Feb. 12, 1935. E. SCHMIERER 1,990,960

MACHINE FOR DISSOLVING XANTHATE AND THE LIKE

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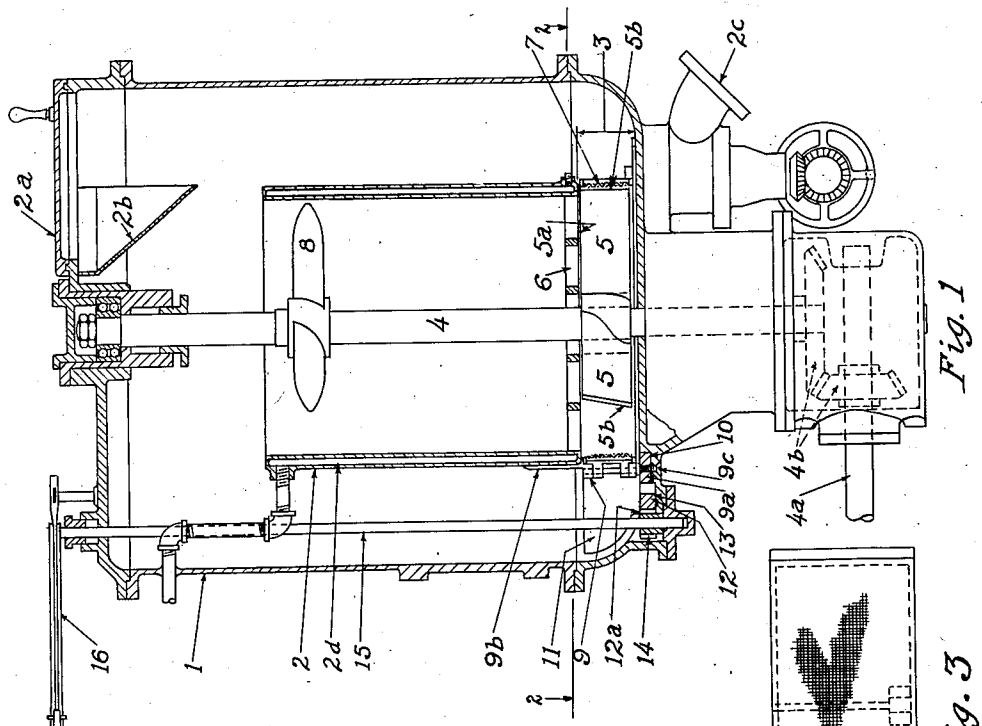


Fig. 1

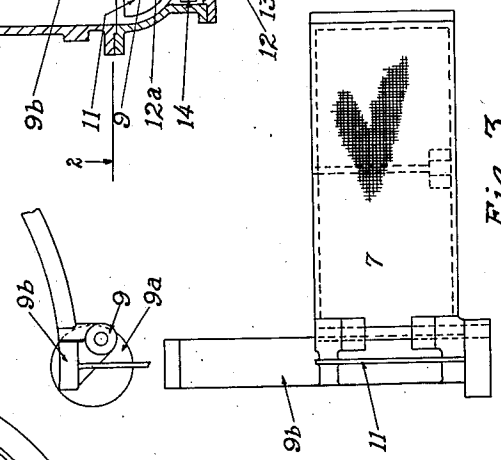


Fig. 3

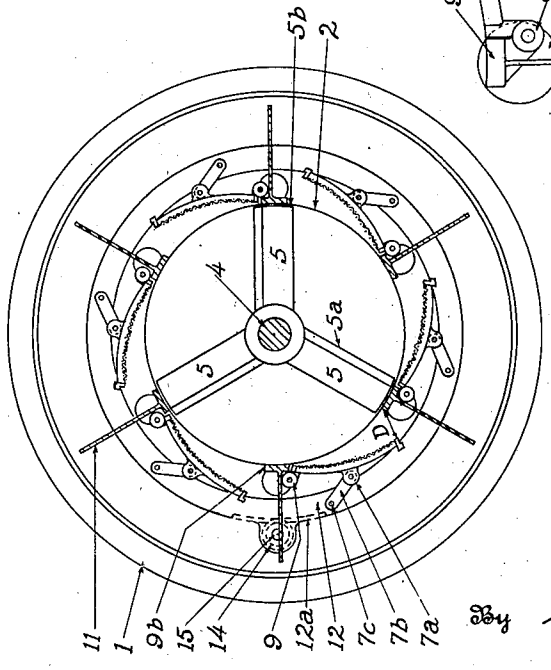


Fig. 2

Inventor

EUGENE SCHMIERER

By George B. Willcox

Attorney

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MACHINE FOR DISSOLVING XANTHATE AND THE LIKE

Eugene Schmierer, Saginaw, Mich., assignor to Baker Perkins Company, Inc., Saginaw, Mich., a corporation of New York

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6 Claims. (Cl. 259—97)

My invention relates to machines for dissolving cellulose xanthate and similar gummy and somewhat porous dough-like masses. The claimed improvements are more particularly adapted to dissolvers of the type described in Patent No. 1,742,226, issued January 7, 1930, to R. Thurm and myself jointly. In such dissolvers the solvent fluid and the more solid material to be incorporated in it for producing a complete solution are subjected to recurrent circulation accompanied by shearing or tearing and mixing the resultant particles with the solvent and to deflecting or baffling actions to increase fluid agitation and to promote intimate contact of the solvent liquor with the freshly exposed areas of the suspended material.

The present improvement is embodied in the deflecting, baffling and shearing means so that the device conveniently and easily dissolves greater quantities of large pieces of material in less time than heretofore.

The object of the invention is to provide a dissolver of such character in which the shearing and baffling structure shall be strong and mechanically efficient, simple to operate and capable of being easily and quickly adjusted to meet the varying requirements for dissolving large pieces at the beginning of an operation and for effectively treating the resultant great quantities of small pieces toward the finish.

Another object is to secure reliable heat control that can be steadily maintained under all conditions of adjustment of the screening elements.

These advantages I attain by a novel relative arrangement of the blades and the screening and baffling elements and by the means for moving the several sections of the screen outwardly after the manner of a gate that swings ajar.

This novel arrangement is hereinafter described in detail, the essential elements being more particularly pointed out in the appended claims defining my invention. It is to be understood, however, that the claims are not intended to be limited to the form of the parts illustrated and described further than a limitation to the desired form is necessary to distinguish them from the prior art.

Like reference characters indicate like parts in all the figures of the drawing.

Fig. 1 is a vertical sectional view of a mixer bowl embodying my improvement.

Fig. 2 is a part horizontal section on the line 2—2 of Fig. 1, the bottom cutter bars being omitted.

Fig. 3 is a fragmentary detail view of my improved hinged screen element and its supporting pintle.

A conventional dissolving machine of the class to which my invention is applicable consists of a dissolver bowl 1 containing an open ended circulating drum 2 spaced above the bottom of the bowl as indicated by numeral 3. There is a spindle 4 on which is a rotatable impeller having blades 5 whose upper margins present shearing edges 5a. Associated with the drum 2 are stationary bars 6 with edges contiguous to and cooperating with the shearing edges 5a of the blades.

The impeller is adapted to maintain a recurrent flow of material through the drum and the blades and bars cut up the pieces of material while they are flowing in suspension, thereby exposing fresh-cut areas to the dissolving action of the liquid. The material under treatment may be of the nature of cellulose xanthate, or any other suitable substance. The tips 5b of the blades 5 may be shaped to present working edges that cooperate with suitable screening and shearing, tearing, or otherwise disintegrating elements 7 of a flow-retarding screen or grille-like wall located below the edge of drum 2.

A co-acting propeller 8 is usually fixed on shaft 4 in the upper part of drum 2 to increase the recirculating flow of the liquid. There is a filling lid 2a and chute 2b and a valved draw-off 2c. A power drive shaft 4a and gears 4b actuate the main shaft 4.

I have increased the efficiency and production capacity of such conventional machines, by the following means:

The circular screen or grille is made up of a plurality, six as illustrated herein, of peripheral sections 7. Each section is hinged at one of its ends to an upright pintle 9 and the pintles have bosses 9a at their lower ends seated in recesses 10 that are formed in the bottom of the bowl 1. The bosses are preferably secured in their recesses by means of screws 9c. The upper ends 9b of the pintles are extended to provide supports for the drum 2. Each screen element thus constitutes a door that can be opened outwardly to present an opening or by-pass of controllable width for the outward escape of the fluid from the impeller blades 5.

When the screen elements are closed their inner faces are in a circle co-axial with shaft 4, and when open they discharge preferably in the direction of normal flow.

Adjacent each pintle is a radially disposed vertical baffle 11 which is fixed by its inner edge

to the drum retaining member 9b and extends outwardly toward the wall of the bowl. Each screen element 7 has a boss 7a on its outer face to which a link 7b is pivoted. The outer ends of the links 7b are pivoted at 7c to a ring 12 which is mounted for peripheral sliding movement in an annular groove or way 13 in the bottom of the bowl 1.

A short externally toothed arcuate rack 12c on the outer edge of ring 12 meshes with a pinion 14 fixed to an upright stem 15 that can be turned by means of a handle 16 so as to vary simultaneously the width of the passageway D, at the free end of each of the screen elements 7, appropriate to the varied requirements of any given dissolving operation.

Preferably the drum 2 is formed with a jacket 2d through which a circulation of fluid is maintained for adding heat to the material being worked, or for removing heat from it, in known manner, for temperature control.

The operation of the machine is similar in principle to that of an earlier machine which is described in detail in Patent No. 1,742,226 issued to myself and Richard Thurm, wherein the impeller blades forced the fluid and pieces of suspended material through a coarse grille which kept the larger pieces a long time in the vicinity of the revolving blades, and an additional grille of finer mesh was adapted to be lowered across the flow to effect the final disintegrating and dissolving action which requires further retardation of the flow from the drum outwardly.

My present structure, however, affords a free outward flow when handling very large pieces and renders it unnecessary to put large chunks through a preliminary cutting process before charging them into the machine. Likelihood of breaking or bending the grilles is eliminated and clogging is entirely avoided, or if it accidentally occurs then screens 7 can be opened wider to free the obstructing pieces at any stage of the operation.

In practice, the machine having been charged with material by way of chute 2b, the passageways D are opened wide and the drive shaft 4a is put into action. The smaller pieces of suspended material flow with the liquid down through the drum 3, out through the opening D, thence upwardly outside the drum and again downwardly through it. All excessively large pieces are caught at D and are cut in two by the blade tips 5b. Then the opening D is reduced in size by appropriate adjustment of handle 16, and the same procedure is followed until the screen elements 7 are closed. Thereafter the particles that are too large to pass through the openings of the screens are held thereon until sheared by the blade tips, and soon the entire material is reduced to the desired condition of fluidity. The completed material is then drawn off through outlet 2c. If undesirable heat is generated by the shearing and stirring actions, cooling fluid is circulated through jacket 2d to maintain proper stabilization of temperature.

For the purposes of my inyention the structure, size and shape of mesh in screens 7 may be selected to suit the materials being worked, and for that reason I have not confined the description and claims to any specific mesh or grille design.

No part of the jacketed wall of drum 2 is covered up or masked by the screen elements 7 in any of their adjusted positions in my device. Neither does any such adjustment of the screens alter the character of the smooth, even flow of material around the outer wall of the drum jacket. Consequently the screen arrangement herein described is an assisting element for the attainment of steady control of heat transfer between the jacket and the material being worked.

While I have shown and described the machine as being upright, that is, the axis of rotation being vertical, it is to be understood that for certain classes of work the axis may be inclined or even horizontal. In that case there may be provided additional supplemental agitating means of known structure, for maintaining an appropriate rate of circulation in the bowl around the drum.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a dissolver comprising a bowl having a circulating drum therein and shearing impellers associated with said drum, the combination of a plurality of screen elements adjacent the path of travel of the tips of said impellers, each of said elements being hinged at one end to a pintle, its other end being adapted to open outwardly so as to present a passageway of variable width for material ejected from said drum by said impellers, and adjusting means operable to coincidently vary the amount of such screen openings.

2. A structure as set forth in claim 1 wherein an outwardly projecting baffle is stationed crosswise of the path of material that flows outwardly through the said passage.

3. In a dissolver having a bowl with a circulating drum therein and shearing impellers associated with said drum, the combination of a plurality of arcuate screen elements adjacent the path of travel of the tips of said impellers, each of said elements being hinged at one of its ends and adapted to be opened outwardly at its other end so as to present a passageway of variable width for material ejected by said impellers from said drum, a peripherally rotatable ring, a member operably connecting the ring with each of said elements to effect their simultaneous opening or closing movements upon arcuate movement of the ring, a rack on the ring, a pinion meshing with the rack, and means for rotating the pinion to adjust the said passageways, and thereby progressively accommodate the shearing action of the impellers to the gradually decreasing sizes of the material pieces being operated upon.

4. In a dissolver having shearing blades and adjustable screen elements co-operative with said blades, a ring co-axial with and spaced from said elements, said ring being mounted for peripheral movement, means for imparting limited arcuate movement to said ring, and operative connections between the ring and the several screen elements, said connections being adapted to translate the said arcuate movements of the ring into substantially radially directed opening and closing movements of the screen elements.

5. In a dissolver having a circulating drum and having at an end of the drum impellers whose tips present shearing edges, and screen elements arranged so that their inner faces may be adjacent the path of travel of said edges during the later stages of a dissolving operation, and means adapted to move a portion of each screen section outwardly from said path of travel during the earlier stages of said operation, whereby to affect the shearing action of the impellers in accordance with the progress of the dissolving operation.

6. In a dissolver of the type which includes a recirculating jacketed drum, a plurality of screen-like members of arcuate form adapted

when in their closed positions to present a substantially continuous cylindrical screen wall at one end of the drum, and when opened in a direction substantially radially outward from the drum axis being adapted to present a plurality of discharge outlets for the escape from the drum of such pieces of material as are too large to pass through the meshes of said screen-like members, the arrangement being such that the screen members in their open position shall present no obstruction to the free smooth flow of material along the outer wall of the jacketed drum, and when closed shall present thereto a perforate screen wall.

EUGENE SCHMIERER.