O. BENNETT.

Brick Kiln.

No. 101,416. Patented April 5, 1870.

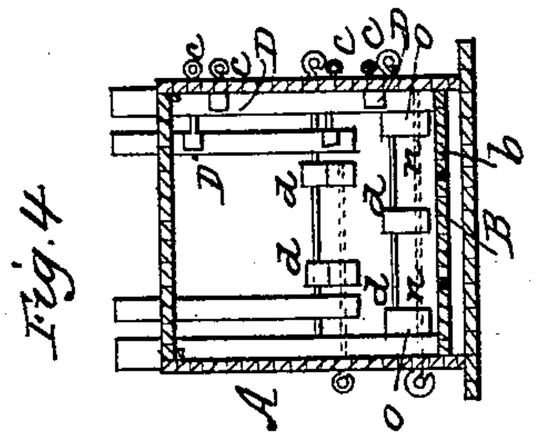

Fig. 4

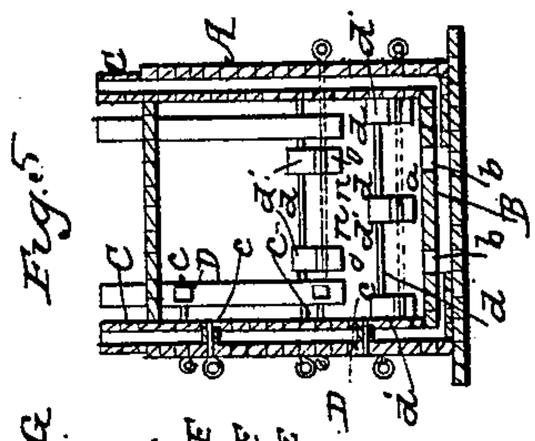

Fig. 5

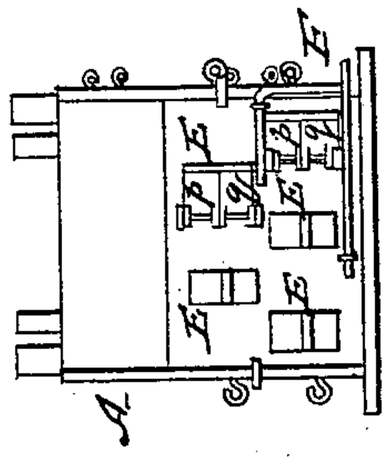

Fig. 2

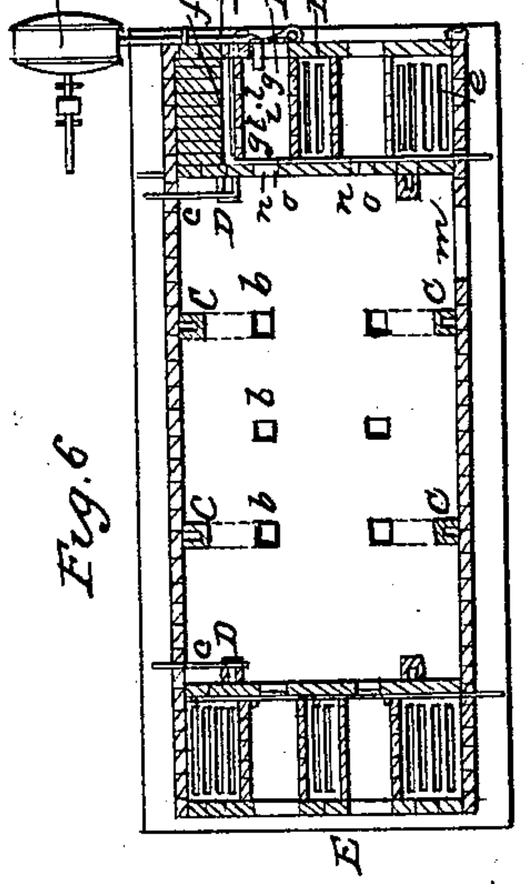

Fig. 6

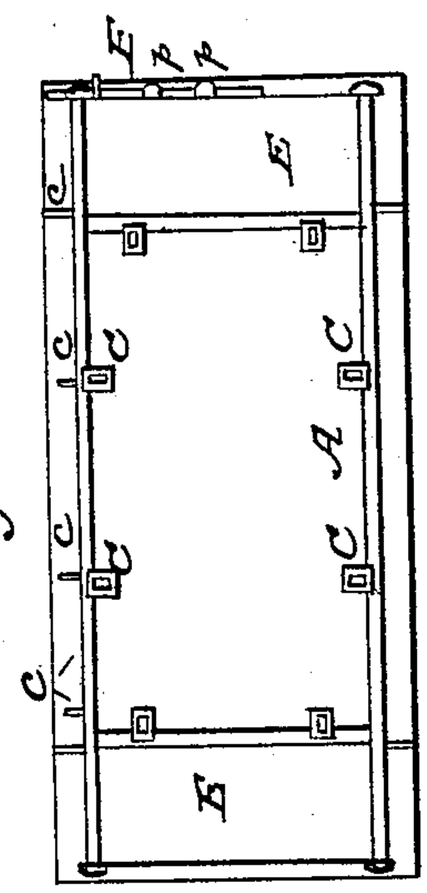

Fig. 1

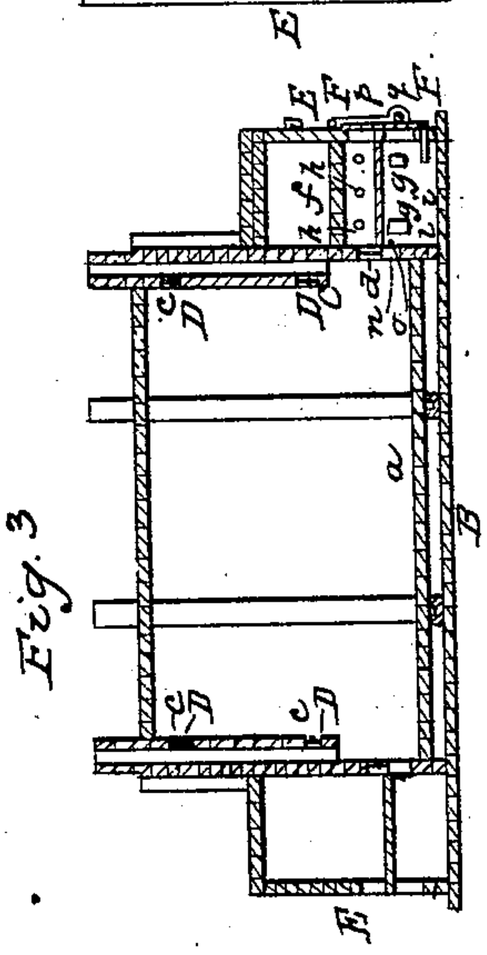

Fig. 3

Witnesses
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Oliver Bennett
by his attorney
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United States Patent Office.

OLIVER BENNETT, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 101,416, *dated April* 5, 1870; *antedated April* 4, 1870.

IMPROVEMENT IN BRICK-KILNS.

The Schedule referred to in these Letters Patent and making part of the same

To all persons to whom these presents may come:

Be it known that I, OLIVER BENNETT, of Boston, of the county of Suffolk and State of Massachusetts, have made a new and useful invention having reference to Brick-Kilns; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view;

Figure 2, a front end elevation;

Figure 3, a vertical and longitudinal section;

Figures 4 and 5 are transverse sections; and

Figure 6 is a horizontal section of a kiln provided with my invention.

In burning brick the important objects to be effected are, first, the uniform burning of all the bricks in the kiln, and, second, economy of fuel, and to the accomplishment of such many plans have heretofore been devised. In what are termed "open kilns" the bricks are laid so as to form arched passages at the bottom of the kiln, the fuel being put and burned in such passages. By this mode of burning bricks those used in making the arches or arched passages are liable to become and generally are overburned, while others in the extreme or upper parts of the kiln are insufficiently burned, and a large part of the heat becomes wasted or is suffered to escape into the open air. Bricks have also been burned in close kilns or chambers, in which the heat and gaseous products of combustion have been driven through the kiln either by the natural draught of the chimney or by artificial means.

My invention has reference to the close-chamber principle with the furnaces located outside of the kiln.

To burn a kiln of bricks to the best advantage, the treatment needs constant variation or change. In the earlier stages of the operation a very gentle heat with a free exit of the vapors and smoke becomes essential, but afterward the heat is to be increased until finally, or at the last stage, it should be intense, at which time the kiln may be nearly if not entirely closed by the dampers. In making my invention I have sought to effect these results to the best advantage.

In using my kiln when it may be supplied with a series of blowers, some of them (as the stage of burning may require) may be used so as to draw the gaseous contents or heat and vapors through the kiln, others being employed to force them through it, and with air. So one or more of the blowers may be applied and used so as to extract the waste heat and gaseous products from the kiln and return them with fresh air into the furnace or furnaces. In this way the gaseous products which would otherwise be lost may be utilized or their combustion accomplished.

The object I have had in view in making my invention has been to direct the heat of the furnace or furnaces, by means of air under pressure, to any part of the stack or pile of brick in the kiln, and to increase or diminish such heat, as circumstances may require.

I have sought also to avoid the employment of steam for such purpose as used in the kiln, in the manner as described in the patent No. 80,046, dated July 21, 1868, and granted to Henry W. Adams.

In burning brick, it becomes necessary to drive out of the material by the heat the water contained in it. In doing this I do not employ steam, let into the kiln so as to come in contact with the bricks to be heated, nor do I employ in the eduction conduit of the kiln a blast of steam to effect a draught of air through the furnaces and the kiln, but in lieu thereof I not only make use of an air-blower to force air into the furnace or furnaces and the kiln, but I use, in connection with the kiln, a series of separate educts provided with dampers, whereby, when the doors of the furnaces are closed, I am enabled to force into the kiln and with the heated smoke and gases of the fuel when in combustion, air, and to compress such air more or less within the kiln, and by means of the dampers to direct the heat to any part or parts of the kiln or its contents, as circumstances may require from time to time, in order to effect the equal burning or indurating of the mass of bricks. I thus avoid the use of steam and any tendency of it to retard the desiccation of the bricks or the expulsion therefrom of the water that may be within them when and after they may be stacked in the kiln.

In the drawings—

A denotes a kiln or chamber, whose sides, floor, and top are to be composed of masonry.

Underneath the floor *a* of the kiln is a shallow chamber, B, which communicates with the kiln through a series of openings, *b b b*, arranged at suitable distances apart.

Leading out of the said chamber B, and arranged at the sides of the kiln, is a series of vertical flues or educts, C C C C. Others of like nature are arranged at the ends of the kiln, but without extending down to the floor thereof.

In each of the said flues or educts there may be two or any other suitable number of dampers, D D, having their shafts, *c*, extended to and beyond the outer side of the kiln, in order to enable a person to open or close each damper, as may be required.

At one or at each end of the kiln there is one or more furnaces, E E, the chamber of combustion of each of which, at its rear end, being made to open into the kiln.

The opening shown at *d* I provide with a rotary valve or deflector, *d'*, made so that, by means of it and by turning it as occasion may require, the heat and gases evolved from the fuel may be directed either upward or downward into the kiln.

Furthermore, there is arranged alongside of each

furnace, and so as to extend both above and below its grate, *e*, an auxiliary or air-conveying chamber, *f*, provided with openings *g* and *h*, leading from it into the ash-chamber *i* and the chamber of combustion *h* of the furnace, there being a damper or valve, *l*, to the upper of the two openings.

An air-conduit or pipe, F, leads into the ash-chamber of each furnace, such conduit being extended from and constituting the educt of an air-blast apparatus or blower, G.

Furthermore, each ash-chamber, at its rear end, I open into the kiln, and provide the opening with a damper, the same being as represented at *n* and *o*, *n* being the opening and *o* the damper.

To the mouths of the fire and ash-chambers of each furnace there are to be doors, as shown at *p q*.

The kiln should be provided with an opening, *m*, in one side of it to enable the bricks to be introduced into it as well as withdrawn from it, such opening being properly sealed while the kiln may be in process of being heated.

From the above it will be seen that after the kiln may have received a charge of bricks and the furnace or furnaces and the air-blower may have been put in operation, we can, by means of the educts and their dampers and by the air under pressure, effect the equal or proper distribution of the heat as respects the stack. We can force the heat to any particular part or parts of it as from time to time may be necessary to finally insure the equal burning of the bricks of the stack.

By means of the lateral or auxiliary air-chambers *f*, and their openings and dampers arranged with the ash and fire-chambers of each furnace, we can direct air into the fire-chamber without first causing such air to pass up through the grate and the fuel when thereon. Thus, by such means the intense or great heat of the flame may be tempered or reduced by such air.

After entrance into the kiln the heated gases and volatile products of combustion may be made to descend through the stack and into the chamber beneath the floor of the kiln, and thence upward through the side educts, or instead thereof the heat may be caused to act on the stack and escape by the side educts or the side and end educts, the whole being to effect the necessary distribution of the heat, as circumstances may require, to attain the result of uniformity in burning the stack.

I make no claim to the production of a current of air through a furnace and brick-kiln by means of a jet of steam let into the educt of the kiln. Nor do I claim the employment of steam in a brick-kiln or its furnace, whether such steam be superheated or not, intending specially to disclaim any and all of what may be described and represented in the specification of the patent of the said Adams, as constituting his invention or as being auxiliary thereto.

What I claim in or with respect to the brick-burning apparatus hereinbefore described, and as represented in the accompanying drawings, may be stated as follows:

The arrangement as well as the combination, substantially as described, of the series of educts C and dampers D D thereof with the brick-kiln A, its furnace or furnaces E, and an air-blast or blower, G, applied to the furnace or furnaces so as to operate therewith, as set forth.

Also, the arrangement and combination of the auxiliary air-chamber *f* and its openings, *g h*, and valve *l*, with the fire-place and ash-pit of a furnace as combined with a kiln, A, and a blower, G, to operate therewith, as described.

Also, the combination and arrangement of the opening *n* and its valve *o*, at the rear of the ash-chamber of each furnace, with such furnace and a kiln, to be operated with and by air-blast or blower applied to the furnace, as set forth.

Also, the combination and arrangement of the rotary deflector *d'* with the furnace E and the kiln A, and an air-blower applied to the furnace, as set forth, such deflector being to enable the heat, when passing out of the opening *d* and into the kiln, to be deflected either upward or downward therein, for the purpose set forth.

Also, the combination and arrangement of the chamber B and its series of inducts *b* with the brick-kiln and its series of escape-flues or educts C, provided with dampers D, as set forth, and with its furnace or furnaces and air-blower to operate therewith, as explained.

OLIVER BENNETT.

Witnesses:
R. H. EDDY,
J. R. SNOW.