

1,335,079.

Patented Mar. 30, 1920.
2 SHEETS—SHEET 1.

Fig. 1.

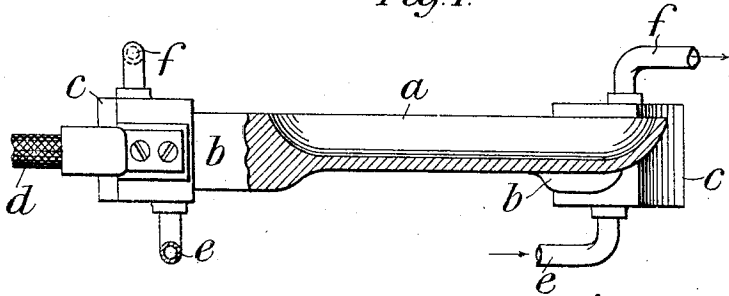
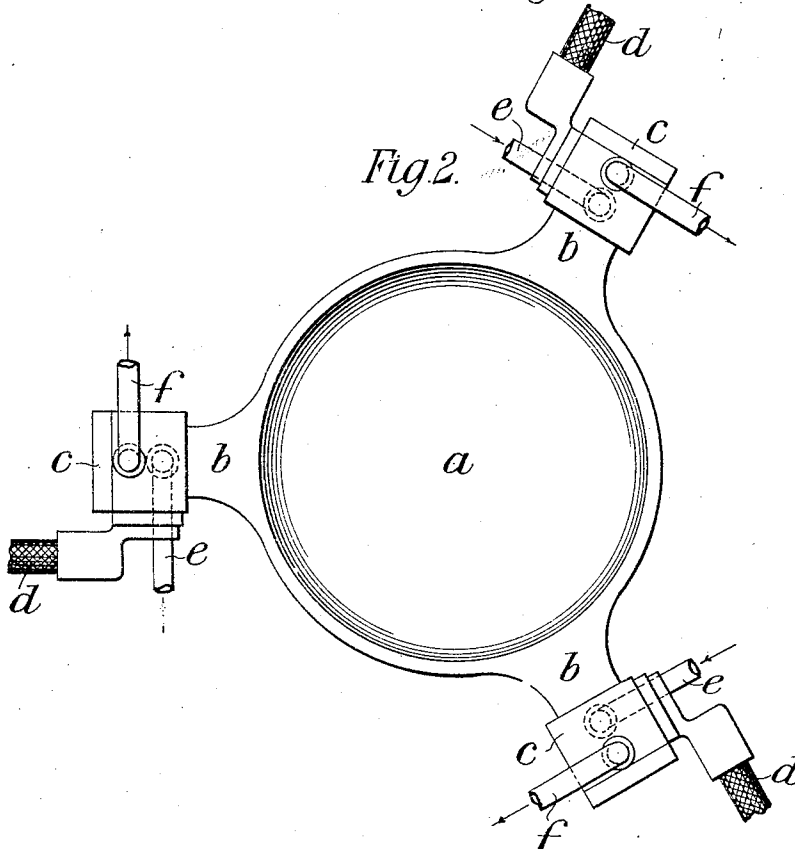


Fig. 2.



Witnesses.

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2 SHEETS—SHEET 2.

Fig.3

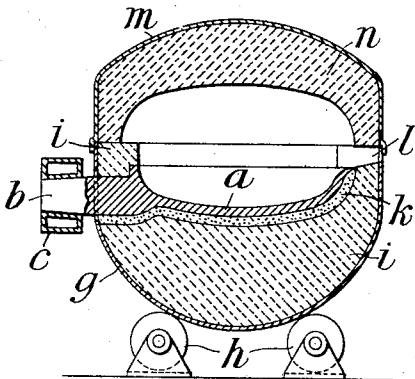


Fig.5

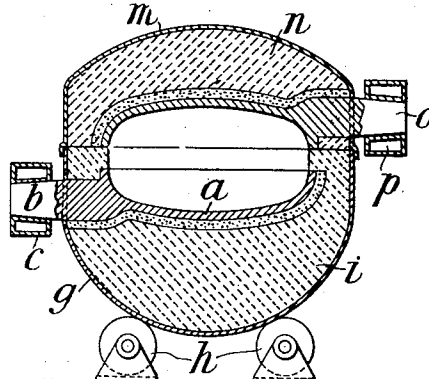


Fig.4

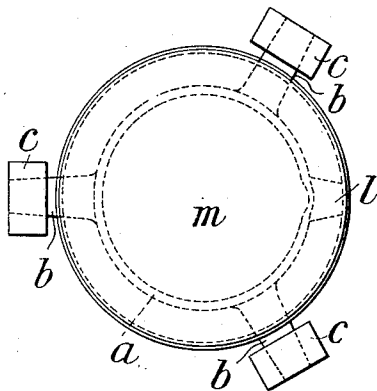
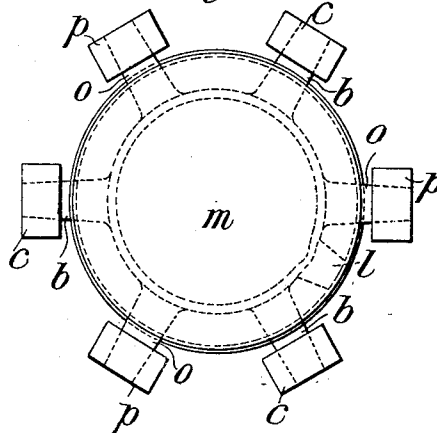


Fig.6



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES WILLIAM SPEIRS, OF BATTERSEA, LONDON, ENGLAND, ASSIGNOR TO MORGAN CRUCIBLE COMPANY, LIMITED, OF LONDON, ENGLAND.

ELECTRIC FURNACE.

1,335,079.

Specification of Letters Patent.

Patented Mar. 30, 1920.

Application filed June 10, 1919. Serial No. 303,125.

To all whom it may concern:

Be it known that I, CHARLES WILLIAM SPEIRS, a subject of the King of Great Britain, residing at Battersea Works, Battersea, London, England, have invented new and useful Improvements in Electric Furnaces, of which the following is a specification.

This invention relates to electrical furnaces of the class which employs a container composed of a material which itself constitutes the conductor through which the electric current is caused to flow and which is designed to be heated by a three phase current.

Heretofore in constructing a furnace of this type it has been proposed to apply a layer of refractory material, conductive when hot, over a lining of non-conducting material in which electrodes are embedded.

According to this invention the container which is constructed of graphite and clay or like mixture, is made in the form of a circular or approximately circular dish or hearth, and in order to reduce heat losses to a minimum, it has formed integral therewith, during the molding operation, three lateral extensions to which accurately fitting water-cooled terminals are applied.

The container dish or hearth may be lined with a material such as clay, bauxite, zirconia or carborundum, to prevent loss of graphite by oxidation and to prevent electrical contact and/or chemical action with the substance being melted, and can be then used to melt steel, brass, gold, silver and other metals or glass, or for other metallurgical purposes. The container can be fitted with a spout or tapping hole which is advantageously taken from the bottom so as to enable the metal to be poured, leaving the scum behind.

The container, trough or hearth must be supported and surrounded by a metal casing, (arranged to tilt, if necessary) lined with firebrick or other suitable material.

To enable the invention to be fully understood, it is hereinafter described by reference to the accompanying drawings, in which:—

Figure 1 is a sectional side view of one form of electrically heated circular hearth made according to the invention, and

Fig. 2 is a plan view thereof.

Fig. 3 is a sectional view of a furnace provided with a hearth as above described, and

Fig. 4 is a plan.

Figs. 5 and 6 are views similar to Figs. 3 and 4 respectively of a furnace, the roof of which is designed to be heated in the same manner as the hearth.

a indicates the hearth which, as above stated, is of approximately circular shape in plan view and *b, b, b* the three lateral extensions which are made integral with the hearth *a* and are designed to receive the accurately fitting terminals *c* for the conductors *d* which supply the three-phase current for heating the hearth. The terminals are of the water-cooled type, water entering at *e* and issuing at *f*.

In practice the cross sectional area of the hearth *a* is so proportioned that the resulting current distribution will produce uniformly distributed heat throughout the whole area of the hearth.

The hearth *a* hereinbefore described can be inclosed in a metal casing in any convenient manner. As shown in the drawings it is represented as being mounted in a casing carried upon rollers *h, h*, so that it can be tilted, the said hearth being supported upon a bed *i* of fire-brick or other refractory material with a layer *k* of refractory powder or insulating material interposed between the hearth proper and the bed; the said bed is also advantageously carried between the lateral extensions *b, b* and extended over the upper edge of the hearth as shown, to form an insulating layer, while the lateral extensions project beyond the furnace casing.

It is to be understood that this arrangement is only given as an example and that the hearth may be mounted in any other convenient manner and designed to be tilted or not as desired. If the furnace is designed to be tilted, the charge may be poured through the spout *l*, but, if the hearth is stationary, then the charge may be withdrawn through a tapping hole communicating with the bottom of the furnace. Also, as shown in Fig. 3, the furnace is represented as being provided with a cover comprising a casing *m*, which rests upon the casing *g*, and an inner lining *n* of fire-brick or other refractory material, which roof can be lifted off

by any convenient means. Charging and examining doors, (not shown) can be arranged where required.

5 In some cases the roof of the furnace may be constructed with an inner lining which may practically constitute a duplicate of the hearth itself, and be heated independently. Such an arrangement is shown in Figs. 5 and 6, lateral extensions *o, o* being
10 provided for the application of water cooled terminals *p, p*.

A container mounted and constructed as hereinbefore described may be employed for melting charges weighing several tons.

15 The voltage applied to the terminals, and consequently the current flowing through the container and the heat thereby generated can be controlled by several well-known electrical methods.

20 Having now particularly described and ascertained the nature of the said invention

and in what manner the same is to be performed, I declare that what I claim is:—

1. An electric furnace comprising a container in the form of an approximately circular saucer-shaped hearth having three integral lateral extensions, and terminals attached to said extensions for supplying three-phase electric current thereto. 25

2. An electric furnace of the kind defined by claim 1 in combination with an arch or roof electrically heated by three-phase current. 30

3. An electric furnace of the class specified and comprising a container of a circular saucer, dish or hearth shape, three terminal extensions integral with the said container and water cooled terminals applied to said extensions for the supply of three-phase electric current. 35

CHARLES WILLIAM SPEIRS.