G. J. RENNIE.

CLEANING DEVICE FOR WATER COOLED WALL FURNACES.

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1,035,050.

Patented Aug. 6, 1912.

FIG. 2.

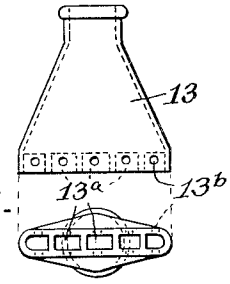

FIG. 1.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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CLEANING DEVICE FOR WATER-COOLED-WALL FURNACES.

1,035,050. Specification of Letters Patent. Patented Aug. 6, 1912.

Application filed February 21, 1912. Serial No. 679,197.

To all whom it may concern:

Be it known that I, GEORGE J. RENNIE, a citizen of the United States, residing at Aspinwall, Pennsylvania, have invented certain new and useful Improvements in Cleaning Devices for Water-Cooled-Wall Furnaces, of which the following is a specification.

My invention relates to blast furnaces of what is called the thin-wall type, in which the outer surface of the furnace is kept wet by a series of water troughs; and its primary object is to provide for cleaning the mud out of such water troughs.

I have illustrated the invention in the accompanying drawing as applied to such furnaces now in use, but it will be understood that the invention makes possible the use of much deeper and more extended cooling envelops on such furnaces.

Figure 1 is a vertical central section of the furnace with my invention applied, and Fig. 2 is a detail view of the operating end of the mud sucker I employ.

It will be understood that blast furnaces with thin brick walls lined on the outside with metal plates are possible only when there is provided sufficient means for cooling the wall. Experience has shown that this cooling is best done by a multiple series of annular narrow troughs encircling the furnace and overlapping, and that the water in these troughs must circulate at a particular low speed in order to keep the water from getting too cold. That is, while it is economical to allow the water to retain as much heat as possible without burning the brick lining, it is disastrous to have the temperature change suddenly, and the water must not get too cold because of injurious effects as well as because it carries off and wastes the heat. The water cannot be forced through the troughs with sufficient rapidity to clean out the mud and detritus that necessarily collects in their bottoms, and it has heretofore been possible to clean the mud out of the troughs without stopping the furnace only by slow, laborious, and inefficient dipping with long handled spoons and shovels.

My invention is the result of recognizing that the mud must be taken out without stirring and practically continuously, and that this can be done by sucking it from the bottom of the trough with a device that can be moved progressively around the furnace. I therefore provide an efficient sucking device and a mounting of pipes and platforms by which a flexible hose can be used in this way.

In the drawing the wall 3 of the furnace is covered on the outside with a series of overlapping troughs 4, 4, 4, etc., in which the water is continually maintained by means of a series of feed-pipes 5, shown at the right, and supplied by main water pipe 6. The water from each of the troughs at some point overflows by pipe 7 into the bottom of the next succeeding trough, so that the mud is deposited at the bottom, as well as to keep the water in the troughs at a uniform temperature throughout its volume. It will be understood that the mud usually collects at the bottom point of the trough.

I provide on the structure of the furnace, as on the uprights 8, a series of platforms 9, preferably, but not necessarily surrounding the furnace, and in proximity with this a series of upright drawoff pipes 10, 10, supplied at convenient intervals with nipples 11, 11, having closing valves and means to attach a flexible hose 12, so that a workman walking along the platform 9 can insert the hose to the bottom of the trough and by a slow stepping movement sink the end of the hose into the mud and progressively draw it out all around the annular trough 4.

In Fig. 2 I have shown my preferred form of the sucking nozzle 13 for the flexible hose 12. It should be made of brass and should be provided with an elongated series of vertical openings 13^a and also lateral openings 13^b and may be attached to the hose in any convenient manner. All of the suction pipes 10 lead to a chamber 14 made in the form of a steam injector in any usual way. As shown, the steam pipe 15 provides a jet through the restricted opening 16 and draws the mud and water through the pipe 10, as will be understood. By this means I am enabled to continually remove the collected mud from the bottom of the cooling troughs, without stirring it up and without requiring space for a hoe or other tool. It will be seen, therefore, that the cooling troughs may be made very narrow and very deep, and the operation of cleaning them may be carried on without disturbing the proper temperature conditions, so essential to the operation of such furnaces.

The particular form of pump for drawing off the mud is not essential, but the ad-

vantages of my invention flow from the combination of the trough cooled furnace with means for removing the mud without agitation directly from the bottom of the troughs and progressively around them.

Other advantages of the device will occur to those familiar with the art.

Having thus described my invention and illustrated its use, what I claim is the following:

1. The combination with a furnace having water cooled walls, comprising a series of overlapping water troughs, of a suction pump mounted near the furnace, inlet pipes to said pump having attachments at various heights, a flexible pipe and suction nozzle adapted to be thus connected to said pump inlets at various positions, and supports to enable the carrying of said nozzle around the furnace at any point, substantially as described.

2. The combination of a furnace having narrow, overlapping, annular water troughs on its outer surface, of a pump, pipe connections to said pump, and a sucker nozzle adapted for attachment thereto at various positions and for movement progressively around the bottom of said troughs, substantially as described.

In testimony whereof I have hereunto subscribed my name in the presence of the subscribing witnesses.

GEORGE J. RENNIE.

Witnesses:
FRED'K. STAUB,
JO. BAILY BROWN.