

May 12, 1936.

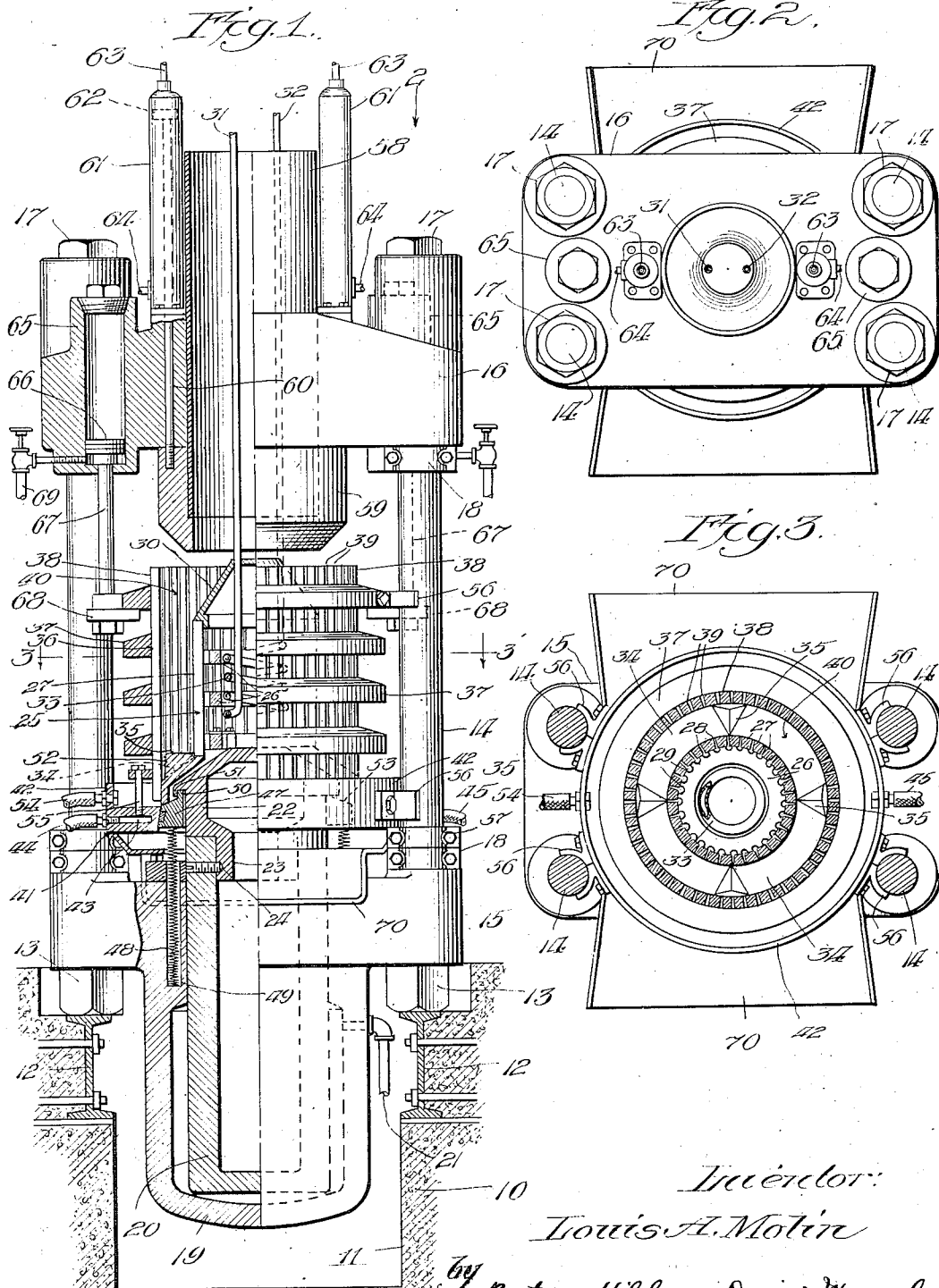
L. A. MOLIN

2,040,394

HYDRAULIC PRESS

Filed Sept. 22, 1933

3 Sheets-Sheet 1



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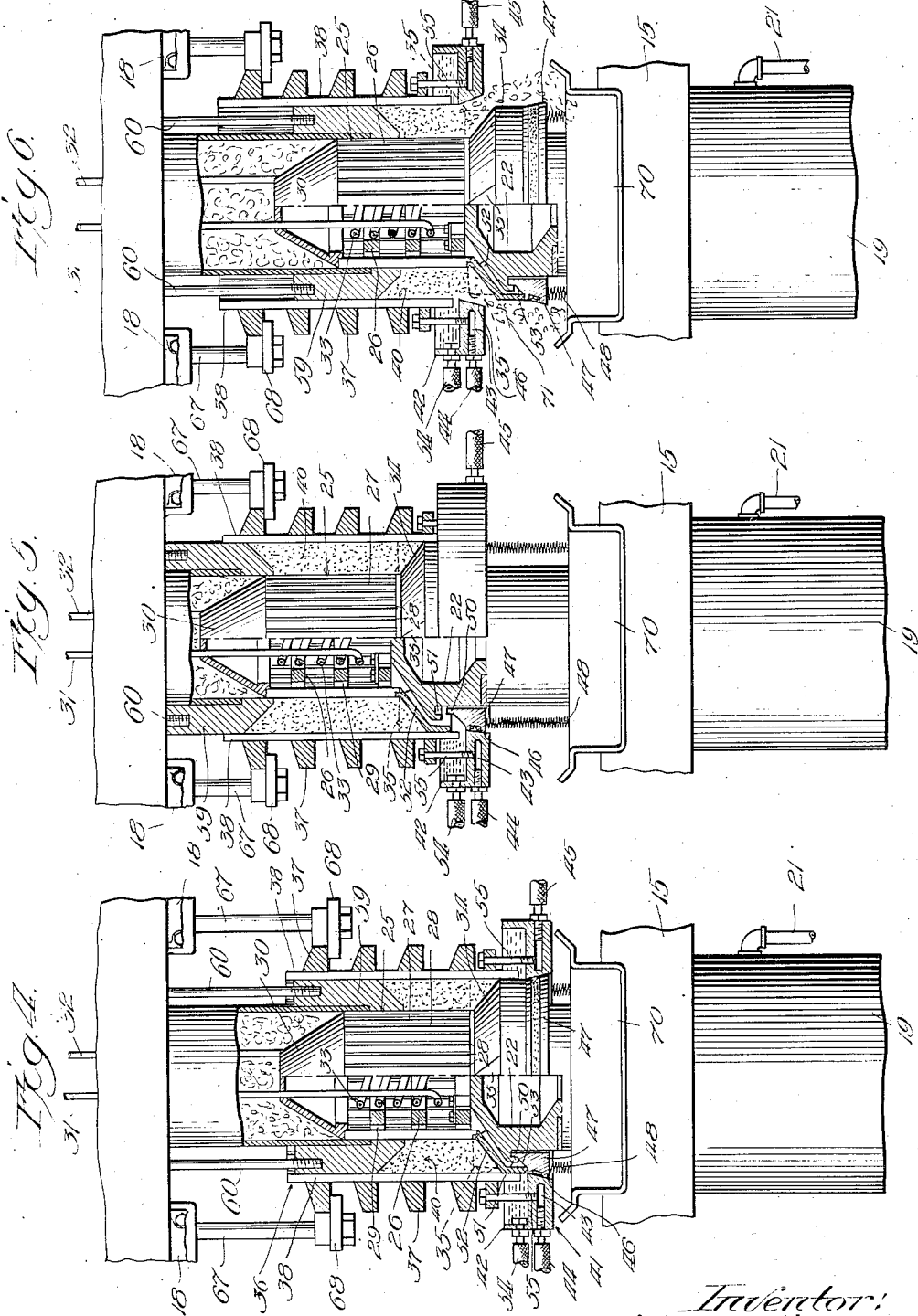
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 8.

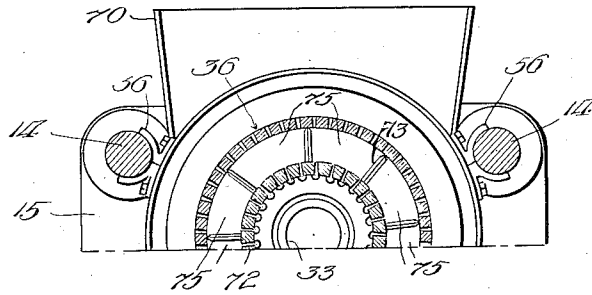
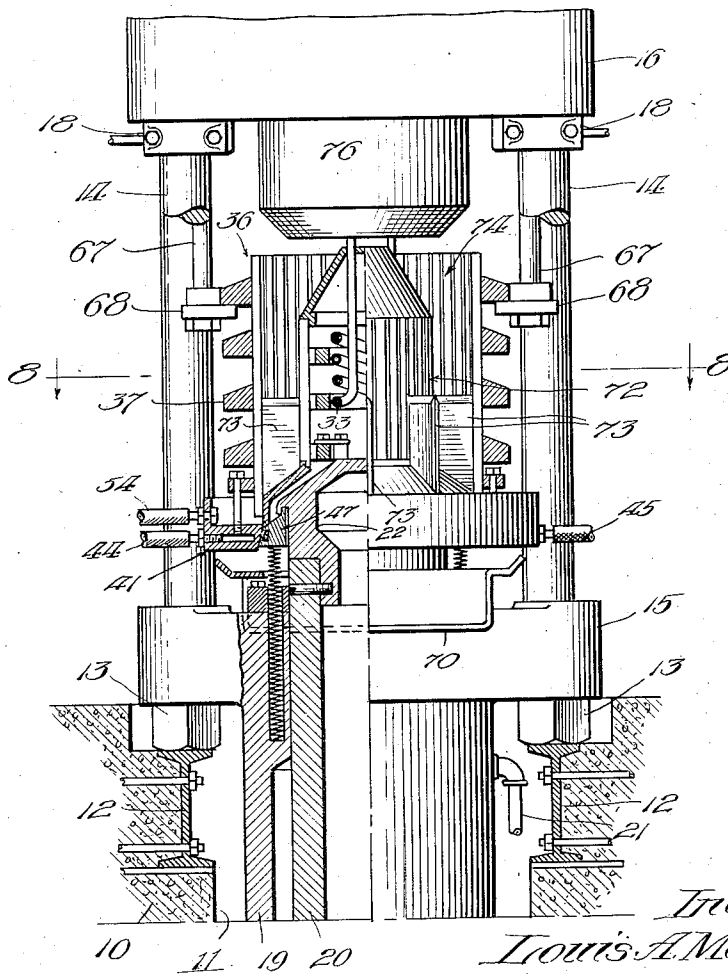


Fig. 7.



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UNITED STATES PATENT OFFICE

2,040,394

HYDRAULIC PRESS

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Application September 22, 1933, Serial No. 690,524

13 Claims. (Cl. 100—50)

My invention relates to an hydraulic press and more particularly to a mechanism of this character which is utilized for the extraction of oils and greases from oil-bearing seeds, animal tissues for crackling, and other oil-bearing materials whose oil content may be substantially removed by the application of pressure, with or without the addition of heat.

Present methods of commercially extracting oil or grease from the above materials generally comprehend the use of an hydraulic press which is manually charged with the oil-bearing material that is segregated into individual masses by the interposition of spaced metal plates or other forms of separating devices in order to better apply the pressure to the total mass of a charge. The pressure chamber is generally cylindrical in form so that considerable time is required for the oil which is extracted from the central portions of the several masses to seep radially for discharge through the apertures of the pressure chamber wall. Moreover, a machine of this type must not only be manually charged, but also unloaded in the same way, the plates forming a plurality of compressed cakes which are discharged singly through the head of the cylinder by the pressure ram.

Another type of extracting mechanism takes the form of the so-called "extrusion press" which provides for the continuous extraction of oil from oil-bearing material that is moved under a constant pressure through the machine, the pressure also acting to discharge the residue. According to this method, it is contemplated that, when any given unit of the material has reached the discharge end of the machine, the maximum amount of oil content will have been extracted. In practice, however, it has been found that, not only is a very inferior grade of oil produced by this machine, but a rather large quantity of oil is left in the residue, so that this type of press is characterized by relatively low efficiency.

It is therefore one of the objects of my invention to devise an oil-extracting press that is loaded and unloaded automatically, and in which the maximum pressure possible is applied to the material for a substantial period of time, as determined by the characteristics of the material being compressed, to thereby secure a maximum yield of oil or grease.

A further object is to provide a press of the character indicated employing a pair of concentric curb cylinders between which the material is squeezed by suitable members operating in the annular space between the cylinders, the liquid

or oil escaping in opposite directions from the compressed cake through both curbs, thereby providing for a marked increase in efficiency over the single curb type of press by lowering the extent of travel of the oil through the cake before its escape, this characteristic action resulting in an increased oil output for any given time of compression.

A further object is to provide a press having an inner curb and a spaced, surrounding outer curb which together form a material-receiving chamber that is provided at one end with a tamping or pre-pressing ring and at the opposite end with a principal ram, the tamping ring acting to fully charge the chamber and initially extract a portion of the oil from the material, while the principal ram moves in a direction opposite to that of the tamping ring to complete the extracting process, this arrangement resulting in certain economies in the over-all length of the press owing to the necessity for moving the principal ram only a relatively short distance.

A further object is to devise a press having the foregoing inner and outer curb construction wherein the principal ram is formed as a part of the inner curb and provision is made for heating the interior of the inner curb to establish the proper squeezing temperature.

A further object is to provide a press having the characteristics noted above in which the curb is free to move with the ram during the pressing operation to thereby substantially eliminate friction between the material and the outer curb, as would otherwise occur if the curb was fixed in position and the ram was required to move the entire charge relative to the curb, the outer curb being additionally held at the end of its movement during compression to permit the separate return of the ram to initial position, thus providing a discharge opening between the outer curb and ram through which the material is expelled by the tamping ring.

A further object is to devise a press substantially as set forth above in which the tamping ring and principal ram are hydraulically actuated and in connection with which, owing to the relatively short stroke of the ram, it is possible to use a rather small quantity of hydraulic fluid and a smaller and less expensive pump installation, with consequent lower operating cost.

A further object is to devise a hydraulic press having a pair of concentric curbs, one of which is provided with a number of radially extending fins which divide the annular compression space into a plurality of smaller chambers, thus in-

creasing the area of hard, metallic pressing surface and lowering the time required for pressing any given quantity of material.

In the drawings:

5 Figure 1 is an elevation, partly in section, of my improved press, the several parts being shown in curb-charging position.

10 Fig. 2 is a plan view of the press, as viewed in the direction of the arrow 2 in Fig. 1, showing the upper header of the press and location of the hydraulic cylinders forming part of the mechanism for actuating the tamping ring and for holding the outer curb in raised position during the discharge of the residue cake, respectively.

15 Fig. 3 is a section along the line 3—3 in Fig. 1, looking in the direction of the arrows, showing the spaced relation of the concentric curbs, the knife blocks which assist in splitting the compressed cake during the discharge, and the chute into which the broken cake is delivered.

20 Fig. 4 is an elevation of a portion of the press, partly in section, as illustrated in Fig. 1, showing the tamping ring in the act of tamping or pressing an initial charge of the loosely-packed material in the curb chamber, and further showing that this movement of the ring serves, in conjunction with the inner curb, to close off temporarily the main supply of oil-bearing material.

25 Fig. 5 is a view similar to Fig. 4, but showing the tamping ring retracted to its uppermost position and the ram applying final compression to the material in the chamber, the inner curb also coacting with the tamping ring to isolate the material supplied.

30 Fig. 6 is a view, generally similar to Figs. 4 and 5, but illustrating the final or residue discharging step in the operation of the press, the outer curb being held in the raised position shown in Fig. 5, and the inner curb and associated ram being moved downwardly by the tamping ring to a position below the lower end of the outer curb to thus provide a discharge opening through which the compressed cake is discharged.

40 Fig. 7 is an elevation, partly in section, showing a modified curb construction wherein a number of spaced, radial fins are located in the material-receiving chamber between the concentric curbs to thereby increase the area of the hard surface available for compression.

50 Fig. 8 is a section along the line 8—8 in Fig. 7, looking in the direction of the arrows, and showing the spacing of the radial fins and the several isolated chambers formed thereby.

55 The specific embodiment of my invention, as set forth in the present application, relates to a press for the extraction of greases from animal tissues or cracklings. The material is fed to the chamber between the curbs by gravity and provision is made for automatically interrupting this supply by the same or associated elements which effect the tamping and compression of the material. It will be understood, however, that, notwithstanding the specific disclosure of my invention takes the form of a press for the extraction of oils and greases, the broader phases of the invention are likewise applicable to the general extraction of fluids from any material that may be subjected to pressure for this purpose.

70 Referring to Fig. 1 of the drawings, the numeral 10 designates a suitable foundation which is provided with a pocket 11. The sides of the pocket above the bottom thereof are offset to receive a pair of girders 12, upon each of which

rests a pair of nuts 13 that are mounted upon the lower ends of a pair of tie rods 14 which extend upwardly through the adjacent ends of a lower header 15. In plan view, the header 15 possesses the generally rectangular shape as shown in Fig. 2 and a tie rod 14 is located adjacent each corner thereof. These rods project upwardly through an upper header 16 and receive on their upper extremities nuts 17, similar to the nuts 13. The header 16 possesses a marginal outline conforming to that of the header 15 and each of the headers are maintained in abutting relation to their associated nuts by means of clamping collars 18. The headers and tie rods constitute a box-like structure which forms the principal framing of the press and the entire weight of which is carried on the girders 12.

20 Preferably integrally formed with the header 15 is a hydraulic cylinder 19 that extends downwardly in the pocket 11 and has detachably mounted therein a piston 20. Actuating fluid, such as oil and the like, is introduced into the cylinder 19 by means of a pipe 21 that may be in communication with a remote pumping mechanism.

25 The piston 20 is formed as an annular shell whose lower end is closed and on the upper end of which rests a ram 22 having an annular portion 23 which fits within the piston 20 and is locked thereto by means of a set screw 24. Accordingly, when fluid is introduced into the cylinder 19, the piston 20 and ram 22 move together as a unit.

30 Except for certain passages hereinafter described, the top surface of the ram 22 is closed and resting thereon is an inner curb 25 composed of a plurality of axially spaced rings 26 which are externally connected by means of longitudinally extending bars 27. As shown clearly in Figs. 1 and 3, these bars are arranged in the manner of barrel staves, but are spaced circumferentially from each other sufficiently to provide openings 28 that are large enough to permit of the easy flow of oils or greases there- through, while substantially restricting the inward movement of solid material when under pressure. Preferably, the outer face of each ring 26 is provided with a plurality of grooves 29, each of which registers with an opening 28 in order to avoid any blind spots along the bars 27 where contacted by the rings 26. The upper ends of the bars 27 have rested thereon a frusto-conical cover 30 which closes the upper end of the inner curb and which is suitably apertured to receive the inlet and exhaust pipes 31 and 32, respectively, of a steam heating coil 33 that is located within the inner curb. The pipes 31 and 32 extend upwardly through a supply or feed pipe, hereinafter described, which delivers the material to the press.

35 As indicated in Figs. 1 and 3, the pressing surface 34 of the ram 22 is inclined downwardly and outwardly from the lower ends of the inner curb bars 27 and this surface is preferably provided with several knife blocks 35 which coact with certain parts hereinafter described to more effectively break up the residue cake during the discharge thereof from the press, four of such blocks being shown.

40 An outer curb 36 encircles the ram 22 in spaced relation to the inner curb and is composed of a plurality of axially spaced rings 37 which are internally connected by means of longitudinally extending bars 38. As in the case of the inner

75 receive a pair of girders 12, upon each of which

curb, the bars 38 are spaced from each other to form openings 39 therebetween and are arranged after the general manner of barrel staves.

The spacing of the inner and outer curbs forms a material-receiving chamber 40 within which the material is compressed and an oil pan 41, located adjacent the lower end of the outer curb, is utilized to receive the oil squeezed from the material. For a purpose presently explained, the oil pan 41 is preferably formed of two separable parts. One of these parts is an annular ring 42 having the substantially L-shaped cross section shown in Fig. 1, the upstanding limb of this ring being outwardly disposed in order to properly retain the collected oil. The oil in this ring is maintained above the congealing point in order to facilitate its handling through having an internal passage 43 which, on one side of the ring is in communication with the flexible steam inlet hose 44 and on the opposite side with a corresponding hose 45 through which the steam is exhausted from the ring. The inner face of the ring 42 is tapered as at 46 and coats with an oil seal ring 47 which constitutes the second part of the oil pan. The face 46 tapers upwardly toward the top of the press and the ring 47 is normally maintained in engagement therewith by means of a plurality of coil springs 48 that contact the underside of the seal ring and are located in appropriate pockets 49 provided in the cylinder 19. The seal ring 47 encircles the ram 22 and an annular flange 50 projects upwardly from the inner side of the ring and fits within a suitable annular slot provided in a shoulder 51 which is undercut in the ram 22. A plurality of passages 52 are provided in the ram 22 and these passages lead from the interior of the inner curb 25 and terminate at the outwardly inclined, upper surface 53 of the ring 47. Accordingly, any oils which are squeezed through the inner curb pass outwardly through these passages 52 and, when the ram 22 is separated from the seal ring 47 in the manner hereinafter explained, the indicated oil may flow into the oil pan 41 and from thence may be evacuated through a suitable flexible hose 54. As clearly shown in Fig. 1, the oil pan portion 42 is rigidly connected to and moved with the outer curb by means of cap screws 55.

In order to provide for the free movement of the outer curb along the rods 14 for a purpose presently explained, arcuate shoes 56 are attached to the upper curb ring 37 and also to the pan ring 42. The curb 36 is therefore free to move upwardly from the position shown in Fig. 1, but movement downwardly is restricted by a plurality of clamping collars 57, one for each of the rods 14.

A supply tube 58 is slidably mounted in the upper header 16 in axial alignment with the inner curb and through this tube is delivered the oil bearing material to the compression chamber 40 located between the concentric curbs. The lower end of the tube 58 projects below the upper header 16 and has attached thereto a tamping ring 59 whose dimensions are such that it fits closely in the annular, material-receiving chamber 40.

The tamping ring 59 is hydraulically actuated by means of piston rods 60 which project upwardly through the header 16 into cylinders 61 mounted on the upper side of the header. Two such rods are shown in the drawings, but this number may be varied as desired. A piston 62 is fastened on the upper extremity of each piston rod

60 and this piston is of the double-acting variety. Actuating fluid is introduced into the cylinders 61 above the pistons 62 by pipes 63 to thereby move the tamping ring 59 downwardly from the position shown in Fig. 1, while the reverse movement of the ring is effected by the delivery of fluid into the cylinders 61 below the pistons 62 through pipes 64, it being understood that the pipes 63 and 64 are in communication with a suitable pump mechanism.

Another pair of cylinders 65 is also provided on the upper header 16 and within each of the cylinders operates a piston 66 having a piston rod 67 whose lower end is provided with an arm 68 which engages with the underside of an upper ring 37 on the outer curb. At an appropriate time in the operation of the press, as hereinafter explained, actuating fluid is introduced into the cylinders 65 below the pistons 66 through pipes 69 to hold the outer curb in its raised position.

A pair of oppositely extending chutes 70 are carried by the lower header 15 and are so disposed with reference to the lower end of the compression chamber 40 that, when the ram 22 is moved downwardly upon the completion of the pressing operation to provide a discharge opening for the residue, the latter will fall directly on the chute on opposite sides of the press for subsequent transfer to containers, belt conveyors, or the like.

In describing the operation of my improved press, reference will be had more particularly to Fig. 1 and Figs. 4 to 6, inclusive. Referring first to Fig. 1, it will be understood that the supply pipe 58 communicates with some form of bin or reservoir, or other supplying arrangement, so that the oil bearing material flows by gravity downwardly through the pipe. As shown in Fig. 1, the tamping ring 59 is in a fully retracted position, while the ram 22 is at the lowermost point of its stroke and, in this position, closes the lower end of the chamber 40. Moreover, in this position of the ram, the conical cover 30 is so disposed with reference to the tamping ring 59 that the material may freely flow to the chamber 40.

This flow continues until the chamber becomes loosely packed with the oil bearing material, whereupon the tamping ring 59 is actuated downwardly into the position substantially shown in Fig. 4 to thereby more completely pack the initial charge of material in the chamber and also exert some compression on the material which may be sufficient to extract some oil therefrom.

The tamping ring is thereupon retracted to the position shown in Fig. 1, thus permitting a fresh charge of material to be delivered into the chamber above the compact mass already resting on the ram, whereupon the tamping ring is again moved downwardly to compress the second charge of the material. This operation is repeated until the curb is completely charged with a fairly compacted mass of the oil bearing material, that is, until the curb has acquired such a charge that, when submitted to the high pressure of the ram, efficient results from the standpoint of production will be obtained. During this entire operation, as well as during all subsequent operations of the press, it will be understood that steam or some other heating medium is continually passing through the heating coil 33, so that the oil in its passage outwardly and inwardly through both curbs is never given an opportunity to congeal. Steam is also constantly passing through the steam space in the oil pan, so that grease which is collected therein is always maintained in a fluid condition.

Upon the completion of the final tamping operation, the downwardly-acting, hydraulic pressure on the tamping ring is relieved and fluid under pressure is introduced into the cylinder 19 to thereby cause an actuation of the ram 22 upwardly. The outer curb, owing to its substantially floating mounting on the tie rods 14, moves upwardly with the ram during the initial phases of the latter's movement and this upward movement of the ram also causes an upward movement of the tamping ring until the latter abuts against the underside of the upper header 16, which thereafter resists the pressure created by the ram, so that the upper thrust of the ram is taken substantially by the principal frame of the machine. The squeezing of the material in the chamber 40 causes a lateral seepage or emission of the oil from the cracklings through the openings in both curbs, that is, the oil flows in opposite directions through the walls of the inner and outer curbs, so that, compared to a single curb construction, the distance traversed by the oil before it becomes free from the compressed cake is substantially cut in half. Accordingly, the time required for the pressing operation is considerably reduced and the percentage of oil obtained from any given quantity of material is increased. The oil that is squeezed through the walls of the outer curb flows directly into the oil pan, while that squeezed through the inner curb reaches the pan through the passages 52.

The final step of the squeezing operation is illustrated generally in Fig. 5 and it will be particularly noted that the ram has become separated from the sealing ring 47, thereby uncovering the delivery ends of the passages 52 and permitting the free flow of the oil from the inner curb into the oil pan. During the upward movement of the outer curb, contact of the sealing ring 47 therewith is maintained by the extending action of the springs 48.

The provision of the slidable curb constitutes an important feature of my press inasmuch as the pressure required to squeeze the material in the chamber 40 is thereby materially reduced. If the curb were fixed in position, it is obvious that the squeezing movement of the ram would necessitate a shifting of the entire charge relative to the curb at a time when considerable friction was being created between the material and the wall of the curb. According to my arrangement, however, the curb and the ram substantially move together during the initial stages of the compression and there is only a relatively slight movement of the ram with respect to the curb in completing the final pressing operation.

Upon the completion of the main pressing operation, fluid is introduced into the cylinders 65 below the piston 66 for the purpose of temporarily restraining any tendency of the outer curb to move downwardly. At the same time, pressure in the cylinder 19 is relieved and fluid under pressure is introduced into the cylinders 61 above the pistons 62 in order to move the tamping ring downwardly. This downward movement of the tamping ring acts through the residue cake to move the ram and the sealing ring 47 engaged thereby downwardly until the ram reaches its lowermost position as indicated in Fig. 1. Since the outer curb is maintained in the raised position shown in Fig. 6, this downward shift of the ram creates an annular discharge opening 71 between the oil pan ring 42 and the ram through which the residue cake is discharged onto the chute 70, while being split by the knife blocks 35.

Upon the completion of the discharge, the tamping ring is retracted upwardly by hydraulic pressure and the pressure in the cylinders 65 is relieved to permit a dropping of the outer curb to the position shown in Fig. 1, whereupon the fresh material in the supply pipe is again free to move downwardly into the chamber 40 for subsequent treatment by the tamping ring.

A press of the foregoing character possesses several important operating advantages from the standpoint of efficiently handling the oil or grease bearing material. In the first place, the press is loaded and unloaded automatically, without any necessity for manual labor of any character, other than an operator to control the admission of pressure to the several hydraulic pumps. The tamping and pre-pressing movements of the tamping ring insure that the curb will be loaded to its maximum capacity for each cycle of operation, so that the press operates at maximum efficiency at all times, regardless of the native, loose nature of the material. The steam coil within the inner curb is so disposed as to continuously apply heat to the charge in the chamber which is sufficiently hot to maintain the emitted grease in a fluid condition and of insuring that the grease will continue to flow freely until it has been discharged to the openings in both walls of the curb. Owing to the concentric disposition of the curb walls and the resulting creation of an annular, material-receiving chamber, the squeezed oil travels in opposite directions outwardly of the material so that my improved construction provides for a minimum of travel on the part of the emitted oil and thus reduces the time during which it is necessary to maintain pressure on the ram. This annular pressing space also enables a higher unit pressure to be applied to the cracklings, compared to the unit pressure obtaining in the ram cylinder, because of the difference in the area to which the former pressure is applied.

In Figs. 7 and 8 is illustrated a modified type of press which is identical with that just described except in the particulars which will now be described. The inner curb 72, corresponding to the inner curb 25, is provided with a plurality of fins 73 which radiate outwardly and extend from the squeezing face of the ram upwardly in the compression chamber 74, but terminate at some distance from the upper end of the inner curb 72. These fins are spaced from each other circumferentially of the inner curb and each pair defines a compression chamber 75.

By using the fins 73, it is possible to materially increase the area of the hard surface which subjects the material to compression. This construction, therefore, makes for greater efficiency because, for any given ram pressure, it is possible to extract a greater percentage of the oil contained in the cake.

In the operation of this press, it will be understood that the pre-pressing movements of the tamping ring 76 terminate short of the upper ends of the fins 73 and that, during the discharging step of the process, corresponding to a relation of the press parts as illustrated in Fig. 6, the ram will be disposed sufficiently below the oil pan so that the fins 73 will not interfere with the discharging movement of the tamping ring 76.

I claim:

1. An hydraulic press of the vertical type comprising in combination, an inner curb, an outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a ram nor-

mally closing the lower end of and movable to compress the material in the chamber, said ram being undercut to provide a shoulder and having passages extending from the interior of the inner curb to the face of the shoulder for discharging liquid squeezed through the inner curb, a collecting pan adjacent the lower end of the outer curb and extending inwardly to include the delivery ends of the passages, and a member operating as an abutment for the compressing movement of the ram.

2. An hydraulic press comprising in combination, curb guides, an inner curb, an outer curb spaced from and surrounding the inner curb and slidably mounted on the guides for movement relative to the inner curb, a ram formed as a part of the inner curb and movable to compress the material between the curbs, the outer curb moving with the ram during the initial stage of the compression of the material and the ram having passages for discharging outwardly of the outer curb liquid squeezed through the inner curb, and a member operating as an abutment for the compressing movement of the ram.

3. An hydraulic press of the vertical type comprising in combination, curb guides, an inner curb, an outer curb spaced from and surrounding the inner curb to form a material-receiving chamber and slidably mounted on the guides, a ram normally closing the lower end of and movable to compress the material in the chamber, the outer curb moving with the ram during the compression of the material and the ram being undercut to provide a shoulder and having passages extending from the interior of the inner curb to the face of the shoulder for discharging liquid squeezed through the inner curb, a collecting pan composed of two separable parts, one part surrounding the lower end of the outer curb and the other part registering with the delivery ends of the passages at the beginning of the compression movement of the ram and subsequently separating from the shoulder, a member operating as an abutment for the compressing movement of the ram, means for holding the outer curb in its uppermost position upon the completion of compression, and means for moving the abutment member downwardly to thereby return the ram and the part of the pan engaged thereby to initial position, and to discharge the residue cake between the ram and outer curb.

4. An hydraulic press of the vertical type comprising in combination, curb guides, an inner curb, an outer curb spaced from and surrounding the inner curb to form a material-receiving chamber and slidably mounted on the guides, a tamping member and a ram located adjacent the opposite ends of the chamber, respectively, means for actuating the member and ram in opposite directions at different times to fully charge and compress the material in the chamber, respectively, the outer curb moving with the ram during the early stages of compression and the ram being undercut to provide a shoulder having passages extending from the interior of the inner curb to the face of the shoulder for discharging liquid squeezed through the inner curb, a collecting pan composed of two separable parts, one part surrounding the lower end of the outer curb and the other part registering with the delivery ends of the ram passages at the beginning of the compression movement of the ram and subsequently separating from the shoulder, and means for holding the outer curb in its uppermost position upon the completion of compression, the tamping member

being thereupon moved downwardly to return the ram and the part of the pan engaged thereby to initial position, and to discharge the residue cake between the ram and outer curb.

5. An hydraulic press comprising in combination, curb guides, an inner curb, an outer curb spaced from and surrounding the inner curb to form a material-receiving chamber and slidably mounted on the guides, a plurality of spaced plates extending lengthwise from one end of the chamber and terminating short of the opposite end, a tamping member and a ram located adjacent the opposite ends of the chamber, respectively, means for actuating the member and ram in opposite directions at different times to fully charge and compress the material in the chamber, respectively, the outer curb moving with the ram during the initial stages of the ram compression movement, and means for holding the outer curb in its uppermost position upon the completion of compression, the tamping member being thereupon actuated to move the ram downwardly below the lower end of the outer curb to thereby discharge the residue cake between the ram and outer curb, the discharging movement of the tamping member terminating short of the adjacent ends of the plates.

6. An hydraulic press of the vertical type comprising in combination, an inner curb, a slidable, outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a collecting pan carried by the lower end of the outer curb, a ram movable to compress the material in the chamber and retractible to its initial position, the outer curb moving with the ram during compression and the ram having passages connecting the pan with the interior of the inner curb, a sealing ring having sealing contact with the outer curb and ram and adapted to direct the expressed fluid into the pan, means for holding the outer curb in its shifted position, the ram moving the ring during its retracting movement to provide a discharge opening with the adjacent end of the shifted curb, and means for discharging the residue cake through the opening.

7. An hydraulic press of the vertical type comprising in combination, an inner curb, a slidable, outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a collecting pan carried by the lower end of the outer curb, a ram movable to compress the material in the chamber and retractible to its initial position, the outer curb moving with the ram during compression and the ram having passages connecting the pan with the interior of the inner curb, a sealing ring having sealing contact with the outer curb and ram and adapted to direct the expressed fluid into the pan, means for maintaining contact of the ring with the outer curb during its shifting movement, means for holding the outer curb in its shifted position, the ram moving the ring during its retracting movement to provide a discharge opening with the adjacent end of the shifted curb, and means for discharging the residue cake through the opening.

8. An hydraulic press of the vertical type comprising in combination, an inner curb, a slidable outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a collecting pan carried by the lower end of the outer curb, a ram movable to compress the material in the chamber and retractible to its initial position, the outer curb moving with the ram during compression and the ram having passages connecting the pan with the interior of the inner

curb, a sealing ring having sealing contact with the outer curb and ram and adapted to direct the expressed fluid into the pan, springs for maintaining contact of the ring with the outer curb during the latter's shifting movement, means for holding the outer curb in its shifted position, the ram moving the ring during its retracting movement to provide a discharge opening with the adjacent end of the shifted curb, and means for discharging the residue cake through the opening.

9. An hydraulic press of the vertical type comprising in combination, an inner curb, a slidable outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a collecting pan carried by the lower end of the outer curb, a ram normally closing the lower end of the chamber, said ram being movable to compress the material in the chamber and retractible to initial position and the outer curb moving with the ram during compression, the ram having passages connecting the pan with the interior of the inner curb, a sealing ring having sealing contact with the outer curb and ram and adapted to direct the expressed fluid into the pan, means for holding the outer curb in shifted position upon the completion of the compression, the retracting movement of the ram shifting the sealing ring from contact with the outer curb to thereby provide an opening with the adjacent end of the outer curb, and means for discharging the residue cake through the opening.

10. An hydraulic press of the vertical type comprising in combination, an inner curb, a slidable outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a collecting pan carried by the lower end of the outer curb, a tamping member and a ram located adjacent the opposite ends of the chamber, respectively, means for actuating the member and ram in opposite directions at different times to fully charge and compress the material in the chamber, respectively, the outer curb moving with the ram during compression and the ram having passages connecting the pan with the interior of the inner curb, a sealing ring having sealing contact with the outer curb and ram and adapted to direct the expressed fluid into the pan, and means for holding the outer curb in its shifted position upon the completion of compression, the tamping member being thereupon actuated to move the ram and sealing ring to a position providing a discharge opening with the outer curb through which the residue cake is discharged by the continued movement of the tamping member.

11. An hydraulic press of the vertical type comprising in combination, curb guides, an inner curb,

an outer curb freely slidable along the guides and surrounding the inner curb to form a material-receiving chamber, a collecting pan carried by the lower end of the outer curb, a ram movable to compress the material in the chamber and retractible to its initial position, the outer curb moving with the ram during compression and the ram having passages connecting the pan with the interior of the inner curb, a sealing ring having sealing contact with the outer curb and ram and engaged by the latter, the ring being adapted to direct the expressed fluid into the pan, means for holding the outer curb in its shifted position upon the completion of compression, the ram moving the ring during its retracting movement to provide a discharge opening with the adjacent end of the shifted curb, and means for discharging the residue cake through the opening, said outer curb returning by gravity to its initial position in contact with the sealing ring when the holding means is released.

12. An hydraulic press of the vertical type comprising in combination, an inner curb, an outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a collecting pan surrounding the lower end of the outer curb for receiving fluid expressed therethrough, a ram movable to compress the material in the chamber and having passages leading from the interior of the inner curb and terminating in the pan for delivering fluid from the inner curb, and a member operating as an abutment for the compressing movement of the ram.

13. An hydraulic press of the vertical type comprising in combination, an inner curb, a slidable outer curb spaced from and surrounding the inner curb to form a material-receiving chamber, a ram movable to compress the material in the chamber and retractible to its initial position, the outer curb moving with the ram during compression, a collecting pan composed of two separable parts, one part surrounding and being carried by the lower end of the outer curb and the other part being formed as a sealing ring having sealing contact with the outer curb and ram, the ram having passages connecting the pan with the interior of the inner curb and the ring being adapted to direct the fluid expressed from the inner curb into the pan, means for holding the outer curb in its shifted position, the ram moving the ring during its retracting movement to provide a discharge opening with the adjacent end of the shifted curb, and means for discharging the residue cake through the opening.

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