

(No Model.)

2 Sheets—Sheet 1.

A. M. BISHOP.
BRICK KILN.

No. 565,594.

Patented Aug. 11, 1896.

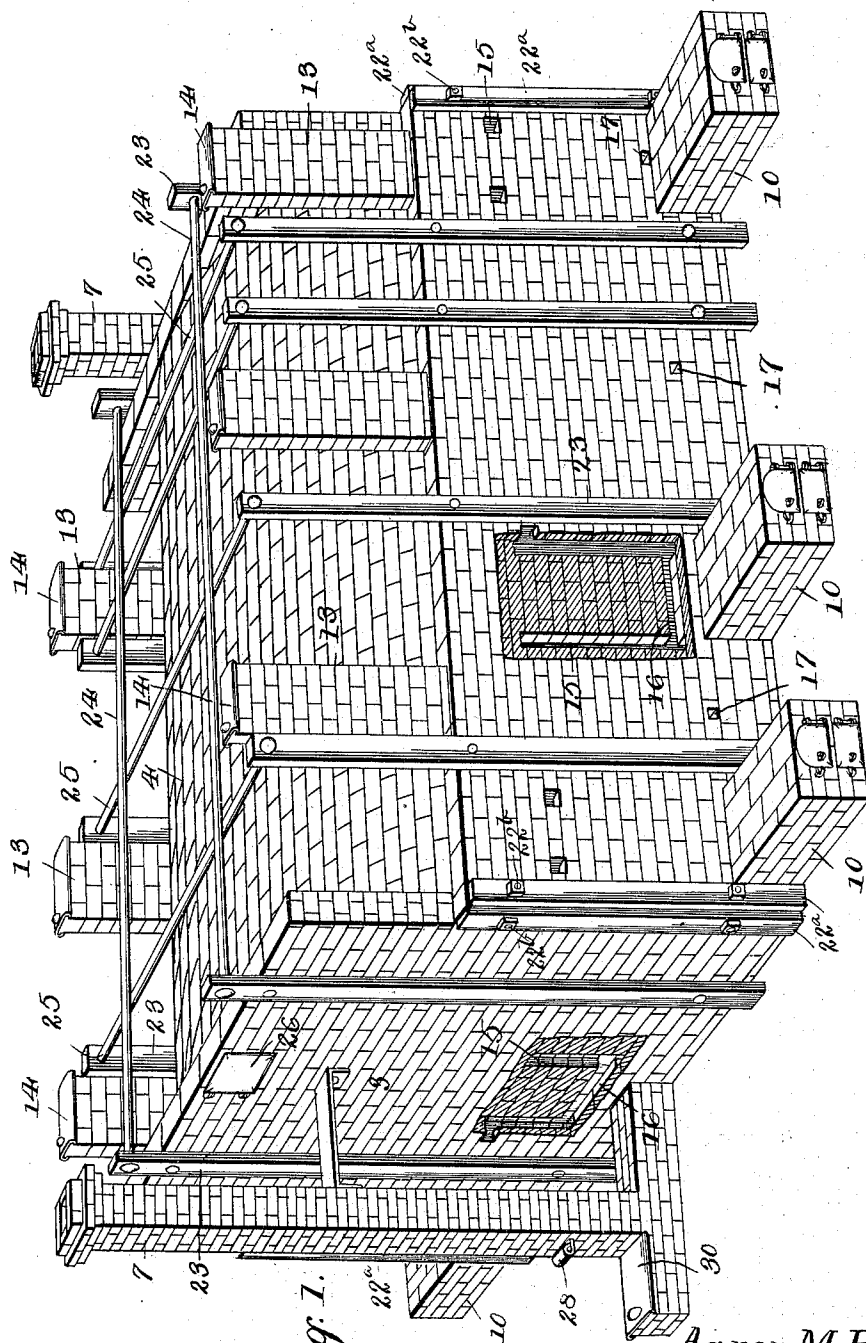


Fig. 1.

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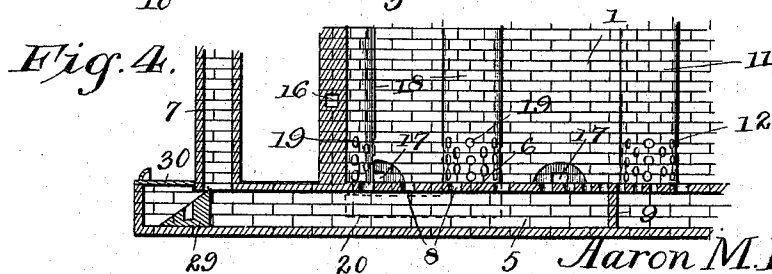
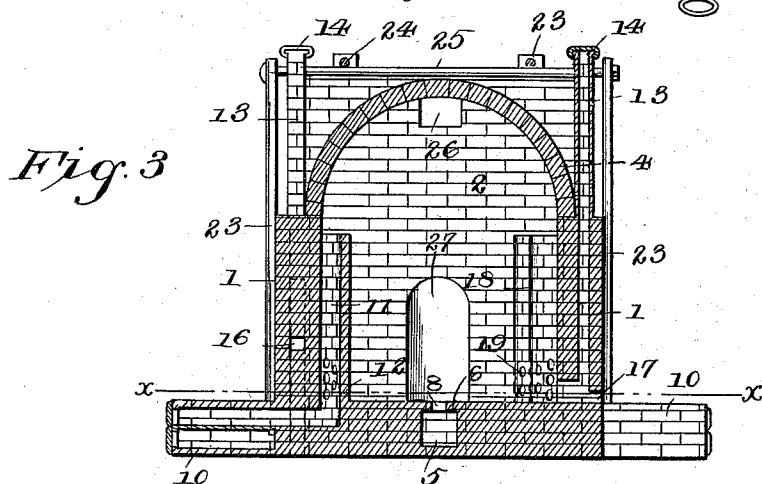
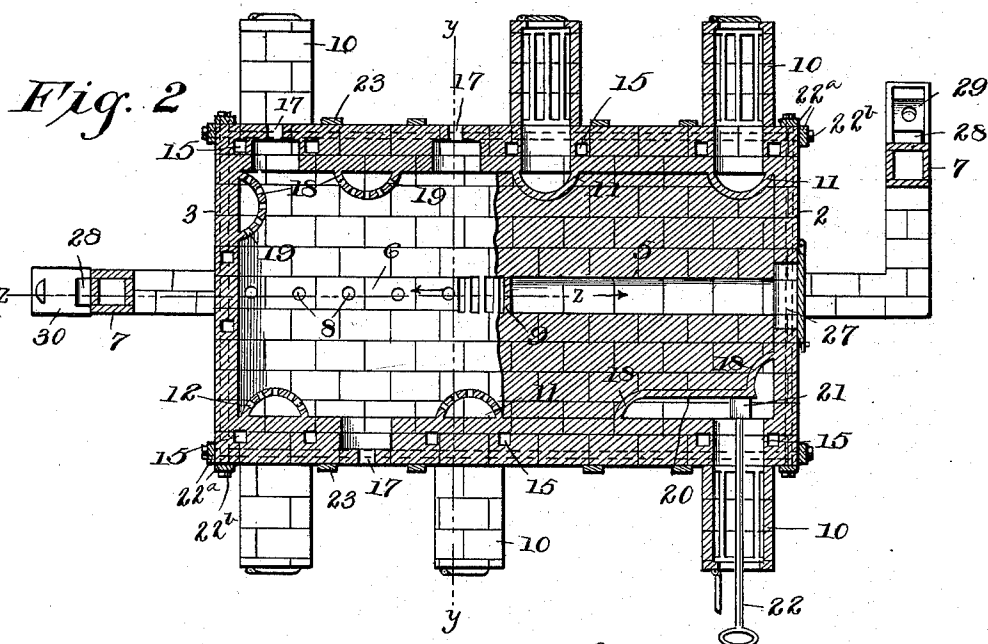
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UNITED STATES PATENT OFFICE.

AARON M. BISHOP, OF GREEN SPRING, OHIO.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 565,594, dated August 11, 1896.

Application filed July 22, 1895. Serial No. 556,765. (No model.)

To all whom it may concern:

Be it known that I, AARON M. BISHOP, a citizen of the United States, residing at Green Spring, in the county of Seneca and State of Ohio, have invented a new and useful Brick-Kiln, of which the following is a specification.

This invention relates to certain new and useful improvements in kilns for water-smoking and burning brick, and aims to secure a thorough and uniform distribution of the heat throughout the interior of the kiln and to obviate cold corners or places which in the ordinary kiln are not reached by the effective heat so as to thoroughly and effectually burn the brick.

The invention also aims to prevent the cracking and bulging of the walls and to provide for the escape of the heat at the places directly above the furnaces, thereby preventing injury to the furnace-walls from the excessive heat.

Other objects and advantages are contemplated and will appear in the following description in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a brick-kiln constructed in accordance with this invention, parts being broken away. Fig. 2 is a plan section thereof about on the line X X of Fig. 3, parts being broken away. Fig. 3 is a cross-section on the line Y Y of Fig. 2. Fig. 4 is a detail section on the line Z Z of Fig. 2.

The kiln comprises similar side walls 1, a front wall 2, a back wall 3, and a crown 4, the latter curving between its edges and supported upon the side walls 1. A smoke-flue 5 extends longitudinally of the kiln and beneath its floor 6, and communicates at its ends with similar stacks 7, which are of a suitable height to create a strong draft through the said flue 5. This smoke-flue 5 is arched over, and a series of vertical passages 8 establish communication between it and the interior of the kiln and form escapes for the smoke and gases from the interior of the kiln to the smoke-flue 5. A division-wall 9 separates the smoke-flue 5 at an intermediate point, thereby preventing the smoke and gases from traveling the entire length of the kiln and causing the draft to be from the center of the smoke-flue outward in opposite directions to the stacks 7, as indicated by the arrows in Fig. 2.

A series of furnaces 10 of like construction are provided along the sides of the kiln at proper intervals, and their inner ends communicate with vertical flues 11, which terminate a short distance from the top of the side walls 1, so as to convey the hot air to the crown of the kiln. These vertical flues 11 have a series of openings 12 in their inner walls for the ingress of cold air from the interior of the kiln when starting the latter. These openings 12 extend for a short distance above the floor 6, and in the operation of the kiln the air in the lower portion thereof is drawn into the vertical flues 11 through the openings 12 by the strong draft of the hot air in its passage upward through the vertical flues 11, thereby creating a circulation of air within the kiln which materially assists in the burning of the brick. The walls of the vertical flues 11 project inwardly from the inner sides of the kiln-walls, and are preferably semi-circular in plan section, as substantially this form has been found to give the best results.

A series of chimneys 13 are provided, one for each furnace, and communicate at their lower ends with the interior of the kiln at about the floor-line, and these chimneys are intended for carrying off the water-smoke and the excess of smoke and gases when starting the fire in the furnaces. These chimneys will be conveniently located, and it is not essential that they be placed above the furnaces, but it is preferred to arrange them equidistant along the sides of the kiln-walls to present a uniform appearance and to secure a uniform draft within the kiln. Cut-offs 14 are provided for closing the upper ends of the chimneys when it is required to retain the heat, as during the process of burning the brick after the water-smoking has been completed and after the fires in the furnaces have been thoroughly ignited.

To prevent cracking and disintegrating of the kiln-walls by the excessive heat attendant upon the fires in the furnaces, air-passages 15 are formed in the side walls of the kiln directly above the furnaces 10, two passages being provided in that portion of the wall immediately above the furnaces, and these passages extend in vertical and parallel relation and open outward at their upper ends for the escape of the heat absorbed by

that portion of the wall in proximate relation to the furnaces. These vertical and parallel air-passages 15 are connected by a cross-passage 16, so as to equalize the temperature and insure the escape of the heat from one or the other of the passages in the event of one becoming closed from any cause.

In order that the burning of the brick may be observed, a series of peep-holes 17 are located in the sides of the kiln, preferably about opposite the floor 6 and in that portion of the kiln-walls opposite the communication of the chimneys 13 with the interior of the kiln. By locating the peep-holes at these points a greater range of observation can be had because the walls are thinnest at such points and because the communication of the chimneys with the interior of the kiln admits of a greater range of vision without the necessity of enlarging the inner ends of the peep-holes, as will be readily understood.

The cold corners existing in brick-kilns of ordinary construction are obviated in the present invention by providing vertical flues 18 similar in construction to the vertical flues 11, and placing the same at diagonally opposite points of the kiln and upon the end walls thereof. These vertical flues extend to a height equal with the vertical flues 11, and have openings 19 near their lower ends above the floor 6 for the same purpose as the openings 12, and these flues 18 communicate at their lower ends with ducts 20, which extend into and communicate with the adjacent furnaces and with the proximate vertical flues 11. Thus it will be seen that the diagonally opposite furnaces adjacent to the vertical flues 18 supply the latter and the contiguous flues 11 with heat. A block 21 is located in each of the ducts 20 and is movable therein to secure an equal distribution of the heat to each of the communicating flues 18 and 11. Thus if the heat passing to the flue 18 is in excess of the heat passing to the adjacent flue 11, the block 21 is moved so as to control the heat and cause the latter to pass equally to each of the communicating flues, thereby distributing the same within the kiln. The block 21 is accessible through the furnace and is shifted by means of a poker 22 or other convenient implement. Obviously any convenient means may be employed for operating the block 21 to attain the desired end.

The kiln will be constructed of brick or masonry in any of the usual ways with the corners securely bound by vertical corner-beams 22^a, arranged on the outside of the side and end walls at the corners thereof and fastened in position by tie-bolts 22^b, embedded in the walls. In order to prevent the warping of the walls, the latter are strengthened and braced by vertical beams 23, which are connected at their upper ends by longitudinal and transverse tie-rods 24 and 25, the lower ends of the vertical beams being fixed in any manner, preferably by being em-

bedded in the ground. In order to secure ventilation, the end walls are formed at their upper ends with openings which are closed by doors 26. The front wall is supplied with a door 27, through which the brick to be burned is passed into the kiln and removed therefrom. The rear wall is supplied with vertical air-passages 15 and a cross connecting-passage 16, similar to the air-passages formed in the side walls above and in proximate relation to the furnaces 10. Dampers 28 are located in the stacks 7 to cut off the draft therethrough when it is desired to concentrate the heat and complete the burning of the brick. Check-blocks 29 are located in the extensions of the smoke-flue 5 and are adapted to be moved more or less directly beneath the stacks 7 to regulate the draft therethrough. The extremities of the smoke-flue 5 are projected beyond the stacks 7 a short distance to accommodate the check-blocks 29 when the latter are moved outward, so as not to obstruct the draft through the smoke-flue 5 and the stacks 7. The extreme portions of the smoke-flue are open at their top sides and are closed by doors 30, and when these doors are open a poker or other instrument can be inserted into the ends of the smoke-flue 5 and engaged with the check-blocks 29 to enable the proper adjustment of the latter for attaining the required draft through the kiln.

The green brick to be burned are supplied to the kiln and built up in the usual way upon the floor 6, after which the fires in the furnaces are started, all the drafts and dampers being open to provide for the ready escape of the smoke and products of combustion and also to facilitate the escape of the moisture expelled from the brick during the process of water-smoking. After the bricks have been thoroughly water-smoked the check-blocks 29 and the cut-offs 14 are properly adjusted to retain and prevent the too rapid escape of the heat, and after the bricks near the outer walls of the kiln have been burned the cut-offs 14 are completely closed and the dampers 28 drawn out and the check-blocks 29 moved, so as to provide for as strong a draft as possible through the smoke-flue 5 and the stacks 7. This causes the flame and heat to pass downwardly from the crown through the body of the brick, burning the latter, thence through the smoke-flue 5 and the stacks. After the burning has sufficiently progressed the dampers 28 are closed and the heat retained, thereby permitting the brick to gradually cool and to thoroughly anneal, so as to obviate cracking and splitting incident to the too rapid cooling of the brick after the same have been burned.

The invention is susceptible of application to kilns for burning pottery-ware and for other purposes where it is required to secure an equal distribution of the heat throughout the space inclosed by the kiln-walls. Hence it is to be understood that in adapting the in-

vention to the particular form or style of
kiln various changes in the form, proportion,
and the minor details of construction may be
resorted to without departing from the prin-
5 ciple or sacrificing any of the advantages of
this invention.

Having thus described the invention, what
is claimed as new is—

10 In a kiln, the combination of a vertical flue
at the end wall, a companion vertical flue lo-
cated at the side of the kiln, a duct connect-
ing the two vertical flues, a furnace for sup-

plying heat to the said duct, and a block ar-
ranged in the duct and adapted to be moved
therein to control the passage of the heat to 15
the said flues, substantially as set forth for
the purpose described.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in
the presence of two witnesses.

AARON M. BISHOP.

Witnesses:

MARK CLINGER,
HENRY PARKER.