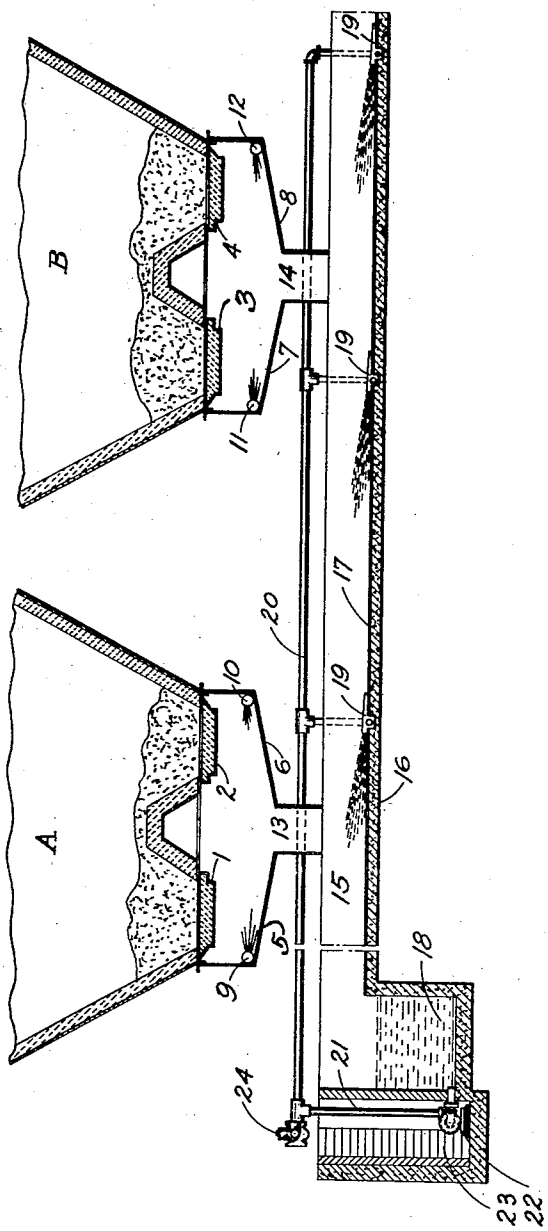
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APPARATUS FOR HANDLING SOLID MATERIALS

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# UNITED STATES PATENT OFFICE

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## APPARATUS FOR HANDLING SOLID MATERIALS

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This invention relates to apparatus for handling solid material and more particularly to sluiceways along which solid materials are carried by fluid streams.

Sluiceways may conveniently be employed for removing ashes from boiler hoppers and for other purposes, but it has been found that when these are applied, for example, to boiler plants situated only above the level of a closely situated body of water, and particularly where the water line is subject to fluctuations such as tides, it is often difficult to keep water from at times backing up in the sluiceway. It has further been found that when water does back up in such a sluiceway, particles of ash, slag, and the like will be washed into the nozzles and into the water delivery line, causing the same to clog and to wear unduly, and producing other disadvantages.

An object of the present invention is to provide a system for conveying solid materials along a sluiceway which will be free from the disadvantages attendant to prior types of apparatus used for this purpose.

Other objects will hereinafter appear.

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

The figure is a central vertical sectional view, taken along the center line of a sluiceway provided with apparatus embodying the invention.

The apparatus as shown is applied for conveying ashes discharged from two hoppers A and B of boiler furnaces or the like. Each hopper is provided, at its bottom, with two discharge openings having movable gates 1, 2, 3, and 4 which control the discharge of ashes therethrough. The ashes drop upon feed plates 5, 6, 7, and 8, along which they are moved by jets of water or the like issuing from nozzles 9, 10, 11 and 12 to central discharge openings 13 and 14, through which they pass to the interior of a sluiceway 15, comprising an outer shell 16 and an inner lining 17 of cast iron or the like. This sluiceway extends substantially horizontally from beneath the discharge openings to a sump 18, in which the solid material may be allowed, if desired, to settle and from which it may be removed by any suitable conveying means, such as for instance a clam shell bucket (not shown).

Distributed along the bottom of the sluiceway are nozzles 19 by which a fluid conveying stream is delivered to the sluiceway and by which it is directed therealong toward the sump 18. These nozzles are connected to a supply line 20 which may be connected to the discharge 21 of a pump 22 positioned in a well 23 adjacent sump 18, from which it may draw its supply of water.

If only the parts thus far described were used, and the water from some outside source were to back up into the sump and raise its water level above the bottom of the sluice, this water would, when the jets are not being operated, flow back into the jets and supply lines, carrying with its particles of ash and slag which would tend to clog the nozzles of the pipe and, being highly abrasive, would wear the discharge openings of the nozzles when passing therethrough. Moreover, this flowing of the fluid back into the nozzles would be assisted by a suction caused in the supply line 20 due to the water flowing back through discharge 21 to the pump when the latter ceases operation.

To prevent any flow of water into the nozzles, a check valve 24, which is arranged so as to close upon the application of pressure to supply line and to open upon any suction occurring in the line, is connected to the line. This serves as a vent, and, as soon as the pump is stopped, opens and allows the water to flow out through the nozzles into the sluiceway, instead of flowing back to the pump, the entire line or as much of it as is above the water line, being emptied of water and filled with air.

By so venting the line, I find that all backflow through the nozzles is eliminated, and of course, the disadvantages attendant upon such back flow are also eliminated.

While I have disclosed the illustrated embodiment of my invention in some particularity, obviously many other embodiments will readily occur to those skilled in the art to

which this appertains, and I do not therefore limit myself to the precise details shown and described, but claim as my invention all embodiments falling within the scope of the appended claims.

I claim:

1. Apparatus for handling solid materials which comprises a sluice, jets adapted to deliver a stream of liquid to the interior thereof, a supply line above and connected to the jets and adapted to be connected to a source of liquid pressure, the supply line being provided with a vent above the jets, and valve means for closing the vent, said means closable by liquid pressure in the supply line and adapted to open upon withdrawal of the pressure whereby liquid between the vent and the jets is drained through the jets.

2. Apparatus for handling solid materials which comprises a sluice, jets adapted to deliver a stream of liquid to the interior thereof, a supply line above and connected to the jets, means for supplying liquid under pressure to the supply line, and a check valve disposed above the jets and connected to the supply line adapted to be closed by the application of liquid pressure to the interior of the supply line and adapted to admit air thereinto when the pressure is released whereby liquid between the valve and jets is drained through the jets.

3. Apparatus for handling solid materials which comprises a sluice, jets for delivering liquid to the interior thereof, a supply line above and connected to deliver liquid to the jets, a pump adapted to discharge into the supply line and having an intake communicating with the sluice for supplying liquid under pressure to the line, and a check valve connected to the supply line above the jets closable by liquid pressure within the line and adapted to admit air therein when the pressure is released whereby liquid in the line is drained through the jets.

4. Apparatus for handling solid materials which comprises a sluice, jets for delivering liquid to the interior thereof, a supply line above and connected to the jets, and a check valve disposed exteriorly of and connected to the supply line above the jets, closable by liquid pressure within the supply line and adapted to admit air into the line when the pressure is released.

In testimony whereof I hereunto affix my signature this 4th day of October, 1927.

FRANK B. ALLEN.