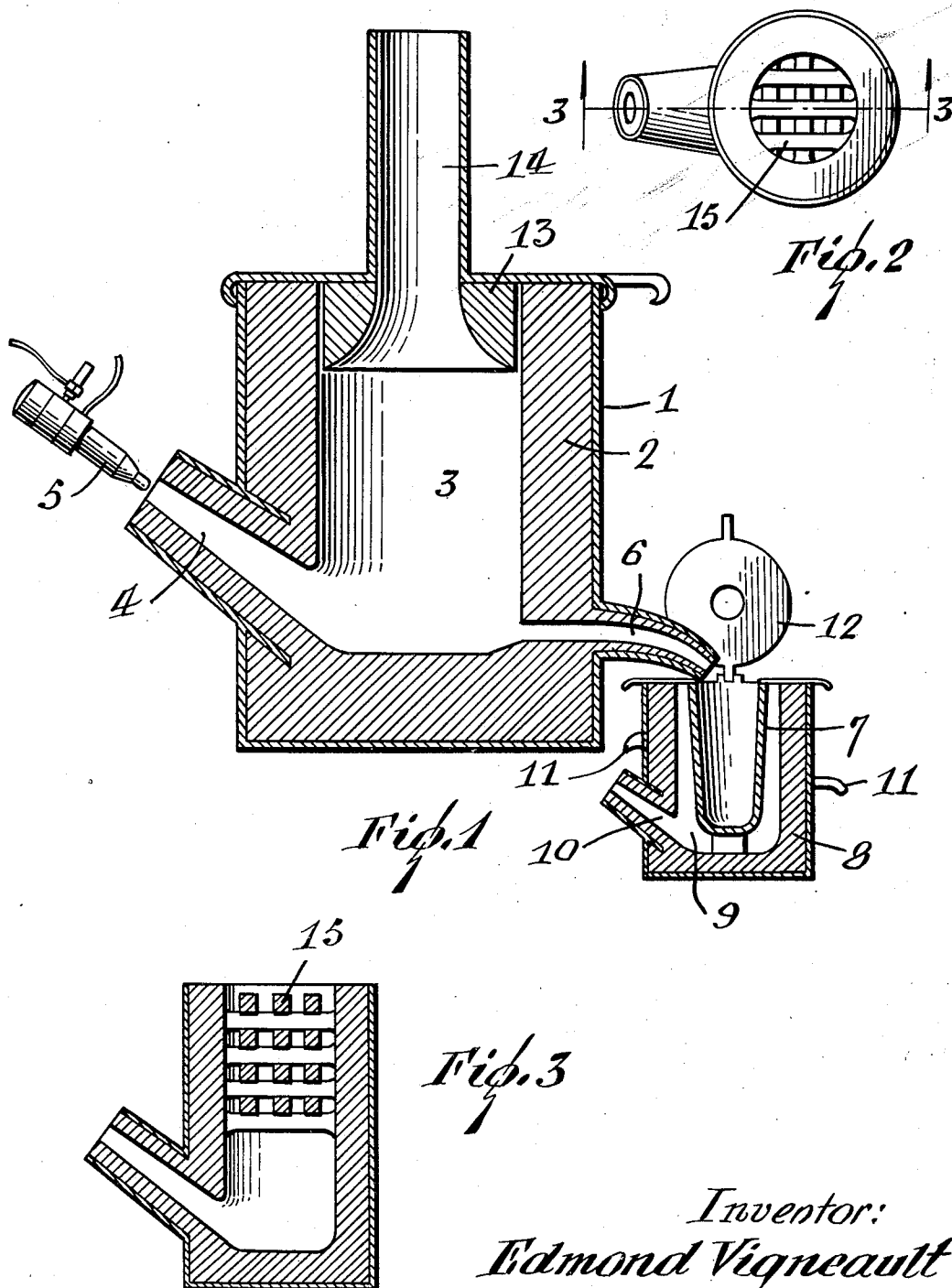


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APPARATUS FOR DIRECT, RAPID, AND CONTINUOUS
MELTING OF NON-FERROUS METALS
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APPARATUS FOR DIRECT, RAPID, AND CONTINUOUS MELTING OF NONFERROUS METALS

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Application June 30, 1941, Serial No. 400,406

1 Claim. (Cl. 266—33)

The present invention pertains to a novel apparatus and method for direct, rapid and continuous melting of non-ferrous metals. The principal object of the invention is to melt metal continuously by the application of heat in a novel manner.

More specifically, the heat is applied in the form of a heat jet injected directly into the melting chamber and in direct contact with the lower part of the metal filling the said melting chamber. The oil burner is in perfect combustion and heat is injected as the combustion product of a fully controlled mixture of oil and air in correct proportions, as a result of which there is an exothermic reaction at the metal and consequently immediate fusion at the surfaces thereof. Further, the melting chamber being provided with a chimney for entering the metal to be melted, the metal not in contact with the heat jet is pre-heated by the escaping gases.

In order that the process may proceed at a speedy and uniform rate, I provide for the immediate withdrawal of the molten metal. This is done by means of a spout extending from the bottom of the melting chamber and preferably at a point opposite the point of heat injection.

Another object of the invention is to maintain the metal in molten condition after it has been withdrawn from the melting chamber. This object is accomplished by permitting the molten metal to flow from the spout into a portable receiver which is provided with means for the injection of an auxiliary heat jet. In this operation, use is made of the principle that insulated molten metal may be maintained in that state by the application of comparatively little heat. Thus, by the immediate withdrawal of the molten metal from the melting chamber and its delivery into a heated vessel, a great economy of time and cost is effected in both the melting of the metal and maintaining it in molten condition.

The invention is fully disclosed by way of example in the following description and in the accompanying drawing in which:

Figure 1 is a vertical section of the device;

Figure 2 is a plan view of a modified construction, and

Figure 3 is a section on the line 3—3 of Figure 2.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

The larger vessel shown in Figure 1 includes a metal cylinder 1 lined with a refractory material 2 such as heat-resisting fire brick. The interior

is in the nature of a fire chamber designated by the numeral 3.

In one side of the receptacle and near the bottom of the chamber 3 is formed a spout or opening 4 which serves as the intake for the heating medium, as will presently appear. Opposite to the spout 4 and also communicating with the bottom of the chamber 3 is a discharge spout 6 for the molten metal.

A quantity of metal in the form of blocks or the like is dropped through the flue 14 to the bottom of the chamber 3, said quantity in rigid form may rise to the top, and the heat for melting the same is provided by a specially constructed oil burner 5 positioned to throw a flame into the passage 4. This burner is designed to discharge a flame in perfect combustion and is described in detail in my co-pending application, Serial No. 389,822, filed April 22, 1941.

The invention utilizes the principle whereby a metal in molten condition can be maintained in this state by the use of comparatively little applied heat. Another vessel or receiver 7 is positioned beneath the discharge spout 6 and is preferably mounted in a fire brick receptacle 8, forming therewith an air jacket 9. The member 8 also has a lateral passage 10 extending to the bottom of the receiver 7. An auxiliary burner for maintaining the metal in a molten condition in the receptacle 7 may, if necessary, be applied to the passage 10. The receptacle 8 has handles 11 for carrying, and the vessel 7 is equipped with a hinged lid 12.

In order to confine the generated and radiant heat in the chamber 3, the latter is provided with a fire brick cover member 13 in its upper portion. From this member is extended a flue or chimney 14 for the purpose of providing a gas escape and entrance for the metal to be melted.

The application of heat under perfect combustion produces an exothermic reaction and rapid melting of the metallic surface. The molten metal is immediately drawn off through the spout 6 and replaced automatically by gravity by the pre-heated metal so that the melting is continuous in the fire chamber 3. The molten metal which has been drawn off is maintained in the molten condition in the air-insulated receiver 7 with or without the application of auxiliary heat, as necessary, and is also replaced by new metal introduced in the flue 14 in order to be pre-heated by the heat of the chamber 3 and escaping gases. The vessel 7—12 is also useful for transferring the molten metal to another

point. Thus, the metal is maintained in the molten condition easily and inexpensively.

In the modification shown in Figures 2 and 3, the cover and flue in the main melting chamber are replaced by a fire brick screen 15. This device further serves the purpose of increasing the reaction surface and also adds volume to the radiant body. In other words, the screen furnishes a means for adjusting the radiant body in the proper proportion for the instantaneous melting of the charge in the furnace.

Although specific embodiments of the invention have been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention as indicated by the appended claim.

What I claim is:

A device for melting metal comprising a fire-brick lined receptacle forming a melting chamber, said receptacle having a lateral passage communicating with the bottom of said chamber, said chamber having a vertical wall opposite said passage, means for injecting an oil flame into said chamber through said passage, and a discharge spout having approximately the diameter of said passage extending from the bottom of said chamber at said wall opposite said passage, and a fire-brick screen in the top of said chamber, and having openings therethrough to the atmosphere, for entering metal in said chamber.

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