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COUNTERCURRENT LIXIVIATION OF DISINTEGRATED MATERIAL WITH SUBSEQUENT MULTIPLE PRESSING AND RECYCLE OF EXPRESSED LIQUID

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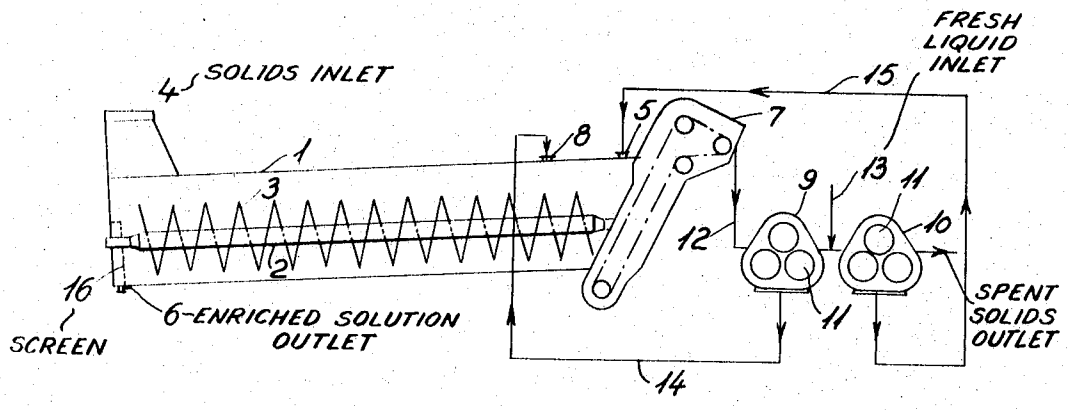

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COUNTERCURRENT LIXIVIATION OF DISINTEGRATED MATERIAL WITH SUBSEQUENT MULTIPLE PRESSING AND RECYCLE OF EXPRESSED LIQUID

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ABSTRACT OF THE DISCLOSURE

This invention relates to a process for extracting sugar from solid sugar containing material by passing lixiviating liquid in countercurrent flow to the disintegrated solid sugar containing material and subjecting the lixiviated material to at least two pressing operations. Water is added to the lixiviated material after it has been subjected to the first pressing operation, the liquids resulting from the first and the subsequent pressing operation(s) being separately recirculated to the lixivating apparatus and introduced therein at spaced points.

This invention relates to a process for the continuous extraction by lixiviation of a substance soluble in a lixiviation liquid, in the following referred to as "extractable substance," from a disintegrated material insoluble in said lixiviation liquid but pervious thereto, in the following referred to as "material," said process being the type in which the disintegrated material and primary lixiviation liquid are supplied to opposite ends of a continuous counter-current lixiviating apparatus, and the lixiviated material is supplied to successive pressing operations, the pressed-off liquid being supplied to the lixiviating apparatus as a secondary lixiviating liquid in a zone located between the inlet for primary lixiviating liquid and the outlet for enriched lixiviating liquid.

It is the object of the invention to improve this known method in such a manner as to obtain an increased degree of lixiviation with the same quantity of fresh lixiviating liquid, or the same degree of lixiviation with a smaller quantity of fresh lixiviating liquid as compared with the known processes of the type referred to.

According to the invention, the fresh lixiviating liquid is supplied to the lixiviated material after this has been subjected to the first pressing operation and before it is subjected to the subsequent pressing operation or operations and the liquid resulting from the said first pressing operation is supplied to the lixiviating apparatus as secondary lixiviating liquid, while supplying the liquid resulting from the said subsequent pressing operation or operations to the lixiviating apparatus as primary lixiviating liquid.

The improvement obtained by the process according to the invention as compared with the known processes results from the fact that when supplying fresh lixiviating liquid to the pre-pressed material, the latter is soaked with fresh lixiviating liquid so that the concentration of extractable substance in the material is reduced while at the same time the concentration of extractable substance in the added lixiviating liquid is correspondingly increased. When the added lixiviating liquid is again pressed off in the subsequent pressing operation or operations, the quantity of extractable substance transferred to the lixiviating liquid will therefore leave the material together with the lixiviating liquid, whereby the concentration of extractable substance in the finally pressed material is correspondingly decreased. A consequence of the occurrence described is that the liquid resulting from the first pressing operation will have a higher concentration of extractable substance than the liquid from the second pressing operation and subsequent pressing operations, if any. To obtain the highest possible efficiency of the lixiviating apparatus itself for these two liquids, these are supplied separately to the apparatus in positions where the concentration of equilibrium prevailing in the apparatus corresponds to the concentration of the supplied liquids.

The invention will now be explained in further detail with reference to the accompanying drawing which diagrammatically illustrates a plant for carrying out the process according to the invention, the lixiviating apparatus being illustrated, by way of example, in the form of an inclined trough to the lower end of which the material is supplied and is then moved towards the upper end of the trough by conveying means while the lixiviation liquid is supplied to the upper end of the inclined trough and from there flows downwards through the trough under the influence of gravity in counter-current to the material. It is observed, however, that the process according to the invention is also applicable to all other types of continuous counter-current lixiviating apparatus.

In the drawing, 1 is a trough arranged at an inclination in its longitudinal direction. Two screw conveyors (only one of which is shown in the drawing) are mounted for rotation about parallel axes in the trough, each conveyor consisting of a shaft 2 and conveying blades 3 arranged at an inclination to the circumferential direction. At its lower end, the trough 1 has a supply opening 4 for disintegrated material, and at its upper end an inlet 5 for primary lixiviating liquid. Moreover, the trough 1 is provided at its lower end with an outlet 6 for enriched lixiviating liquid and a perforated screen 16 serving to hold back the disintegrated material from the outlet 6, and at its upper end with a discharge opening for lixiviated material which opening is in communication with an elevator mounted in an elevator housing 7.

Finally, the trough is provided with an inlet 8 for secondary lixiviating liquid.

The plant also comprises a first roller mill 9 and a second roller mill 10, each consisting of three rollers 11.

In carrying out the lixiviation of disintegrated material e.g. crushed sugar canes, the material is supplied to the inclined lixiviation trough 1 through the supply opening 4 and is then moved by means of the conveyors to the upper end from which the lixiviated material is withdrawn through the elevator housing 7. From the latter, the lixiviated material is moved by means of well-known conveying means generally referred to by the reference character 12 in the drawing, to the first roller mill 9. After pressing in the first roller mill 9, fresh lixiviating liquid is supplied to the material through a pipe 13 and the material is then moved on to the second roller mill 10 while the liquid pressed off in the first roller mill 9 is conducted through a pipe 14 to the lixiviation trough 1 and is introduced through the inlet 8 as a secondary lixiviating liquid.

During the passage of the material through the second roller mill 10, the liquid added to the material between the two roller mills is pressed off, which liquid contains part of the extractable substance which was left in the material after the first pressing operation. This liquid is combined with pressed-off liquid from any additional pressing operations and conducted through a pipe 15 to the lixiviation trough to be introduced into the latter through the inlet 5 as primary lixiviating liquid.

From the inlet openings 5 and 8, the lixiviating liquid flows under the influence of gravity towards the lower end of the trough 1 in counter-current to the crushed sugar canes. During this movement, an extraction of sugar

takes place, the sugar being dissolved in the lixiviating liquid which then passes through the screen **16** and is discharged through the outlet **6** in an enriched condition.

In an apparatus of the type described and having a capacity corresponding to about 1500 tons of sugar canes per 24 hours, a saving in quantity of lixiviating liquid of about 25% is obtained as compared with the quantity used in the known processes of the type referred to when the same degree of lixiviation is to be obtained.

I claim:

A process for the continuous lixiviation of disintegrated material comprising the steps of supplying disintegrated material to one end of a continuous counter-current lixiviating trough, conveying said material through said trough to the other end thereof, removing said material from said other end of said trough, subjecting lixiviated material removed from said lixiviating trough at the other end thereof to a first pressing operation and at least one subsequent pressing operation, supplying fresh lixiviating liquid to said lixiviated material after it has been subjected to said first pressing operation and before subjecting it to said subsequent pressing operation, supplying the liquid resulting from said subsequent pressing operation to said other end of said lixiviating trough as primary lixiviating liquid, supplying the liquid resulting from said first pressing operation to an intermediate zone of said lixiviating trough as secondary lixiviating liquid passing said primary and secondary lixiviating liquid along said trough countercurrent to the movement of the material being lixiviated, removing said lixiviating liquid from the one end of the lixiviating trough as enriched solution.

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