Aug. 10, 1926. 1,595,957

F. B. ALLEN

COMBINATION ASH GATE AND SLUICEWAY

Filed August 26, 1925 2 Sheets-Sheet 1

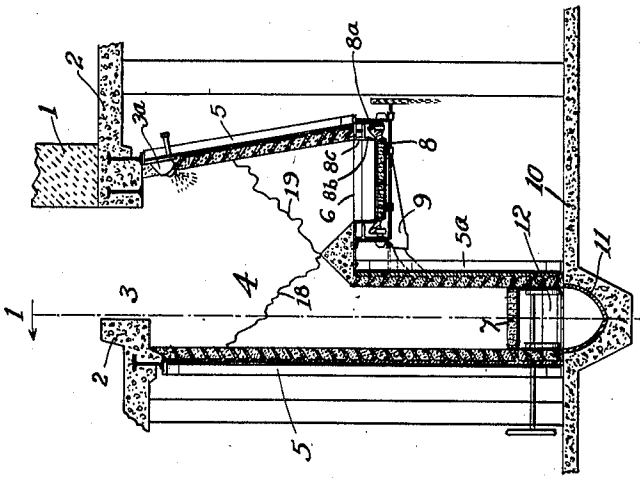


Fig. 2

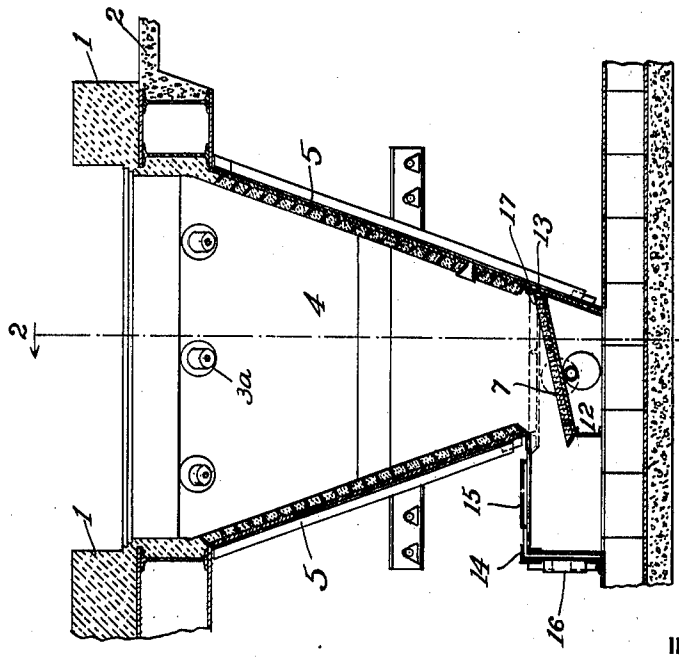


Fig. 1

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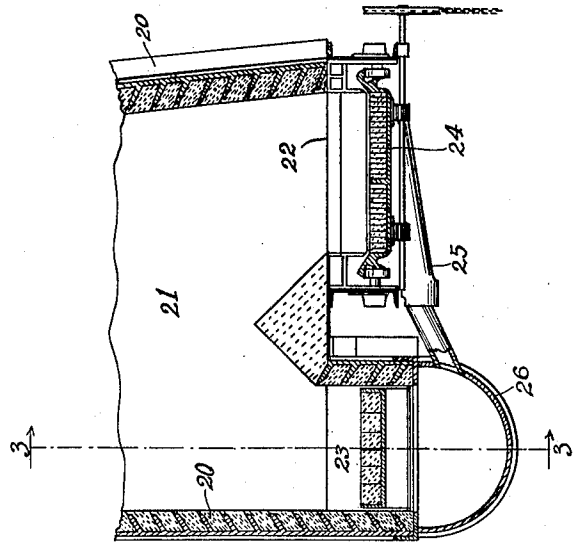


Fig. 4

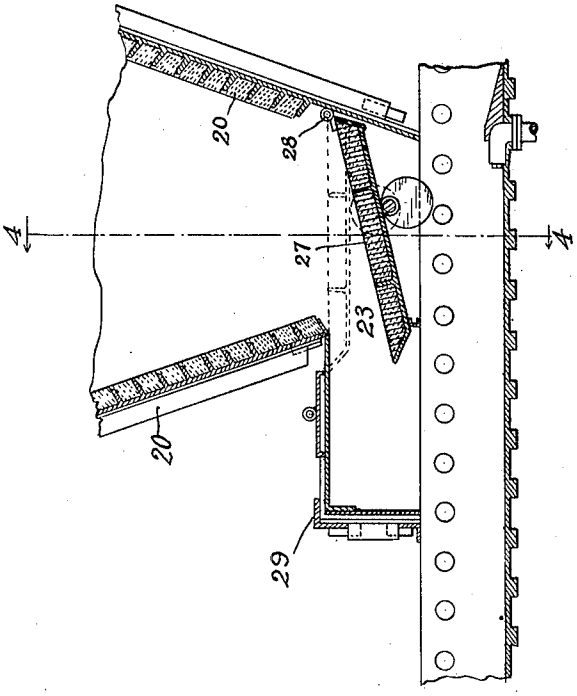


Fig. 3

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UNITED STATES PATENT OFFICE.

FRANK B. ALLEN, OF LOWER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA.

COMBINATION ASH GATE AND SLUICEWAY.

Application filed August 26, 1925. Serial No. 52,479.

This invention relates to hoppers for solid material and particularly to ash hoppers for fuel burning furnaces.

One object of the invention is to construct a hopper for handling combined solid and liquid materials, which is provided with two sets of lower discharge openings, one set adapted to discharge to a sluiceway associated therewith and the other set adapted to discharge to other means of ash conveyance, thus allowing either system of ash conveyance to be used as desired. For instance, should the sluiceway be inoperative because water was not available or temperatures were so low as to make freezing probable, then the other system of ash handling could be used from the same hopper with no changes in the structure whatever.

It is usually less expensive to convey ashes hydraulically out of boiler houses than it is to carry it out by means of cars or similar apparatus. The disadvantage heretofore has been that a sluiceway system was not considered sufficiently reliable for the operator to be entirely dependent thereon and he has, therefore, gone to the additional operating expense of carrying the material from point to point in cars or the like. With the system proposed it can be seen that it is possible for the operator to use the sluiceway without fear of such interruption, for should it be inoperative for any reason the operator may then immediately substitute the other system of ash handling without making any structural change. He can thus handle ashes, the major portion of the time, in the most efficient way and though one system fail, not be subjected to the possibility of totally shutting down the ash disposal system.

Incidentally my invention enables me to construct a hopper from which solid material may be discharged at different levels and into different types of conveyors.

In the drawing forming a part of this specification—

Figs. 1 and 2 are respectively longitudinal and transverse sectional views of one form of hopper constructed in accordance with my invention and

Figs. 3 and 4 are respectively longitudinal and transverse sectional views of another form of hopper embodying my invention.

I have elected hereinafter to describe my invention in connection with a fuel burning furnace although by so doing I do not intend to limit my invention thereto. Referring first to Figs. 1 and 2, 1 designates fragmentary portions of walls of a furnace which walls are carried on bottom or floor walls 2 having openings 3 thru which solid material in the form of ashes and the like may be discharged into a hopper 4 composed of side walls 5. The hopper 4 is provided within its lower portion with a plurality of, in this case two discharge openings 6 and 7, through which material, both solid and liquid, may be discharged from the hopper. At 3^a is shown means for discharging liquid into the hopper 4 for cooling the ashes passing thereinto through opening 3.

The openings 6 and 7 are provided with means, associated therewith and with the hopper, for permitting the free passage of liquid through the opening and for permitting the periodical and controllable discharge of solid material through the openings. Opening 6 as shown in Fig. 2 is provided with a door 8 mounted to move into open and closed position with respect to the opening 6. The door 8 is formed with liquid retaining marginal flanges 8^a on three sides of the door which project above the bottom of depending flanges 8^b on a frame 8^c which surrounds the discharge opening 6.

Liquid passing through the opening 6 is thus retained by flanges 8^a and directed to the fourth or remaining side of door where it is discharged into a cross trough 9 which trough may in turn discharge through a pipe connection (not shown) which leads to a sewer or other place of disposal (not shown), or it may discharge into the hopper above or below the opening 7 and pass therethrough into the sluiceway, later to be described. The construction of the door 8 and its associated parts is more fully disclosed and claimed in U. S. Letters Patent No. 1,547,284 issued to me on July 28, 1925.

At one side and closely adjacent to the opening 6, I provide a hopper wall 5^a and extend certain of the walls 5 down to the floor 10 in which is disposed a sluiceway 11. A feed plate 12 is provided beneath opening 7 and above sluiceway 11 to serve as a means for controllably retaining solid material in the hopper. This feed plate 12 is pivotally mounted at one end as at 13 so that if desired it may be moved into a substantially horizontal position, as shown in dotted lines in Fig. 1. The feed plate 12 is, however, of

sufficient size and extends beyond the walls 5 of the hopper 4 far enough so that solid material will be retained in the hopper thereby, even when the said plate is in the full line position shown in Fig. 1. To provide access to the feed plate 12 and opening 7 for repairs, cleaning, etc., I have provided a box-like superstructure 14 over the sluiceway 11 and at one end of the feed plate 12. This superstructure is provided with removable parts or doors 15 and 16.

It will be understood that whatever the position of feed plate 12, liquid may pass through the opening 7 freely and without serious obstruction at all times. When it is desired to remove solid material from the hopper through opening 7 this is preferably accomplished by discharging liquid from a pipe 17 along the top surface of the feed plate 12 which causes the solid material to flow from the feed plate into the sluiceway, in which it may be conveyed by any suitable means, for example, by fluid under pressure.

It will be understood that my device may be employed where freezing temperature is encountered during the part of the year. The continued flow of relatively small quantities of liquid through the opening 7 often tends to cause stoppage of the sluiceway due to the freezing of the liquid therein. Also the water supply for the sluiceway may fail thus making the sluice temporarily inoperative. Accordingly, by my invention I discontinue the discharge of solid material through the opening 7 during such portions of the year or at such times and permit the portion of the hopper immediately thereabove to become filled with ashes, discharging the solid material through the opening 6 during such periods. It will be understood that when the opening 6 only is being used, the ashes will remain in the hopper as indicated by the inclined line 18 in Fig. 2. During the period when conditions are favorable to the use of the sluiceway, I may employ the opening 7 and when this opening is not in use solid material will tend to remain in the hopper substantially as is indicated below inclined line 19 in Fig. 2.

An additional advantage of my invention is that the opening 6 may be utilized at any time when the solid material in the hopper is to be discharged into trucks, lorrie cars or similar conveyances.

Referring now to Figs. 3 and 4, 20 indicates fragmentarily certain walls of a hopper adapted to be employed in conjunction with a furnace substantially as shown in Figs. 1 and 2. It will be understood, however, that I do not limit my invention to hoppers for use only with fuel burning furnaces. In the lower portion of the hopper 21, formed in part by walls 20, I provide two or more discharge openings 22 and 23. The discharge of solid material through opening 22 is controlled by a door 24 of substantially the same construction as door 8 of Fig. 2. Associated with this door is a liquid carrying trough 25 connected to discharge liquid received from the door 24 into a sluiceway 26 disposed beneath opening 23 and preferably connected to the hopper-walls on opposite sides of said opening. Liquid passing through opening 22 will pass freely into trough 25 and thence into sluiceway 26. Other means of conducting away liquid from the trough 25 may, of course, be provided.

Passage of solid material through opening 23 into sluiceway 26 is controlled by means of a feed plate 27 which corresponds in all essential respects to feed plate 12 of Fig. 1 and need not be further described at this time. A pipe 28 is adapted to discharge liquid across the top surface of feed plate 27.

Although I indicate feed plates to control flow of material to sluiceway from hopper it is understood that this may not be necessary under certain conditions for example when water continuously flows in sluiceways in sufficient quantity and speed to carry away material as rapidly as it drops thru the hopper.

A superstructure 29 similar to superstructure 14 of Fig. 1 permits access to the hopper and feed plate 27.

It will be noted that the sluiceway 26 is suspended from the hopper at approximately the same level as door 24, which is in contrast of the showing in Fig. 2 where the sluiceway is disposed in the floor 10. Such construction provides headroom for workmen beneath the hopper and has the advantage of being conveniently disposed for renewal of parts and for other purposes. Likewise sluiceway 26 may be located above door 24 in case trough 25 must discharge to another point.

Having thus described my invention what I desire to secure by Letters Patent is defined by what is claimed:

1. In combination with a hopper having a plurality of discharge openings in its lower portion, means associated with the said openings for permitting the periodical discharge of solid material and a continuous discharge of liquid material through the openings, means associated with the hopper to receive and carry away liquid discharged through the said openings, one of the said means including a sluiceway adapted also to receive and carry away solid material discharged from one of the said openings.

2. In combination with a hopper provided with a plurality of discharge openings in its lower portion, closures associated with said openings for permitting the periodical discharge of solid material through the said

openings and the continuous discharge of liquid material, a sluiceway associated with the said hopper to receive liquid and solid material discharged through certain of the said openings, the closure associated with another opening in the said hopper having means for collecting and discharging liquid passing thru the opening, and means for carrying away liquid collected by the said closure.

3. In combination with a hopper provided with a plurality of discharge openings in its lower portion, closures associated with the said openings for permitting the periodical discharge of solid material through the said openings and the continuous discharge of liquid material, a sluiceway associated with the said hopper to receive liquid and solid material discharged through certain of the said openings, the closure associated with another opening in the said hopper having means for collecting and discharging liquid passing thru the opening, and means for carrying away liquid collected by the said closure, the last said means including the said sluiceway.

4. In combination with a hopper comprising side walls and having a plurality of separate discharge openings in its lower portion, means associated with each of the openings for permitting the periodical discharge of solid material and the continuous discharge of liquid material therethrough, and a sluiceway associated with the hopper for receiving solid material discharged through certain of the said openings and liquid discharged from all the said openings.

5. In combination with a hopper having a plurality of discharge openings in its lower portion, a movable, solid material retaining closure for one of said openings, means associated with the closure for collecting and discharging liquid passing thru the opening, a conduit to receive liquid collected and discharged by the said means, a solid material retaining closure for another of said openings and a sluiceway associated with the last said opening to receive and conduct away solid and liquid material passing thru the last said opening.

In testimony whereof I hereunto affix my signature.

FRANK B. ALLEN.