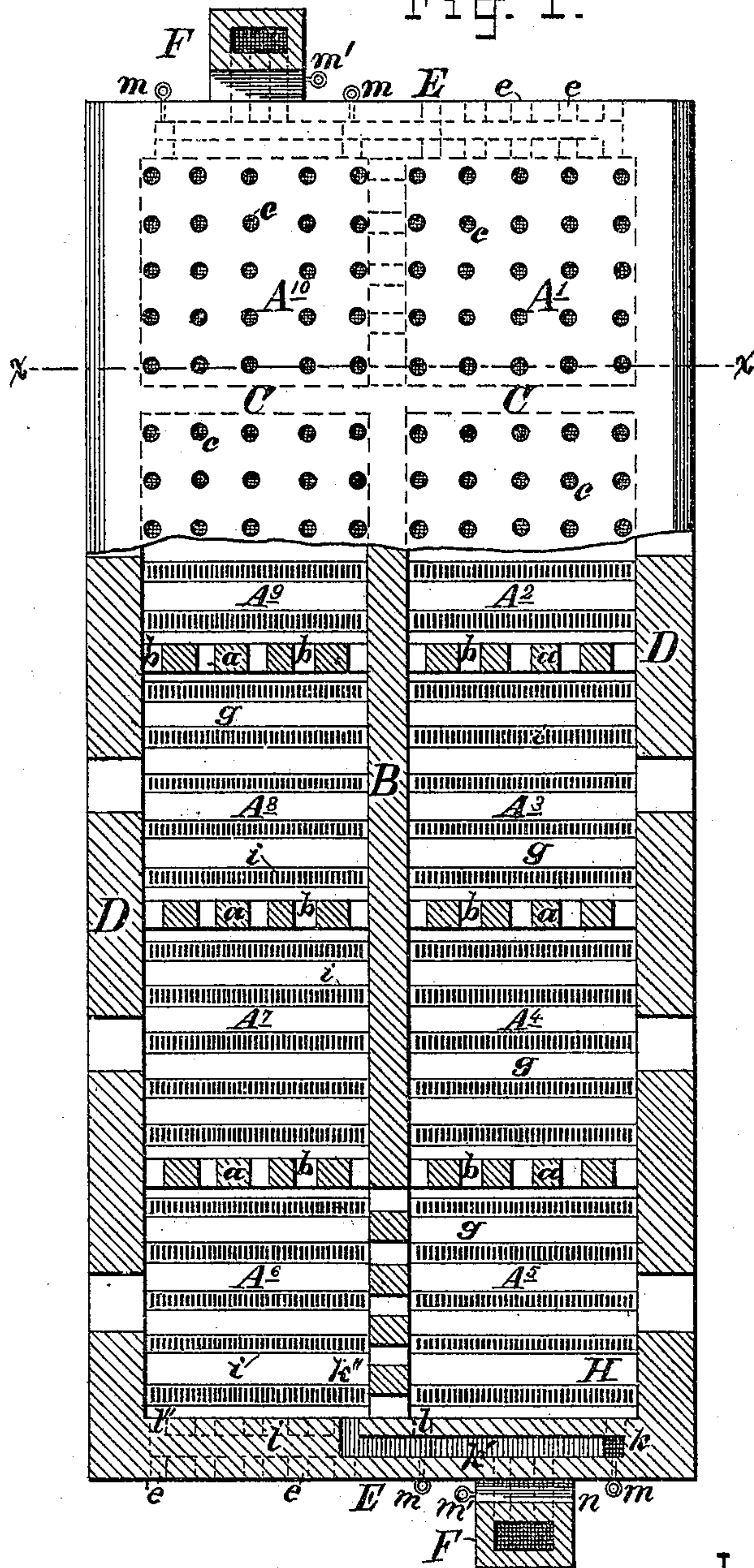


A. MORAND.  
BRICK-KILN.

No. 175,729.

Patented April 4, 1876.

Fig. 1.



Witnesses:

Arthur C. Fraser.

Thomas Keigham

Inventor:

Augustus Morand,

By his Attorneys,

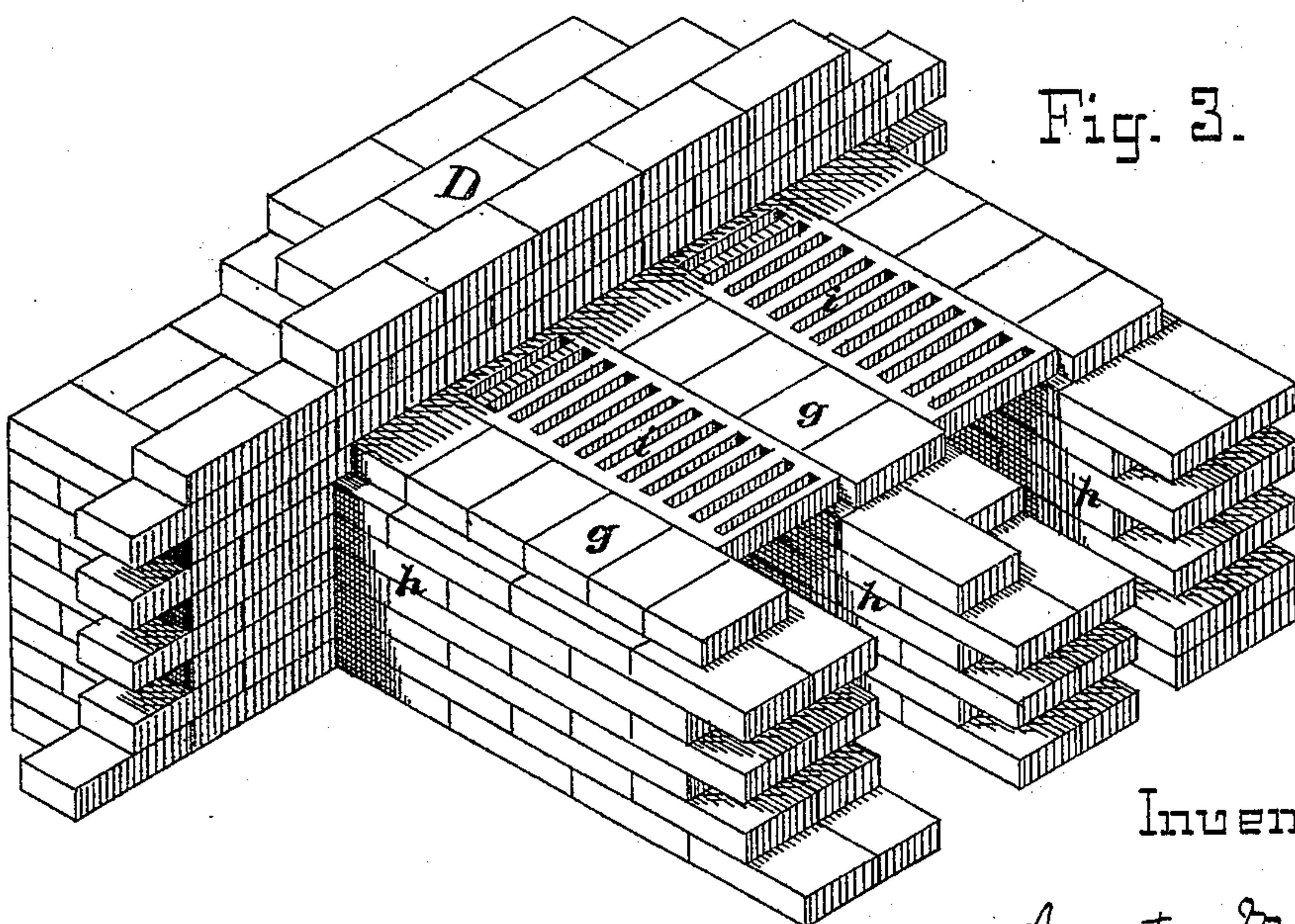
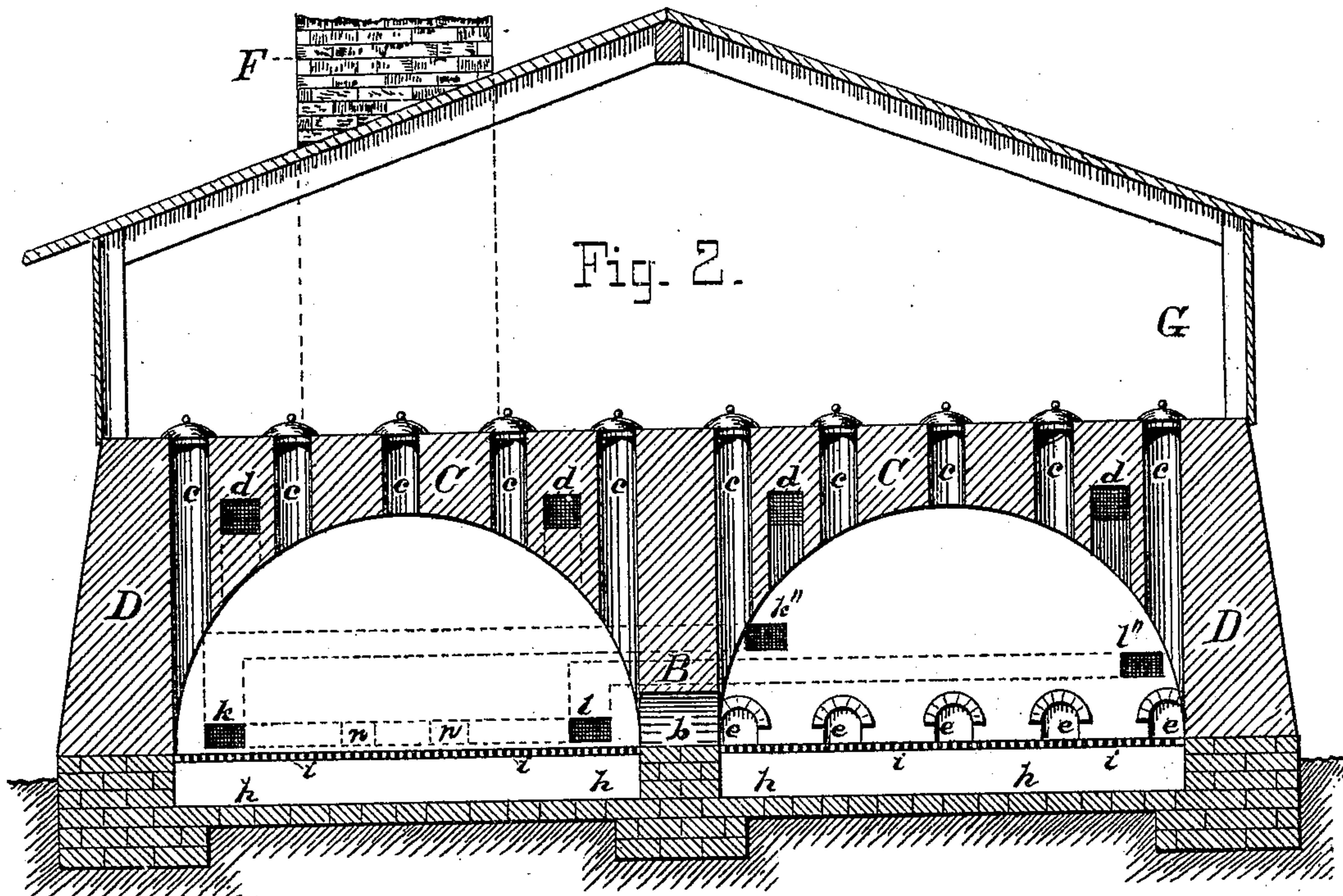
Burke & Fraser.



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Burke & Fraser



# UNITED STATES PATENT OFFICE.

AUGUSTUS MORAND, OF GERMANTOWN, PENNSYLVANIA.

## IMPROVEMENT IN BRICK-KILNS.

Specification forming part of Letters Patent No. 175,729, dated April 4, 1876; application filed January 5, 1876.

*To all whom it may concern:*

Be it known that I, AUGUSTUS MORAND, of Germantown, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Kilns for Drying and Burning Bricks, and other wares and materials, of which the following is a specification:

This invention relates most particularly, but not entirely, to that class of kilns characterized as perpetual or continuous, the object being the better regulation of the draft, and the avoidance of choking from accumulation of ashes. It is an improvement on the kiln patented by me on the 28th of December, 1875, and it will be necessary to the better understanding of what I now desire to claim to describe in a general way the kiln illustrated in said patent.

In the drawings, Figure 1 is a plan of a kiln embodying my invention. Fig. 2 is an enlarged transverse section of the same taken in the plane of the line *x x* in Fig. 1. Fig. 3 is an enlarged perspective detail, clearly showing one of the features of my invention, which will be hereinafter fully described.

The kiln herein shown may be operated continuously, if desired. It consists of two parallel rows of chambers,  $A^1$  to  $A^{10}$ , each chamber being separated from that adjacent by a partition-wall, *a*, perforated with openings *b b*, the two tiers or rows being separated by a central partition, *B*, and housed in by a continuous arched roof and wall, *C*.

*D D* are side walls; *E E*, end walls. *F F* are chimneys. *c c* are stoking-holes. *d d* are longitudinal flues constructed in the haunches or crowns of the arches, and opening into the chimneys and chambers. *e e* are fire-places, and *G* is a temporary structure to protect the workmen.

So far as above described the kiln does not differ from that shown in my patent of December 14, 1875, before mentioned.

The present invention consists in providing pits sunk in the floors of the chambers and covered with gratings or perforated plates, the said pits extending transversely between the side walls, or longitudinally between the walls *a a*, not open to the outer air, and situated directly beneath the rows of stoking-holes, as will be hereinafter described.

Another feature consists in constructing flues in the end walls for communication between the pairs of chambers at the ends, in the manner and for the purposes to be hereinafter described.

Heretofore, in constructing kilns of this character, it has been customary to make the floor *g* uniform, solid, and continuous, and to stack the green bricks and materials thereon so as to leave an area or tubular space beneath each stoking-hole *c*. The coal or other combustible charged through the stoking-holes was liable to collect, partially burned, in the said tubular spaces, become mixed or clogged with ashes, and prevent the adjoining bricks from being properly burned. To obviate this I sink cavities or recesses *h h* in the floor, or construct them in building the floor, preferring to build them as shown in Fig. 3. The stoking-holes *c c* being arranged in rows, either transversely or longitudinally, beneath each row is sunk a recess, *h*, extending, preferably from side wall to side wall, but not opening into the outer air, as that would disarrange the operations, and defeat the objects to be attained by this form of kiln. I cover these recesses with gratings *i i*, or some perforated refractory material, as shown. The green wares may be stacked in the chambers, as described above, and the combustibles will fall upon the gratings. Should the fuel cake or tend to accumulate in the tubular spaces a suitable poker may be inserted from above and the mass be stirred, by which means the ashes are separated from the same and fall through the gratings into the recesses or pits.

After the burned wares are removed from the chamber, the grates may be lifted and the ashes removed. By this means the fires are kept clean and free from ashes, and the wares burned uniformly from bottom to top. Heretofore, in the operation of kilns of this class, it has been customary to commence drying and burning with the chamber  $A^1$ , carry it on through the intermediate chambers to  $A^5$ , and then pass the products of combustion, hot air, &c., through the openings *b b* in the central partition *B* to the chamber  $A^6$ . From thence the operation was carried back through the intermediate chambers to  $A^{10}$ , and then to  $A^1$  again, so as to be continuous. Es-



tablishing communication between chambers  $A^5$  and  $A^6$  and  $A^{10}$  and  $A^1$ , through the partition B, is found to so deflect the heated gases, &c., as to leave the wares in the outer corners H of chambers  $A^5$  and  $A^{10}$ , and to some extent in  $A^6$ , in an imperfectly burned condition. In my present invention I obviate this defect in the operation by constructing the flues which establish communication between the adjoining end chambers  $A^5 A^6$  and  $A^{10} A^1$  in the end walls E E of the kiln. The precise arrangement of these flues is not important, but I prefer that herein shown, which I will now describe. As each end of the kiln is constructed and arranged alike, it will only be necessary to describe one end.

In the chamber  $A^5$  will be seen a flue,  $k$ , near the floor, which passes in and up, opening into a horizontal flue,  $k'$ , which terminates with a flue,  $k''$ , opening into chamber  $A^6$ . Another flue,  $l$ , in chamber  $A^5$ , also near the floor, opens into a horizontal flue,  $l'$ , which terminates in a flue,  $l''$ , in chamber  $A^6$ . The location and direction of these several flues are indicated, partially in dotted lines, in Figs. 1 and 2. They are provided with suitable dampers  $m m$ . The flues  $k$  and  $l$  are connected by means of a horizontal flue, as clearly indicated by dotted lines in Fig. 2, and from this flue another flue or flues,  $n$ , passes into the chimney F, being controlled by a damper,  $m'$ .

By arranging the communicating flues in the end walls, as herein shown, the heated gases, &c., are carried directly through the terminal chambers, instead of being deflected to one side, and the charge of wares in said chambers will be as thoroughly and uniformly burned as those in the intermediate chambers. As the heated gases tend to accumulate in the

upper part of the chambers I prefer to place the flues as near the bottom as possible.

When it is desired to temporarily increase the capacity of the kiln to meet an urgent demand, all communication between the two sides of the kiln may be cut off, and fires started simultaneously in chambers  $A^1$  and  $A^6$ . The dampers  $m' m'$  must be also thrown open.

The longitudinal flues  $d d$ , shown in Fig. 2, are constructed and arranged to operate as described in my former patent, and will require no further description here.

Any number of chambers may be used, of course, although but ten are shown here.

I claim—

1. In a kiln, the combination of the stoking-holes  $c c$ , with the pits or recesses  $h h$  arranged directly below them, and the gratings or perforated coverings  $i i$ , all constructed and arranged to operate in the manner substantially as herein specified.

2. The arrangement, in a continuous kiln having parallel rows of chambers, of a communicating flue or flues between the pairs of terminal chambers in the end walls E E, substantially as represented, so that the current of heated gases, &c., will pass directly through said chambers in a plane parallel to the longitudinal axis of the kiln, in the manner substantially as herein shown and specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

AUGUSTUS MORAND.

Witnesses:

ARTHUR C. FRASER,  
HENRY CONNETT.