(No Model.)

3 Sheets—Sheet 1.

A. YATES.

BRICK KILN.

No. 264,118.

Patented Sept. 12, 1882.

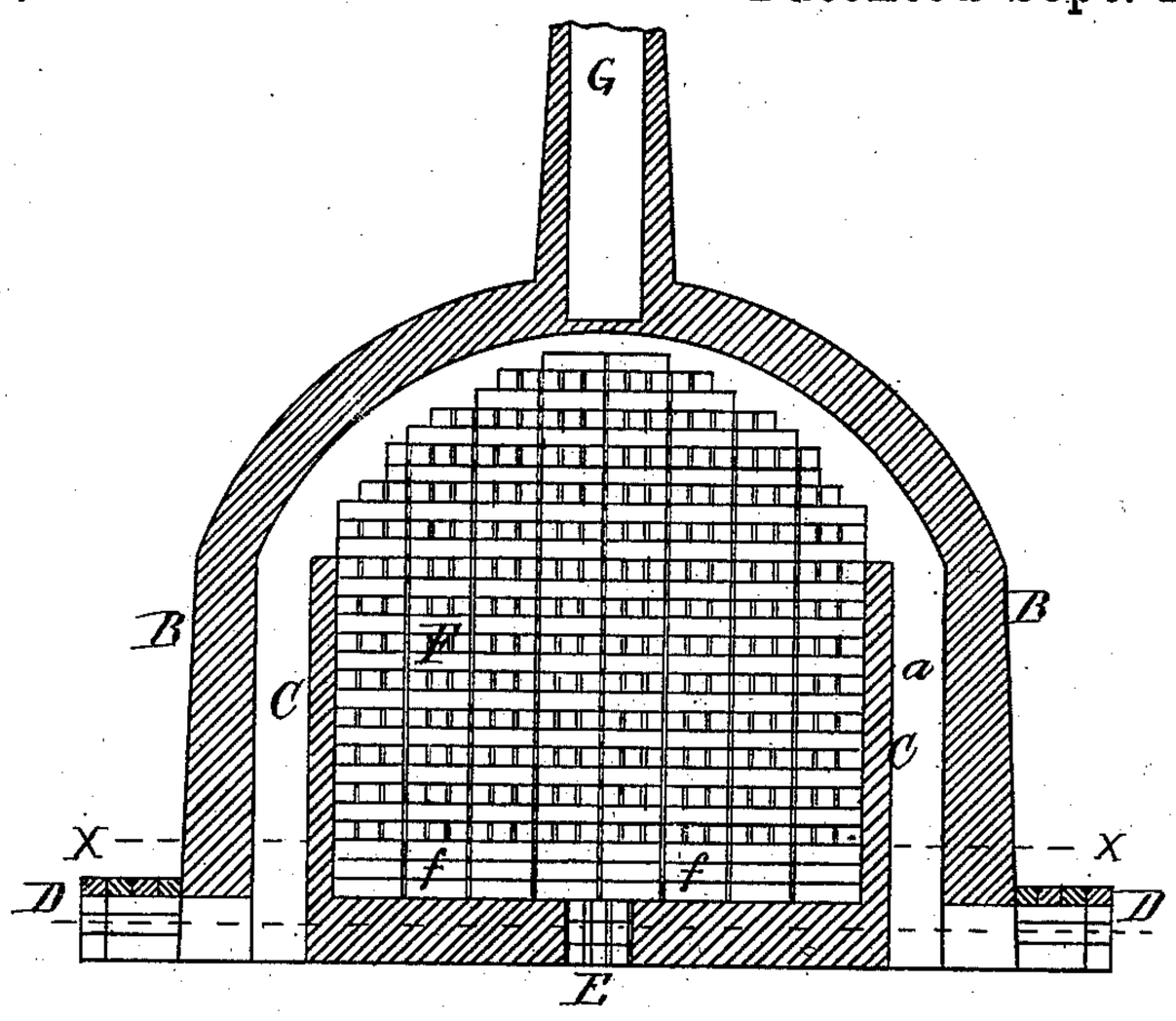

Fig. 1.

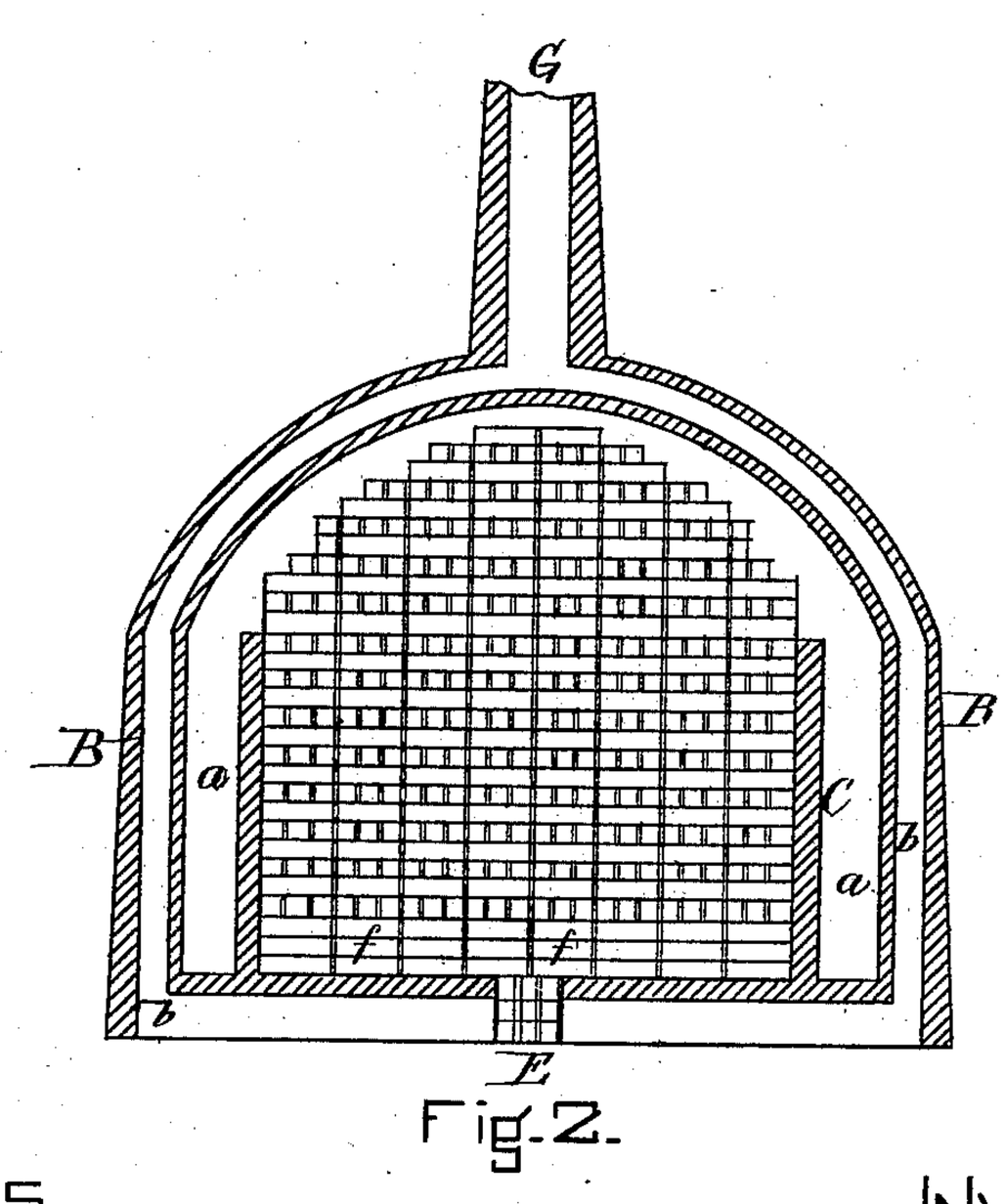

Fig. 2.

WITNESSES

Willard C. Fogg

Fred. Harris

INVENTOR

Alfred Yates

by his attys

Clarke & Raymond

(No Model.)

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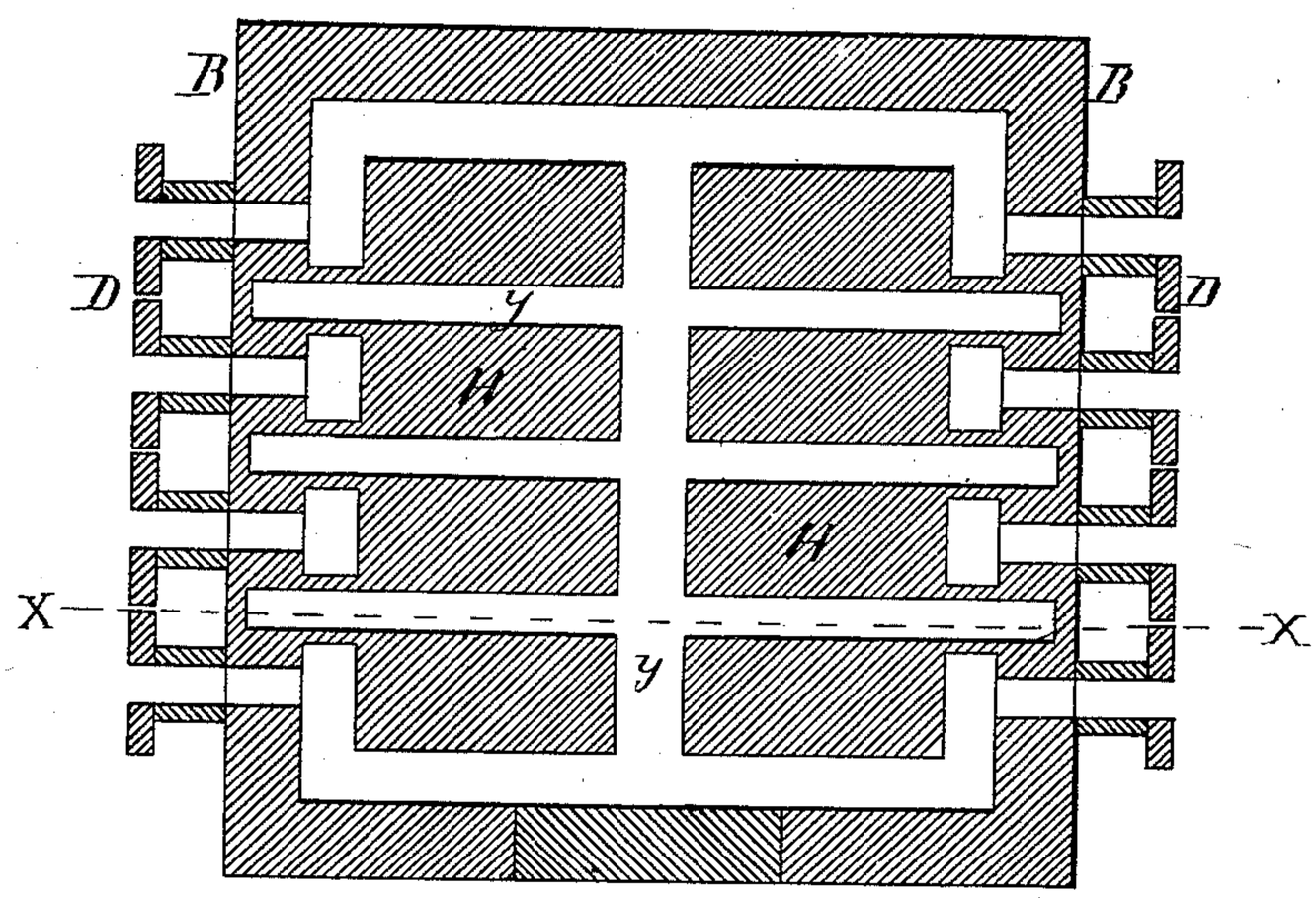

Fig. 3.

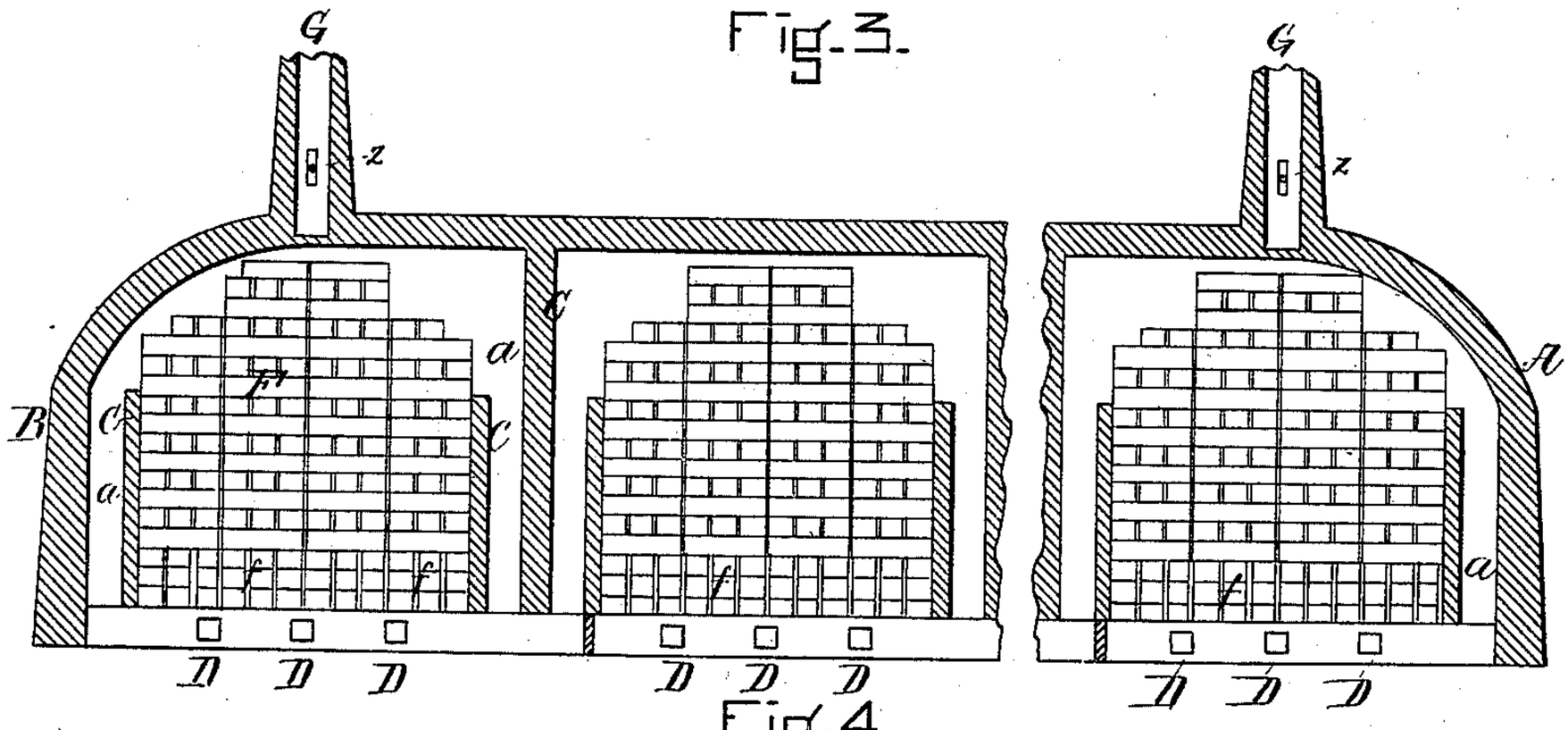

Fig. 4.

WITNESSES

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Clarke & Raymond

(No Model.)

3 Sheets—Sheet 3.

A. YATES.

BRICK KILN.

No. 264,118.

Patented Sept. 12, 1882.

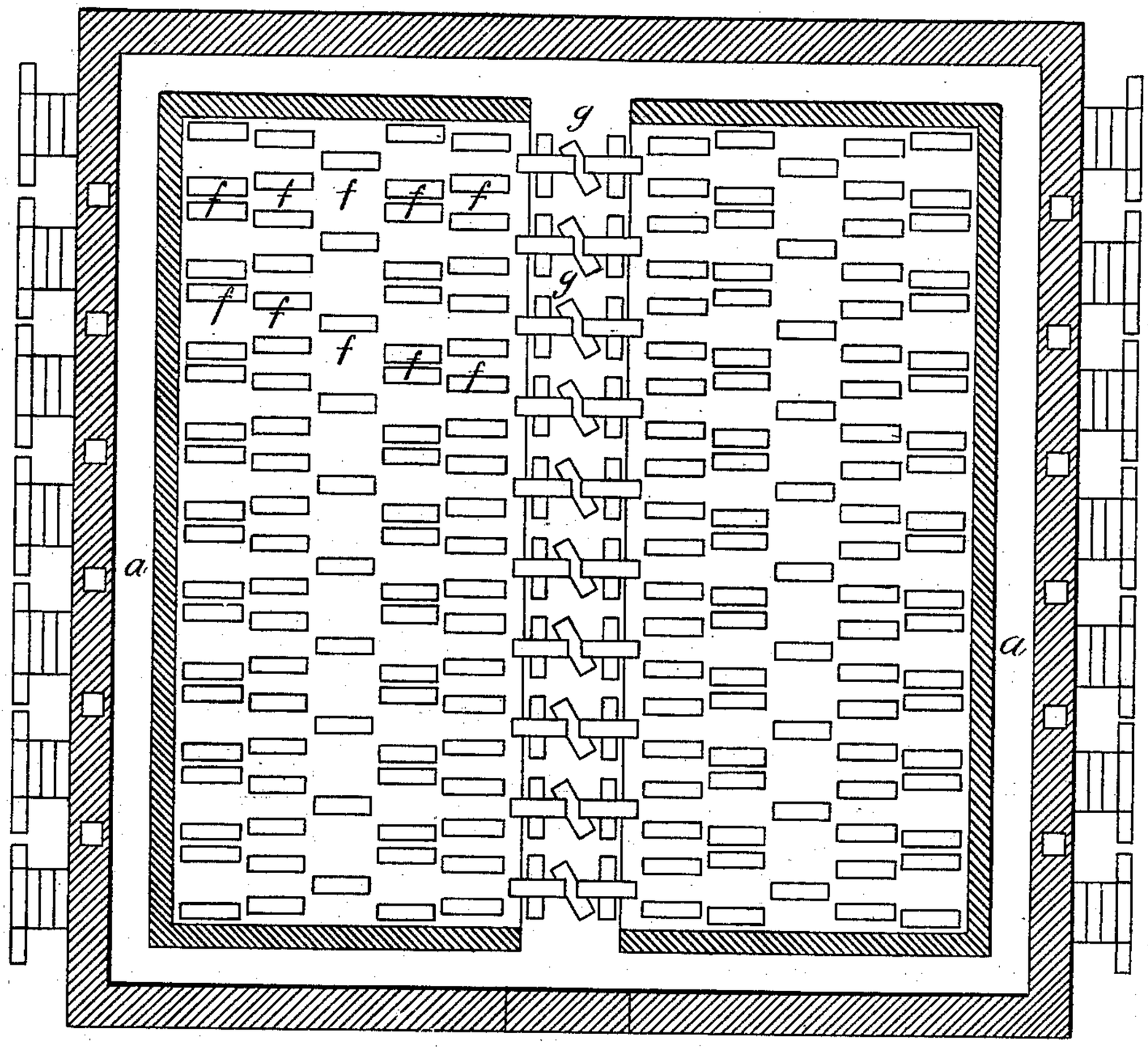

Fig. 5.

WITNESSES

Watt and C. Fogg

Fred. Harris

INVENTOR

Alfred Yates

by his attys

Clarke & Raymond

UNITED STATES PATENT OFFICE.

ALFRED YATES, OF CAMBRIDGE, MASSACHUSETTS.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 264,118, dated September 12, 1882.

Application filed April 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALFRED YATES, a subject of Victoria, Queen of the United Kingdom of Great Britain and Ireland, and a resident of the city of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Brick-Kilns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which like letters indicate corresponding parts.

Figure 1 represents an end elevation of a kiln at the point indicated by the dotted line *x x* of Fig. 3. Fig. 2 represents an end elevation of the kiln, showing the outer and inner flues. Fig. 3 is a ground plan, representing the manner of arranging the flues at the bottom of the kiln. Fig. 4 represents the side elevation of a series of connecting-kilns. Fig. 5 is a plan representing the manner of piling the lower courses of brick in the kiln.

My invention relates to brick-making, which usually consists of five operations: first, preparing the brick-earth; second, tempering; third, molding; fourth, drying; fifth, burning. My special invention herein described relates more particularly to the fifth process, or that of burning the brick. The other operations I perform in the usual manner.

Bricks are usually burned either in a clamp or in a kiln. The latter is a preferable method, as less waste arises, less fuel is consumed, and the bricks are sooner burned.

My present invention relates to the burning of bricks in kilns and not in clamp. Kilns are usually constructed about thirteen feet long, ten and a half feet wide, and twelve feet in height, with walls about one foot thick, carried up a little out of the perpendicular, and inclined toward each other at the top. Flat arches are constructed upon the bottom of the kiln, having holes left in the arches resembling lattice-work. Upon these arches the bricks are piled, and the kiln being covered with pieces of tile or some other substance, wood is put in the arches, and the mass of bricks is gradually dried by a gentle fire, after which the operation of burning takes place.

In order to accomplish the burning more effectively and with a saving of fuel, I have constructed a kiln in which, instead of using wood, as is customary in this country, I use coal.

I am aware that coal has been used to some extent for burning brick, but owing to the construction of the kilns, or the manner of constructing the flues, the use of coal has not been continued to any extent.

One great difficulty in the use of coal is that the sulphur and gases from the burning coal discolor the brick and makes them unsalable. To obviate this difficulty, and to render the use of coal for burning practicable, is the chief object of my invention.

In order that those skilled in the manufacture and burning of brick may fully understand my process, I will proceed to explain particularly the several features of my kiln, and the manner in which I purify the fire or heat from the sulphur, so that it does not adhere and discolor the bricks to any extent in the operation of burning.

I represent in Fig. 3 a plan illustrating the manner of arranging the flues at the bottom of the kiln. D D are the arches in which the fire is placed. B is the outer wall of the kiln. H H are the foundation-bricks, upon which the bricks to be burned are to be placed, *y y* being the flues for the circulation of air and heat beneath the kiln proper.

Fig. 5 represents the manner of piling the lower courses of brick in the kiln to induce a proper checking of heat and to induce a uniform circulation. *f f* represent what are usually denominated the "draft-rows." The bricks are set on their edges, and I usually arrange the lower courses with two or three draft-rows, one heading-row, and one check-row. This arrangement, as is shown in Fig. 5, makes a proper checking as well as circulation in the lower portion of the kiln. In the center of the stack I pile the bricks, as shown in *g g*. These four or five courses, placed upon the top of the foundation of the kiln, as shown in Fig. 3, prepare the kiln for the balance of the brick which are to be burned, which are then piled one upon another on top of the courses which I have described, as represented in Fig. 5, in the usual manner until the kiln is filled.

In Fig. 1 I represent an elevation showing the manner of piling the brick and the construction of the furnace D and the other parts

of the kiln. B represents the outer wall of the kiln, which is brought together in the form of a stack, as shown, G representing the top of the stack. Upon the base or bottom of the stack, as represented in Fig. 3, are built walls upon each side of the kiln, in which the bricks are piled, and which are represented in Fig. 1 by C C. This wall C C rises to nearly the top of the stack, or to where the kiln begins to arch to form the stack. *a* represents the inner flue, which connects with the furnace or fire-arch D.

In Fig. 2 is shown an end elevation of the kiln, the retaining-walls C C, the inner flue, *a*, and the outer flue, *b*, which is formed in the outer wall, B, and which connects with the top of the stack G. The object of the walls C C, and the construction heretofore described, and the arrangement of draft passages and flues are to induce a thorough circulation of heat, and at the same time to conduct the heat from the arch or furnace D first up the outside of the walls C C in the passage *a* to the top of the stack of the kiln, and from thence the heat passes downward through the brick piled, as already described, and finds an exit at the bottom through the main flue E, which extends from end to end of the kiln at the bottom. From E the heat passes to the outer flue, *b*, and thence passes off through the top of the stack. By this manner of firing the heat is purified of the sulphur and other substances which come from the coal, and which tend to discolor the brick before the heat comes in contact with the mass of the bricks in the stack, and consequently the brick after burning are not discolored and rendered unsalable by the deposit of sulphur or discoloration which ensues when coal is used, and the heat is permitted to ascend directly in the stack, as is usually done with wood and with coal, as heretofore used.

In Fig. 4 I represent a series of kilns which can be used with great advantage for the purpose of saving fuel in drying the brick preparatory to burning, and for this purpose I construct two or more kilns side by side, as represented in Fig. 4, and fill the same with brick, as I have described. I then dry off the bricks F in the first kiln, in the usual manner, and then commence my system of firing with coal, as already described; but instead of allowing the heat to pass off through the top of the stack at G, I close the dampers in the top *z* and conduct the heat to the second stack, and thus utilize the surplus heat in burning the first stack to dry the bricks in the next stack; and the same process is continued with the other stacks, utilizing the surplus heat of the burning kiln for drying the next preparatory to burning, thus by shifting the heat from one to another I make much saving in fuel, as will be seen. I also draw the air for burning kilns through the kiln or kilns which have been burned, thereby utilizing the heat of those kilns in heating the air which supports combustion in the burning kiln or kilns.

Having now described my invention, what I claim and desire to secure by Letters Patent of the United States, is—

1. In a brick-kiln, the fire-arches D D, the draft-passage *a b* E, and the damper *z*, arranged, combined, and adapted to operate substantially as and for the purposes set forth.

2. The herein-described arrangement of the flues *a* E B, in combination with the checking, heading, and draft-rows *f f f f f*, and the conducting and checking passages *g g*, formed by the piling or arranging of the brick, substantially as and for the purposes described.

3. A brick-kiln consisting of the outer walls, B B, inclosing the flues *b b*, the fire-walls C C, and the draft-flues *a* and E, substantially as and for the purposes set forth.

4. A kiln for the burning of brick by the use of coal, consisting of the outer wall, B B, the inner fire-walls, C C, the arches or fire-pots D D, and the flues *a*, *b*, and E, combined and arranged to operate substantially as and for the purposes described.

5. In a brick-kiln, the herein-described system of piling, arranging, or combining two or more draft-rows, *f f*, and two or more check-rows, *f f*, with an intermediate heating-row, *f*, arranged to form the base of a mass of brick within a kiln, and adapted to induce a proper circulation and economic distribution of heat, substantially as and for the purposes set forth.

6. In the art of brick-burning, the system of piling the lower course, *f f f f f*, for conducting, checking, and conveying the heat toward the center of the kiln, in combination with the conducting and checking rows *g g*, substantially as and for the purposes set forth.

7. A brick-kiln consisting of the walls B B, with flues *b b* and the chimney G, provided with a damper, *z*, and the draft-passages *a* and E, the fire-arches D D, and fire-walls C C, all arranged, combined, and adapted to operate substantially as and for the purposes set forth.

ALFRED YATES.

Witnesses:
F. F. RAYMOND, 2d,
WILLARD C. FOGG.