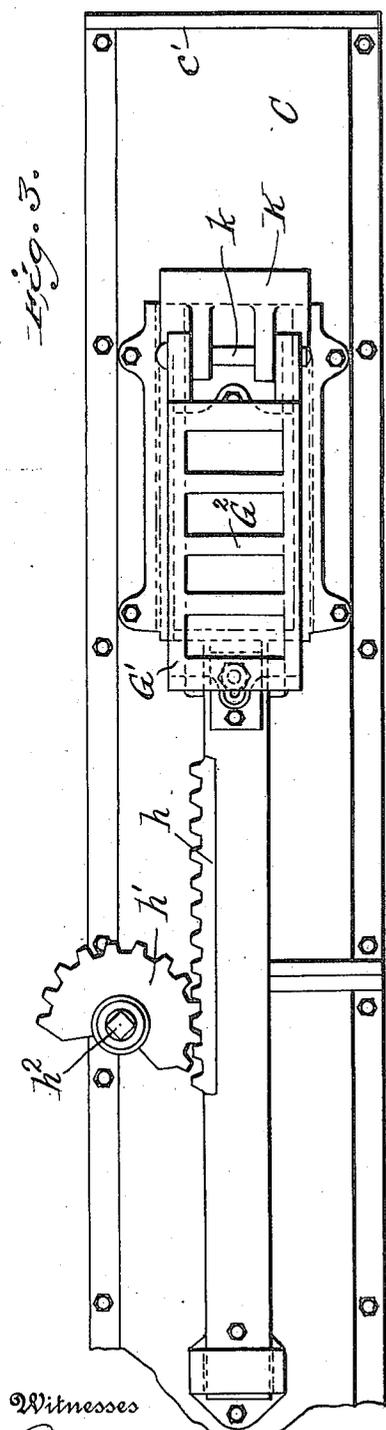




1,165,791.

Patented Dec. 28, 1915.  
 2 SHEETS—SHEET 2.



Witnesses  
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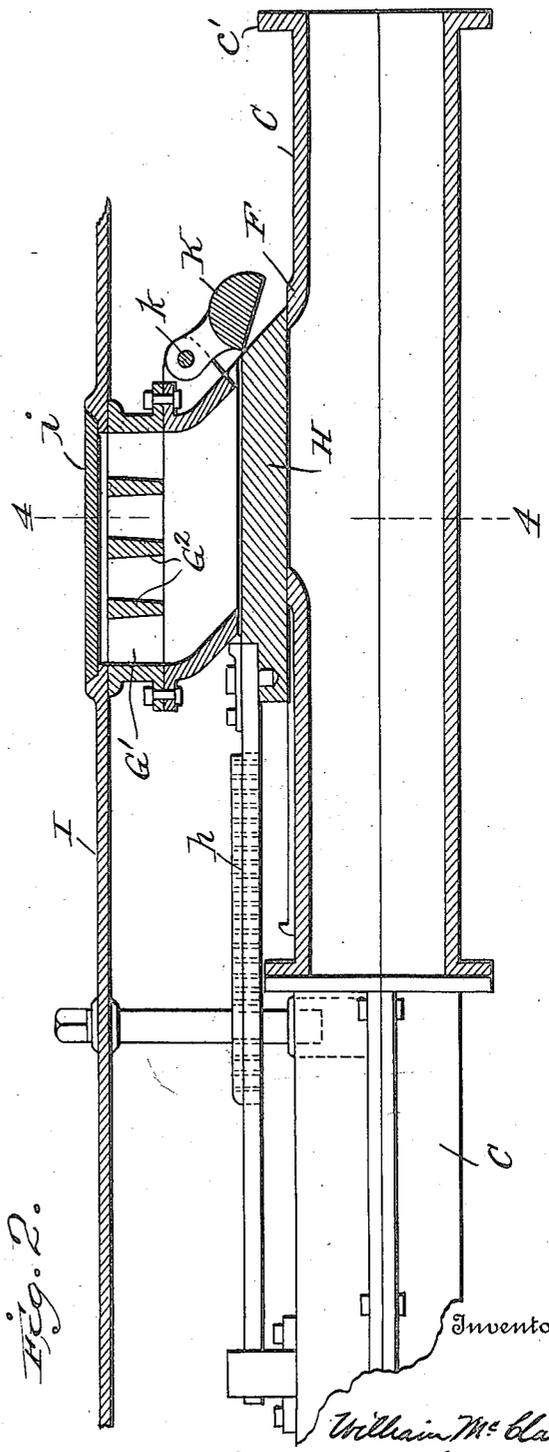


Fig. 2.

By

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# UNITED STATES PATENT OFFICE.

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## CONVEYER SYSTEM.

1,165,791.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, WILLIAM McCLAVE, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Conveyer Systems; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to systems primarily designed for conveying and discharging ashes from the ash pits of a boiler or battery of boilers whereby the manual handling of the ashes is largely eliminated.

In accordance with the present invention, a conveyer duct is provided which extends in a substantially horizontal line below the level of and immediately in front or within the ash pit doors, said duct being provided with transverse openings for the introduction of the ashes, which openings are provided with suitable valves. The discharge end of the duct is curved upwardly so as to discharge the ashes at a high level from whence they may be removed by gravity. In the system contemplated by the present invention, the end of the duct remote from the discharge end is adapted for the admission of air, while at successive points in the length of the duct jet nozzles are provided for the introduction of steam under pressure, said nozzles being directed toward the discharge end of the duct whereby a powerful current of air is produced which will carry with it all ashes or material introduced in rear of the jets. Provision is also made whereby all of the entrance openings to the duct may be closed so as to permit of pressure being produced within the duct for the forcible discharge of any accumulations which may clog the duct, as will be hereinafter more particularly explained.

The invention consists in certain novel details of construction and combinations and arrangements of parts, whereby the objects and advantages above indicated may be secured, together with other advantages which will be readily appreciated from the description of the construction of the parts themselves.

Referring to the accompanying draw-

ings,—Figure 1 is a front elevation of a conveyer system embodying the present improvements with the surrounding parts largely in section; Fig. 2 is a detail sectional elevation of a portion of the conveyer duct with a transverse opening and duct through which the ashes are introduced into the conveyer duct; Fig. 3 is a top plan view of the parts shown in Fig. 2, but with the flooring or cover plates omitted; Fig. 4 is a transverse section on the line 4—4 of Fig. 2; Fig. 5 is a transverse section through the conveyer duct in a plane immediately in front of a pair of the jet nozzles, the plane being indicated in Fig. 6 by the line 5—5; Fig. 6 is a detail longitudinal section in the plane indicated by the line 6—6 of Fig. 5.

Like letters of reference in the several figures indicate the same parts.

Referring particularly to Fig. 1, A indicates the boiler front of a battery of boilers, B the receiving and settling or separating chamber to which the ashes are conveyed, and C indicates generally the conveyer duct, through which the ashes are conveyed and by which they are discharged into the receiving chamber B.

The particular construction of the receiving chamber need not be described herein further than to say that it is designed for the reception of the ashes. The deposited ashes are supported on an inclined floor B' from which they may be removed by gravity. The walls of the chamber are protected from the action of the material discharged from the duct by an arrangement whereby the discharged material is thrown into the chamber in a vertical direction; the momentum of the material is checked and overcome by gravity, and the material allowed to settle on the floor without disturbing that already resting on the floor, as would be the case, were the discharge directed either against the walls of the chamber, or against beveled plates or even against the material already accumulated in the chamber. An arrangement of this kind therefore contemplates the upward curving of the discharge end of the duct so as to obtain the advantages last above enumerated as well as to elevate the material to a sufficient height so that it may be subsequently handled by gravity.

The conveyer duct C, as will be seen by reference to Figs. 2, 4, and 5, is formed in

longitudinal and transverse sections having along the edges longitudinal and transverse flanges *c* and *c'*, respectively. The sections are of cast metal and by forming the duct in sections any section may be independently removed and a new section substituted, a provision which is important in view of the fact that practice has demonstrated that the bottom of the duct is worn away very rapidly by the abrasive action of the ashes and cinders traveling over the same. By making the duct in longitudinal section it is found that ordinary castings may be employed for when the longitudinal flanges are drawn together any warpage or irregularity in the casting will be eliminated, and a substantially perfect duct formed without the necessity of machining or dressing the faces or walls of the duct.

The top section of the duct opposite the ash pit of each boiler is formed with an opening transverse to the axis of the duct. The walls *F* of said opening are extended upwardly, so as to be in position for being readily smoothed off by simple planing operations whereby they may form seats for the lower edges of an upwardly extending duct *G* and ways for supporting a slide valve *H* adapted to close the opening as indicated in Fig. 2. The valve is opened to permit of the introduction of ashes by a rack bar *h* and a pinion *h'* mounted on a vertical shaft *h<sup>2</sup>* extending up through the floor plate *I* and adapted for the reception of a handle or lever. The upwardly extending duct *G* is provided with under cut guide-ways *g* for the upper edges of the valve *H*, and the opening through the duct *G* is of less width than the opening into the duct *C* so as to, as far as possible, prevent the lodgment of ashes on the ways which support the valve. The valve *H* is designed to bridge the opening and close communication between the ducts. To effectually accomplish this its forward end necessarily passes through the wall of the duct *G*, and consequently, when the valve is open there is liability of the ashes passing through such opening and gradually accumulating by the action of the valve outside of the main duct. This is prevented in the present construction by the provision of a gravitating swinging gate *K* pivoted at *k'* and adapted to swing down into position to close the opening when the valve is withdrawn and to swing up when the valve returns to its closed position as indicated in said Fig. 2.

The upper end or portion of the duct *G* in which the ashes are introduced, is in the form of a grated section *G'* having transverse bars *G<sup>2</sup>* spaced apart a proper distance to prevent the introduction of large masses of clinkers or cinders which might clog the conveyer duct or be too heavy to be transported by the air currents set up through

the action of the steam jets. Above the duct there is provided a suitable floor plate *I* having an aperture therein which is normally closed by a cover *i*. When it is desired to introduce ashes at any boiler, the cover *i* is removed and the valve opened by the manipulation of the pinion and rack as will be readily understood.

At suitable points in the length of the conveyer duct, upper sections of the duct are provided of the form indicated in detail in Figs. 5 and 6, from which it will be seen that these sections are cast with elongated narrow inclined recesses formed by curved projections *L*, the wide portion of each projection having in its end a jet nozzle *l* for the introduction of a jet of steam which is directed forwardly or toward the discharge end of the conveyer duct. Said jet nozzles *l* are preferably arranged in pairs as in Fig. 5, so that the jets issuing therefrom will substantially fill the duct at a point slightly in advance of the nozzles, and thereby create a suction which will be sufficient to cause the air to sweep through the conveyer duct and carry with it all of the ashes and cinders introduced into the duct in rear of the jet. Each jet, while lying out of line with the interior of the duct, projects into the recess formed by the enlargement *L* and the walls of the chamber so formed are preferably arranged so that the air may flow up around the nozzles without making an abrupt turn or bend, thus eliminating to a large degree the retarding influence which would be exerted on the traveling column of air by the formation of the enlargement.

The jet sections of the duct are preferably arranged successively on the discharge side of the duct from each boiler or pair of boilers as clearly indicated in Fig. 1, and also at other suitable intervals, for instance, in the upwardly extending portion of the duct, so as to augment the action of each other and keep the material flowing through the duct at sufficient speed to insure its clearance.

The end of the duct remote from the discharge end is preferably normally open inasmuch as it is desirable to provide for the introduction of a large volume of air which will be set in motion by the jets, but provision is made in the form of a blank-flange *O* whereby the end of the conveyer duct may be closed completely, so that should occasion require, direct steam pressure may be introduced behind any obstruction or matter clogging the duct to act positively with the boiler pressure, if necessary, for driving the obstruction out of the duct.

From the foregoing it will be understood that in the operation of the apparatus the jets between the boiler from which the ashes are to be taken and the discharge end of the conveyer duct are set in operation and the

ashes are introduced through the transverse opening in position to be drawn in, carried forward and discharged through the action of the jets as aforesaid. Obviously the jets on the opposite side of the opening through which the ashes are introduced, should not be set in operation, inasmuch as this would produce a pressure in the duct at the point of introduction of the ashes and would tend to prevent the entry of ashes. Provision for separately controlling the successive jets is therefore an important feature in the operation of the system and each pair of jets is therefore provided with a valve or other suitable means whereby the introduction of steam may be readily and quickly controlled. Such a valve is indicated in Fig. 6 of the accompanying drawings, but not in Fig. 1, because of the small scale on which that figure is drawn.

In the operation of systems of this character it is found that more or less of the steam condenses in the conveyer duct particularly during the initial operation, and it is desirable that the water of condensation should be removed before the introduction of the ashes. To permit of this being done in a convenient manner, the duct preferably slopes slightly to a point where a loaded water discharge valve P is located in the bottom of the duct. Such valve may have a counter-weight  $p$  and an upwardly extending operating rod  $p'$  whereby, when the apparatus is being prepared for use the valve  $p$  may be opened and all water of condensation allowed to run out through a drain Q into a sewer or drainage system.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In an ash conveyer the combination with a conveyer duct with openings transverse thereto for the introduction of ashes, means for admitting air to said duct at a point on the opposite side of said transverse openings, of means for closing all of said inlet openings, in order to increase the pressure within said conveyer, of a plurality of steam nozzles in the upper part of the duct successively located in proximity to the transverse openings on the side toward the discharge end, and directed toward the discharge end, whereby ashes are normally drawn in and swept by the air and steam with varying velocity according to conditions of load.

2. In an ash conveyer, the combination

with a conveyer duct having a substantially horizontal portion with openings transverse thereto for the introduction of ashes, an upwardly curved discharge end and an air entrance opening at the end remote from the discharge end and beyond the transverse openings, of valves for closing the openings for the introduction of ashes, a blank flange for closing the end air entrance opening, a plurality of steam jet nozzles arranged respectively in the top of the duct in proximity to the openings for the introduction of ashes, and means whereby the supply of steam to said jet nozzles may be independently controlled, substantially as described.

3. In a conveyer system such as described, the combination with the conveyer duct and means for introducing motive fluid under pressure, of a transverse duct for the introduction of solid material into the conveyer duct, a slide valve for closing communication between the ducts and forming a portion of the wall of the conveyer duct, and a gate for closing the opening in the duct through which the valve operates whereby lodgment of material in the opening is prevented when the valve is open.

4. In a conveyer system such as described, the combination with the conveyer duct and means for introducing motive fluid under pressure, of a transverse duct for the introduction of solid material into the conveyer duct, a slide valve for closing communication between the ducts and when closed forming a portion of the wall of the conveyer duct, and a pivoted gravitating gate for closing the opening in the duct wall in which the valve operates.

5. In a conveyer system such as described, the combination with the conveyer duct, and means for introducing motive fluid under pressure, of a transverse duct for the introduction of solid material into the conveyer duct, a longitudinally movable slide valve movable parallel with the conveyer duct for closing communication between the ducts and when closed forming a portion of the wall of the conveyer duct, and a pivoted gravitating gate adapted to be displaced by the slide valve when closed and operating itself to close the opening in the duct wall through which the valve projects.

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