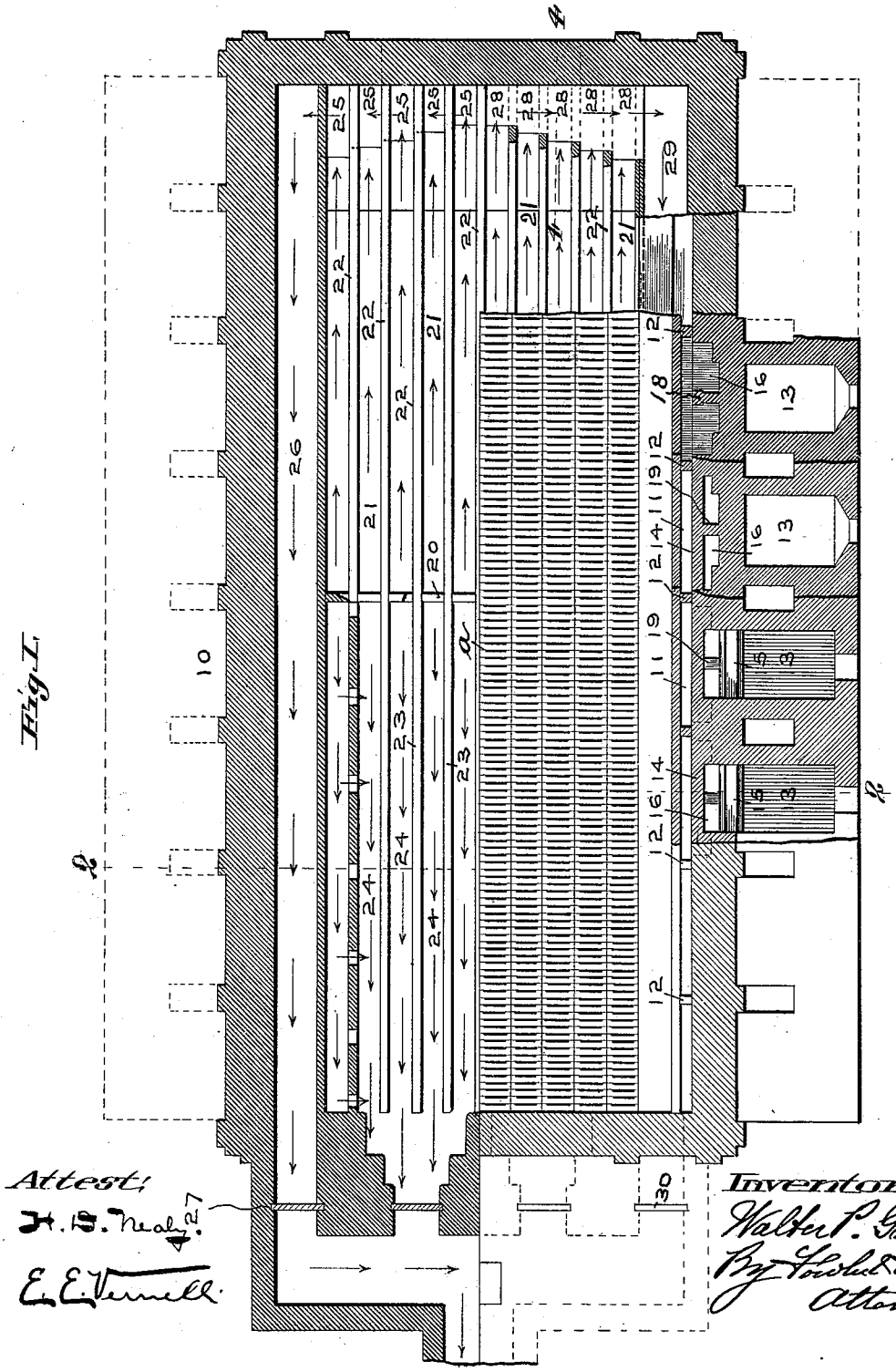
(No Model.) 2 Sheets—Sheet 1.

W. P. GRATH.

BRICK KILN.

No. 546,776. Patented Sept. 24, 1895.



(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

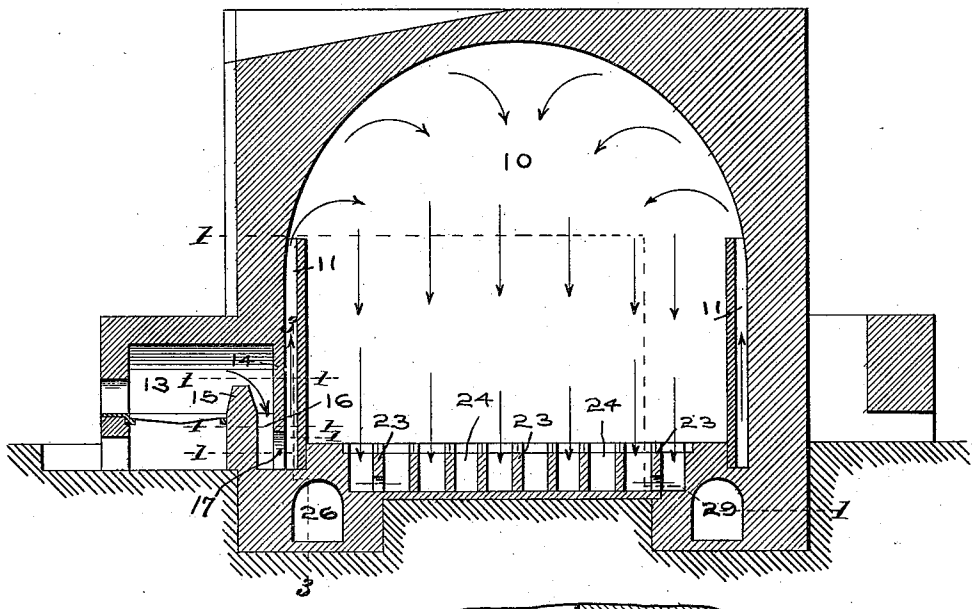


Fig. 3.

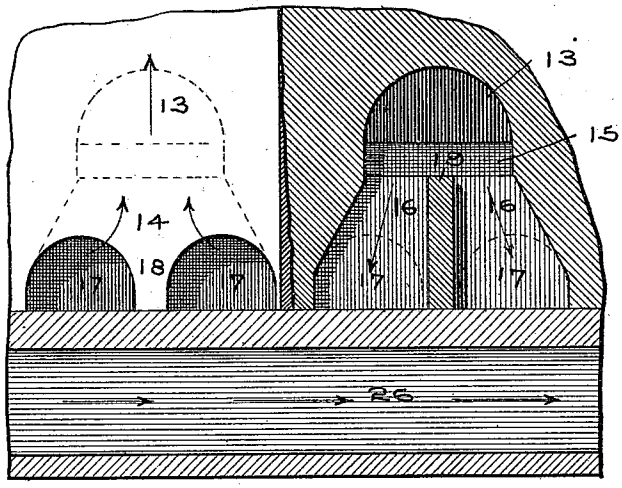
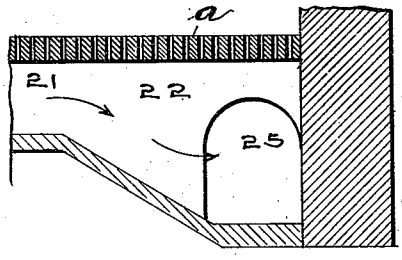


Fig. 4



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UNITED STATES PATENT OFFICE.

WALTER P. GRATH, OF ST. LOUIS, MISSOURI.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 546,776, dated September 24, 1895.

Application filed July 9, 1894. Serial No. 516,889. (No model.)

To all whom it may concern:

Be it known that I, WALTER P. GRATH, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Brick-Kilns, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention consists in a new arrangement of flues beneath the floor of the kiln, the purpose of which will be set forth hereinafter.

My invention will be best understood by referring to the accompanying drawings, in which—

Figure 1 is a sectional plan view taken on the line 1 1 of Fig. 2. Fig. 2 is a transverse vertical section of the kiln, taken on the line 2 2 of Fig. 1; and Fig. 3 is a vertical sectional view of a portion of the kiln, taken on the line 3 3 of Fig. 2. Fig. 4 is a vertical sectional view taken on the line 4 4 of Fig. 1.

The same marks of reference indicate the same parts in the different views.

10 is an ordinary downdraft-kiln constructed in other respects than herein specified in the ordinary manner.

11 represents the updraft-flues leading to the upper part or dome of the kiln.

12 represents partitions in the flues 11, dividing them into separate flues, each leading from its own furnace. Ordinarily the flame proceeds from the furnaces up the flues 11 directly to the bricks opposite the furnaces, and the bricks between the furnaces at the sides of the kiln are not subjected to the flame.

In the present case, 13 represents the furnaces constructed in the ordinary way, except that the flame does not pass directly from the furnace-grate to the updraft-flues, but passes first downwardly and then to the updraft-flues leading to the top of the kiln. To accomplish this I interpose between the updraft-flues 11 and each furnace 13 a wall 14, and I also interpose between each furnace and the wall 14 a bridge-wall 15, leaving a downdraft-flue 16, leading from the upper part of the furnaces 13 to the lower part of the flues 11. In this way the flame passes downward through the flue 16 before it can enter the updraft-flues 11, leading to the top of the kiln. One advantage of this construction is that when the furnaces are being fired and the doors above the grate-bars of the furnaces are opened cold air cannot pass through the furnace directly to the updraft-flues 11, but must pass downward through the flue 16, between the bridge-wall and the wall 14, which, being at a high temperature, heats the air before it reaches the updraft-flues 11 and shields the bricks in the kiln from drafts of cold air, thereby preventing the chilling of the bricks within the kiln. The wall 14 at its lower part is fashioned to form two archways 17, leaving a part 18 between the archways to support the wall 14 and thereby help to sustain the kiln.

Within the flue 16, leading divergently down from the furnaces 13 to the archways 17, as shown in Fig. 3, is a vertical partition 19 between the wall 14 and the bridge-wall 15. The flame in passing upward from the furnace-grate descends to the flue 16, where it diverges and divides into two parts, going through the archways 17 to the upper part of the kiln through the updraft-flues 11. The flame in passing down the flue 16 is separated, and while it to some extent unites in the flues 11, yet the partition-wall and part 18 cause the flame to so diverge and separate as to cause a continuous sheet of flame to issue all along the length of the kiln from the top of the flues 11, instead of, as heretofore, having certain portions along the top of the flues 11 between the furnaces from which practically no flame issues. I am thus enabled to burn all the bricks in the kiln uniformly.

My invention relates to improvements in the way of arranging the flues beneath the floor of the kiln. This is shown in Fig. 1 more particularly. In my patent aforesaid I divided the space beneath the floor *a* into different sections at the front and rear of the kiln, the flues at the front of the kiln beneath the floor delivering the heated air to a common flue near the middle of the kiln and passing along flues at the sides of the kiln. By this arrangement the heat is caused to concentrate at the center of the kiln, leaving the front of the kiln comparatively cool. This is objectionable for the reason that the front of the kiln is protected only by a temporary masonry

placed in position after the kiln has been stacked with bricks for burning, whereas the rest of the kiln is constructed so as to be of a permanent character, and thereby more effectually protects the bricks from being chilled. This temporary masonry is of such character as to be readily removed after the charge of bricks is burned, so that the bricks may be removed from their kilns and another charge put therein. In practice it is found that the temporary masonry above referred to lets cold air into the kilns to some extent and chills the bricks at the front of the kiln. To obviate this I arrange to have the front half of the kiln deliver the heated air from the center to the front of the kiln, where it passes into a common passage-way leading into a flue, preferably at the side and beneath the floor of the kiln, to the smoke-stack.

I divide the kiln beneath the floor into two parts by a transverse partition 20, from which pass a series of flues 21, leading to the front of the kiln and formed by walls 22. From the central partition 20 extend walls 23 to the rear of the kiln, forming flues 24. These last-mentioned walls and flues are of substantially the same arrangement as referred to in my aforesaid patent, and need not be further referred to. One half of the flues 21 leading to the front of the kiln may deliver the heated gases to a passage-way common to such flues, and the other half of said flues may deliver into a passage-way common to the latter-mentioned flues. This is the arrangement shown in the drawings, Fig. 1. Here the flues 21 near the front of the kiln slope downwardly at the front of the kiln, as shown in Fig. 4, leading into a common flue 25, connected by archways in the walls 22 at the front of the kiln. This flue 25 delivers the heated gases into a flue 26, passing along the side and beneath the floor of the kiln. The draft through these flues may be controlled by a damper 27, which governs the passage of gases to the smoke-stack. The flues at the other side and front half of the kiln may also pass into a similar transverse flue 28 at the front of the kiln, which in turn leads into a flue 29, similar to in every respect the flue 26 previously described, and which is controlled by a damper 30, the same as flue 26. From this construction it results that the heated gases and air will be caused to pass toward or concentrate at the front of the kiln, and will thus effectually prevent the chilling of the bricks at the front, where the temporary masonry is, and the bricks at the front of the kiln will be burned as effectually as the bricks in the other parts of the kiln. The present arrangement is also an advantage in that it does away with the blank spaces beneath the floor of the kiln inclosed by the wall 12, in my previously-referred-to patent, and thus imparts greater uniformity to the heating of the kiln. It will therefore be seen that by reason of the proper distribution of the flame in the first instance, and, second, by the concentration of the heat at the front of the kiln, where most needed, I am enabled to burn all the bricks in the kiln uniformly.

Having fully set forth my invention and described the best mode now known to me of carrying out the principle thereof, what I desire to claim and secure by Letters Patent of the United States as my invention is—

1. A brick kiln divided beneath the floor thereof into a front and rear part, and having flues in the front part beneath the floor leading to the front of the kiln, said flues communicating with a return flue leading to the smoke-stack for the purpose described.

2. A brick kiln divided beneath the floor thereof into a front and rear part, and having flues in the front part beneath the floor leading into a common flue at the front of the kiln, said latter flue communicating with a return flue leading to the smoke-stack for the purpose described.

3. A brick kiln divided beneath the floor thereof into a front and rear part, the front part subdivided into two longitudinal halves, and having flues leading from each said subdivision to a common flue at the front of the kiln, and side flues beneath the floor of the kiln, communicating with the said flues at the front of the kiln, and leading to the smoke-stack, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal, this 5th day of July, 1894, in the presence of the two subscribing witnesses.

WALTER P. GRATH. [L. S.]

Witnesses:
A. C. FOWLER,
J. A. WESTON.