

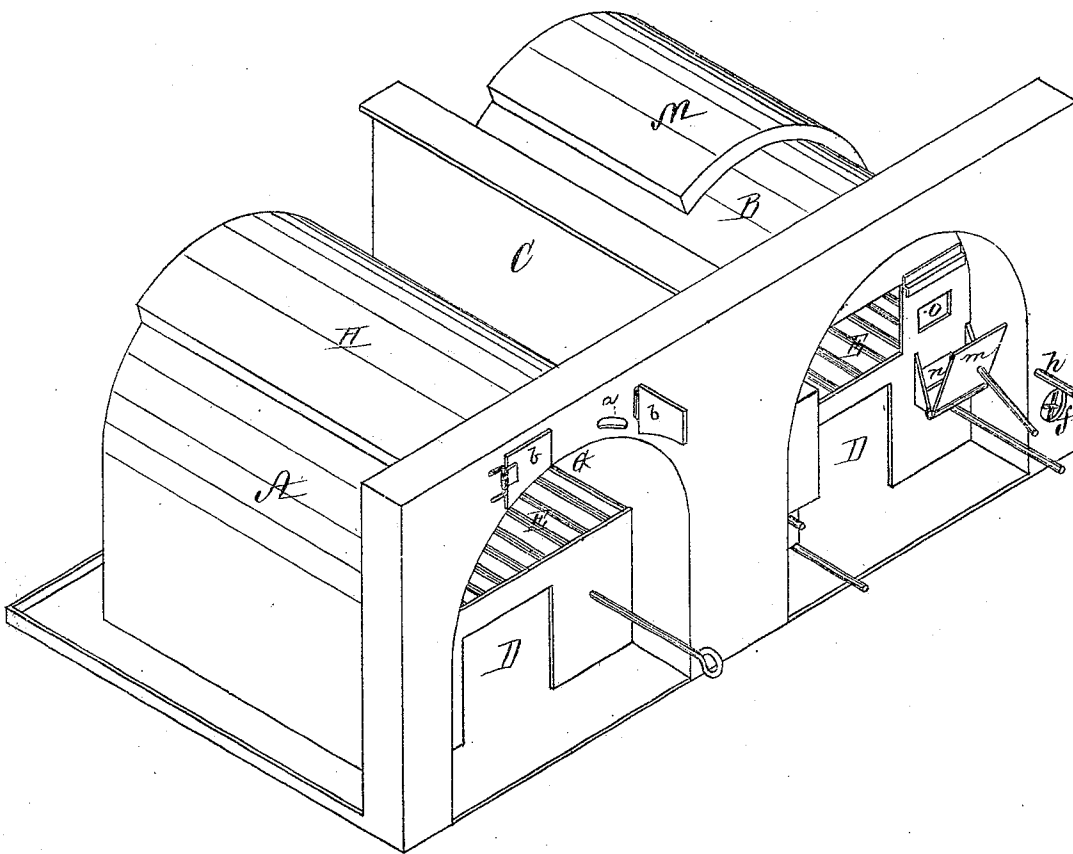
O. BENNETT.

Improvement in Furnaces for Kilns.

No. 127,836.

Patented June 11, 1872.

Fig. 1.



*Witnesses,
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W. J. Cambridge*

*Inventor,
O. Bennett*

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Fig. 2.

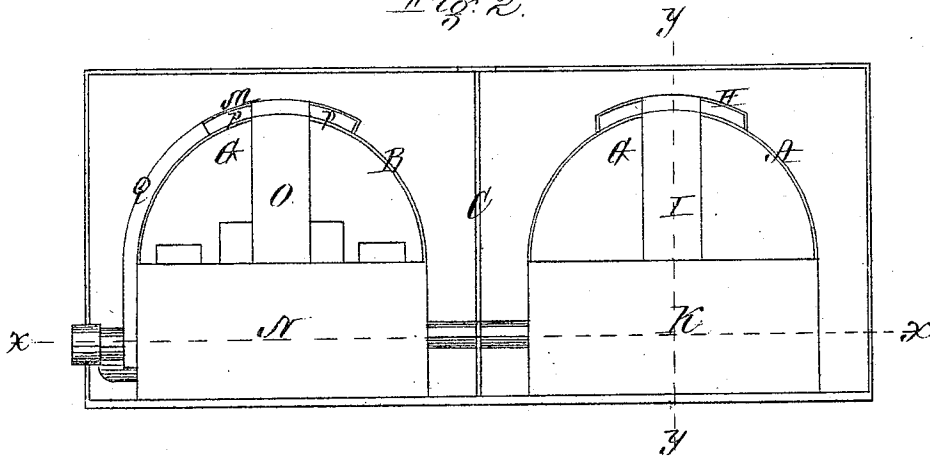
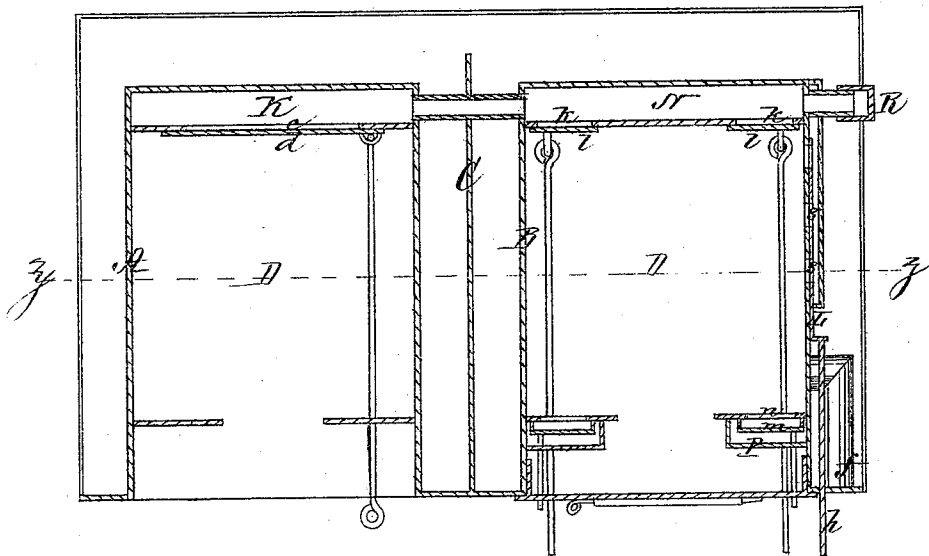


Fig. 3.



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Fig. 4.

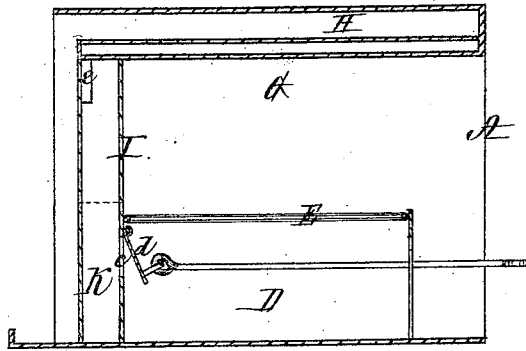


Fig. 5.

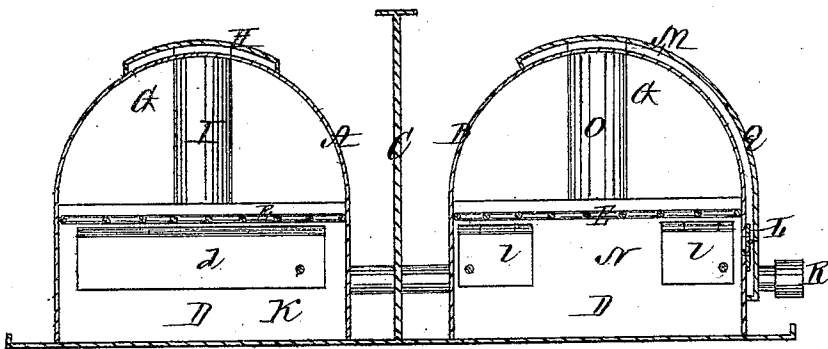
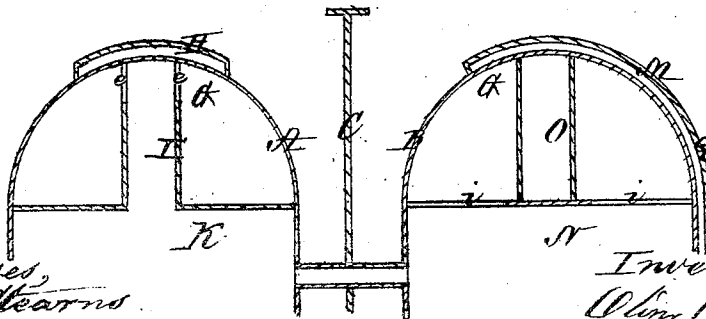


Fig. 6.



Witnesses,
S. W. Stearns
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Inventor,
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UNITED STATES PATENT OFFICE.

OLIVER BENNETT, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN FURNACES FOR KILNS.

Specification forming part of Letters Patent No. 127,836, dated June 11, 1872.

To all whom it may concern:

Be it known that I, OLIVER BENNETT, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Furnaces for Brick-Kilns, Potteries, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a perspective view of two furnaces of a brick-kiln, &c., constructed in accordance with my invention. Fig. 2 is a rear elevation of the same. Fig. 3 is a horizontal section on the line *xx* of Fig. 2. Fig. 4 is a section on the line *yy* of Fig. 2. Fig. 5 is a section on the line *zz* of Fig. 3; Fig. 6, detail in section, to be referred to.

My present invention has particular reference to certain improvements in furnaces for brick-kilns, described in Letters Patent of the United States No. 101,416, granted to me on the 5th day of April, 1870; and this invention has for its object to burn all the bricks or other articles throughout the kiln to a uniform degree of hardness, and to economize in the consumption of fuel required to accomplish this end; and my invention consists of a flue leading over or through the combustion-chamber to a point at or near the arched passage of each row or stack of bricks or other articles to be burned, in order that a column of external air may be made to impinge upon the intensely-heated air at this point, the external (and comparatively cool) air being set in motion by natural or artificial means, such as a blower, or otherwise, whereby the intensity of the heat may be reduced and equally distributed throughout the kiln, thus preventing the undue burning of the bricks or other articles contiguous to the furnace, and the insufficient burning of those remote therefrom. And my invention also consists in a hollow trunk or "bridge-wall" extending across the inner end of each furnace, and provided with a damper, to allow a column of external air to enter therein and pass up and out of the top of a hollow vertical partition connected therewith and situated between the two contiguous arches of the stacks of bricks or other articles to be burned, by which means the external air is directed upon the heated air at or near the top of the inner end of the combus-

tion-chamber, for the same purpose as that just described. And my invention also consists in a flue communicating with the external air and extending from the ash-pit, outside the furnace or combustion-chamber, to near or beyond its top, the external air flowing or being forced around the outside of the top of the combustion-chamber and into the arches of stacks or piles, a sliding plate or damper, either perforated or not, being provided for closing the communication with the flue outside the furnace, in order that the current of external air may be diverted and caused to pass under the grate into a hollow trunk or "bridge-wall," and thence through one or more apertures in its top into contact with the hot air at the rear of the combustion-chamber. My invention also consists in passing or forcing a column of external air through a series of hollow trunks or "bridges" connected together, the cold air entering the end of one trunk or "bridge" and flowing through it and the other trunks or "bridges," and also up and out of the top of each of the hollow partitions between the arches of the stacks, by which arrangement I am also enabled to equally distribute the heat as required.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawing, A B are two furnaces of a brick-kiln, separated from each other by a suitable wall, C. D D are the ash-pits; E E, the grates; and G G, the combustion-chambers. Over the top of the furnace A, and extending longitudinally therewith, is a flue, H, communicating with the external air through openings *a* in the front of the furnace, and closed by doors *b*. A column of external air, either impelled by its natural draught or by a blower, is directed to the top of the inner end of the combustion-chamber, a division in the flue H being made by continuing up a vertical partition, I, so as to divide and direct the hot air into two channels, each leading to the arches of two contiguous stacks of bricks, by which means the intensely-heated air accumulating in the top of the combustion-chamber is driven through the whole length of the arches, and up the apertures therein through all of the bricks or other articles in the kilns,

suitable dampers in the kilns being provided if it be found desirable to increase the draught, the heat being equally distributed through the stacks or piles of bricks or other articles, so that they are all brought to the same degree of temperature; whereas, by the old process of burning or baking brick or other articles, those nearest the fire were overburned, while those remote therefrom were insufficiently burned. Across the back of the ash-pit of the furnace A is built a hollow trunk or "bridge-wall," K, provided with an opening, *c*, on its inner side, controlled by a damper, *d*, operated by means of a rod, the handle of which extends out to the front of the furnace. The hollow vertical partition I, at the rear of and extending up to the under side of the combustion-chamber G, communicates with the hollow "bridge-wall" K, and equally divides the space at the rear of the furnace, and also serves to separate the arch of one stack of bricks from that of another. On each side of this vertical partition, near its top, is formed an opening or outlet, *e*, Fig. 6, leading into the combustion-chamber, by which construction, when the damper *d* is opened and the external air allowed to enter, it is caused to impinge against the heated air at this point and set it in motion, thus distributing the heat equally, as required. Through one side of the front of the furnace B passes a pipe, *f*, the inner end of which opens into the ash-pit D. L is a plate, provided with perforations *g*, and made to slide, by means of a rod, *h*, back and forth, so as to close and open communication with an outside flue, M, presently to be described, the side of the ash-pit being provided with openings similar in size to the perforations in the sliding plate. N is a hollow trunk or "bridge-wall," extending across the inner end of the furnace B, and provided with one or more apertures, *i*, in its top, and one or more openings, *k*, in its side, the latter being controlled by dampers *l*. O is a vertical partition separating one arch from another, and dividing and directing the current of hot air into two channels. The partition O has not, however, a passage through it, as that (I) belonging to the furnace A. When the sliding plate or damper L is moved so as to close communication with the outside flue M, and the damper *l* is open, a column of external air is drawn or forced into the ash-pit by a blower placed at the outlet of the pipe *f*; thence the external air passes through the openings *k* into and out of the top of the trunk or "bridge" N, meeting and setting into motion the body of hot air collected in the combustion-chamber, and diffusing it equally throughout the kilns.

If desired, a portion of the cold or external air passing into the pipe *f* may be directed over the fire through the combustion-chamber, it being only necessary to open the door *m* of an aperture, *n*, leading into the ash-pit, and allow the cold air to flow therefrom through the apertures, and thence through an aperture, *o*, into the combustion-chamber, above

the fire, the door *m* being operated by means of a rod extending through a casing, P, which tightly incloses a space around the apertures *n* *o*.

I will now describe the outside flue M of the furnace B. It is formed between the outside of the furnace and a casing, Q, extending from a point between the level of the grate up to and a little beyond the top of the furnace, two outlets, *p*, for the said flue, being formed just over the inner end of the combustion-chamber, by which construction, when the aperture or apertures *i* in the top of the trunk or "bridge" N are closed, and the sliding perforated plate or damper L opened, the column of external air is driven out so as to impinge on the body of hot air collected at the inner end of the combustion-chamber. By connecting the ends of contiguous hollow trunks or "bridges" by suitable pipes, a single blower applied at the point R will be sufficient for actuating and distributing the hot air of a series of furnaces, the tops and sides of the "bridges" being closed, and a hollow vertical partition with openings at the top being provided for each "bridge."

From the foregoing, it will be seen that I have in the present application for a patent enumerated five methods of uniformly distributing the hot air and equalizing the temperature throughout a kiln, said five methods being different from those set forth in my Letters Patent No. 101,416; the sole object of my present invention being to cover different modes of construction and arrangements of flues and dampers which might be made, and which were not secured under the said Letters Patent.

Claims.

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

1. A flue, H, extending over or through the combustion-chamber of the furnace of a kiln for burning bricks or other articles, substantially as and for the purpose set forth.

2. I also claim a hollow trunk or "bridge-wall," K, extending across the rear of the furnace, and provided with an inlet and an outlet for the passage of the external air to the desired point, substantially in the manner and for the purpose described.

3. I also claim a hollow trunk or "bridge-wall," K, provided with an inlet for the entrance of the external air, in combination with a vertical partition, I, provided with outlets, substantially as and for the purpose set forth.

4. I also claim a hollow trunk or "bridge-wall," N, having one or more apertures, *i*, in its top, and provided with an opening in its side, controlled by a damper, substantially as and for the purpose described.

5. I also claim a hollow trunk or "bridge-wall," N, having an inlet and outlet for the external air, in combination with a vertical partition, O, substantially in the manner and for the purpose set forth.

6. I also claim a flue, M, extending from the ash-pit outside the furnace, in combination with a sliding plate or damper, L, and with or without an inlet-pipe, f, substantially as described, for the purpose set forth.

7. I also claim a series of hollow trunks or "bridge-walls," extending across the rear of the furnaces, and connected together at their ends, to allow of the passage of cold air from

one to the other, for the purpose of equally distributing the heat, substantially as described.

Witness my hand this 16th day of January, 1872.

OLIVER BENNETT.

In presence of—

N. W. STEARNS,

W. J. CAMBRIDGE.