

F. C. ROBERTS.
HOT BLAST STOVE FOR HEATING AIR, STEAM, OR OTHER GASES, AND BRICK THEREFOR.
APPLICATION FILED MAR. 30, 1912.

1,032,505.

Patented July 16, 1912.

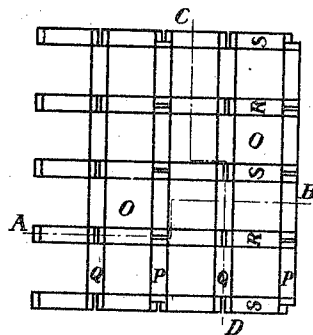


FIG. 1

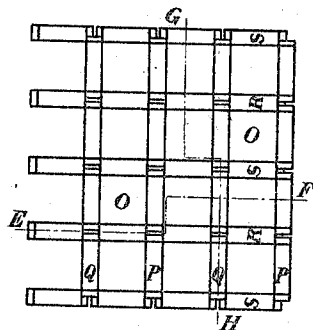


FIG. 5

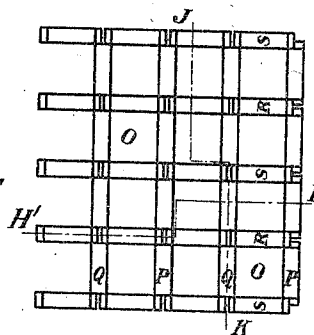


FIG. 10

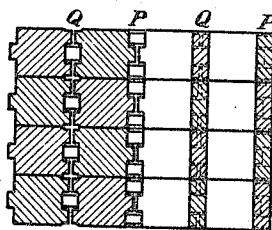


FIG. 2
SECTION A-B

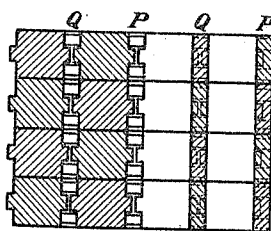


FIG. 6
SECTION E-F

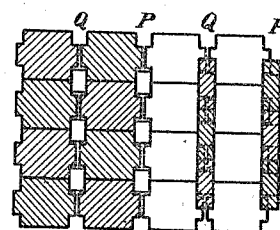


FIG. 11
SECTION H'-I

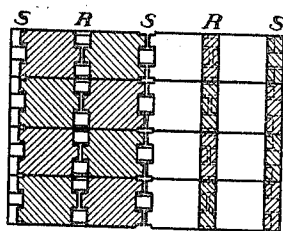


FIG. 3
SECTION C-D

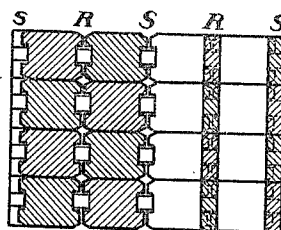


FIG. 7
SECTION G-H

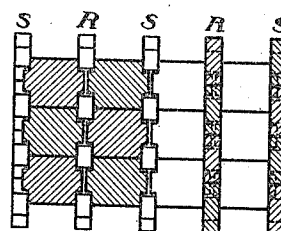


FIG. 12
SECTION J-K



FIG. 4



FIG. 8



FIG. 9

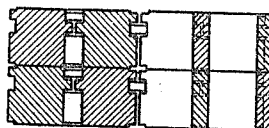


FIG. 13

Inventor

Witnesses

L. K. Lachman
Kilham J. Frost

Frank C. Roberts

UNITED STATES PATENT OFFICE.

FRANK C. ROBERTS, OF WYNNEWOOD, PENNSYLVANIA.

HOT-BLAST STOVE FOR HEATING AIR, STEAM, OR OTHER GASES, AND BRICK THEREFOR.

1,032,505.

Specification of Letters Patent.

Patented July 16, 1912.

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To all whom it may concern:

Be it known that I, FRANK C. ROBERTS, a citizen of the United States, residing at Wynnewood, in the county of Montgomery and State of Pennsylvania, have invented a new and useful Improvement in Hot-Blast Stoves for Heating Air, Steam, or other Gases, and Brick Therefor, which improvement is fully set forth in the following specification, taken in connection with the accompanying drawings.

My invention relates to hot blast stoves of the character used in heating the air for blast furnaces and in which fire brick surfaces are arranged to act as regenerators for absorbing and giving off heat. These regenerators are built with fire bricks so laid as to form a series of vertical flues through which the highly heated gases are drawn by the chimney draft; the heat of the gases is, in this process, partly absorbed by the brick work. When the brickwork has become highly heated, the necessary valves are operated whereby the flow of gases is discontinued and air or other medium forced through the flues composing the regenerator; in this manner the heat absorbed by the brickwork in the first described process is given off to, or absorbed by, the air in the second described process.

Manifestly the above described processes submit the brickwork to alternate heating and cooling, and consequently to alternate expansion and contraction. Further, it is well known that the heated gases in their passage through the regenerators necessarily carry a considerable quantity of dirt, which if allowed to accumulate in the flues impairs the heating capacity of the regenerators by reducing the amount of brick surface brought into contact with the heated gases. As a result, it is essential that the brickwork of the regenerators be constructed in as solid and permanent form as possible in order that the flues shall maintain their original shape and thus prevent the formation of projecting surfaces upon which the dirt contained in the gases would be deposited and the heating capacity of the stove thus impaired.

The object of my invention is therefore to provide a regenerator composed of bricks which when laid together as hereinafter described, form a structure which will allow the necessary expansion and contraction to take place without materially affecting the

original shape and alinement of the flues. I attain this object by the designs and arrangements of brickwork illustrated in the accompanying drawings in which—

Figure 1 is a plan of a portion of a regenerator; Figs. 2 and 3 are sections through the regenerator on the planes indicated; Fig. 4 shows the brick used in the regenerator illustrated in Figs. 1, 2 and 3. Fig. 5 is a plan of a portion of a regenerator built with bricks of a different design from that shown in Fig. 4; Figs. 6 and 7 are sections through this regenerator on the planes indicated; Figs. 8 and 9 show the shape of the bricks used in the construction illustrated in Figs. 5, 6 and 7. Fig. 10 is a plan of a portion of a regenerator which may be constructed by the use alone of the brick shown in Fig. 8; Figs. 11 and 12 are sections through this regenerator on the planes indicated. Fig. 13 shows one of the walls of a regenerator constructed with another form of brick.

Similar letters refer to similar parts throughout the several views.

As indicated in the drawings the regenerator flues O are formed by the intersection of two series of parallel walls, the one series P, Q, P, Q, being normal to the other series R, S, R, S.

The individual bricks forming the various constructions illustrated are provided at their two ends with either projections or recesses or both. The brick used (see Fig. 4) in the regenerator shown in Fig. 1 is provided with a projection at one end and a recess at the other end. The brick used in the regenerator shown in Fig. 5 are of two types (see Figs. 8 and 9); that shown in Fig. 8 has a projection at each end while that shown in Fig. 9 has a recess in each end. In constructing the regenerator shown in Fig. 10, a brick with projections at each end is employed (see Fig. 8).

In the various designs of brick illustrated the projections and recesses extend in all cases entirely across the least dimension or thickness of the brick, *i. e.* from side to side while the length of the projections or the depth of the recesses is one half or less than one half the thickness of the brick; it is evident that the foregoing requirements for the projections and recesses are necessary in order to insure that when the bricks are laid in the walls P, Q, R and S each brick will be held securely in place. It is also to be noted that all projections and recesses are

located below the top surface or above the lower surface of the brick and that it is not essential that the projections and recesses be located symmetrically in reference to the central axis of the brick which passes through the two ends but that the projections and recesses may be arranged as indicated in Fig. 13.

It is desirable to prevent the concentration of weight upon the portions of the brick immediately above and below the recesses in order to prevent said portions from breaking; to this end the top of the upper portion and the bottom of the lower portion are not in the same planes respectively as the upper and lower surfaces of the main body of the brick. Two means are shown to meet this requirement as illustrated in Figs. 4 and 9.

In the construction shown in Figs. 1, 2, 3, 5, 6, 7 and 13 the bricks are laid in horizontal courses extending across the regenerator. If it is thought desirable the construction shown in Figs. 10, 11 and 12 may be used wherein, the horizontal joints between the brick in each alternate parallel wall of each series occur one half course or height of brick below or above the horizontal joints in the adjacent parallel walls of the same series.

Having thus described my invention, what I claim and desire to cover by Letters Patent is:—

1. In a hot blast stove regenerator, a flue structure composed of bricks provided with projections and recesses in their two ends the projections and recesses between abutments extending across the width of the bricks, the projections and recesses in their horizontal direction being equal to not greater than one half the breadth of the bricks, the projections and abutments of the recesses having neither their uppermost nor lowermost surfaces in the same planes as respectively the upper and lower surfaces of the main body of the brick, and the vertical height of the recesses being greater than the combined vertical height of the projections engaging therewith.

2. In a hot blast stove regenerator, interlocking bricks, having projections vertically not greater than one half the height of the brick and horizontally not greater than one half the thickness of the brick, and recesses

vertically greater than the engaging projections, abutments for the recesses, the topmost and bottommost faces of the projections and the abutments of the recesses being in planes lower and higher respectively than the top and bottom faces of the bricks.

3. Interlocking bricks, having projections and recesses at their ends, the vertical height of the recesses being greater than that of the projections and abutments for the recesses, the uppermost and lowermost surfaces of the abutments being below and above the uppermost and lowermost surfaces of the bricks respectively.

4. Interlocking bricks, having at their ends projections considerably removed from their upper and lower edges, and recesses correspondingly removed and abutments for the recesses, the uppermost and lowermost surfaces of the abutments being below and above the uppermost and lowermost surfaces of the bricks respectively.

5. Interlocking bricks, having at their ends projections equidistant from top and bottom of the bricks and recesses equidistant from top and bottom of the bricks whose vertical height is more than the vertical height of the projections and abutments for the recesses, the uppermost and lowermost surfaces of the abutments being below and above the uppermost and lowermost surfaces of the bricks respectively.

6. In a brick, a projection at one end of the brick equal in thickness to the thickness of the brick, horizontally not greater than half of the thickness of the brick, vertically less than half the vertical height of the bricks, its upper surface being below the top surface of the brick and its lower surface above the lower surface of the brick; at the other end of the brick abutments forming a recess therebetween corresponding to the projection but greater vertically than the projection, the uppermost and lowermost surfaces of the abutments being respectively below and above the top and bottom surfaces of the brick.

Signed at Philadelphia, this 28th day of March 1912.

FRANK C. ROBERTS.

Witnesses:

J. DONALDSON PAXTON,
RANDOLPH H. MILLER.