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APPARATUS FOR BLEACHING FATTY SUBSTANCES

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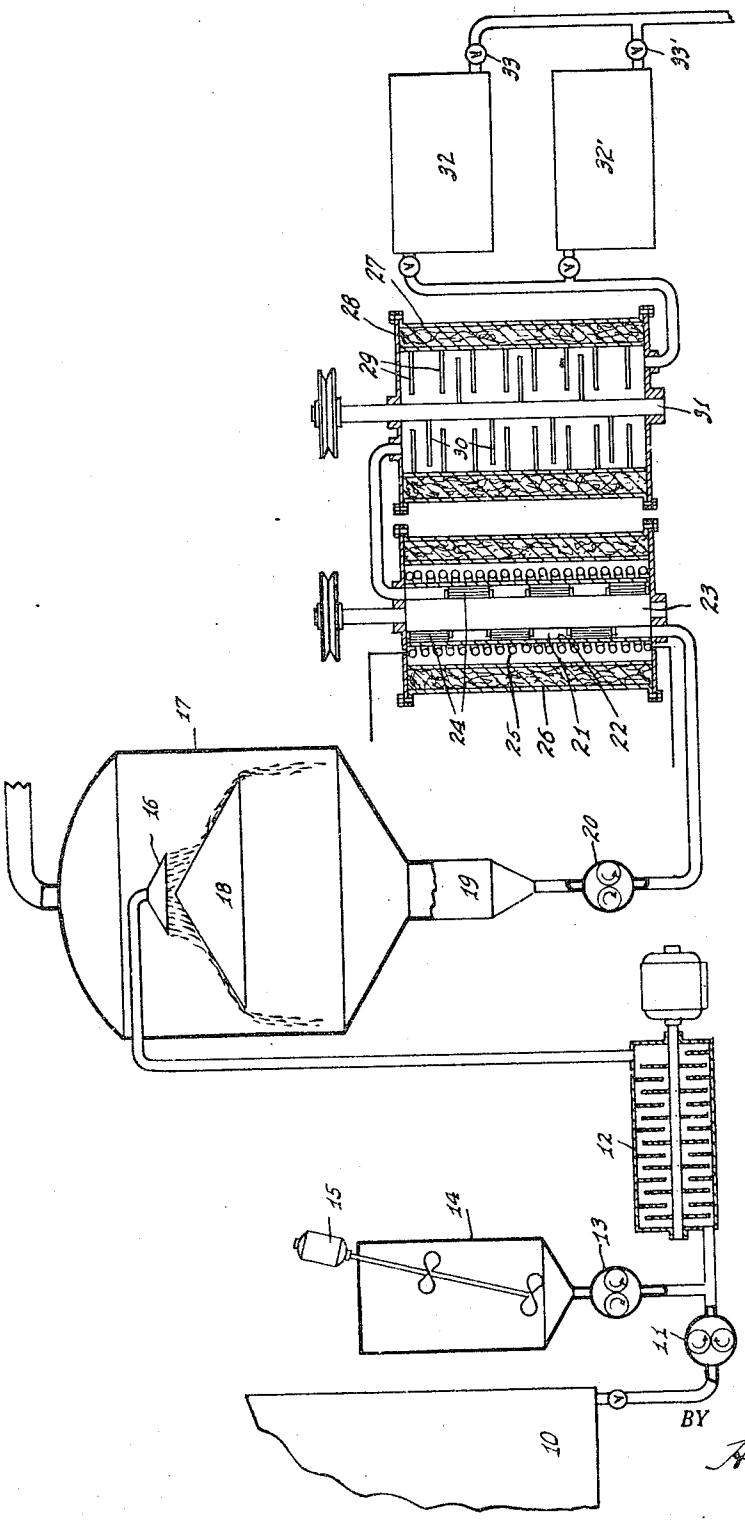

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APPARATUS FOR BLEACHING FATTY SUBSTANCES

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The object of my invention is to provide improved means by which oils or fats in a continuous stream may be effectively bleached at low cost. The term "oleaginous material" is used throughout the present specification and claims as a generic term including both oils and fats.

The accompanying drawing illustrates, diagrammatically, an embodiment of my invention.

In the drawing 10 indicates a supply reservoir for the liquid material to be bleached, and 11 a pump capable of delivering a continuous stream therefrom to and through a mixer 12. Also delivering to mixer 12 is a pump 13 supplied from a mixing tank 14 equipped with a mechanical agitator 15. Tank 14 contains a supply of bleaching material, such as fuller's earth, preferably as a slurry, with a convenient amount of the liquid to be bleached. The effluent from mixer 12 is delivered as a spray from a nozzle 16 in a vacuum chamber 17, the spray forming a thin stream on baffles 18 and passing into a sump 19 whence it is discharged by pump 20. A relatively high vacuum is maintained in chamber 17 by well known means, not shown, so that occluded air in the mixture under treatment is extracted in order that the result of the bleaching action may be more stable.

Up to this point, the material to be treated is at a relatively low temperature but sufficiently high to render it adequately fluid, and little, if any, bleaching action occurs prior to arrival beyond pump 20.

It is well known that bleaching occurs best at a temperature in the neighborhood of 240° F. and within a relatively short time. I believe it to be advantageous that each particle of oleaginous material and its accompanying particle of bleacher be brought to bleaching temperature as promptly as possible and that that temperature be maintained only long enough for the bleaching action to be accomplished. To this end, the effluent from pump 20 is to be delivered to one end of a relatively thin annular heating chamber 21 formed between tube 22, and a rotary beater shaft 23 provided on its periphery with beaters 24 which will scrape tube 22. Tube 22 is jacketed by heating means 25 which, in turn, is jacketed by heat insulation 26, the arrangement being such that the mixture under treatment is brought to proper temperature within a short period of 1 to 10 seconds.

Under proper conditions of uniform heating and thorough mixture of oleaginous material and bleacher, bleaching will be accomplished within a few minutes and therefore the effluent from the

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heating chamber passes into one end of a tube 27 jacketed by heat insulation 28 and provided with inwardly projecting pins 29 with which are interdigitated beaters 30 carried by rotary shaft 31.

By properly proportioning the effective capacities of the heating chamber and the mixer 26—29, any desired relation between heating time and bleaching time may be definitely established.

The effluent from tube 27 passes to filters 32, 32' which, by alternate use in conjunction with valves 33, 33', will permit continuity of bleaching for an indefinite period.

The pumps 11, 13 and 20 may be driven by any well known means preferably including speed-varying means so that rates of flow and local pressures may be established as desired.

Merely as illustrative, it may be noted that if tube 22 is 46" long, 4" in diameter, shaft 23 diameter 3½", tube 27 length 46", diameter 15", and shaft 31 diameter 2", there will be provided a heating period of approximately 2.5 seconds and a bleaching period of 1.57 minutes at a normal pressure established by pump 20.

I claim as my invention:

1. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising a source of supply of such material, a source of supply of a bleaching agent, and converging conduit means for establishing a flowing stream composed of a mixture of such material with such bleaching agent, means for subjecting a section of said stream to subatmospheric pressure substantially at atmospheric temperature, whereby occluded air therein will be extracted therefrom, and means for subjecting a section of the stream beyond said first-named section of said air-freed mixture to heat sufficient to result in bleaching of the oleaginous material.

2. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means for mixing such material with a bleaching agent and for causing such mixture to flow in a continuous stream, means for subjecting a section of said stream to subatmospheric pressure substantially at atmospheric temperature, whereby occluded air therein will be extracted therefrom, means to define a restricted section of said mixture stream, means in advance of said restricting means for raising the pressure upon said stream, means for heating said restricted stream section to bleaching temperature within a few seconds, and subsequent means for defining a less restricted section of said stream and maintaining it at bleaching temperature.

3. Apparatus for accomplishing bleaching of a flowable oleaginous material, comprising means for establishing a flowing stream composed of a mixture of such material with a comminuted bleaching agent, means for subjecting a section of such stream to sub-atmospheric pressure, means for increasing the pressure upon a second section of said stream beyond said first section, and means for heating a third section of said stream beyond said second section to a temperature sufficient to bleach the oleaginous material.

4. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means providing a passage, means for mixing such material with a bleaching agent, means for causing the mixture to flow in a continuous stream through said passage, means for subjecting successive portions of said stream to sub-atmospheric pressure at substantially atmospheric temperature, whereby occluded air therein will be extracted therefrom, subsequent means for returning the pressure upon said stream at least to atmospheric value, means beyond said last-named means to define a restricted section of said mixture stream, means for heating said restricted stream section to bleaching temperature within a few seconds, subsequent means for defining a less restricted section of said stream and maintaining it at bleaching temperature, and means within said last-mentioned means for mechanically mixing the mixture stream therein.

5. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means providing a passage, means for causing a stream of definitely proportioned successive quantities of oleaginous material and a bleaching agent to flow through said passage, means for subsequently extracting occluded air from the mixture substantially at atmospheric temperature, means acting on such mixture after such extraction for raising the temperature of successive portions, within a period of a few seconds, of said mixture to bleaching temperature, and means for subsequently maintaining successive portions of said mixture at bleaching temperature until desired bleaching has been attained.

6. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means providing a passage, means for establishing through said passage a flowing stream of definitely proportioned successive quantities of oleaginous material and a slurry of such oleaginous material and a bleaching agent, means for subsequently extracting occluded air from the mixture substantially at atmospheric temperature, means acting on such mixture after such extraction for raising the temperature of successive portions, within a period of a few seconds, of said mixture to bleaching temperature, and means for subsequently maintaining successive portions of said mixture at bleaching temperature until desired bleaching has been attained.

7. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means for establishing a continuously flowing stream of definitely proportioned successive quantities of oleaginous material and a bleaching agent, a cylinder receiving said mixture, a rotary beater extending lengthwise in said cylinder and restricting the effective volume thereof to an annulus of relatively small radial extent, means associated with said cylinder for rapidly raising the temperature of successive portions of mixture flowing through said annulus to bleaching temperature, and a bleaching chamber arranged to receive the effluent from said cylinder and having a capacity sufficient to cause a decreased velocity of flow therethrough affording adequate bleaching time.

8. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means for establishing a flowing stream of definitely proportioned successive quantities of oleaginous material and a bleaching agent, means for subsequently extracting occluded air from the mixture, a cylinder receiving said mixture, a rotary beater extending lengthwise in said cylinder and restricting the effective volume thereof to an annulus of relatively small radial extent, means associated with said cylinder for rapidly raising the temperature of successive portions of mixture flowing through said annulus to bleaching temperature, a bleaching chamber arranged to receive the effluent from said cylinder and having a capacity sufficient to cause a decreased velocity of flow therethrough affording adequate bleaching time, agitating means within said bleaching chamber, and means for driving said beater and said agitating means.

9. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means for establishing a flowing stream of definitely proportioned successive quantities of oleaginous material and a slurry of such oleaginous material, and a bleaching agent, a cylinder receiving said mixture, a rotary beater extending lengthwise in said cylinder and restricting the effective volume thereof to an annulus of relatively small radial extent, means associated with said cylinder for rapidly raising the temperature of successive portions of mixture flowing through said annulus to bleaching temperatures, a bleaching chamber arranged to receive the effluent from said cylinder and having a capacity sufficient to cause a decreased velocity of flow therethrough affording adequate bleaching time, and agitating means within said bleaching chamber.

10. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means for establishing a flowing stream of definitely proportioned successive quantities of oleaginous material and a slurry of such oleaginous material and a bleaching agent, means for subsequently extracting occluded air from the mixture, a cylinder receiving said mixture, a rotary beater extending lengthwise in said cylinder and restricting the effective volume thereof to an annulus of relatively small radial extent, means for driving said beaten, means associated with said cylinder for rapidly raising the temperature of successive portions of mixture flowing through said annulus to bleaching temperature, and a bleaching chamber arranged to receive the effluent from said cylinder and having a capacity sufficient to cause a decreased velocity of flow therethrough affording adequate bleaching time.

11. Apparatus for accomplishing bleaching of a flowable oleaginous material comprising means for establishing a flowing stream of definitely proportioned successive quantities of oleaginous material and a slurry of such oleaginous material and a bleaching agent, means for subsequently extracting occluded air from the mixture, a cylinder receiving said mixture, a rotary beater extending lengthwise in said cylinder and restricting the effective volume thereof to an annulus of relatively small radial extent, means associated with said cylinder for rapidly raising the temperature of successive portions of mixture flowing through said annulus to bleaching temperature, a bleaching chamber arranged to receive the efflu-

ent from said cylinder and having a capacity sufficient to cause a decreased velocity of flow therethrough affording adequate bleaching time, agitating means within said bleaching chamber, and means for driving said beater and said agitating means.

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