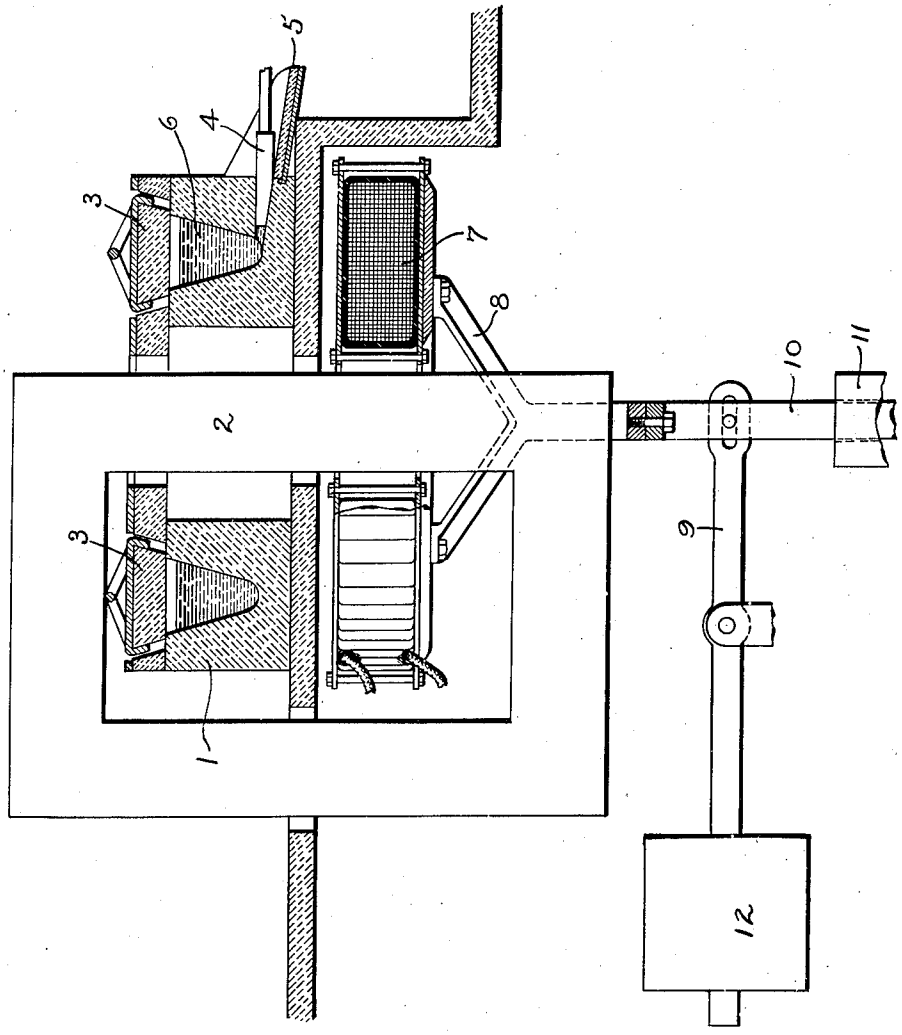
R. FLEMING.

INDUCTION FURNACE.

APPLICATION FILED OCT. 10, 1907.

1,020,688. Patented Mar. 19, 1912.



Witnesses:
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UNITED STATES PATENT OFFICE.

RICHARD FLEMING, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

INDUCTION-FURNACE.

1,020,688. Specification of Letters Patent. **Patented Mar. 19, 1912.**

Application filed October 10, 1907. Serial No. 396,726.

To all whom it may concern:

Be it known that I, RICHARD FLEMING, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Induction-Furnaces, of which the following is a specification.

This invention relates to electric furnaces of the induction type, in which the mass of metallic ore to be fused forms the closed secondary circuit of a transformer, the primary circuit consisting of a suitable coiled conductor in inductive relation to a magnetic core common to both circuits.

Heretofore it has been customary to incorporate the primary winding in the structure of the furnace, concentric with the core which passes also centrally through the circular crucible in which the ore to be smelted is placed.

As all parts are stationary, the apparatus calls for additional devices for regulating the current and adjusting it to the load: because with different quantities or qualities of ore, different quantities of current must be used.

The object of my invention is to render the furnace self-regulating so that it will automatically adjust itself to any variation in load. This I accomplish by making the primary coil separate from the furnace and mounting it adjacent thereto in such a manner that it can move under the mutual repulsion which exists between it and the secondary circuit. A counterweight tends to force the movable coil toward the crucible in order that the repulsion may be opposed until the current exceeds the desired strength.

The accompanying drawing is a sectional elevation of an electric furnace embodying my invention.

The crucible 1 is annular and is made of fire-brick or some other suitable refractory material. Through its center passes the middle leg of the laminated iron core 2, which is preferably of the closed magnetic type. The crucible is provided with lids 3, a tap-hole closed by a plug 4, and a spout 5 for directing the molten metal into a pot or mold; all as usual.

The annular charge of metalliferous material 6 in the crucible forms the closed secondary of a transformer, whose primary coil 7 is arranged in inductive relation to the core 2, and is mounted on a frame 8 supported by a lever 9. A stem 10 works in a guide 11 to steady the movements of the coil 7, and a counterweight 12 on the lever overbalances the weight of the coil and urges it toward the crucible.

When the resistance of the charge in the crucible is large, the primary coil will lie near the crucible; but if the resistance is small, the increased current will cause the primary coil to be repelled to such a point that the current will decrease to the normal quantity. Since the resistance of each charge varies with the quantity and quality of the ore, it follows that the furnace will automatically regulate itself and take the proper current under all circumstances.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. An electric furnace comprising a magnetic core, a charge-receiving chamber, and a winding in inductive proximity to said chamber and movable along said core.

2. An electric furnace of the induction type having its primary coil movable toward and away from the crucibles.

3. An electric furnace of the induction type having its primary coil movable, and a weight urging said coil yieldingly toward the crucible.

4. An electric furnace of the induction type, comprising an annular crucible, a magnetic core, a primary coil, a support for said coil placed in inductive relation to said crucible, a lever carrying said support, and a counterweight on said lever.

5. An electric furnace comprising a magnetic core, a winding magnetically related thereto, a charge-receiving crucible in inductive proximity to said winding and means for automatically varying the relative position of said elements in accordance with the variations in the resistance of the charge of the crucible.

6. An electric furnace comprising a charge-receiving chamber, a winding inductively related thereto and means for automatically regulating the current in the primary coil in accordance with the variations in the quantity and quality of the charge.

7. An electric furnace of the induction type, comprising a means for automatically regulating the inductive effect of the primary upon the furnace charge forming the secondary, in accordance with the variations in the quantity and quality of said charge.

In witness whereof, I have hereunto set my hand this nineteenth day of September, 1907.

RICHARD FLEMING.

Witnesses:
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