Oct. 13, 1959 M. CORNELL 2,908,346

APPARATUS FOR HOMOGENIZING AND DEGASIFYING FLOWABLE MATERIALS

Filed March 13, 1958 2 Sheets-Sheet 1

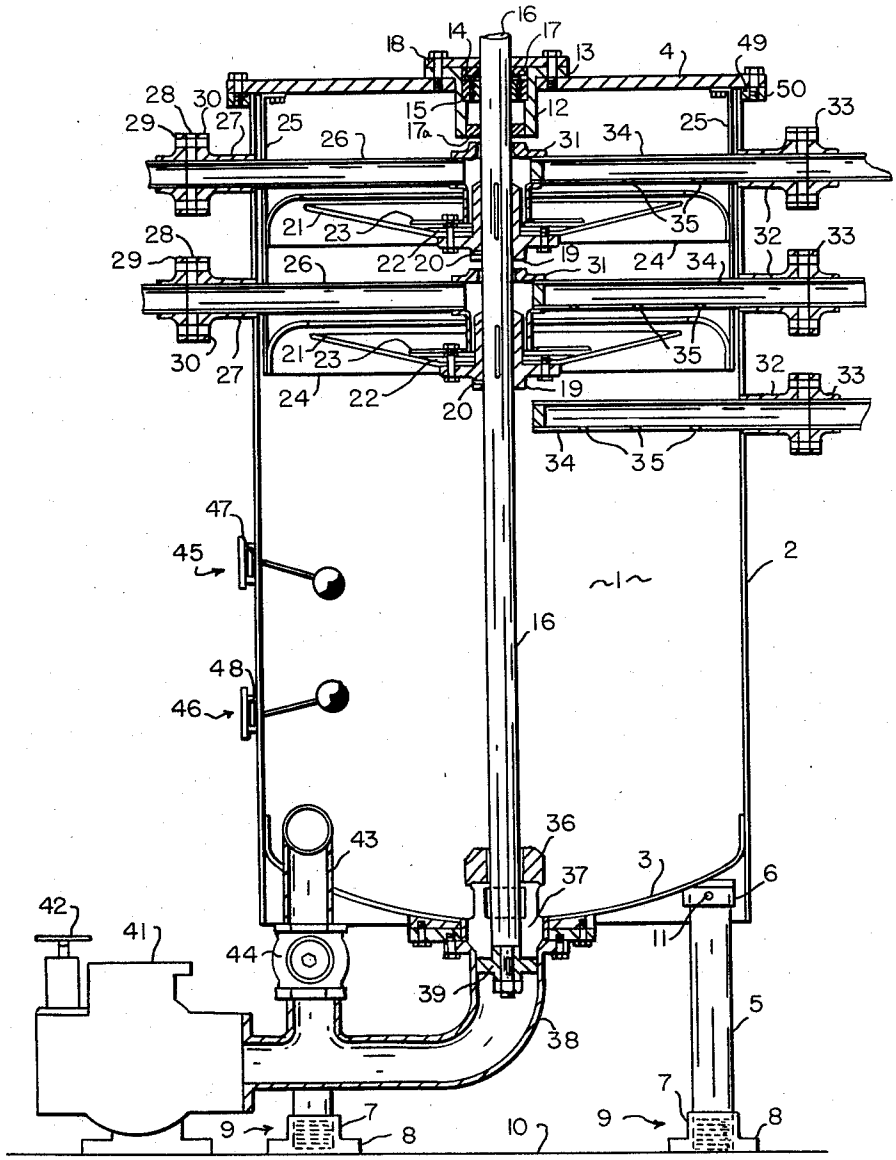


Fig. 1

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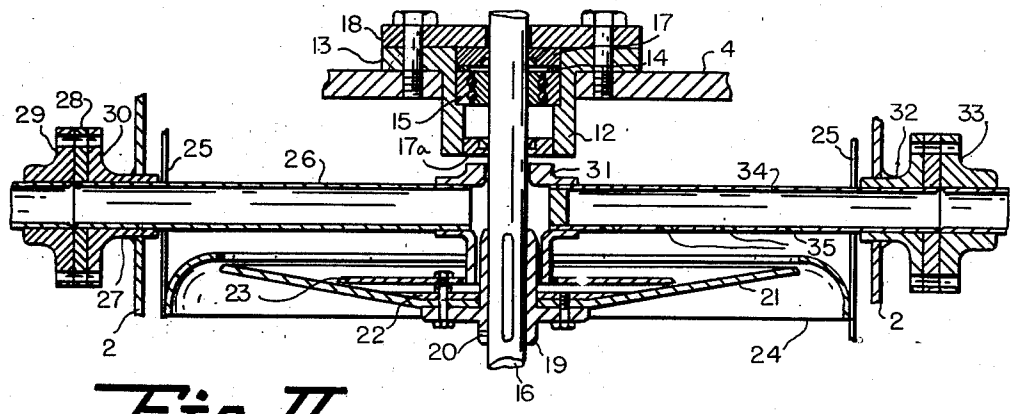


Fig. II

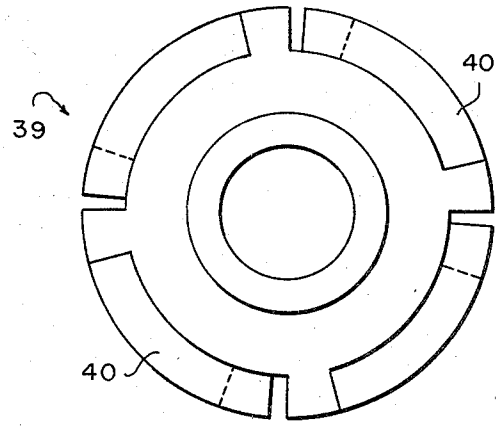


Fig. III

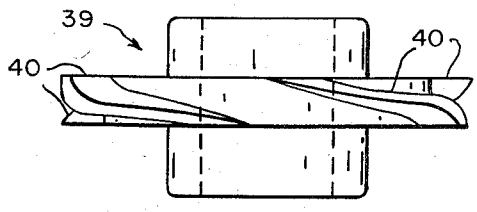


Fig. IV

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United States Patent Office 2,908,346
Patented Oct. 13, 1959

2,908,346

APPARATUS FOR HOMOGENIZING AND DEGASIFYING FLOWABLE MATERIALS

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Application March 13, 1958, Serial No. 721,253

12 Claims. (Cl. 183—2.5)

Many materials such as lubricants, paints, flowable plastics, foods and great varieties of other compositions need to be physically refined in order to attain the highest degree of efficacy.

Many organic compounds are subject to spoilage or deterioration by oxidation or the action of aerobic agents. There are, of course, many processes in which aeration is advantageous, but there are also many processes in which the elimination of air and/or other gases or vapors is quite as important, and in which it is impracticable to employ heat to drive out the deleterious gaseous or vaporous contaminants.

The superiority of suspensions of fine solid particles in liquids and of colloidal suspensions usually depends to a considerable extent upon the fineness and uniformity of distribution of the fine solid or colloidal particles; the finer and more uniformly distributed the particles of pigment in a paint, for example, the better its covering characteristics and the longer it will keep in storage without "settling out."

Keeping qualities, utility in the culinary arts, and flavor and healthful qualities of foodstuffs often also are enhanced by thorough homogenization and degasification.

The need for homogenization and degasification in the preparation of liquid and pasty components of oils and greases is well known.

My application for United States patent Serial No. 660,266 discloses a machine for degasifying, blending, milling and homogenizing materials having liquid or pasty components. The method and apparatus disclosed in the instant application enables materials, such as oils and greases, that are handled in large volume to be processed more rapidly in apparatus which is relatively sturdy and compact and which can be manufactured and operated with great economy.

It is an object of this invention to provide homogenizing and degasifying apparatus in which materials are supplied to rapidly rotating processing units that are fixed to rotating shafts, such materials being supplied through conduits which themselves are stationary.

A further object is to provide conduits whose mountings are so designed as to facilitate removal and replacement of sections thereof which are adjacent to processing units.

It is a further object to provide apparatus having evacuating conduits which are stationary and which are readily removable and replaceable.

It is a further object to provide apparatus having a single shaft, said apparatus being so designed that a plurality of homogenizing and degasifying units can be mounted upon said single shaft, and being so designed that the number of units so mounted can be readily increased or decreased.

Other objects and many advantages of the invention will be apparent upon perusal of the following specification as illustrated by the accompanying drawings, in which:

Fig. I is a sectional view taken substantially along a vertical plane through the apparatus;

Fig. II is a sectional view on an enlarged scale of a homogenizing and degasifying unit;

Fig. III is a plan view on a further enlarged scale of an impeller which is an element of the apparatus; and

Fig. IV is an elevational view of the impeller.

Materials to be homogenized and/or degasified are processed in a chamber **1** which has a cylindrical wall **2**, and the size and wall thickness of which may vary with the type of material to be treated and with the rate at which the material is to be processed. A chamber 36 inches in diameter and 60 inches high having a wall thickness of 5/16 inch has been found to operate satisfactorily in processing some materials.

The lower end of the chamber **1** is closed by a dish-shaped bottom **3** which may be welded in place. The upper end of the chamber is closed by a flat cover **4** which is removably bolted in place. Since the interior of the chamber **1** is partially evacuated when the apparatus is functioning, the bottom **3** is made convex outwardly to better withstand the excess of outer atmospheric pressure over the reduced interior pressure. The chamber **1** is supported by four legs **5** which are fitted into sockets **6** that are welded to the chamber **1**, the lower ends of the legs **5** being threaded into bosses **7** extending upwardly from flanges **8**, the flanges and bosses constituting feet **9** which may be fastened to a floor or base plate **10**. The chamber **1** may be properly plumbed by screwing the lower ends of the legs **5** into or out of the bosses **7**, whereupon the legs **5** may be locked against accidental turning by means of set screws **11** threaded into the sockets **6**.

Fitted through a central opening in the cover **4** is a bearing holder **12** having a flange **13** which overlies the cover **4**. Mounted within the bearing holder **12**, below a spacer ring **14**, is the outer race of a double row ball bearing **15** which is capable of supporting an axial load or thrust.

The inner race of the double row ball bearing **15** is fixed to a rotatable vertical shaft **16**, which preferably is turned by an electric motor acting through variable speed mechanism, such, for example, as a V-belt drive, to turn the vertical shaft **16** at an appropriate speed, e.g. 1,000 to 1,500 r.p.m. Since suitable motors and drive mechanisms are commercially available they are not described in detail herein or illustrated in the accompanying drawings.

The upper and lower ends of the bearing holder **12** are provided with oil seals **17** and **17*a*** which surround the shaft **16** and serve to retain lubricant with which the bearing holder **12** is adapted to be packed. A cover plate **18** closes the upper end of the bearing holder **12** and surrounds the shaft **16**, the cover plate **18** and bearing holder **12** being secured to the main cover **4** by means of cap screws.

Keyed to the shaft **16** at definite heights within the chamber **1** are hubs **19**, which after being located as to height are fastened to the shaft **16** by set screws **20**. Each of the hubs **19** has a flange to which is secured a circular dispersing rotor **21**, having a flat central portion and an outer portion that is frusto-conical in shape. Overlying the flat central portion of the dispersing rotor **21** and fixed thereto is an annulus **22**, the edge of which is beveled to fit the frusto-conical outer portion of the dispersing rotor without leaving a shoulder around the edge of the annulus. Also mounted upon the hub **19**, parallel to the flat portion of the dispersing rotor **21**, is a "buttering" ring **23**. The buttering ring **23** has a sharp edge around its periphery which lies in optimum proximity to the surface of the frusto-conical portion of the dispersing rotor **21**. The optimum proximity may vary with the

viscosity and other characteristics of the material to be treated. The gap between the sharp edge of the buttering ring and the surface of the frusto-conical portion of the dispersing rotor must be wide enough to permit non-deformable particles to pass through, but narrow enough to spread deformable material into a thin layer. The sharp edge of the buttering ring prevents the material from clinging to the periphery of the ring or curling or creeping over the edge as some materials would be liable to do if the edge were rounded or blunt.

Surrounding the periphery of each dispersing rotor **21** and overlapping somewhat the peripheral edge of the dispersing rotor is a stationary deflecting ring **24**, which is smoothly curved as indicated in Fig. I with its uper margin turned nearly horizontally inward, to catch material thrown centrifugally outward from the periphery of the dispersing rotor, and with its lower margin nearly vertical to direct the material downward. The deflecting rings **24** are hung by stiff metal straps **25** which are secured at their upper ends to the cover **4**.

Material to be homogenized and/or degasified is fed through pipes **26** which extend over the deflector rings **24** from fittings **27** welded into openings in one side of the chamber **1**. Each pipe **26** is provided with a flange **28** which is bolted between an inlet pipe flange **29** and a flange **30** on the fitting **27**.

The inner end of each pipe **26** enters a radial tapered hole in a boss formed on a collar **31** (which may be of cast bronze or other metal) that loosely surrounds the shaft **16** and a hub **19** but does not turn with the shaft and hub. The lower end of each collar **31** extends into the central opening of a buttering ring **23**, so that material to be processed follows through the pipe **26** into the collar **31**, and from the lower end of the collar to the center of the dispersing rotor assembly.

Fittings **32** similar to the fittings **27** are welded into openings on the opposite side of the chamber **1**. Bolted between each fitting **32** and an outlet pipe flange **33** is a flange on the outer end of a pipe **34**, the inner end of which extends into a radial opening in a second boss formed on one of the collars **31**. Each collar **31** thus is supported by the pipes **26** and **34**, which extend radially inward from opposite sides of the cylindrical chamber **1**. Each collar **31** is supported with sufficient firmness by one pipe **26** and one pipe **34**, but the machine may be constructed with three or more pipes **26** and **34** supporting each collar **31**.

Each pipe **34** is employed to evacuate gases from the chamber **1**. The inner end of each pipe **34** that extends into a boss on a collar **31** is plugged, and a plurality of perforations **35** are located along each pipe **34**. One of the pipes **34** is located above each of the deflecting rings **24**, and an additional pipe **34** may be located below the lowermost deflecting ring **24**.

The shaft **16** extends through a central opening in the bottom **3** of the chamber **1**, where it is journaled in a guide bearing **36** mounted upon a structure **37** having ports through which treated material may flow into a discharge pipe **38**.

The extreme lower end of the shaft **16** is reduced in size and has detachably fixed thereon an impeller **39** having helical blades **40** which move homogenized and degasified material into the discharge pipe **38**, whence it is pumped by a variable flow pump **41**, the capacity of which is substantially less than the pumping capacity of the impeller **39** but can be adjusted manually by turning a hand wheel **42**. Leading upward from the discharge pipe **38** is a branch pipe **43** for returning a stream of the material to the chamber **1**. The branch pipe **43** passes through the bottom **3** of the chamber **1** and is equipped with a manually adjustable valve **44** that can be set to maintain in the discharge pipe **38** a pressure higher (e.g. by 15 inches of mercury) than that in the chamber **1**, so as to increase the efficiency of the pump **41**.

When the apparatus is in operation and the impeller is pumping treated material downward, an upward thrust is exerted upon the shaft **16**. This upward thrust tends to counterbalance the weight of the dispersing rotors and other parts carried by the shaft **16**, thus relieving the ball bearing of much of the axial load to which it otherwise would be subjected.

Tapped into the wall **2** of the chamber **1** are level controls **45** and **46** for maintaining the volume of liquid in the chamber **1** between a certain minimum and a certain maximum. These level controls may be of any desired type but are shown schematically as floats actuating micro switches **47** and **48** and arranged one above the other. The micro switches **47** and **48** may transmit signals to an attendant, in response to which he can increase or decrease the rate of discharge through the pump **41** or the rate at which material is supplied through the pipes **26** or, instead of merely transmitting signals to an attendant, they may actuate controls which automatically adjust the pump **41** or the rate at which material is supplied.

Ingress of air into the chamber **1** is prevented by a gasket or seal such as a rubber O-ring **49** that is clamped between the cover **4** and a flange **50** at the upper end of the cylindrical wall **2**.

In the operation of the device, air is first withdrawn through the pipes **34** until the vacuum inside the chamber **1** has reached approximately 28 inches of mercury. Then with the shaft **16** and the parts fixed thereto rotating at a speed of about 1200 r.p.m., a flowable material such as oil or grease is admitted to the pipes **26** and is fed through each collar **31** to the space between the annulus **22** and the buttering ring **23**. Since the annulus and buttering ring are rotating at high speed, a thin layer of the material emerges through the gap between the sharp edge of the buttering ring and the conical inner surface of the dispersing rotor **21** and is pressed by centrifugal force against the conical inner surface of the rotor. Such bubbles as the material may contain are flattened and ruptured by the centrifugal pressing and by the distortion that they undergo as the thin layer stretches over more and more area during its expanding outward movement. Even bubbles of microscopic size are thus destroyed as the layer is converted into a film, and as the film stretches under the vacuum prevailing within the chamber, absorbed gases are largely eliminated.

The same forces that destroy the bubbles also flatten and disperse any soft lumps that may have passed through the gap between the conical inner surface of the dispersing rotor and the sharp edge of the buttering ring.

The film of material being processed is flung centrifugally from the peripheral edge of the dispersing rotor through the narrow gap between the rotor and the concavely curved inner surface of the deflecting ring **24**. The deflecting ring is stationary and deflects the material downward in a cylindrical curtain that runs into an accumulation of processed material in the lower part of the chamber **1**. A partial vacuum is maintained on both sides of the curtain by evacuation of air through the pipes **34**, which take air and other gases from outside and from inside of the curtain.

The lowermost of the pipes **34** takes gases which emanate from the descending cylindrical curtain and from the accumulation in the lower end of the chamber. Since gases from inside the curtain are removed without being drawn through the curtain, none of the liquid material is entrained with the gases. The lowermost pipe **34** is located at a substantial distance above the level that the accumulation of material is permitted to reach.

Since the impeller **39** as described above forces the material into the discharge pipe **38**, the pump **41** in this device is not required to work against the vacuum prevailing in the chamber **1**, and the necessity of installing the chamber **1** at an elevated location is obviated.

The pump **41** need not be started for withdrawing

processed material from the accumulation in the lower part of the chamber until the level of the accumulated liquid actuates the lowermost level control. Thereupon the pump **41** is set to withdraw processed material at a rate that is equal to the rate at which material to be processed is supplied through the pipes **26**.

Should the quantity of processed material in the lower part of the chamber **1** diminish to a point where the lowermost level control **46** is actuated, the pump **41** is stopped, preferably automatically. Thus the chamber **1** is prevented from emptying.

Because of the rotation of the shaft **16**, which passes through the accumulation of processed material in the lower part of the chamber **1**, and because the material that is added to the accumulation strikes the surface of the accumulation from a direction that is slightly out of vertical, the liquid in the lower part of the chamber **1** tends to rotate as a body in the direction in which the shaft **16** rotates. The rotation of the accumulation of processed material, which may be of the order of 60 r.p.m., tends to form a vortex so as to uncover the ports in the structure **37**. In order to provide a counterforce to prevent the material from rotating at a speed sufficient to form a vortex, the branch pipe **43** is located adjacent the wall **2** of the chamber **1**, and the upper end of the branch pipe **43** is bent to discharge material in a direction opposed to the direction in which the material in the chamber **1** tends to rotate.

It will be observed that the shaft **16** and all of the elements driven by the shaft **16** are fixed together and spin as a unit, there being no gearing between the shaft and the parts turned thereby. Hence the apparatus for homogenizing and degasifying operates with minimum power consumption and with little or no noise.

The capacity of the apparatus is high and can be multiplied, when desired, by the addition of identical units each consisting of two pipes **26** and **34** and a dispersing assembly.

The size of the apparatus, the speed at which the shaft **16** is turned and the rate at which material is supplied, as well as the number of units mounted on the shaft, can be varied to adapt the machine to the conditions under which it is to be operated as well as to the output desired.

A machine such as illustrated, having a chamber 36 inches in diameter and 60 inches in height with a 2.125 inch shaft turning at a speed of 1200 r.p.m. and carrying two homogenizing and degasifying units, will have a capacity of about 175 to 300 gallons per minute when operating upon oil of various viscosities, the lighter the oil the greater the capacity.

The embodiments of the invention hereinabove described and illustrated by the accompanying drawings are to be regarded as exemplary only and the invention is to be regarded as encompassing all modifications and variations within the spirit and scope of the subjoined claims.

Having described the invention, I claim:

1. In apparatus for homogenizing and degasifying flowable materials, a chamber having a side wall, a bottom and a cover removably secured to said side wall; means for withdrawing material from the bottom of the chamber; said cover having a central opening; a rotatable substantially vertical shaft projecting through said opening; a dispersing rotor fixed upon said shaft, said dispersing rotor having a concave frusto-conical upper surface, a buttering ring having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a stationary inlet pipe leading from without said chamber; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being located below said inlet pipe; an evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring, said evacuating pipe having its inner end closed and having a series of perforations along its side; and another evacuating pipe lying beneath said dispersing rotor and said deflecting ring; whereby gases and vapors extracted from the material are withdrawn from opposite sides of the film of material flowing from the dispersing rotor.

2. In apparatus for homogenizing and degasifying flowable materials, a chamber having a side wall, a bottom and a cover removably secured to said side wall; means for withdrawing material from the bottom of the chamber; said cover having a central opening; a rotatable substantially vertical shaft projecting through said opening; a dispersing rotor fixed upon said shaft, said dispersing rotor having a concave frusto-conical upper surface, a buttering ring having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a stationary inlet pipe leading from without said chamber to the space between said ring and rotor surface; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being located below said inlet pipe; an evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring, said evacuating pipe having its inner end closed and having a series of perforations along its lower side but in other respects being similar to and mounted similarly to said inlet pipe; and another evacuating pipe lying beneath said dispersing rotor and said deflecting ring and being similar to the evacuating pipe first mentioned; whereby gas and vapor are extracted from opposite sides of the film of material flowing from the dispersing rotor.

3. In apparatus for homogenizing and degasifying flowable materials, a chamber having a side wall, an outwardly convex bottom and a cover removably secured to a flange surrounding said side wall; means for withdrawing material from the bottom of the chamber; said cover having a central opening; a rotatable substantially vertical shaft projecting through said opening; a dispersing rotor fixed for axial adjustment upon said shaft, said dispersing rotor having a concave frusto-conical upper surface, a buttering ring having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a stationary inlet pipe leading from without said chamber to the space between the ring and said surface; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being hung by stiff metal straps from said cover, said deflecting ring being located below said inlet pipe; a perforated evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring; and another evacuating pipe positioned beneath said dispersing rotor and said deflecting ring; whereby gas and vapor is evacuated from both sides of the film of material flowing from the dispersing rotor.

4. In apparatus for homogenizing and degasifying flowable materials, a chamber having a cylindrical side wall, a bottom and a cover removably secured to the upper margin of said cylindrical side wall; means for withdrawing material from the bottom of the chamber; said cover having a central opening; a solid rotatable substantially vertical shaft projecting through said opening; a dispersing rotor assembly fixed upon said shaft, said dispersing rotor assembly comprising a hub, a dispersing rotor having a concave frusto-conical upper surface fixed to said hub, a buttering ring also fixed to said hub and having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a non-rotating collar surrounding said shaft and having its lower margin extending through said buttering ring; an inlet pipe

leading from without said chamber into said collar; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being located below said inlet pipe; an evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring, said evacuating pipe having its inner end closed and in supporting relationship to said collar and having a series of perforations along its side; and another evacuating pipe lying beneath said dispersing rotor and said deflecting ring; whereby gases and vapors from the material are extracted from opposite sides of the film of material flowing from the dispersing rotor.

5. In apparatus for homogenizing and degasifying flowable materials, a chamber having a cylindrical side wall, an outwardly convex bottom and a cover removably secured to a flange surrounding the upper margin of said cylindrical side wall; means for withdrawing material from the chamber; said cover having a central opening; a solid rotatable substantially vertical shaft projecting through said opening; a dispersing rotor assembly fixed for axial adjustment upon said shaft, said dispersing rotor assembly comprising a hub, a dispersing rotor having a concave frusto-conical upper surface fixed to said hub, a buttering ring also fixed to said hub and having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a non-rotating collar surrounding said shaft and having its lower margin extending through said buttering ring; an inlet pipe leading from without said chamber into said collar; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being hung by stiff metal straps from said cover, said deflecting ring being located below said inlet pipe; a perforated evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring, said evacuating pipe having its inner end closed and in supporting relationship to said collar; and another perforated evacuating pipe lying beneath said dispersing rotor and said deflecting ring; whereby gases and vapors are evacuated from both sides of the film of material flowing from the dispersing rotor.

6. In apparatus for homogenizing and degasifying flowable materials, a chamber having a side wall, an outwardly convex bottom and a cover removably secured to a flange surrounding said side wall; means for withdrawing material from the chamber; said cover having a central opening; a rotatable substantially vertical shaft projecting through said opening; a dispersing rotor fixed for axial adjustment upon said shaft, said dispersing rotor having a concave frusto-conical upper surface, a buttering ring having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a stationary inlet pipe leading from without said chamber to the space between said ring and surface; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being hung by stiff metal straps from said cover, said deflecting ring being located below said inlet pipe; a perforated evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring, but in other respects being similar to and mounted similarly to said inlet pipe; and another evacuating pipe located beneath said dispersing rotor and said deflecting ring and being similar to the evacuating pipe first mentioned, whereby gas and vapor are evacuated from opposite sides of the film of material flowing from the dispersing rotor.

7. In apparatus for homogenizing and degasifying flowable materials, a chamber having a cylindrical side wall, a bottom and a cover removably secured to the upper margin of said cylindrical side wall; means for withdrawing material from said chamber; said cover having a central opening containing a bearing holder and a bearing capable of taking axial thrust; a solid rotatable substantially vertical shaft journaled, by means of said bearing, in said bearing holder; a dispersing rotor assembly fixed upon said shaft, said dispersing rotor assembly comprising a hub, a dispersing rotor having a concave frusto-conical upper surface fixed to said hub, a buttering ring also fixed to said hub and having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a non-rotating collar surrounding said shaft and having its lower margin extending through said buttering ring; an inlet pipe leading from without said chamber into said collar; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being located below said inlet pipe; a perforated evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring for evacuating such space, said evacuating pipe having its inner end closed and in supporting relationship to said collar; and another perforated evacuating pipe lying beneath said dispersing rotor and said deflecting ring for evacuating the space beneath the rotor and the film of material flowing from the rotor.

8. In apparatus for homogenizing and degasifying flowable materials, a chamber having a cylindrical side wall, an outwardly convex bottom and a cover removably secured to a flange surrounding the upper margin of said cylindrical side wall; means for withdrawing material from the bottom of the chamber; said cover having a central opening; a solid rotatable substantially vertical shaft projecting through said opening; a dispersing rotor assembly fixed for axial adjustment upon said shaft, said dispersing rotor assembly comprising a hub, a dispersing rotor having a concave frusto-conical upper surface fixed to said hub, a buttering ring also fixed to said hub and having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a non-rotating collar surrounding said shaft and having its lower margin extending through said buttering ring; an inlet pipe leading from without said chamber into said collar; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being hung by stiff metal straps from said cover, said deflecting ring being located below said inlet pipe; a perforated evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring, said evacuating pipe having its inner end closed and in supporting relationship to said collar; and another perforated evacuating pipe lying beneath said dispersing rotor and said deflecting ring and being similar to the evacuating pipe first mentioned for evacuating the space beneath the rotor independently of the space above the rotor.

9. In apparatus for homogenizing and degasifying flowable materials, a chamber having a cylindrical side wall, an outwardly convex bottom and a cover removably secured to a flange surrounding the upper margin of said cylindrical side wall; said cover having a central opening; a solid rotatable substantially vertical shaft projecting through said opening; a dispersing rotor assembly fixed for axial adjustment upon said shaft, said dispersing rotor assembly comprising a hub, a dispersing rotor having a concave frusto-conical upper surface fixed to said hub, a buttering ring also fixed to said hub and having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a non-rotating collar surrounding said shaft and having its lower margin ex-

tending through said buttering ring; an inlet pipe leading from without said chamber into said collar; a non-rotating deflecting ring surrounding sad dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being hung by stiff metal straps from said cover, said deflecting ring being located below said inlet pipe; a perforated evacuating pipe leading out of said chamber from space above said dispersing rotor and said deflecting ring, said evacuating pipe having its inner end closed and in supporting relationship to said collar; and another perforated evacuating pipe lying beneath said dispersing rotor and said deflecting ring for evacuating the space beneath the rotor; a guide bearing and guide bearing supporting structure fitted within an opening in the bottom of said chamber, said guide bearing surrounding said shaft adjacent the lower end of said shaft, a discharge pipe leading from said support structure, an impeller fixed to the lower end of said shaft and impelling processed material from said chamber into said discharge pipe, a pump for withdrawing processed material from said discharge pipe, a branch pipe leading from such discharge pipe and discharging tangentially into said chamber, a valve in said branch pipe; and controls responsive to the amount of such material in said chamber for controlling the rate of withdrawal by said pump.

10. In apparatus for homogenizing and degasifying flowable materials, a chamber having a cylindrical side wall, a bottom and a cover removably secured to the upper margin of said cylindrical side wall; said cover having a central opening; a solid rotatable substantially vertical shaft projecting through said opening; a dispersing rotor assembly fixed upon said shaft, said dispersing rotor assembly comprising a hub, a dispersing rotor having a concave frusto-conical upper surface fixed to said hub, a buttering ring also fixed to said hub and having a peripheral edge spaced slightly from said concave frusto-conical upper surface; a non-rotating collar surrounding said shaft and having its lower margin extending through said buttering ring; an inlet pipe leading from without said chamber into said collar; a non-rotating deflecting ring surrounding said dispersing rotor, said deflecting ring being smoothly curved with its upper margin being turned nearly horizontally inward and its lower margin turned nearly vertically downward, said deflecting ring being located below said inlet pipe; a perforated evacuating pipe leading out of said chamber from space above sad dispersing rotor and said deflecting ring, said evacuating pipe having its inner end closed and in supporting relationship to said collar; another perforated evacuating pipe lying beneath said dispersing rotor and said deflecting ring for evacuating the space beneath the rotor; a guide bearing and guide bearing support structure fitted within an opening in the bottom of said chamber, said guide bearing surrounding said shaft adjacent the lower end of said shaft; a discharge pipe leading from said support structure; an impeller fixed to the lower end of said shaft for impelling processed material from said chamber into said discharge pipe, a pump for withdrawing processed material from said discharge pipe, a branch pipe leading from said discharge and discharging tangentially into said chamber; a valve in said branch pipe; and controls responsive to the amount of material in said chamber and controlling the rate of withdrawal through said pump, whereby the amount of material collected in said chamber is maintained between predetermined upper and lower limits.

11. In apparatus for homogenizing and degasifying flowable materials, in combination, a vertically positioned cylindrical chamber, a rotatable shaft mounted coaxially of the chamber, at least one frusto-conical dispersing rotor mounted on the shaft, means for feeding material onto said rotor, a stationary deflecting ring mounted in the chamber to direct material thrown from the dispersing rotor downwardly into the lower portion of the chamber, perforated evacuating tubes located in the spaces above and below the rotor, a discharge pipe leading coaxially from the bottom of the cyindrical chamber, an impeller mounted on an end of the shaft extending into the discharge pipe, and a branch pipe connected to the discharge pipe and discharging tangentially into the lower portion of the chamber, whereby material driven by said impeller through said discharge and branch pipes opposes a rotary motion of the material induced by the rotation of the dispersing rotor and shaft.

12. In apparatus for homogenizing and degasifying flowable materials, in combination, a vertically positioned cylindrical chamber, a rotatable shaft extending axially through the chamber, at least one frusto-conical dispersing rotor mounted on the shaft, an inlet pipe extending radially into the chamber, a perforated evacuating tube extending generally radially into the chamber at substantially the same elevation as the inlet pipe, a collar that surrounds the rotary shaft and that is supported on said inlet pipe and evacuating tube, said collar serving to direct material from the inlet pipe onto the dispersing rotor, means for axially directing material discharged radially from the dispersing rotor, a discharge pipe leading axially from the bottom of the chamber, an impeller mounted on the lower end of the rotatable shaft and located in the entrance to the discharge pipe for raising the pressure of the material in the discharge pipe over the pressure in the chamber, a discharge pump for withdrawing material from the discharge pipe, and a branch pipe leading from the discharge pipe and discharging tangentially into the lower portion of the chamber in a direction counter to the rotation of the dispersing rotor and material discharged therefrom.

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