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ASH REMOVAL DEVICE

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Fig. 1.

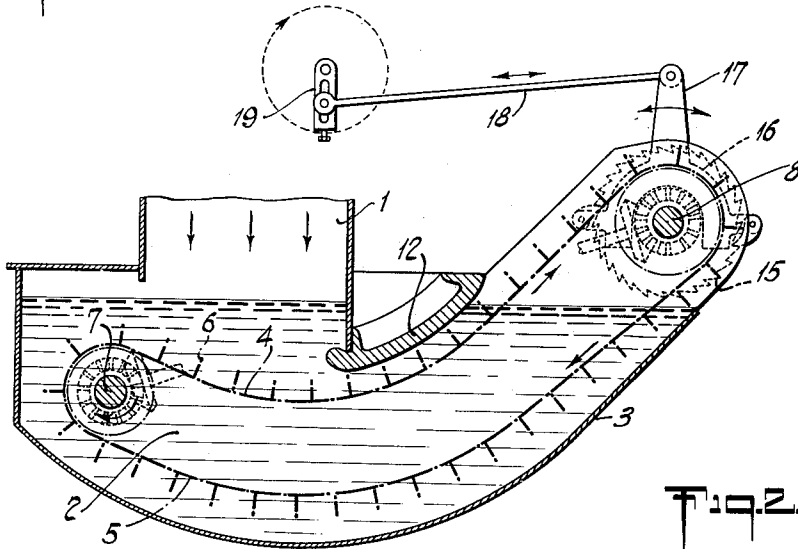


Fig. 2.

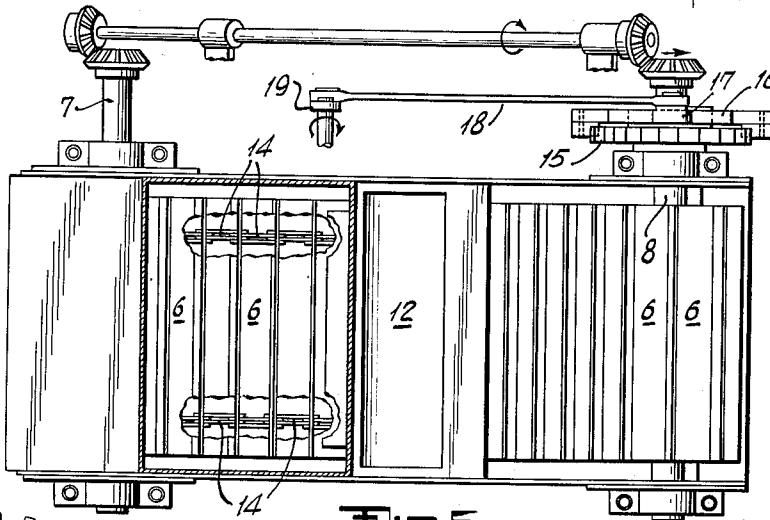


Fig. 3.

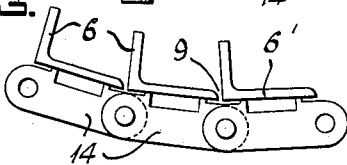


Fig. 5.

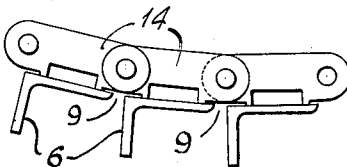
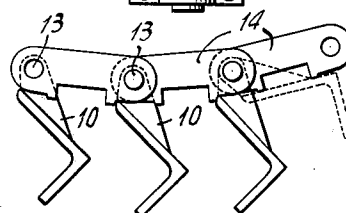


Fig. 4.

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ASH REMOVAL DEVICE

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5 Claims. (Cl. 110-165)

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The present invention relates to a device for dust-free removal of fine ash, slag, and the like from combustion plants, particularly from plants burning fuel whose combustion residue contains a large portion of fly ash and in which the ash is dropped into a pit containing water.

An object of the present invention is the provision of means for the removal of ash from ash pits, said means comprising a container built onto the ash pit and being filled with water, an endless belt conveyor having a sagging loop portion immersed in the water and disposed in the path of the ash sinking through the water, the upper portion of the conveyor being so constructed as to catch the ash and carry it outside of the container. The conveyor belt comprises two lateral chains, to which one of the legs of angle bars are connected forming a continuous belt-like structure, the other legs of the angle bars extending in outward direction from the loop transversely to the direction of movement of the belt and forming pockets or troughs for receiving the ash. Due to the sag of the belt, the clearances between adjacent transverse bars are closed at the upper, concave portion of the conveyor which receives the ash, and the clearances between adjacent transverse bars are widened at the lower, convex portion of the conveyor. In this way the ash particles which have dropped onto the conveyor, are retained thereon until discharged from the conveyor, and ash which sticks to the conveyor belt after having passed its discharge position or which may leak through and inside the loop formed by the conveyor finds no hold on the lower portion of the conveyor loop and drops to the bottom of the container. One leg of the angle bars may be rigidly connected with the chain links or the edge of the leg may be pivotally connected with the link pins. In the latter case, the angle bars rest on the chains when they travel along the concave, upper portion of the belt loop forming a substantially continuous belt, and they hang down from the convex, lower portion of the loop. In both cases the bottom of the container is adjacent to the outermost edge of the angle bars so that they can pick up ash accumulated at the bottom of the container and push and carry it along to the point where the ash is discharged from the conveyor.

The conveyor according to the invention is preferably suspended by two rollers, one of which is located outside of the container where the ash is discharged, and the other is disposed within the container.

The desired sag of the conveyor according to the invention is assured by suitable guide means, such as rails mounted on the inside walls of the container or guide members extending across the container. In addition to or in lieu of the guide means, the desired sag or deflection of the conveyor belt may be obtained by the provision of coupling means between the rollers on which the

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belt is suspended for assuring synchronous rotation of both rollers.

The belt is moved by rotation of one of the rollers at adjustable speed or at adjustable intervals and periods, for example by means of a ratchet drive having an adjustable stroke.

Further and other objects of the present invention will be hereinafter set forth in the accompanying specification and claims, and are shown in the drawing which, by way of illustration, shows what I now consider to be preferred embodiments of the invention.

In the drawing:

Fig. 1 is a diagrammatic longitudinal sectional view of the device according to the invention;

Fig. 2 is a top view of the device shown in Fig. 1 with parts broken off;

Fig. 3 is a side view of a part of the upper portion of the conveyor belt for the device according to the invention;

Fig. 4 is a side view of a part of the lower portion of the conveyor belt for the device according to the invention;

Fig. 5 is a side view of a part of a modified conveyor belt for the device according to the invention.

Like parts are designated by like numerals in all figures of the drawing.

Referring more particularly to the drawing, numeral 1 designates a shaft into which drops the ash to be removed. A container 2 having a curved bottom 3 and filled with water is connected with the bottom of the shaft. A sagging portion of a conveyor belt loop having an upper part 4 and a lower part 5 is immersed in the water in the container and so positioned that the upper part 4 of the loop is adapted to receive the ash coming down through shaft 1 and quenched in the water, and the lower part 5 is adjacent to the bottom 3 of the container whose curvature conforms with that of the part 5 of the conveyor loop. The belt comprises a plurality of parallel link chains 14 which are interconnected by means of transverse bars 6 having an angular cross-section. The conveyor is supported by two shafts, one of which (7) is inside the container and the other (8) is disposed outside of the container. Either one of said shafts is motor driven. In the illustrated embodiment of the invention, shaft 8 carries a ratchet wheel 15 which is engaged by a ratchet brace 16 having an arm 17 which is connected by a rod 18 with a rotating crank 19 of adjustable length. The extent of the angular movements of shaft 8 can be varied by changing the length of the crank 19. The lower portion 5 of the conveyor belt sags freely and takes along ash which may have accumulated at the bottom of the container. The upper portion 4 is guided along a predetermined path by a guide member 12. Because of the concave configuration of the upper portion of the conveyor belt the clearances 9 between adjacent angle bars 6 are reduced to

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a minimum when the bars travel along the upper path, as shown in Fig. 3, and a substantially continuous conveyor surface is formed by the substantially flat, longitudinal portions 6' of the bars for receiving the ash coming down from shaft 1. The upper part of the belt moves to the right as seen in Fig. 1 and the ash is discharged after the direction of movement of the belt is reversed around the shaft 8. Due to its weight, the lower part 5 of the conveyor belt assumes a convex configuration causing widening of the clearances 9 between adjacent transverse bars, as shown in Fig. 4. Ash which may have reached the inside of the belt loop will fall through the widened spaces 9 to the bottom of the container from which it is removed by the outwardly extending legs of the bars 6 and carried along by the conveyor.

Instead of rigidly connecting one leg of the transverse bars 6 with the links of the chains 14 as shown in Figs. 3 and 4, the angle bars may be provided with ear portions 10 which are swingably connected to the link pins 13 as shown in Fig. 5. The bars assume the position shown by solid lines in Fig. 5 when they travel along the lower portion of the loop path of the conveyor and afford large openings between the bars for permitting ash to fall through the lower portion of the conveyor. The swinging bars are well suited for brushing the bottom of the container and pushing along ash which may have accumulated thereon. In the upper portion of the loop of the conveyor, the swinging bars assume the position shown by dotted lines in Figs. 5 and with one of their legs form a substantially continuous belt surface.

Instead of providing guide means 12 or in addition thereto, the shafts 7 and 8 may be interconnected for synchronous operation, for example by gearing means as shown in the upper portion of Fig. 2.

While I believe the above described embodiments of my invention to be preferred embodiments, I wish it to be understood that I do not desire to be limited to the exact details of method, design and construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A conveyor device for fine-grained ash, comprising a container containing water, means connected with said container for dropping ash into the water therein, two shaft means rotatably connected with said container; a plurality of parallel endless chains carried by and forming sagging loops between said shaft means and having concave upper and convex lower portions, a part of said portions being immersed in the water in the container; said container having a bottom curved substantially parallel to said convex lower portions; and transverse bars of angular cross-sections connected with said chains; each bar having a substantially flat longitudinal portion disposed parallel to the chains at least at the concave portions thereof and being unconnected with and adjacent to the longitudinal portions of the neighboring bars to form a substantially continuous conveyor surface, when travelling on the upper, concave portion of the loop path for receiving and retaining the ash sinking in the water; each bar having a portion disposed at an angle with respect to said flat portion, disposed transversely to the travel direction of said chains, and projecting outward with respect to said loops to form with the flat portion and the outwardly

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projecting portion of an adjacent bar an ash-retaining trough when travelling on the upper portion of the loop path, said portions disposed at an angle having longitudinal edges disposed adjacent to said curved bottom when travelling on the lower, convex portion of the loop for carrying along ash accumulated at the bottom of said container.

2. A device as defined in claim 1, comprising guide means connected with said container and engaging said transverse bars for assuring a predetermined configuration of the path thereof.

3. A device as defined in claim 1, said shaft means being interconnected for synchronous operation and maintenance of a sag in said chains at all operating speeds.

4. A device as set forth in claim 1, one of said shaft means being immersed in the water in said container and the other shaft means being located above the water level and the number of said transverse bars being equal to the number of links in said chains.

5. A conveyor device for fine-grained ash, comprising a container containing water, means connected with said container for dropping ash into the water therein, two shaft means rotatably connected with said container; a plurality of parallel endless chains composed of links swingably interconnected by pins and carried by and forming sagging loops between said shaft means and having concave upper and convex lower portions, a part of said portions being immersed in the water in the container; said container having a bottom curved substantially parallel to said convex lower portions; and transverse bars of angular cross-section individually connected with individual pins of said chains and being located at the outside thereof; each bar having a substantially flat longitudinal portion resting by gravity on the concave portions of the chains and forming a substantially continuous conveyor surface when travelling on the upper portion of the loop path for receiving the ash sinking in the water, said bars hanging down from the convex portion of the chains, forming gaps for dropping ash therethrough, each bar having a portion disposed at an angle to said flat portion and projecting toward the outside of the chain loops to form with the flat portion and the outwardly projecting portion of an adjacent bar an ash-retaining trough when travelling on the upper portion of the loop path, said portions disposed at an angle having longitudinal edges disposed adjacent to said curved bottom when travelling along the lower portion of the loop for carrying along ash accumulated at the bottom of said container.

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