

No. 865,789.

PATENTED SEPT. 10, 1907.

J. V. MARTIN.
FURNACE FOR MELTING METAL.
APPLICATION FILED MAR. 29, 1907.

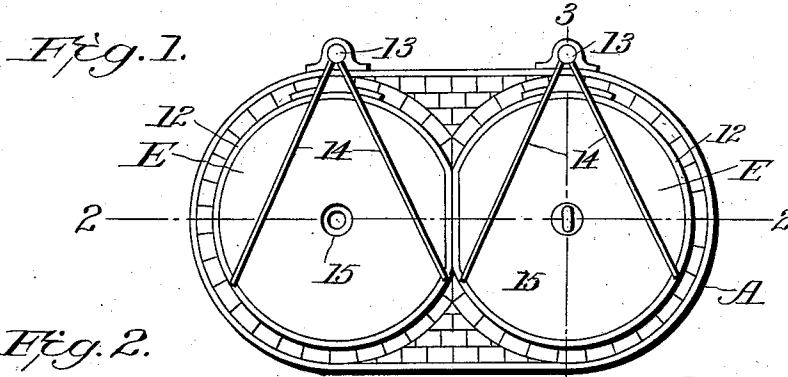


Fig. 2.

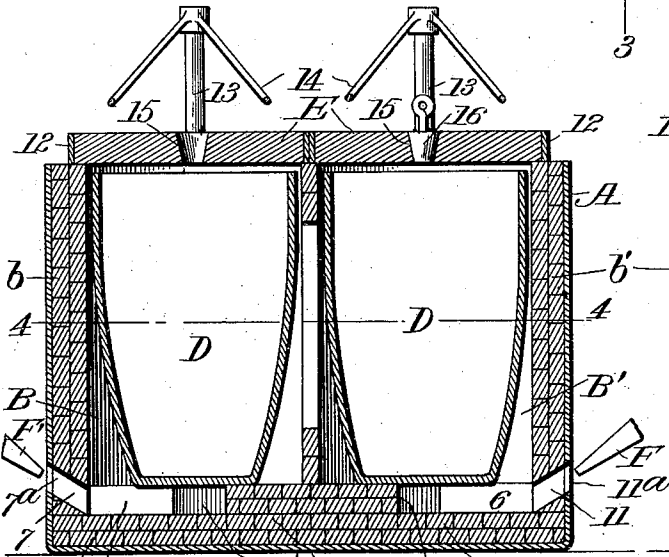


Fig. 3.

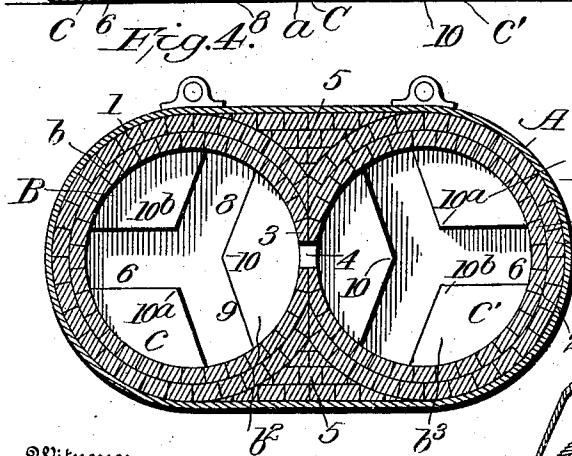
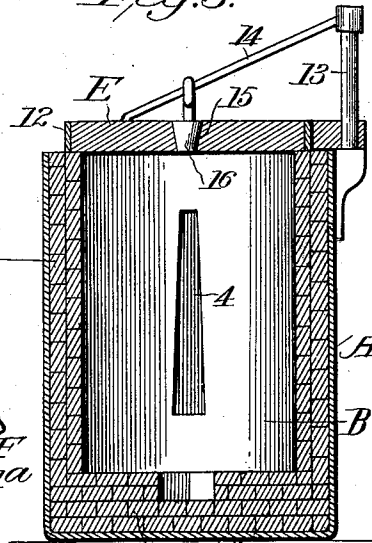
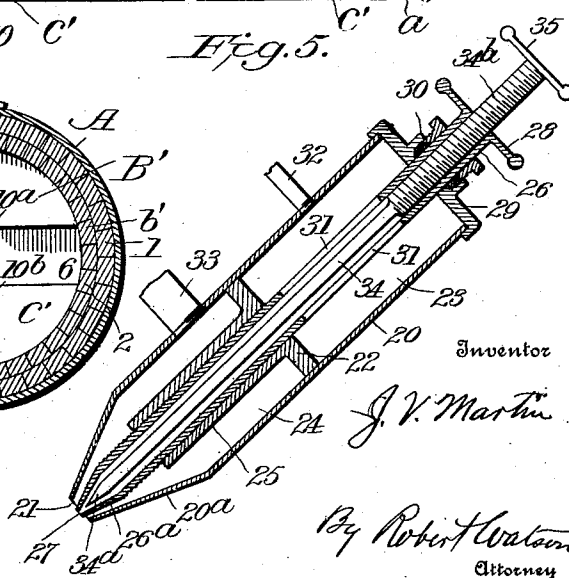


Fig. 5.



Witnesses

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FURNACE FOR MELTING METAL.

No. 865,789.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed March 29, 1907. Serial No. 385,270.

To all whom it may concern:

Be it known that I, JAMES V. MARTIN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Furnaces for Melting Metal, of which the following is a specification.

This invention comprises improvements in furnaces for melting metals, the details and advantages of which will be clear from the following specification, taken in connection with the accompanying drawing in which,

Figure 1 is a top plan view of a pair of communicating furnaces arranged within a single casing; Fig. 2 is a vertical section through the same on the line 2—2 of Fig. 1; Fig. 3 is a section through one of the furnaces on the line 3—3 of Fig. 1; Fig. 4 is a horizontal section through the furnaces on the line 4—4 of Fig. 2, the crucibles being omitted, and Fig. 5 is a longitudinal section through one of the burners for injecting liquid fuel into the furnaces chambers.

Referring to the drawing A indicates a metal shell or casing, elliptical in plan view or cross section, said casing being open at its upper end and having its lower end closed by a metal base or bottom piece *a*. The end portions of the casing are semi-circular in form, and within the casing are arranged two furnaces, B and B', each cylindrical shape and arranged vertically side by side, the cylindrical walls *b*, *b'* and the bases *c* and *c'* of the furnaces being made of fire brick or other suitable refractory material. As shown in Fig. 4, the cylindrical walls *b* and *b'* are each made of two layers of fire brick, 1, 2, the part 3 of the brick work, however, which forms the partition between the furnaces chamber being narrowed down to about the thickness of a single brick. A communicating opening 4 extends through this partition, said opening being in the form of a long vertical slot, which is narrower at the top than at the bottom, as shown in Fig. 3. The opening is wedge-shaped, its side walls gradually diverging from its upper end downward. Fillings 5 of fire brick or other refractory material are placed between the side walls of the casing and the circular layers of brick 1, so as to form a backing for the furnace walls at the central part of the casing.

Upon the bottom *a* of the casing is arranged a lining C of refractory material which forms the bottom or bases of both furnaces. The base *c* of the furnace B has a channel 6 extending from the central portion of the base to a fuel inlet opening 7 in the wall of the furnace, which communicates with an opening 7^a in one end of the shell on casing A. Two channels 8 and 9 diverge in opposite directions from the inner end of the channel 6, and these branch channels extend to the vertical walls of the furnace, as shown in Fig. 4. At the points where the channels diverge or radiate three supporting parts or corners 10, 10^a and 10^b are left for supporting the crucible D. The base *c'* of the furnace B' is the same in

construction as the base of the furnace B except that the channels are arranged so that the channel 6 of the furnace *c'* extends to the fuel inlet openings 11 and 11^a at the opposite end of the furnace casing.

The furnaces are provided with suitable covers E, of fire clay, surrounded by metal bands 12, which latter are hinged to standards 13 at one side of the casing and brace rods 14 extend from the upper ends of said standards to distant parts of the bands 12 so as to give support to the covers at a distance from the standards to which they are hinged. Conical openings 15 are arranged at the centers of the covers and a conical plug 16 is provided and adapted to fit into the opening in either cover.

In operation if it is desired to melt metal in the crucible of the furnace B', the plug 16 will be placed in the opening of the cover of said furnace, after the metal is in the crucible, and the fuel inlet opening 7 of the furnace B will be closed by a suitable plug. Liquid fuel is then injected through the opening 11^a from a burner F and the flames strike the bottom of the channel 6 and against the part 10 of the base (which latter serves as a baffle plate) and here divides, the flames passing through the diverging channels 8 and 9 to the side walls of the furnace, thence passing upwardly around the sides of the crucible. The bottom of the crucible and the sides, therefore, are exposed to the flames. From the furnace B', the hot gases pass through the communicating opening or passage way 4 into the furnace B and around the crucible in said furnace and thence out through the opening 15 in the cover thereof. The hot gases are thus utilized to heat metal in the furnace B while the metal in the furnace B' is being melted. As the heat accumulates in the upper part of the furnace B', it is desirable to restrict the direct flow of gases from the upper portion of said furnace into the adjoining furnace and to allow the cooler gases to flow into the adjoining furnace with greater freedom. For that reason I make the slot 4 wedge-shaped, as shown, so that the flow of gases from one chamber to another is restricted at the upper portion of the slot and this restriction becomes less towards the bottom of the slot, where the cooler gases can flow through more freely.

When it is desired to melt metal in the crucible of the furnace B and at the same time heat metal in the crucible of the furnace B', the plug 16 is removed from the opening in the cover of the furnace B' and inserted in the cover of the furnace B and fuel is injected from a burner F' through the openings 7 and 7^a, the gases passing in the reverse direction through the furnaces.

In Fig. 5 I have shown a burner of the form which I prefer for feeding fuel to the furnaces. In said figure, 20 indicates the outer shell or casing of the burner, which, as shown, is tubular and its forward end 20^a is

made tapering to the outlet 21. A partition 22 is arranged about midway in the casing dividing the latter into two chambers 23 and 24. A long internally threaded sleeve 25, integral with the partition 22, extends
 5 from said partition toward the tapered end of the casing. Within this sleeve is arranged a tube 26 having a threaded surface engaging the threads in the sleeve 25. This tube 26 has its forward end 26^a tapered and adapted to project through the opening 21 in the casing
 10 20. The tube 26 has at its forward end a small outlet 27. The tube extends through both chambers of the casing and is provided at its rear end with a hand-wheel 28 by means of which the tube may be turned within the sleeve 25 so as to move the tapering end of the tube
 15 into position to close the outlet 21 in the casing or to vary the size of said outlet. A cap 29 extends over the rear end of the casing and the tube extends through a stuffing box 30 in said cap. That portion of the tube which is within the chamber 23 has slots 31 through its
 20 wall so that oil may pass from the chamber 23 into the interior of the tube and thence outward through the outlet opening 27. A pipe 32 leads to the interior of the chamber 23 for the purpose of conducting oil or other liquid fuel into said chamber. A pipe 33 is arranged to carry air under pressure into the chamber 24.
 25 Within the tube 26 is arranged a needle valve consisting of a long rod 34 having a tapering point 34^a adapted to close or regulate the size of the outlet opening 27, and having a thickened threaded portion 34^b at its rear end fitting within the rear end of the tube and threaded therein, so that by turning the needle valve within the tube the valve may be adjusted. A wheel or handle 35 is arranged upon the rear end of the needle valve for convenience in operating the latter.
 30 The threads between the sleeve 25 and the tube are fine and close fitting so as to prevent air from passing from the chamber 24 to the chamber 23 and to prevent the liquid from passing outward from the chamber 23 between the threaded portions of the needle valve and
 40 tube.

The needle valve regulates the flow of liquid, and the threaded tube regulates the flow of air, and both are adjustable so that the outlet openings may be closed or varied in size.

What I claim is

1. A furnace for melting metal comprising a casing having an interior cylindrical wall and base, both of refractory material, said casing and wall having a fuel inlet opening therethrough, and said base having a main channel extending from its center to said inlet opening and branch channels diverging from the inner end of the main channel to the cylindrical wall, said wall having a vertically extending slot for the escape of gases arranged diametrically opposite to said inlet opening, and a crucible adapted to be supported upon the base at the diverging points of the channels. 45
2. The combination with an oblong casing, of two furnaces therein, arranged side by side, each furnace comprising a cylindrical wall of refractory material and a base of refractory material, the adjacent walls of said furnace having a communicating opening therethrough, said casing having fuel inlet openings at its ends and said walls having inlet openings registering with the inlet openings in the casing, and the base of each furnace having a main channel extending from its center to said inlet opening and branch channels diverging from the inner end of the main channel to the wall of the furnace at each side of said communicating opening, and a crucible adapted to be supported upon the base at the diverging points of the channels. 50 60 65 70
3. In a double furnace for melting metals, the combination with a suitable outer casing of two cylindrical furnaces therein arranged vertically side by side, the adjacent walls of said furnaces having a narrow vertically-extending slot therethrough, and said furnaces each having a fuel inlet opening diametrically opposite said slot, and means upon the floor of each furnace between the inlet opening and slot for baffling the flames. 75
4. In a double furnace for melting metals, the combination with a suitable casing, of two furnaces therein arranged vertically side by side, and each having a fuel inlet opening, the adjacent walls of said furnaces having a vertically extending communicating opening therethrough, said opening being narrower at the top than at its lower end. 80 85
5. In a double furnace for melting metal, the combination with a suitable casing, of two furnaces therein arranged vertically side by side, and each having a fuel inlet opening, the adjacent walls of said furnaces having a vertically extending communicating opening therethrough, said opening being narrow at the top and gradually increasing in width toward its lower end. 90

In testimony whereof I affix my signature, in presence of two witnesses.

JAMES V. MARTIN.

Witnesses:

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WM. P. DAVIS.