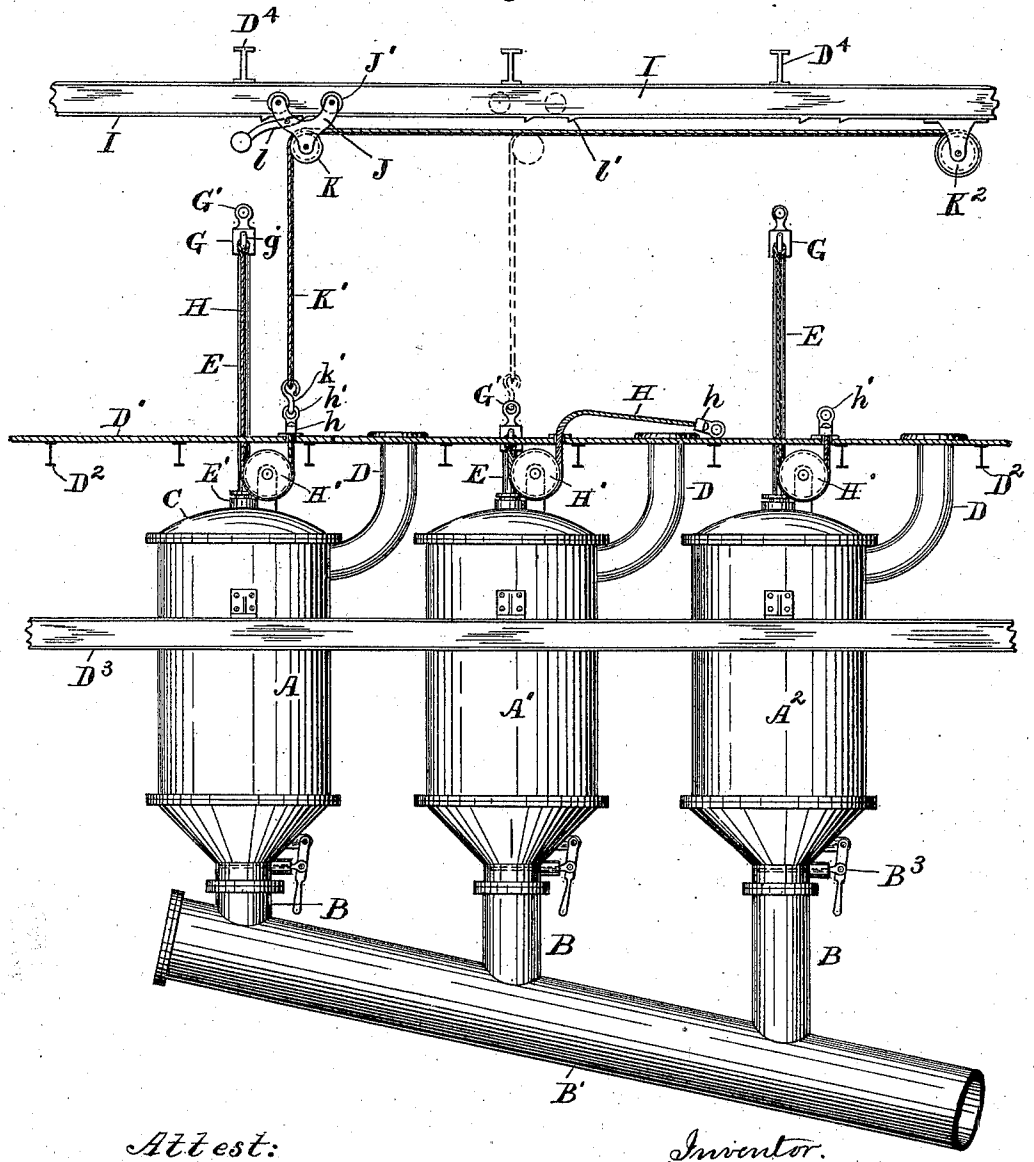
(No Model.) 3 Sheets—Sheet 1.

E. HOLTHAUS.

APPARATUS FOR RENDERING AND PRESSING.

No. 576,314. Patented Feb. 2, 1897.

Fig. 1.



Attest:
L. Lee.
Edw. F. Kinsey

Inventor.
Emil Holthaus, per
Thomas S. Crane, atty.

(No Model.) 3 Sheets—Sheet 2.

E. HOLTHAUS.

APPARATUS FOR RENDERING AND PRESSING.

No. 576,314. Patented Feb. 2, 1897.

Fig. 3.

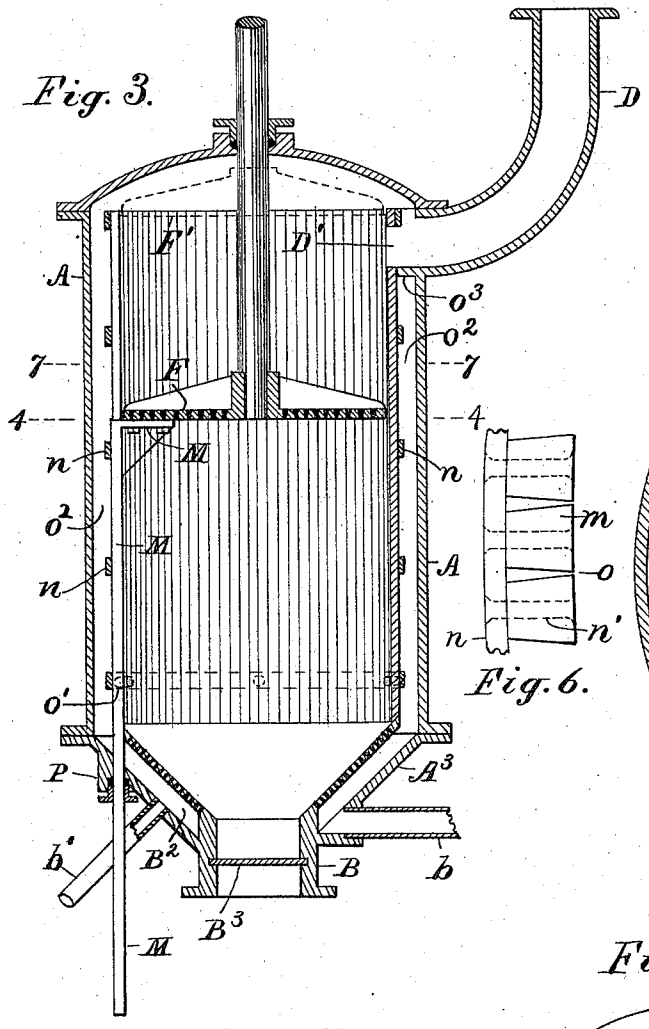


Fig. 2.

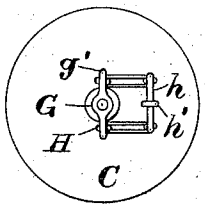


Fig. 6.

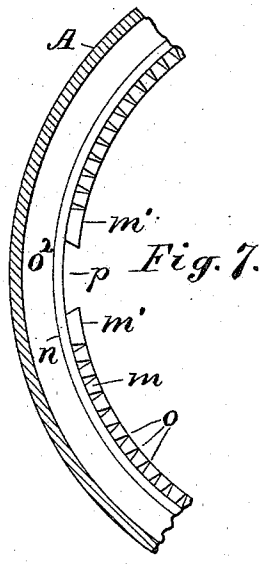


Fig. 7.

Fig. 5.

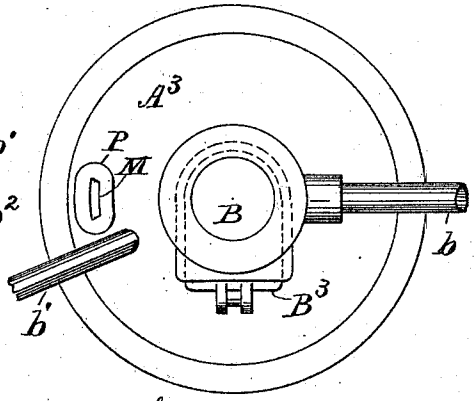
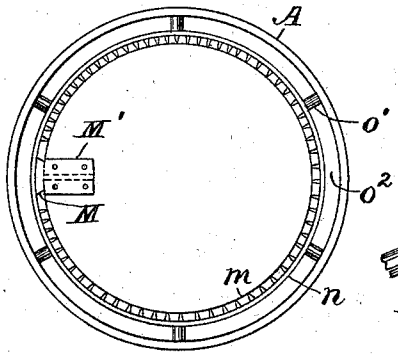


Fig. 4.



Attest:
L. Lee.
Edw. F. Kinsey.

Inventor.
Emil Holthaus, per
Thomas S. Crane, Atty.

(No Model.) 3 Sheets—Sheet 3.

E. HOLTHAUS.

APPARATUS FOR RENDERING AND PRESSING.

No. 576,314. Patented Feb. 2, 1897.

Fig. 8.

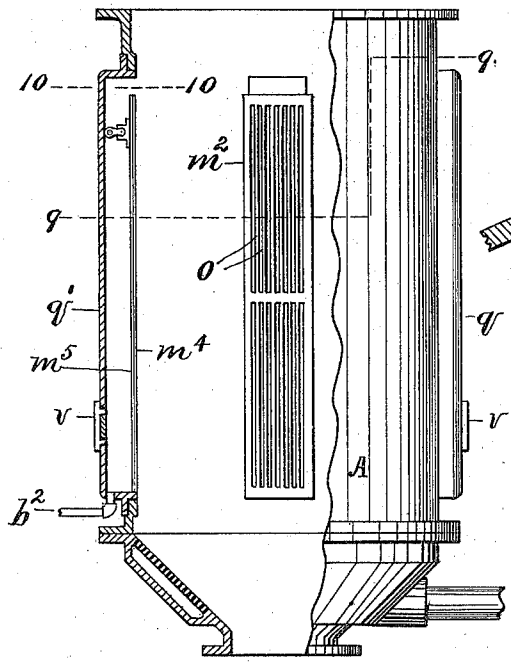


Fig. 10.

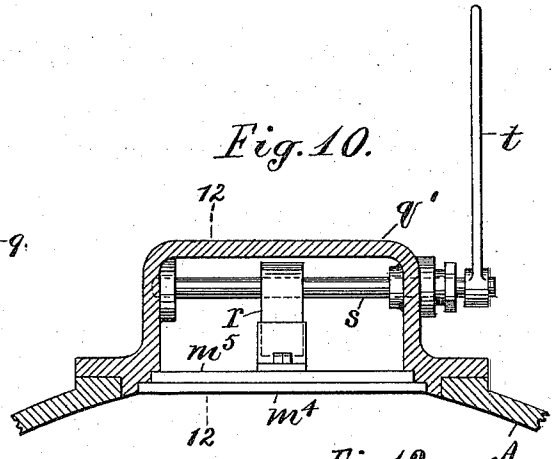


Fig. 12.

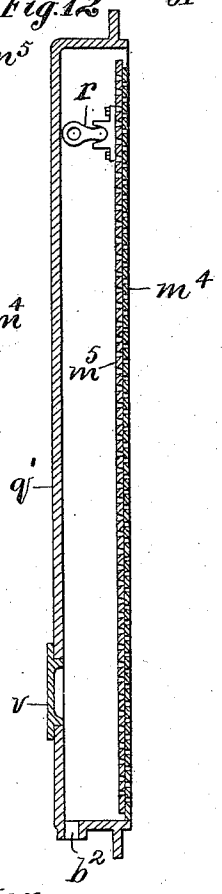


Fig. 11.

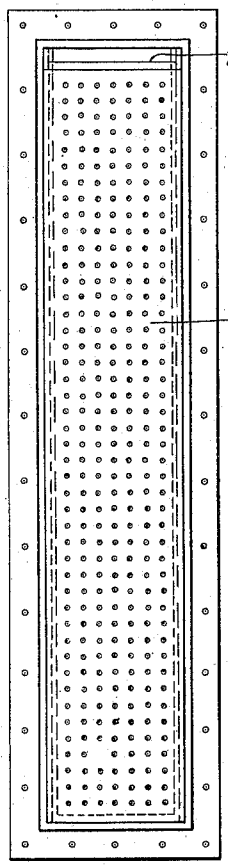
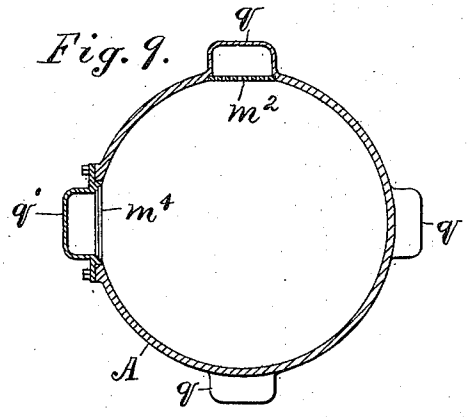


Fig. 9.



Attest:
L. Lee.
Edw. F. Kinsey.

Inventor.
Emil Holthaus, per
Thomas S. Crane. Atty.

UNITED STATES PATENT OFFICE.

EMIL HOLTHAUS, OF CANARSIE, NEW YORK, ASSIGNOR TO CYRUS C. CURRIER, OF NEWARK, NEW JERSEY.

APPARATUS FOR RENDERING AND PRESSING.

SPECIFICATION forming part of Letters Patent No. 576,314, dated February 2, 1897.

Application filed August 11, 1896. Serial No. 602,415. (No model.)

To all whom it may concern:

Be it known that I, EMIL HOLTHAUS, a citizen of the United States, residing at Canarsie, county of Kings, State of New York, have invented certain new and useful Improvements in Apparatus for Rendering and Pressing, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to furnish improved means in a rendering-tank for pressing the material at the close of the rendering operation and for draining off the expressed fluid.

My present invention furnishes means for alternately depressing and elevating the several pistons in a series of tanks by connection successively with a single hoisting-rope. To accomplish this object, I provide, in conjunction with such a series of rendering-tanks, an elevated track extended over all of the said tanks and provided with a hoisting-carriage and pulley having a hoisting-rope. A stationary hoisting-drum is provided to draw the said rope horizontally, and the pulley upon the carriage transforms the movement to a vertical one, so that when the carriage is adjusted over each of the said tanks the movement of the rope may be used to actuate any of the pistons at pleasure. It has been common heretofore to shift a reciprocating mechanism from one apparatus to another where it is desired to operate them successively; but I avoid the use of reciprocating mechanism by providing each rendering-tank with a reversing-pulley and an auxiliary rope adapted to connect with the hoisting-rope when it is required to force the piston downward by the upward movement of the latter. I provide the tank with a perforated piston to permit the escape of fluid upwardly; and to facilitate the discharge of the fluid from the material below the piston I provide the tank with a sectional lining, which is preferably formed with vertical slots expanded outwardly to clear themselves readily from obstructions. The sections of the lining may be formed of straight bars (one between each pair of the slots) sustained within the tank by hoops attached to the shell of the latter, or the sections may be attached to the inner faces of boxes applied to the apertures in the shell.

In rendering-tanks employing a movable piston it has been common to furnish the inside of the tank with a vertical series of outlet-holes to drain off the liquid which accumulates on top of the piston, and great difficulty has been found in preventing such holes from clogging by the pressure of the material into the same during the descent of the piston. The clogging of the holes may be prevented by movable plates adapted to close the apertures during the pressing operation.

My invention also furnishes a free outlet for the liquid upon the top of the piston by providing upon the inner wall of the tank a vertical channel, which is open above the piston and which is wholly closed below the same, whatever the position of the piston. The opening of such channel is covered by a slide-valve, which for convenience is extended through a stuffing-box on the bottom of the tank. The slide-valve is preferably attached to the piston and depends from the same, so as to constantly close the outlet-channel below the piston, while leaving the channel entirely open above the same. The slide-valve takes the place of one or more of the vertical bars of the grating and slides between the remaining bars as the piston moves up and down within the tank.

These improvements will be understood by reference to the annexed drawings, in which—

Figure 1 is a diagram showing three rendering-tanks with reciprocating mechanism for actuating their several pistons in turn. Fig. 2 is a plan of one of the tank-covers. Fig. 3 is a sectional elevation of one of the tanks upon double the scale of Fig. 1. Fig. 4 is a cross-section on line 4 4 in Fig. 3. Fig. 5 shows the bottom of the rendering-tank. Fig. 6 is a diagram, upon a greatly-enlarged scale, of several of the grating strips or sections with the means of attaching them to the hoop, and Fig. 7 is a section of one side of the tank upon line 7 7 in Fig. 3 upon twice the scale of Fig. 4. Fig. 8 is a partial section of the tank with external draining-boxes. Fig. 9 is a cross-section on line 9 9 in Fig. 8. Fig. 10 is a cross-section of draining-box on line 10 10 in Fig. 8. Fig. 11 is an inner view

of the draining-box, and Fig. 12 a section on line 12 12 in Fig. 10.

Figs. 1 to 7 will first be described.

A, A′, and A^2 designate the rendering-tanks in Fig. 1; B, the outlets of the same, connected with a common delivery-pipe B′, which in practice is commonly connected with a drying apparatus.

C designates the cover of the tank, and D the inlet-hoppers, which are extended from a floor D′, upon which the garbage can be carted to dump into such hoppers.

E is the piston-rod, extended through stuffing-box E′ to move the piston F within the tank.

G is a cross-head upon the top of rod E, provided with an eye G′ at the top for hoisting the rod and with eyes g' at opposite sides for the attachment of the reversing-ropes H. These ropes are extended over reversing-pulleys H′, which are journaled upon the head C and are furnished above the floor with a common connection h, having an eye h'. The floor is supported by beams D^2, and the tanks are supported by beams D^3, and a flanged track I is supported over the series of tanks by beams D^4.

A carriage J is provided with four rolls J′ to fit the lower flange of the track upon opposite sides of the same, and sustains the means for hoisting the rod E when adjusted over the same. A hoisting-pulley K is shown upon the carriage, and a hoisting-rope K′ is extended from the same to a winding-drum K^2, by which the rope may be hoisted in any position.

A hook k' is shown at the end of the rope K′ to engage the eye h', as shown in Fig. 1, when it is desired to force the piston downward, the upward pull of the hoisting-rope being converted by the reversing-ropes H and the reversing-pulley H′ into a downward movement at the cross-head G. The piston-rod of the middle tank is shown in its lowest position, and the carriage J and hoisting-rope K′ are shown in dotted lines arranged to engage the eye G′ upon such rod to hoist the same by a direct pull.

A weighted pawl l is shown pivoted upon the carriage J, and a tooth l' is shown upon the track I in a suitable position to retain the carriage in the proper relation to each of the piston-rods. The carriage, with its hoisting-rope K′, furnishes a reciprocating mechanism adapted to raise and lower the piston-rod of either of the tanks in turn.

The sectional lining or grating is shown in Figs. 3, 4, 6, and 7, formed of vertical bars m, which are secured in close proximity to one another upon hoops n, which are supported by studs o' within the shell of the tank at a suitable distance to form a water-channel o^2. The bars are shown in Fig. 6 secured to the hoops by rivets n' and are narrowed toward the hoops, so as to form slots o, expanded toward a draining-chamber o^2. The hoops and the grate-sections secured thereon form a cylindrical lining which may be completed outside of the tank and provided with the projecting studs o' to center it within the shell. The outlet from the funnel is provided with a gate B^3, and a conical draining-channel B^2 is formed within the funnel and connected openly with the chamber o^2 outside of the grating. When inserted in the tank, the lower end of the slotted lining rests upon the inner surface of the funnel A^3, and the periphery of the piston is fitted to move freely within such lining. At one side of the tank bars m' are secured at a suitable distance apart to form a vertical opening p from the chamber o^2 to the interior of the tank, the adjacent edges of the bars being beveled to form a dovetail connection with the slide-valve M, the outer side of which lies against the hoops n. The valve is preferably attached at its upper end by a foot M′ to the piston F and is projected at its lower end through a stuffing-box P upon the funnel A^3 of the tank. The piston is perforated to discharge the expressed fluid upward. The inner wall of channel B^2 is perforated to discharge the expressed fluid, and an outlet-pipe b is extended from the lowest part of the channel to draw off such fluid. A steam-pipe b' is connected to the interior of the chamber B^2 to discharge steam within the same, and thus through the perforated lining and the perforations of the chamber B^2 for cooking the material in the rendering operation. The steam-pipe b' is opened and the outlet-pipe b is closed when rendering, and the reverse arrangement is made when pressing and draining. A passage D′ is formed through the grating at the lower end of the hopper D, and the channel o^2 is closed by partition o^3 upon the bottom and sides of such passage, so that the material to be rendered may be discharged from the passage within the slotted lining when the piston is wholly raised, as indicated by dotted lines F′ in Fig. 3.

Instead of lining the entire shell of the tank with the grating and forming the water-chamber o^2 between the shell and such grating the shell may be formed with a number of vertical apertures extending throughout the whole movement of the piston, a section of the grating applied to each of such apertures, and a draining-box secured upon the outer side of the shell over each aperture and provided with a separate outlet-pipe to carry off the expressed fluid.

Figs. 8 and 9 show a tank thus constructed with four draining-boxes, three of which (lettered q,) are shown integral with the shell, and the fourth, q', made detachable and secured by flanges. A section m^2 of the grating formed with integral slots o is shown fitted to the inner side of one of the draining-boxes q, while the detachable draining-box q' is provided upon the inner side with a fixed grating m^4, having round holes, which are prevented from clogging by a movable plate m^5, fitted to the rear side of such grating and arranged to close the holes and pre-

vent any current of material through the same during the descending movement of the piston. The movable plate m^5 is provided with holes corresponding with the grating m^4, and is moved by a crank r and a rock-shaft s, having a handle t upon the outer side of the draining-box. When the plate m^5 is raised a suitable distance, as shown in Fig. 12, the holes in the grating m^4 are closed, as during the descent of the piston, and thereafter the movable plate is depressed so that its holes correspond with those in the grating and the fluid is permitted a free escape through the grating to the water-chamber within the draining-box, from which it is discharged by outlet-pipe b^2. The boxes are preferably formed with hand-hole covers v to remove any accumulations.

These devices produce the same result, and the method of rendering with the apparatus is as follows: The hoisting apparatus is adjusted over one of the tanks and the piston F elevated to its highest position. The gate B^3 is then closed and the material inserted through the hopper. The steam is then admitted by the pipe b' and the material cooked until the grease is separated therefrom. The piston is then forced downward, and the greater part of the fluid pressed upwardly through the holes in the piston, escaping freely from the upper portion of the grating to the water-chamber outside the same. With the construction shown in Figs. 1 to 7, the valve M closes the valve-opening p below the piston, and the fluid escapes laterally through the slots o in the grating as well as upwardly through the holes in the piston. These slots are made very narrow so as to permit the passage of the fluid chiefly, and any fibrous material which catches in the slots is removed in great part in the further advance of the piston by the friction of the material in its downward movement. Any material which crowds its way through the slots is materially freed by their expansion toward the outer side, and the current of fluid carries such material away through the outlet-pipe b or b^2. The fluid which passes from and above the piston is not compelled to pass through the slots, which are liable to be more or less clogged in that portion over which the piston has passed, but as the valve M moves downward with the piston the valve-opening p above the same permits a perfectly free discharge for the liquid.

With the construction shown in Figs. 10 to 12, inclusive, the closing of the apertures in the grating m^4 prevents the movement of the material through the same during the pressing operation, and the subsequent opening of the apertures by moving the plate m^5 permits the fluid to drain from the material and to escape from the space above the piston with the utmost freedom.

The draining-boxes formed upon the outside of the shell possess a certain advantage over the continuous water-chamber o^2, formed within the shell, as the limited space within such boxes may be readily cleaned through a hand-hole, and the boxes may also be made detachable, as shown at q', which permits the ready removal of any of the boxes for examination and cleaning.

The clogging of the perforations through which the fluid is drained is of constant occurrence in such rendering-tanks, and a construction like the grating with vertical slots, which in large measure avoids clogging, or a construction which permits the draining apertures to be cleaned with facility, is of great value in the operation of such rendering-tanks.

It is found in practice that a very slow movement for the piston is desirable to press the fluid most effectively from gelatinous or animal matters, and I therefore in practice construct the piston of nearly sufficient weight to produce the desired pressure, by which means very little additional force is required in the reciprocating mechanism to press the piston downward.

The slide-valve M and the movable plate m^5 produce substantially the same effect, as both secure a free opening for the escaping fluid and prevent the passage from the same from being clogged during the pressing operation, the slide-valve keeping the opening p closed where the material is under pressure and moving downward as the material is compressed to open the same for the escape of the fluid above such material. The movable plate m^5 holds the draining apertures closed while the material is under pressure and is afterward moved to open such apertures to drain the material freely.

The slide-valve M and the piston are shown connected to move together, but they may be moved independently with the same result, as the slide-valve may, like the movable plate m^5, be employed to wholly close the opening p during the pressing operation, and then drawn downward to a proper level to discharge the fluid above the piston. The slide-valve may be thus actuated by any suitable means, but its connection with the piston renders it wholly automatic and obviates the employment of such means.

It has been common heretofore where the bottom of the material has been exposed to the steam to exclude the material from the funnel by a screen and introduce the steam below the same, but such construction prevents the discharge of the material downward and necessitates its removal through a door in the side of the tank. By forming the funnel with the conical draining-channel B^2 perforated upon its inner wall the bottom of the material may be thoroughly cooked and drained, while its discharge is effected at the bottom of the funnel with the utmost facility. Such construction thus permits the application of the steam to the entire mass of the material from the top to the bottom and drains it freely throughout the same extent.

I am aware that perforated receptacles have been supported within a rendering-tank, and also receptacles formed of vertical bars; but I have found by experience that it is undesirable to obstruct the interior of the tank with any mechanism whatever, and I therefore furnish the draining appliances entirely at the sides of the tank and leave the funnel at the bottom entirely unobstructed for the convenient discharge of the material through the gate B^3.

Having thus set forth the nature of the invention, what I claim herein is—

1. The combination, with a cylindrical rendering-tank, of a cylindrical grating, lining the tank, and formed of separate vertical bars, with intervening vertical slots expanded outwardly between said bars, a draining-chamber between such grating and the wall of the tank, a piston movable within the grating, and a pipe or pipes having connections with the draining-chamber to alternately inject steam and draw off the tank-water, substantially as herein set forth.

2. The combination, with a rendering-tank, of the draining-chamber at the side of the same with an outlet-pipe for the liquid, and a vertical valve-opening extended into the tank, a piston movable vertically in the tank, and a slide-valve adjustable in the opening to drain the water from the tank, as and for the purpose set forth.

3. The combination, with a rendering-tank having a draining-chamber at the side of the same, with a vertical valve-opening extended into the tank, of a piston movable vertically in the tank, and a slide-valve movable with the piston to close the said opening below the level of the piston, and an outlet from the said chamber, as and for the purpose set forth.

4. The combination, with a cylindrical rendering-tank, of a cylindrical grating lining the tank and formed of separate vertical bars with intervening vertical slots expanded outwardly between said bars, a draining-chamber between such grating and wall of the tank, a vertical valve-opening in such grating, a piston movable vertically in the tank, and a slotted valve adjustable in the opening to drain the water from the tank, as and for the purpose set forth.

5. The combination, with a rendering-tank having a vertical chamber on the side of the same, with an outlet from said chamber, a vertical opening from the chamber to the interior of the tank, a piston movable vertically in the tank, a stuffing-box in the bottom of the tank in a line with the said opening, and a slide-valve extended through the said stuffing-box and adjustable in the said opening, as and for the purpose set forth.

6. The combination, with a series of rendering-tanks provided each with a piston and piston-rod, of a track extended above all of said tanks, a carriage movable upon the said track with a hoisting-rope depending therefrom, a reversing-pulley upon the rendering-tank, a head upon the piston-rod with reversing-rope extended from such head around the reversing-pulley, and means for connecting the hoisting-rope in turn with the head and with the reversing-rope, to reciprocate the piston, substantially as herein shown and described.

7. The combination, with a rendering-tank having a piston movable vertically therein, and provided in the shell with a vertical aperture throughout the movement of the piston, of a grating fixed in such aperture, a draining-box secured upon the shell of the tank outside of such grating with an outlet for the liquid, and a movable plate fitted to the outer side of the grating and having corresponding perforations, and connected with a handle exterior to the draining-box to adjust such movable plate, the whole arranged and operated substantially as herein set forth.

8. The combination, with a rendering-tank having a piston movable vertically therein, and provided in the shell with a series of vertical apertures extending throughout the movement of the piston, gratings applied to the said apertures, and draining-boxes outside of the said gratings to form water-chambers, with separate outlets for the water from each of the said chambers, the whole arranged and operated as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EMIL HOLTHAUS.

Witnesses:
THOMAS S. CRANE,
EDW. F. KINSEY.