

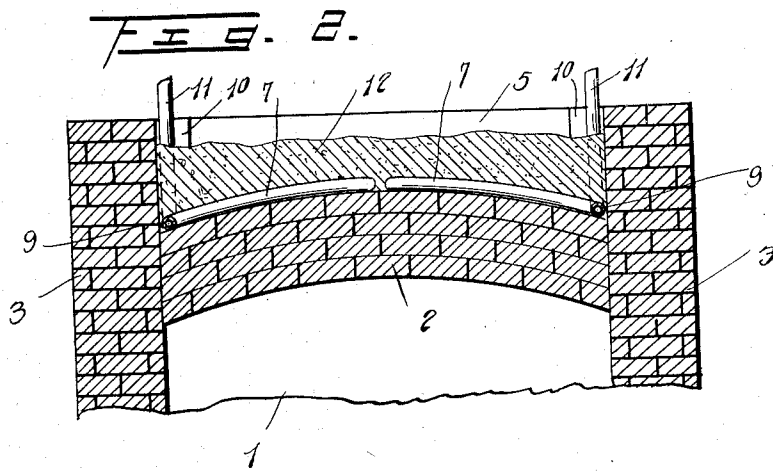
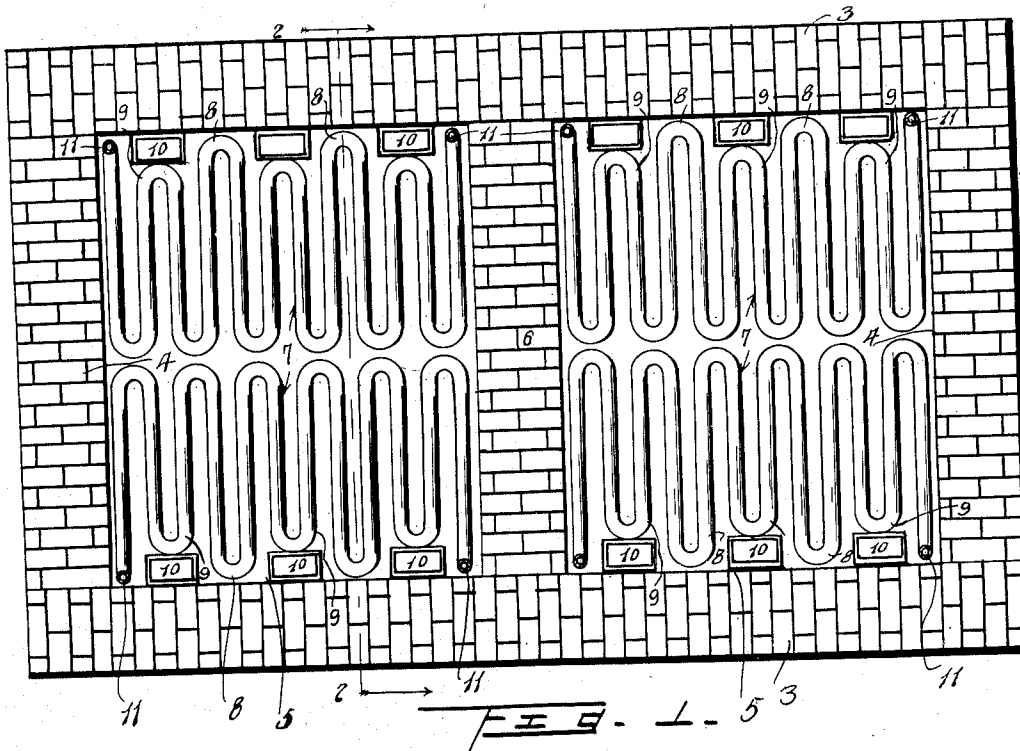
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WATER COOLED ROOF FOR REVERBERATORY FURNACES

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WATER-COOLED ROOF FOR REVERBERATORY FURNACES.

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The invention relates to furnaces for smelting ores and particularly to that type of furnace known in the art as a reverberatory furnace. In furnaces of the type stated, the ore is not subjected to the direct heat of the furnace but the heated gases are conducted through the smelting chamber having an arched roof so arranged that the heated gases striking the roof reverberate or are reflected downwardly on the ore that is spread on the hearth or floor of the smelting chamber. As a consequence the roof of the smelting chamber is subjected to an intense heat that eventually eats away or disintegrates the roof making it necessary to reconstruct the smelting chamber.

This invention has for its object the provision of means by which the intense heat of the roof may be minimized and consists in the provision of water circulation pipes arranged in returned sections having inlet and discharge connections through which water is continuously circulated to carry off the heat of the roof to reduce its temperature and thereby lengthen the life of the roof and reduce the expense of installation of structures of this type.

A further object of the invention is the provision of means by which the water circulation pipes may oscillate under the action of the roof expanding and contracting. It will be of course understood that the expansion and contraction of the roof will be unequal, the middle of the arched roof being subjected to the greatest heat and expands more rapidly and to a greater extent than the edges of the roof and the cooling members are therefore arranged in returned sections extending about half way across the roof from the side walls so as to permit expansion and contraction of the roof without affecting the cooling pipes, the arrangement stated permitting oscillation of the section, swinging on arcs having for their centers the returned portions adjacent the side walls of the furnace.

A further object of the invention is the provision of a furnace of the type stated having a recess arranged above the arched roof in which the cooling mediums are arranged and adapted to hold a granular material of a refractory nature to assist in carrying off the heat created in the furnace from the roof.

The invention will be described in detail

hereinafter and will be found illustrated in the accompanying drawing, in which

Figure 1 is a top plan view of a portion of a smelting furnace showing the cooling members in position, the granular refractory material being omitted, and

Figure 2 is a transverse sectional view on a plane indicated by the line 2-2 of Figure 1, the granular refractory material being shown in position.

In the drawing similar reference characters will be used to designate corresponding parts in both of the views.

A reverberatory furnace is shown in the drawing in which the smelting chamber 1 has an arched roof 2 made of suitable refractory material, usually fire brick, side walls 3 built of the same material and end walls 4. In constructing the furnace, the side and end walls 3 and 4 respectively are extended above the upper surface of the roof 2 to form a recess 5, and this recess may be divided into smaller recesses by transverse walls 6. It will be understood that the smelting chamber may be of any desired length to accomplish the purpose intended and that the showing in the drawing is for illustration of the invention to be hereinafter described only, and it will be understood that the application of the invention may be made to furnaces having smelting chambers of any desired length and proportions.

The cooling device comprises members 7, each consisting of pipe sections having returned portions 8 and 9, the returned portions 9 being shorter than the returned portions 8, to accommodate charging ducts 10 arranged in the roof 2. The ends of the pipe sections forming the cooling medium 7 are extended upwardly adjacent the side walls 3 as shown at 11, one of said upwardly extended ends being adapted to be used for the inlet of the cooling medium, usually water, while the other is for the discharge of the cooling medium; it being apparent that the discharged water may be utilized for any purpose for which heated water may be utilized. Arranged above the cooling medium 7, which is as shown in engagement with the roof 2, is a filling of granular material such as silica and soda, fire clay or brick, and designated 12.

Because of the structure of the cooling member 7 as shown, comprising the returned sections extending but half way across the upper surface of the roof, it will be apparent

that these sections may oscillate caused by the expansion and contraction of the roof 2 under influence of the heated gases without interfering with the stability of the roof or 5 with the cooling member. Furthermore, by having a plurality of cooling members for the roof, arranged as shown in the drawing in separate recesses, and these arranged with two members in each recess, it will be ap- 10 parent that a more efficient cooling of the roof may be accomplished than by having but a single cooling medium applied to the entire structure.

What is claimed is:—

15 1. A cooling means for reverberatory furnaces, including an ore treating chamber having side and end walls and a roof, the side and end walls extended above the roof to form a recess, a cooling member arranged 20 in said recess and contacting with the roof, and a filler of granular material in said recess and covering said cooling member.

2. In a reverberatory furnace having side 25 and end walls and an arched roof, cooling members comprising pipe sections for circulation of a cooling medium arranged above

the roof and contacting therewith, said cooling members consisting of pipe sections having returned portions arranged substantially 30 parallel with one another, some of said returned portions being shorter than the remainder of said portions, and charge ducts arranged in alinement with said shorter returned portions.

3. In a reverberatory furnace having side 35 and end walls and an arched roof, said side and end walls extending above the roof to form a recess, cooling members arranged in said recess and contacting with the roof, said members comprising pipe sections having 40 returned portions extending from the side walls half way across the roof, inlet and discharge pipes for the pipe sections arranged adjacent to the side walls, some of said returned portions being shorter than the re- 45 mainder of said portions, charge ducts arranged in alinement with the shorter of said portions, and a filler of granular refractory material in said recess and covering said cooling members. 50

In testimony whereof I affix my signature.
MICHAEL CORCORAN.