Sept. 9, 1930. F. B. ALLEN 1,775,264

APPARATUS FOR HANDLING ASHES OR OTHER SOLID MATERIALS

Filed Dec. 22, 1926

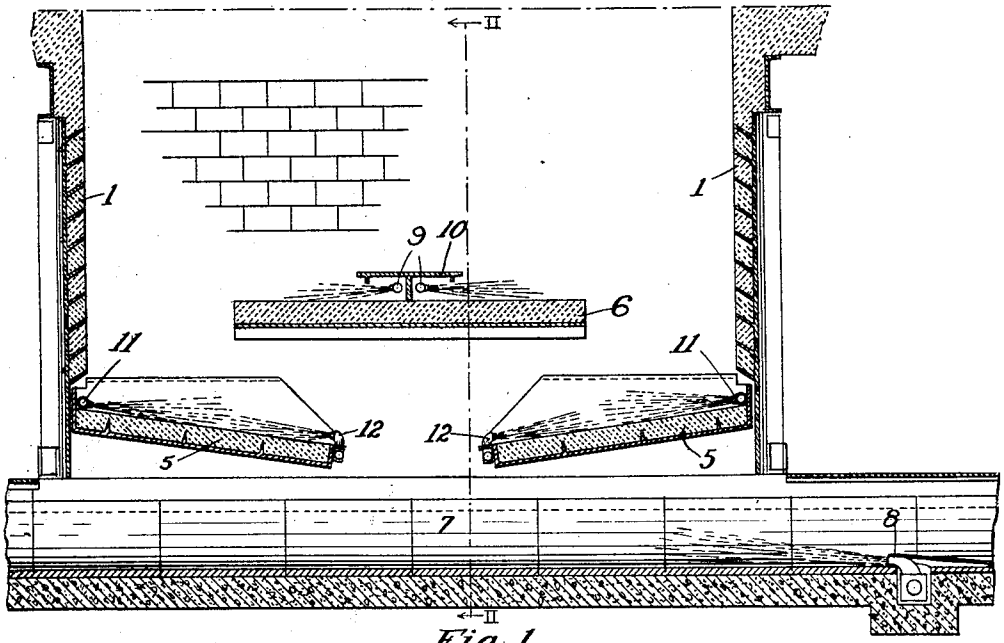


Fig. 1

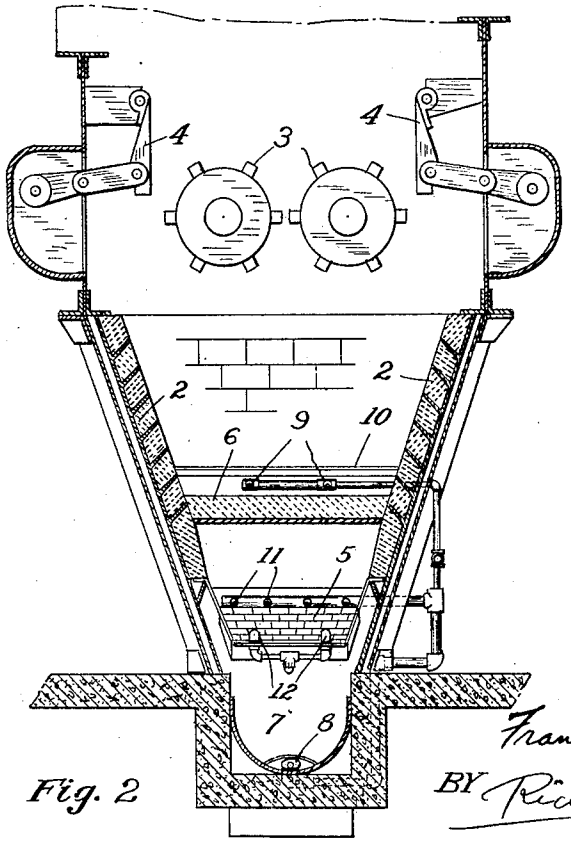


Fig. 2

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UNITED STATES PATENT OFFICE

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APPARATUS FOR HANDLING ASHES OR OTHER SOLID MATERIALS

Application filed December 22, 1926. Serial No. 156,293.

This invention relates to apparatus for handling ashes or other solid material and is particularly adapted to handling such ashes as are delivered from the combustion chamber of a boiler furnace.

An object of this invention is to provide an ash handling apparatus which will be economical of space.

Another object is to provide an ash handling apparatus which will permit the boiler being situated near the floor of the boiler house.

Other objects will hereinafter appear.

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

Fig. 1 is a longitudinal section of an ash handling apparatus as installed beneath a boiler furnace, and,

Fig. 2 is a transverse section thereof on the line II—II of Fig. 1, and showing, in addition, the location of clinker crushing or grinding mechanism above the apparatus of Fig. 1.

An ash hopper is illustrated, having vertical end walls 1 and downwardly converging side walls 2, and is positioned below the discharge opening of the stoker in the combustion chamber of a boiler, arranged for the burning of non-pulverized fuel. The ashes are discharged from the combustion chamber upon a clinker grinding or crushing mechanism 3, deflectors 4 being positioned adjacent the sides of this mechanism to control the passage of solid material.

Adjacent the bottom of the hopper, two downwardly converging feed plates 5 are shown, and above these extending across central portions of the hopper is a horizontal plate or shelf 6, the ends of which project over the inner ends of the feed plates. Of course, the feed plates may be horizontal, pivoted or otherwise arranged to accomplish their purpose. Beneath the hopper and below the level of the floor of the boiler house is a sluiceway 7 to which ashes are delivered by the feed plates, along which they are conveyed by a stream of water produced by nozzles 8. The feed plates and shelf shield the sluiceway from the heat of the combustion chamber and are themselves somewhat shielded therefrom by the clinker-grinding mechanism.

Nozzles 9 are provided upon the central portions of the upper surface of the shelf and these direct streams of water outwardly along the top of the shelf toward the edge thereof. These nozzles are protected by a metal plate or canopy 10 and this, in turn, is protected from the heat of the furnace by the ashes which accumulate thereon.

At the outer edges of the feed plates nozzles 11 are positioned to direct streams of water inwardly along the plates. Adjacent the lower edges of the feed plates nozzles 12 direct streams of water outwardly along the upper surface of the plates. The two sets of nozzles are so arranged that the streams from nozzles 11 tend to pass over the streams from nozzles 12. The operation of the apparatus is as follows:

Hot ashes and clinkers are delivered to the grinders 3. In passing between these, the large particles are broken up and at the same time, all particles are retarded in falling and allowed to cool somewhat before passing to the bottom of the ash hopper. The solid material drops upon the shelf and feed plates and the streams from nozzles 9 carry the same along the shelf to its outer edges, from which it may drop to the feed plates. These streams carry the material in small successive quantities forming a substantially continuous stream thereof. This material passes to the upper surface of the feed plates, where the streams of water from nozzles 11 carry it as well as that which drops directly on the plates over the inner edge into the sluiceway. Nozzles 12 tend to carry the material back up the feed plates, but as these are directed against a lower part of the material than the streams from nozzles 11, the two cooperate to impart a rotary motion to the material, tending to roll the same down the feed plates and into the sluiceway. When the material drops from the feed plates it is carried by the stream in the sluiceway to a point of disposal in a well known manner.

The height of the ash hopper is much less than that of prior devices as the entire sluice-

way is below the level of the floor and the feed plates themselves are made to perform not only the function of prior feed plates but also to shield the sluiceway, so that no other bottom is required in the hopper, and the feed plates may, therefore, be positioned immediately above the sluiceway.

While only one embodiment of my invention has been illustrated, obviously many others will readily occur to those skilled in the art to which it appertains and I do not therefore limit myself to the precise details shown and described, but claim as my invention all embodiments thereof coming within the scope of the appended claims.

I claim:

1. A hopper, a sluiceway therebelow, transverse feed plates and a shelf overlapping the same in the bottom of the hopper causing all of the material passing therefrom to follow a circuituous path, and fluid means for moving solid material along each plate and shelf to the sluiceway.

2. A hopper, a sluiceway therebelow, hydraulic means for moving material along the sluiceway, a feed plate above the sluiceway, a shelf spaced above said plate and overhanging said plate, and fluid means for moving material from said shelf so that it may drop therefrom to said plate.

3. A hopper having an open bottom, a sluiceway therebelow, a feed plate immediately above the sluiceway, a shelf spaced above the plate and overhanging the same, and fluid means for moving solid material from the shelf and plate and for conveying material along the sluiceway.

4. A hopper, a sluiceway immediately therebelow, two transverse feed plates in the bottom of the hopper, extending from side to side thereof and each extending to one end of the hopper, the inner ends of the plates being spaced apart, a shelf above said two first mentioned plates, and overlying the inner ends thereof, outwardly directed jets centrally of the shelf for conveying solid material falling thereon to the end thereof, and inwardly directed jets for delivering fluid on the said two transverse plates.

5. A hopper, a sluiceway immediately therebelow, transverse feed plates in the bottom of the hopper at the ends thereof, a transverse shelf in the hopper above said feed plates and overlying the inner ends thereof, means for directing fluid along the upper surface of said shelf towards its outer ends, means for directing fluid along the upper surface of said feed plates from the outer ends toward the inner ends, other means for directing streams of fluid along said feed plates from their inner ends toward their outer ends, and fluid means for conveying the material along the sluiceway.

6. A hopper having feed plates in the bottom thereof, a sluiceway below the feed plates and arranged to receive solid material therefrom, nozzles at the junction of the feed plates with the hopper walls for delivering fluid to carry material along the plates to the sluiceway, nozzles along the open ends of the feed plates for directing fluid towards the first mentioned nozzles, the streams of fluid from the second mentioned nozzles being directed closely along the surface of the feed plates and the streams from the first mentioned nozzles being directed above the streams from the second mentioned nozzles.

In testimony whereof I hereunto affix my signature this 17th day of December, 1926.

FRANK B. ALLEN.