(No Model.) 2 Sheets—Sheet 1.

H. H. GARRETT.

GAS FURNACE FOR MELTING METALS.

No. 421,263. Patented Feb. 11, 1890.

FIG. 2.

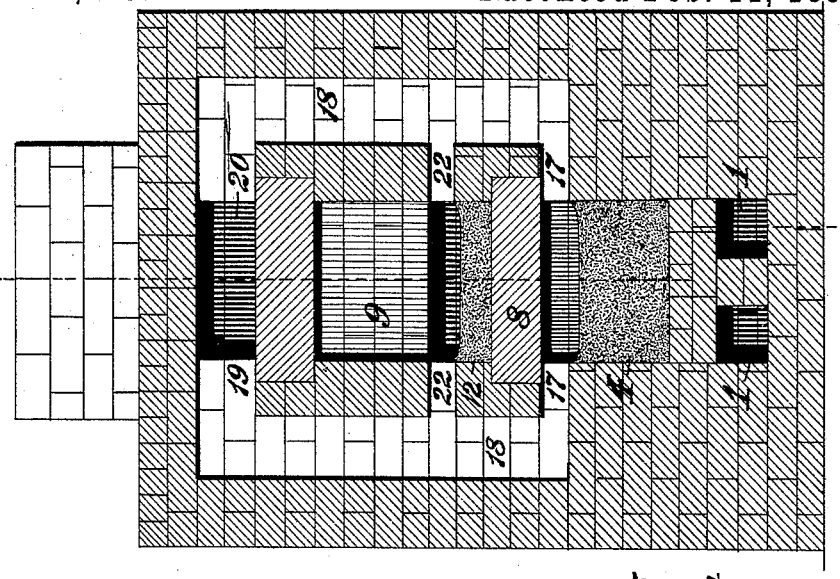
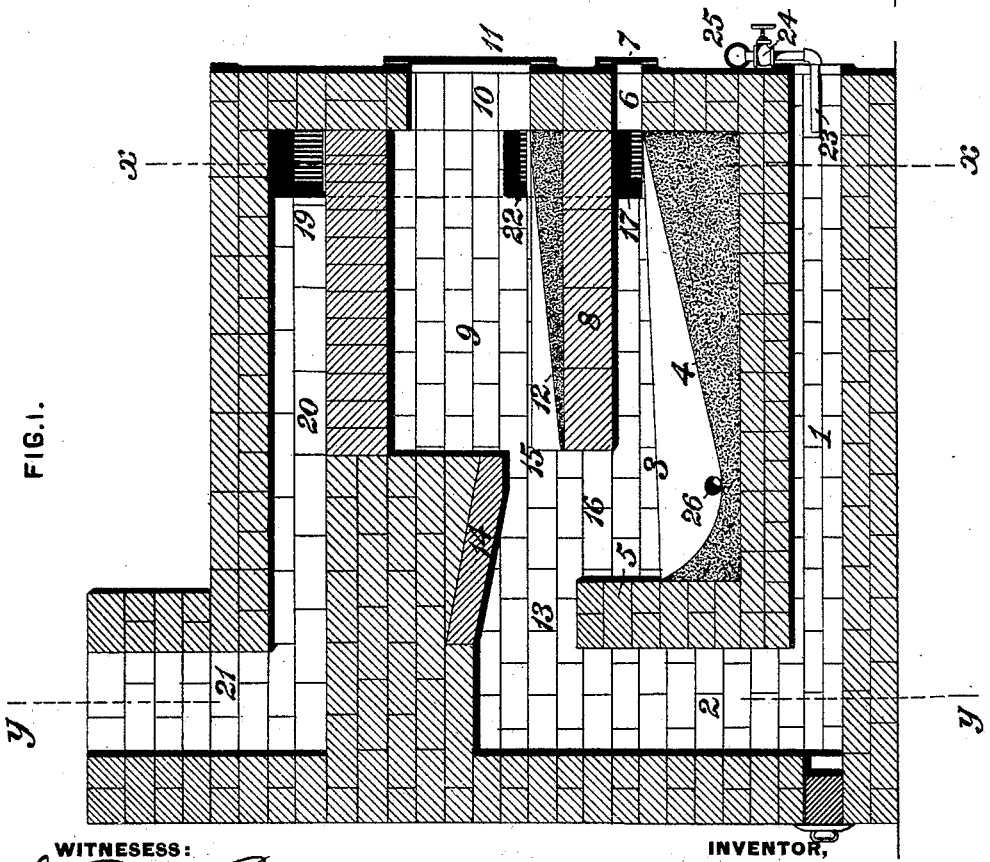


FIG. 1.



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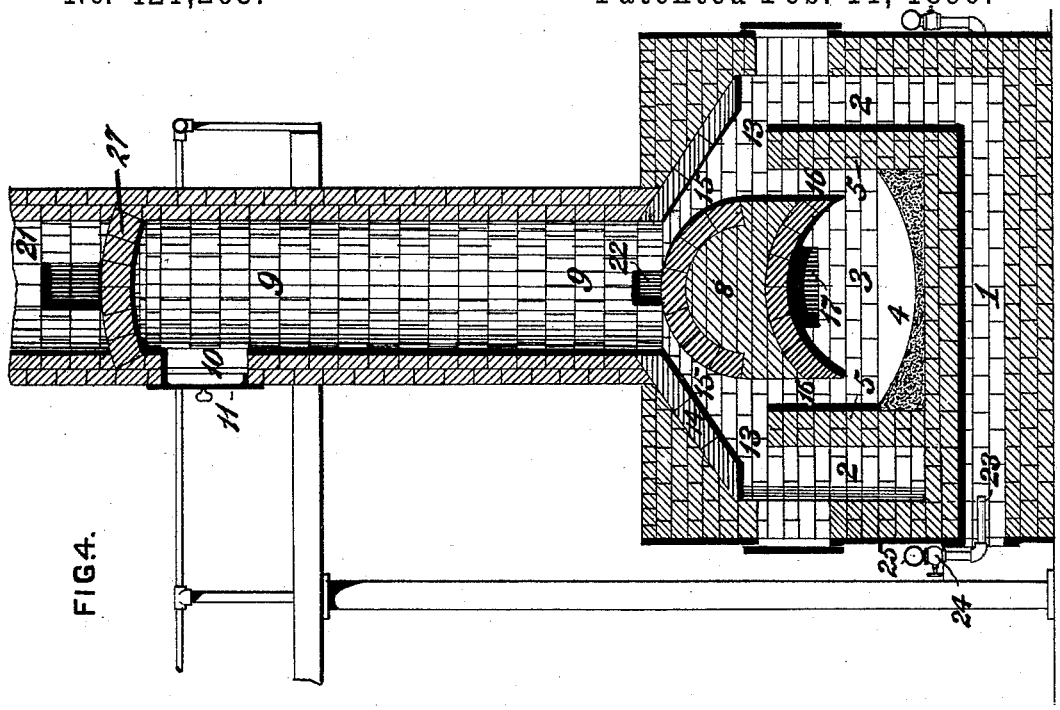

FIG.4.

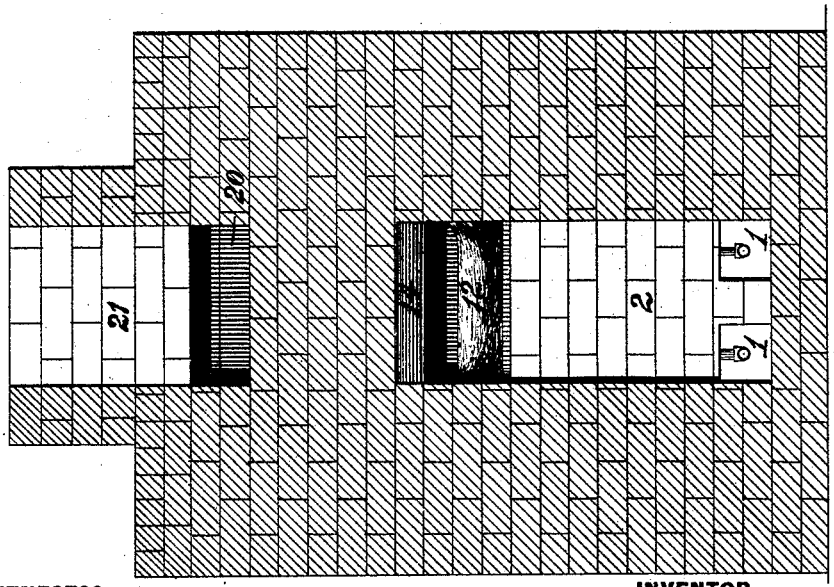

FIG.3.

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UNITED STATES PATENT OFFICE.

HENRY H. GARRETT, OF PITTSBURG, PENNSYLVANIA.

GAS-FURNACE FOR MELTING METALS.

SPECIFICATION forming part of Letters Patent No. 421,263, dated February 11, 1890.

Application filed August 5, 1889. Serial No. 319,712. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. GARRETT, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Gas-Furnaces for Melting Metals, of which improvement the following is a specification.

The object of my invention is to provide a furnace of simple, compact, and comparatively inexpensive construction, in which gaseous fuel may be utilized for melting brass or other metals without requiring the employment of crucibles.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a longitudinal central section through a gas-furnace embodying my invention; Figs. 2 and 3, transverse sections through the same at the lines *x x* and *y y*, respectively, of Fig. 1; and Fig. 4, a vertical central section illustrating the application of my invention in a furnace of the cupola type.

In the practice of my invention I construct a furnace having substantially rectangular boundaries, in the lower portion of which I form one or more gas-flues 1, which extend horizontally from the front of the furnace to a point near its opposite end at which said flues, when more than one is employed, unite in a common vertical flue 2. A molten-metal-receiving chamber 3, having a hearth or bottom 4 of suitable refractory material, is formed in the furnace above the horizontal gas flue or flues 1, being separated from the rear vertical flue 2 by a bridge-wall 5 and extending therefrom to the front wall of the furnace, in which there is provided an opening 6, closed by a skimming-door 7, for the removal of impurities from the surface of the molten metal. The molten-metal-receiving chamber 3 is, except at its rear end, closed at its top by a horizontal wall 8, by which it is separated from a melting-chamber 9, extending from the front wall of the furnace to the rear of the wall 8 and being provided with a front charging-opening 10 and door 11 and a hearth or bottom 12, of refractory material, which is downwardly inclined from its front to its rear end. The rear gas-flue 2 leads at top into a lateral throat or passage 13, formed between the top of the bridge-wall 5 and a downwardly and forwardly inclined deflecting-wall 14, which extends from the flue 2 to a channel or passage 15, through which the throat 13 of said flue communicates with the melting-chamber 9 at the rear end of its hearth 12. A channel or passage 16, formed between the top of the bridge-wall 5 and the rear of the top wall 8 of the molten-metal-receiving chamber 3, establishes communication between said chamber at its rear end and top and the flue 2 through the throat 13, and also between said chamber and the melting-chamber 9. A lateral discharge-flue 17 extends from each side of the molten-metal-receiving chamber at the top of its hearth at the front end to a vertical flue 18, the flues 18 being connected at top by a transverse flue 19 with a horizontal flue 20, leading to a stack or chimney 21. Discharge-flues 22 lead from the sides of the melting-chamber 9, near the front of its hearth, into the vertical discharge-flues 18.

In operation a charge of metal having been placed upon the hearth of the melting-chamber 9, a jet of gas is admitted to and ignited in one or both of the lower flues 1, being supplied by a burner-pipe 23, leading from a service-pipe 25 and controlled by a cock or valve 24. The air required for admixture with the gas is drawn into the flues 1 and the products of combustion of the mingled air and gas pass through the rear vertical gas-flue 2, throat 13, and passages 15 and 16 into the melting-chamber 9 and molten-metal-receiving chamber 3, highly heating the same, and being thence discharged through the flues 22, 17, 18, 19, and 20 into the stack 21. The charge of metal in the chamber 9 is thereby brought to a state of fusion, the metal as melted dropping from the rear end of the hearth 12 into the lower receiving-chamber 3, in which it is maintained in a fluid condition and prevented from chilling by the direct action of the products of combustion delivered through the passage 16, the same passing over its surface and escaping at its front end through the lateral flues 17. The molten metal is drawn off from time to time, as required, from the chamber 3 through a tap-hole 26.

The essential elements of my invention are

embodied in the same operative relation as above described in the cupola-furnace shown in Fig. 4, in which, as in all furnaces of this type, the melting-chamber 9 is vertical. A further structural modification is presented in the provision of means for the introduction of the heated products of combustion at both ends of the molten-metal-receiving chamber 3 and at both sides of the melting-chamber 9, the discharge from both chambers being through lateral flues, as in the instance first described. A bridge-wall 5 and vertical gas-flue 2 are located at each end of the molten-metal-receiving chamber 3, and a series of horizontal gas-flues 1 is employed, one or more of said flues leading into the vertical flues 2 at one end of the chamber 3, and the remaining one or more into the flue at the opposite end. The top wall 8 of the chamber 3 is in the form of a substantial arch, at each end of which a vertical passage 16 leads from the delivery-throat 13 of the adjacent vertical gas-flue 2 into the top of the chamber 3. The top of the arched wall 8 forms the hearth of a vertical melting-chamber 9, which communicates at each side by a passage 15 with the adjacent delivery-throat 13. The melting-chamber is closed at top by an arched roof 27, above which extends the stack 21, and is provided with an upper charging-opening 10, closed by a door 11.

Lateral discharge-flues 17 22 lead from the chambers 3 and 9 into vertical flues 18, opening into the stack above the roof.

The operation of the furnace is identical with that before described, and a thorough and effective application of the heat of the products of combustion is attained by the duplication of the passages for their delivery to the chambers 3 and 9.

I claim as my invention and desire to secure by Letters Patent—

1. In a furnace for melting metals, the combination of a molten-metal-receiving chamber, a bridge-wall located at one end of said chamber, a gas-flue having a lateral throat or opening at the top of the bridge-wall, a melting-chamber located above and separated by a wall below its hearth from the receiving-chamber, channels or passages establishing communication between the melting-chamber and the receiving-chamber and between the throat of the gas-flue and each of said chambers, a stack or chimney, and discharge-flues leading from each of said chambers into the stack, substantially as set forth.

2. In a furnace for melting metals, the combination of a molten-metal-receiving chamber, a bridge-wall located at one end of said chamber, a gas-flue having a lateral throat or opening at the top of the bridge-wall, a melting-chamber located above and separated by a wall below its hearth from the receiving-chamber, a deflecting-wall forming the top of a connecting passage from the throat of the gas-flue to the melting-chamber, a channel or passage leading from the bottom of said connecting-passage to the receiving-chamber, and discharge-flues leading from the melting-chamber and the receiving-chamber, respectively, to the stack, substantially as set forth.

3. In a furnace for melting metals, the combination of a horizontal gas-flue, a burner-pipe leading into one end thereof, a molten-metal-receiving chamber located above said gas-flue, a bridge-wall located at one end of said chamber, a vertical gas-flue communicating with the end of the horizontal flue farthest from the burner-pipe and having a lateral throat or opening at the top of the bridge-wall, a melting-chamber located above the receiving-chamber, channels or passages establishing communication between the throat of the vertical flue and the adjacent ends of the melting and receiving chambers and between said chambers at said ends, and lateral discharge-flues leading from said chambers to a stack, substantially as set forth.

In testimony whereof I have hereunto set my hand.

HENRY H. GARRETT.

Witnesses:
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R. H. WHITTLESEY.