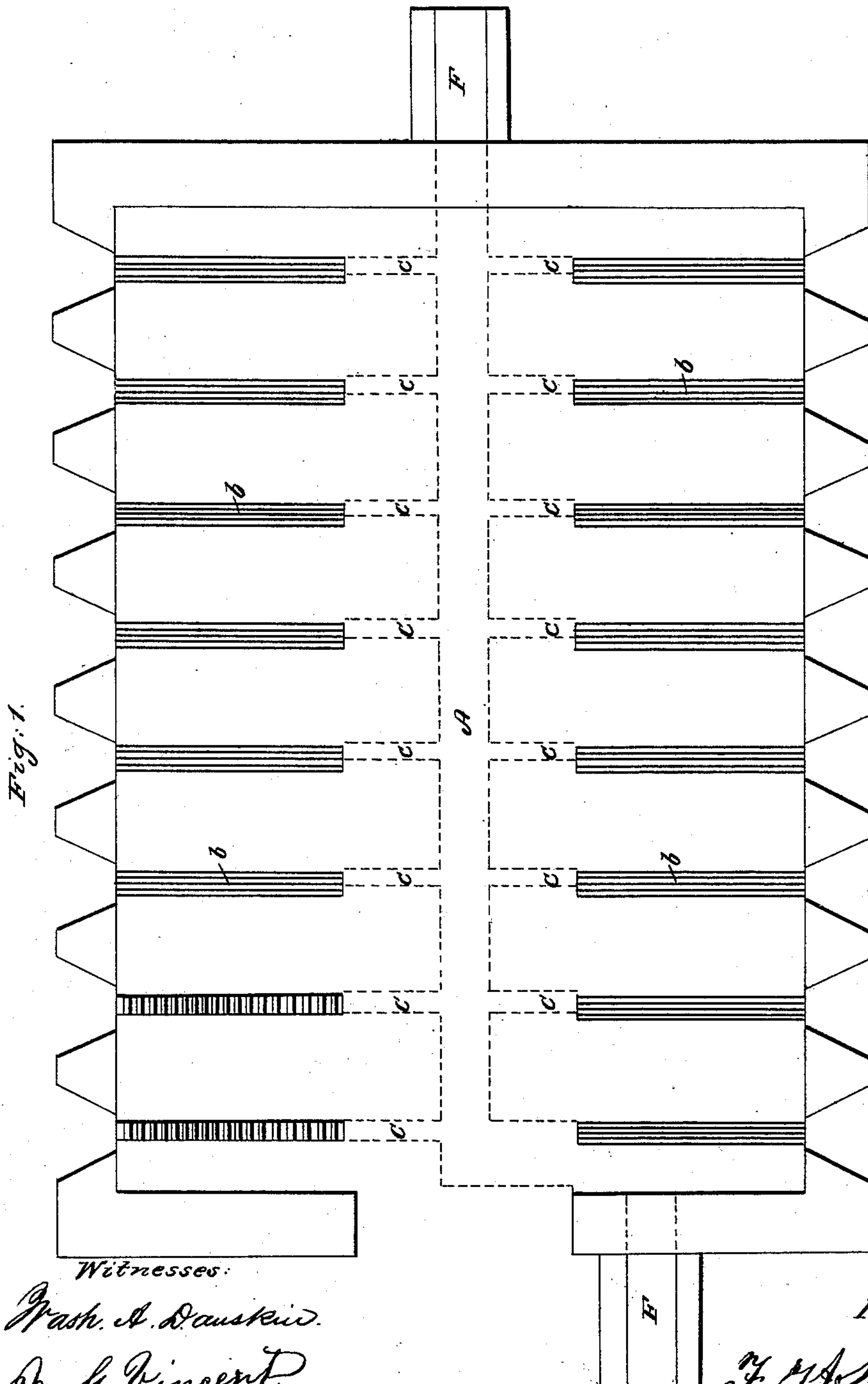


F. H. SMITH.

Brick Kiln.

No. 58,146.

Patented Sept. 18, 1866.

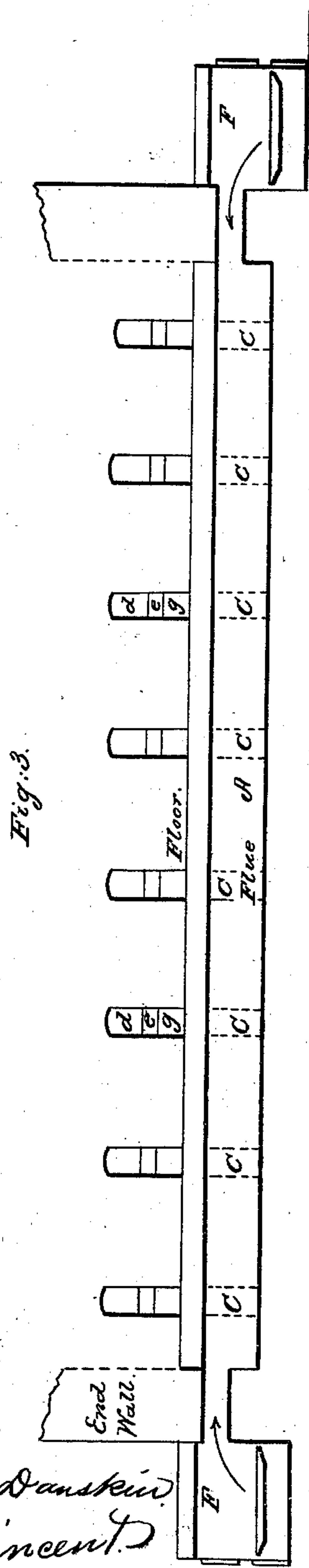


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Patented Sept. 18, 1866.



Witnesses:
Wm. A. Danstien
Chas. E. Vincent

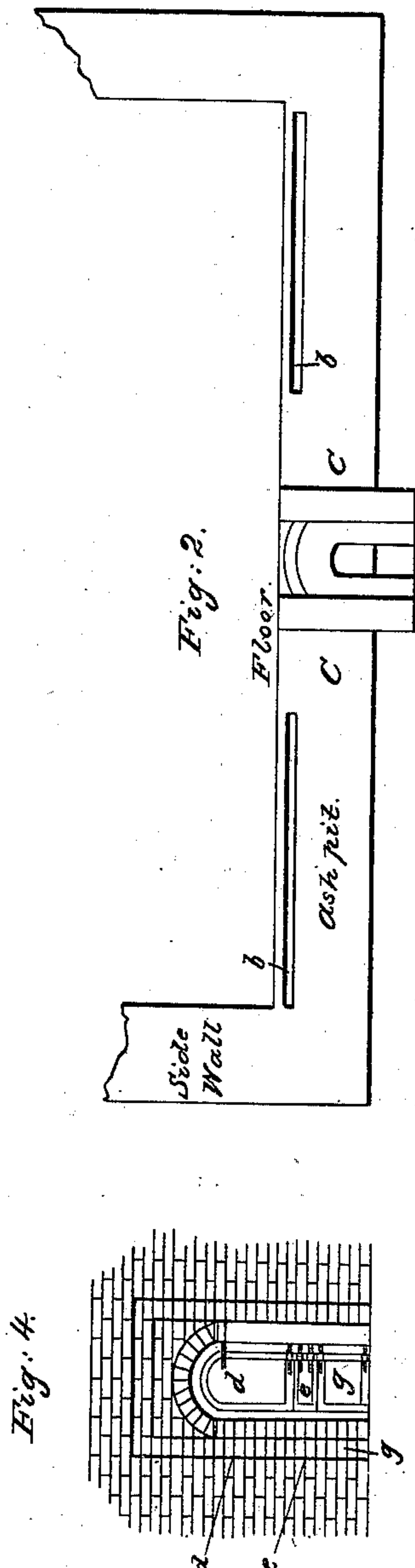
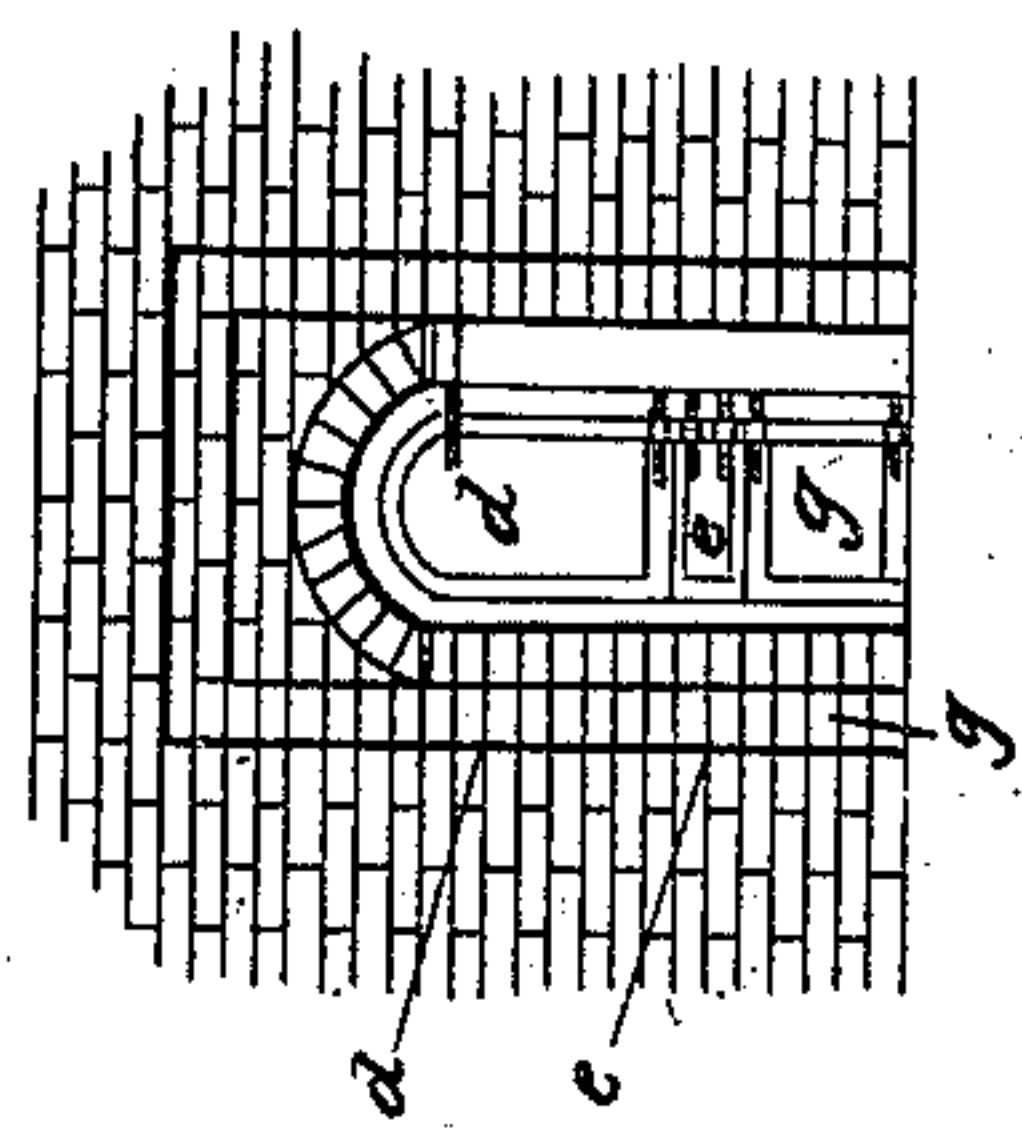


Fig. 4.



Inventor:
F. H. Smith.

UNITED STATES PATENT OFFICE.

FRANCIS H. SMITH, OF BALTIMORE, MARYLAND.

IMPROVED BRICK-KILN.

Specification forming part of Letters Patent No. 58,146, dated September 18, 1866.

To all whom it may concern:

Be it known that I, FRANCIS H. SMITH, of the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in the Modes of Constructing Brick-Kilns; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification.

A brief account of the common method of burning bricks will assist in explaining the nature of my invention.

A moderate fire is kindled in all the mouths, which is gradually increased as the water-smoke is being driven off, and so continued till it disappears, which shows the kiln or bricks therein are dry. Soon after this the fire will be seen on top. Fuel is then added as much as the bricks will bear without melting. As all the mouths are open and the draft comes from both sides alike, the heat is necessarily concentrated midway between the two fires, the effect of which is to burn that part of the kiln, and this is shown by its beginning to settle. The firing might be continued almost indefinitely without burning the bricks along the heads—that is, near to the side walls wherein are the mouths.

The progress or degree of burning is ascertained by the shrinkage or settling of the bricks, which, when completed, is about nine inches. To burn the heads, therefore, the heat must be taken off from the middle, now almost sufficiently burned, and thrown against the heads. This is done by closing the mouths on one side, so as to entirely exclude the air. The heat is now driven violently from the side that is left open against the one that is shut up, which will settle in about twenty-four hours. Then the opposite side is treated in the same manner, and thus the heat is thrown first upon the middle and successively upon the two heads until the burning is completed. If well done the kiln will have shrunk about nine inches and be nearly as level as before the torch was applied.

Much time is lost and fuel wasted in turning from one head to the other. It has long been a desideratum to settle both heads at the same time, but believed to be impracticable. To

accomplish this is the object of the present invention, and it is applicable to the use of either wood or coal for fuel.

First, it consists in the employment of a middle flue beneath the floor, extending outside or beyond the walls at each end, to receive air, and having lateral communications with each ash-pit.

Second, it consists in a furnace placed at the mouths of said middle flues, through which all the air has to pass, and thus becomes heated before it enters the kiln, forming the hot-blast.

Third, it consists in a middle door at the feed-mouths, by the opening or shutting of which the heat may be thrown upon a particular spot, when necessary.

Figure 1 is a ground plan of the kiln; *a a*, the feed-mouths; *b b*, the gratings; *A*, the middle flue; and *c c*, the lateral communications to the ash-pits beneath the floor, (shown by dotted lines;) *F*, the furnaces outside the walls at the mouths of *A*. Fig. 2 is a cross-section of the same; Fig. 3, a side view, showing the mouths; Fig. 4, an enlarged view of one of the feed-mouths, showing the feed-door *d*, the middle door, *e*, and a third door, *g*, for the ash-pit.

It will be observed, Fig. 1, that the grate-bars on each side extend only one-third of the breadth of the kiln, the middle third of the floor remaining unbroken. The reason for this will be given hereinafter.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

To begin with bituminous coal. The mouths should be furnished with an iron door for the feed *d* about twelve inches wide by thirteen inches high; below it one twelve inches wide by six inches high, *e*, and a third door for the ash-pit *g*, twelve inches wide by twelve inches high, all hung on hinges. The grate-bars should be fifteen inches wide, and in length one third of the width of the kiln—that is, if the kiln be twenty-four feet wide, the grates on each side should be eight feet long.

The middle flue, *A*, should be twenty inches wide, twenty inches high, and arched above for strength, or covered with old stove-plates. It should extend five feet outside the wall, and there furnished with grates and doors like that of a common steam-boiler. The lateral

flues *c c* should be ten inches wide, twenty inches high.

Similar letters of reference in each of the several figures indicate corresponding parts.

The operation is commenced by closing the mouths *F F*, so as to exclude the air. The fire is kindled in all the mouths and kept only moderately burning, but gradually increased as the water-smoke becomes thin and the fires appear above. This will be accomplished in from thirty-six to forty-eight hours. Some wood split up small may now be thrown into the middle with advantage. In twelve hours more the middle will have a settling-heat and be started. During this part of the operation the feed-door *d* is to be closed, the doors *e g* open.

Then commences the benefit of my invention. Both sides are now to be closed entirely, with every crack daubed with clay, the mouths *F F* opened, and a strong fire kindled therein, which is best to be of wood. The draft is now just the reverse of the old method. It comes from the center, and drives the heat violently against both walls, and thus the entire kiln is settled at once.

The feed-doors are to be opened only to replenish with coal when necessary, and left open as little as possible.

Now it will be understood why the grating does not extend from one head to the other. If so, the air, when admitted through the flue *A*, would be dispersed through the middle, then the hottest part, instead of being driven to the heads. A great benefit is also derived from heating the air as it passes through the furnaces *F F*. The effect is astonishing.

The same kiln, after being altered to the present plan, consumes but one-half the fuel formerly required.

The middle door, is of great benefit, as by its management the kiln is controlled; for should a cold spot appear, which will sometimes occur in spite of all precaution, by opening *e*, opposite to it, an inch or so the black smoke will be seen coming from it, showing that the heat has reached the desired spot.

Mr. Andrews's or Anderson's patent, of Norristown, Pennsylvania, has also these flues; but they are merely to receive air from a fan. It has no outside communication with the air, for even the ash-pits are closed; consequently the entire principle is different.

To burn with wood, the construction is the same, only that instead of iron gratings, which would pass too much air, the ash-pit is contracted above so as to receive bricks on edge set three-fourths of an inch apart. Fig. 1, *m m* shows two of the mouths treated thus.

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

1. The middle flue, *A*, beneath the floor, extending outside the walls to connect with furnace *F*, and having lateral communications with ash-pits.

2. The furnaces placed at the mouths of said flue, heating all the air that passes into the kiln, creating the hot-blast.

3. The middle door, *e*, in combination with the flues *A* and *c* and the furnace *F*.

FRS. H. SMITH.

Witnesses:

JOHN B. RAY,

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