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FLUSHING DEVICE FOR CENTRIFUGAL SEPARATORS

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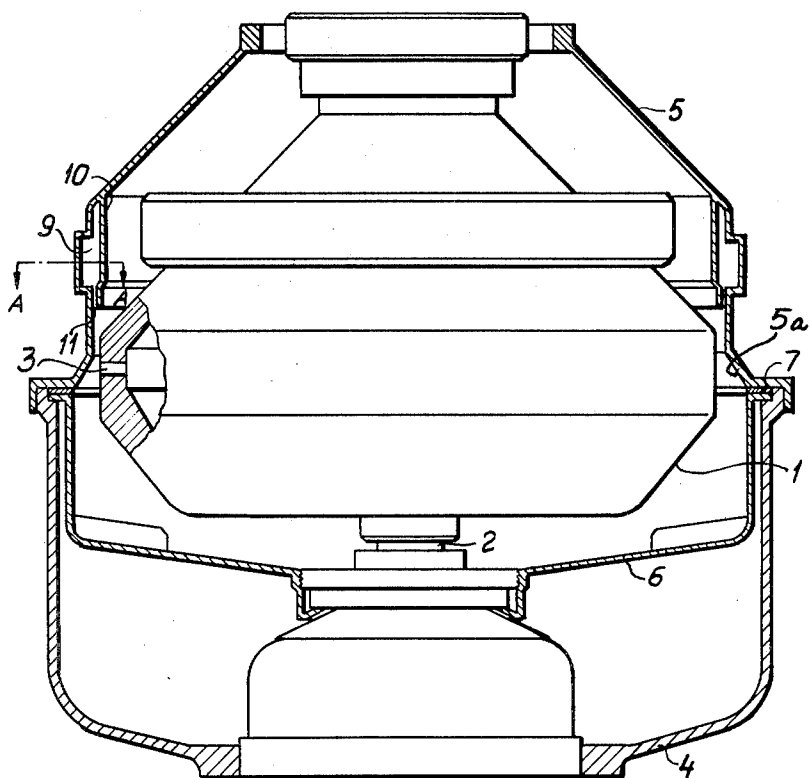


Fig. 1

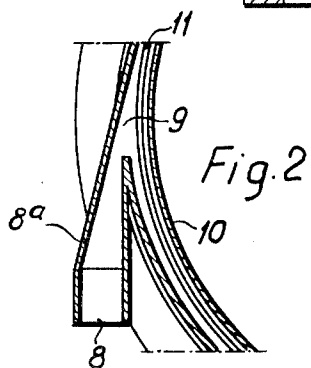


Fig. 2

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## FLUSHING DEVICE FOR CENTRIFUGAL SEPARATORS

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2 Claims. (Cl. 233-14)

This invention relates to centrifugal separators of the type in which the centrifugal bowl is surrounded by a stationary hood having an inner wall portion against which a centrifugally separated component is discharged from a nozzle or other peripheral outlet of the bowl. More particularly, the invention relates to an improved separator of this type which avoids certain difficulties encountered heretofore in the use of such separators.

In the use of the above-noted type of separator, it often happens that the separated component ejected from the peripheral outlet of the bowl has a wearing or a corroding effect on the hood wall, as when separating yeast or other sludge-containing liquids. Also, the ejected component may adhere to the wall of the hood and form deposits or cakes which gradually increase in thickness. These deposits may eventually have a retarding effect on the centrifuge or may become detached from the hood wall as lumps which obstruct the discharge lines, thereby causing interruption of the centrifuging operation.

The principal object of the present invention is to provide a centrifugal separator which overcomes the above-noted difficulties.

According to the invention, the hood is provided with means for feeding flushing liquid under pressure into the hood, such means being so arranged that the flushing liquid sweeps those portions of the inner wall of the hood which otherwise would be contacted directly by the separated component ejected from the bowl outlet. In this way, the flushing liquid (which may be water) constantly flushes the above-noted portions of the hood wall and thereby prevents or counteracts wear and corrosion of these portions due to any solid particles or corrosive liquid in the ejected component, and prevents adhering of the ejected component and formation of deposits on the hood wall.

The flushing of the inner wall of the hood entails a further advantage in case one and the same component of the original mixture is to be separated two or more times. For example, in the first separation of yeast in a nozzle centrifuge, the yeast is ejected together with mother lye from the bowl nozzles toward the inner wall of the hood. If the inner wall of the hood at the same time is flushed with water during the separation, the yeast and mother lye diluted with the water will be led away from the bottom of the hood in order to be separated a second time in another centrifuge, possibly after adding more water. The addition of water serves the purpose of washing the yeast free from mother lye. By flushing the inner walls of the hood in this way in the first separator, the flushing liquid is utilized for two purposes, that is, as flushing liquid for the inner wall of the hood and as washing liquid in the subsequent separator.

The invention has other characteristics which will appear more clearly from the following description with reference to the accompanying drawing, in which

FIG. 1 is a vertical section through part of a nozzle centrifuge embodying a preferred form of the invention, and

FIG. 2 is a sectional view on line A—A in FIG. 1.

The centrifuge as illustrated comprises a bowl or rotor 1 driven on a vertical axis by a drive shaft 2. The mix-

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ture to be separated is fed through the top of the bowl into the separating chamber, from which one of the separated components is discharged through outlet means in the form of peripheral nozzles, one of which is shown at 3. The centrifuge also includes a stationary mounting frame 4 for the bowl and its shaft 2, and this frame supports an upper hood 5 and a lower hood 6 surrounding the bowl 1 in spaced relation thereto. These hoods, which serve to collect the discharge from the bowl nozzle means 3, are secured to the frame by bolts (not shown); and clamped between these hoods is a packing ring 7.

When the centrifuge is in operation, a separated component, such as yeast and mother lye, is ejected through each nozzle outlet 3 toward the inner wall of hood 5. It then flows by gravity to the bottom of hood 6 from which it is discharged in the conventional way to a discharge line (not shown).

A pipe 8 forms a source of flushing liquid (usually water) which is fed through a nozzle 8a and injected under pressure into an annular chamber 9 of the upper hood. The chamber 9 is formed by the wall of hood 5 and by an annular plate 10 secured to this wall in spaced surrounding relation to the bowl 1, the chamber 9 having a bottom outlet in the form of a slot 11 above the bowl nozzle means 3. While I have shown only one supply pipe and nozzle 8-8a for the flushing liquid, a series of them may be arranged around the hood 5. The flushing liquid injected through nozzle 8a is tangentially directed in relation to hood 5 in order to cause a rotary motion of the liquid along the hood wall. The liquid finds its way through the slot 11 and sweeps the inner wall of the hood 5 and particularly that portion 5a of it toward which the discharge from bowl nozzle means 3 is ejected. By this flushing of the wall, it is kept free from deposits. At the same time, the flushing liquid prevents or moderates the wear of hood wall 5 by solids (such as yeast particles) in the bowl discharge. Should the component ejected through the nozzle means 3 be corrosive, the flushing liquid will prevent or reduce corrosion too.

In certain cases, the plate 10 may be eliminated if the flushing liquid is fed tangentially with sufficient force so that it sweeps the inner wall of the hood 5 and moves helically downward past those portions otherwise contacted directly by the jet from each bowl nozzle 3. On the other hand, by providing the chamber 9, the nozzle 8a need not be tangentially directed. The essential point is that the nozzle means 8a supply so much flushing liquid per unit of time that it can spray down through the slot 11 and sweep the entire inner wall of the hood at the region toward which the separated component is directed from each bowl nozzle 3.

It will be understood that the discharge from the bowl nozzle means 3 (such as yeast and mother lye) is mixed with flushing liquid from source 8 and directing means 8a-11; and this mixture is discharged from bottom hood 6 and, if desired, fed to the inlet of another centrifugal separator (not shown).

As shown in FIG. 1, the annular portion 5a of the hood projects obliquely downward, which is preferred in order to reduce the impacting force of the sludge discharging from the bowl nozzle means 3.

I claim:

1. In a centrifugal separator for separating sludge as a heavy component from a sludge-containing liquid, the combination of a rotary centrifugal bowl having at its peripheral portion a generally radial outlet nozzle for discharge of the separated sludge component, said outlet nozzle being located at the outermost periphery of the bowl to prevent accumulation of a substantial body of sludge in said peripheral portion, a stationary hood surrounding the bowl in spaced relation thereto and having

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an annular inner wall including an annular portion toward which said separated sludge component is discharged from the outlet nozzle as the bowl rotates, an annular member forming with said annular inner wall of the hood an annular chamber located above said annular portion of the hood, said annular chamber having an outlet slot opening downwardly toward said annular portion of the hood, a source of flushing liquid, and nozzle means extending from said source into said annular chamber tangentially to said annular inner wall of the hood, said tangential nozzle means being disposed above said portion of the hood and operable to deliver thereto a rotating curtain of flushing liquid descending through said slot and between said outermost periphery of the bowl and said annular portion of the hood, whereby said rotating curtain prevents sludge discharging through said outlet nozzle from adhering to said annular portion of the hood and protects said annular portion against wear by the discharging sludge.

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2. The combination according to claim 1, in which said annular portion of the inner wall of the hood projects obliquely downward.

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