April 5, 1927. 1,623,079

C. F. ZIMMERMANN

WASH VENT FOR ASH CONVEYER SYSTEMS

Filed Jan. 3, 1922 2 Sheets-Sheet 1

Fig. 7.

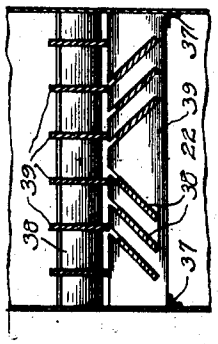


Fig 1

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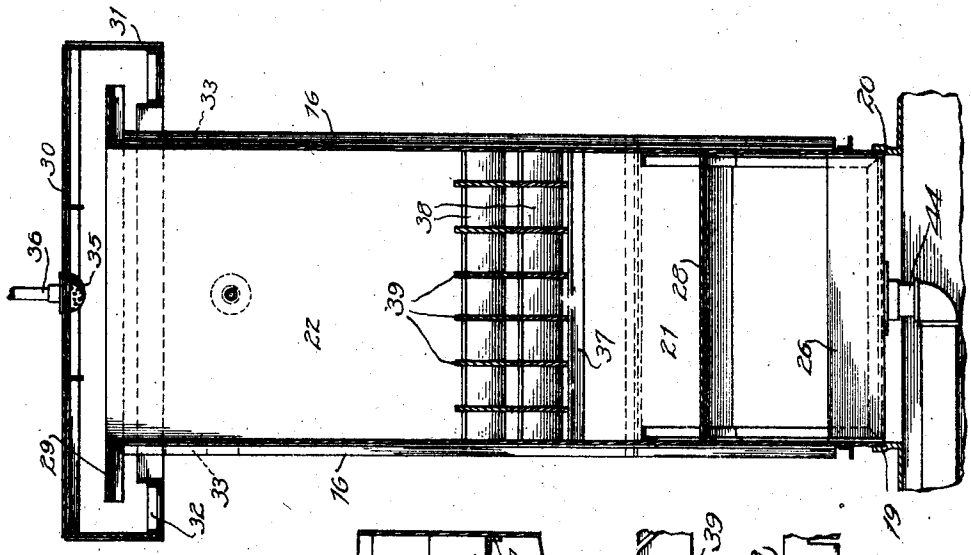


Fig. 3

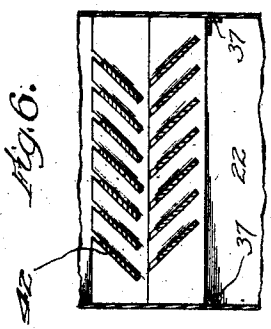


Fig. 6.



Fig. 4



Fig. 5

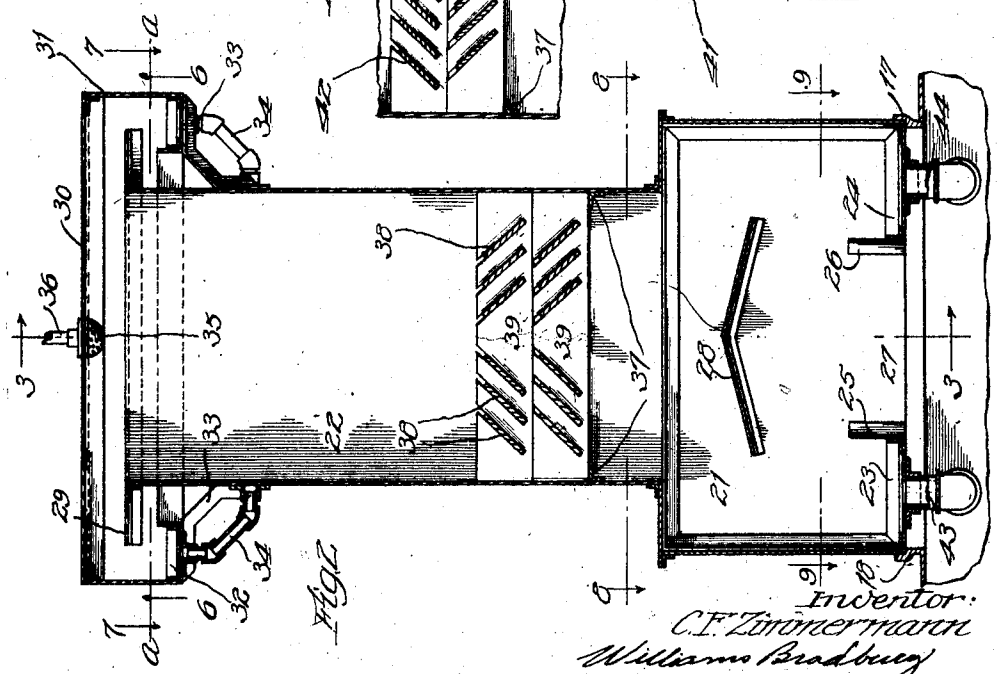


Fig. 2

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UNITED STATES PATENT OFFICE.

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WASH VENT FOR ASH-CONVEYER SYSTEMS.

Application filed January 3, 1922. Serial No. 526,576.

This invention relates to means for removing dust, soot and similar matter from the gases which escape from the ash receptacle of an ash conveyer system.

The invention is especially adapted for use in connection with ash conveyer apparatus wherein steam or air under pressure is discharged into the ash conduit in the direction of movement of the ashes, as by an ejector nozzle. The steam acts to create a partial vacuum which may draw the ashes through part of the conduit, and through its expansion produces a pressure which forces the ashes through the remaining part of the conduit.

In such systems, large quantities of air are drawn in along with the ashes and hot gases. There is, therefore, a large volume of steam, highly heated gases and air constantly being forced into the ash receiving receptacle.

Some means must be employed for permitting the air and gases to escape into the atmosphere, but as large quantities of ash, dust, soot, etc. are suspended in the hot gases and steam at the time they are discharged into the ash receptacle, means must be provided to remove the dust, etc. from the gases before they are permitted to escape.

The means for removing the dust should be so constructed as not to produce back pressure in the ash receptacle or conduit, as this would seriously interfere with the movement of the ashes through the conduit. Also, the water used in washing and cooling the gases and air should not be permitted to drain into the ash receptacle, as this makes the ashes very hard to remove.

The object of the present invention is to provide an improved wash vent for an ash conveyer system and baffle plate arrangements for use therein which shall be compact and readily assembled. One feature of the invention is the large radiating surfaces provided whereby the steam is quickly condensed, and the hot gases cooled, thus tending to reduce the velocity of movement of the gases through the vent due to the rapid decrease in volume of the steam and gases.

Another feature of the invention is the arrangement of the baffle plates so that the gases, while moving upwardly, are repeatedly being directed against a radiating surface, which preferably is maintained wet.

A still further feature of the invention is the arrangement of plates forming the radiating surfaces in sections or grids, so that the amount of radiating surface can be readily increased or diminished as conditions demand.

Another feature related to the one just mentioned is the arrangement of the baffle plates in these sections or grids so that the grids may be merely loosely nested on top of each other.

A still further feature is the manner of forming these sections or grids of substantially flat notched strips which may be stored in quantity in separate strips but may be readily assembled by merely fitting the notched strips together when it is desired to use the grids.

Other features and advantages will appear from time to time as the description of the invention progresses.

In the drawings:

Figure 1 shows a cross section through the ash receptacle with the ash conduit leading thereinto, and the wash vent of the present invention mounted thereon;

Figure 2 is a vertical section through the vent;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 illustrates one end of one form of strip used in making the grid, showing the inclined notches therein;

Figure 5 shows one end of the other type of strip used in forming the grid with the notches in it;

Figure 6 illustrates a modified form of the grid in which the inclined plates of the grid are all set in parallel relation; and

Figure 7 illustrates an arrangement of the grids different from that shown in Figures 2 and 3.

Referring now to the drawings, 12 indicates the ash receptacle of the system. Extending into the receptacle 12 at one side thereof is the ash chute 13 through which the ashes may be forced in any desired manner, but preferably by means of steam or air under pressure. 14 indicates the target board of the ash receptacle against which the ashes impinge when forced from the conduit 13.

The top of the ash receptacle is provided with an opening as indicated at 15. Positioned over the opening 15 is the washing apparatus or wash vent 16 of the present invention. The wash vent is supported on the flanges 17, 18, 19 and 20 surrounding the

opening 15 at the top of the ash receptacle.

The receptacle of the wash vent may be formed of any suitable material, but in the present embodiment, it is disclosed as being formed of metal. As the material and manner of forming this receptacle forms no part of the present invention, it will be only briefly described in the present specification.

The wash vent receptacle consist primarily of a box-like base portion 21 which in the present embodiment is shown as rectangular in cross section, and mounted thereon and communicating therewith is a vertically extending rectangular shell 22. The shell or conduit 22 extends the full width of the base receptacle 21, but is of materially less width than the base member 21 is long.

The base member 21 is provided at the bottom thereof and on opposite sides with the channel members or drains 23 and 24 which extend across the entire width of the base member 21. Between the inner sides 25 and 26 of the drain channels is an opening 27 through which the gases, etc., from the ash receptacle may pass into the wash vent. Positioned over the opening 27 is a barrier or baffle 28. The barrier 28 extends from side to side of the base member 21 and is formed with oppositely sloping sides, the edges of which overlie the channels 23 and 24 respectively.

Extending outwardly from the upper edges of the side wall of the shell 22 is the flange 29. Overlying the top of the shell 22 and extending outwardly beyond the outer edges of the flange 29 is the top member 30 having at its outer edges the downwardly extending flange 31. Secured to the inner side of the lower edges of the flange 31 is a gutter or channel member 32. The entire structure comprising the top 30, flange 31 and gutter 32 is supported by the brackets 33, each of which has one end fixed to the gutter 32, and the other end secured to the side walls of the shell 22. The gutter 32 is provided on opposite sides with the drain or stand pipes 34, each of which communicates at one end with the gutter 32, and at its opposite end with the interior of the shell 22.

Arranged substantially centrally of the top member 30 is a sprinkler nozzle 35 to which water may be supplied from the pipe 36.

The shell 22 on opposite sides thereof is provided with the bracket members or supports 37 which in the present embodiment are shown as angle iron strips having one flange secured to the side wall of the shell 22, the other flange extending horizontally inwardly from the side of the shell.

The brackets 37 are provided to support the baffle plate grid or grids. Each baffle plate grid consists of two sets of intersecting plates or strips, preferably of sheet metal. As shown in Fig. 2, the plates 38 of one set are inclined to the plane of the grid, while the plates 39 of the other set extend substantially at right angles to the plane of the grid, as shown in Fig. 3.

As shown in Fig. 5, the plates 38 are provided with transversely extending notches 40, there being as many notches 40 in each plate 38 as there are plates 39 in the grid, each notch being arranged to receive one of the plates 39. As shown in Fig. 4, each of the plates 39 is provided with a plurality of inclined notches 41. Each of the notches 41 is arranged to receive one of the intersecting strips 38. In other words, the strips 38 and 39 are each provided with as many notches as there are intersecting strips, and the notches in any two strips at their point of intersection are arranged to co-operate so that the notch in each receives a portion of the other strip.

Due to this construction, the plates or strips 38 and 39 may be carried in quantity merely as strips, and when a grid is desired, it may be readily assembled without any particular tools merely by fitting the strips of the two sets together.

Due to the fact that the strips 38 are inclined while the strips 39 extend substantially at right angles to the plane of the grid, the edges of the strips 38 do not extend to the edges of the strips 39. If it is found that one baffle plate grid is insufficient, other grids may be added merely by nesting them on top of the lowermost grid, which in turn is supported on the bracket members 37.

In Fig. 2, two baffle plate grids are shown, one nested on top of the other, with the plates 38 and 39 of the two grids extending in the same direction. Where the shell 22 is substantially square in cross section, if desired the plates 38 and 39 of alternate grids may be arranged substantially at right angles to each other, as indicated in Fig. 7.

In Fig. 2, the plates 38 on opposite sides of the center of the grid are shown as being inclined in opposite directions. In Fig. 6, a modification of this arrangement is shown in which all the inclined plates 42 of a grid are shown as inclined in the same direction. When using baffle plate grids, such as shown in Fig. 6, alternate grids may be reversed so that the plates thereof will be inclined in opposite directions. Thus, the hot gases, etc. passing up between the plates of the lower grid will be caused to impinge directly against the plates 42 of the second grid. If a third grid is employed, it may be arranged so that the plates 42 thereof will incline in the same direction as those of the lowermost grid, so that the gases passing upwardly between the plates 42 of the second grid will impinge directly against the plates of the third grid.

Due to the formation of the grids of sets of intersecting plates and their arrangement so that the rising gases must pass through the openings between the plates, the column

of gas is broken up into a number of small columns, each of which is surrounded by a heat absorbing and dust collecting surface. Also, where a plurality of the baffle plate grids are employed, the small columns of gas formed by the lower grid are caused to impinge against a heat absorbing surface or surfaces of the above grid, and be still further broken up. Thus the gas is brought into contact in finely divided columns with a large baffle plate surface and is thoroughly scrubbed. This results in a very rapid lowering of the temperature of and the rapid removal of dust, etc. from the rising gas.

At the bottom of the gutters 23 and 24 are the drain pipes 43 and 44, respectively, which are arranged to conduct the water to some point remote from the ash receptacle 12.

The operation of the wash vent is as follows:

The hot gases, steam and air which may be highly charged with ash dust, soot, etc. pass upwardly through the opening 27 into the base member 21. The upward rush of the gases is immediately retarded by engagement with the barrier 28 which will be maintained in a semi-cool condition by reason of its upper surfaces being continually wet by the water falling thereon from the spray nozzle 35, and also by the condensed steam, which may be gathered on the baffle plates 38 and 39. The hot gases, upon striking the barrier 28, will be deflected so that they will pass out under the lower edges of the barrier and through the streams of water which are running from the eaves of the barrier.

The gases in their upward movement next encounter the baffle plate grids comprising the plates 38 and 39. In this upward movement, the gases obviously encounter the water from the spray nozzle 35 and also the water of condensation which is dripping from the plates 38 and 39. As the plates 38 and 39 are maintained wet by the washing spray, a large part of the steam will be condensed into water and the hot gases will be materially cooled, thus causing a rapid shrinkage in the volume of the gases passing through the vent. This tends to greatly reduce the speed with which the gases are traveling.

If more than one of the baffle plate grids is employed, the gases will pass through the succeeding plates with substantially the same effect as resulting from their passage through the first plate. As the plates of the various grids in the arrangement shown particularly in Figs. 6 and 7 are positioned at an angle to each other, the gases are caused to impinge directly against the plates of the successive grids. Upon leaving the uppermost baffle plate grid, the gases pass upwardly through the spray from the nozzle 35 until they engage the top 30 of the vent. The gases then are deflected outwardly and pass downwardly between the flange 31 and the outer edge of the flange 29, thence inwardly over the gutter 32 and downwardly and out between the gutter 32 and the sides of the shell 22.

Due to the fact that the barrier or baffle 28 is arranged with its two sides oppositely inclined, the water passing downwardly through the baffle plate grids will be caused to drain from the lower edges or eaves of this barrier into the gutters 23 and 24. Also due to the inclined arrangement of the parts of the barrier 28, the water of condensation which collects on the under surface of the barrier will also drain to the lower edges thereof and fall into the gutters 23 and 24.

Under certain conditions, the moisture in the gases entering the wash vent will not be entirely condensed by the time the gases reach the top of the vent. Therefore, a certain amount of water of condensation will form on the top 30, flange 29 and side flange 31. This water of condensation will, for the most part, drain into the gutter 32 and will be discharged through the pipes 34 into the interior of the wash vent shell 22. Thus it will be seen that practically all of the spray water and water of condensation in the wash vent will ultimately drain into the gutters 23 and 24 from which it will be carried away by the pipe 45, thus preventing water finding its way into the ash receptacle 12.

Although in the above description, certain definite embodiments of the invention have been disclosed, it is to be understood that further modifications of the device are contemplated, and that the invention is to be limited merely by the scope of the appended claims.

What I claim is:

1. In combination, a baffle plate grid comprising a first series of plates with their lengths extending in the plane of the grid and with their widths extending in spaced parallel planes at right angles to the plane of the grid, each of said plates having inclined slots cut along one edge of and sloping away from the center of the plate, a second series of plates extending cross-wise of said first series, each of said second series having slots cut along one edge of the plate, the slots of said second series engaging with the slots of said first series, each of said second series of plates being proportioned so that one longitudinal edge thereof terminates short of the adjacent edges of the first series of plates, and a second baffle plate grid disposed in a plane parallel with said first baffle plate grid and substantially contacting therewith, the termination of the longitudinal edges of said inclined plates affording a plurality of transverse passageways between said first and second grids.

2. A baffle plate grid comprising two sets of substantially flat intersecting plates, the plates of one set being arranged at substantially right angles to the plane of said grid, the plates of the other set being inclined to the plane of said grid, the inclined plates in one half of the grid sloping in one direction and those in the other half sloping in the opposite direction.

3. A baffle plate grid comprising a first series of plates with their lengths extending in the plane of the grid and their widths extending in spaced parallel planes transverse to the plane of the grid, each of said plates having inclined slots cut therein, said slots being inclined away from the centers of said plates, and a second series of plates extending cross-wise of said first series and engaging in said inclined slots, each of said second series of plates being proportioned so that one longitudinal edge thereof terminates short of the adjacent edges of the first series of plates.

4. A baffle plate grid comprising two sets of substantially flat intersecting and interlocking plates, each plate of each set being provided with notches to receive the plates of the other set respectively, the plates of one set being at substantially right angles to the plane of the grid, the plates of the other set being inclined to the plane of and away from the center line of the grid.

In witness whereof, I hereunto subscribe my name this 27th day of December, 1921.

CARL F. ZIMMERMANN.