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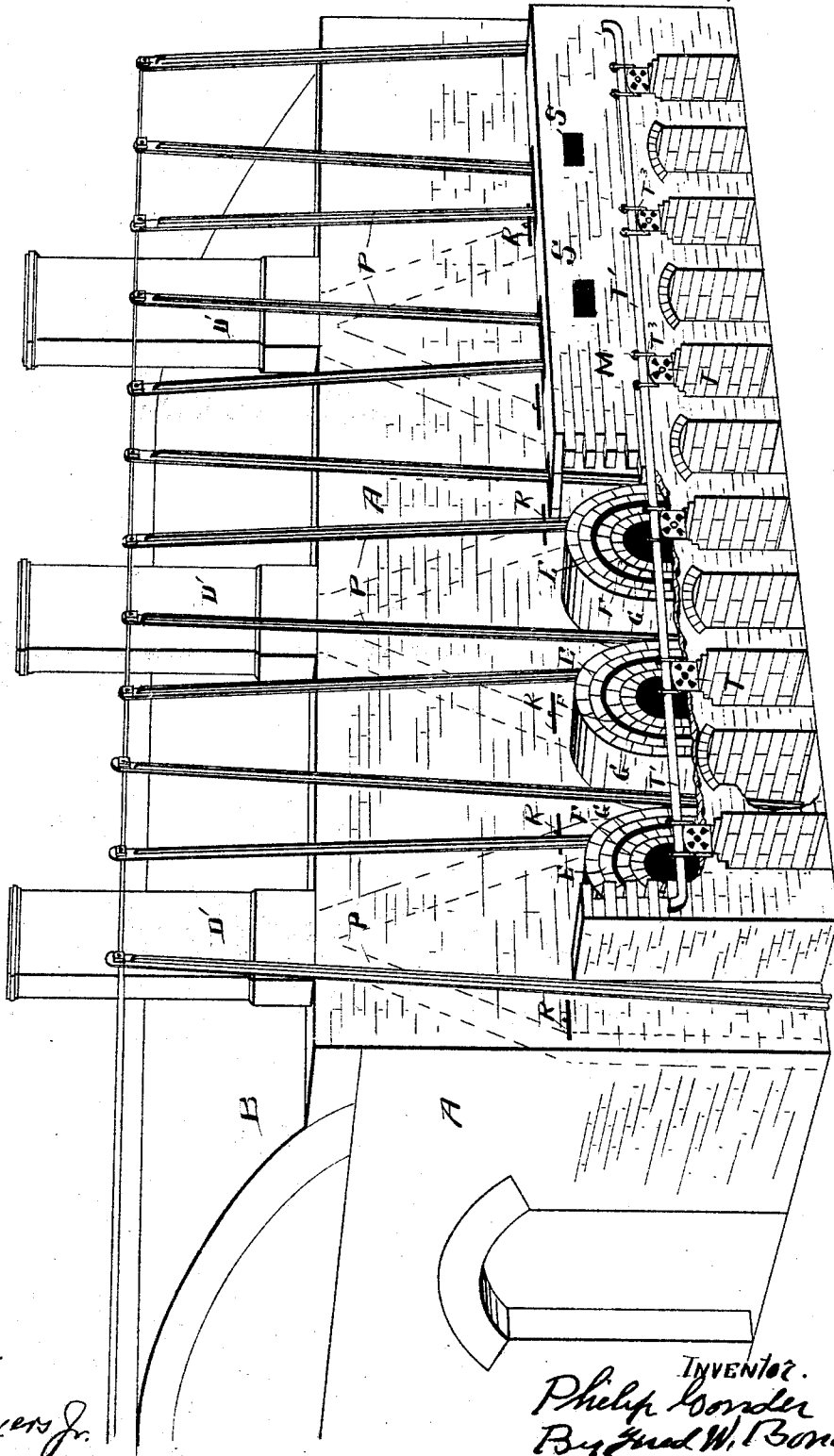
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P. GONDER.
BRICK KILN.

No. 509,890.

Patented Dec. 5, 1893.

Fig. 1



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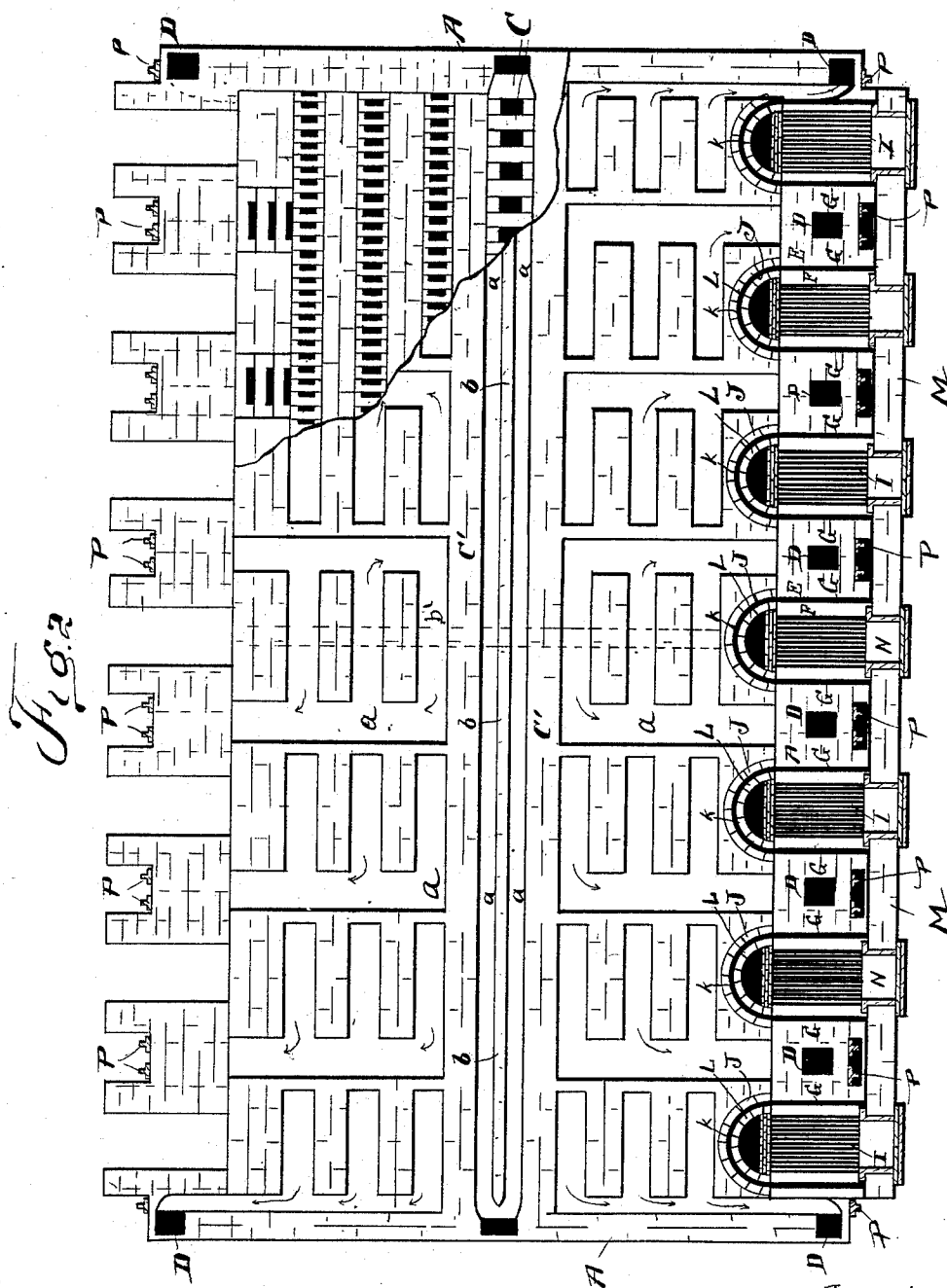
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Fig. 3

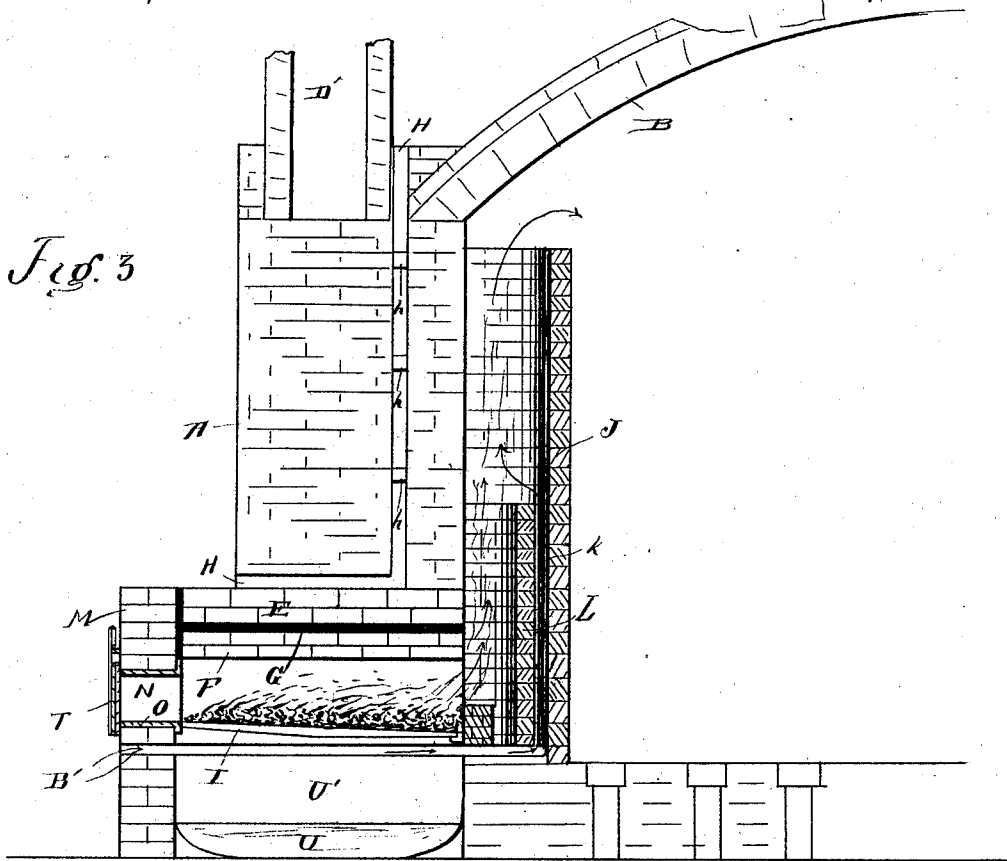


Fig. 4

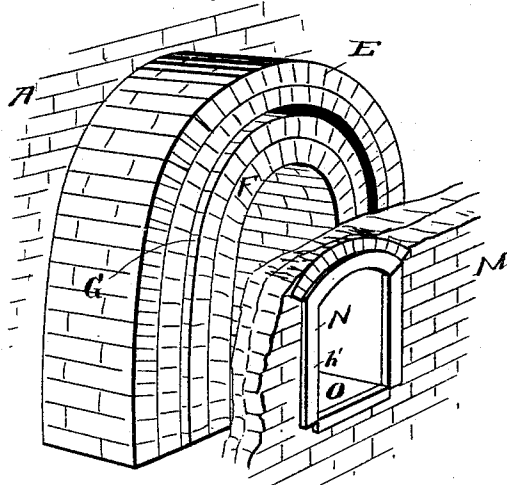
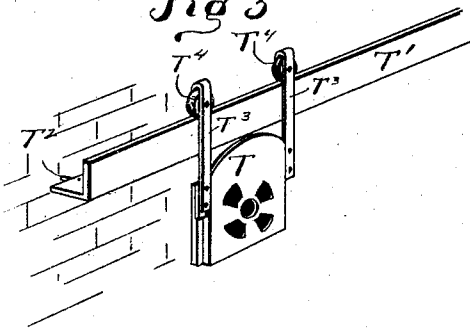


Fig. 5



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Fig 6

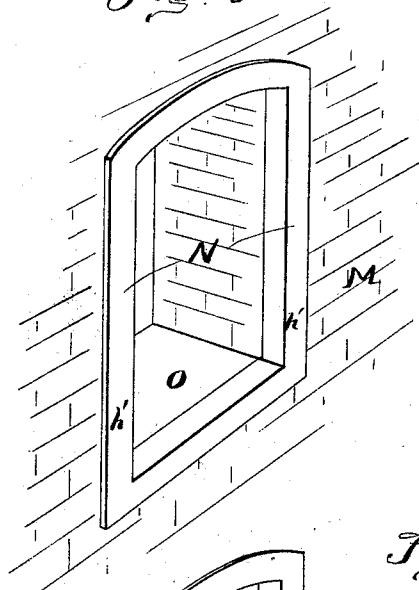


Fig 7

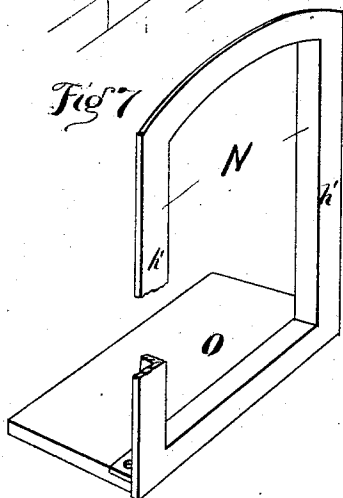


Fig 9

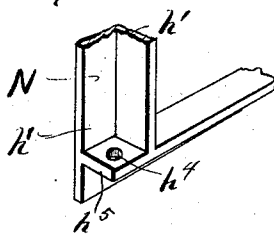


Fig 8

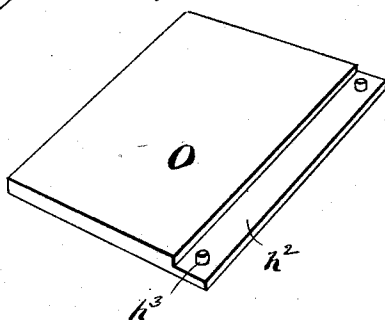
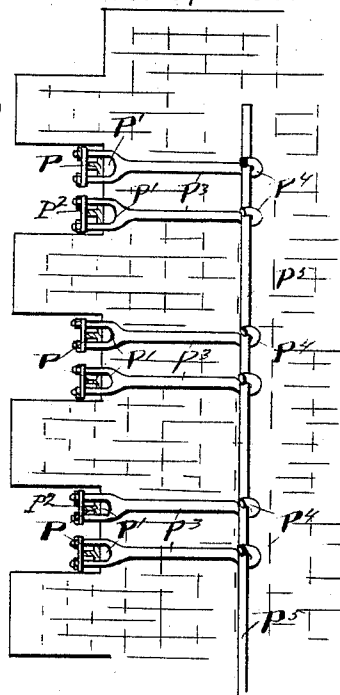


Fig 10



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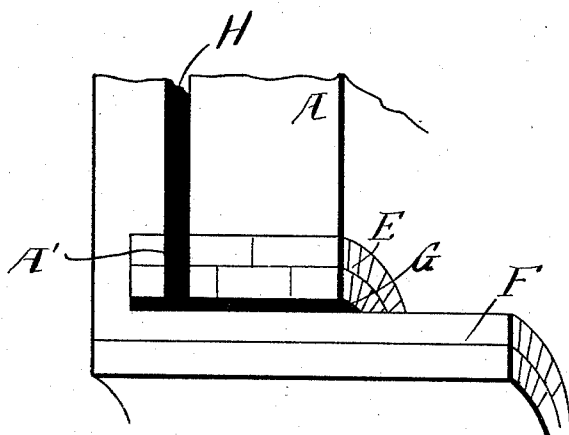
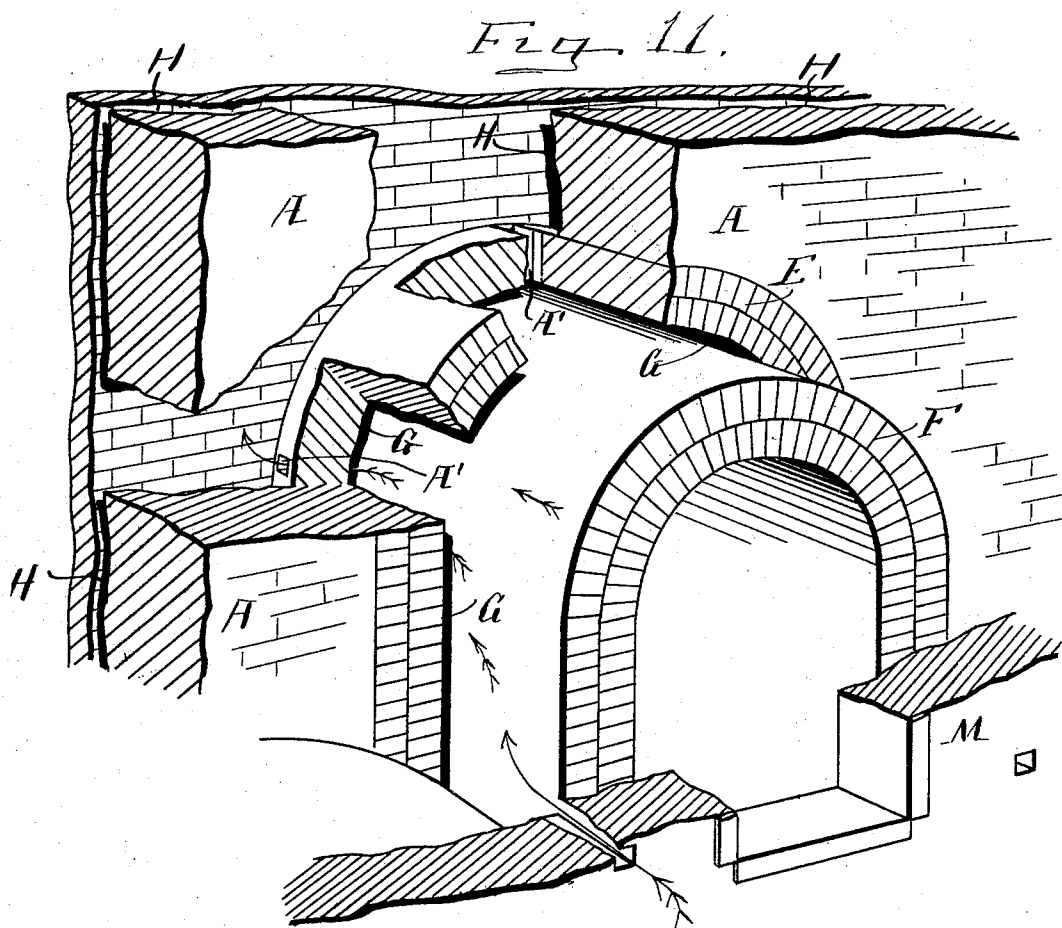
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UNITED STATES PATENT OFFICE.

PHILIP GONDER, OF CANTON, OHIO.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 509,890, dated December 5, 1893.

Application filed May 17, 1893. Serial No. 474,600. (No model.)

To all whom it may concern:

Be it known that I, PHILIP GONDER, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Brick-Kilns; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1, is a perspective view showing the location and arrangement of the kiln proper, and showing a portion of the furnace wall removed, for the purpose of illustrating the location and arrangement of the arches together with their different parts. Fig. 2, is a view showing the location and arrangement of the flues to be located below the kiln floor; also showing a portion of the kiln floor properly laid and ready to receive the brick designed to be burned; also showing the arrangement of the furnace grates, and the pocket-wall foundation, together with the pocket wall properly started. Fig. 3, is a vertical section of the furnace, showing the location of the pocket wall when properly finished, and also showing the different air passages, located within the pocket wall, and within the arch. Fig. 4, is a detached view of a single arch, illustrating a portion of the furnace wall and furnace door frame properly located. Fig. 5, is a detached view showing a portion of the furnace door bar or track properly located and a door properly suspended therefrom. Fig. 6, is a view showing a portion of the outer or furnace wall, showing the door frame properly located and also the door plate. Fig. 7, is a detached view of the furnace door frame, and floor plate, showing the frame broken for the purpose of illustrating the shape of the door frame in cross section. Fig. 8, is a detached view of the furnace door plate. Fig. 9, is a detached view showing a portion of the furnace door frame and illustrating the inner side or portion of said frame; also showing the connecting plate or lug. Fig. 10, is a view showing the bottom or lower ends of the kiln staves or braces, illustrating the manner of anchoring said kiln

staves or braces. Fig. 11, is a view showing a portion of the kiln wall, and illustrating a portion of one of the arches, also showing manner of connecting the air passages. Fig. 12, is a view, showing a portion of the kiln wall and one arch, and illustrating the position of the air passages, said figure being a longitudinal section of the arch.

The present invention has relation to brick kilns, and it consists in the different parts and combination of parts hereinafter described, and the novel manner of constructing the kiln.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

In the accompanying drawings A represents the end and side walls of the kiln proper, which, when properly constructed, form a rectangular kiln, substantially of the form shown in Fig. 1.

The top or upper part of the kiln is covered or inclosed by the arch or crown B, which arch or crown is constructed in the ordinary manner.

Below the kiln floor proper are located a number of flues such as *a*, and are formed of sufficient width and depth to provide the desired amount of draft.

For the purpose of distributing the draft to the different flues located and formed in the side of the kiln proper, the longitudinal partition *b*, and the cross partition *b'*, are provided, thereby providing a more direct draft to the flues hereinafter described.

For the purpose of providing a means for placing the kiln floor brick C, in such a position that they will properly cover the flues *a*, and at the same time provide a means for a direct communication from the interior of the kiln to the flues, the walls or partitions C are provided, which walls or partitions are located and arranged substantially as illustrated in Fig. 2.

The chimney flues D, are started in the foundations of the furnace or kiln walls, and communicate with the flues *a*, which flues are located below the kiln floor proper. At the bottom of the furnace or kiln wall, is located a chimney flue, upon each side of the furnaces,

as illustrated in Fig. 2, which flues are battered as they are brought up with the kiln wall until they meet and form one flue, which is extended up and beyond the kiln wall, by means of the chimneys D'. It will be understood that there are two flues for each chimney, thereby reducing the number of chimneys, and at the same time reducing the cost of construction. Between the battered chimney flues D, are located the bearing arches E, which bearing arches are located and arranged substantially as illustrated in Figs. 1 and 4.

The bearing arches E, are preferably formed of the same class and kind of brick, that the kiln walls proper are formed of. Below the supporting arches E, are located the furnace arches F, which furnace arches are formed of what is known as fire brick, and as shown in Figs. 1 and 4, said furnace arches are separated from the supporting arches by means of the air passages G, which air passages are for the double purpose of providing two separate and distinct arches, thereby providing a means for removing the furnace arches F, without disturbing in any manner the supporting arches, thereby providing a means for renewing the furnace arches after they have been burned out, or destroyed, from any other cause. It will be understood that by providing the air passages G, the furnace arches F, will be permitted to expand and contract without disturbing in any manner the supporting arches E, or the kiln walls proper. The air passages G, are extended downward as illustrated in Fig. 4, thereby inclosing the entire furnace wall or arch F. By this arrangement, it will readily be seen that the furnace wall proper is to a certain extent a separate and distinct structure from the balance of the kiln proper. For the purpose of connecting the air passages G, the main kiln wall A is provided with the air space H, which air space H, runs longitudinally with the side walls of the kiln; and for the purpose of connecting the walls located upon two sides of the air passage H, a sufficient number of tie bricks h , are employed to properly connect the divisions of the kiln walls. Below the furnace arches F, and at the bottoms of the furnaces proper, are located the grate bars I, which grate bars may be constructed in the ordinary manner, and held in proper position in any convenient and well known manner. At the inner ends of each of the furnaces, there is located a pocket wall J, which wall is semicircular in cross section, as illustrated in Fig. 2, and is built up within the kiln to within a short distance of the heel or base of the crown or arch B. These pocket walls are for the purpose of conducting the flame or heat to the top or upper part of the kiln.

For the purpose of closing the inner ends of the furnace proper the short cross walls L, are provided, which cross walls are built to such a height that they will form a stop or back wall for the furnace grates; it being

understood that said walls should not be built to a height so as to interfere with the passage of the smoke and heat, to the top or upper portion of the kiln. For the purpose of providing a pocket wall that will permit the same to expand and contract by heat and cold, without injury, the air passage k , is formed in the pocket wall, which extends about half the height of the pocket wall proper. The portion of the pocket wall J, provided with the air passage, is formed double, and the top or upper end of the air passage communicates with the interior of the pocket wall as illustrated in Fig. 3. Along the front edges of the arches E and F, is built a wall M, inclosing the arches proper, said wall being best illustrated in Fig. 1, a portion of said wall being shown in Fig. 4. Within the wall M, are located the door frames N, which door frames are formed of sufficient size to provide an opening to feed fuel to the furnace proper. These door frames N, are provided with the right angled flanges h' , which right angled flanges are for the purpose of protecting the corners of the wall. At the bottom of the door proper is located the door plate O, which door plate is provided with the offset h^2 , and the lugs h^3 , said lugs being for the purpose of receiving the apertures h^4 , formed in the flange h^5 , thereby securely uniting the bottom or lower end of the door frame, to the plate O.

For the purpose of preventing the side walls A, of the kiln proper from bulging or spreading, the kiln staves or braces P, are provided, and are located upon each side of the kiln, substantially as illustrated in Fig. 1. For the purpose of securely anchoring the bottom or lower ends of the staves or braces P, the yokes P', are provided, which yokes are provided with the screw threaded ends, which receive the screw threaded nuts by means of which the cross bars P², are securely held against the outer edges of the staves or braces P, and thereby binding said staves or braces between the cross bars, and the outer faces of the kiln wall proper. The yokes P', are each provided with the arms P³, which arms are provided upon their inner ends with the hooks P⁴, said hooks being engaged with the longitudinal bar P⁵. It will be understood that the bars P³ and P⁵, are to be embedded in the kiln wall proper, thereby securely anchoring the staves or braces P. The top ends of the staves or braces P, are securely bound together by means of ordinary tie rods, which extend across the top of the kiln proper, and are provided with the ordinary screw threaded collars for the purpose of tightening the tie rods.

Each of the chimney flues D, is provided with a damper R, which dampers are located substantially as shown in Fig. 1, and are for the purpose hereinafter described. From the chimney flues D, lead the cooling holes S, which cooling holes are to be covered by a

hinged door or otherwise, when not in use. After a kiln of brick has been properly burned, and it is desired to cool the kiln, the cooling holes S are opened, and the dampers R are closed, thereby permitting cold air to enter the flues D, below the closed dampers, and extending downward through the chimney flues, and into the floor flues *a*, thence upward through the kiln floor and the brick, and finally to escape through the proper opening provided in the top of the crown B.

For the purpose of providing a means for easily operating the furnace door T, the angle bar such as T', is provided, and located substantially as illustrated in Fig. 1, except that said bar may be located somewhat higher than illustrated in said figure, if desired; as it will be understood that my improvement can be carried out without reference to any particular location of the bar or track T'. The angle bar or track T', is securely held in proper position by means of a number of bars such as T², built in the wall, and the track riveted or bolted to the bars T², substantially as illustrated in Fig. 5. The doors T, are each provided with the arms T³, which arms extend upward and their upper ends provided with the grooved pulleys T⁴, which grooved pulleys roll back and forth upon the track T'.

It will be understood that by my peculiar manner of hanging the doors T, they can be easily moved back and forth and thereby provide a means for easily opening or closing the doors.

For the purpose of preventing the grate bars I, being destroyed by excessive heat, the water pans U are located below the grate bars I, and at the bottom of the ash pits U', as illustrated in Fig. 3. During the time a kiln of brick is being burned, water is placed in the water pans U, thereby providing a means for cooling the bottoms or under sides of the grate bars.

The air passage H, extends to the top of the kiln wall proper, as illustrated in Fig. 3, and its bottom or lower end is continued horizontally to the outer face of the kiln wall, as illustrated in said Fig. 3, thereby permitting cold air to enter said air passage and causing a current of air to circulate through said passage. It will be understood that tie bricks should be employed at intervals along the horizontal portion of the air passage, a sufficient number being employed to support the wall above said passage, and at the same time be so distributed, so as not to materially interfere with the entrance of air.

For the purpose of permitting air to enter the air passage G, the outer kiln wall or furnace wall should be set at a short distance away from the front faces of the arches E and F, thereby permitting air to enter said air passages.

It will be understood that by providing the air passages as above described, the main kiln walls will not crack by reason of expansion

or contraction, thereby increasing the durability of the kiln walls proper.

As shown in Fig. 3, an air passage is provided which is located to one side and below the furnace proper, which leads through the wall and connects with the air passage located within the pocket wall; said air passage being designated by the letter B'. The furnace wall M, located in front of the arches E and F, and provided with the cooling holes S, is one continuous wall from end to end, and above the ash pit and the furnace openings is a solid wall, except the openings provided to receive the staves or braces as illustrated in Fig. 1. The ends of the wall M, are built solid with the kiln wall A, and the top of the wall M is connected with the kiln wall, thereby inclosing the space between the ends of the arches E and F, and at the same time leaving a space between the inner faces of the wall M, and the outer faces of the arches E and F. By this arrangement, it will be understood that the arches will be permitted to expand and contract without interfering with the wall M, or the kiln walls A, thereby preventing the lateral strain of either the kiln walls A, or the furnace walls M.

For the purpose of connecting the air passages G and H, the air passages A' are provided, which air passages extend through the walls of the supporting arches E. In use I prefer to locate one of the openings or passages A' at the top of the supporting arch, and an opening upon each side of the supporting arch; but it will be understood that these openings may be varied, as to location and number without departing from the nature of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a kiln, constructed substantially as described, having located below the floor thereof a series of flues, and partitions *b* and *b'*, a kiln floor located above the flues *a*, the arches E, and F, the air passages G, located between the arches, the pocket walls J, provided with air passages, the chimney flues D located between the arches, and the chimneys D', leading from the flues D, substantially as and for the purpose set forth.

2. The combination of a brick kiln, of the class described, provided with flues below the floors thereof, a kiln floor located above the ground flues, the flues D, communicating with the flues *a*, the arches E and F, and separated from each other and the pocket walls J, substantially as and for the purpose specified.

3. The combination of a kiln of the class described, and provided upon the sides thereof with arches such as E and F, separated from each other to form an air passage G, communicating with the air passage H, through the air passages A', substantially as and for the purpose specified.

4. The combination of the kiln such as de-

scribed, and provided upon the sides thereof
with arches, such as E and F, the air passages
G, H, and A', grates located within the arches,
and water pans, located below the grates, sub-
stantially as and for the purposes specified.

5 5. The combination of a kiln, provided with
staves or braces P, the yokes P', having screw
threaded ends, the cross-bars P², the arms P³
provided with hooks, and the longitudinal

bars P⁵, substantially as and for the purpose re-
specified.

In testimony that I claim the above I have
hereunto subscribed my name in the presence
of two witnesses.

PHILIP GONDER.

Witnesses:

WM. STERLING,
F. W. BOND.