

E. C. SPEIDEN.
ELECTRIC FURNACE.
APPLICATION FILED JAN. 31, 1911.

992,281.

Patented May 16, 1911.

2 SHEETS—SHEET 1.

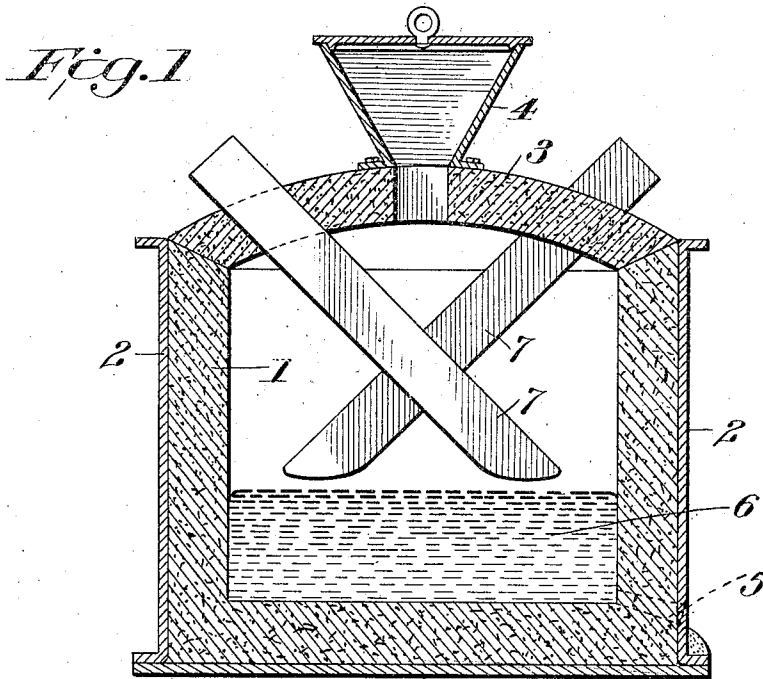
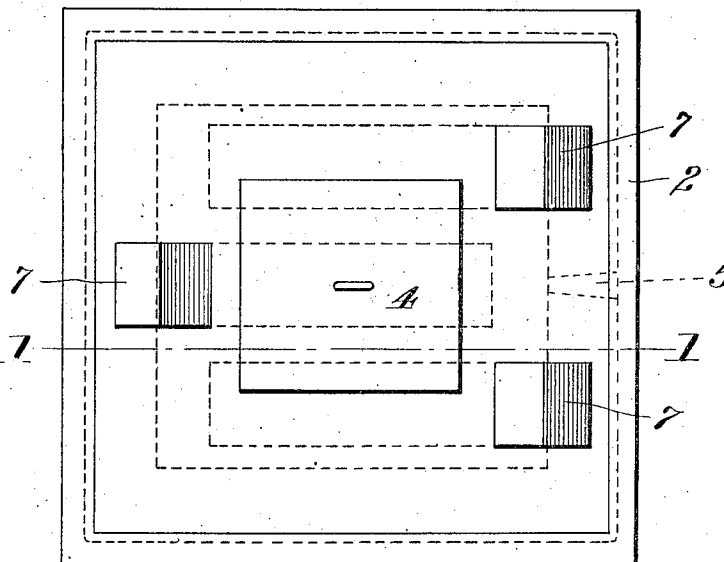


Fig. 2.



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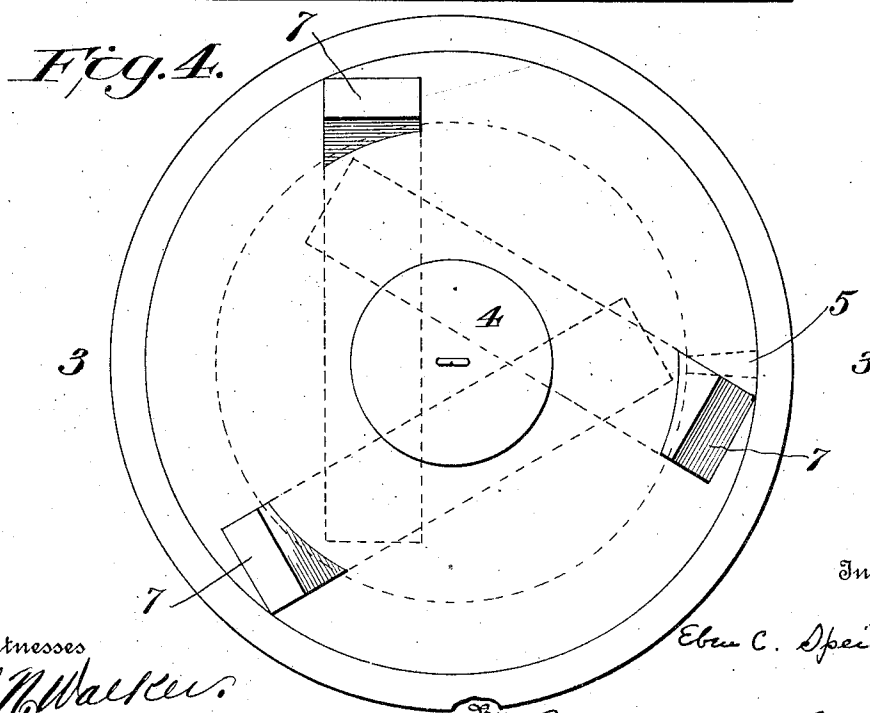
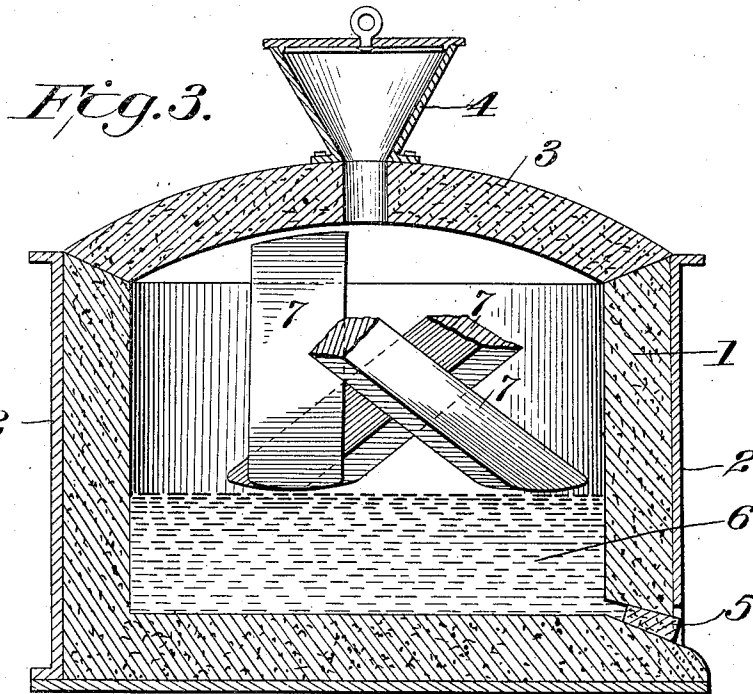
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UNITED STATES PATENT OFFICE.

EBEN C. SPEIDEN, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO INTERNATIONAL
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ELECTRIC FURNACE.

992,281.

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To all whom it may concern:

Be it known that I, EBEN C. SPEIDEN, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

This invention relates to electric furnaces, the primary object of the invention being the provision in such furnaces of means for reducing the direct radiation of heat from the surface of the molten bath. In the preferred embodiment of the invention this result is secured by such disposition or arrangement of the electrodes that they may intercept the heat radiated upwardly from the zone of maximum temperature, and thereby constitute an effective shield for the upper structure and roof of the furnace.

Certain preferred forms of furnaces embodying the invention are shown in the accompanying drawings, wherein:

Figure 1 is a vertical sectional view of one form of furnace on the line 1—1 of Fig. 2; Fig. 2 is a plan view of the construction shown in Fig. 1; Fig. 3 is a vertical sectional view of a modified form of furnace on the line 3—3 of Fig. 4, the electrodes being shown partly in elevation; and Fig. 4 is a plan view of the construction of Fig. 3.

In said drawings, 1 represents the refractory walls of the furnace chamber, surrounded by a metal shell 2. 3 represents an arched furnace roof, also of refractory material, and 4 a feed-hopper supported thereby.

5 indicates the tap-hole for the molten charge 6.

All of the foregoing parts may be of any desired or usual construction, and the roof of the furnace may be omitted if desired.

The essential feature of the invention relates to the disposition or arrangement of the electrodes in such manner as to protect, shield, or shadow the upper portion of the furnace structure, including the roof, from the effects of heat radiated from the zone of maximum temperature. This result is best obtained by disposing the electrodes in overlapping series, whether in parallel planes or in angular relation to each other.

One or more inclined electrodes may be used as desired.

In the construction shown in Figs. 1 and 2 the electrodes 7, three in number, are arranged in parallel planes, the outer electrodes at the same inclination, and the intermediate electrode oppositely inclined and overlapping the outer electrodes. This arrangement brings the working ends of the electrodes at the apices of a triangle, which is preferably approximately equilateral as most clearly shown in Fig. 2. Under these conditions the maximum temperature development is within or near the general area including the working ends of the electrodes; and, as will be observed, this area is substantially beneath the electrodes, the lower sides of which therefore intercept the radiant heat and protect the upper structure of the furnace. The electrodes, which may be of carbon or graphite, are unaffected at the high temperatures attained. The foregoing arrangement is well adapted for use with a three-phase circuit, whether of the star or delta type, but is advantageous under all conditions of electrical supply whether of direct or alternating current of single or polyphase; and irrespective of whether or not the molten bath is included in the circuit.

Figs. 3 and 4 illustrate a modified arrangement wherein the vertical planes of the electrodes are arranged at an angle to each other, the result accomplished being however the same in that the zone of maximum temperature development is beneath the electrodes. Electrodes arranged as in these figures are to be regarded as "overlapping," as this term is herein employed.

The electrodes may be prismatic or circular or of other shape in section and the furnace may operate either by arc or incandescence or by a combination of both, the essential feature of the invention being the disposal of the electrodes in such manner that they are interposed, in the normal operation of the furnace, between the zone of maximum temperature development and the upper structure of the furnace.

I claim:

1. An electric furnace having an inclined electrode or electrodes located above a zone

of maximum temperature development and in position to shield the upper portion of the furnace structure.

2. An electric furnace having overlapping electrodes inclined above a zone of maximum temperature development.

3. An electric furnace having overlapping electrodes inclined above a zone of maximum temperature development, the

working ends of the electrodes being at the apices of an approximately equilateral triangle.

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

EBEN C. SPEIDEN.

Witnesses:

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A. M. WILLIAMSON.