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WATER COOLED HOPPER

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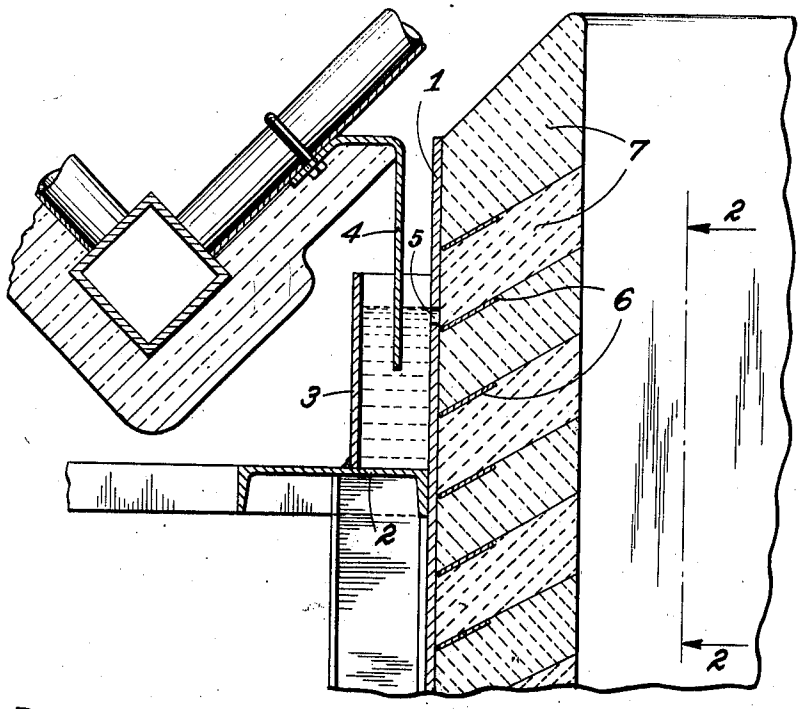


Fig. 1

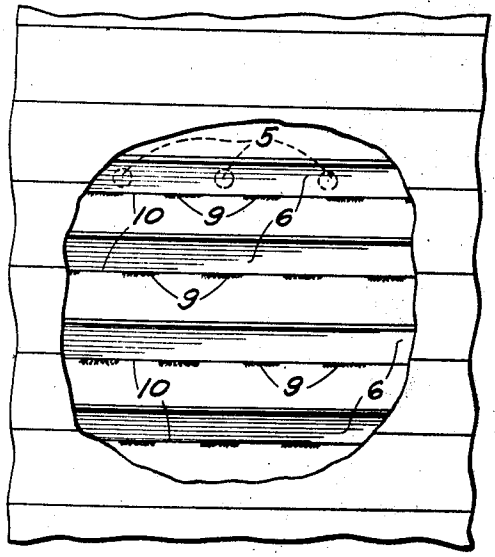


Fig. 2

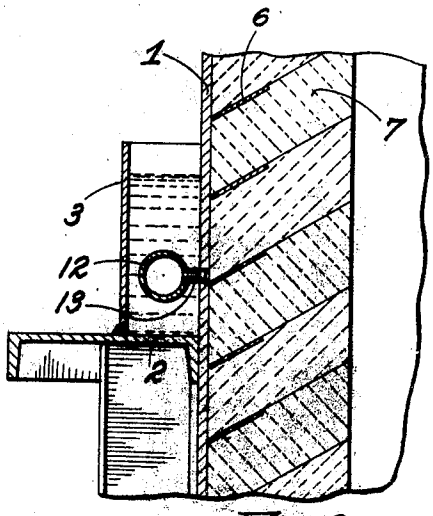


Fig. 3

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WATER COOLED HOPPER

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6 Claims. (Cl. 110—1)

This invention relates generally to ash hoppers of steam generating stations and more particularly to such hoppers in which the metal walls are protected against high temperatures by cooling liquid.

In the drawing accompanying and forming a part of this application,

Figure 1 is a fragmentary, vertical, sectional view of a hopper embodying the present invention;

Figure 2 is a side elevation of the apparatus of Fig. 1 with certain liners removed; and

Figure 3 is a view similar to Fig. 1 but showing a modified embodiment of the invention.

In Figs. 1 and 2, 1 designates one of the upstanding metal walls of a hopper of the type commonly used with furnaces of steam generating stations. It will be understood that wall 1 is illustrative of each of the several (for example 4) walls of the hopper, for which reason only one is illustrated, and that such walls need not be vertical, as shown.

Near its upper end, wall 1 is provided with outwardly and upwardly extending walls 2 and 3 which, together with metal wall 1, form a trough in which liquid may be kept in contact with the outer surface of wall 1. A wall depends from the furnace outside of the ash discharge opening therefrom and extends into the liquid in the trough and acts as a seal to prevent the passage of gases into the combustion chamber of the furnace over the top of the hopper walls. The metal wall 1 is provided with a plurality of passages 5 thru which the liquid, preferably water, in the trough may flow to the inner surface of wall 1.

The wall 1 is provided on its inner surface with a plurality of horizontally arranged, vertically spaced, upwardly and inwardly inclined ledges 6 on which refractory liners 7 are supported. Each of these ledges 6 is attached at its lower portion to the wall 1, preferably at horizontally spaced places, so as to provide a plurality of passages between the inner surface of wall 1 and the ledges thru which spaces water may flow along the inner surface of wall 1. The ledges may be stitch welded to wall 1 at intervals as shown at 9 with intervening unwelded places 10. When the welds 9 of one ledge are aligned with unwelded places 10 of ledges thereabove and therebelow, the cooling liquid will follow a zigzag path and contact substantially all parts of the inner surface of wall 1. The liners 7 are preferably, tho not necessarily, cemented together but it is important that they should not be cemented to the inner surface of wall 1. These liners, as illustrated, bear against the inner surface of wall 1 and define therewith spaces thru which films of liquid may flow down on the surface of the wall.

From the foregoing description it will be understood that the liquid, preferably water, which is introduced into the trough for sealing purposes may pass thru passages 5 in wall 1 and thence down over the inner surface of the wall between the wall and the liners and thru the openings between the wall and the ledges, thereby more or less completely covering the inner surface of wall 1 with a film of liquid which is constantly being removed and replaced. In this manner the heat which would normally be transmitted to the metal wall 1 is largely absorbed and carried away by the water with the result that the wall is protected against the high temperatures in the hopper and its useful life is thereby considerably lengthened.

In Fig. 3, which shows a modified embodiment of the present invention, a liquid carrying pipe 12 has a plurality of branch outlets 13 thru which its liquid may flow to the inner surface of wall 1. Such apparatus may be employed with the trough of Figs. 1 and 2, as shown, or without the trough, if desired.

Having thus described the present invention so that others skilled in the art may be able to understand and practice the same, I state that what I desire to secure by Letters Patent is defined in what is claimed.

What is claimed is:

1. A hopper comprising an upwardly extending metal wall, liquid holding means outside of said wall and communicating with the inner surface of said wall thru passages in said wall and refractory liners supported adjacent to the inner surface of the wall and defining therewith spaces for liquid to flow from said passages down the inner surface of said wall between said surface and said liners.

2. A hopper comprising an upwardly extending metal wall provided near its top with means for holding liquid in contact with its outer surface and having passages therethru for conducting such liquid to its inner surface, horizontally extending, vertically spaced ledges secured against the inner surface of said wall and refractory liners disposed adjacent to the inner surface of the said wall and defining therewith spaces for films of liquid to flow on the inner surface of said wall in contact with the adjacent surfaces of said liners.

3. A hopper comprising a substantially vertical metal wall provided adjacent to its upper

end with a trough for holding liquid in contact with its outer surface and having passages therethru for conducting such liquid to its inner surface, and refractory liners protecting substantially the entire inner surface of the said wall, the inner surface of said wall and the opposed surfaces of said liners defining spaces therebetween for films of liquid to flow downwardly on the inner surface of said wall.

4. A hopper comprising an upwardly extending metal wall, a liquid holding pipe outside of and near the top of said wall communicating with the inner surface of said wall thru passages in said wall, vertically spaced, horizontally extending liner supporting ledges on the inner side of said wall, and liners supported on said ledges adjacent to the inner surface of the wall and defining with the wall spaces for liquid to flow down the inner surface of said wall from said passages.

5. A hopper comprising an upwardly extending metal wall, liquid holding means outside of said wall and communicating with the inner surface of said wall thru passages in said wall, vertically spaced liner suporting ledges so secured to the inner surface of said wall as to provide passages for liquid to flow down along the wall and past said ledges, and liners supported on said ledges and defining, with the inner surface of said wall, spaces for liquid to flow down the inner surface of said wall between said wall and liners.

6. A hopper comprising an upwardly extending metal wall having passages therethru, liquid holding means outside of said wall and communicating with the interior surface of said wall thru said passages, vertically spaced, horizontally extending ledges inclined upwardly and inwardly from the inner surface of said wall, means connecting the lower portions of said ledges at horizontally spaced places to the inner surface of said wall, thereby leaving spaced places thru which liquid may flow between said ledges and wall, the spaced places of adjacent ledges being out of vertical alignment, and refractory liners on said ledges.

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