J. R. FLAHERTY.

MELTING FURNACE.

APPLICATION FILED FEB. 26, 1908.

1,003,444. Patented Sept. 19, 1911.

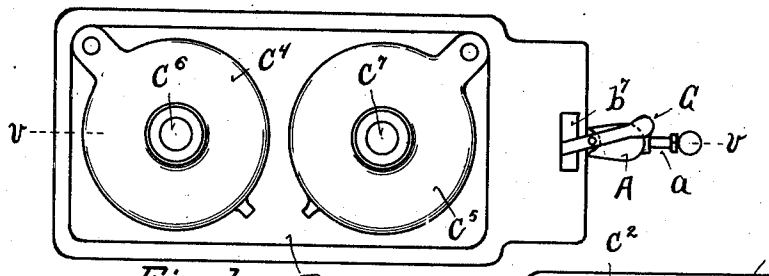

Fig. 1.

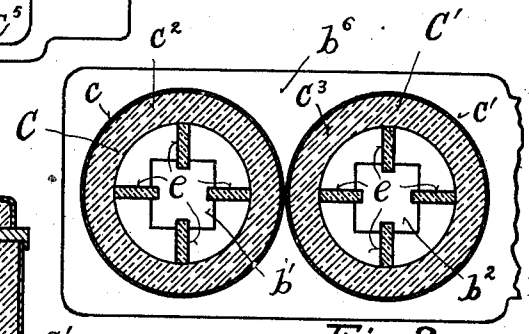

Fig. 3.

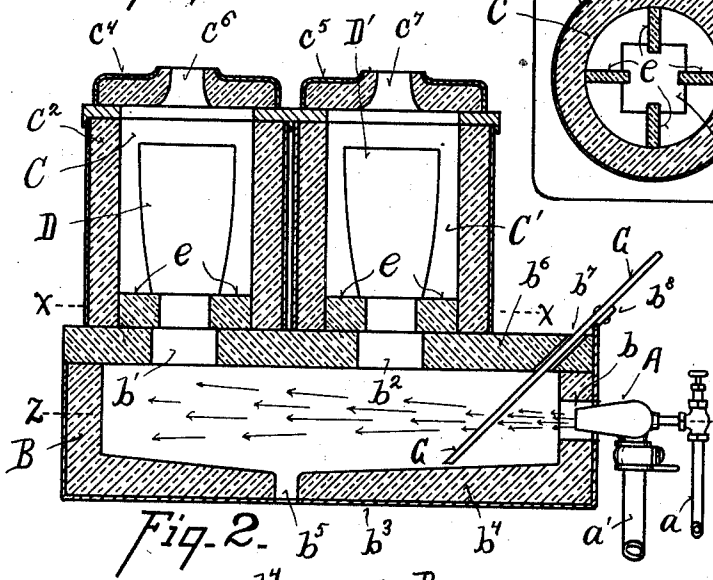

Fig. 2.

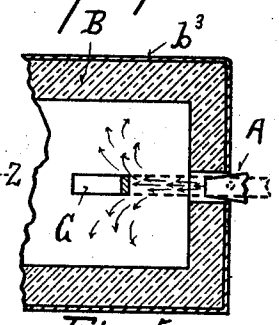

Fig. 5.

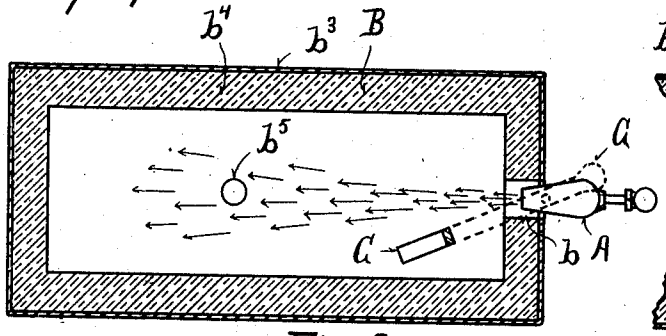

Fig. 4.

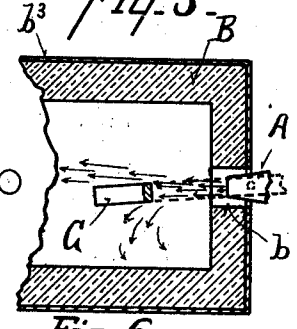

Fig. 6.

Witnesses

A. McCormack

Nathaniel H. Maxwell.

Inventor

John R. Flaherty

By Walter B. Murray

Attorney

UNITED STATES PATENT OFFICE.

JOHN R. FLAHERTY, OF CINCINNATI, OHIO.

MELTING-FURNACE.

1,003,444. Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed February 26, 1908. Serial No. 417,797.

To all whom it may concern:

Be it known that I, JOHN R. FLAHERTY, a citizen of the United States of America, and resident of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Melting-Furnaces, of which the following is a specification.

My invention relates to a melting furnace wherein a crucible which holds the metal to be melted, is heated by the combustion of oil or gas. Heretofore in this class of melting furnaces it has been customary to lead the injector from which the fuel is discharged into the chamber upon the bottom of which the crucible was seated. The objections to this are that the flame wore away the crucible, the bottom of the crucible was not heated evenly with the rest of it, and the full heat of the combustion was not had in the crucible chamber.

The object of my invention is a melting furnace in which the maximum effect of the heat is secured in the crucible chamber, in which the bottom and sides of the crucible are thoroughly heated and in which the crucible is not cut by a direct blast of flame from the fuel feeder. This object is attained by the means described in the specification and illustrated in the accompanying drawings, in which,

Figure 1 is a plan view of a melting furnace embodying my invention. Fig. 2 is a sectional view taken upon line *v*—*v* of Fig. 1. Fig. 3 is a sectional view taken upon line *x*—*x* of Fig. 2 part of the mixing chamber being shown broken off. Fig. 4 is a plan view taken upon line *z*—*z* of Fig. 2. Figs. 5 and 6 are detailed views similar to Fig. 4, but showing different positions of the baffle rod.

Referring to the parts, the fuel pipe *a*, and the air pipe, *a'*, are connected to an injector casing, A, whose end enters a hole, *b*, at one side of an elongated mixing chamber, B, in whose top are holes, b', b^2, preferably rectangular in shape. The bottom and sides of the mixing chamber are composed of an external metal shelf, b^3, with a lining, b^4, of fire brick, or other refractory material. The bottom slants to a discharge opening, b^5. The top, b^6, is made likewise of a refractory material and has at one end an inclined perforation, b^7, in longitudinal alinement with the hole *b*.

Seated upon the top of the mixing chamber are two crucible chambers, C, C', centrally situated above the openings, b', b^2. The crucible chambers have cylindrical metal sides, *c*, *c'*, lined with refractory material, c^2, c^3, and have covers, c^4, c^5, with central openings, c^6, c^7. In the bottom of the crucible chambers, C and C', four narrow blocks, *e*, are placed so as to project over the edges of the holes, b', b^2. The crucicles, D and D', rest upon the blocks, *e*, centrally above the openings, b', b^2. The shell, b^3, has in alinement with the opening, b^7, a lug, b^8, upon which a baffle-rod, G, is pivoted and extends downward through the perforation, b^7, into the mixing chamber. Baffle rod, G, may be made of graphite or other refractory material.

The operation is as follows: The air and fuel are mixed together and ignited in the chamber, B, and rise through the openings, b', b^2, contacting the bottoms of the crucibles, D and D', and surrounding the sides thereof. The combustion in the chamber, B, is only partial, but that taking place in the crucible chambers is complete, so that the heat generated therein is of a maximum degree. The force of the blast from the feeder, A, necessary for feeding the fuel and for getting a thorough admixture of the fuel and the air, is dissipated in the chamber, B, so that the gases arising through the openings, b', b^2, do not wear the crucibles severely. The life of a crucible is thus lengthened. The bottom of the crucibles being fully in contact with the flames, there is no "black spot" in the metal being melted.

By means of the baffle-rod, G, I may direct the gases into the crucible chamber desired; for instance, when the baffle-rod is placed entirely to one side of the opening, *b*, as illustrated in Fig. 4, the blast of the fuel and air is carried past the opening, b^2, strikes the opposite end of the chamber and the gases rise into the crucible chamber, C. If the baffle-rod, G, be placed directly in front of the opening, *b*, as illustrated in Fig. 5, the baffle-rod, G, breaks up the current and the ignited gases will rise into the crucible chamber, C'. If the baffle-rod be placed in a position so as to partially interrupt the current, as illustrated in Fig. 6, the gases will rise into both the crucible chambers, C and C'.

What I claim is:

1. In a melting furnace the combination of an elongated chamber having an opening

at one of its ends and a series of openings in its top, a feeder for fluid fuel and air in the opening in the end of the chamber, a series of crucible chambers seated upon the elongated chamber and having openings in their bottoms to register with the openings in the top of the elongated chamber, crucibles within each of the chambers seated above the openings in their bottoms, and a baffle rod at the end of the elongated chamber adjacent to the feeder for regulating the entrance of the flames into the crucible chambers.

2. In a melting furnace the combination of a chamber having an opening in its end, an opening in its top and an opening in its bottom, the floor of the bottom being made slanting to the opening therein, a feeder for a fluid fuel and air in the opening in the side of the chamber, a crucible chamber seated upon said chamber and having an opening in its bottom to register with the opening in the top of said chamber, a crucible and means for supporting it above said opening in the top of said chamber whereby the ignited gases from said chamber may contact the bottom and surround the sides of the crucible.

3. In a melting furnace the combination of a combustion chamber provided at one end with an opening and at the top with a series of openings, a fluid fuel feeding device for introducing fuel into said chamber through the opening provided in the end of the chamber, a crucible adapted to be mounted above each hole in the top of said chamber, a baffle rod located within said chamber and adjacent to said feeder for regulating the delivery of burning gases to said crucible.

4. In a melting furnace the combination of a combustion chamber provided with an opening in one side and a series of openings in the top, a series of crucible chambers mounted upon said combustion chamber and each provided with an opening in its bottom adapted to register with one of the openings in the top of said combustion chamber, a crucible located within each of said crucible chambers, a feeder for introducing fluid fuel into said combustion chamber through the opening provided in the side and means located within said combustion chamber and adjacent to said feeder for regulating the introduction of burning gases from said combustion chamber into said crucible chambers.

JOHN R. FLAHERTY.

Witnesses:
WALTER F. MURRAY,
AGNES MCCORMACK.