

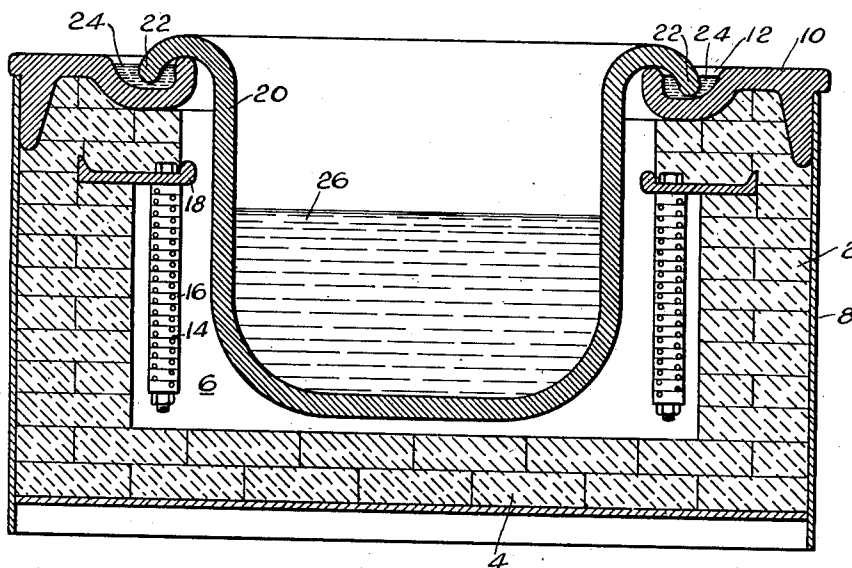
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CYANIDE POT

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UNITED STATES PATENT OFFICE.

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CYANIDE POT.

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My invention relates to furnaces and more particularly to electrically heated furnaces of the heat treating type.

In furnaces of the above mentioned type, usually comprising a crucible containing a fused salt supported in operative position within a furnace casing, difficulty has been experienced in preventing the salt from creeping, responsive to capillary attraction, beyond the rim of the crucible, and over adjacent furnace parts. The salt employed is usually a cyanide, which has a marked deleterious effect upon the furnace refractory and upon the electrical heating elements disposed adjacent to the crucible, but my invention is equally applicable to salt baths comprising chlorides, carbonates, silicates, or suitable mixtures thereof.

It is an object of my invention, therefore, to provide, in conjunction with a furnace of the above mentioned type, means for preventing the fused material therein from contaminating and injuring adjacent furnace parts.

In practicing my invention, I provide a crucible having an out-turned peripheral rim adapted to be supported in operative position in a furnace casing of the pot type, and a liquid seal between the peripheral rim of the crucible and the supporting structure. I employ, in the seal, a liquid of a suitable chemical and thermal characteristic to react with the fused salt to alter the physical and chemical characteristics of said salt.

Referring to the drawing, the single figure is a view in vertical section of a heat treating furnace embodying my invention.

Referring more particularly to the drawing, an annular wall 2, built of suitable refractory heat insulating material, and a circular base 4, of similar material, define the substantially cylindrical furnace chamber 6. A sheet metal shell 8, completely covering the outer surface of the refractory portions 2 and 4, effects the necessary structural reinforcement thereof.

A cast plate 10 of a suitable heat resistance metal rests upon the upper face of the refractory wall 2 in supporting relation, and is provided with an annular channel 12 adjacent to the inner periphery thereof.

Heating of the chamber 6 effected by a helically wound electric resistance element 14 substantially coaxial with the axis of the furnace chamber, and maintained in operative

position by a plurality of grooved blocks 16 suspended from an annular plate 18, of metallic refractory material peripherally embedded in the annular wall 2. The resistance element 14 is electrically connected to a suitable source of power (not shown) in the usual manner.

A crucible 20, substantially coextensive in diameter with the diameter of the inner peripheral edge of plate 10, is provided with an outturned rim 22. The crucible is so proportioned when in operative position within the chamber 6, the inner peripheral edge of the plate 10 engages the under side of the rim 22 in supporting relation, and the outer peripheral edge of the rim is received within the channel 12.

The channel 12 is substantially filled with a suitable liquid 24, molten lead in the present embodiment, so that the peripheral edge of the rim 22 is submerged therein.

The fused material employed in the heat treating operation comprises, in the present embodiment, a cyanide salt 26 contained within the crucible 20.

In operation, the salt 26 is maintained at a desired heat treating or tempering temperature by the energization of the resistance element 14, and at the temperature thereby attained, there is a tendency of the fused salt to creep, responsive to capillary attraction, up and over the sides of the crucible and into the molten lead contained in the channel 12. The lead and cyanide thereupon chemically react to form a fusible lead compound, such as lead cyanide slag, which floats upon the surface of the molten lead. When sufficient of the slag has accumulated, it may be skimmed off and additional lead added to the liquid within the channel if found necessary.

The formation of the slag on the surface of the lead seal prevents, to a marked degree, the surface oxidation of the lead, but if it is desired to further reduce the lead loss, a layer of charcoal or other chemically inert material may be floated upon the surface of the molten lead.

During the operation, the lead is maintained in a molten state by heat from the rim 22 depending therein. In usual operation, the minimum temperature of the rim rarely falls below 327° C., which is approximately the melting point of the lead.

While I have shown and described as the preferred embodiment of my invention, a

heat treating bath comprising fused cyanide salt, it is obvious that my invention is applicable to furnaces employing other salts, such as chlorides, carbonates, silicates, etc., or, in general, any material which tends to creep out of the crucible and beyond the rim thereof. Further, while I have shown a liquid seal between the crucible rim and the supporting structure comprising a quantity of molten lead, clearly the choice of the liquid used therein should not be confined to molten lead, but any liquid having a desired chemical effect upon the fused material of the heat treating bath may be employed.

By my invention, I have provided an improved and effective means, in a heat-treating bath type of furnace, whereby injury to adjacent furnace parts incident to the creeping of the fused bath material past the rim of the crucible is prevented.

Various modifications may be made in my invention without departing from the spirit and scope thereof, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and set forth in the appended claims.

I claim as my invention:

1. In a heat treating furnace, the combination with a crucible containing a molten salt, and means for supporting said crucible in a heating chamber, of means forming a liquid seal between said crucible and supporting means for preventing the creeping of said molten salt over said supporting means.

2. In a heat treating furnace, the combination with a crucible containing a molten salt, and means for supporting said crucible in a heating chamber, of a liquid seal between said crucible and supporting means comprising a liquid of suitable characteristics to chemically react with said fused salt to form a slag adapted to float upon the surface thereof.

3. In a heat treating furnace, the combination with a crucible containing a bath of molten material, and means for supporting said crucible in a heating chamber, of a liquid seal between said crucible and supporting means comprising a bath of molten lead and a flange on said crucible depending therein.

4. In a salt-bath furnace, the combination with a crucible for containing said bath op-

eratively supported in a heating chamber, of a liquid seal between the rim of said crucible and the supporting structure comprising a quantity of molten lead, means for maintaining said lead in a liquid state, and means for preventing the surface oxidation thereof.

5. In a heat treating furnace comprising a crucible containing a fused material, and an out-turned rim formed peripherally of said crucible, means adjacent to said rim and cooperating therewith to prevent the creeping of said fused material over adjacent furnace parts, said means comprising a channel adapted to receive the peripheral edge of said rim, and a liquid material in said channel covering the edge of said rim and adapted to chemically react with said fused material to form a slag on the surface thereof.

6. In a tempering bath, a crucible containing a molten material, means for supporting said crucible in operative position, and means for preventing said molten material from creeping out of said pot and over said supporting means responsive to capillary attraction, said means comprising a liquid seal between said crucible and support including a material adapted to chemically react with said molten material to change the physical characteristics thereof.

7. In a heat treating furnace, a crucible containing a molten material supported in the heating chamber thereof, and means for preventing said material from creeping over adjacent furnace parts responsive to capillarity, said means comprising a channel cooperating with the peripheral edge of said crucible, and a liquid in said channel adapted to chemically react with said material to alter the physical and chemical characteristics thereof.

8. In a heat treating furnace, the combination with a crucible containing a molten salt and means for supporting said crucible in operative position in said furnace, of cooperating means between said crucible and support constituting a liquid seal therebetween.

In testimony whereof, I have hereunto subscribed my name this 28th day of October 1927.

WILLIAM J. MERTEN.