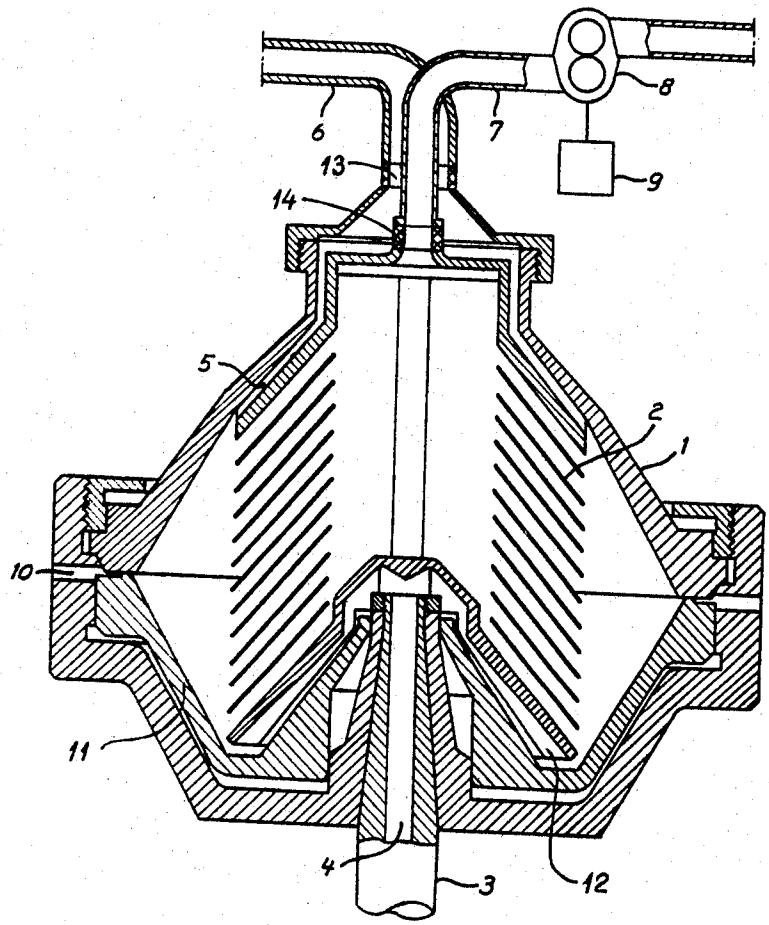
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CENTRIFUGE

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CENTRIFUGE

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2 Claims

ABSTRACT OF THE DISCLOSURE

A centrifugal rotor is provided with an inlet for a mixture of two liquid components to be separated from each other and of which one component is highly viscous, the rotor also having outlets for the respective separated components. A displacement pump is inserted in a stationary discharge pipeline hermetically connected to one of the rotor outlets, preferably the one for the highly viscous component, and the throughput capacity of this pump is adjustable during operation to control the discharge of the two separated components from the rotor.

The disclosure

The present invention relates to centrifuges for separating from each other two liquid components of which one is highly viscous.

In centrifugally separating liquid mixtures containing a highly viscous component, such as neat soap mixed with nigre or spent lye, or a corn (maize) starch hydrolysate having a fat-containing component of high viscosity, it is difficult to discharge the two components from the centrifuge well separated from each other. This is due to the great flow resistance which the highly viscous component generates in its outlet. In order to cause the latter component to flow out of the centrifuge, it has been necessary to discharge it in admixture with a certain quantity of the component of lower viscosity, which is obviously undesirable.

If the one component is of particularly high viscosity and the separation is carried out in such a way that such component is well separated from the low-viscosity component, it is not possible to obtain the usual liquid level formation in the centrifuge rotor, based on specific gravity. In this case, disturbances occur in the discharge of the high-viscosity component from the centrifuge, in that this component discharges intermittently. Discharging plugs of the high-viscosity component are thus accompanied by certain amounts of low-viscosity component.

The present invention has for its principal object to solve this problem and consequently ensure uniform discharge of two components from the centrifuge, well separated from each other.

According to the invention, the centrifuge for separating the liquid mixture is characterized in that its rotor outlet for one of the separated components, preferably the high-viscosity component, is hermetically connected to a stationary pipeline in which is inserted a displacement pump of the type having a throughput capacity that can be controlled during operation, as by conventional means for adjusting the number of revolutions of the pump rotor per minute. The displacement pump thus

completely controls the discharge of the components from the centrifuge.

The displacement pump is preferably inserted in the outlet pipeline for the component which is separated in a smaller quantity than the other component. When separating corn starch hydrolysate, for example, a high-viscosity product is obtained which amounts to about 1 to 1.5% by weight of the hydrolysate. It is obvious that the quantity variations, considered relatively, will be greater in the high-viscosity component than in the other component, which consequently amounts to 98.5 to 99% of the hydrolysate by weight. Thus, it is possible to control the separation process with a greater accuracy in this case where the high-viscosity component is also the component which is separated in a smaller quantity.

The invention is described more in detail below, reference being made to the accompanying drawing in which the single illustration is a vertical sectional view of a centrifuge embodying an example of the invention. While the centrifuge as illustrated is of the self-opening type, it will be understood that the invention is not limited thereto but may be embodied, for example, in a nozzle centrifuge or a centrifuge having a solid rotor wall; and the inlet of the rotor as well as one of its outlets can be either open to atmosphere or sealed from atmosphere.

In the drawing, a centrifugal rotor **1** contains a conical disc set **2** and is driven by a spindle **3**. The latter has a central channel **4** which forms a hermetically closed inlet for the liquid mixture to be separated. The mixture entering the rotor flows radially outward through passage **12** and thence into the separating chamber where the disc set **2** is located. From this chamber, the separated heavy component discharges through channels **5** above the disc set to a stationary outlet pipe **6** hermetically connected to the rotor, and separated light component discharges from the inner edges of the disc set to a stationary outlet pipe **7** hermetically connected to the rotor. A displacement pump, such as a motor-driven gear pump **8**, is inserted in the pipe **7**, and the number of revolutions per minute of the pump rotor can be controlled during operation by means of a conventional speed regulator associated with the pump motor and shown schematically at **9**. Sludge which may be collected in the separating chamber of the centrifuge is discharged periodically through peripheral openings **10**, as by operating a conventional slide valve **11** in the usual manner.

As shown, the stationary outlet pipes **6** and **7** are hermetically connected to the corresponding rotor outlets through seals **13** and **14**, respectively. The centrifuge can be used to advantage, for example, for the separation of a glucose-containing hydrolysate which has been produced from corn starch by hydrolysis, preferably with hydrochloric acid or enzymes. The acid hydrolysis liquid is neutralized, for example with soda ash, and is then fed to the centrifuge inlet **4**. In the rotor **1**, a glucose-containing liquid is separated as a heavy component which discharges through the pipeline **6**, and as the light component a high-viscosity product containing fat and protein is separated, this light component being discharged by the pump **8** through the pipeline **7**. The amount of glucose-containing liquid in the high-viscosity product ought to be as small as possible, provided that it is not so small that pump **8** is unable to discharge the high-viscosity product. If glucose-containing liquid in a significant amount accompanies the high-viscosity prod-

uct through the outlet pipe 7, this can be observed by the naked eye. The speed of the rotor of pump 8 can then be adjusted to reduce this amount, until an optimum separation result is attained.

I claim:

1. A centrifuge for separating from each other two liquid components of which one component is highly viscous, said centrifuge comprising a hollow centrifugal rotor having an inlet for a mixture of said components and also having outlets for the respective separated components, a stationary pipeline hermetically connected to said highly viscous component outlet, a displacement pump inserted in said pipeline, and means for adjusting the throughput capacity of said pump during operation thereof.

2. A centrifuge according to claim 1, in which said outlet for the highly viscous component is the outlet for that component which is separated in smaller quantity than the other component.

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U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,437,267 April 8, 196

Bengt Ingmar Dahlberg

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading to the printed specification, line 8, "3,906/66" should read -- 3,909/66 --.

Signed and sealed this 21st day of April 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JI
Commissioner of Patent