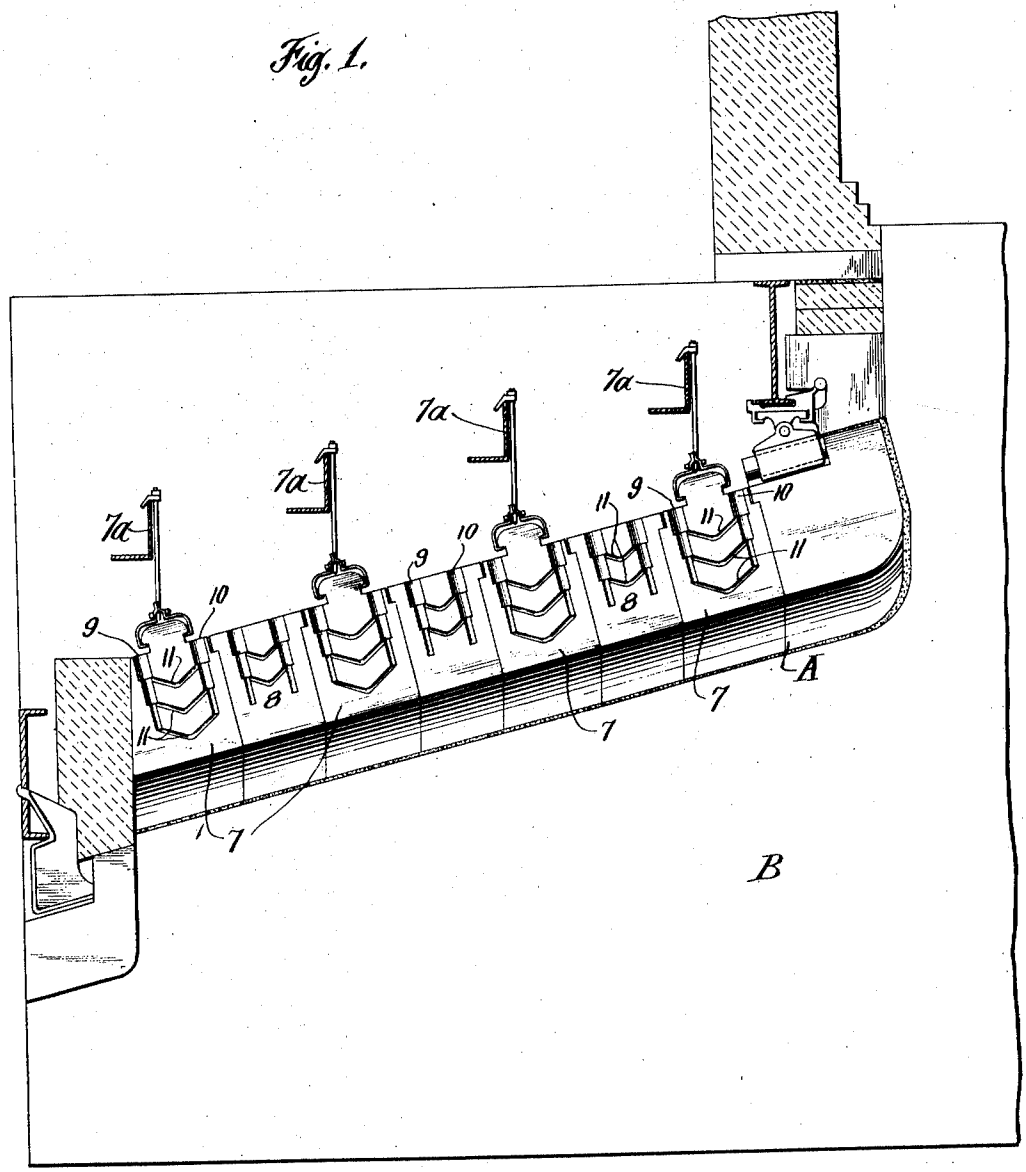
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VENTILATED BRICK CONSTRUCTION

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Fig. 1.



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Fig. 2.

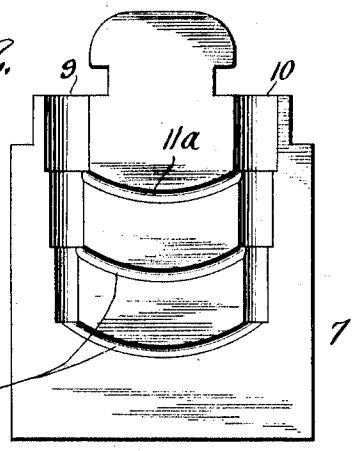


Fig. 3.

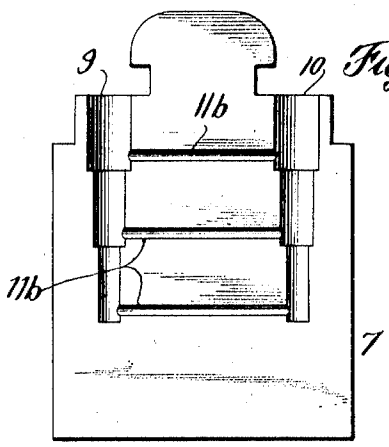


Fig. 4.

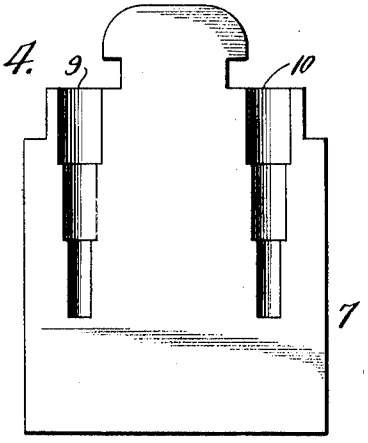


Fig. 5.

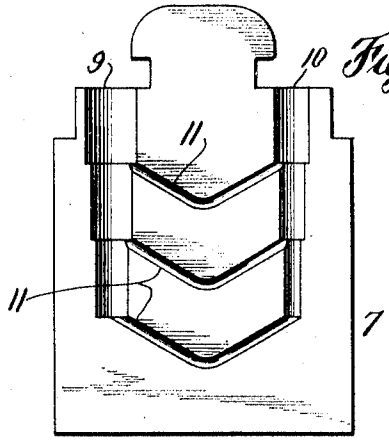


Fig. 6.

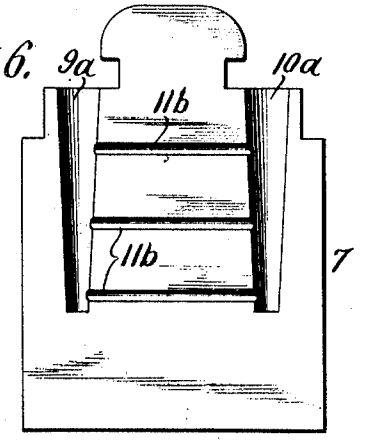


Fig. 7.

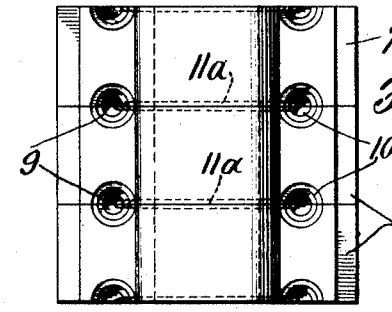
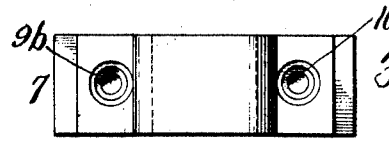


Fig. 8.



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Patented Aug. 6, 1929. 1,723,650

UNITED STATES PATENT OFFICE.

RALEIGH J. HIMMELRIGHT, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN ARCH COMPANY, A CORPORATION OF DELAWARE.

VENTILATED BRICK CONSTRUCTION.

Application filed January 16, 1923. Serial No. 612,926.

This invention relates to ventilated brick constructions and is particularly useful in arches, top and other walls of combustion chambers.

Among the difficulties encountered in the refractories of combustion chambers is the spalling of the brick, arising out of the difference in temperature between the portions nearest the source of heat and the portions away from the source of heat. This, of course, reduces the useful life of the arch or wall and it has sometimes been proposed to make the bricks of considerable depth so that they might last longer, but this does not meet the difficulty as the spalling occurs at a correspondingly increased depth so that there is no net gain.

It is the primary object of my invention to increase the life of brick structures by reducing the liability of spalling, and also the extent thereof should it occur; and my invention also contemplates increasing the life of such structures by the utilization of deeper bricks in which the spalling is eliminated, or, at least greatly reduced.

The foregoing, together with such other objects as may hereinafter appear or are incident to my invention, I obtain by means of a construction, various embodiments of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a longitudinal section through a portion of a stoker fired combustion chamber, showing the application of my improvements to an arch; Figs. 2 to 6, inclusive, are end elevations of arch brick, drawn on an enlarged scale, illustrating various modifications of the invention; Fig. 7 is a plan view of a number of the bricks of Fig. 2 when assembled; and Fig. 8 is a plan view of still another modification of the invention.

My invention proceeds upon the theory that if the heat of those portions of the bricks nearest the flame be conducted away more rapidly so that the temperature of such portions does not reach as high a point as is ordinarily reached, the tendency to spall will be eliminated or at least the spalling will not be of such an extensive character. With this end in view I ventilate the refractories by providing recesses in which a circulation or eddying of air is set up in a manner analogous to the drying out of a boot by inserting a piece of card board part way to the bottom. This current of air absorbs radiant heat and cools the bricks.

In Fig. 1, the reference letter A denotes the arch or top wall of the combustion chamber B, such arch being made of a plurality of courses of T-headed bricks 7, suitably suspended by their heads from the structural work 7^a and a plurality of courses of bricks 8, carried on the suspended courses of bricks. The bricks 7 of each suspended course have their side or abutting faces so recessed or grooved that between each pair of brick two channels or holes 9 and 10 are formed at opposite sides of their T heads, such channels or holes extending from the outer face of the bricks part way to the inner face of the bricks next the flame, and being preferably connected, in multiple, by cross channels 11. As shown, the holes or recesses 9 and 10 extend beyond the middle of the roof's thickness. These recesses 9 and 10 are stepped, the several sections thereof being successively of less diameter in a direction toward the inner face of the bricks. The channels 11 preferably connect the respective sections at their bases. Due to such causes as inequalities in manufacture, irregularities that must necessarily be present in assemblage, as well as possible differences in temperature and movement of the outside air, there will be uneven or unbalanced pressure conditions set up causing a current of air to flow in one direction or the other, down through the recess 9 and the channels 11 and up through the recess 10, or vice versa, as the case may be. That is to say, cold air will be drawn through the U passages in the bricks, and in passing therethrough will become heated by absorbing radiant heat, and thus the temperature of the inner portion of the bricks next the flame will not rise to such relatively high temperatures and spalling will be eliminated or reduced. The cooling action is quite effective, since the inner surfaces of the channels or recesses are exposed to direct contact with the air, and the extent of the U passages in the direction of roof slope promotes circulation.

The bricks 8 are similarly formed, although as shown, the bottom cross connecting channel 11 may be omitted.

In the construction of Figs. 2 and 3 the same general arrangement is employed, al-

though in this instance the cross connecting channels 11^a and 11^b are respectively curved and straight instead of being angular, as shown in Fig. 1.

In the construction of Fig. 4 no cross connecting channels are provided. This arrangement may be employed to some advantage, particularly when there would be a slight space or crack between the abutting faces of the bricks.

With reference to Fig. 5, which illustrates a construction which, in certain respects, I prefer to employ, one of the apertures is made of a diameter greater than the other aperture so as to ensure the setting up of a flow of air through the brick.

In the construction of Fig. 6 the apertures 9^a and 10^a instead of being stepped are tapered. Fig. 7 illustrates a number of the bricks of Fig. 2 in plan view and shows how the apertures and connecting channels are formed between the abutting faces of the bricks.

In Fig. 8 the recesses 9^b and 10^b are formed in each brick.

It will be seen that among the advantages of my invention is the ability to make the bricks of greater depth than heretofore, which will result in extended life because the tendency to spall will be minimized; and that even with respect to bricks of normal or less than normal depth the length of the life will be increased.

What I claim is:

1. A refractory brick channeled to afford, when built into a refractory furnace structure, a U passage from the exterior of the structure inward toward its inner surface and out again to its exterior, such passage comprising pairs of inward extending channels cross-connected in multiple.

2. A refractory T-headed brick with ventilating channels extending inward beyond its middle at either side of its head.

3. A refractory brick with a T-head extension and having ventilating channels extending inward at either side of its head, together with a cross connection between channels whereby to afford a passage for the circulation of air from one channel to another.

4. A refractory T-headed brick with ventilating channels extending inward at either side of its head and a cross channel connecting said first channels below said head.

5. A refractory brick having a plurality of ventilating channels extending inward from its outer face toward its fire face, with air-conducting means between the channels, said channels being of greatest diameter at the outer face of the brick.

6. A refractory brick having a plurality of ventilating channels extending inward from its outer face toward but terminating short of its fire face together with cross connecting means between channels, a channel having a greater cross sectional area at the outer face of the brick than on the interior of the brick.

7. A refractory brick having a U-channel extending inward from its outer face and out again and having a greater cross sectional area at the outer face than on the interior of the brick.

In testimony whereof, I have hereunto signed my name.

RALEIGH J. HIMMELRIGHT.