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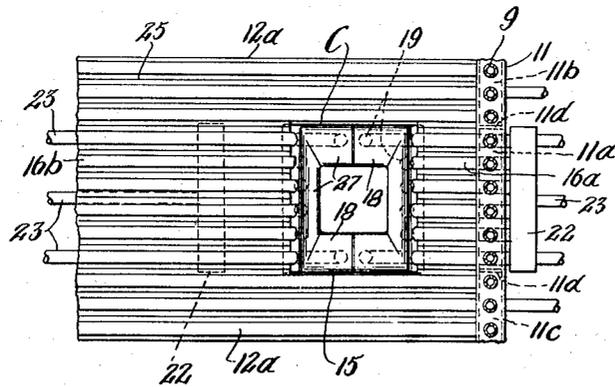
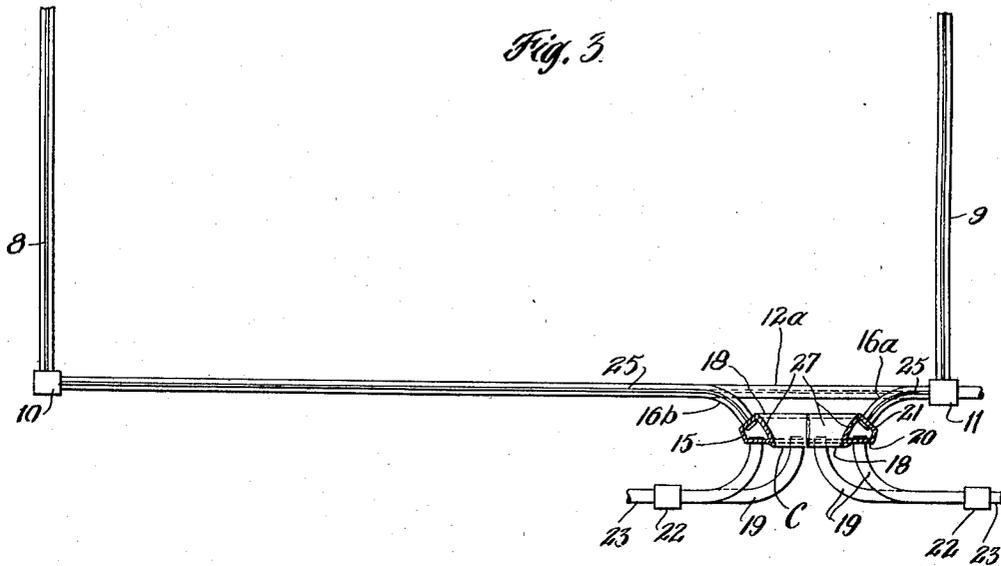
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SLAGGING FURNACE

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2 Sheets-Sheet 2



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SLAGGING FURNACE

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7 Claims. (Cl. 122—235)

This invention relates to slagging furnaces and in particular to improvements in the bottom construction of slagging furnaces in which liquid slag discharges through an opening extending through the bottom.

The primary object of my invention is the provision of a bottom construction for such furnaces employing means at the liquid discharge opening which will very effectively resist the destructive action of the discharging liquid slag.

Another object of my invention resides in the provision of improved water cooled means at the liquid discharge opening in which difficulties from steam pockets are avoided.

How the foregoing, together with other objects and advantages, are attained will be apparent from a consideration of the following description, referring to the accompanying drawings in which:

Figure 1 is a fragmentary sectional elevational view of the lower portion of a slagging furnace embodying my invention;

Figure 2 is a fragmentary cross-section taken on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 1 illustrating a modified arrangement of my invention; and

Figure 4 is a fragmentary plan view of Figure 3.

In Figures 1 and 2 I have illustrated a combustion chamber A provided with a bottom B constructed in accordance with my invention and having an opening C extending therethrough for the discharge of liquid slag. The furnace is fired in a manner to produce liquid slag and as illustrated, I prefer to introduce pulverized fuel and air at the corners of the combustion chamber by means of burners D in a manner to produce vortical firing with the fuel and flame stream directed toward the slag discharge opening.

The upright walls of the combustion chamber are lined with steam evaporating tubes and in Figures 1 and 3 I have indicated the upright tubes of the end walls 8 and 9. These tubes are connected at their lower ends into lower headers 10 and 11 and at their upper ends they are connected to deliver into a steam space in any well known manner.

As illustrated in Figures 1 and 2, the bottom B of the combustion chamber A comprises a plurality of closely spaced bent water tubes 12 connected at their lower bent end portions 13 into inlet headers 14, 14 and at the ends of their upper horizontally inclined portions into the lower headers 10 and 11 of the end walls 8 and 9; hol-

low means 15 bounding the slag discharge opening C; and a plurality of bent tubes 16 connected with the hollow means 15 at one end and into the lower headers 10 and 11 at their other ends. These tubes 16 slope upwardly from the hollow means 15 to the headers 10 and 11 and have portions 17 which are horizontally inclined to correspond to the inclination of the bottom tubes 12.

The hollow means 15 is preferably constructed of two similar hollow members 18—18 arranged together to form a square discharge opening. If desired however these hollow members may be in the form of semi-circular rings so that where assembled a ring-like member providing a circular discharge opening is formed.

A plurality of inlet tubes 19 are connected into the hollow members 18—18 for leading water thereto. The tubes 19 are connected into the lower portion or wall 20 of the members 18 and the delivery tubes 16 are connected into the upper portion or wall 21 of these members.

The inlet tubes 19 are connected into inlet headers 22, 22 to which water is supplied by downcomer tubes 23 leading from water space of the boiler. Similar downcomer tubes are connected into the headers 14.

By making the headers 22 separate from the headers 14 the circulation through the hollow members 18 and the tubes 16 is independent from the circulation through the tubes 12. In some instances I may employ one continuous inlet header common to the tubes 12 and 16.

It is pointed out that the tubes 12 and 16 are in effect upcomer tubes because flow is upwardly therethrough to the headers 10 and 11 and from thence upwardly through the upright tubes of the walls 8 and 9. It is pointed out that the tubes 12 and 16 carry a dense mixture and since they incline upwardly away from the hollow members 18 danger of steam pockets forming therein is avoided.

I prefer to cover the bottom tubes with refractory material such as chromium ore as indicated at 24 in Figure 1 which may be supported by laterally extending fins 25 provided on the tubes. The space 26 between right and left hand sets of bottom tubes may also be filled with such refractory material.

In Figures 3 and 4 I have illustrated an installation in which the liquid slag discharge opening C is located adjacent a wall of the furnace. When so arranged the bottom tubes 12a may extend continuously from one lower header 11 to the other lower header 10 and incline slightly up-

wardly from the header 11 to the header 10. At the slag discharge opening relatively short bent tubes 16a connect one hollow member 18 to the lower header 11 and longer bent tubes 16b connect the other hollow member 18 to the lower header 10. The lower header 11 may be divided into compartments 11a, 11b, and 11c by partitions 11d with the tubes 16a connected into the compartment 11a and the tubes 12a into the compartments 11b and 11c.

I prefer to dispose the walls 27 of the hollow means 15 at an angle so that inclined surfaces effectively exposed to radiant heat are provided over which the discharging slag flows. Thus slag is prevented from building up at the opening and reducing its size.

I claim:

1. A slagging furnace having upright walls comprising steam evaporating tubes and headers into which the lower ends of the tubes are connected, a bottom for the furnace having a slag discharge opening extending therethrough, hollow means constituting the boundary of said slag discharge opening, water inlet tubes connected into said hollow means, and outlet tubes connected at one end into said hollow means, certain of said outlet tubes being connected at their other ends into the lower header of one upright wall of the furnace and the remainder of said outlet tubes into the lower header of the opposite upright wall of the furnace.

2. A slagging furnace having upright walls comprising steam evaporating tubes and headers into which the lower ends of the tubes are connected, a bottom for the furnace having a slag discharge opening extending therethrough, a pair of hollow members constituting the boundary of said slag discharge opening, water inlet tubes connected into each of said members, a plurality of outlet tubes connected at one end into one of said members and at their other ends into the lower header of one upright wall of the furnace, and a plurality of outlet tubes connected at one end into the other of said members and at their other ends into the lower header of the opposite upright wall of the furnace.

3. A slagging furnace having upright walls comprising steam evaporating tubes and headers into which the lower ends of the tubes are connected, a bottom for the furnace having a slag discharge opening extending therethrough, a pair of hollow members constituting the boundary of said slag discharge opening water inlet tubes connected into each of said members, a plurality of outlet tubes connected at one end into one of said members and at their other ends into the lower header of one upright wall of the furnace, and a plurality of outlet tubes connected at one

end into the lower header of the opposite upright wall of the furnace, said outlet tubes sloping upwardly from the hollow members to said lower headers.

4. In a furnace for burning slag forming fuel, the combination of a combustion chamber, and a bottom for said chamber comprising spaced water tubes, means on said tubes substantially closing the spaces therebetween, said water tubes being arranged to provide an opening in said bottom for the discharge of liquid slag, hollow means bounding said opening, a plurality of inlet tubes outside of the combustion chamber connected into said hollow means for supplying water thereto, certain of said bottom water tubes being connected into said hollow means to constitute delivery tubes, and means for supplying water to the remaining of said bottom water tubes.

5. In a furnace for burning slag forming fuel, the combination of a combustion chamber, and a bottom for said chamber comprising spaced water tubes, means on said tubes substantially closing the spaces therebetween, said water tubes being arranged to provide an opening in said bottom for the discharge of liquid slag, hollow means bounding said opening, a plurality of inlet tubes outside of the combustion chamber connected into the lower portion of said hollow means for supplying water thereto, certain of said bottom water tubes being connected into the upper portion of said hollow means to constitute delivery tubes, and means for supplying water to the remaining of said bottom tubes.

6. In a furnace for burning slag forming fuel the combination of a combustion chamber, and a bottom for said chamber comprising spaced water tubes, means closing the spaces between the tubes, said tubes being arranged to provide an opening in said bottom for the discharge of liquid slag, hollow means bounding said opening, and means for supplying water to said hollow means, said spaced water tubes curving downwardly toward said hollow means and being connected thereto to constitute delivery tubes.

7. In a furnace for burning slag forming fuel the combination of a combustion chamber, and a bottom for said chamber comprising spaced water tubes, means closing the spaces between the tubes, said tubes being arranged to provide an opening in said bottom for the discharge of liquid slag, and hollow means bounding said opening; said hollow means being divided into a plurality of similar sections, means for supplying water to each of said sections, certain of said spaced water tubes curving downwardly toward said sections and being connected thereto to constitute delivery tubes.

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