Aug. 4, 1942. W. V. KNOLL 2,292,276

GELATIN AND GLUE EXTRACTING APPARATUS

Filed March 8, 1939 4 Sheets-Sheet 1

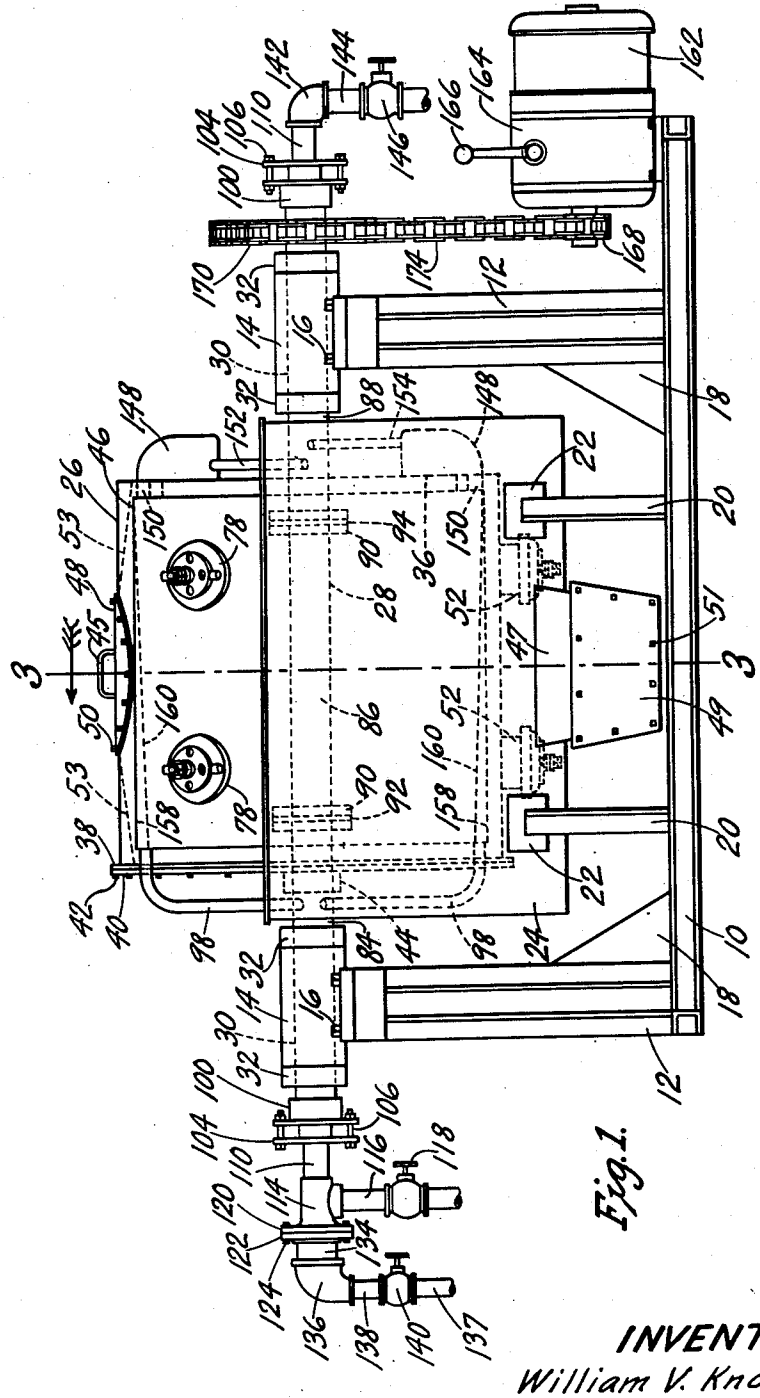


Fig. 1.

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Filed March 8, 1939 4 Sheets-Sheet 2

Fig. 2.

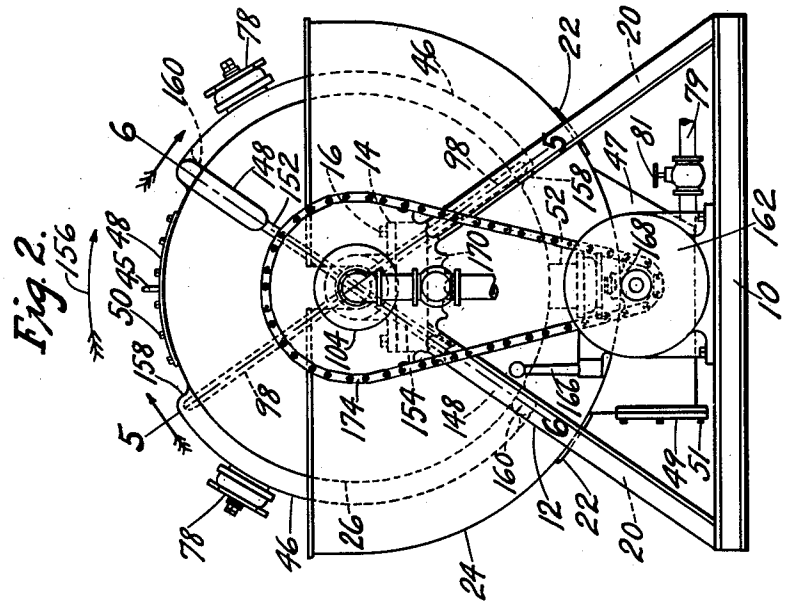
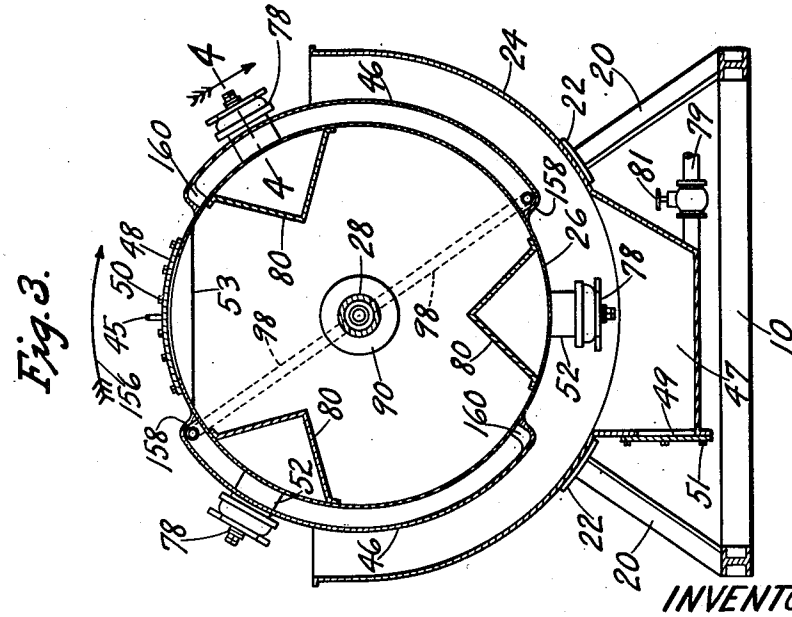


Fig. 3.



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Filed March 8, 1939 4 Sheets-Sheet 3

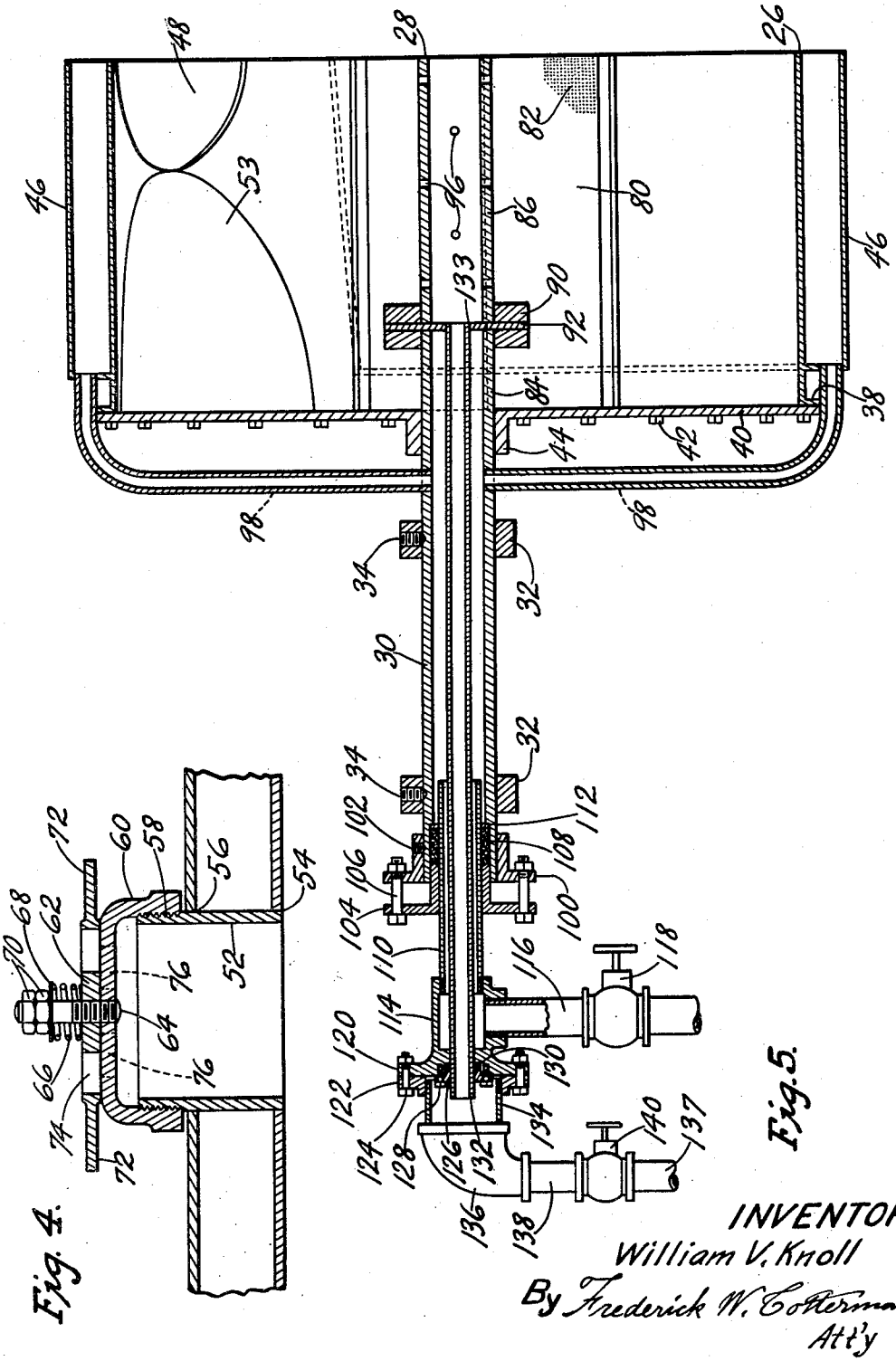


Fig. 4.

Fig. 5.

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GELATIN AND GLUE EXTRACTING APPARATUS

Filed March 8, 1939 4 Sheets-Sheet 4

Fig. 7.

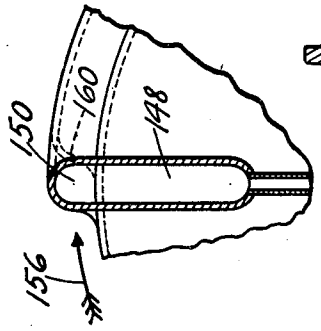


Fig. 6.

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UNITED STATES PATENT OFFICE

2,292,276

GELATIN AND GLUE EXTRACTING APPARATUS

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Application March 8, 1939, Serial No. 260,599

13 Claims. (Cl. 210—150.5)

This invention relates particularly to an apparatus for liberating gelatin and grease from animal matter such as hides and hide trimmings, sheep pates, bones, horn piths, etc., but is applicable also in the reduction of fishery offal, and in the liberation and separation of oils and other by-products from vegetable matter such as soy beans, castor beans, nuts, and kindred vegetable growth.

In the manufacture of gelatin and glue, its liberation from the aforesaid raw materials is accomplished by cooking the materials, which have previously been washed and treated, in water at a comparatively low temperature, and while this operation is known in the industry as the boiling operation, the temperature at which it is carried out is seldom as high as the boiling point of water ranging instead from one hundred thirty to two hundred degrees Fahrenheit.

In the preparation of these raw materials for the boiling operation, particularly the hides and trimmings, it is the conventional practice to place the materials into pits or concrete tanks, where a cover of approximately a two percent milk of lime solution is applied and left on for a period of four to twelve weeks. Where packer's salted hide trimmings are being prepared, they are given a preliminary washing to remove dirt and salt, before being placed in the liming pit. Bone is given a preliminary treatment which comprises crushing and degreasing and subsequent maceration for extraction of the mineral substance by means of diluted acid, thereby producing a by-product acid phosphate.

To shorten the time of preparation for the boiling operation, the more drastic method of applying caustic soda is sometimes employed, but when this chemical is used, great care and attention must be given to prevent overtreatment. In any event, after the stock has been properly limed, which may be in some degree evidenced by the swollen condition of the material, it is removed from the liming pit and placed in open washers, such washers generally comprising round wooden tanks set into a wash room floor. Usually a cone shaped roller is attached to a vertical post in the center of the tank and made to roll in a circular path over the top of the stock being washed, squeezing and rubbing out the lime.

The washing operation requires from ten to seventeen hours, until a titration test indicates that the alkalinity of the wash water has been reduced to a factor of 0.1. At this point, sulphuric acid is added to the stock as a neutralizer, and after being subjected to the acid treatment for a period of as long as eight hours, the stock is again washed until it is but slightly on the acid side. This completes the preparation for the boiling operation.

While a number of improved devices have been proposed to facilitate the boiling operation, the industry in general still employs rather crude apparatus for this purpose. The most commonly employed apparatus comprises an open wooden vat having a steam coil resting on the bottom. In some cases heat is transferred to the material being cooked by allowing steam to escape thru small leakage holes in the steam pipes and percolate thru the mass.

More generally the steam coils are not provided with leakage holes but transfer the heat of the steam to the mass by conduction. In such cases the coils are covered by a layer of excelsior which is in turn covered by a plank floor upon which the mass of material rests. The floor is provided with cracks or perforations to permit circulation of the liquor about the coils.

The space in the vat above the floor is substantially filled with the prepared animal matter, enough soft water being added to cover the stock. Steam is then turned into the heating coils to bring the water to the desired temperature, which depends somewhat on the kind of material being treated.

Obviously, with a heating element at the bottom of an open top vat it is very difficult to maintain a uniform temperature thru so large a mass, altho the maintaining of a uniform temperature is highly important in the production of a high quality product.

In these open type vats no means of agitation is provided, the operators merely loosening up the mass at intervals by inserting long hand paddles whereby they lift a portion of the mass near the bottom to the top and open up spaces into which the warm liquor may penetrate. This means of agitation is slow and laborious and rarely loosens up the mass uniformly, and consequently many parts of the material remain for hours before being reached by the heated liquor, whereby the boiling operation is greatly prolonged.

Certain grades of skins, such as sheep pates for instance, may contain up to 22% of their dry weight in soluble fat or tallow. Due to the low temperatures used, this fat is released slowly and rises to the top in small quantities during the entire cooking period, where it must be skimmed

at frequent intervals by the operators, with hand scoops.

Due, however, to the unequal heating, and to the prolonged period required for the hot liquor to reach all parts of the mass, the liberation of the fat is imperfectly accomplished so that, after the cooking period is entirely completed, the mass still contains a large percentage of the available grease or tallow, which is customarily removed in a filter press, or by subjecting the mass to a gasoline extraction process. Even after use of a filter press there usually remains in the stock from six to nine per cent of the grease.

Obviously, with the use of the open vat used as above described, or any other equipment at present employed in the art, the cooking period is greatly prolonged, the labor involved considerably greater than it should be and the final results far from as effective as desirable. Further, the prolonged period for which a given volume of material must be cooked necessitates a large number of vats, which necessarily require a large floor space area.

The period required to dispose of a single vat full of stock is further prolonged because the residue, from which the liquor has been extracted, settles to the bottom and is then removed with shovels or forks, the vat being subsequently cleaned of the excelsior and solid matter then thoroughly washed before it may be used again. Several hours are added to the time consumed by these cleaning operations.

With certain kinds of gelatin or glue stock, it has been found inadvisable to liberate all of the available gelatin, glue and tallow in a single cooking operation. This is due to the fact that the lower the temperature maintained in the circulating liquor, the higher the quality of the gelatin reclaimed. Such low temperatures, however, do not liberate a very high percentage of the total available gelatin, with the result that treatment at higher temperatures must follow if substantially all of the available gelatin is to be extracted.

These stocks are usually subjected to several cookings, fresh water being introduced in each instance. The liquors drawn off in the several cookings are designated as first run, second run, third run and fourth run liquors, the temperature being raised at each succeeding run a matter of ten or more degrees. It is, of course, the aim of the manufacturer to recover as much of the available gelatin in the first cooking as possible, because the first run liquor will produce a product of the highest quality and of the greatest market value. Gelatin produced from second, third and fourth run liquors is of progressively darker shade and lower quality. Glue from these subsequent runs is of lower adhesive quality as well as of less transparency than that made from the first run liquor.

It is therefore the practice to prolong the first or low cooking period, not necessarily for a fixed period of time, but long enough to allow the liquor to reach a density usually corresponding to four to six percent of the dry gelatin, whereupon the liquor is drawn off and subsequently treated in an evaporator to further reduce it to a density of approximately ten percent of the dry product.

The treatment in an evaporator is, however, generally admitted to be detrimental to the color and quality of the product and therefore any method or apparatus which would reduce the liquor of the first cooking to a density sufficient to warrant elimination of the subsequent evaporating operation, and do this in a greatly reduced period of time, with less labor and equipment and in less floor space, would be a valuable contribution to the art.

It is therefore an object of this invention to provide an apparatus which will greatly reduce the time consumed, the steam used, the labor expended, the amount of equipment needed and the floor space required, for liberating a given amount of gelatin from a given quantity of stock.

Another object is to provide an apparatus whereby the heat necessary to the boiling operation and glue liberation may be made to quickly reach every part of the mass of stock and be kept uniform thruout the cooking period, to the end that liberation of first run liquor may be complete in all parts of the mass at the same time and in the shortest possible period.

Another object is to provide means for removing a greater percentage of the available gelatin in the first cooking period, whereby more of the better quality gelatin will be produced from a given volume of stock.

A further object is to provide means for producing a more highly concentrated liquor in a given time and with a given temperature, to the end that a separate evaporating operation may be avoided and the produce thereby benefited.

Still another object is to provide apparatus adapted to greatly facilitate the removal of the residue thereby saving considerable time and hard labor.

Other objects and meritorious features of the invention will become apparent from a consideration of the following description, reference being made to the drawings, wherein,

Fig. 1 is a front elevation of the apparatus.

Fig. 2 is an end elevation looking from the right hand end of Fig. 1.

Fig. 3 is a section taken at right angles to the axis at 3—3 of Fig. 1.

Fig. 4 is a fragmentary section taken at 4—4 of Fig. 3 thru one of the discharge valves, the scale of the section being four times that of Fig. 3.

Fig. 5 is an axial section thru substantially half of the apparatus taken at 5—5 of Fig. 2, showing the conducting pipes for respectively conveying steam to the steam jackets and water to the cylinder, the section being drawn to a scale double that of Fig. 2.

Fig. 6 is an axial section thru the remaining half of the apparatus taken at 6—6 of Fig. 2, showing the means for collecting condensate from the rotating steam jackets and conveying it to the outside, the section being drawn to a scale double that of Fig. 2.

Fig. 7 is a fragmentary section taken at 7—7 of Fig. 6 thru the condensate collecting trap.

Similar numerals refer to similar parts thruout the several views.

Construction

Referring to the drawings which show an embodiment of the invention, a base 10 has upwardly extending standards 12 to the upper ends of which the journal boxes 14 are secured by screws 16. Gussets 18 hold the standards rigid with the base.

Intermediate the standards 12, and also supported on the base 10 are the legs 20 having saddles 22 at their upper ends for holding a tank 24, within which a cylinder 26 is mounted on a long hollow shaft 28 which has journal bearings 30 rotatable in the boxes 14. End thrust collars 32 secured to the shaft by set screws 34 (see Figs.

5 and 6) hold the shaft against axial movement with respect to the boxes.

The cylinder 26 is closed at one end by the end wall 36 (see Fig. 6), which is permanently secured in the cylinder by welding or similar means. The other end is flanged at 38 and an end enclosing head 40 is secured to the flange by the screws 42. The head 40 has a hub 44 which fits the hollow shaft 28 tightly and is preferably brazed or welded thereto so as to make a pressure tight joint between the shaft and hub.

For the purpose of introducing heat to the interior of the cylinder 26 there are two diametrically opposite and equal steam jackets 46 preferably welded steam tight at their junction with the cylinder wall. The jackets 46 are spaced far enough apart to allow space in the cylinder wall for a manhole which is kept closed, while the apparatus is operating, by the manhole cover 48, held pressure tight to the cylinder by the screws 50.

The chief purpose of the manhole is to provide an opening thru which the solid material which is to be operated upon may be gotten into the cylinder and thru which the residue may be discharged after extraction of the liquors. A handle 45 is provided for raising the cover after the bolts 50 are removed. A chute 47 formed in the bottom of the tank 24 has a cover 49 held on by screws 51. This chute receives the residue when the manhole is turned downward with the manhole cover 48 removed. Sloping plates 53 secured to the inside of the cylinder adjacent the manhole guide the residue toward the manhole thereby accelerating its discharge. The residue is removed from the chute by removing its cover 49 and drawing the solid material out with a rake or similar tool.

As outlets thru which the extracted liquors may be discharged from the cylinder, relatively large nipples 52 are placed in two circular rows, each row comprising three equally spaced nipples welded pressure tight into the cylinder wall as at 54 (see Fig. 4).

Since all but two of the nipples pass also thru the steam jacket, those so passing thru are necessarily also welded to the steam jacket as at 56. The two nipples which are spaced intermediate the two steam jackets are, of course, welded in the cylinder wall only.

The outer ends of the nipples 52 are externally threaded as at 58 to receive an internally threaded valve body 60. On each body a plate 62 is freely rotatable on a stud 64 which is fastened into the body. A heavy spring 66 holds the plate against the body under considerable pressure but permits the plate being rotated about the stud.

A washer 68 and nuts 70 are provided to adjust the tension of the spring. Handles 72 are provided for rotating the plate 62. In the closed position of the valve shown in Fig. 4, a circular row of four equally spaced holes 74 in the plate are misaligned with an equal circular row of holes 76 in the body, but by turning the plate with the handles 72, the holes 74 and 76 may be aligned to open the valves. The valves may be broadly designated by the numeral 78.

Three channel shaped screens 80 of V shaped cross section and as long as the inside of the cylinder are secured with the open side of the V to the inner wall of the cylinder so as to cover the nipples. The screens are made of closely perforated sheet metal of sufficiently heavy gage to withstand the tumbling action of the stock as the cylinder rotates. A small section only of the sheet metal is shown with perforations 82, but it will be understood that the entire area of sheet metal composing the screens will be similarly perforated.

Obviously any liquor left out thru the valves 78 must first pass thru the screens 80. When liquor is discharged thru the valves 78 it is collected by the tank 24 and collects in the chute 47 where it may be drawn off thru the pipe 79 by opening the valve 81.

The long hollow shaft 28 is made up of three sections 84, 86 and 88 joined together by flanges 90 which are welded pressure tight to the ends of the sections (see Figs. 5 and 6).

A disc 92 is interposed between the flanges 90 which join the sections 84 and 86 and a second disc 94 is interposed between the flanges 90 which join the sections 86 and 88. The flanges and discs are brazed or welded together, thereby dividing the interior of the long shaft into three compartments, each of which is sealed pressure tight from the other.

The middle section 86 has a series of radial holes 96 extending thru its wall thereby connecting the interior of the section with the interior of the cylinder 26.

Two steam conductor pipes 98 connect the interior of section 84 of the hollow shaft to the interior of the steam jackets 46, the ends of the pipes being brazed, welded, or similarly secured in openings in the shaft and jackets.

To the outer end of the shaft section 84 a flanged member 100 is secured by the set screws 102. The extreme end of the shaft section is counterbored to receive the packing gland 104 which is drawn toward the flanged member by the bolts 106 thereby compressing the packing 108 around the stationary tube 110. A washer 112 forms an abutment for one end of the packing 108.

The tube 110 is secured in a fitting 114 into which a steam supply pipe 116 extends. A valve 118 is provided to regulate the flow of steam. The fitting 114 has a relatively large flange 120 to which a standard pipe flange 122 is secured by the bolts 124. The center of the flange 120 is counterbored to receive the packing gland 126 which is drawn into place by the screws 128 against the packing 130.

A long tube 132 fits snugly but rotatably in the packing gland 126 at the outer end, the inner end 133 being brazed or welded pressure tight in the disc 92. A short pipe nipple 134 connects the flange 122 to an elbow 136 which communicates with the water inlet pipe line 137 thru a nipple 138 and a valve 140 which controls the flow of water which will enter the cylinder 26 thru the rotating tube 132 and holes 96.

Altho no such connections are shown it will be understood that the water supply line 137 may be further connected to several sources of supply, such as a cold water line, a hot water line, and a tank containing water with the proper lime content for the liming operation held in solution.

Steam will enter the jackets 46 by passing thru the space between the rotating tube 132 and the non-rotating tube 110, into the shaft section 84 and thru the pipes 98.

To the outer end of the shaft section 88 another flanged member 100 is secured by set screws 102. The extreme end of the shaft section is counterbored to receive a packing gland 104 which is drawn toward the flanged member by bolts 106 thereby compressing the packing 108 around a stationary tube 110. A washer 112 forms an abutment for one end of the packing 108.

The tube 110 is secured in an elbow 142 from which a condensate drain pipe 144 extends. A valve 146 is provided to regulate the flow of condensate from the steam jackets.

Extending from one corner of the steam jackets 46, first axially, then radially inward, are two elbow like condensate traps 148 the neck 150 of which opens into the steam jacket. Two drain pipes 152 and 154 extend from the bottoms of the traps radially inward and thru the wall of the shaft section 88 and approximately to the center line of the section. Pipes 152 and 154 are staggered so that the inner or outlet end of one does not come opposite the outlet end of the other.

In Figs. 3 and 7, the arrows 156 indicate the direction of rotation of the cylinder 26. By reference to Figs. 1, 3 and 7 it will be seen that while the leading edges 158 of the jackets i. e., the edges which precede during rotation are in an axial plane, the trailing or following edges are inclined as at 160 so as to provide drainage downward toward the corner to which the neck 150 of the trap 148 joins.

With the foregoing arrangement, the inclined trailing edge 160 of each jacket transfers condensate from the jacket to a trap for the one quarter revolution of the cylinder which begins when the inclined edge 160 passes upwardly thru a horizontal axial plane and ends when the same inclined edge passes thru a vertical axial plane. The discharge from that same trap, however, continues also thru the next quarter revolution. Each jacket therefore transfers condensate to a trap for a quarter revolution and the trap empties thru its radial drain pipes for a half revolution. The two traps together therefore, provide a continuous discharge into the pipe section 88, half the time thru a drain pipe 152 and the other half the time thru a drain pipe 154, whereby all of the condensate from each jacket is completely discharged at each revolution of the cylinder.

The staggered relation of the drain pipes 152 and 154 prevent one discharging into the open end of the other. The steam inlet and the condensate outlet pipes are preferably so regulated that the liquid level in shaft section 88 will be somewhat below a horizontal plane passing thru the axis of rotation.

While any suitable motive power may be employed for rotating the cylinder 26, the power apparatus shown comprises an electric motor 162 with a multispeed gear box 164 having a handle 166 shiftable to different positions to provide different input to output ratios. Since the cylinder must revolve very slowly, the gearing should preferably provide for a large reduction in speed. A small part of the total reduction in speed between the motor and cylinder may be furnished by the sprocket and chain drive shown, which comprises the small sprocket 168 on the output shaft of the gear box and a larger sprocket 170 secured to the shaft section 88 by the set screws 172, together with the roller chain 174.

The operation of the apparatus is as follows:

Operation

Assuming for purposes of illustration that the machine is to be operated to extract glue from packers salted hide trimmings. The operation is begun by emoving the manhole cover 48 and filling the cylinder 26 with the stock. The cover 48 is then returned to place and bolted up tight. A preliminary washing operation to remove the salt and dirt from the trimmings is first performed by opening the valve 140 and filling the cylinder with cold water brought in thru the long tube 132.

One of the valves 78 may be brought to the extreme top position and kept open until it overflows in order to determine when the cylinder is completely filled.

The cylinder is then rotated for a time with the valves 78 completely closed after which they are opened slightly and the cylinder kept rotating with the supply valve 140 partly open. The soiled water escapes thru the pipe 78 preferably into an open gutter where it may be observed so that when it finally appears clear, the water supply valve 140 is closed, the valves 78 opened wide and rotation continued until the water has all been drained off whereupon the preliminary washing operation will have been completed.

The liming operation is next carried out by bringing into the cylinder thru the pipe 137, water carrying about two percent of lime in solution until the cylinder is again filled. The supply valve 140 and the discharge valves 78 are now closed and the cylinder rotated for about sixty hours without steam in the jackets. The discharge valves are then opened and the cylinder further rotated until the lime solution is discharged and drawn off thru the valve 81.

It will be seen that in both the preliminary washing and the liming operation, the constant rotation of the cylinder and the rubbing action of the mass falling on the screens and sliding over them soon carries the liquid to every part of the stock. Inasmuch as, by conventional methods, the liming operation alone often takes as long as ninety days, it is apparent that the time saved by using the present apparatus is considerable.

The operation of washing out the remaining lime solution may be carried out by closing the discharge valves 78 and bringing into the cylinder, thru the water supply line, clean soft water until the cylinder is again filled, then closing the supply valve 140 and rotating the cylinder for about one hour, after which the supply valve is again opened wide and the discharge valves slightly opened and rotation continued with a constant flow of fresh water thru the stock until a titration test shows the alkalinity of the water to have been reduced to a factor of 0.1.

Sulphuric acid is now introduced thru the incoming water to neutralize the stock, the period being extended until the stock shows slightly on the acid side, whereupon all water is drawn off. No steam is introduced into the steam jackets neither during the washing, liming, or acidulating operations, and fresh cold water only is passed thru the apparatus.

The boiling operation is now begun by completely filling the cylinder thru the supply pipe 137 with fresh soft water which may be cold, but preferably is warmed to a temperature somewhat below the desired cooking temperature. The supply valve and the discharge valves are now all completely closed. Steam of the desired temperature for first run boiling is now introduced into the steam jackets 46 by opening the steam valve 118 and the condensate valve 146 slightly.

As the cylinder rotates the stock is tumbled over and over, and inasmuch as the cylinder may preferably be large enough to contain a ton or more of the stock it will be obvious that dur-

ing cylinder rotation, the stock will continuously, by its own weight be alternately pressed against and rubbed over the V shaped perforated screens then returned to the steam heated cylinder walls until, in a relatively short period of time, all parts of the stock are brought up to the desired cooking temperature for first run liquor.

When the cooking operation has proceeded for a sufficient length of time, dictated somewhat by experience, a single valve 78 may be very slightly opened and sufficient liquor drawn off thru the valve 81 to make a density test. When such tests show that the desired density has been reached, all six of the valves 78 are slightly opened and rotation of the cylinder continued until all available first run liquor is drawn off thru the valve 81.

Rotation of the cylinder is now momentarily discontinued and all valves 78 are tightly closed except one which is brought up to a position about that shown at 4—4 of Fig. 3, and the cylinder is again filled with clean soft warm water until it overflows thru this valve whereupon the valve is closed. The steam temperature is now raised to that desirable for second run liquor and rotation of the cylinder resumed. The reason that the cylinder is not completely filled with water for second run cooking is that less water is required to cover the stock after first run liquor has been extracted.

After second run cooking has proceeded for a proper time shown by density tests taken as before indicated, the second run liquor is drawn off and the cylinder refilled with soft water. Each run will of course require less water to cover the stock because of shrinkage occurring as the several runs are drawn off. Each run will also require raising of the steam temperature in order to break down the grease and gelatin remaining in the stock.

When all the grease and gelatin has been extracted the residue must be removed. This is accomplished by stopping rotation of the cylinder and removing both the manhole cover 48 and the chute cover 49, and rotating the cylinder very slowly to cause the residue to be dropped into the chute 47 from which it may be removed with a shovel, rake or similar tool. Before refilling the cylinder with stock, it may preferably be rotated for a short period with the water supply valve 140 open to thoroughly clean it before the next run.

Inasmuch as the stock is uniformly agitated and heated and at the same time continuously pressed against and rubber over the screens while in the heated state, rapid and through liberation of the gelatin and grease is effected, and because of the uniformity in the application of the hot liquor to every part of the stock, a greater volume of first run liquor is reclaimed. The apparatus further speeds production because of the rapidity with which the stock may be entered, treated and removed.

Standard practice may be followed in subsequent operations, such as centrifugally separating the grease from the gelatin liquor, filtering the gelatin liquor to clarify it, operations to increase its density, molding, gelling, drying, grinding, etc., these steps forming no part of the present invention.

While a single embodiment of the invention has been disclosed to illustrate its operative principle, it will be understood that various modifications and exemplifications will come within the scope thereof as defined in the following claims.

I claim:

1. In an apparatus of the character described, a tank, a container, journal bearings to support said container for rotation within said tank about a horizontal axis, combined agitating and screening means comprising a perforated channel member extending axially within said container with the open side of the channel adjoining the inner wall of the container, a valve for connecting the container and tank in the portion of the container wall which is covered by said channel member, means to carry liquid thru one of said journal bearings into said container, and a cover member removable for introducing solid matter into said container, or transferring it from said container to said tank.

2. Apparatus for extracting gelatin and the like comprising a tank, a stock container, journal bearings to support said container within said tank for rotation about a horizontal axis, combined tumbling and screening means comprising perforated channel members extending axially within said container with the open sides of the channels abutting the inner wall of the container, the closed sides projecting inwardly toward the axis, valves in that portion of the container wall covered by said channel members and opening out into said tank, openable means for introducing solids into said container or transferring it from said container to said tank, a perforated pipe section within said container intermediate said journal bearings, and means to carry liquids thru one of said bearings into said perforated pipe section.

3. In an apparatus for the extraction of gelatin and the like, the combination of a horizontally disposed revolvable stock container, journals for said container, combined agitating and screening means consisting of horizontally disposed V shaped screening members projecting from the wall of the container inwardly toward the axis and having their open sides attached to the inner periphery of the container, controllable ports thru the container wall but within the space enclosed by said screens, a revolvable perforated hollow center shaft, means for introducing liquids thru said shaft into said cylinder, and means for introducing the gelatin bearing stock into the container.

4. In a cooking apparatus for extracting gelatin or the like, a horizontally disposed cylinder, bearings for rotatably supporting said cylinder, heating means secured to said cylinder to revolve therewith, combined extracting and screening means consisting of longitudinally disposed V shaped screens projecting from the cylinder wall inwardly toward the axis and having the open sides of the V secured against the inside of the cylinder, valves for opening ports thru that part of the cylinder wall which is covered by said screens, a revolvable perforated hollow center shaft, means for passing liquids thru said center shaft and screens and out said valves, an open trough for collecting the liquids coming from said valves, and means for introducing gelatin bearing stock into said cylinder.

5. In an extracting apparatus of the character described, a stock container, a steam jacket on the outer wall of said container, bearings for rotatably supporting said container, one at each end, transverse conduits at the ends of the jacket extending inwardly and terminating at the inner sides of the bearings, a first and a second rotatable axial conduit extending from the inner ends

of the first said conduits thru said bearings, the first axial conduit being connected thru a rotatable joint to a steam supply line, and a third axially rotatable conduit extending thru the first axial conduit to the inside of the container and communicating with said inside thru perforations in the wall of said third conduit, and another rotatable joint connecting the third said conduit to a liquid supply line.

6. In an apparatus for the extraction of gelatin and the like, a stock container, a steam jacket overlying said container, a hollow shaft extending centrally thru said container, bearings on said shaft at the ends of said container for rotatably supporting said container, the interior of said shaft being divided into compartments, an inwardly extending conduit at one end of the jacket connecting it to one compartment, a second inwardly extending conduit at the other end of the jacket connecting it to a second compartment, a steam supply pipe, a condensate discharge pipe, and rotating joints respectively connecting said first and said second compartments to the supply and the discharge pipes.

7. Extracting apparatus of the character described, comprising, in combination, a stock container, a steam jacket superimposed on said container, a hollow shaft extending centrally thru said container, bearings on said shaft at the ends of said container for rotatably supporting said container, the interior of said shaft being divided into three compartments, a radial conduit at one end of the jacket connecting it to one end compartment, a radial conduit at the other end of the jacket connecting it to the second end compartment, the middle compartment having perforations connecting it to the inside of the container and a pipe extending thru the first end compartment and connecting the middle compartment to the liquid supply line thru a rotatable joint, and a steam supply line connected to the first end compartment thru a rotatable joint.

8. In a steam heated apparatus of the character described, a rotatable stock container, a rotatable steam jacket on the outer wall of said container but not extending continuously around it, thereby providing for said jacket a leading and a trailing edge wall, a drainage conduit emanating from one end of said jacket, just forward of the trailing edge wall thence inwardly, a second drainage conduit coaxial with said container extending from the inner end of the first said conduit, a supply conduit coaxial with said container, and a second supply conduit extending from said first supply conduit outwardly into said jacket.

9. In a steam heated apparatus of the character described, a rotatable stock container, a rotatable steam jacket overlying the outer wall of said container but not extending continuously around it, thereby providing for said jacket a leading and a trailing edge wall, a drainage conduit emanating from one end of said jacket just forward of the trailing edge wall and extending inwardly, said trailing edge wall being at such angle with the axis of rotation as to slope downwardly toward the outlet into said conduit when the said edge wall passes upwardly thru a horizontal axial plane, a second drainage conduit coaxial with said container extending from the inner end of the first said conduit, a supply conduit coaxial with said container, and a second supply conduit extending from said first supply conduit outwardly into said jacket.

10. The combination, in a steam heated apparatus, of a rotatable container, a steam jacket superimposed on the outer wall of said container but not enclosing a space which extends continuously around the container, thereby providing for said jacket a leading and a trailing edge wall, a drainage conduit emanating from one end of said jacket just forward of the trailing edge wall and extending from thence toward the axis of rotation, the outer portion of said conduit being enlarged to compose a condensate trap, and a conduit coaxial with said container extending from the inner end of the first said conduit.

11. The combination, in a steam heated device, of a rotatable container, two opposite steam jackets superimposed on the outer wall of said container to rotate therewith each jacket having a leading and a trailing edge wall, a discharge conduit for each jacket emanating from said jacket just forward of their trailing edge walls thence inwardly toward the axis of rotation, a coaxial conduit adapted to receive the inner ends of the said discharge conduits in axially staggered positions, a supply conduit coaxial with said container, and radial supply conduits extending from said first supply conduit outwardly into said jackets.

12. The combination, in a steam heated device, of a rotatable container, two opposite steam jackets overlying the outer wall of said container, each jacket having a leading and a trailing edge wall, a discharge conduit for each jacket emanating from said jackets just forward of their trailing edge walls thence inwardly toward the axis of rotation, a coaxial conduit of larger diameter, the inner ends of the said discharge conduit extending thru the wall of the coaxial conduit in axially spaced apart positions, their ends reaching substantially to the axis of rotation, a supply conduit coaxial with said container and radial supply conduits extending from said first supply conduit outwardly into said jacket.

13. In combination, an open stationary tank, a closed cylinder rotatably supported in said tank, openable means to fill said cylinder with stock, combined extracting and screening means comprising a series of V shaped screens extending longitudinally in said cylinder with the apices pointing toward the axis and the open sides secured to the cylinder walls, valves in the cylinder wall but only in that portion covered by said screens, a hollow shaft for rotatably supporting said cylinder, the hollow of said shaft being divided by cross partitions into a first, a second, and a third chamber, the second chamber being within the cylinder and having perforations thru its wall connecting said middle chamber and the inside of said cylinder, diametrically opposite steam jackets overlying the cylinder, radial pipes connecting one end of the jackets to the first chamber, radially disposed traps having passage ways entering the jackets near their trailing edges, radial pipes connecting the traps to the third chamber, a non-rotatable condensate pipe extending into said third chamber, a non-rotatable steam supply pipe extending into the first chamber, a long pipe extending lengthwise thru the first chamber into the middle chamber, a liquid supply line, and packing glands sealing the joint between the third chamber and the condensate line, between the first chamber and the steam supply line, and between the long pipe and the liquid supply line.

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