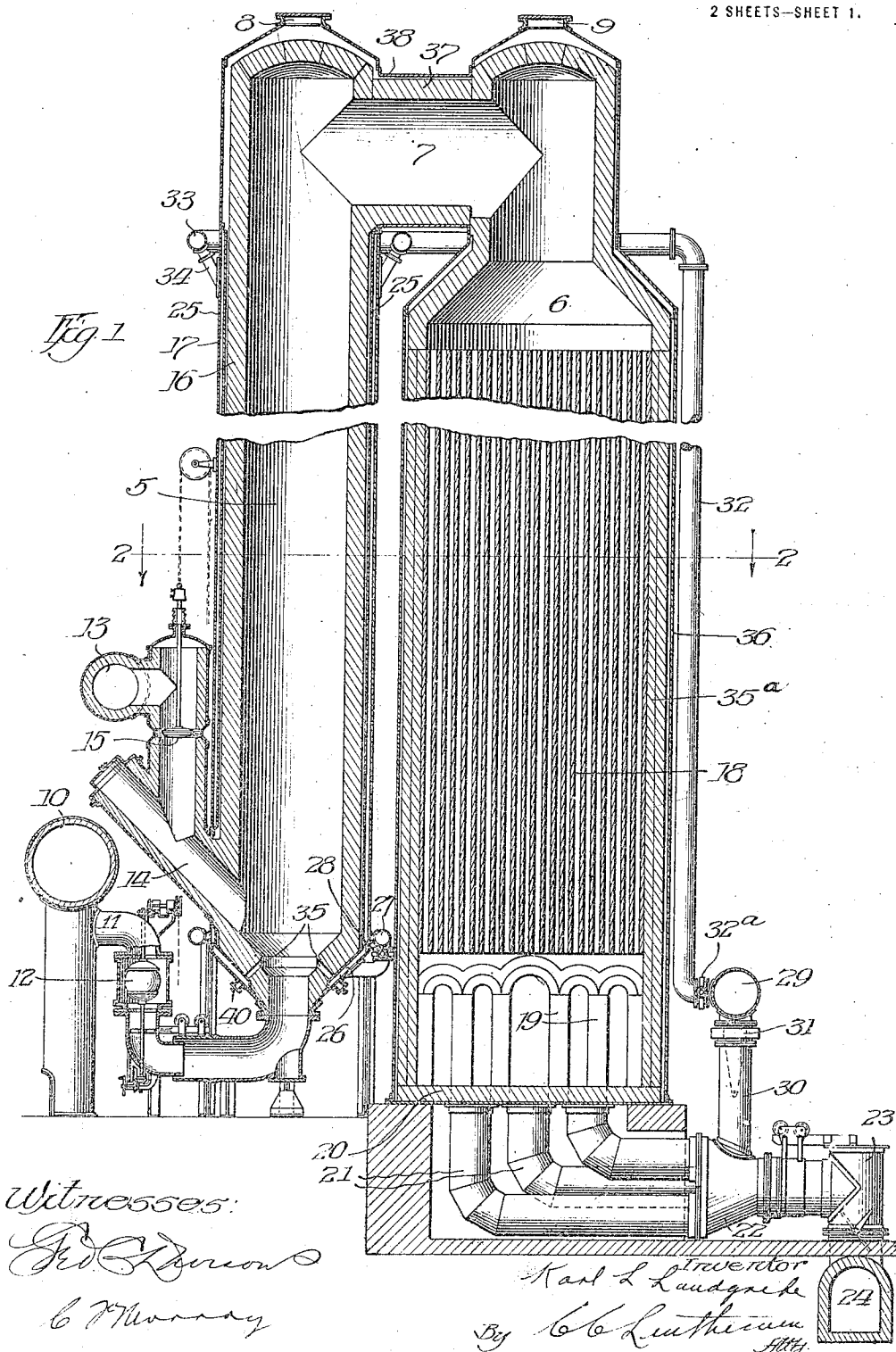


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HOT BLAST STOVE.
APPLICATION FILED JULY 31, 1915.

1,168,014.

Patented Jan. 11, 1916.

2 SHEETS—SHEET 1.

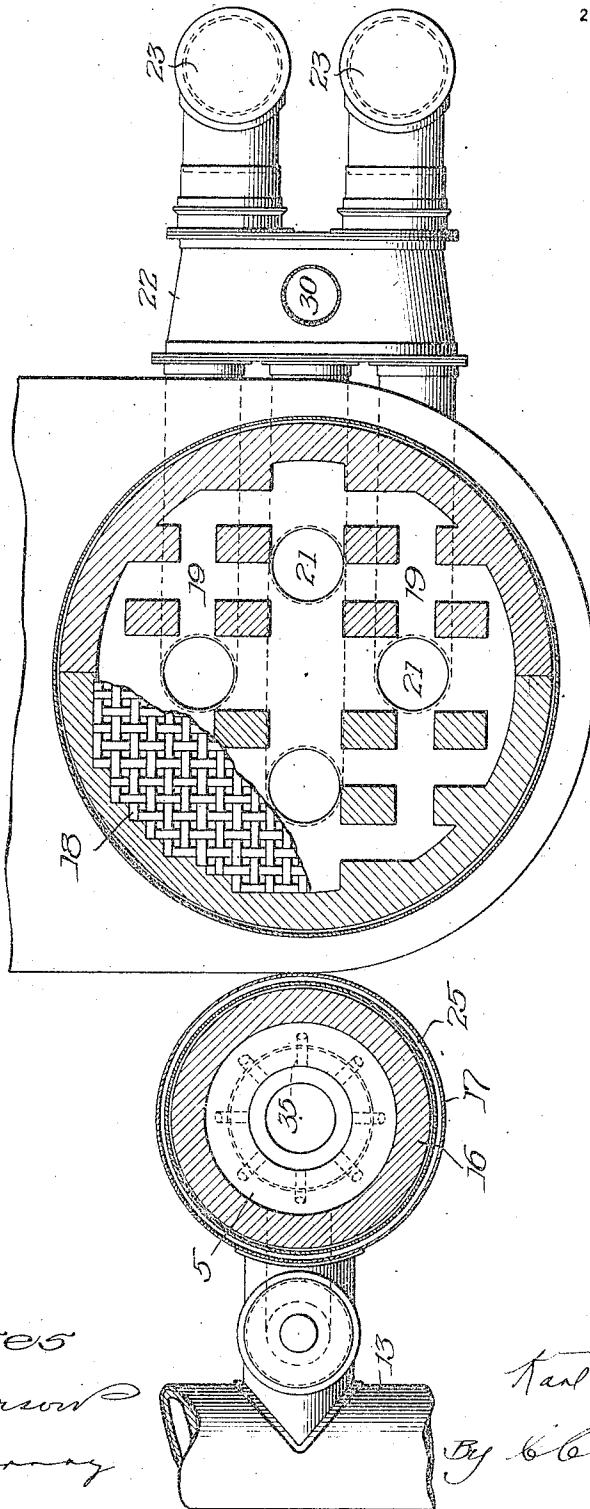


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2 SHEETS—SHEET 2.

Fig 2.



Witnesses
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UNITED STATES PATENT OFFICE.

KARL L. LANDGREBE, OF ENSLEY, ALABAMA.

HOT-BLAST STOVE

1,168,014.

Specification of Letters Patent.

Patented Jan. 11, 1916.

Application filed July 31, 1915. Serial No. 42,928.

To all whom it may concern:

Be it known that I, KARL L. LANDGREBE, a citizen of the United States, and resident of Ensley, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Hot-Blast Stoves, of which the following is a specification.

The present type of stove consists of a single shell having within it the combustion and heating chambers, the heating chamber being filled with checker work and the combustion chamber being unobstructed.

The object of hot blast stoves is to heat air forced through the same for use in blast furnaces and the like. The checkers are heated by means of gas from the blast furnace and air combining in the combustion chamber and being drawn or forced through the checkers, thereby heating them. When sufficiently heated, air is forced through said heated checkers, absorbs heat therefrom, and is directed through the combustion chamber into the blast furnace.

In the present type of stove great difficulty is experienced in the burning through of the walls of the combustion chamber, thereby harming the checkers in the heating chamber, necessitating shutting down the stove for repairs. As it takes a long time for the checkers to cool sufficiently to permit men to enter the stove to make repairs, a great amount of time is lost, as the heating chamber cools much more slowly than the combustion chamber.

One of the objects of my invention is to provide an arrangement wherein the combustion and heating chambers are contained in separate shells, suitably connected for operation, and thereby effecting a great saving of time in making repairs as well as providing a heating chamber composed wholly of checkers, whereby a greater amount of air blast is heated. I am also able to employ a cylindrical combustion chamber, which shape has been found to be the best for burning the gas most efficiently.

I further provide a shell surrounding the walls of the combustion chamber through which shell or annular space the cold air blast is directed. Two results are thereby accomplished (1) preheating the cold air so that it more readily combines with the gases in the combustion chamber, thus utilizing

the heat radiated by the walls of said chamber, and (2) cooling the walls of the combustion chamber by the air blast, thereby prolonging the life of the walls.

By using the stoves embodying my invention it is possible to supply enough highly preheated air for the successful operation of a blast furnace with a fewer number of stoves than is possible with the stoves of the type now in general use—a great economic advantage.

To further increase the efficiency of the heating chamber, I employ a novel arrangement of pipes at the bottom of the heating chamber.

Another of the disadvantages of the present type of stove is that the gases forced through the checkers do not move uniformly therethrough. To overcome this channeling of the gases and thus uniformly draw the gases through the checkers, I prefer to employ a plurality of pipes in the bottom of the heating chamber, spaced apart at equal distances.

To accomplish these and other objects, my invention consists in certain features and combinations hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1 is a vertical sectional view of a stove embodying my invention, and Fig. 2 is a sectional view on line 2—2 of Fig. 1 through the heating and combustion chambers; the checkers are shown as cut away to permit a view of the novel arrangement of exhaust pipes at the bottom of the heating chamber.

In the drawings, the combustion chamber is indicated by the numeral 5 and the heating chamber by the numeral 6, these chambers being connected by a flue 7. Manhole covers 8 and 9 provide for entrance to the chambers 5 and 6. These covers are suitably lined with brick to prevent burning. A gas main 10 leads from the blast furnace and is connected by a pipe 11, to the interior of the combustion chamber 5. A suitable valve 12 is located in the pipe 11. A hot blast main 13 is connected to the chamber 5 by a pipe 14 and a valve 15.

16 represents the brick walls of the chamber 5, surrounded by a shell 17.

The checkers in the heating chamber 6 are designated by the numeral 18. They are of the usual kind and are supported on

arches 19. 20 is the bottom of the heating chamber 6. Pipes 21 extend from the bottom 20 to a breeching 22, which latter is connected to chimney valves 23 which control admission to the stack flue 24.

Between the shell 17 and the wall 16 of the combustion chamber 5, I provide an annular space 25. I also provide another annular space 26 at the bottom of the chamber 5 and connect spaces 25 and 26 by a pipe 27 having a valve 28 therein. The annular space 26 is connected to the interior of the chamber 5 by openings 35.

An air main 29, connected to the breeching 22 by a pipe 30, and a valve 31 has an upstanding pipe 32 and a valve 32^a leading to a bustle pipe 33 around the combustion chamber, which pipe is connected to the annular space 25 by pipes 34.

The heating chamber 6 is composed of the usual walls 35^a and a shell 36. The neck or flue 7 is composed of brick walls 37 and a shell 38.

The operation of the stove is as follows: To heat the checkers 18 in the heating chamber 6, gas is admitted to the combustion chamber 5 from the gas main 10 through pipe 11. Cold air from the main 29 is forced through the pipe 32 to the bustle pipe 33, from which it enters the annular space 25, where it becomes heated by the radiation from the walls 16. The walls 16 may be made of special bricks provided with holes, or else of the usual bricks forming checker openings through the walls. The heated air passes through the pipe 27 and the valve 28 into the annular space 26, thence through openings 35 into the combustion chamber 5. Peep-holes 40 are provided to enable one to observe the process of combustion in the chamber 5. The combined gases and air, being hot, are led through the neck 7 down through the checkers 18 through the pipes 21 to the breeching 22, thence to the stack, the valves 15 and 31 being closed. When the heating chamber has absorbed sufficient heat, the valves 12 in the gas line and 32^a in the air line are closed; also valves 23 and 28. Air valve 31 and hot blast valve 15 are opened. The cold air blast rushes through the pipe 30, breeching 22, pipes 21 and checkerwork 18, where it is heated, through the neck 7, chamber 5, pipe 14, and into the main 13, whence it is delivered to the blast furnace. The valve 28 in line 27 is closed so that the economy effected by preheating the air for combustion may not be lost by allow-

ing the hot blast to enter the annular space 25 and there give up its heat by radiation.

One of the advantages derived from designing the neck 7 in the manner shown is to allow the brick walls 16 and 35 of the chambers 5 and 6 to expand upwardly without exerting any undue strains on the shells 17 and 36 surrounding the walls.

I do not limit my invention to the exact form disclosed, but consider any modification embracing separate combustion and heating chambers connected in any manner as coming within the scope of my claims and the spirit of my invention.

I claim:

1. In a hot blast stove, the combination of a heating chamber, and a separate combustion chamber, means connecting said chambers, a breeching, a plurality of pipes leading from the bottom of the heating chamber and directly connecting said heating chamber and said breeching, a stack, and means connecting said breeching and said stack, substantially as described.

2. In a hot blast stove, the combination of a heating chamber and a separate combustion chamber, means connecting said chambers, a breeching, a plurality of pipes leading from the bottom of the heating chamber and connecting said heating chamber and said breeching, a stack, and means connecting said breeching and said stack, said combustion chamber provided with a shell about its walls, an air blast line connected to said shell and to said breeching, and valves in said connections, substantially as described.

3. A heating chamber provided with a plurality of substantially vertical passages therethrough, a plurality of pipes arranged to extend through the bottom of said chamber, a stack, said pipes connected to said stack, an air main, connections between said air main and said stack connection, a valve in said connection, a combustion chamber apart from said heating chamber, connections between said chambers, a shell about said combustion chamber, connections between said air main and said shell, connections between said shell and said combustion chamber, and a valve in said connections, substantially as described.

Signed at Ensley, Alabama, this 17th day of July, 1915.

KARL L. LANDGREBE.

Witnesses:

JAMES P. DOYLE,
O. L. BURFORD.