

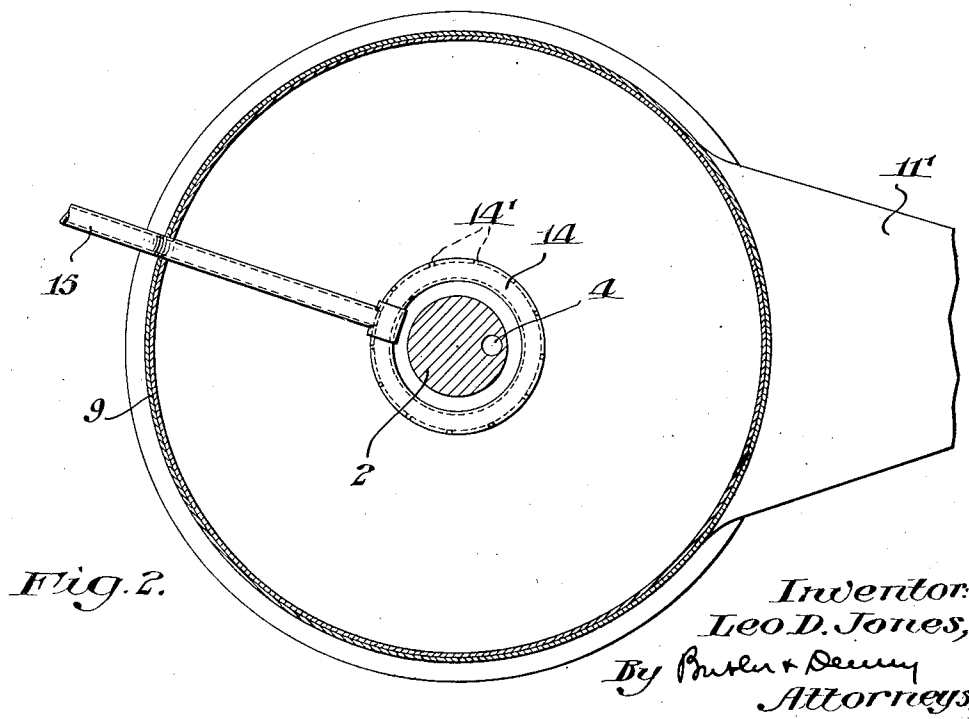
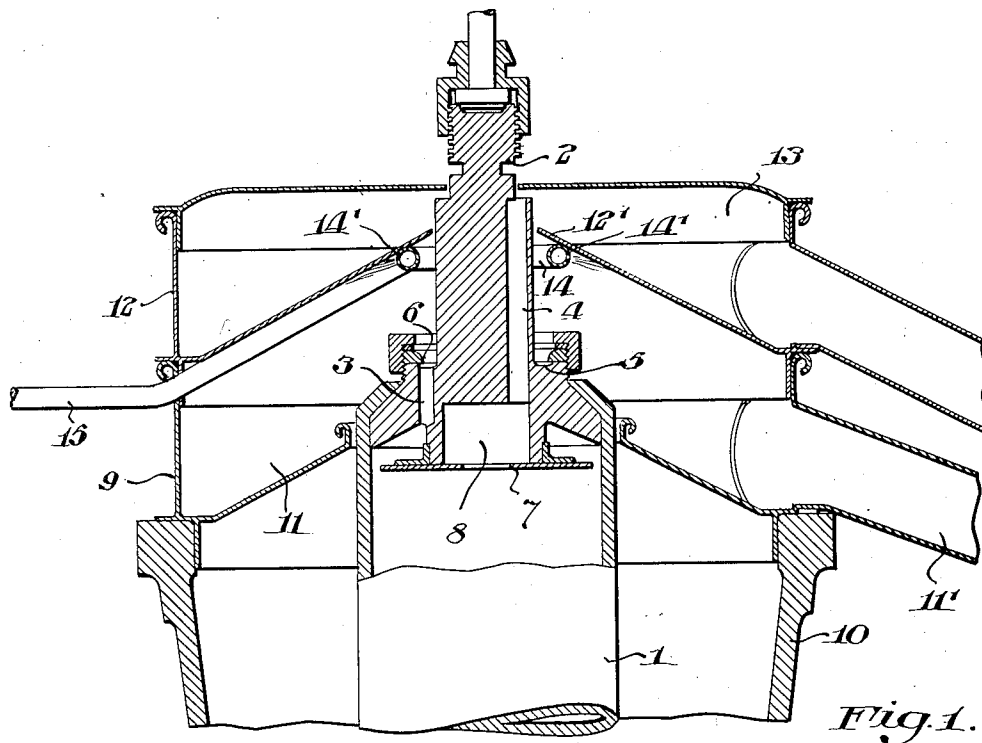
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METHOD AND MECHANISM FOR CENTRIFUGAL TREATMENT OF SUBSTANCES

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METHOD AND MECHANISM FOR CENTRIFUGAL TREATMENT OF SUBSTANCES.

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This invention relates to centrifugal apparatus and to processes involving the use of the same and particularly to such apparatus and processes wherein substances are subjected to the action of centrifugal force to effect a desired change therein and are thereafter centrifugally discharged in dispersed form from the influence of centrifugal force.

10 Substances are subjected to centrifugal force to effect various changes therein such as separation into its constituents, emulsification, breaking of emulsions, treatment with a reagent, removal of impurities, and other
15 changes constantly increasing in number with the application of the principles of centrifugal treatment to additional industrial operations. In the effective application of the principles of centrifugal treatment, the substances are centrifugally discharged from the centrifugal rotor in a highly dispersed state and in that condition they are highly sensitive to surrounding influences and the
20 conversion of the substances into that state, and subsequently into an agglomerated or collected state, may also affect the condition of the substance treated.

In accordance with my invention a substance is subjected to the action of centrifugal force to effect a desired change therein and to discharge the substance from the influence of centrifugal force in a dispersed state and the conditions of the atmosphere into which the substance is so discharged
35 and within which it exists in a dispersed state are so regulated as to control the condition of the substance while it is in that state as by promoting, or preventing, or controlling, changes occurring in the substance
40 due to the conditions of the surrounding atmosphere or resulting from the centrifugal treatment. Thus in accordance with my invention changes may be produced or prevented, or controlled, in the substance
45 discharged from the centrifuge, by regulation of the conditions of the atmosphere into which the substance is centrifugally discharged in dispersed form, such regulation of the atmosphere being made in accordance with the laws of physics and chemistry to produce the desired effect.

The invention is embodied and exemplified in a method and mechanism designed to facilitate the removal of viscous or other effluents discharged from centrifugal rotors
55 and disposed to adhere to receivers therefor, thus accumulating and interfering with the desired operations.

The practice of such a method and the use of such mechanism in accordance with
60 my invention involves the discharge of a fluid within the receptacle into which an effluent from a centrifugal rotor is received and so affecting said effluent as to prevent its accumulating in the receptacle.

In the treatment of petroleum oil for the separation therefrom of petrolatum or wax contained therein, the oil has been chilled and then run through a centrifugal rotor from which the separated wax and wax
70 freed oil are delivered to receiving compartments or "covers;" a carrier liquid, such as brine, being used in the rotor for facilitating the operation.

As the wax discharged from the bowl is
75 viscous, it is disposed to adhere to the walls of the compartment or "cover" into which it is discharged and to accumulate, with resulting obstruction of the method above referred to which embodies the operation
80 after some time.

In the preferred practice of my invention, hot brine is delivered against the top of the compartment for receiving the wax effluent and washes such top so as to heat
85 the same and remove the wax therefrom, the wax being heated by the heated surface, against which it is thrown, by contact with the brine and by the heated atmosphere of the compartment, so that its fluidity is increased and its discharge from the "cover"
90 or receptacle is facilitated.

The invention is embodied and exemplified in the construction and operation set out in the following description and the accompanying drawings in illustration thereof.

In the drawings, Fig. 1 is a broken sectional view showing the top of a centrifugal rotor provided with improvements of my invention, and Fig. 2 is a part sectional plan of the construction as seen with the top cover removed.

In the drawings, the centrifugal rotor 1 has the neck 2, by which it is suspended and revolved, and is provided with the passages 3 and 4, through which the centrifugally separated and stratified constituents are discharged.

In the separation of wax from chilled oil, the separated wax flows through the passages 3 to the channel 5 whence it is discharged over the weir or dam 6 concentric with the rotor, and the wax freed oil flows to the discharge passages 4 over the weir or dam 7 and through the compartment 8 concentric with the rotor.

15 A "cover" 9, supported detachably by the case 10, provides the compartment 11 into which the wax is discharged as it is delivered over the weir 6, and a "cover" 12, supported detachably by the "cover" 9, provides a compartment 13 for receiving the wax freed oil from the passage or passages 4.

A tubular ring or delivery conduit 14, connected with a supply conduit 15 and provided with the apertures 14', encircles the bowl neck 2 in proximity to the top of the bottom surface of the conical bottom 12' of the cover 12, the part 12' forming the top of the compartment 11. The conduit 14 is adapted for discharging hot fluid through its peripheral openings 14' against the bottom surface of the part 12' above the wax discharged over the weir 6, such wax in greater or less amount being thrown against the part 12'. As the heating fluid 35 or hot brine, which is fed through the conduit 15 to the conduit 14 and discharged through the openings 14' thereof, washes the bottom surface of the part 12', heats the compartment 11, heats the wax and acts 40 directly upon the wax, the latter is thus caused to flow freely from the compartment 11 through the spout 11' thereof.

From the foregoing it will be apparent that hot fluid projected against the common 45 wall dividing compartment 11 from compartment 13 will heat that common wall 12', and also the atmosphere within compartment 11, and the heat of that common wall 12' will heat the atmosphere in compartments 11 and 13.

50 A further example of centrifugal mechanism and operations wherein my invention is applicable is found in Letters Patent No. 1,232,104 to P. T. Sharples. In operation 55 such machines rotate about 15,000 R. P. M. Obviously suitable fluids and liquids and other means may be employed to effect the desired control of the atmosphere within the spirit of my invention.

In a division hereof, Serial No. 182,236 filed April 9, 1927, there is claimed the specific application of my invention to the dewaxing of petroleum oil and the details of mechanism suitable for that purpose. Here-

in are claims directed to that broad aspect 65 of my invention whereby the condition of a substance is controlled by regulating the conditions of the atmosphere acting upon the substance discharged in dispersed form from the centrifuge; and also the regu- 70 lation of the temperature of such atmosphere.

Having described my invention, I claim:—

1. In the centrifugal treatment of a substance the process which comprises subject- 75 ing the substance to the action of centrifugal force to effect a desired change in the substance and to discharge the substance in dispersed form from the influence of the centrifugal force, and suitably regulating the 80 conditions of the atmosphere within which the substance is so discharged to control the condition of the substance so discharged.

2. In the centrifugal treatment of a substance, the process which comprises sub- 85 jecting the substance to the action of centrifugal force to effect a desired change in the substance and to discharge the substance in dispersed form from the influence of centrifugal force into a collecting receptacle 90 and controlling the condition of the substance so discharged by projecting a suitable fluid into said receptacle while said discharged substance exists in dispersed form therein. 95

3. In the centrifugal treatment of substances, the process which comprises centrifugally subsiding and centrifugally discharging the substance in dispersed form and suitably regulating the conditions of the 100 atmosphere within which the substance is discharged to control the condition of the substance during and after discharge thereof.

4. In the centrifugal treatment of substances, the process which comprises effect- 105 ing a desired change in a substance by subjecting it to the action of centrifugal force and centrifugally discharging the changed substance from the influence of centrifugal force, and suitably regulating the conditions 110 of the atmosphere within which the substance is so discharged to control the condition of the substance during discharge thereof.

5. In the centrifugal treatment of a substance the process which comprises subject- 115 ing the substance to the action of centrifugal force to effect a desired change in the substance and to discharge the substance in dispersed form from the influence of the centrifugal force, and suitably regulating the 120 conditions of the atmosphere within which the substance is so discharged to prevent undesirable alteration of the substance while it exists in the dispersed state in which it is discharged. 125

6. In the centrifugal treatment of substances, the process which comprises centrif-

ugally subsiding and centrifugally discharging the substance and suitably regulating the conditions of the atmosphere within which the substance is discharged to control further alterations in the substance during discharge thereof.

7. In the centrifugal treatment of substances, the process which comprises effecting a desired change in a substance by subjecting it to the action of centrifugal force and centrifugally discharging the changed substance from the influence of centrifugal force, and suitably regulating the conditions of the atmosphere within which the substance is so discharged to control further change in the substance during discharge thereof.

8. In the centrifugal treatment of a substance the process which comprises subjecting the substance to the action of centrifugal force to effect a desired change in the substance and to discharge the substance in dispersed form from the influence of the centrifugal force, and controlling further change in the substance by regulating the conditions of the atmosphere within which the substance is so discharged.

9. In the centrifugal treatment of substances the process comprising subjecting a substance to the action of centrifugal force and thereby separating it into its constituents and discharging one of said constituents in dispersed form, and discharging hot fluid into contact with the substance so discharged while it exists in such finely dispersed form, and thereby controlling the condition thereof.

10. In combination, a centrifugal machine of the type wherein a substance is subjected to the action of centrifugal force to effect a change therein and centrifugally discharged in a dispersed state, and means for regulating the conditions of the atmosphere within which the substance is centrifugally discharged in a dispersed state.

11. In combination, a centrifugal machine of the type wherein a substance is subjected to the action of centrifugal force to effect a change therein and centrifugally discharged in a dispersed state, a compartment for collecting a substance so discharged, and means for regulating the condition of the atmosphere within said compartment and thereby controlling the condition of the substance while it exists in the dispersed state in which it is discharged.

12. In a centrifugal apparatus, the combination of a rotary separating bowl provided with an upper outlet for the discharge of the lighter separated liquid and a lower outlet for the discharge of the heavier separated liquid, receptacles, one over the other, positioned to receive the liquids delivered from the respective bowl discharges, and means to substantially raise the temperature

of the gas surrounding the stream of liquid being delivered in dispersed form from the upper bowl outlet into the upper receptacle.

13. In the centrifugal treatment of a substance, the process which comprises subjecting the substance to the action of centrifugal force to effect a desired change in the substance and to discharge the substance in dispersed form from the influence of centrifugal force, and suitably regulating the temperature of the atmosphere, within which the substance is so discharged in dispersed form, to control the condition of the substance so discharged.

14. The method comprising subjecting a substance to the action of centrifugal force and thereby separating it into its constituents and discharging one of said constituents against the wall of a collecting receptacle, and simultaneously discharging a jet of hot fluid against said wall and into contact with said substance discharged against said wall.

15. The mechanism which comprises the combination with a centrifugal rotor having separate outlets for the discharge of constituents separated by the action of centrifugal force, a receptacle for collecting a constituent discharged from the influence of the centrifugal force, said receptacle having a surface against which the constituent collected therein is thrown, and a jet projecting a fluid against said surface of said receptacle impinged by a constituent discharged from said rotor.

16. Mechanism for the separation of substances comprising a centrifugal bowl having separate outlets for the discharge of separated substances, receptacles respectively positioned to receive substances discharged from said outlets, and means directing hot fluid against an inner surface of one of said receptacles and imparting heat to another of said receptacles.

17. Mechanism for the separation of substances comprising a centrifugal bowl having separate outlets for the discharge of separated substances, receptacles having a common wall and respectively positioned to receive substances discharged from said outlets, and means directing hot fluid against one surface of said common wall.

18. Mechanism for the separation of substances comprising a centrifugal bowl having separate outlets for the discharge of separated substances, receptacles respectively positioned to receive substances as they discharge from said outlets and having a common wall, and means heating said common wall.

19. Mechanism for the separation of substances comprising a centrifugal bowl having separate outlets for the discharge of separated substances, receptacles respectively positioned to receive substances discharged from said outlets and having a common

5 wall against one side of which one discharged substance impinges and over the other side of which another discharged substance flows, and means directing hot fluid against one side of said wall.

20. Mechanism for the separation of substances comprising a centrifugal bowl having separate outlets for the discharge of separated substances, receptacles respectively positioned to receive substances as they discharge from said outlets, and a single means heating both of said receptacles.

21. In a centrifugal apparatus, the combination of a rotary separating bowl provided with a plurality of discharges for liquids of different specific gravities, a receptacle surrounding the bowl and positioned to receive the liquid delivered from one of said discharges, a pipe entering said receptacle, said pipe opening in the neighborhood of the stream of liquid discharging from the bowl into said receptacle, and means for passing heated fluid through said pipe and out said opening and heating said receptacle.

22. The mechanism which comprises the combination with a centrifugal rotor having outlets for separated constituents and a receptacle for a constituent aforesaid, of

a conduit extending around the axis of said rotor, said conduit having apertures for projecting a heating fluid against a surface of said receptacle.

23. The mechanism which comprises the combination with a centrifugal rotor having outlets for the discharge of separated constituents, and a receptacle for receiving a constituent discharged from said rotor, of a conduit having an aperture opening into said receptacle whereby heating fluid may be applied within said receptacle to the constituent received therein.

24. A centrifugal machine comprising a rotor having means for separately discharging constituents of different densities of a substance separated in said rotor, an effluent collector with which a constituent makes initial contact on its discharge from said rotor and over which it flows to a discharge point, and means for maintaining a heating fluid in contact with said collector over an area substantially equal to the area of the path of flow of said effluent and heating the collector section with which said constituent makes initial contact.

In testimony whereof I have hereunto set my name this 4th day of October, 1921.

LEO D. JONES.