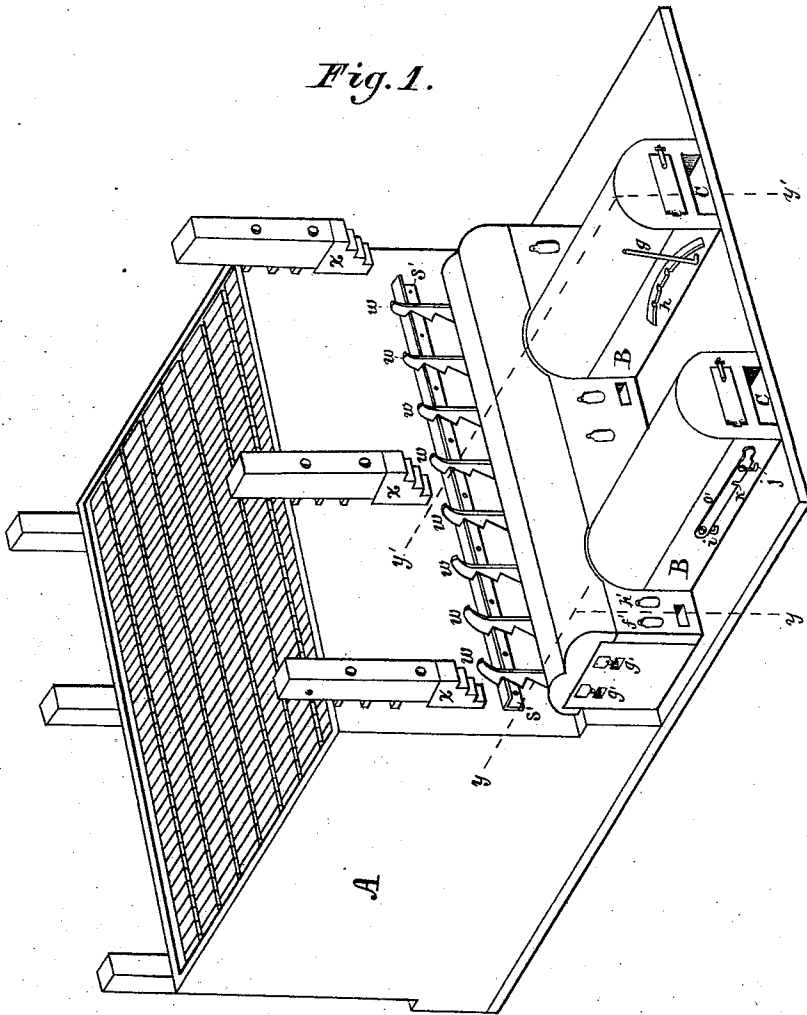


W. S. COLWELL.
Brick-Kilns.

No. 157,090.

Patented Nov. 24, 1874.

Fig. 1.



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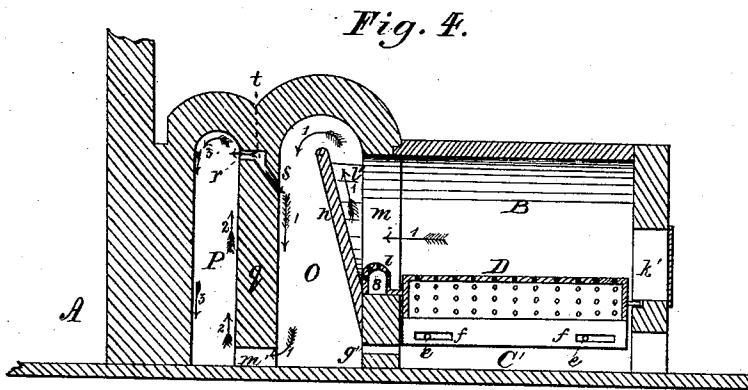
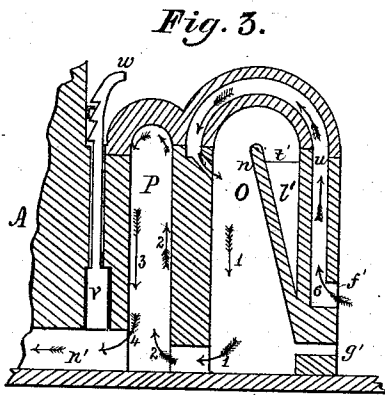
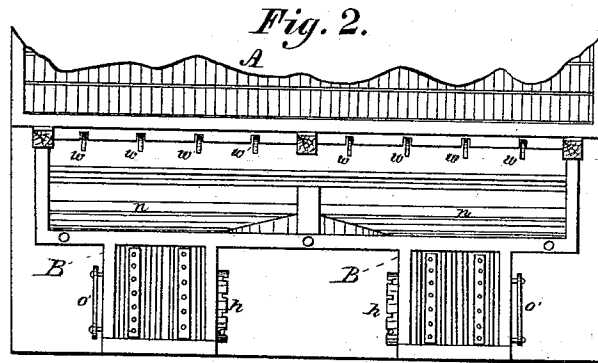
By

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 Wm S. Colwell
 Per James L. Johnston
 his Attorney

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UNITED STATES PATENT OFFICE.

WILLIAM S. COLWELL, OF ALLEGHENY, PENNSYLVANIA.

IMPROVEMENT IN BRICK-KILNS.

Specification forming part of Letters Patent No. 157,090, dated November 24, 1874; application filed October 14, 1874.

To all whom it may concern:

Be it known that I, WILLIAM S. COLWELL, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus and Process for Burning Brick; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention relates to an improvement in apparatus and process for burning brick and generating heat for other purposes; and consists in a furnace having a fire chamber or chambers, in combination with combustion-chambers having air-inlets and air-distributing flues so disposed with relation to the fire chamber or chambers and the combustion-chambers that the air is conveyed to and mixed with the products obtained from the burning fuel without undue rarefaction, in contradistinction to the use of heated air, the whole being constructed, combined, and applied, with relation to the brick-kiln or other place or thing to be heated, that it will receive the greatest amount of heat that can possibly be obtained from the kind of fuel used.

To enable others skilled in the art with which it is most nearly connected to make and use my invention, I will proceed to describe its construction and operation.

In the accompanying drawing, which forms part of my specification, Figure 1 is a perspective view of my apparatus for burning brick. Fig. 2 is a top view or plan of the same, showing the crown of the fire and combustion-chambers removed. Fig. 3 is a vertical section of the combustion-chambers at line *y* of Fig. 1. Fig. 4 is a vertical section of the fire and combustion chambers at line *y'* of Fig. 1.

In the accompanying drawings, A represents an ordinary brick-kiln constructed in the usual manner, excepting that the openings for the fire-arches are provided with "fire-tile" cut-off valves which are susceptible of being adjusted so as to open and close the openings of said fire-arches. Another exception in the construction of the kiln A consists in a series of abutments, X, projecting from its walls for the upright timbers to rest on for the roof which covers the kiln used for protecting it

from the rain or snow. B represents the furnaces, which are furnished with grate-bars of ordinary construction and an air-distributing device, D, which is pivoted on crank-bars *e* and *e'*, which are placed in slots *f*. To one end of the crank-bar *e'* is secured a crank, *i*, to which is pivoted a connecting-rod, *o'*, furnished with notches *k*, which are fitted to a wrist-pin on the crank *j*, on the end of the crank-bar *e*, to the opposite end of which is secured a lever, *g*, which is held in position in notches in the piece *h* secured to the furnace-wall.

By this arrangement of the crank-bars, cranks, connecting-rods, and levers, the air-distributor D can be agitated and adjusted to several different positions with relation to the plane of the grate-bars, and thereby adapting the air-distributor to any desired amount of fuel and fire which may be on the grate-bars, or the varying conditions of the fuel and fire thereon, whereby the proper quantity of air can be furnished suitable to the condition of the furnace for facilitating the consumption of the fuel and for insuring perfect combustion.

In the rear of the grates and the air-distributor D is arranged a perforated bridge-wall, *l*, constructed of cast or wrought iron. This hollow and perforated bridge-wall receives a supply of air through openings *h'* placed on each side of the furnace B, arranged as indicated at *h'* in Fig. 1. The air passing through openings *h'* enters the cavity *s* of the bridge-wall *l*, and, passing through the small openings in it, mixes with the flame, smoke, and gases as they pass into the spreading-chamber *l'* formed by the inclined wall *n* arranged in the rear of the opening *m*. The end walls *t'* are also inclined.

By this arrangement of the hollow perforated bridge-wall *l*, openings *h*, and spreading-chamber *l'*, cold air, in contradistinction to hot air, is mixed with the flame, smoke, and gases of the fire as they leave the furnace of the fire-chamber B, and the flame, smoke, gases, and air commingled strike the inclined wall *n*, are spread out in the chamber *l'*, and caused to pass over the top edge of the wall *n* in a thin sheet down into the combustion-chamber O. The combustion-chamber O communicates with the combustion-chamber P by means of openings *m'* at the base of the partition-wall

g. The openings m' gradually increase in size from the center of the furnace to the right and left of it. In the partition-wall g , at its junctions with the crowns of the chambers O and P, is an air-chamber, t , which extends the entire length of the wall. This chamber t communicates with the combustion-chambers O and P by means of openings r and s , as shown in Figs. 3 and 4. The openings s are arranged midway between the openings r . Air is admitted to the chamber t by means of a series of openings, f' , and flues u at suitable intervals in the outer walls of the combustion-chamber O. The mouths of the fire-arches n' of the kiln A are provided with cut-off gates v , constructed of "fire-tile," to which is secured rods w , provided with notches, which catch on a flange projecting from the side walls of the kiln A, as shown in Figs. 1 and 3. The openings g in the walls of the combustion-chambers O and P are called "peep-holes," and used for the purpose of examining the condition of things in the combustion-chambers and fire-arches of the kiln.

The skillful mechanic will, from the foregoing description and accompanying drawings, be enabled to construct my improvement in apparatus for burning brick. I will therefore proceed to describe its operation, which is as follows: Fire is made in the furnace B. The air-distributers D are adjusted so as to distribute the proper amount of air to the flame, smoke, and gases caused by the consuming of the fuel used. The smoke, gases, and flame in passing through the opening m and over the hollow bridge-wall will receive a fresh supply of air distributed in jets among the flame, smoke, and gases by means of the perforated bridge-wall l . They then strike against the wall n , and are spread out in the chamber l' . They then pass over the top edge of the wall n in a thin sheet down into the combustion-chamber O, as indicated by arrows marked 1, and in their passage down into the chamber air is again mixed with

them, by air which passes out from the chamber t through the openings s . They then pass from the chamber O through openings m' into the general receiving and combustion chamber P, and passing up into it, as indicated by arrows marked 2, come in contact with air, as indicated by arrows 5, issuing out of the opening r of chamber t , and then return down into chamber O, as indicated by arrows 3, enter the fire-arches n' , as indicated by the arrow marked 4. The flow of heat into the fire-arches n' from the chamber P is controlled by means of the fire-tile cut-off gates, by which the operator can also regulate the heat in different parts of the kiln A, and to the condition of the brick in the different parts of it.

It will be observed that two furnaces are used, but each furnace must have a chamber, l' , wall n , and chamber O communicating with the general receiving and combustion chamber P.

The skillful mechanic will readily understand that the furnaces B may be connected directly with the general receiving and combustion chamber P. By such arrangement a good result will be obtained, but not so good as by the arrangement hereinbefore described.

Having thus described my improvement, what I claim as of my invention is—

1. In a furnace, the air-distributers D, adjustable with relation to the fire-grate, substantially as herein described, and for the purpose set forth.

2. In a furnace, the combination of the distributers D, fire-grate, and hollow perforated bridge-wall l , substantially as described, and for the purpose set forth.

3. The furnaces B, having chambers l' and O, in combination with a general receiving and combustion chamber, P, substantially as herein described, and for the purpose set forth.

W. S. COLWELL.

Witnesses:

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JOHN L. KERR.