

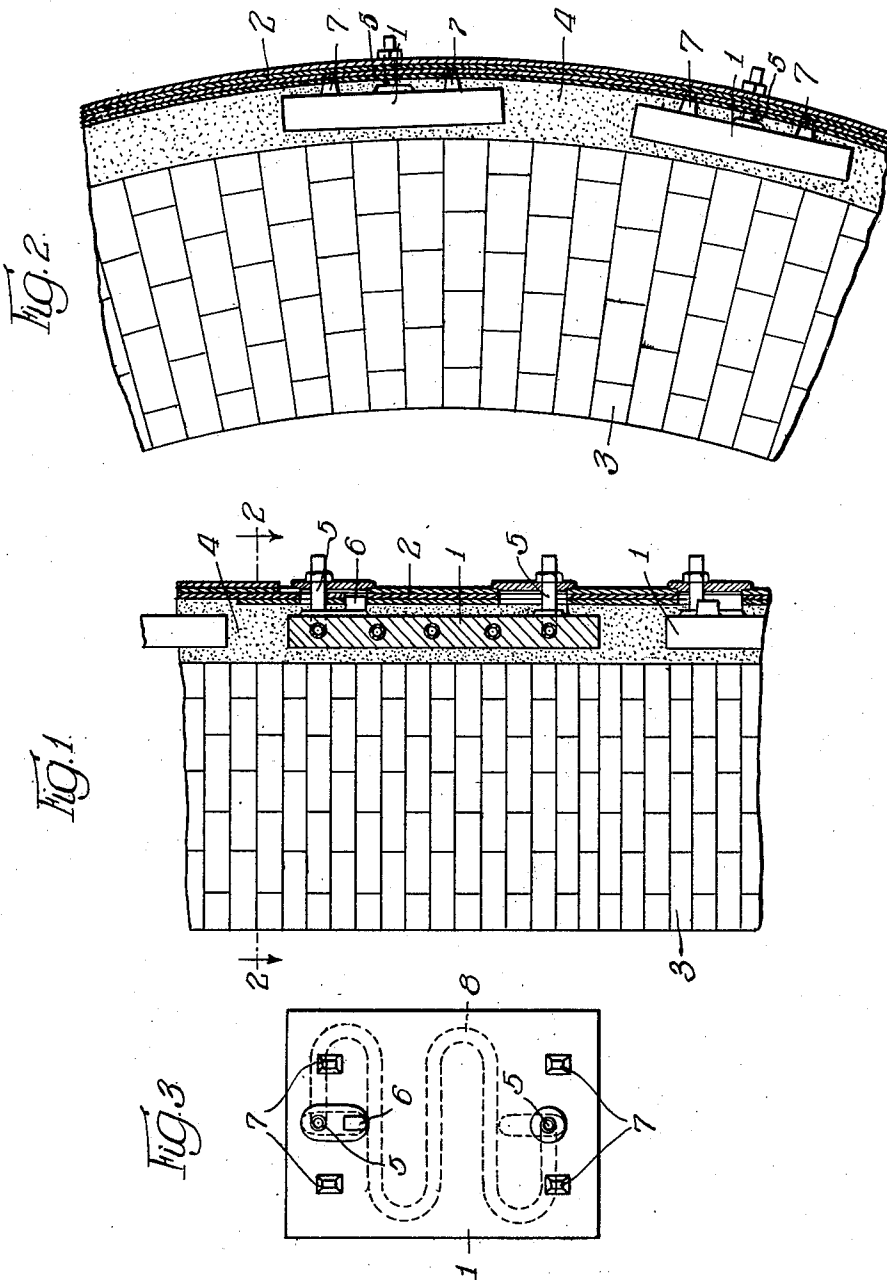
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SHAFT COOLING SYSTEM FOR BLAST FURNACES

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SHAFT COOLING SYSTEM FOR BLAST
FURNACES

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This invention relates to a new and improved shaft cooling system for blast furnaces or the like, and particularly to a construction comprising cooling members located between the brickwork and metallic shell of the furnace.

Cooling systems are well known and commonly used in blast furnaces and shaft furnaces at the present time, but such systems usually employ cooling members generally flat in shape and disposed horizontally in the brickwork in such manner that they lie between the courses of brick and extend almost to the inner surface of the brickwork of the shaft. The cooling members made according to the present invention are not placed in the actual brickwork of the furnace shaft, but instead are arranged separately from the brickwork between the outer sheet steel casing of the furnace and the brick masonry of the shaft. The flat cooling members or chambers of the present invention are located so as to extend approximately vertically and approximately parallel to the outer face of the masonry and the inner face of the shaft. While the shaft and shell faces are cylindrical or slightly conical in shape, it will be understood that the cooling members may be flat and consequently not exactly parallel to the adjacent surfaces. The cooling chambers of the present invention may be arranged to form a regular or an irregular distribution behind the sheet metal casing, which is thus partially or entirely covered with cooling members.

This arrangement of the shaft cooling system with the use of cooling chambers approximately parallel to the shaft wall and casing, has the advantage over the previously used cooling systems in that it cools the masonry of the furnace more uniformly than such prior systems. Where the cooling chambers or slabs lie embedded within the masonry, the masonry immediately adjacent them is cooled to a greater extent than that spaced from the chambers, so that the refractory lining immediately adjacent the chambers has a greater life than the portions of the masonry spaced a greater distance away from the chambers. Consequently, this portion of the masonry spaced from the chambers is worn away to form an irregular inner surface of the masonry. With proper spacing of the cooling system according to the present invention, the brickwork lining of the shaft may be worn away substantially uniformly which is an important factor in the regular and uniform operation of the furnace.

It has further been found that the use of flat cooling chambers made according to the present

invention and located between the brick shaft and metal shell serves to afford a considerable cooling effect and brings about a uniform cooling of the masonry, with a much greater durability of the shaft than that with prior cooling systems.

A further important feature of the present invention is that with a cooling system of this type the masonry of the shaft can be built up entirely independently and the cooling chambers can also be put in place without regard to the progress of the work on the masonry of the shaft.

An additional advantage is the fact that the brickwork of the shaft can be removed and renewed without taking out or changing the cooling chamber structures, as was necessary with former constructions. The space between the brickwork and the metallic casing of the shaft in which the flat cooling chambers are placed, is preferably filled up with loose refractory packing material.

It is an object of the present invention to provide a new and improved cooling system for the protection of the brickwork of shaft furnaces and the like.

It is a further object to provide a construction of this character in which the cooling means are supported independently of the brickwork of the furnace.

It is an additional object to provide a construction in which the cooling effect may be distributed substantially uniformly over the areas to be cooled.

It is also an object to provide a construction which is simple in design, of relatively low cost and adapted for commercial installation and use.

Other and further objects will appear as the description proceeds.

I have shown a preferred embodiment of my invention in the accompanying drawing, in which—

Figure 1 is a vertical section through a shaft wall and shell wall with the cooling system in place;

Figure 2 is a horizontal section taken on line 2—2 of Figure 1; and

Figure 3 is a face view of one of the cooling elements.

As shown in the drawing, the flat cooling chambers 1 are located between the metallic casing 2 of the furnace and the brick masonry shaft 3 of the furnace. That portion of the space between the shell 2 and the masonry 3 which is not filled by the cooling members 1, is filled by loose refractory packing material 4. The arrangement of the cooling chambers may differ in individual

cases. For example, substantially the whole inner face of the casing of the shaft may be covered with these flat cooling chambers or they may be arranged in checkerboard fashion or in continuous spaced rows extending vertically or horizontally.

The chambers as shown are held in position upon the metallic casing by means of the water inlet and outlet pipes 5, but other securing means may be used if desired. The members 1 are further provided with the bosses 6, which serve to bear against the shell 2 by fitting in openings therein and thus transfer the weight of the chambers to the metal shell. In addition, the members 1 are provided with spacing bosses 7 which serve to hold the flat chambers at a definite, predetermined distance from the inner face of the sheet metal casing.

The cooling water may be circulated in the flat members 1 in any desired manner. In the construction shown, the water is circulated through a reversely bent pipe 8 which is cast in the slab forming the member 1. Preferably a metal or alloy which is a good conductor of heat is used for the cooling members. For example, copper

or copper alloys may be used or in some cases the chambers may be made of aluminum or, if desired, the chambers may be made of iron.

While certain preferred embodiments of the invention have been shown and described, they are to be understood to be illustrative only as the structure and installation may be varied to suit differing conditions and requirements, and I contemplate such modifications as come within the spirit and scope of the appended claims.

What is claimed is:

1. In a shaft furnace, a brick shaft construction, a metallic shell enclosing the brickwork and spaced therefrom, cooling members located between the brickwork and shell, and refractory material filling the spaces between the brickwork, shell and cooling members.

2. In a shaft furnace, a brick shaft construction, a metallic shell enclosing the brick shaft and spaced therefrom, and flat metallic cooling members located between the shell and shaft, said members being spaced from the shaft and being provided with bosses for supporting them upon the shell and spacing them from the shell.

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