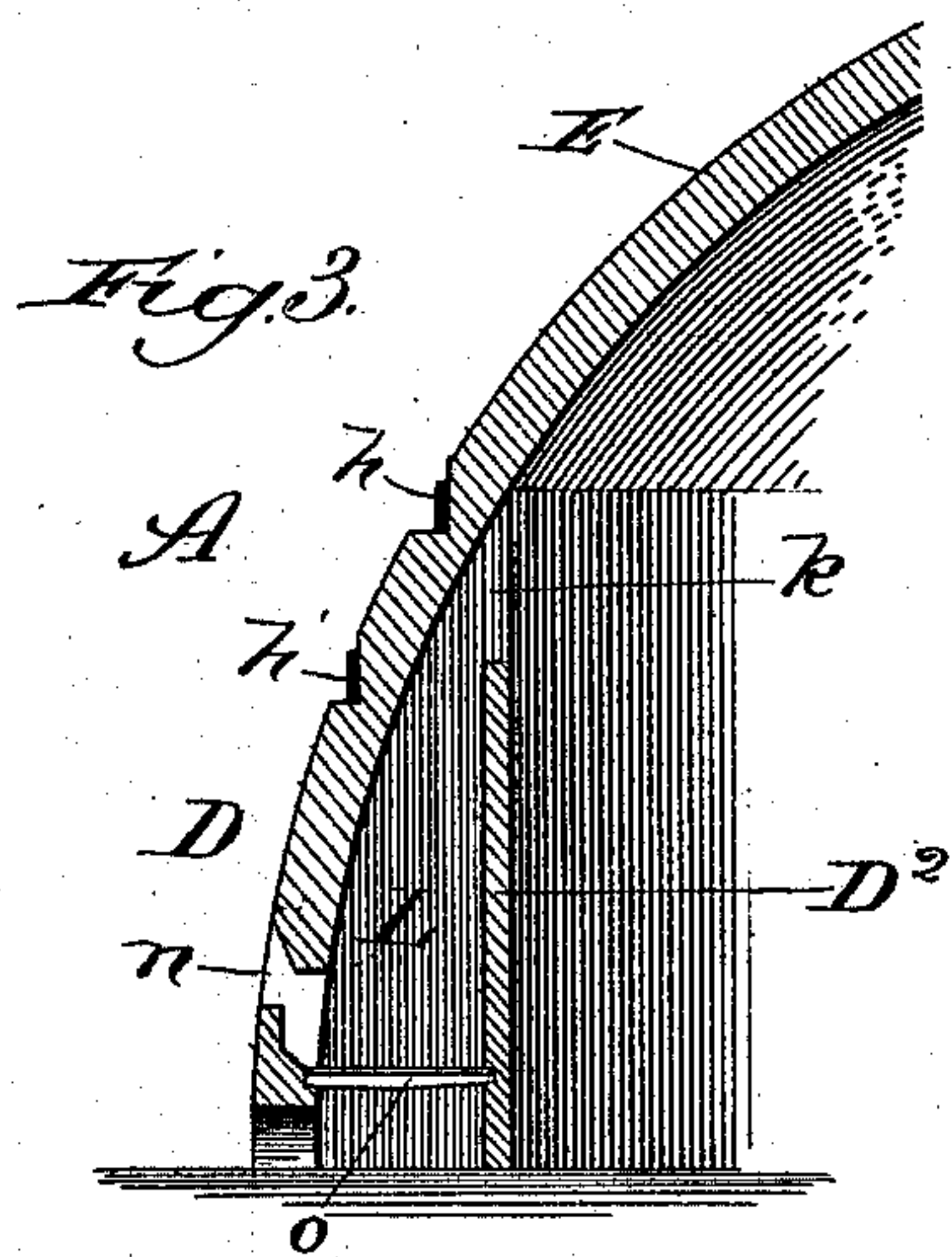
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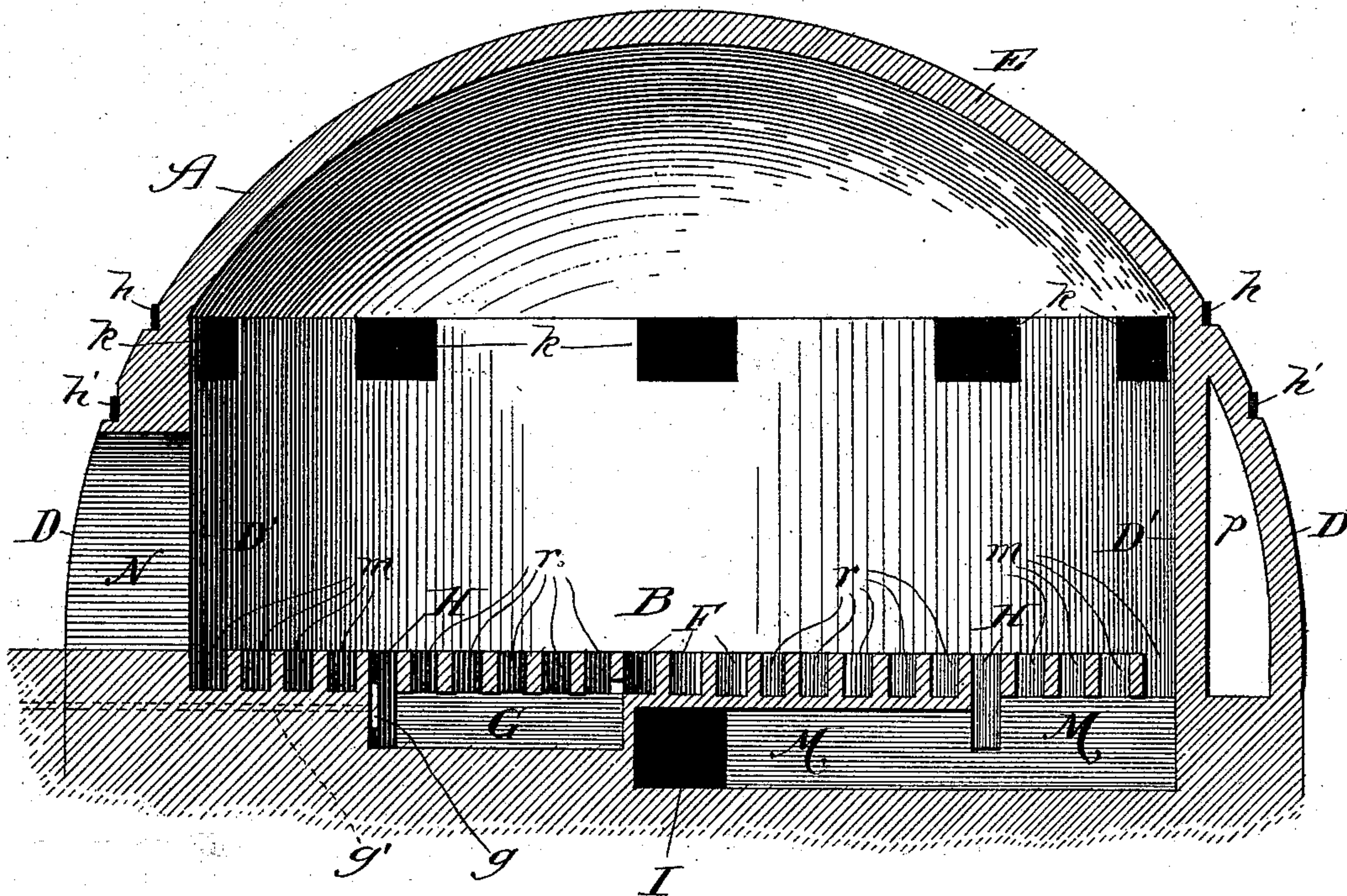
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*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

ERNEST VON OVEN, OF NAPERVILLE, ILLINOIS.

## BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 402,369, dated April 30, 1889.

Application filed December 20, 1888. Serial No. 294,161. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST VON OVEN, a citizen of the United States, residing at Naperville, in the county of Du Page and State of Illinois, have invented a new and useful Improvement in Kilns, of which the following is a specification.

My invention relates to an improvement in the class of kilns employed for burning brick, tile, and the like; and it relates more particularly to the class known as "downdraft" kilns.

One object of my invention is to afford a construction of the kiln-bottom whereby an even or substantially even distribution of the heat through the entire material to be burned may be obtained, thereby to overcome the unequal burning incident to many constructions of kiln at present in use, wherein the distribution of heat is so uneven as to prevent proper burning of large portions of the material.

A further object is to improve the construction of the part of the kiln which extends above the bottom, thereby to increase its capacity and strengthen the structure to an extent that will reduce the extent of binding ordinarily employed in kiln structures for strengthening purposes and render possible material simplification in the construction, besides affording other improvements hereinafter set forth.

In the accompanying drawings, Figure 1 is a sectional plan view taken above the floor-level, showing the kiln-bottom, and representing by full and dotted lines the arrangement of flues, whereby the draft is so controlled as to produce the desired even distribution of heat within the kiln, and showing the chimney with which the flues communicate; Fig. 2, a vertical section through the entire kiln, taken at the line 2 of Fig. 1 and viewed in the direction of the arrow, the section showing besides my improved construction of the kiln-bottom that of the structure above the bottom; and Fig. 3, a broken sectional view showing a detail of construction.

A denotes the entire kiln, comprising a bottom, B, which is formed in the ground and surmounted by an open floor, (not shown,) on

which the material to be burned is piled, brick walls D, and a brick crown, E.

As shown, and hereinafter described, the structure is round, though my improved bottom is equally applicable to angular forms of kiln.

To construct the bottom B, a series of flues,  $r$ , concentric in a round kiln, (fewer or more than shown, as desired,) are formed in the ground around a center, F, and all intercommunicate through radial passages formed in their bases (which should be on or about the same plane) and afford transverse flues G, which enter a flue, H, surrounding the outermost flue of the series, and which should be deeper than the latter. I is the main flue, which leads radially across the kiln-bottom and through the wall D to the chimney K, from or from near the center of the bottom B, underneath the series of flues already described as surrounding the center F, with which it has no direct communication, and underneath the flues, hereinafter described, surrounding the said series of flues  $r$ .

The flue H is surrounded by a desired number of flues,  $m$ , of about the same depth as the flues  $r$ , and each leading at different points into the main flue I, through radial passages M and M', each extending from the inner side of the wall D near its base into the flue I. The flues M all extend radially to the center of the bottom, where they meet the inner end of the main flue, while the flues M' extend part way straight toward the main flue near the middle of its length, whence they branch, as shown at  $x$ , into it to enter it in the direction of the current of the products of combustion in passing toward the chimney, thereby to avoid impediment to the current from the flues M, as would obviously be produced were they to run straight into the sides of the main flue. The flues  $m$  and H all open at their bases into the flues M and M', which, however, do not communicate with the flues  $r$  through their bases, but pass underneath the latter to the main or outlet flue; and it will be noticed that the flues M and M' are located between the radial flues G, whereby the latter must communicate with them indirectly through the deep flue H.



No floor is shown in the drawings, as it might tend to produce confusion and involves no new features of construction, being formed in the usual manner by laying fire-brick provided with openings between them.

The wall D is of novel construction. It extends from a level between the top and base of the bottom B, vertically, or nearly so, to or somewhat beyond the surface of the ground, whence it inclines by curving, as shown, to the line from which the crown E extends, and inside the wall D is a wall, D', preferably vertical, as shown, forming the inner side of the wall D, and which meets the latter at or near the junction therewith of the crown. Thus the outer wall and crown form substantially a hemisphere, thereby rendering the structure sufficiently strong to cause it to be practically self-supporting, and, as a consequence, reducing to the minimum the number required of the strengthening-bands hereinafter described; and a space straight on its inner side, and curving upward and inward on its outer side, is provided between the walls D and D', which is divided off by brick walls *l* at intervals to form fire-chambers L, and by thicker walls, *l'*, to form the door-opening N to the kiln.

The fire-chambers should be lined on their opposite lateral sides with fire-brick and provided at their outer sides, above the grates *o*, if the latter be used, with chutes *n*, at which to introduce the fuel, and the inner sides of the fire-chambers may, in building the wall D', be left open, and subsequently closed up by piling fire-brick D<sup>2</sup>, whereby the fire-chambers may be readily renewed when burned out by removing the fire-brick and replacing it with new without disturbing the brick-work of the kiln. At the top of each fire-chamber is left, in the construction, an opening, *k*, Fig. 2, through which the products of combustion enter near the top of the kiln and are drawn down by the draft produced with the arrangement of flues in the kiln-bottom B, in the manner hereinafter described.

If desired, the spaces between the walls D D' and defined by the walls *l l'* may be filled with sand or other suitable material; or they may be left unfilled (the structure being sufficiently strong with them empty) to afford air-spaces which will tend to prevent loss of heat from the interior by conduction.

The crown E may be formed in the usual manner; but the broad foundation afforded by the double wall D D' obviates the necessity of strengthening with more than the two hoops or bands *h* and *h'*, which should be provided, as shown, respectively, near the plane at which the crown joins the wall structure and near the plane of junction of the walls D and D'. Thus the structure is rendered sufficiently strong without requiring any band to encircle its lower part where it would be required on the plane of the door-opening, at which it would give rise to inconvenience.

By the construction of the kiln thus described the fire-chambers L do not, as ordinarily in downdraft kilns, project beyond the inner surface of the wall, but are flush with the latter and materially increase the capacity of the kiln, and the arrangement of the flues in the bottom B is such, as quite extensive use of my improvement has demonstrated, that the heat is distributed evenly throughout the entire contents of the kiln.

If for any reason the heat in the center of the kiln should ever require to be controlled to reduce it, and thereby also lead the products of combustion more to the sides of the material being burned, I provide dampers *g*, supported in the deep flue H, adjacent to the radial flues G, and controlled by rods *g'*, extending horizontally from them through the structure, whereby sliding of the rods will force the dampers against the outlet-openings into the flue H of the flues G and thereby practically shut off the central part of the kiln from the surrounding part, this operation being, however, to a material extent normally produced by the intervening deep flue H between the series of flues *r* and *m*.

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

1. In combination with the superstructure of a kiln for burning brick, tile, and the like, a kiln-bottom, B, having a series of flues, *r*, a series of flues, *m*, and an intervening flue, H, into which the flues *r* lead, a main flue, I, in the base of the bottom B and forming the ultimate outlet for the products of combustion, and flues M, communicating directly with the flues *m* and extending below the flues *r* into the main flue I, substantially as described.

2. In combination with the superstructure of a kiln for burning brick, tile, and the like, a kiln-bottom, B, having a series of flues, *r*, a series of flues, *m*, and an intervening flue, H, flues G, extending radially from near the center of the kiln into the flue H and communicating directly with the flues *r*, a main flue, I, in the base of the bottom B and forming the ultimate outlet for the products of combustion, and flues M, extending radially from near the wall of the kiln between the flues G into the main flue below the flues *r* and communicating directly with the flues *m*, substantially as described.

3. In combination with the superstructure of a kiln for burning brick, tile, and the like, a kiln-bottom, B, having a series of flues, *r*, a series of flues, *m*, and an intervening deeper flue, H, flues G, extending radially from near the center of the kiln into the flue H and communicating directly with the flues *r*, a main flue, I, extending from near the center of the base of the bottom to the chimney K, flues M and M', extending radially from near the wall of the kiln between the flues G into the main flue below the flues *r* and communicating directly with the flues *m*, and lateral



branches  $\alpha$  on the flues  $M'$ , substantially as described.

4. In a kiln for burning brick, tile, and the like, the superstructure comprising an outer  
5 wall, D, and crown E, forming together, substantially, a hemisphere, an inner wall,  $D'$ , joining the outer wall near its junction with the crown, and fire-chambers L, formed at in-

tervals between the walls D and  $D'$  and opening at their upper ends into the kiln, substantially as and for the purpose set forth. 10

ERNEST VON OVEN.

In presence of—

M. J. BOWERS,

J. W. DYRENFORTH.