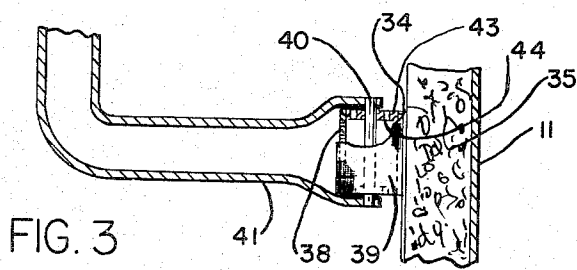
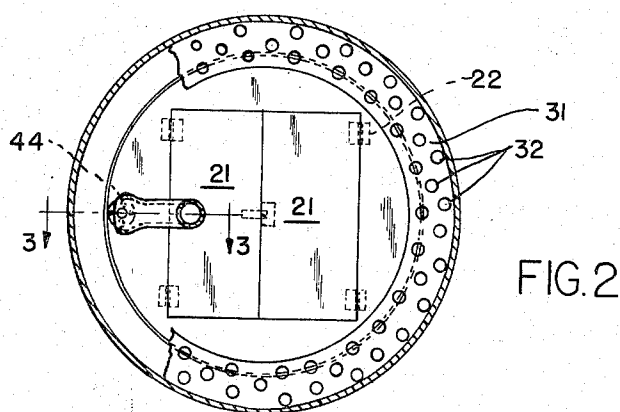
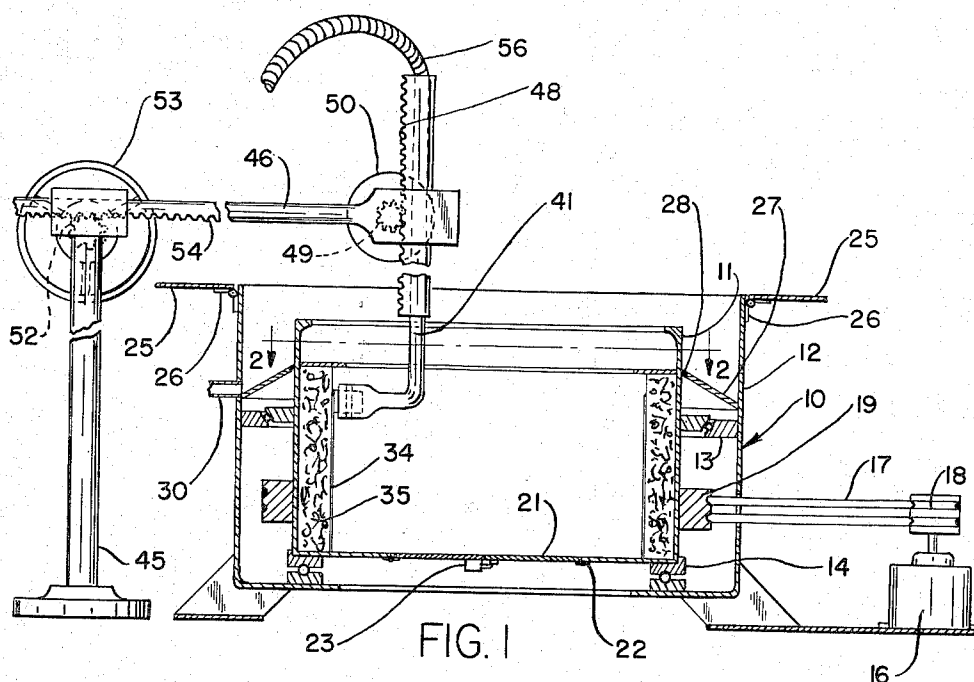


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CENTRIFUGING APPARATUS
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CENTRIFUGING APPARATUS

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The present invention relates to an apparatus for separating two materials that have been divided by centrifugal force.

While centrifugal force forms a useful tool to divide compounds into identifiable parts, it is often a difficult problem to physically displace one of the parts away from the other with a high degree of accuracy, or a degree of accuracy commensurate with the line of division that is obtained. For example, when a mixture of whey and curd are centrifuged in the manufacture of cheese, the heavier curd packs against the outside wall of the centrifuge drum, while the lighter whey forms a cylinder inside the curd, and a scoop may be used to pick off the majority of the rotating whey. However, a residuum of whey will remain that cannot be removed with a scoop without running the risk of or actually picking off some of the curd.

The principal object of the present invention is to provide an apparatus for removing this residuum of the lighter fluid without, at the same time, taking any of the heavier material along therewith.

The feature of the invention is that this may be accomplished even though the inner surface of the heavier material forms shallow interstices within which lighter material is pocketed.

Further objects and advantages include: a device which is simple to manufacture and maintain; a device which is easily operated even by inexperienced help and which is relatively fool-proof; and a device which may be readily adapted to automatic or semi-automatic operation.

Additional objects and advantages will become apparent from the following description, taken in conjunction with the drawings, in which:

Figure 1 is a sectional elevation of an embodiment of the invention;

Figure 2 is a partial section taken at line 2—2 of Figure 1; and

Figure 3 is a section taken at line 3—3 of Figure 2. The apparatus that I have devised for removing the residuum of the relatively lightweight liquid from the inner surface of a heavier material in a centrifuge sorbs that liquid with an object from which the liquid can subsequently be removed. Of course, in some instances the whole of the lighter liquid may be removed by this apparatus. Preferably that other object is a movably mounted member which may take the form of a roller which contacts the liquid to sorb the same and then rotates to another

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position at which the liquid is removed from the object as by means of strong air currents.

It will be apparent that the centrifuge may take many forms. In Figure 1, the centrifuge, generally 10, includes a rotating cylinder 11 mounted in a circular frame 12 by means of upper and lower roller bearings, 13 and 14, respectively. Cylinder 11 is driven from a motor 16 through belts 17 interconnecting a pulley 18 on the motor shaft and a pulley 19 secured to the outer wall of cylinder 11.

A portion of the bottom of cylinder 11 forms a pair of doors 21 mounted on hinges 22. The doors are normally held in place by a latch 23.

A pair of covers 25 mounted on hinges 26 may be used to close the top of the circular frame 12 so that the liquid thrown out of the centrifuge 11 by the centrifugal force will be deflected downwardly and trapped by a baffle 27 surrounding the centrifuge cylinder. The baffle 27 is secured to the wall of frame 12 and a gasket 28 provides a seal between the inner edge of the baffle 27 and the wall of cylinder 11. The liquid trapped between the baffle 27 and the vertical wall of the frame 12 may be removed through a drain connection 30.

A strainer plate 31 having a plurality of openings 32 therein is secured to the inner wall of the cylinder 11 a short distance below the top thereof.

It will be apparent to those skilled in the art that when a mixture of a relatively light fluid and a heavier material is poured in the rotating centrifuge cylinder 11, the heavier material will assume a position against the wall of the centrifuge with the lighter fluid on the inside. The majority of the lighter fluid will be thrown off through strainer plate 31, but a thin film 34 of liquid will remain on the inner surface of the heavier material 35. If the mixture that was centrifuged was whey and curd during the course of the cheese manufacture, the majority of the whey would be thrown off with a thin film 34 of whey remaining on the inner surface of the curd, the heavier material 35.

To remove the remaining whey 34, the covers 25 are opened and a rotary member or roller 38 (see Figure 3) having a covering 39 of an absorbing material, such as cheese-cloth, thereabout is brought into contact with the film of whey. The roller 38 is rotatively mounted on an axle 40 and secured inside the end of a hollow arm 41, whereby the covering will move about a closed path.

The ends 43 of roller 38 have a plurality of

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openings 44 therethrough. The open end of arm 41 is shaped to fit as closely as possible about the ends 43 and the periphery of roller 38, as is seen in Figures 3 and 2, respectively.

As will be seen in Figure 1, arm 41 is mounted on a stand 45 through a horizontal extension 46. A rack 48 on the side of arm 41 is engaged by a gear 49 rotated by a hand wheel 50 to provide vertical movement to arm 41. Horizontal movement is obtained by rotating a gear 52 through a hand wheel 53, and by means of the gear's engagement with a rack 54 on horizontal extension 46, the arm 41 and roller 38 are moved toward and away from a wall of cylinder 11.

A flexible hose 56 is connected to the upper end of arm 41 and also to a source of reduced pressure, such as a vacuum pump (not shown).

As has previously been explained, after the majority of the whey or other liquid is removed, there remains a thin film 34. The covers 25 are opened and by manipulating of hand wheels 50 and 53 the roller 38 is inserted within the rotating cylinder 11 and brought into contact with the film of liquid 34.

The sorbing surface 39 of the roller will begin picking up the liquid. The contact between the periphery of roller 38 and the material within the rotating cylinder 11 causes the roller to commence to rotate. The portion of the sorbing surface 39 of the roller that was in contact with the film 34 rotates to within the end of arm 41. At that point the air which is being drawn through openings 44 by the low pressure existing within arm 41, through its connection 56 with a suitable source of reduced pressure, passes through the damp sorbing surface picking up moisture and reducing the moisture content of the sorbing material. Continuous rotation of the roller causes every portion of the sorbing surface to be continually picking up liquid while in contact with film 34 and discharging liquid into the air being drawn through arm 41.

The foregoing description of a specific embodiment is for the purpose of complying with U. S. C. 112 and should not be construed as imposing unnecessary limitations upon the appended claims.

I claim:

1. A device for removing the residuum of relatively lightweight liquid from the inner surface of a heavier material in a centrifuge in which the two have been separated, said device including a roller, the surface of which is a sorbing material, and arm means for inserting said roller into said centrifuge with a portion of sorbing surface in contact with said residual liquid, said roller being rotatively mounted on one end of

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said arm means, said arm means including a vacuum conduit, one end of said vacuum conduit fitting closely about another portion of said sorbing surface, the other end of said vacuum conduit being adapted to be connected to a suitable vacuum source.

2. A device for removing the residuum of relatively lightweight liquid from the inner surface of a heavier material in a centrifuge in which the two have been separated, said device including a hollow rigid roller having a perforate surface and an absorbing covering about said perforate surface, a tubular arm, said roller being rotatively mounted at one end of said arm, said arm at said end fitting about one side of said roller and about the ends of the roller at said side, the other end of said arm having a vacuum line connection thereon, the ends of said roller having openings therein whereby the interior thereof is open to the atmosphere and mounting means for said arm to position said end of said arm within said centrifuge with said covering in contact with said liquid.

3. A device for separating a relatively lightweight liquid and a heavier material including the combination of a centrifuge having a wall against which the material is disposed by centrifugal force with the liquid on the surface of the material, and liquid removal means adjacent said centrifuge, said means including a supporting arm member and a movably mounted member having a sorbing surface movable along a closed path, said movably mounted member being mounted on said arm member, said means being constructed to bring said surface into contact with said liquid in said centrifuge and to transport the sorbed liquid from within to without said centrifuge.

4. A device for separating a relatively lightweight liquid and a heavier material including the combination of a centrifuge having a wall against which the material is disposed by centrifugal force with the liquid on the surface of the material, and liquid removal means adjacent said centrifuge, said means including a supporting arm member, and a rotary member mounted on said arm member and having a sorbing surface, said means being constructed to bring said surface into contact with said liquid in said centrifuge and to transport the sorbed liquid from within to without said centrifuge.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,754,774	Sharples	Apr. 15, 1930