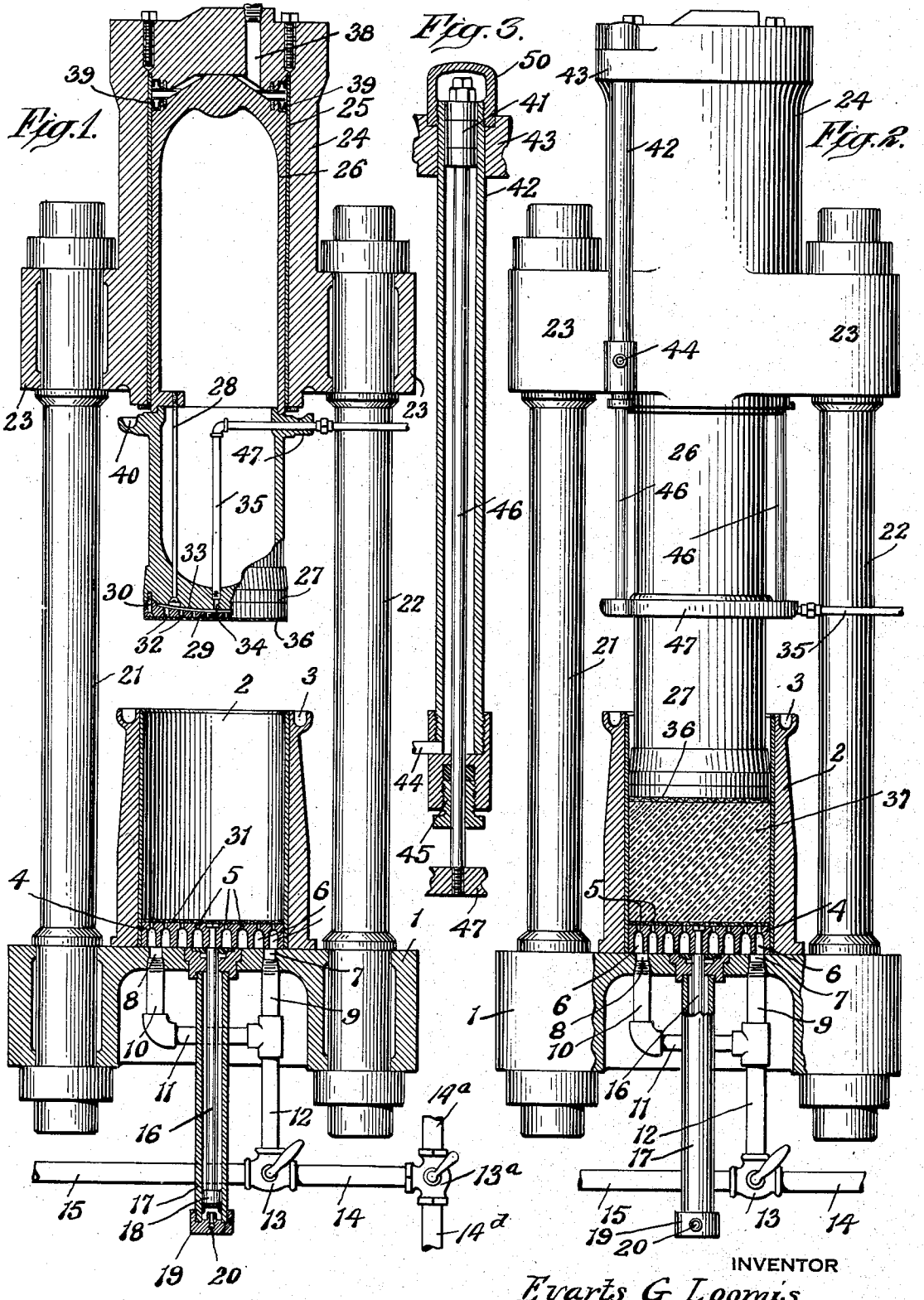
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DEHYDRATING PRESS AND METHOD OF DEHYDRATING

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DEHYDRATING PRESS AND METHOD OF DEHYDRATING

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This invention relates to dehydrating presses, and more particularly to those in which a liquid is first removed from the material under treatment, and then another liquid is permitted to percolate through the material and the latter liquid then pressed out of the material. An example of such material is nitro-cellulose, where the material is preferably maintained in moistened condition for safety purposes, then excess water is drained, wrung or pressed out and alcohol is allowed to percolate through the material and then excess alcohol is pressed out and reclaimed.

The object of this invention is to provide a process of treating material and a press of a construction suitable for the performance of such a function as described on any material requiring such treatment, whether it be the cellulosic material mentioned or some other material or substance.

A further object of the invention is to provide a dehydrating means of the character described wherein effective and efficient recovery of the liquid with which the material is saturated is had.

In the accompanying drawing wherein an embodiment of the invention is shown, Fig. 1 is a vertical sectional view through a press made in accordance with the invention; Fig. 2 is an elevation of the press, with the lower portion of the same shown in section and the press shown loaded and in operation; and Fig. 3 is a vertical sectional view through the hydraulic lifting means for elevating the ram or plunger.

In the drawing, 1 indicates the base member or support for the press, and upon which the receptacle 2 in which the material is compressed, is supported. Said receptacle 2 is in the form of a cylindrical member having its upper edge formed with an annular overflow groove 3 and having a vertically movable bottom 4 formed with a plurality of apertures 5 communicating with the channels 6 in the underside of the bottom 4, said channels leading to the openings 7 and 8 in the base of support 1. Openings 7 and 8 respectively, connect to the pipes 9 and 10, which are joined by the cross pipe 11 and that leads into pipe 12 which connects through the two-way valve 13 to the lateral pipes 14 and 15.

Located on top of the bottom member 4 in receptacle 2 is a screen 31 or other foraminous material serving to prevent clogging of the apertures 5. The bottom 4 and the screen carried by it are adapted to be raised at the proper time to eject any material located in receptacle 2 after the completion of the dehydrating operation, the raising of the bottom being performed by means of the rod 16 located within cylinder 17 and provided at its lower end with the piston 18. The upper end of the rod 16 is secured to the bottom 4. The lower end of cylinder 17 is provided with closure member 19 having inlet port 20 through which fluid may enter to hydraulically elevate piston 18, thereby causing rod 16 to lift the bottom and cause it to raise the material in receptacle 2 and eject it therefrom.

Secured in and extending upwardly from the base member 1 are the parallel spaced supporting rods 21 and 22 which have their upper ends secured in the lug portions 23 of hydraulic cylinder 24. Cylinder 24 is lined as indicated at 25 and movable vertically within the cylinder is a hollow plunger or ram composed of the upper portion 26 and attached lower member 27, the latter being attached to the upper portion 26 by means of the lengthy screws 28, several of which are employed. Secured to the lower end of the plunger portion 27 by means of the screws 30 is an apertured face plate 29 formed with a plurality of openings 32 communicating with the recess 33 from which a port 34 extends, said port 34 being connected to a pipe 35 extending upwardly through the plunger portion 27 and thence extending laterally out through the side of the plunger and finally connecting through piping having swing joints or flexible connections, not shown, with a vacuum pump, the purpose of which is to produce suction sufficient to allow atmospheric pressure to force the alcohol or other percolating fluid through perforations 32 and out through the pipe 35 thus to prevent leakage between the material cylinder 2 and ram 27 and to recover or reclaim said liquid.

The underface of the face plate 29 is covered with a screening or foraminous material 36 to prevent clogging of the opening 32. The connected plunger portions 26 and 27, constituting the ram, are adapted to be lowered to cause plunger portion 27 to descend into receptacle 2 and compress the material 37 located therein to a required extent, as presently pointed out. The plunger is forced downwardly by means of hydraulic fluid entering through entrance opening 38 formed in the upper end of cylinder 24. Plunger 26 is provided at its upper end with packing 39 to prevent leakage of the hydraulic fluid past the plunger, to prevent the fluid from reaching the contents of the receptacle 2 and possibly contaminating the same. The plunger portion 27 is formed with an annular collection groove 40 at the point where it joins the plunger portion 26 so that it may capture any hydraulic

fluid which may possibly trickle past the portion 26 of the plunger.

The plunger or ram is adapted to be raised to the position shown in Fig. 1 by means of hydraulic lifting means, each of which includes a piston 41 (Fig. 3) located in cylinder 42, the upper end of said cylinder being capped as indicated at 50, and secured in lug 43, projecting from the cylinder 24. Piston 41 is elevated to the position shown in Fig. 3 by means of hydraulic pressure entering into the lower end of the cylinder through pipe 44 connected to a suitable source of liquid supply. The lower end of hydraulic cylinder 42 is closed by stuffing box 45 and the lower end of piston rod 46 is secured in flange 47 of plunger member 27. Two of the cylinders 42 and associated parts are employed for raising the plunger.

From the foregoing the operation of the device will be readily understood. The receptacle 2 is first filled with moist or damp material such as nitrated linters that have generally been drained, centrifuged or otherwise treated after having been washed to remove the excess water from this material. After this, hydraulic pressure is permitted to enter through opening 38 in cylinder, 24, causing the ram or plunger to descend and have its lower end portion 27 enter into receptacle 2 and press water out of the material 37 and form the material into a uniform mass but not so solid that it may obstruct the desired percolation that follows. The water may drain out of pipes 9 and 10 into pipe 12, through valve 13, and finally out through the drain pipe 15. At this time valve 13 is in such a position that it is shutting off pipe 14 and establishing communication between pipes 12 and 15. The valves leading to the hydraulic cylinder 38 may now be closed, leaving the ram or plunger down within receptacle 2 and applying moderate pressure to the material therein. The vacuum or suction of an alcohol or other fluid pump is then started or put in communication with pipe 35 which reduces the air, gas or vapor pressure between the fibrous or granular structure of the material. Alcohol or some other fluid, according to the nature of the material being treated, is now pumped in through pipes 14*a* and 14, and forced up through pipes 12, 10 and 9, the valve 13 having been turned to shut off communication between pipe 12 and pipe 15. The alcohol enters through the pipes leading to channels 6 and passes upward through openings 5 and through the screen 31 to reach the material and it percolates upwardly through the material to saturate the same by relative specific gravity carrying only gases, air or vapor above it and which are carried away by the suction. As the alcohol rises, it comes into contact with screen 36 and suction draws the alcohol up through apertures 32 and out through pipe 35 to a point where it is recovered. After this percolation is carried to the desired extent, the alcohol entering through pipe 14*a* is shut off and then the ram or plunger is caused to descend farther and compress the alcohol-soaked material to an extent required to remove all surplus alcohol from it, the alcohol thus removed being drawn upward through the suction pipe 35. When the final compressing operation of the material has been completed, the vacuum through pipe 35 is cut off and valve 13*a* is turned to connect pipe 12 to drain surplus alcohol out of the bottom of material receptacle 2 and from pipes 14 and 14*d* to supply tank. The ram is then elevated or raised by means of the hydraulic pistons 41 and then hydraulic piston 18 is elevated to raise the bottom 4 and cause the dehydrated contents of the receptacle tube to be ejected out of said receptacle. The bottom 4 of receptacle 2 will descend by gravity upon release of hydraulic pressure below piston 18.

What I claim is:

1. In an apparatus of the character described, a receptacle for material to be compressed, a ram movable downwardly into the receptacle to close the top of the same and to compress the material therein, means for raising and lowering the ram out of and into the receptacle, a movable bottom in the receptacle and means for raising the same when the ram is elevated, means for forcing a liquid through said bottom to saturate the contents of the receptacle, and means directly connected to the ram for exerting suction through the ram to draw off liquid extracted from the contents of the receptacle by the pressure of the ram.

2. The method of dehydrating materials comprising placing a quantity of the material in a receptacle, introducing a percolating fluid at the bottom of the receptacle to cause said fluid to rise upwardly through the material, applying pressure on top of the material in the receptacle by a movable pressure-imposing element to compress the material, and employing a vacuum exerted through the movable pressure imposing element during the compression of the material to draw off the percolating fluid.

3. An apparatus of the character described comprising, a receptacle for holding material to be compressed, said receptacle having a normally open top, a ram normally located above the open top of the receptacle and mounted for descending movement into the receptacle to thereby close the open top of the same and compress material within the receptacle and extract liquid therefrom, the receptacle being provided with a vertically movable perforated bottom, means for forcing liquid upwardly through the perforated bottom to cause said liquid to saturate the material in the receptacle, suction means associated with the ram for removing liquid upwardly from the material in the receptacle while the ram is disposed within the receptacle and is acting as a closure means for the open top of the same, and means for elevating the perforated bottom of the receptacle to eject the contents of the receptacle after the ram has been elevated to a position above the top of the receptacle.

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