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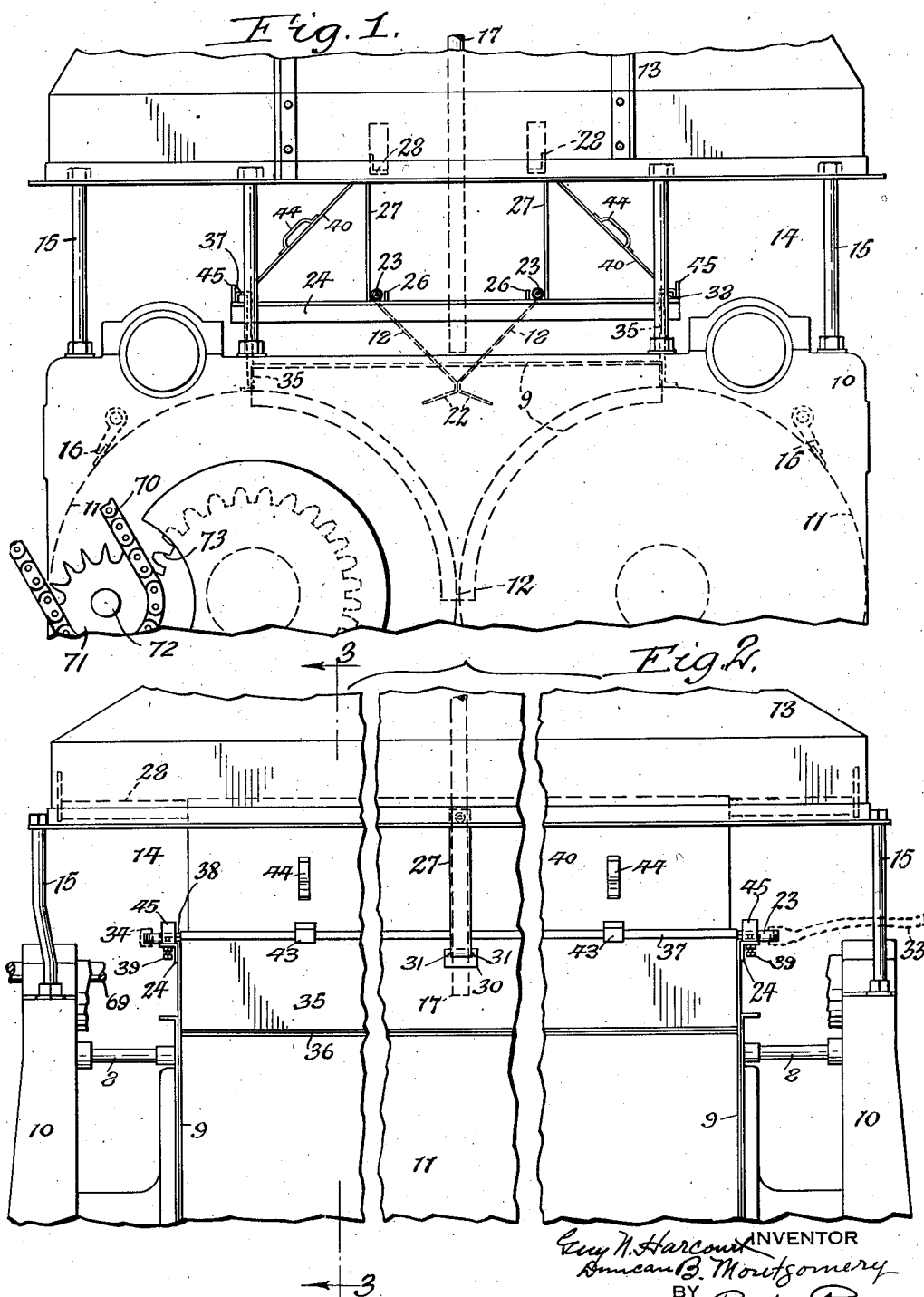
G. N. HARCOURT ET AL

2,392,382

APPARATUS FOR FEEDING LIQUID TO DRYING DRUMS

Filed June 9, 1943

4 Sheets-Sheet 1



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Jan. 8, 1946.

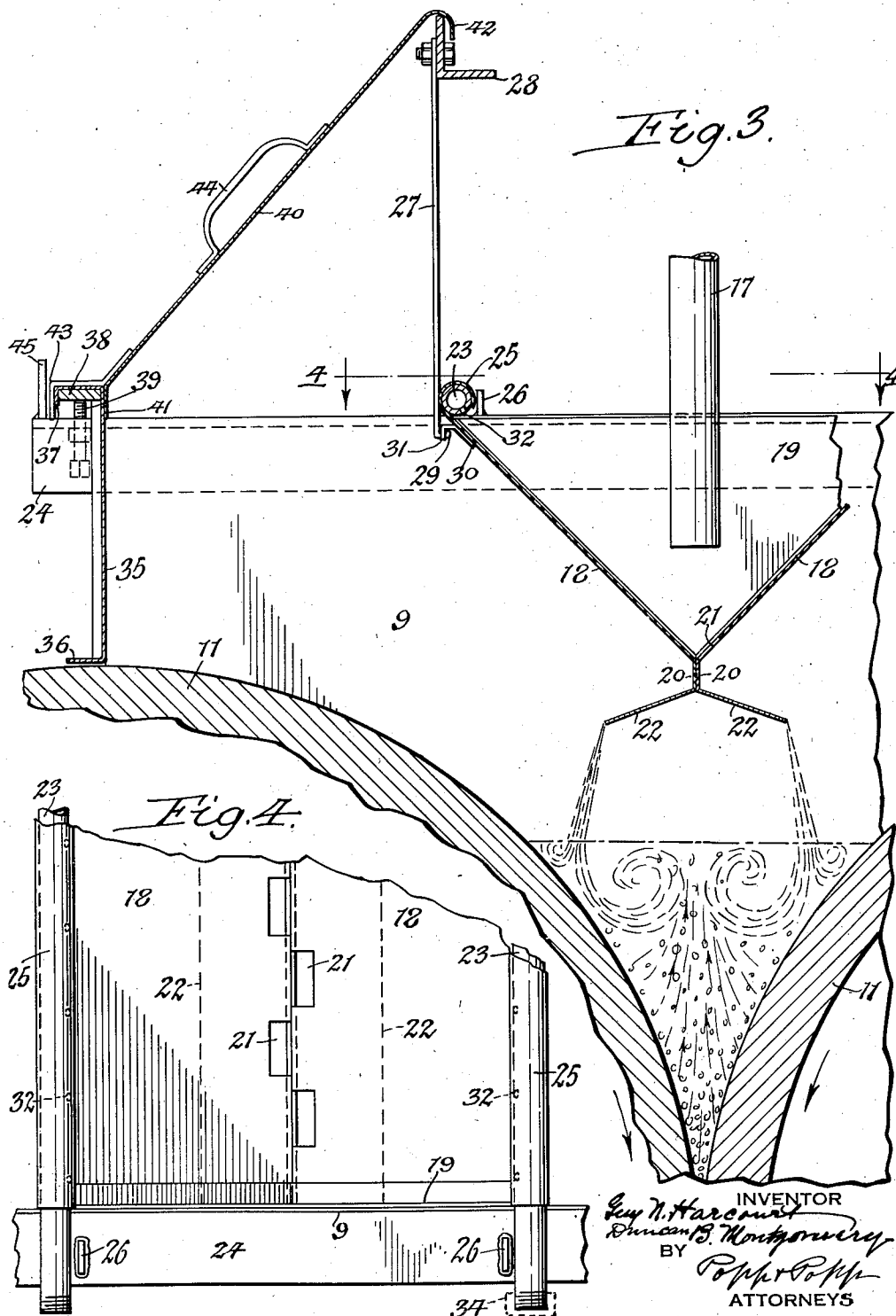
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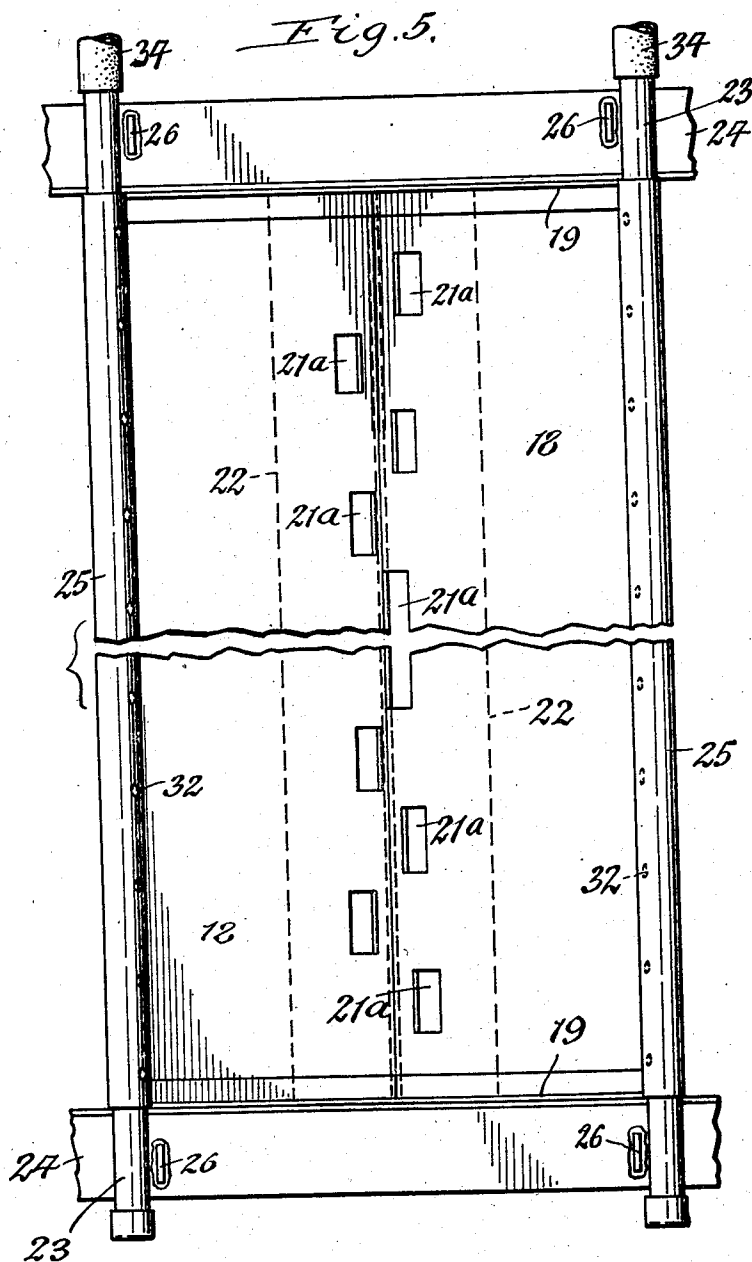
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APPARATUS FOR FEEDING LIQUID TO DRYING DRUMS

Filed June 9, 1943

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Jan. 8, 1946.

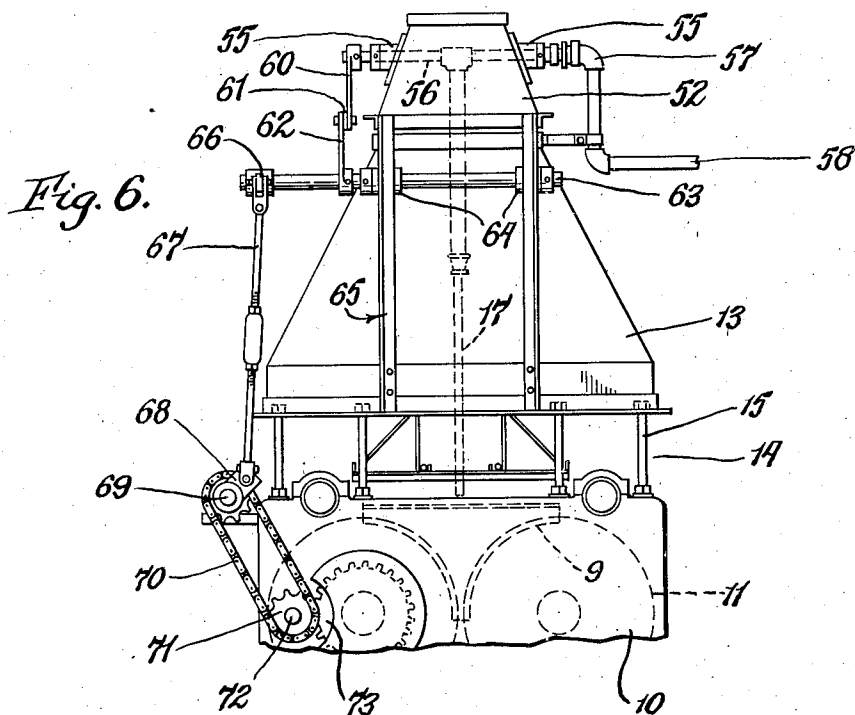
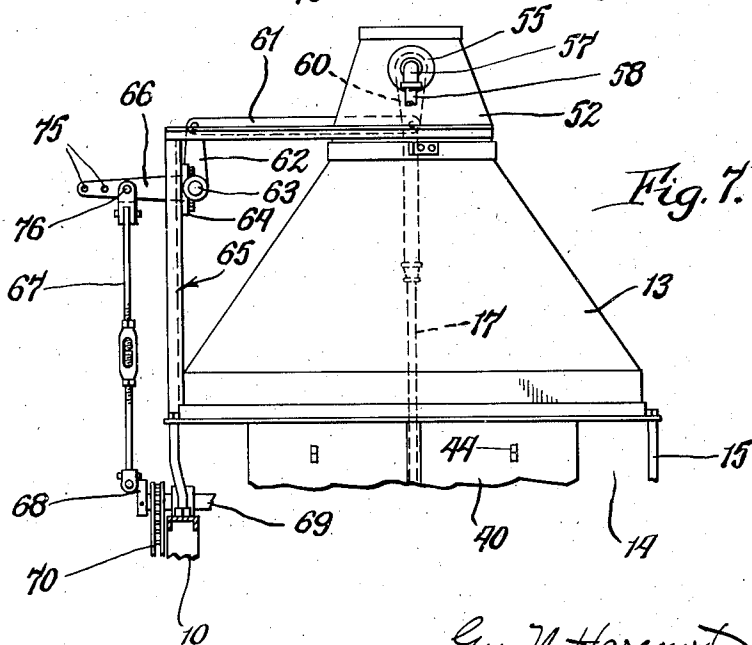
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APPARATUS FOR FEEDING LIQUID TO DRYING DRUMS

Filed June 9, 1943

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,392,382

APPARATUS FOR FEEDING LIQUID TO
DRYING DRUMS

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Application June 9, 1943, Serial No. 490,166

10 Claims. (Cl. 159—11)

This invention relates to a liquid feed for atmospheric and vacuum double drum driers and more particularly to the pendulum type of feed shown in the United States Lavett Patent No. 2,129,329, dated September 6, 1938, the present invention being designed as an improvement on the structure disclosed in this patent.

In the operation of this prior feed device the deposit of the liquid, particularly when viscous, was not entirely uniform in the center and at the ends of the drums and the liquid also splashed on the overhead ventilating hood and other parts of the drier on which it hardened and could only be removed with difficulty. It was also found that when viscous feed liquid, such as concentrated distillery slops, was deposited from directly above the center of the valley between the drums, the dilute feed liquid would pass directly down through the center of the pool to the bite or line of closest approach of the drums and was drawn through the bite and deposited as a layer on the underside of each drum without proper pre-concentration in the boiling pool in the valley between the drums. Thus, instead of mixing with the boiling liquid in the pool and bringing it to a uniform density, the dilute feed liquid would pass directly through the center of the pool without thorough admixture with the liquid already in the pool and hence the pool had a core or center part of light or dilute liquid and side layers, against the drums, of heavy or concentrated material. With this condition uniformity of drying and concentration of the product could not be accurately maintained.

One of the objects of this invention is to provide a feed mechanism for double drum driers whereby the liquid is distributed more uniformly the full length of the valley formed by the drums thereby to secure a more uniform drying effect.

Another object of this invention is to deposit the liquid on opposite sides of the center of the valley formed by the opposing surfaces of the drums and thus insure the thorough admixture of the dilute feed liquid with the liquid in the boiling pool retained in the valley so that this pool is maintained at uniform density throughout and the liquid withdrawn from the pool by the drums likewise is of uniform density to permit of more accurate control of the drying conditions to obtain a product of uniform quality.

A further object of this invention is to provide a baffle means for drum driers whereby any splashings of liquid from the boiling pool of the liquid or from the hot drum surfaces are prevented from reaching the ventilating hood and

other parts of the drier, this baffle means intercepting practically all the splashings and returning the same to the pool in the valley between the drums thereby to prevent sticking of the splashings on the hood, eliminating waste of material and greatly reducing the amount of cleaning to be done.

Another object is to so organize the baffles that the vapor is carried through to the hood in a substantially saturated condition and so that the baffles are slightly cooler than the vapor. By this arrangement a part of the saturated vapor condenses on the baffles to maintain their useful surfaces in a moist condition, this insuring that the splashings which strike the baffles largely slide back into the pool instead of baking on the baffles, a condition which would be as undesirable as baking on the hood as with prior devices.

A still further object of this invention is to so organize the liquid feed mechanism and its associated baffle that parts of the same may be utilized for delivering water or other liquid to the trough from which the feed liquid is delivered into the valley between the drums and thus facilitate the operation of cleaning the apparatus.

In the accompanying drawings:

Fig. 1 is a fragmentary end elevation of an atmospheric double drum drier equipped with this invention.

Fig. 2 is a fragmentary side elevation of the same.

Fig. 3 is a fragmentary cross section thereof, on an enlarged scale, taken on line 3—3, Fig. 2.

Fig. 4 is a fragmentary plan view of the liquid feeding trough and associated parts, this view being taken on line 4—4, Fig. 3 looking downwardly.

Fig. 5 is a view similar to Fig. 4 and showing a modified form of the invention.

Fig. 6 is a diminutive view similar to Fig. 1 and illustrating, in particular, the pendulum feed mechanism.

Fig. 7 is a diminutive view similar to Fig. 2 and likewise particularly illustrating the pendulum feed mechanism.

Those parts of the drying apparatus shown in the drawings as illustrating the type of double drum drier adapted to receive this invention consist generally of a main frame 10, a pair of horizontal, parallel cylindrical drums or rolls 11 journaled on the frame and forming between their upper parts a valley above the bite 12 along which the opposing parts of the drums are arranged in closely spaced relation to each other. The opposite ends of the valley between the upper parts

of the drums are closed by vertical end boards 9 extending across the ends of the valley and drums and connected with the adjacent parts of the main frame by horizontal supporting rods 8, as shown in Fig. 2. The end boards 9 extend above the tops of the drums, as shown in Figs. 1, 2 and 3, for a purpose which will presently appear.

Above the drums is arranged a hood 13 through which the vapors issuing from the liquid which is being dried are withdrawn; which hood has its lower end spaced by an air passage 14 from the drums to permit free movement of external air into the hood from the space around the drums. The hood is supported on the frame by means of posts 15 and its upper end is connected with an exhausting device of any suitable character to carry away the vapors entering the hood. The drums are hollow and heated internally by steam or other heating medium and the same are rotated so that the upper parts thereof move inwardly and toward the bite between the same. The liquid to be dried is deposited in a pool of liquid maintained in the valley formed by the upper inner opposing parts of the drums and is carried in the form of films from the bite between the same downwardly around the underside of the drums and upwardly on the outer sides of the same during which movement the films are dried on the drums. The drums are maintained at a temperature at which the liquid in the pool between the drums boils and splashing occurs, it being one of the objects of this invention to prevent this splashed liquid from reaching the hood 13 and baking thereon, or from baking on any baffles used to prevent these splashings from reaching the hood. During the last part of the upward movement of the films on the outer sides of the drums the dried films of liquor are removed from the drums by scrapers, blades or doctors 16 preparatory to depositing fresh coats of liquid on the cleared surfaces of the drums.

The means for feeding the liquid to be dried to the heating or drying drums include a liquid feed pipe 17 which is pivoted at its upper end so that its lower discharge end oscillates like a pendulum in a vertical plane lengthwise of the valley between the opposing upper parts of the drums in the manner shown and described in the patent previously mentioned and also as hereinafter described. In this prior patent the feed pipe moved comparatively rapidly when in its central position and comparatively slowly when in its extreme positions of its swinging movement which caused the liquid to be delivered unevenly into the pool of liquid lengthwise of the valley between the drums. Further, liquid splashing from the pool would strike the hood where it would dry and thus render necessary subsequent removal of the dried liquid from the hood which work was difficult and interrupted the operation of the apparatus unnecessarily.

The improvements in liquid feeds which overcame the above mentioned difficulties in accordance with the present invention are constructed as follows:

Within the space between the opposing upper parts of the drums and the lower end of the feed pipe is arranged a liquid distributing hopper or trough which receives the liquid from said pipe and delivers the same into the valley between the drums. In the preferred construction this hopper comprises two inclined side walls 18 of sheet metal which converge downwardly and two transverse sheet metal end walls 19. The lower edges

of the side walls meet each other in a plane which is vertically and lengthwise in line with the bite between the drums and the path of the liquid feed pipe and these side walls are connected with each other by sheet metal flanges 20 projecting downwardly from the lower edges of the side walls and connected with each other by spot welding or otherwise. The end walls are V-shaped and each of these is connected at its downwardly converging edge with the corresponding end portions of the side walls of the hopper by spot welding, brazing or otherwise.

Adjacent to its lower inner edge each side wall of the distributing hopper is provided with a longitudinal row of discharge openings 21 and the openings in one row are out of line transversely with the openings in the other row so that the several openings are staggered, as shown in Fig. 4, and cause the liquid passing through the same to be delivered in alternate streams on opposite sides of the bite between the drums.

Below each row of liquid discharge openings 21 is arranged a longitudinal distributing plate, wing or shelf 22 which is inclined outwardly and is connected at its inner edges with the respective hopper flange 20 while its outer edge terminates in line with a vertical longitudinal plane on one side of the bite between the drums. The opposite ends of the hopper engage the inner side of the upper parts of the end boards 9, as shown in Figs. 2 and 4.

Various means may be employed for mounting this hopper in its operative position but the preferred means for this purpose, shown in the drawings, include two longitudinal supporting pipes or rods 23 which rest at their opposite ends on horizontal cross bars 24 secured crosswise to the outer side of the upper edge portions of the end boards 9, as shown in Figs. 1, 2, 3 and 4. The upper edges of the hopper side walls are connected with these supporting pipes by forming these edges in the shape of curls 25 which are bent inwardly over the pipes so as to form a connection between the same, as best shown in Fig. 3.

The supporting pipes of the hopper rest loosely on the supporting bars 24 so that the hopper can be readily removed for convenience in cleaning, inspecting and repairing this part of the apparatus. The distributing hopper is retained in its central operative position by means of stops or retaining lugs 26 arranged on the upper side of the supporting bars and adapted to be engaged by the inner side of the supporting pipes 23.

In order to prevent the distributing hopper from sagging between its ends intermediate supports are provided for the side walls of the same, each of which preferably comprises a hanger 27 secured at its upper end to a cross bar 28 on the inner side of the hopper and provided at its lower end with an inwardly and upwardly projecting hook 29, and a clip 30 secured to the outer side of the central part of the respective hopper side wall and engaged by the hook of the hanger and provided with lugs 31 which are arranged on opposite sides of the hook 29 and prevent horizontal displacement of said hook and clip but enable the same to be readily detached vertically from one another.

In order to enable the supporting pipes 23 to be utilized as part of the means for cleaning the feed hopper and associated parts, each of these pipes is provided on its underside with openings 32 preferably arranged in a longitudinal row and adapted to discharge water from the interior of the same downwardly over the inclined upper side

of the respective hopper side wall and thereby wash off any materials thereon and carry the same out through the openings 21 and into the valley between the drums. Water for this purpose may be supplied to each supporting pipe 23 by means of a water supply hose 33 detachably connected with either end of this pipe while the opposite end thereof is closed by a cap 34, as shown by dotted lines in Fig. 2.

The numeral 35 represents two upright splash plates or walls of sheet metal or other suitable material, each of which is arranged lengthwise above the highest part of one of the drums and engages its opposite ends with the corresponding ends of the end boards 9. The lower edge of each splash plate is provided with a laterally projecting flange 36 which is arranged close to the periphery of the respective drum, as shown in Fig. 3, and the same is capable of vertical adjustment relative to this drum, this being preferably accomplished by providing the upper edge of this plate with an outwardly projecting hook flange 37 which engages over an adjusting rail 38 arranged lengthwise of this splash plate and extending over the transverse bars 24 of the end boards 9, and adjusting screws 39 threaded into said bars and engaging with the underside of said adjusting rails, as shown in Figs. 2 and 3. By turning the screws 39 in one direction or another, the splash plates may be adjusted to bring the lower edges of the same close to the periphery of the drum without producing any scraping effect thereon.

The numeral 40 represents two splash curtains or covers of sheet metal or other material each of which inclines inwardly and extends across the space between the upper edge of one of the splash plates 35 and the corresponding supporting bar 28 within the central part of the hood 13. Each of these splash curtains is provided at its lower edge with a depending longitudinal flange 41 engaging with the upper part of the inner side of the corresponding splash plate 35 and the same is removably supported in this position by means of a hook flange 42 arranged at the upper end of this splash curtain and engaging over the respective bar 42 of the hood and a plurality of hook-shaped clips 43 projecting outwardly from the lower edge of this splash curtain and engaging over the corresponding adjusting rail 38, as shown in Figs. 2 and 3. For convenience in manipulating the splash curtains when applying the same to the apparatus or removing the same therefrom, each of these splash curtains is provided with handles 44 on its outer side, as shown in Figs. 1, 2 and 3.

For the purpose of confining the supporting rails and the splash plates and curtains supported thereon in the required operative position relative to the drums, each of the supporting bars is provided with stop lugs 45 which project upwardly adjacent to the outer side of the supporting rails, as shown in Figs. 1, 2 and 3, and therefore form stops which limit the movement of these rails and the parts carried thereby away from the longitudinal center of the apparatus.

As previously indicated, the feed pipe 17 is oscillated back and forth, in the manner of a pendulum, lengthwise of the drums with its open lower end discharging into the distributing hopper having the side walls 18. For this purpose the hood 13 is provided with a vent stack 52 of reduced size, the vapors being discharged through this stack.

On the front and rear walls of the vent stack

52 are mounted bearings 55 in which a horizontal rocking feed pipe 56 is journaled. One end of this feed pipe is connected by a swivel elbow 57 with a liquor feed pipe 58 and the other end of the pipe 56 is plugged or closed, the liquor from the rocking feed pipe 56 being discharged through the depending liquor feed pipe 17, the lower discharge end of which is located in the hopper provided by the walls 18. The liquor feed pipe and particularly its outlet can be of such size as to create no head of liquor in the pipe or the outlet may be confined so as to maintain a pressure in the pipe. The liquor is preferably supplied by means of a variable speed pump (not shown) of such construction as to deliver a constant quantity of liquor. It will also be understood, however, that the liquor may be fed by gravity or any other suitable means. The axis of the rocking feed pipe 56 is at right angles to the axes of the drums 11 and therefore upon rocking the feed pipe 56 the depending feed pipe 17 is swung along the hopper provided by the walls 18 in the manner of a pendulum.

To so rock the rocking feed pipe 56 the closed end thereof is provided with a rock lever 60 which is connected by a link 61 with a rock arm 62 fast to a shaft 63. This shaft 63 extends parallel with the rocking feed pipe 56 and is preferably supported by bearings 64 carried by an angle frame 65, the vertical leg of which is supported by the reinforced lower rim of the hood 13 and the horizontal leg of which is supported by the vent stack 52. A second rock arm 66 is secured to the rock shaft 63 and this rock arm is connected by an adjustable rod 67 with a crank 68 on a crank shaft 69. The crank shaft 69 is oscillated from the trunnion of one of the drums 11 by means of an endless chain 70 passing around a sprocket 71 fast to a shaft 72 driven from a gear 73 provided on the trunnion of the adjacent drum 11.

The speed at which the pendulum feed pipe 17 swings can be adjusted to suit the particular liquor being handled by changing the sprocket 71 and gear 73. On certain concentrated solutions, three complete cycles per revolution of the drums gave excellent results. The length of the swing of the pendulum feed pipe can be increased or decreased by lengthening or shortening any of the rock arm centers. For this purpose the rock arm 66 is shown as having a series of holes 75 in any of which the pin 76 connecting it to the adjustable link 67 can be inserted to adjust the effective length of the arm 66.

It will be seen that liquor from the main feed pipe 58 flows through the swivel elbow 57 and rocking feed pipe 56 into the depending feed pipe 17 so that it is discharged from the lower end of the feed pipe 17 directly into the hopper provided by the walls 18. As the drums are rotated the gear 73, shaft 72 and sprocket 71, through the chain 70, drive the crank 68 which, through the adjustable rod 67, reciprocates the arm 66 and rock shaft 63, this reciprocating motion being transmitted through the rock arm 62, link 61 and rock arm 60 to the rocking feed pipe 56. The length of swing so provided is adjusted by adjusting the effective length of the arm 66 by selecting one of the holes 75 to attach the rod 67 and is preferably adjusted so that the depending feed pipe 17 swings in the manner of a pendulum back and forth between the extremities of the hopper formed by the walls 18 and distributes the liquor the full length of this hopper.

The form of the invention shown in Fig. 5 is designed to provide greater uniformity in the feed

of the liquid along the length of the valley or space between the drums. With the pendulum feed, uneven distribution of the feed liquid is occasioned by the fact that the pendulum 17 is operated by a crank, as previously explained. At the end of the stroke where the movement of the pendulum is reversed, the rate of travel of the pendulum horizontally is slower than at the center. Therefore the pendulum passes through the center of its swing at a faster rate than at the ends of its swing and the amount of liquid deposited is greatest at the ends of its swing. This lack of uniformity of the feed from the pendulum can be compensated by forming the openings in the side walls 18 of the hopper so that the discharge from the hopper is proportionately greater at the center than at the ends of the hopper. Thus, as shown in Fig. 5, the openings 21a at the ends of the hopper are located at a higher elevation than the openings at the center of the hopper and hence a part of the liquid fed to the ends of the hopper will flow toward the center of the hopper so as to compensate for the lack of uniformity of the pendulum feed where the pendulum is driven by a crank. In other respects the form of the invention shown in Fig. 5 is identical with that shown in Figs. 1-4.

Operation

When starting the operation of this apparatus the liquid feed pipe 17 swings back and forth lengthwise of the hopper and delivers the liquid to be dried successively into different parts of the hopper and alternately in opposite directions. The liquid delivered into the hopper is discharged through the two rows of openings 21 in the bottom part of the hopper on opposite sides of the longitudinal center of the hopper in the form of two rows of streams which are staggered with reference to each other. As the liquid escapes through each of the rows of openings 21 of the hopper, the same runs onto the respective distributing plate or shelf 22, then runs outwardly on the latter and then drops from the outer edge of the same into the valley of the drums on a longitudinal line or vertical plane which lies between the center of the valley and the axis of the respective drum. As the normal feeding of the liquid continues the same forms a pool the level of which varies but is always on a horizontal line located between the axes of the drums and the top of the peripheries of the same, as shown, for example, by the broken line 46 in Fig. 3. This pool is maintained at a boiling temperature by the heated drums. During the downward rotation of the opposing surfaces of the drums the same are coated with the feed liquor and each drum carries a film of the same from the bite between the drums to the doctors 16, during which times the films are dried on the drums and thereafter scraped therefrom by said doctors.

It has been found that if the liquor is fed into the center of the boiling pool, the dilute liquid on account of its velocity tends to flow directly down through the center of the pool to the bite between the drums. Therefore this liquor does not properly mix with the liquid already in the pool with the result that layers of heavier material built up along the surfaces of the drums leaving a core of light material maintained by the direct downward flow of the incoming dilute feed liquid as just described. As a result the consistency of the material drawn through the bite of the drums varies in concentration, a layer of the dilute feed

liquid forming on top of the material with heavy layers alongside the drums.

Occasionally some heavier material accumulates at the surface of the pool toward the sides or slides down from the splash shields and does not mix properly with the balance of the liquid in the pool. Such material, when forced through the bite, forms spots and patches which are not as dry as the balance of the layer of material on the drum surface. Consequently uniformity in drying and in the product cannot be accurately maintained.

In accordance with the present invention, the dilute feed liquid is fed at a distance from the centerline of the drums and hence is mixed immediately with the liquid boiling in contact with the drums. When moving downward on account of its velocity and cooling effect it will contact the surface of the drums before reaching the bite and also be deflected upward by a current rising from the drum surface as indicated in Fig. 3. Therefore, it will be heated rapidly to the boiling point and start to boil away from the drums toward the center of the pool, thereby mixing thoroughly with the liquid in the center. This provides more uniform concentration throughout the entire liquid in the pool which makes the liquid boil more freely and with less splashing.

Any material accumulating on the splash shields and occasionally sliding down into the pool of liquid will be mixed with the liquid in the pool by the boiling action at the sides of the drum and prevented from passing immediately into the bite.

Hence the incoming material is required to thoroughly mix with the more concentrated material already in the pool and heavy layers are prevented from building up along the drum surfaces. The present invention thereby insures greater uniformity in drying and uniformity in the product as compared with processes in which the material is fed directly along the center of the pool.

A certain amount of splashing is incident to the boiling of the material in the space or valley between these drums. Heretofore this material would splash up against the hood 13 and bake thereon so as to be extremely difficult to remove. In accordance with the present invention, any splashed liquid is intercepted by the outer side of the feed hopper from which the splashings tend to flow downward and mix with the incoming liquid. This flow is aided by the saturated condition of the vapors which prevent drying of these splashes. The vapors therefore maintain the material in a moist condition so that splashings which impinge against it tend to slide down and rejoin the liquid in the pool.

The splash curtains are kept in a moist condition because the vapor passing between them is substantially saturated and these curtains are cooled by their contact with the external atmosphere. As a result splashings reaching these moist splash curtains slough off and rejoin the pool. In any event the arrangement of the hopper and splash curtains is such as to positively prevent any splashings from reaching the hood 13. These several intercepting surfaces act efficiently as baffles which cross the path of the liquor splashings which are projected from the drums and return the same to the liquor pool so that no splashings reach the hood and thus render cleaning of the same unnecessary as well as avoiding waste of material.

Splashing of liquid has heretofore been found

particularly troublesome when drying heavy viscous liquids, such as distillery slops, which splashing in the present case are prevented from reaching the hood and instead will hit the baffle and shield means formed by the hopper and the splash plates and curtains and still provide sufficient passageway for the escape of vapors which are developed between the drums during the operation of drying the liquor. These baffle or shield means are therefore particularly desirable in case the liquid level drops below normal and thus cause the fresh liquid to strike bare parts of the heated drums, at which time the liquid is apt to splash badly, which splashing is prevented by the shield or baffle from reaching the hood.

We claim as our invention:

1. A viscous liquid feeding apparatus for a double drum drier having a pair of parallel heated drums which have their opposing sides in closely spaced relation to one another and forming a valley therebetween containing a pool of said viscous liquid of substantial depth and width, said apparatus including means for delivering the viscous liquid to be dried into said pool at a distance from a vertical plane intersecting the bite of the drums and at a distance from the longitudinal sides of said pool whereby a turbulence is maintained in the viscous liquid in said pool.

2. A liquid feeding apparatus for a double drum drier having a pair of parallel heated drums which have their opposing sides in closely spaced relation to one another and forming a valley therebetween which carries a pool of said liquid, said apparatus including a liquid receiving hopper arranged lengthwise a substantial distance above said valley and provided on its underside with two longitudinal rows of openings which are arranged on opposite sides of the longitudinal center of the hopper and discharge liquid into said valley on opposite sides of the longitudinal center of the same, and distributing flanges arranged below said rows of openings and extending laterally from the central part of said hopper and terminating a substantial distance above the surface of said pool and between a vertical plane intersecting the bite of the drums and the longitudinal sides of said pool whereby a turbulence is maintained in said pool.

3. A liquid feeding apparatus for a double drum drier having a pair of parallel heated drums which have their opposing sides in closely spaced relation to one another and forming a valley therebetween which carries a pool of said liquid, said apparatus including a liquid receiving hopper which has downwardly converging side walls, and discharge openings in the lower parts of these walls through which the liquid is discharged into said valley on opposite sides of its longitudinal center, and distributing flanges secured to said hopper and arranged below said rows of openings and inclining laterally from the underside of said hopper toward opposite sides of the center of said valley and terminating a substantial distance above the surface of said pool and between a vertical plane intersecting the bite of the drums and the longitudinal sides of said pool whereby a turbulence is maintained in said pool.

4. A liquid feeding apparatus for a drier having a pair of parallel heated drums forming a valley between their opposing upper parts, said feeding apparatus including a liquid receiving hopper arranged above said valley and provided

on its underside, with liquid discharge openings, a stationary support above said drums, and means for removably mounting said hopper on said support including pipes secured to the upper edges of the opposite sides of said hopper and resting at their opposite ends on said support, each of said pipes being adapted for connection with a water supply and provided with openings through which said water is discharged into said hopper for cleaning the same.

5. A liquid feeding apparatus for a drier having a pair of parallel heated drums forming a valley between their opposing upper parts, said feeding apparatus including a liquid receiving hopper arranged above said valley and provided on its underside with liquid discharge openings, and means for removably supporting said hopper in its operative position, including lower and upper stationary supports arranged above said drums, pipes mounted on opposite longitudinal edges of said hopper and resting at their ends on said lower supports, and hangers each connected at its upper end on an upper support and detachably connected at its lower end with the central part of one side of said hopper.

6. A liquid feeding apparatus for a drier having a pair of parallel heated drums forming a valley between their opposing upper parts, said feeding apparatus including a liquid receiving hopper arranged above said valley and provided on its underside with liquid discharge openings, and means for removably supporting said hopper in its operative position, including lower and upper stationary supports arranged above said drums, pipes mounted on opposite longitudinal edges of said hopper and resting at their ends on said lower supports, and hangers each connected at its upper end on an upper support and detachably connected at its lower end with the central part of one side of said hopper, the detachable connection between each hanger and the respective hopper side comprising a clip secured to said hopper side and provided with a downwardly turned hook, and an upwardly turned hook arranged on said hanger and engaging the upwardly turned hook on said hopper side.

7. A liquid feeding apparatus for a drier having a pair of parallel heated drums forming a valley between their opposing upper parts, said feeding apparatus including a liquid receiving hopper arranged above said valley and provided on its underside with liquid discharge openings, and means for removably supporting said hopper in its operative position, including lower and upper stationary supports arranged above said drums, pipes mounted on opposite longitudinal edges of said hopper and resting at their ends on said lower supports, and hangers each connected at its upper end on an upper support and detachably connected at its lower end with the central part of one side of said hopper, the detachable connection between each hanger and the respective hopper side comprising a clip secured to said hopper side and provided with a downwardly turned hook, an upwardly turned hook arranged on said hanger and engaging the upwardly turned hook on said hopper side, and stops arranged on said downwardly turned hook and on opposite sides of said upwardly turned hook.

8. A liquid feeding apparatus for a drier having a pair of heated drums forming a valley between their opposing upper parts, said feeding apparatus including a liquid feed hopper arranged above said valley and having outlet open-

ings through which the liquid is discharged from the hopper into said valley, splash plates arranged over said drums and on opposite sides of said hopper, and means for adjusting said plates vertically relatively to said drums, including a hook flange arranged on the upper edge of each of said plates, a supporting bar engaged by said hook flange, and an adjusting screw engaging said supporting bar and mounted on a stationary support.

9. A liquid feeding apparatus for a drier having a pair of heated drums forming a valley between their opposing upper parts, said feeding apparatus including a liquid feed hopper arranged above said valley and having outlet openings through which the liquid is discharged from the hopper into said valley, splash plates arranged over said drums and on opposite sides of said hopper, inwardly inclined splash curtains arranged over the spaces between said splash plates and the opposite sides of said hopper, and means for detachably mounting said splash curtains on a support including hook flanges arranged at the

upper edges of said curtains and engaging over relatively stationary supports, flanges arranged at the lower edges of said curtains and projecting downwardly on the inner side of said splash plates, and clips arranged on the lower edges of said curtains and engaging over the upper edges of said plates.

10. A liquid feeding apparatus for a double drum drier having a pair of parallel heated drums which have their opposing sides in closely spaced relation to one another and forming a valley therebetween, said apparatus including a liquid receiving hopper arranged lengthwise of said valley, and means for feeding liquid into said hopper at different rates in different parts thereof, said hopper being provided on its underside with a longitudinal row of openings which are formed to effect a movement of the liquid longitudinally of the hopper to compensate for the lack of uniformity in the rate of liquor fed to the hopper.

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