May 10, 1932. A. E. LEEK 1,858,160

SEPARATING DEVICE FOR SOLIDS AND LIQUIDS

Filed Jan. 21, 1930 2 Sheets-Sheet 1

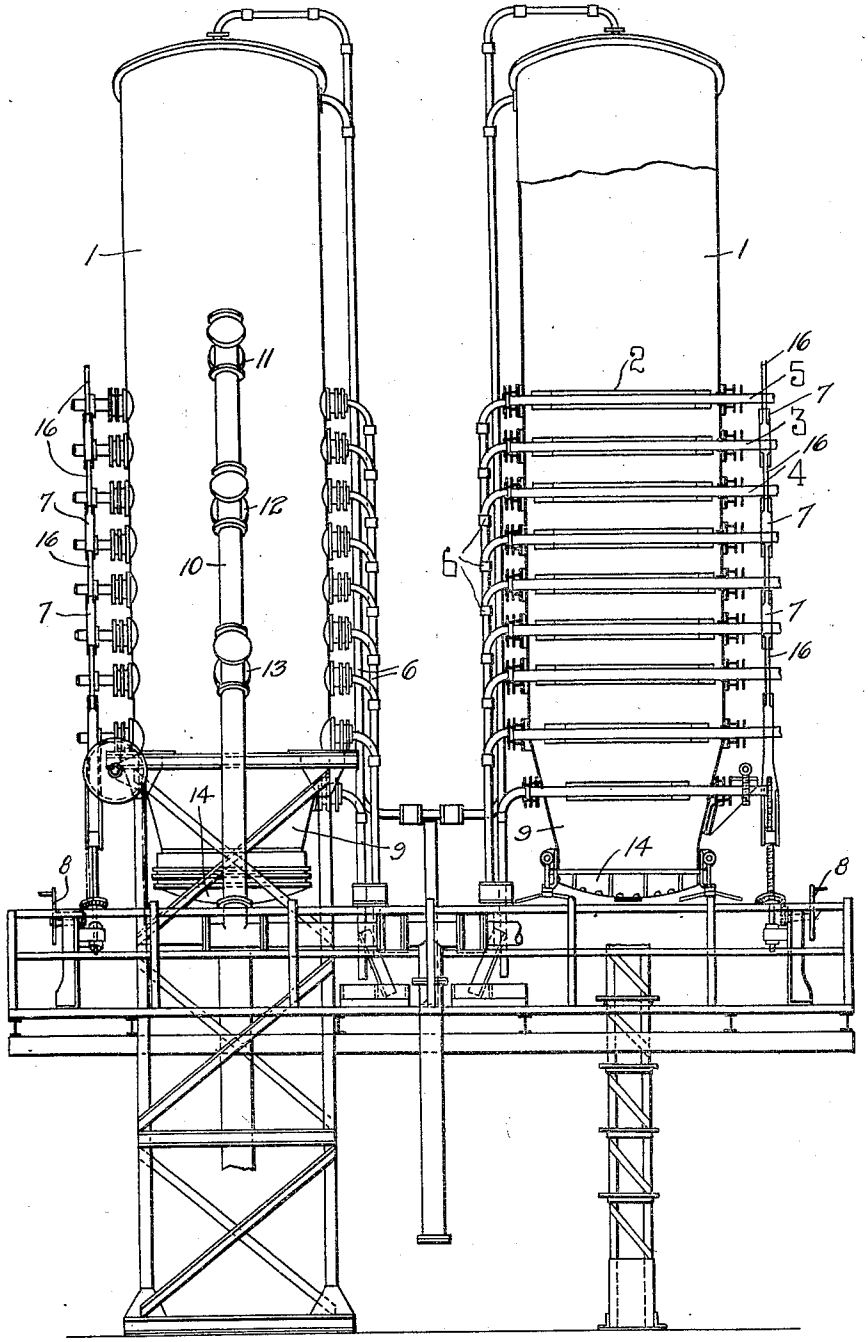


Fig. 1.

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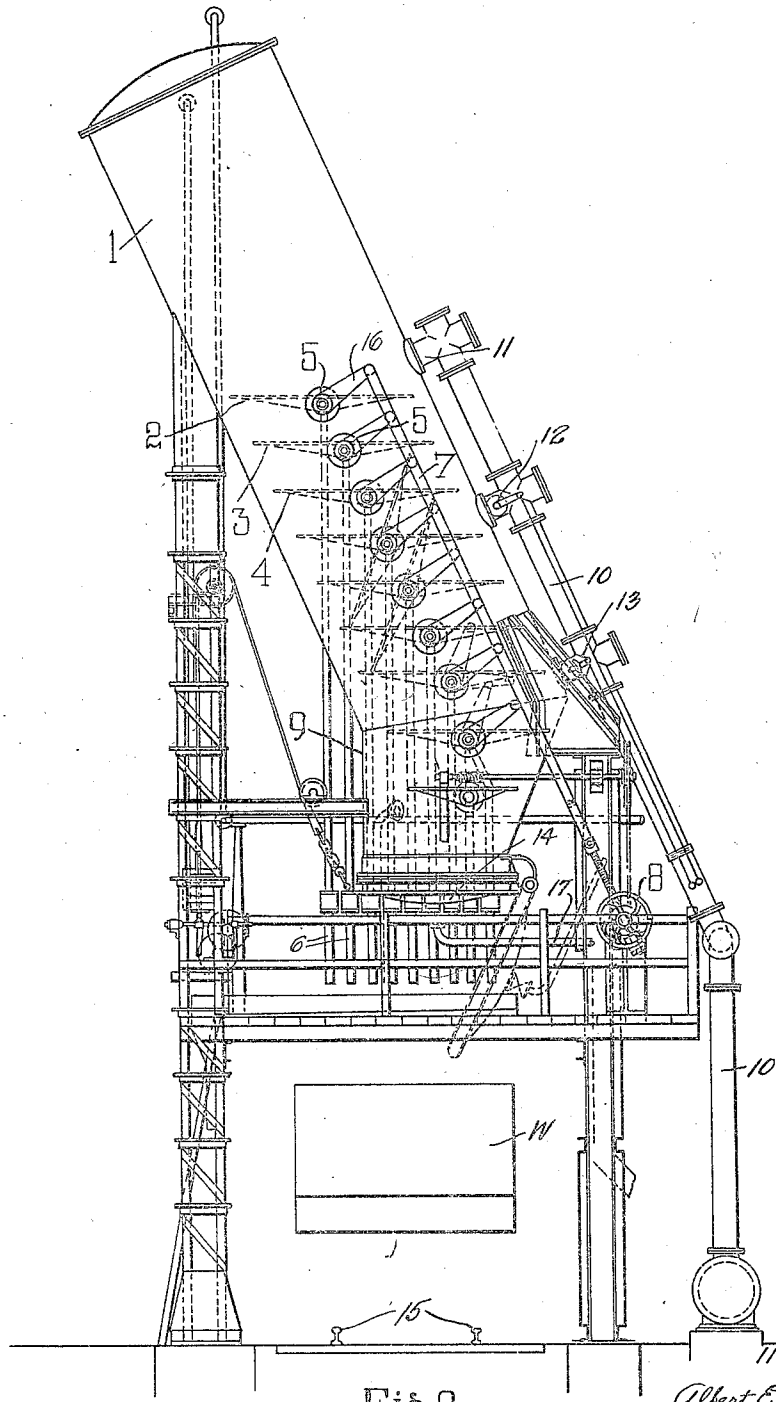


Fig. 2.

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UNITED STATES PATENT OFFICE

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SEPARATING DEVICE FOR SOLIDS AND LIQUIDS

Application filed January 21, 1930, Serial No. 422,407, and in Great Britain January 25, 1929.

The present invention relates to improvements in separating or filtering devices for the removal of solids from mixtures of solids and liquids, such as coal slurries, taken by way of example, of the type in which a number of filtering trays are superposed within a container, which are pivoted about their axes, so that they may be tipped to discharge the matter deposited upon them from the liquid or slurry.

According to the present invention a number of filter trays are mounted within a container about pivotal axes, which are staggered one relatively to the other; for instance these axes may lie, not in a vertical plane as has been hitherto usual, but in a plane at an angle to the vertical.

By this means, it will be possible to provide a larger number of trays for a given volume of container than has hitherto been possible, and yet to allow of the same freedom of swinging of the tray about its pivotal axis for discharge purposes.

The invention is more particularly described with reference to the accompanying drawings, in which:—

Fig. 1 is a front elevation showing a pair of filtering or separating devices mounted adjacent to one another, with parts of the right hand device broken away.

Fig. 2 is a corresponding side view.

A container 1 for liquid slurry or the like material from which solids are to be removed or filtered is provided with a number of trays 2, 3, 4, ..., mounted about hollow pivotal axes 5 each of which hollow axes is connected to an outlet pipe 6.

It will be noticed that the pivotal axes 5 for these trays are staggered or displaced from one another both vertically and horizontally so that their axes will lie in a common plane which will not be vertical as hitherto, but lie at an angle to the vertical.

It will normally be preferred that the angle which this plane makes to the vertical will be similar to the angle of the axis of the container 1 whereby considerable saving in space is obtained.

The trays are each revoluble about their axis and are connected to arms 16 linked together by connecting rods 7 to be operated from a common hand wheel 8 so that they may be all tipped simultaneously. If desired, they may be tipped individually by separate tipping means.

The cylindrical body 1, inclined at an angle to the vertical may of course, be mounted on a cylindrical or truncated conical base 9 having its axis disposed vertically.

The trays may be of the type in which a perforated or reticulate surface is adapted to take up a filter bed of material by a gravity deposition from a liquid slurry, in which it is immersed, and then subsequently to have liquid slurry filtered through it by the action of a pressure difference. the accumulated filter bed on the trays being discharged periodically.

These trays can be mounted within a container of usual form, but it may be desirable to mount these within a container, the main body of which is of cylindrical cross-section inclined at a similar angle to the vertical as the plane containing the axes of the trays as above indicated.

The improvements of this invention are also applicable to leaching or the like apparatus for the treatment of solids with liquids.

It will be preferred in the case for instance of filtering slurry or the like materials, to fill the container by letting material into this at a number of different levels instead of filling it from one point at the top alone.

By this means a more rapid filtering is possible because the cakes of filtrate are more uniform in thickness and in the grading of the sizes of solids one with another.

Filtering preferably proceeds by allowing a bed of filtrate to form upon the pivotal trays when these are lying in a horizontal position and then subsequently applying the pressure difference to the container so that the liquid in this is drawn through the gravity formed filter beds on the trays and clear liquid passes off through the draw off pipes connected to the hollow trunnions.

The angle of inclination of the sides of the container 1 to the vertical may conveniently be selected to be somewhat greater than the angle of repose of the filtered mate-

rial periodically discharged from the trays.

Slurry or the like material to be filtered is passed into the container 1 through a main feed pipe 10 having a number of connections 11, 12, 13 . . . . to the container 1. This allows for a more rapid filling of the container 1 than if a single connection were provided.

After one or more charges of slurry have been filtered by drawing off the liquor through the pipes 6, the filter cakes upon the staggered trays 2, 3, 4 . . . . may be discharged by operating the hand wheel 8 subsequent to the opening of the door 14 closing the bottom of the container 1, the filter cakes falling into a wagon body W or other receptacle upon rails 15 below the container, whereupon the door 14 can be reclosed and further filtering can proceed.

The door itself may also serve as a filter surface and be provided with a pipe 17 for drawing off liquor.

I declare that what I claim is:—

A device for the separation of solids from mixtures of liquids and solids comprising a container, the axis of which is inclined to the vertical, a plurality of filter trays, the edges of which lie in planes parallel to the axis of the container, means to pass liquid and solid material to said container, means to draw off liquid from said trays individually, an extension piece on the lower end of said container disposed about a vertical axis, a closing door normally lying in a horizontal plane, a filter tray mounted on said door, means to draw off liquid from the interior to said tray, means to tilt said door with said tray about a horizontal axis to discharge the filter cake upon it, and means to tilt said filter trays individually to separately discharge filter cakes upon them.

In witness whereof, I have hereunto signed my name this 2nd day of January, 1930.

ALBERT EDWARD LEEK.