No. 783,234. PATENTED FEB. 21, 1905.

F. L. WHITE.

HOT BLAST STOVE.

APPLICATION FILED MAR. 30, 1904.

2 SHEETS—SHEET 1.

FIG. 1.

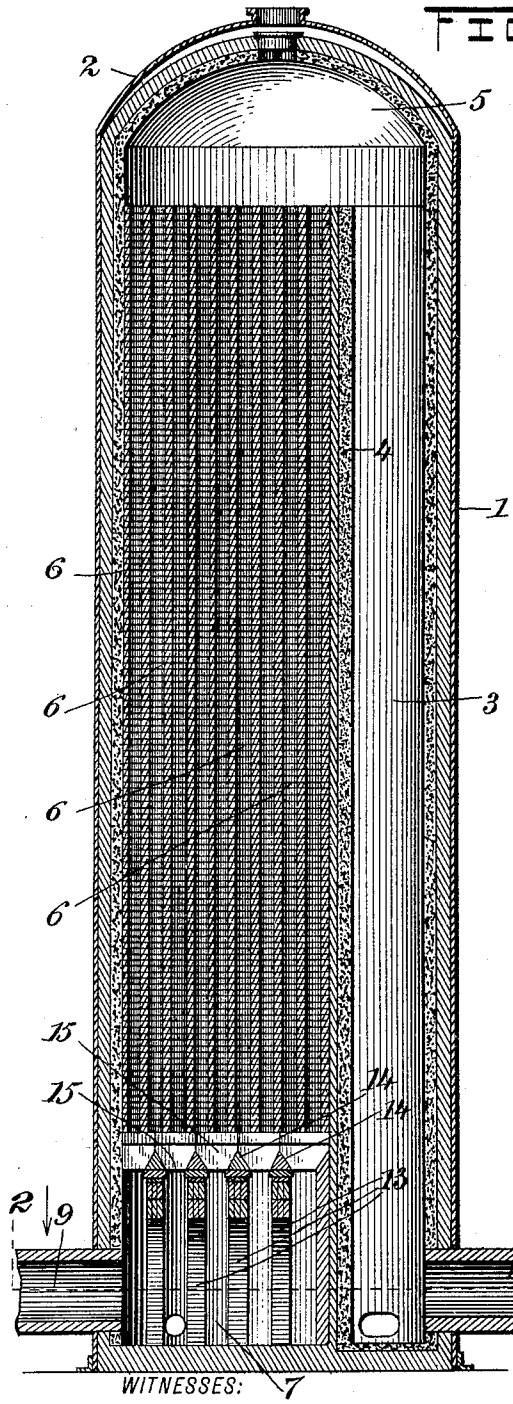



FIG. 2.

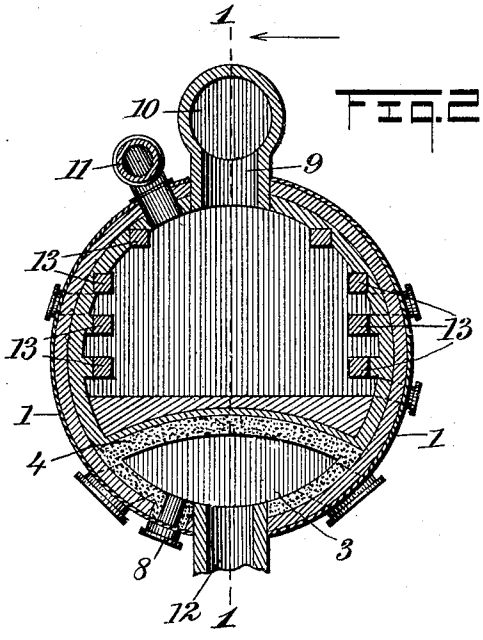
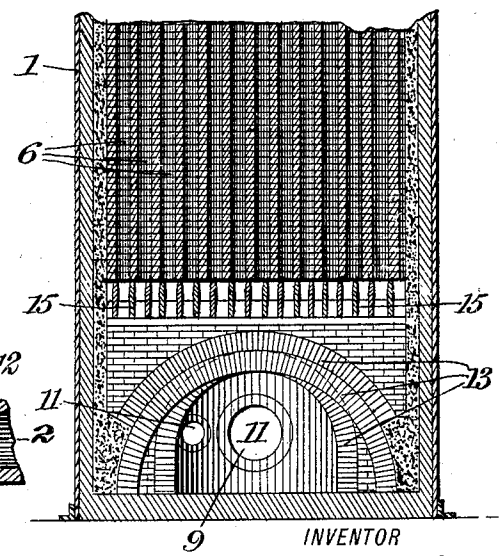



FIG. 3.




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2 SHEETS—SHEET 2.

FIG. 4.

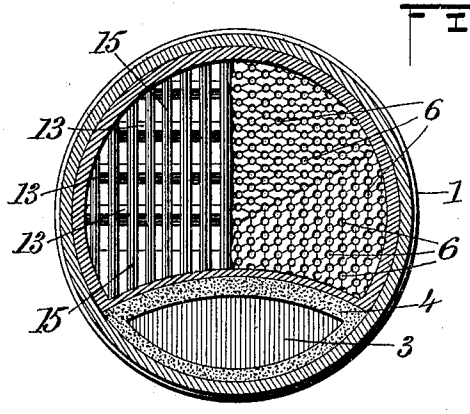
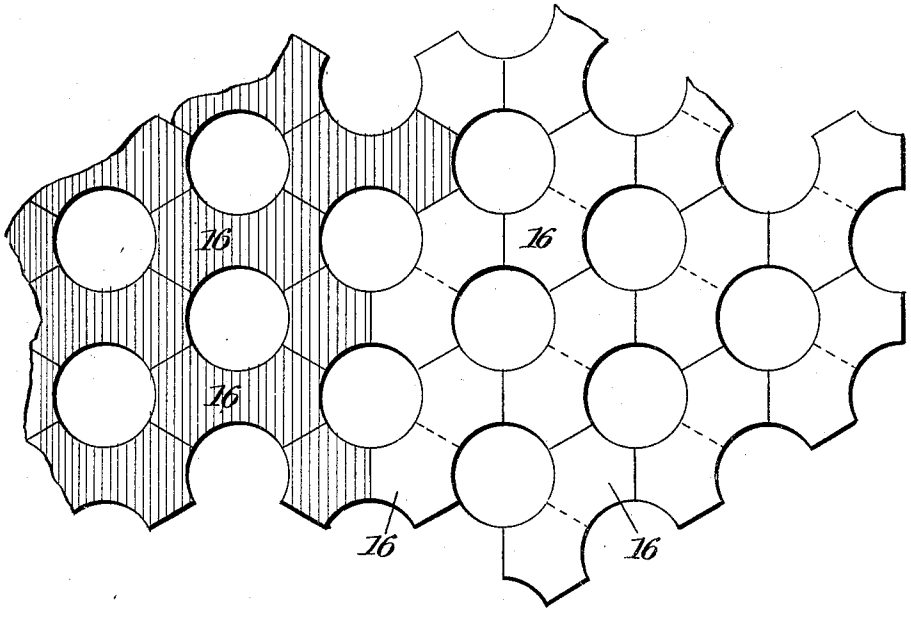



FIG. 5.




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PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 783,234. Patented February 21, 1905.

# UNITED STATES PATENT OFFICE.

FRANK L. WHITE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN KERNAN, OF PITTSBURG, PENNSYLVANIA.

## HOT-BLAST STOVE.

SPECIFICATION forming part of Letters Patent No. 783,234, dated February 21, 1905.

Application filed March 30, 1904. Serial No. 200,695.

*To all whom it may concern:*

Be it known that I, FRANK L. WHITE, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Hot-Blast Stove, of which the following is a full, clear, and exact description.

This invention relates to improvements in hot-blast stoves; and it consists in an improved construction of hot-blast stove having in the lower regenerative chamber an improved arrangement of supporting-arches and having the regenerative passages between the upper and lower regenerative chambers formed in a body of novel checker-brick laid so as to break joints and present a bonded structure.

Other features of the invention will appear as the same is more fully disclosed.

In order to render the nature of the invention clear to persons skilled in the art to which it pertains, I will describe its embodiment in a hot-blast stove and point out the novel features in the claims forming a part of this specification.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical sectional view through my improved hot-blast stove. Fig. 2 is a horizontal sectional view upon the line 2 2 of Fig. 1. Fig. 3 is a vertical sectional view through the lower portion of the hot-blast stove, taken on a plane at right angles to the plane of Fig. 1. Fig. 4 is a diagrammatic sectional view showing the arrangement of successive courses of checker-brick within the stove and the arrangement of the brick girders upon their supporting-arches; and Fig. 5 is a detail view, upon an enlarged scale, of a portion of one course of the checker-brick, the relative positions of the brick in the course below being indicated by dotted lines at one side of the figure.

In describing the invention I will first describe the general structure of the stove and then point out the peculiar features of the several novel elements thereof.

Referring to the drawings, 1 designates the outer shell of the hot-blast stove, which may be constructed in any ordinary or preferred manner and which is preferably provided with a dome-shaped top 2. At one side of the hot-blast stove a vertical combustion-chamber 3, having the cross-sectional form shown in Fig. 2, is constructed, the combustion-chamber being separated from the rest of the stove by a curved partition-wall 4. At the top of the stove the combustion-chamber 3 opens into an upper regenerative chamber 5, which extends entirely across the upper portion of the stove and communicates with regenerative passages 6, formed in a mass of checker-brick and extending downward to the lower regenerative chamber 7.

Gas is admitted to the combustion-chamber through an opening 8 at its lower end, and the ignited gas passes upward in the combustion-chamber to the upper regenerative chamber, whence the products of combustion pass downward through the regenerative passages to the lower regenerative chamber, from which they escape through a passage 9, leading to a chimney-valve 10. The cold blast is admitted to the lower regenerative chamber through a conduit 11, and the hot blast passes out of the stove through a flue 12, extending from the lower portion of the combustion-chamber.

In the lower regenerative chamber of the improved hot-blast stove I provide a series of arches 13, arranged in planes substantially perpendicular to the axis of the passage 9, leading to the chimney-valve. These arches 13 span the lower regenerative chamber from side to side and afford support for the mass of checker-brick in which the regenerative passages 6 are formed. In order to support the checker-brick so that no sagging or disarrangement thereof can occur, the arches 13 are very staunchly constructed, as shown in Fig. 3, and at the top of each arch there are arranged a series of triangular bricks 14, which are spaced apart, as shown in Fig. 1. The triangular bricks 14 have bricks 15 resting between them on the adjacent arches, thus forming girders to support the weight of the mass

of checker-brick. The triangular bricks 14 act as spacers and also as a lateral support to the bricks 15, leaving open passages between the girder-bricks 15 for the passage of the products of combustion, which pass downward through the checker-brick, and the cold blast which passes upward from the lower regenerative chamber.

The mass of checker-brick in which the regenerative passages 6 are formed is preferably made up of bricks 16, each of which is of lozenge shape and has the angles thereof cut away to present circular arcs. These bricks are formed with the straight sides thereof arranged at angles of sixty degrees and one hundred and twenty degrees to each other, and the arcs presented at the angles of the bricks are all formed upon the same radius. The bricks are therefore adapted to be laid in courses in which the arcs of adjacent bricks combine to form circles, as shown in Fig. 5. Moreover, the bricks described may be laid in courses in which the long axes of all the bricks in one course are parallel, but are disposed at angles to the long axes of all the bricks in the courses immediately above and below. In this way a bonded structure is formed which is firmly held together and in which there will be no shifting of the bricks, with consequent obstruction of the passages.

By arranging the arches in the lower combustion-chamber in a plane substantially perpendicular to the axis of the gas-passage and approximately at right angles to the axis of the cold-blast conduit I am able to avoid obstructing the entry of the cold blast and also avoid injury to the arches found in hot-blast stoves as ordinarily constructed and due to the chilling effect of the cold blast thereon.

The hot-blast stove above described is provided at the bottom with the usual manholes through which access may be had to the interior of the stove for cleaning; but as these features are without novelty specific mention thereof has not been made.

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

1. A hot-blast stove comprising a plurality of parallel arches presenting inclined upper faces, a plurality of brick girders disposed transversely of said arches projecting thereabove, said girders having inclined faces resting upon said arches, and substantially vertical end faces abutting against each other, the upper edges of said girders alining to form continuous flat faces, and layers of brick laid upon said last flat faces and presenting regenerative passages.

2. A hot-blast stove comprising a plurality of arches presenting inclined upper faces, a plurality of brick girders disposed transversely of said arches and having inclined end faces resting on said first inclined faces, said girders further having substantially vertical end faces abutting against each other, and regenerative passages supported upon the said girders, said passages being formed of blocks of substantially diamond shape interspersed with substantially triangular blocks, all of said blocks having concave outer faces uniting to form said passages.

3. In a hot-blast stove in combination, a plurality of parallel arches presenting inclined upper faces, a plurality of brick girders disposed transversely of said arches and projecting thereabove, said girders having inclined faces resting upon said first faces, said girders further having substantially vertical end faces abutting against each other and against the side walls of said furnace, and regenerative passages formed by blocks resting upon said girders.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK L. WHITE.

Witnesses:
W. A. AUSTIN,
M. H. ENGLAND.