June 9, 1931. F. B. ALLEN 1,809,501

APPARATUS FOR HANDLING ASHES

Filed Jan. 7, 1927

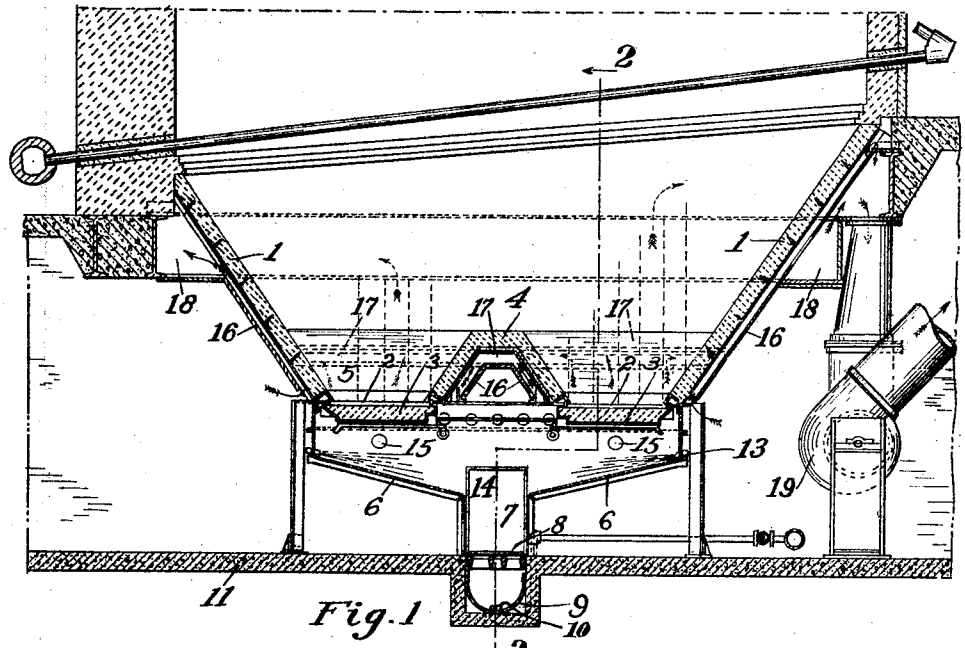


Fig. 1

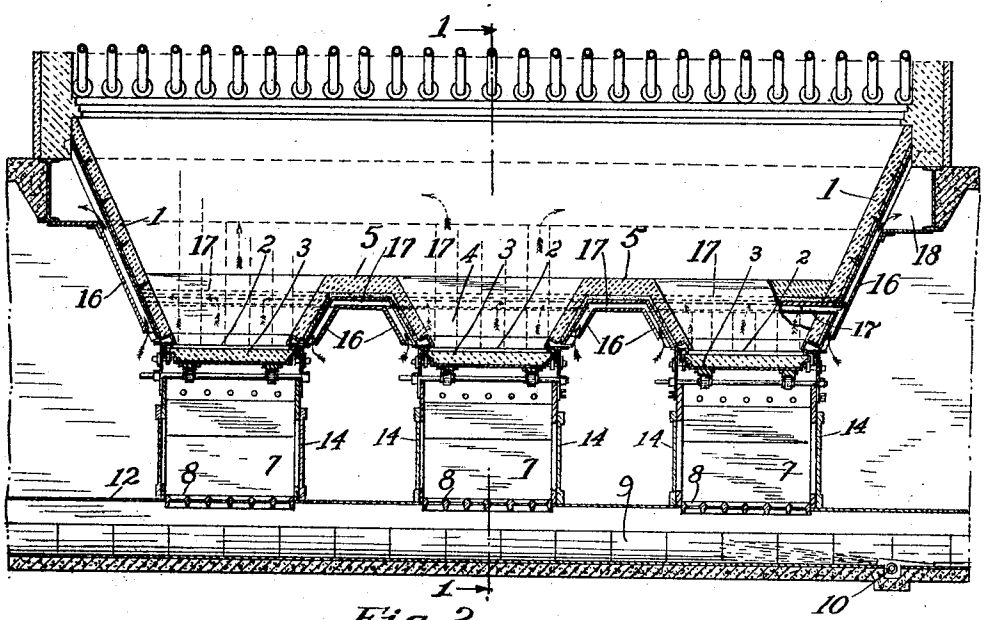


Fig. 2

INVENTOR
Frank B. Allen
By Richey & Watts
ATTORNEYS

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UNITED STATES PATENT OFFICE

FRANK B. ALLEN, OF LOWER MARION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ALLEN-SHERMAN-HOFF COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

APPARATUS FOR HANDLING ASHES

Application filed January 7, 1927. Serial No. 159,560.

This invention relates to an improved device for removing combustion residues from a furnace bottom.

In a copending application of the same inventor there has been disclosed an improved construction of furnace bottom and means for removing furnace residues therefrom which, generally speaking, comprises a furnace hopper having a plurality of discharge openings arranged in rows lengthwise of the hopper and in rows transversely of the hopper, downwardly inclined walls disposed beneath each opening adapted to receive residues discharged therethrough, and a sluice beneath the discharge end of the walls and extending lengthwise of the hopper to receive residues discharged from the walls. In the construction above described downwardly inclined walls extended uninterruptedly lengthwise of the hopper and are inclosed in a common compartment, the walls of which extend unbrokenly throughout the length of the hopper.

While the walls of the furnace hopper as commonly constructed are lined with firebrick and are inclined at a sharp angle to the vertical in order to cause the molten slag and ash to be discharged from the walls through the discharge openings of the hopper by gravity, yet under normal operating conditions some of the slag accumulates upon the walls forming a deposit which must be removed. In the construction above described poke holes have been provided in the walls of the compartment between the downwardly inclined walls and the discharge openings through which a bar or the like can be inserted into the bottom of the furnace hopper to loosen and remove the solidified slag from the opposed wall of the hopper. In the construction described in which the discharge openings are arranged in a plurality of rows it has been impossible to reach all the walls of the hopper with a bar or the like to clean the same. The applicant has devised a construction whereby this difficulty has been overcome while at the same time maintaining the hopper in close relation to the furnace residue disposal system. The improved furnace hopper is of relatively low height and as a consequence the boiler house in which the furnace, together with the furnace hopper, are disposed, can be constructed with much less height than previously, thereby effecting great economy in cost of construction and maintenance.

In general the invention comprises a furnace bottom having a plurality of discharge openings disposed in rows lengthwise of the hopper and in pairs transversely of the hopper with the exterior faces of the walls of the hopper between adjoining discharge openings extending upwardly in spaced relation. Spaced compartments are provided, each communicating with a pair of openings and having a wall or feed plate beneath each opening of each pair, the walls below each pair of discharge openings converging downwardly and adapted to receive residues discharged through the openings, and a sluice is disposed beneath the discharge ends of the walls the sluice extending lengthwise of the hopper and adapted to receive residues discharged from the walls.

The invention will be more readily understood from the description of one practical embodiment thereof illustrated in the accompanying drawings in which

Fig. 1 is a transverse sectional view of the device taken on the line 1—1 of Fig. 2.

Fig. 2 is a longitudinal sectional view of the device taken along the line 2—2 of Fig. 1.

Referring particularly to the drawings, in its preferred embodiment, the furnace bottom comprises walls 1 which converge downwardly and which cooperate with the walls 4 to form transversely extending crickets and with the walls 5 to form longitudinally extending crickets to form a plurality of hoppers disposed in rows lengthwise of the furnace bottom and in pairs transversely thereof. Each discharge opening 2 is provided with a door 3. The exterior faces of the side walls of the crickets 4 and 5 extend upwardly in spaced relation and are preferably inclined to the vertical to correspond with the inclination of the inner face of the hopper wall which is inclined at a sharp angle to the vertical to facilitate the flow of

molten slag down the firebrick lining of the wall.

Below each pair of the discharge openings is a compartment having a deflecting wall or feed plate 6 below each opening, with its inner end beneath the transverse cricket 4. The pairs of plates which extend and slope toward each other empty into a common conduit 7 in which is a grid 8 for retaining large pieces of solid material, so that these may be removed from the hopper or broken upon the grid. The plates are shown as inclined downwardly to their adjoining ends. They may, however, be horizontal, arranged to move on pivots or arranged in many other manners. Below the conduits and grids, and extending transversely of the furnace beneath the cricket 4 is sluiceway 9 along which the ashes may be conveyed by a stream of water, the conveying current being conveniently produced by water supplied through nozzles 10 and by the water used to move the ashes from the feed plates. The entire sluice is situated below the level of the boiler house floor 11 and is covered between and outside of the sluice hoppers with plates 12 forming a continuation of the floor, so that the sluice does not contribute to the height of the apparatus above the floor, nor does it obstruct the interior of the boiler house.

The nozzles 13 are provided at the outer ends of the feed plates and arranged to direct streams of water inwardly along the surfaces thereof.

It will readily be seen that the material may be discharged in quantity through the openings 2 upon the feed plates 6 and will be carried down the feed plates to the sluice hopper by the water from nozzles 13 in small successive quantities or in a more or less continuous stream and so will readily pass through the grid and into the sluiceway where the stream of water will readily transport it to a point of disposal. Pieces too large to pass through the grid will be retained thereon and can be reached through doors 14 in the ends of the sluice hopper. These pieces may be removed and disposed of or may be broken upon the grid, so that they will pass therethrough.

A continuous removal of solid material from the feed plates prevents to a great extent the formation of any solid deposits thereon. Suitable apertures 15 are provided in the side walls above the feed plates, through which apertures, bars or other tools may be inserted to remove slag and the like from the furnace hopper walls and plates, the walls 1 of the ash hopper being accessible to said tools when the doors 3 are moved to open the discharge openings. An operator can, therefore, conveniently loosen any accumulations of solid material forming either in the ash hopper itself or in the space above and between the feed plates. As the ash hopper is very close to the floor 11, the operator must stand beneath the hollow piers and the hollows or upwardly extending recesses in the lower side of these allow him sufficient room to work without being cramped as he would be if these were solid.

From the above, it will readily be seen that I have provided ash handling apparatus in which a hopper having several discharge openings may be caused to deliver material into a single sluice and in which the hopper may be situated very close to the boiler house floor, while at the same time the interior walls, both of the hopper itself and of the space within the handling apparatus are readily accessible to an operator, and that space is provided in which the operator may comfortably stand while working upon the interior of the apparatus and hopper.

The hopper walls and crickets are provided with upwardly extending passages 16 through which air may flow to cool them. The upper ends of the passages in the crickets open into horizontal passages 17 positioned just below the tops or crests of the crickets, and these conduct the air to passages in the main walls. A peripheral conduit or bosh 18 receives the air from the upper ends of the passages in the main walls and a fan 19 draws the air from this conduit. Of course, other means than the fan shown could be used for causing the air to flow and other fluids than air might be used for the cooling medium.

While I have described the illustrated embodiment of my invention with some particularity, obviously many modifications and variations thereof will readily occur to those skilled in the art to which this appertains, and I do not, therefore, limit myself to the precise details illustrated and described, but claim as my invention all embodiments thereof, coming within the scope of the subjoined claims.

I claim:

1. Apparatus for handling furnace residues comprising a hopper having a plurality of discharge openings disposed in rows lengthwise of the hopper and in pairs transversely of the hopper, the exterior faces of the walls between adjoining pairs of openings extending upwardly in spaced relation whereby an open passageway is formed, a wall beneath each opening of each pair, the walls of each pair converging downwardly and adapted to receive residues discharged through the opening, and a sluice beneath the discharge ends of the walls and extending lengthwise of the hopper adapted to receive residues discharged from the walls.

2. Apparatus for handling furnace residues comprising a hopper having a plurality of openings disposed in rows lengthwise of the hopper and in pairs transversely of the hopper, the exterior faces of the walls between adjoining openings extending up-

wardly in spaced relation, a wall beneath each opening, the walls beneath the openings of each pair converging downwardly and adapted to receive residues discharged through the openings, and a sluice beneath the discharge ends of the walls and extending lengthwise of the hopper adapted to receive residues discharged from the walls.

3. Apparatus for handling furnace residues comprising a hopper having a plurality of openings disposed lengthwise of the hopper and in pairs transversely of the hopper, the exterior faces of the walls between adjoining pairs extending upwardly in spaced relation whereby an open passageway is formed, spaced compartments each communicating with a pair of openings and having a wall beneath each opening of each pair, the walls of each pair converging downwardly and adapted to receive residues discharged through the openings and a sluice beneath the discharge ends of the walls and extending lengthwise of the hopper adapted to receive residues discharged from the walls.

In testimony whereof I hereunto affix my signature this 3d day of January, 1927.

FRANK B. ALLEN.