Dec. 21, 1954 D. C. AFFLECK 2,697,598

COOLING MEANS FOR BLAST FURNACE WALLS

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FIG. 1.

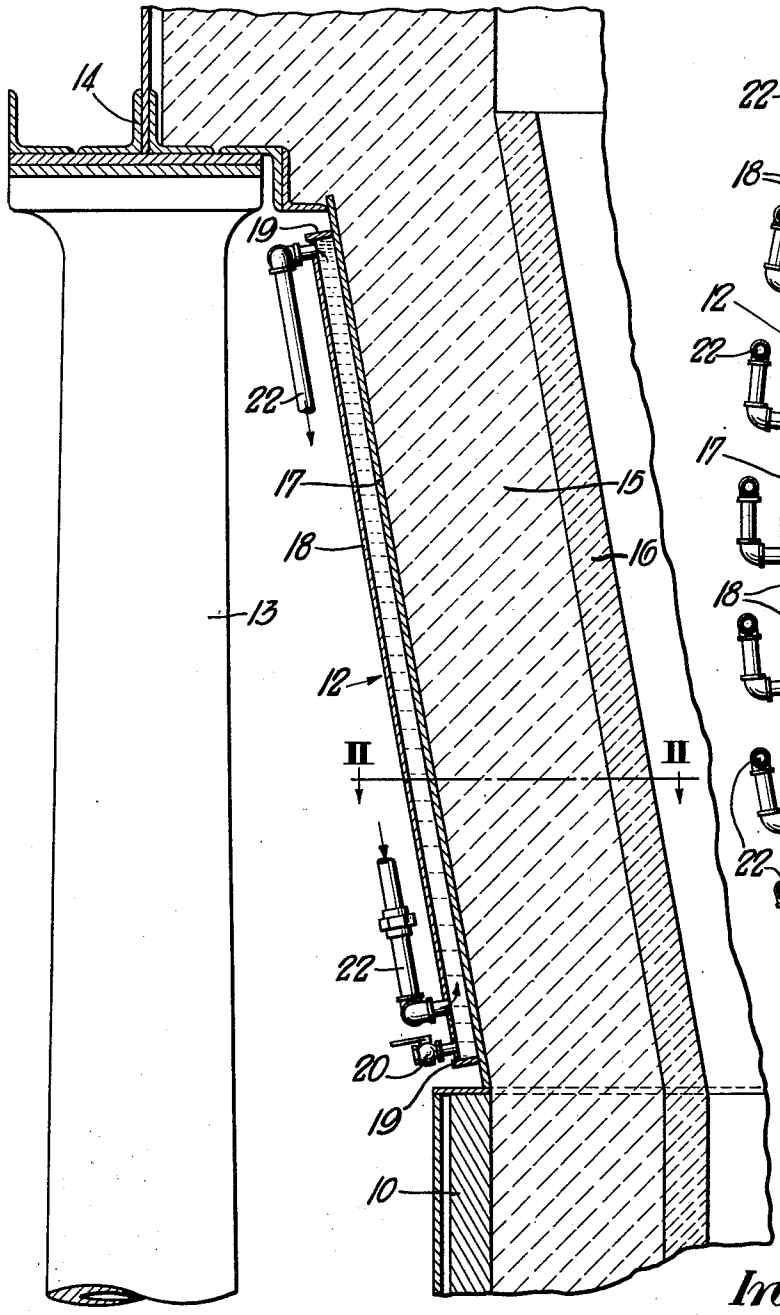
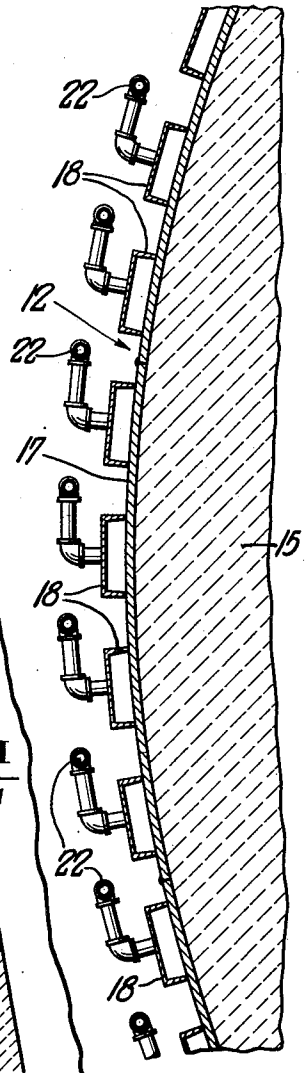


FIG. 2.



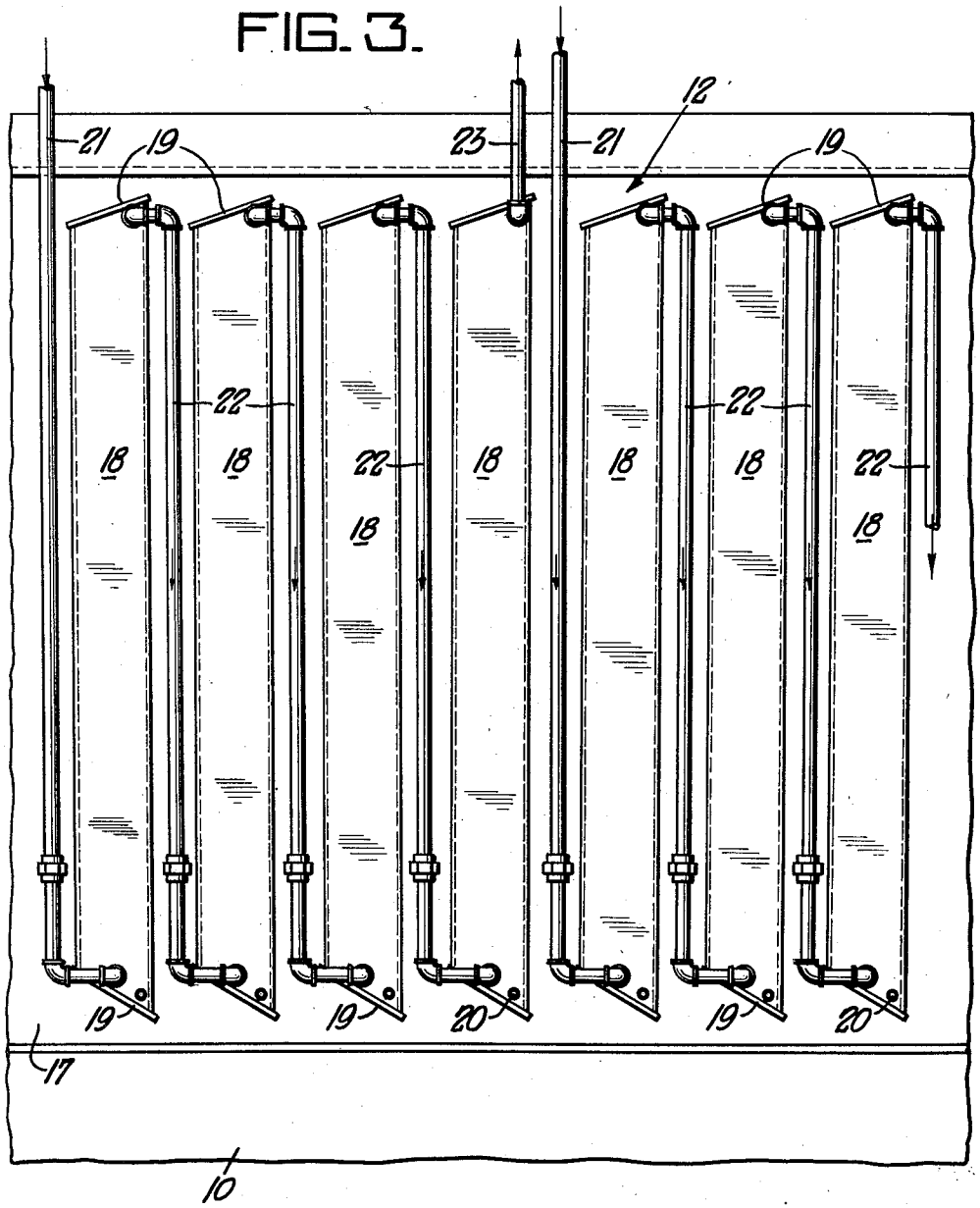
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FIG. 3.



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COOLING MEANS FOR BLAST FURNACE WALLS

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2 Claims. (Cl. 266—32)

This invention relates to an improved means for cooling blast furnace walls, especially in the bosh region.

In the blast furnace art, a "bosh" is an outwardly sloping region of a furnace located immediately above the hearth and tuyères. The bosh is one of the hottest parts of a furnace and its walls usually require water cooling. The most common type of bosh wall is formed of ceramic brickwork with water-cooled hollow metal plates embedded between the bricks at regular intervals. A more recent type of wall construction, applicable to the bosh and also to other parts of the furnace, includes carbon blocks surrounded by a steel jacket. Cooling this latter type of wall has caused difficulties, since the usual embedded plates are not suitable for use with carbon blocks.

An object of the present invention is to provide an improved cooling means especially suited for cooling walls of the foregoing type.

A further object is to provide an improved cooling means in which the furnace wall carries external but fully enclosed water circulating channels divided into a plurality of separate courses, whereby circulation in any one course can stop temporarily without overheating the wall, and in which all welded joints in the jacket are visible for convenient inspection.

In accomplishing these and other objects of the invention, I have provided improved details of structure, a preferred form of which is shown in the accompanying drawings, in which:

Figure 1 is a vertical sectional view through a blast furnace wall which is equipped with cooling means embodying features of my invention;

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

Figure 3 is a side elevational view of a wall equipped with cooling means of my invention.

The drawings show a portion of a blast furnace which includes a hearth **10**, a bosh **12**, supporting columns **13** and a mantle **14**. The furnace has the usual tuyères and charging and tapping means, which are not shown since they are not involved in the present invention. The bosh wall is formed of a relatively thick layer of carbon blocks **15**, and as built has an inner layer of ceramic brickwork **16**, which is soon absorbed during furnace operation. If desired, other parts of the wall can embody similar construction, or else they can be of the more common ceramic brickwork construction. For simplicity I have illustrated the cooling means of my invention as applied only to the bosh, although it is apparent that the same cooling means can be applied elsewhere, and that the invention is not limited by this illustration.

In accordance with my invention, a water and gas tight metal jacket **17** surrounds the outside of the carbon blocks **15** of the wall. This jacket is formed of separate arcuate sections welded together along their upright seams, as

indicated in Figure 2. A plurality of fully enclosed spaced apart upright water circulation channels **18** are fixed to the outside of the jacket sections and have top and bottom end plates **19** fixed to their respective ends. Preferably the lower portion of each channel carries a drain cock **20** for removing sediment from the channels.

In the embodiment of my invention illustrated successive groups of four channels each form separate water courses. A water inlet pipe **21** is joined to the lower end of the first channel of each course. Connecting pipes **22** extend from the upper end of each of the first three channels to the lower end of the next channel and thus connect the four channels in series. A discharge pipe **23** is joined to the upper end of the last channel of each course. In the illustration there are eighteen separate water courses of four channels each around the circumference of the furnace, each course occupying 20° of the circumference, although obviously the exact arrangement can vary. Preferably the channels which form each water course are affixed to a separate arcuate section of the jacket **17**. The joints between adjacent sections are located between channels as additional insurance against leakage into the carbon blocks. This arrangement leaves all the joints visible and facilitates their inspection.

Each water course occupies only a small portion of the wall. Consequently if there is a temporary stoppage in the water circulation in any one of them, those remaining furnish sufficient cooling effect to prevent the wall from overheating. Such stoppages can occur, for example, when sediment clogs one of the channels or pipes or when the drain cocks **20** are opened to remove sediment.

While I have shown and described only a single embodiment of the invention, it is apparent that modifications may arise. Therefore I do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

I claim:

1. The combination, with a blast furnace wall of the type formed of carbon blocks and a water and gas tight metal jacket surrounding said blocks, said jacket including a plurality of arcuate sections welded to one another along their upright adjoining edges, of a cooling system comprising a plurality of spaced apart upright channels of U-shape in cross section affixed to the outside of said jacket and extending along the outside face thereof throughout their length, the welds between sections of said jacket being located in spaces between channels, means closing the top and bottom ends of said channels, piping connecting groups of said channels and defining therewith a plurality of separate water courses, and inlet and discharge pipes joined to the bottom of the first channel and the top of the last channel respectively of each water course.

2. A combination as defined in claim 1 in which each water course covers a relatively small portion of said wall so that stoppage of water circulation in one of them allows those remaining to cool the wall sufficiently to prevent overheating.

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