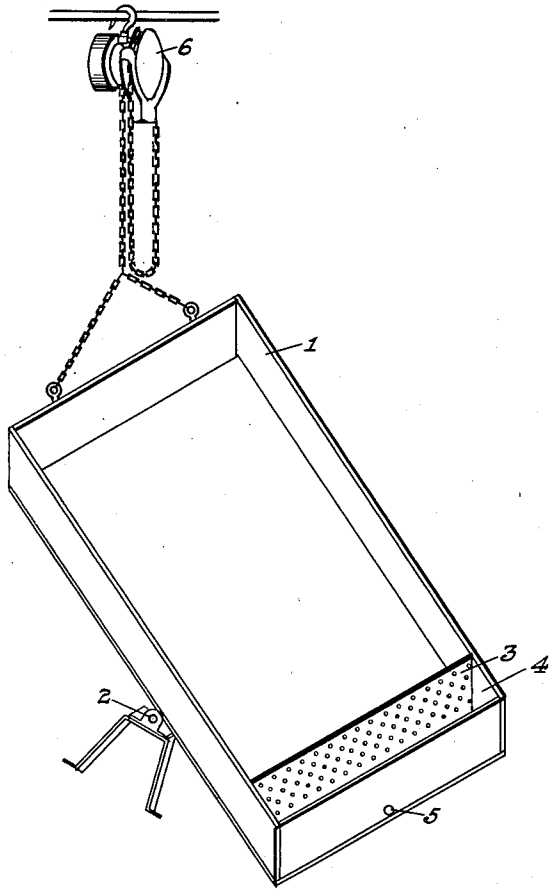
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SEPARATION OF LIQUIDS FROM SOLIDS

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SEPARATION OF LIQUIDS FROM SOLIDS

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1 Claim. (Cl. 210—149)

The present invention relates to an apparatus for separating solids from liquids and relates particularly to such apparatus where the separation is effected by gravitational forces.

When a mass of solids and liquids is allowed to drain, no complete separation of the solids and liquids takes place due to adhesive forces and capillarity in the mass of solids. When a relatively high pile of wet solid material is allowed to drain, it is found that the amount of liquid remaining with the solids varies at the different levels of the pile, the best drained material is at the top whereas at the bottom of the pile the mass contains a considerably larger amount of liquid. The product is, therefore, of non-uniform composition and simple drainage is for technical separation of solids and liquids entirely unsuited.

I found that when a relatively low but spread out mass of solid and liquid is allowed to drain until a semicompact mass is obtained and when this mass is then put on an angle to the horizontal, drainage will continue as if the mass formed a high pile and that under such conditions the drainage will be substantially uniform except perhaps throughout a small portion of the mass adjacent to the lowest point of the mass where the liquid is allowed to run off.

The apparatus of my invention which allows of separating solids from liquids according to this principle, consists of a receptacle which can be supported in horizontal position and can be supported in a position where it forms an angle with the horizontal. It is shown in a simple form in the attached schematic and perspective view which shows the drain table when tilted.

1 in this figure is a shallow box or receptacle, 2 are pivots on which this box is tiltably supported, 3 is a partition, permeable to liquid but retaining the solids, located near one end of the box. This partition forms with said end of the box a compartment 4 in which the draining liquid is collected and from where it is evacuated through, for instance, hole 5 to any desired destination. 6 is a chain block and tackle for maintaining the box in any desired position.

For use, I place the box in substantially horizontal position and fill it with a mixture of solid and liquid. The liquid drains through partition 3 or through the bottom, if this is constructed of a material which is permeable to the liquid, but retains the solid.

When the liquid is drained and the solids have settled into a cake, I slowly tilt the box so that the permeable side of the box is at the lowest level. Drainage continues. The angle to which I tilt the box is kept short of the angle where the cake would follow gravity and slide down. This angle differs, of course, with different materials and different sizes of the particles of the solid. With Glauber salt in the form of the ordinary crystals and a cake 10 to 15 inches thick, the box can be tilted 45° of the horizontal without material sliding down of the cake. I obtain in this manner a far going drainage of the cake and the material is obtained in a form as dry as when it is passed through an ordinary centrifugal process.

The drained material is removed from the box in any convenient manner. I can, for instance, construct my table with a removable front end from which, by increasing the tilt, the cake slides into a hopper where it is removed in any desired manner.

In case where the liquor in which the solids are suspended is allowed to go to waste, I can dispense with the small front compartment which collects liquid and make the front end permeable to liquid letting the liquid drain directly to waste.

The permeable partition can be constructed in many different ways as known in the art of filtering solids from liquids. A very convenient permeable partition consists, for instance, of a perforated board covered with a filter cloth or of perforated stoneware. My drain table can be constructed of any desired material, such as wood, sheet iron, aluminum, etc.; the selection of such material depends entirely upon the nature of the product to be drained. With non-corrosive chemicals, such as Glauber salt, zinc sulfate, etc., sands, minerals, or ores, etc., I use, of course, wooden tables. The drain table can also be used for washing the materials in which case the table with the drained cake is tilted back into a horizontal position, the washing liquid added and stirred into the cake, the table then tilted again for drainage and this operation repeated as often as desired or necessary.

While in the above drawing I have shown my drain table suspended in the center on pivots, it should be understood that I can use any other means which will permit to set the drain table in a horizontal position as well as at different angles to the horizontal. I can, for instance, support the table at both its front or rear ends and then lift the rear end or lower the front end; after the table set in horizontal position has been filled, I set it at such an angle that the permeable end is in a lower position than the rest of the table.

It is, of course, necessary that the box or receptacle be firmly supported in horizontal posi-

tion as well as in the position at which final draining occurs and that the box can easily be brought from one position to the other. A hoist in combination with a pivotal support has been found very convenient for these purposes. I can also use as the supporting elements jacks, a hydraulic ram, air cylinders or a rack and pinion arrangement with a ratchet lock which enables me to support the box in the horizontal as well as in a tilted position.

I claim:

In a process of separating crystallized Glauber salt from mother liquor by gravitational forces, the steps comprising spreading a mixture of Glauber salt and mother liquor in a substantially horizontal layer, allowing said mother liquor to drain thru a part of the support for said layer, which part is permeable to said liquid, to form a cake, then without removing said cake from its support, tilting said support around an axis in a horizontal plane so that the permeable part of said support is placed into a position lower than the non-permeable part of said support, thereby placing said cake in an inclined position and at an angle of about 45 degrees with the horizontal and creating an additional head on the part of the cake in contact with the permeable part of said support, and allowing remaining liquid further to drain from said cake.

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