United States Patent [19]

Kjellgren

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[54] **CENTRIFUGAL SEPARATOR**

[75] Inventor: **Ove Allan Valentin Kjellgren,** Stockholm, Sweden

[73] Assignee: **Alfa-Lavall AB,** Tumba, Sweden

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[52] **U.S. Cl.** ..... **233/41,** 233/1 E

[51] **Int. Cl.** **B04b 1/00**

[58] **Field of Search** ..... 233/1, 1 E, 1 D, 233/26, 28, 27, 29, 34, 35, 38, 39, 40, 41; 260/91.5, 92.1, 92.8

[56] **References Cited**

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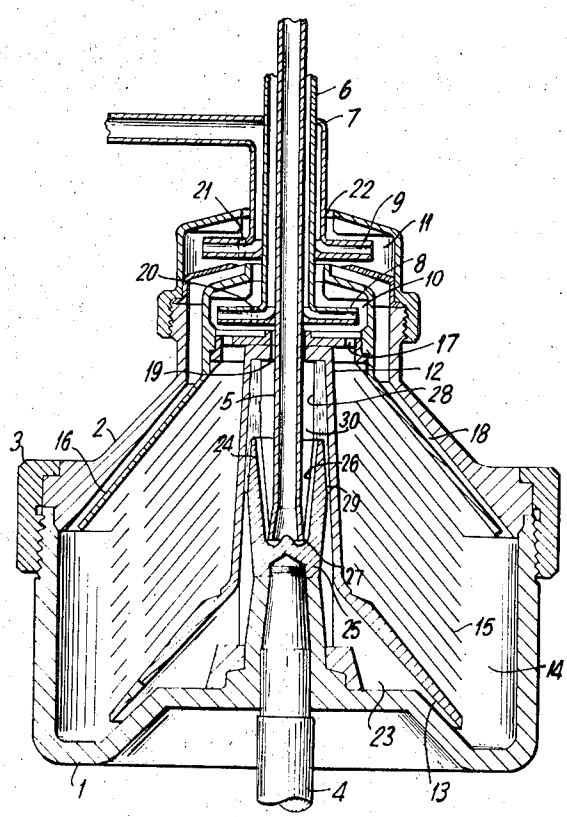
Primary Examiner—George H. Krizmanich

Attorney—Davis, Hoxie, Faithfull & Hapgood

[57] **ABSTRACT**

In a centrifugal separator having a source of supply of a liquid to be separated, a surface of the separator which contacts the liquid is coated with a poly-alkene which is at least partly fluorinated.

6 Claims, 2 Drawing Figures



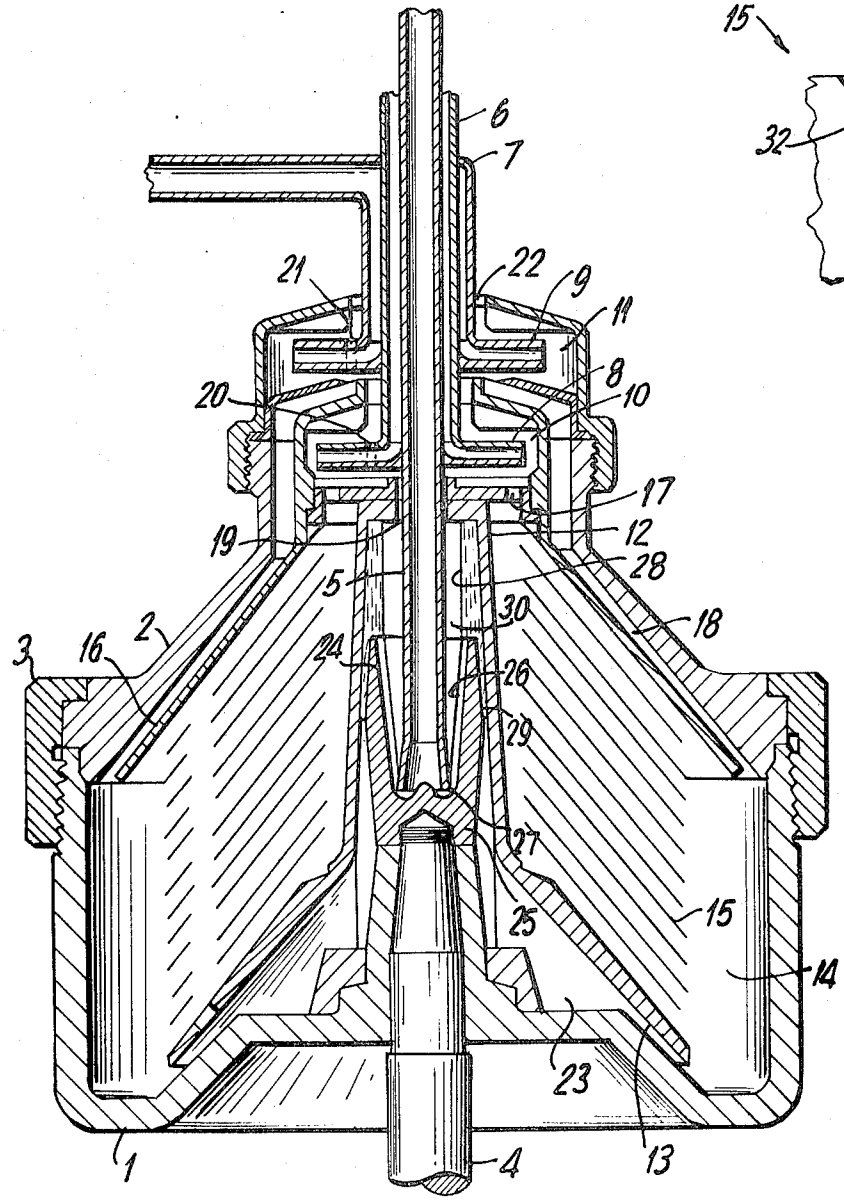


FIG. 1

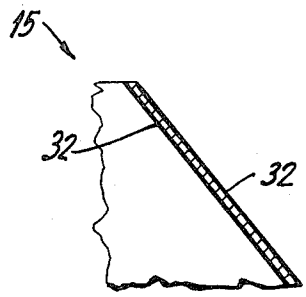


FIG. 2

INVENTOR.
OVE ALLAN VALENTIN KJELLGREN
BY
Davis, Hoxie, Faithfull & Hapgood
ATTORNEYS

CENTRIFUGAL SEPARATOR

The present invention relates to a centrifugal separator having a source of supply of a liquid to be separated, and it relates more particularly to a novel arrangement for solving the problems incident to deposits in the interior of the centrifugal rotor, especially deposits on the discs which are used for increasing the separation efficiency. Such deposits reduce the throughput rate of the separator if its separation capability is to be maintained unchanged.

In modern centrifugal separators, the rotor body and its inner parts are made of stainless steel, and the surfaces of the rotor parts which contact the liquid are polished so as to prevent as much as possible the accumulation of deposits on these surfaces. In spite of this polishing, deposits are formed which must be removed periodically so that the desired separation capability can be maintained.

It has now been found possible to extend very substantially the intervals between the points of time when deposits must be removed if the rotor surfaces coming into contact with the liquid are made of certain other materials than the stainless steel. More exactly, it has been proved through extensive tests that there are materials which have a stronger tendency than polished stainless steel to repel from the surface those deposits which have been centrifugally separated from the liquid. Such materials are completely or partly fluorinated polyalkenes, such as poly-(tetrafluoro-ethylene-perfluoropropene), poly-chlorotrifluoro-ethylene, poly-vinylidene-fluoride and poly-vinylfluoride. It has been found that poly-tetrafluoro-ethylene is especially suitable. Consequently, according to the invention, the surface contacting the liquid can be made of a coating of fluorinated poly-alkene on a support such as the inside of the rotor or said discs.

The invention has given good results in the separation of yeast-containing wort, milk used for cheese-making and also ordinary milk, in which yeast cells and caseine, respectively, have the tendency to form heavy deposits in the interior of the rotor and especially in any disc set which may be provided. Thus, the interspaces between the discs in the disc set are easily clogged in a conventional centrifuge. However, as an example of the efficacy of the present invention, tests have proved that if cheese-making milk is separated in a centrifuge having a disc set in which certain discs are made of stainless steel and other discs are coated with poly-tetrafluoro-ethylene, the latter discs are completely free from deposits after the interruption of the separating operation, although the discs of stainless steel have heavy deposits of caseine.

Examples of centrifuge types in which the present invention can be used to advantage are those disclosed in the Swedish Pat. specifications Nos. 193,813, 219,547 and 310,866.

For a better understanding of the invention, reference may be had to the accompanying drawing in which

FIG. 1 is a vertical sectional view of an example of a centrifuge embodying the invention; and

FIG. 2 is an enlarged fragmentary view, in vertical section, of one of the discs illustrated in FIG. 1 and showing the coating thereon.

The centrifuge illustrated in FIG. 1 is disclosed in U. S. Pat. No. 3,468,475 granted Sept. 23, 1969 (said disclosure being incorporated herein by reference); and it will be understood that the aforesaid coating of a poly-alkene at least partly fluorinated is applied to a surface within the rotor 1 which comes into contact with the liquid to be separated, this liquid being fed into the rotor through the stationary inlet pipe 5. More particularly, the coating is applied to the surface of any of the parts 12, 13, 15, 16 and 24 or to the internal surface of the rotor body 1 and its cover 2, and it may be applied to all of these surfaces. This coating is too thin to be capable of illustration in FIG. 1; but in FIG. 2 illustrating an enlarged fragmentary view of one of the discs 15 in FIG. 1, the coating is shown at 32 on each surface of the disc.

I I claim:

1. In a centrifugal separator, the combination of a centrifugal rotor, means for delivering into the rotor a liquid to be separated, a set of conical discs in the rotor for increasing the separating efficiency and which forms surfaces coming into contact with said liquid, and a coating of at least a partly fluorinated poly-alkene on said disc surfaces for resisting clogging of the disc set.

2. The combination according to claim 1, in which said coating is poly-(tetrafluoro-ethylene-perfluoro-propene).

3. The combination according to claim 1, in which said coating is poly-chlorotrifluoro-ethylene.

4. The combination according to claim 1, in which said coating is poly-vinylidenefluoride.

5. The combination according to claim 1, in which said coating is poly-vinylfluoride.

6. The combination according to claim 1, in which said coating is poly-tetrafluoro-ethylene.

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