April 15, 1958 A. J. POWELL 2,830,530

PRESSES FOR THE EXTRACTION OF OILS, FATS AND THE LIKE

Filed March 4, 1952 5 Sheets-Sheet 1

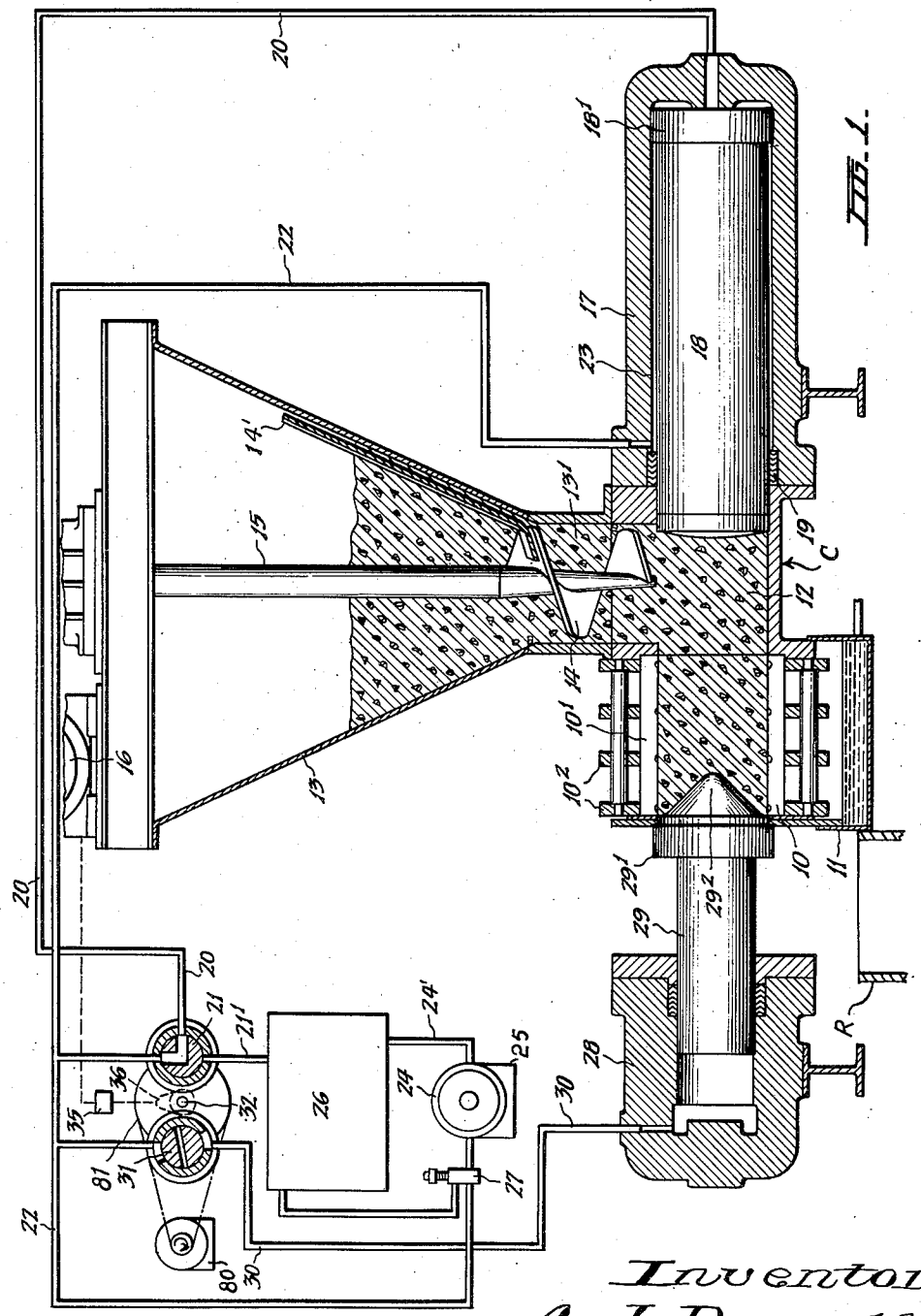

FIG. 1.

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PRESSES FOR THE EXTRACTION OF OILS, FATS AND THE LIKE

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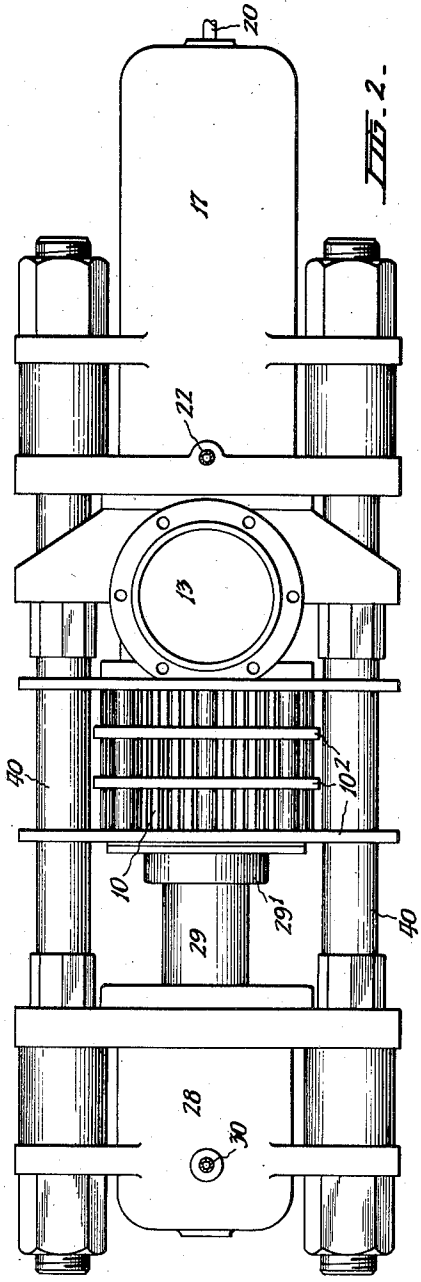

FIG. 2.

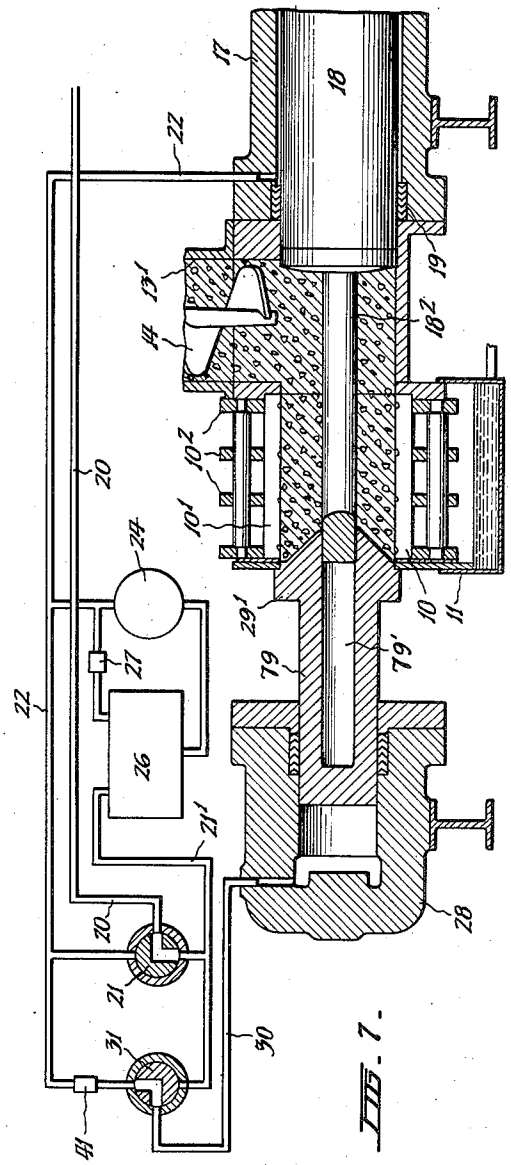

FIG. 1.

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PRESSES FOR THE EXTRACTION OF OILS, FATS AND THE LIKE

Filed March 4, 1952 5 Sheets-Sheet 3

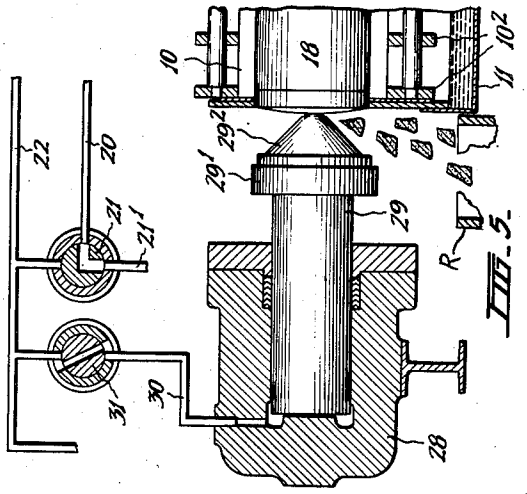

FIG. 5.

FIG. 4.

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PRESSES FOR THE EXTRACTION OF OILS, FATS AND THE LIKE

Filed March 4, 1952 5 Sheets-Sheet 4

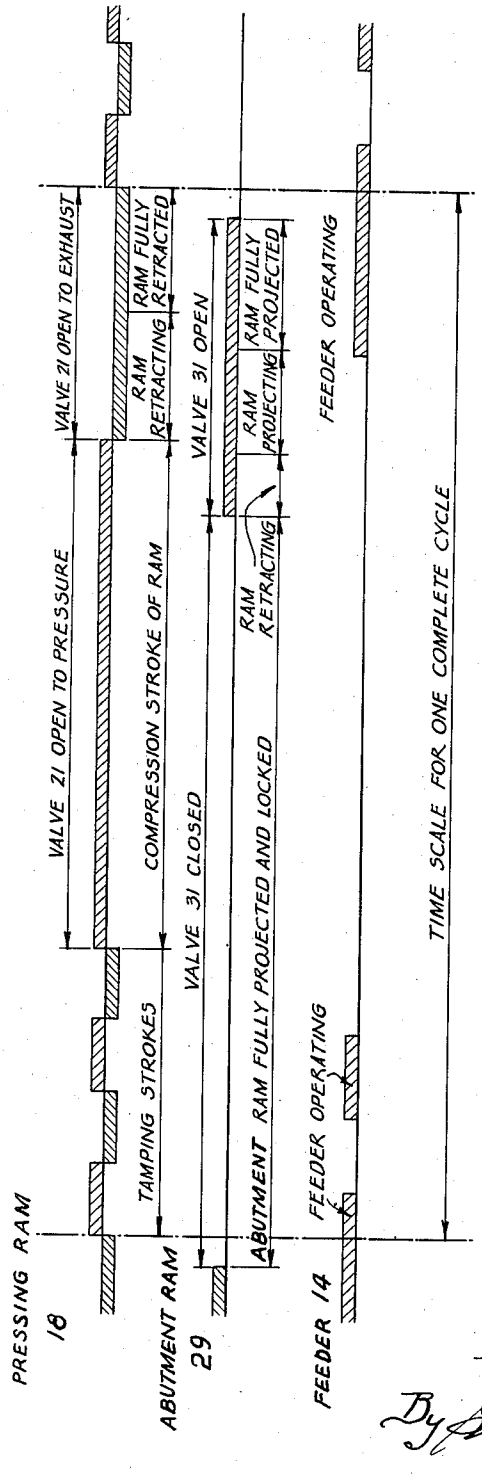

FIG. 6.

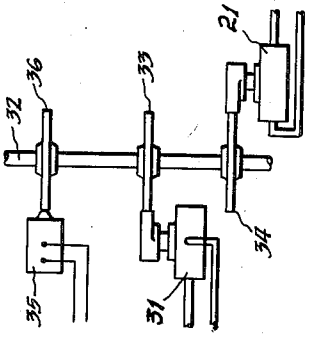

FIG. 5.

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PRESSES FOR THE EXTRACTION OF OILS, FATS AND THE LIKE

Filed March 4, 1952 5 Sheets-Sheet 5

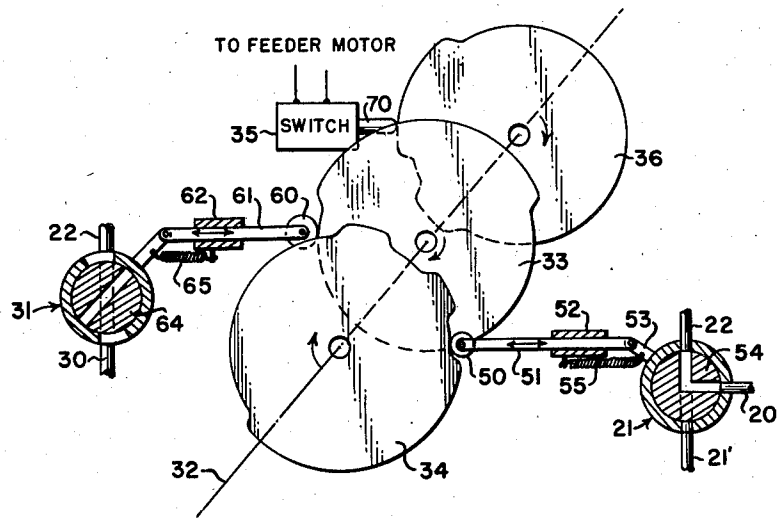

FIG. 8

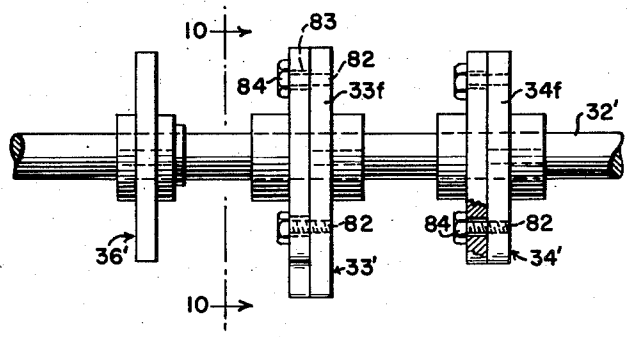

FIG. 9

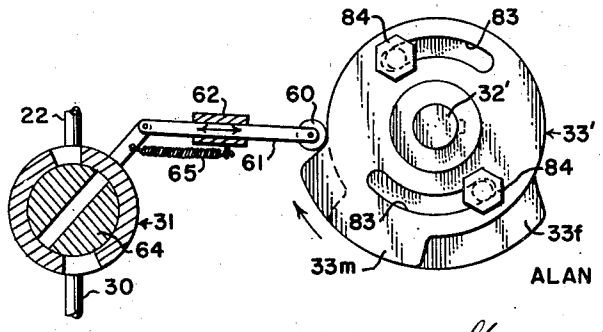

FIG. 10

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2,830,530

PRESSES FOR THE EXTRACTION OF OILS, FATS AND THE LIKE

Alan James Powell, Frankston, Victoria, Australia

Application March 4, 1952, Serial No. 274,791

Claims priority, application Australia March 21, 1951

10 Claims. (Cl. 100—98)

This invention relates to presses for the extraction of oils and fats from organic and other materials, such as oil bearing seeds, animal tissues, cracklings and the like.

The presses usually employed for this purpose embody a hydraulic ram arranged to reciprocate in a cylindrical curb the wall of which is formed with apertures through which the expressed liquid is discharged, the end of the curb remote from the ram being normally closed by a relatively movable closure member whereby the curb may be opened to permit the supply and discharge of solid material thereto and therefrom. In some cases the curb is loaded manually with the successive batches of material to be compressed, while in other cases the loading operation is performed mechanically under manual control.

In either case the cycle of operations is controlled manually and therefore requires the constant attendance of an operator. Thus the cost of the operation is materially increased by the operator while, in addition, the output and the efficiency of the operation is largely dependent upon his industry and skill.

It is also known to express oils and fats from organic materials in continuous automatic presses of the extrusion type, but while such presses do not require the constant attendance of an operator, the efficiency of extraction in such presses is lower than that obtained in the batch type of press previously mentioned.

The general object of the present invention is to provide improvements in and relating to oil and fat extraction presses of the aforesaid batch type, while one particular object thereof is to provide such a press adapted for automatic operation.

Another specific object is to provide such a press wherein the time of each cycle may be readily regulated.

Still another object is to provide an automatic press of simple and convenient construction and having a simplified control system thereof.

Accordingly, the invention broadly resides in a press comprising a cylindrical curb, a reciprocable plunger arranged coaxially with the curb to operate therein, said plunger when fully retracted being withdrawn from the adjacent end of the curb to permit the delivery to the latter of the material to be pressed, and a reciprocable closure member arranged coaxially with the curb to coact with the opposite discharge end thereof, such closure member being retractible to enable the compressed material to be expelled from the curb by further projecting said plunger.

The plunger preferably comprises a hydraulic pressing ram piston and closure member preferably forms the head of a second hydraulic which is opposed to the pressing ram, and one feature of the invention resides in the construction wherein said closure ram piston is of smaller cross-sectional area than the pressing ram piston whereby when both rams are subjected to the same hydraulic pressure, the closure ram piston will be forced towards its retracted position by the greater pressure of the larger pressing ram piston.

The loading end of the curb communicates with a filling chamber and the latter is preferably associated with mechanical feeding means for the material to be treated.

The movements of the ram and closure pistons are controlled by valves and an important feature of the invention resides in actuating said valves automatically in sequence by suitable control means, such as by constantly rotating cams.

The curb and rams are preferably arranged horizontally in which case the filling chamber is preferably arranged at the lower end of a hopper for the material to be treated.

Therefore, the invention particularly resides in an extraction press of the type having a vertically directed feed opening communicating with a casing defining a cylindrical compression chamber located under the feed opening. A ram piston is mounted to be reciprocated horizontally in a ram cylinder and across the compression chamber. A closure piston is mounted to be reciprocated horizontally in a closure cylinder colinearly with the ram piston and in confronting relation therewith. The horizontal casing includes a cylindrical curb, the wall of which is apertured for the discharge of expressed liquid and the curb portion of the casing has a discharge opening adapted to be closed by the closure piston. Means are provided adapted to collect discharge solid matter and extracted or expressed liquid. The closure piston has a conical head for a purpose set forth hereafter and a hydraulic system is provided for actuating the pistons, the system including conduit means connecting the cylinders to a reservoir for hydraulic fluid, to a pump adapted to supply hydraulic pressure for the conduit means and to controllable valves with which are associated control means adapted to control the operation of the pistons. The ram piston has a flange on the end thereof opposite the ram portion thereof and the ram cylinder has a port therein whereby hydraulic pressure may be applied against the end of the ram piston and to the end of the flange to move the ram piston to effect compression of matter fed into the compression chamber. The ram cylinder has a second port through which hydraulic pressure may be applied only to the end of the flange extending radially outwardly of the ram piston so that the ram piston may be withdrawn from the compression chamber. The ram cylinder, ram piston and compression chamber each have a length such that the ram piston may extend partly in the ram cylinder and completely through the compression chamber to discharge matter therefrom and so that the apex portion of the conical head of the closure piston may break up discharged solid matter against the head of the ram piston outside the compression chamber.

For the ensuing more particular description of a practical embodiment of the invention, reference will be made to the accompanying drawings, in which:

Figure 1 is a view in sectional elevation of a hydraulic press and shows diagrammatically the control valves and actuating mechanism therefor,

Figure 2 is a view in plan of the press the hopper assembly and the pump, liquid reservoir, and conduit means of Figure 1 being omitted.

Figure 3 is a view in plan of the control valves and actuating means therefor,

Figure 4 is a view similar to Figure 1 and shows another stage in the operation of the press,

Figure 5 is a view in sectional elevation of a portion of the press and shows a further stage in the operation thereof,

Figure 6 is a diagram showing the timing of the several control cams embodied in the press,

Figure 7 is a view in sectional elevation and shows a modification of the invention,

Figure 8 is a diagrammatic perspective view partly in section illustrating the control cams and the means controlled thereby for the cycle of operation shown in Figure 6,

Figure 9 is a side elevational view illustrating adjustable control cams, and

Figure 10 is a sectional view taken on lines 10—10 of Figure 9 and illustrating one of the adjustable cams in front elevation and the follower associated therewith.

The press shown in Figures 1, 2, 4 and 5 of the drawings comprises a casing structure C that defines a cylindrical compression or compacting chamber including a cylindrical curb generally designated **10** which is open at each end and arranged horizontally above a receptacle **11** for collecting expressed oil or the like, the said curb being secured to a suitable support. A receptacle R (see Figure 1) is located adjacent to and beneath the outer or discharge end of the curb and is adapted to collect or receive discharged solid matter.

The curb is constructed in any convenient or usual manner and preferably comprises a plurality of closely spaced longitudinal bars **10'** arranged on edge and surrounded by spaced circumferential reinforcing rings **10²** capable of withstanding the pressure of the material compressed within the curb.

One end of the curb abuts against and communicates freely with a coaxially disposed filling chamber portion **12** of casing C arranged below a hopper **13** for the material to be treated, and a cylindrical discharge throat **13'** for this hopper is fitted with a suitable feeding device such as the vertically disposed Archimedean screw **14**, forcing the material downwardly into said filling chamber portion **12** through a vertically directed feed opening and thence into the curb **10** as hereafter described. A scraper arm **14'** is secured as shown to the screw **14** to prevent the material from sticking to the wall of the hopper.

The feeding device in the form of the screw **14** is secured to the lower end of a central vertical spindle **15** and is arranged to be operated at appropriate times by an electric motor **16** controlled in the manner hereafter set forth.

A relatively long double acting hydraulic cylinder **17** (hereafter termed the pressing ram cylinder) abuts at its open end that end of the filling chamber which is remote from the curb and this cylinder is fitted with a slidable pressing ram piston **18** adapted when projected forwardly to extend through the filling chamber portion **12** into the curb.

The pressing ram piston **18** is provided at its rear end with a somewhat enlarged plunger head or flange **18'** which engages the wall of the cylinder **17** and is packed in any suitable manner so as to form a fluid-tight seal, while the opposite forward end of the cylinder is provided with an annular packing gland **19** through which the ram piston extends towards the curb as above described.

When the ram piston **18** is fully retracted to its rear position as shown in Figure 1, it is withdrawn almost completely from the filling chamber **12** to enable the material to be treated to pass freely thereinto from the hopper and thence from said filling chamber into the curb. When the ram piston is fully projected, it extends substantially to, that is, at least flush with and possibly beyond the opposite or discharge end of the curb as shown in Figure 5.

The closed rear end of the cylinder **17** is connected by a pipe **20** to a valve **21** which is operable automatically as hereafter described to connect the cylinder successively to a discharge pipe **21'** and to a supply pipe **22** for oil or other liquid under pressure, while the narrow annular space **23** surrounding the ram piston within the forward end of the cylinder is permanently connected to said supply pipe **22**. The supply pipe **22** is connected to the delivery port of a pump **24** arranged to be operated by an electric motor **25** or otherwise.

Thus when the pump **24** is operating, the liquid forced through pipe **22** and into cylinder **17** through the lateral port in the cylinder wall acts on the forward face of head **18'** to normally and continuously urge the ram **18** to its rear end position, Figure 1. As shown, the other pressure receiving face of head **18'** is of greater cross sectional area, thus when fluid under the same pressure is supplied via pipe **20** to the closed end of cylinder **17** against the head **18'**, the ram is moved toward its forward position, that is, it moves to the left as viewed in the drawings.

In the particular arrangement diagrammatically illustrated in Figure 1 of the drawings, the inlet port of the pump **24** is connected by a pipe **24'** to an oil reservoir **26** to which the discharge pipe **21'** of the control valve **21** is also connected while a relief valve **27** in the supply pipe **22** enables the oil to return directly to the reservoir if the delivery pressure exceeds a predetermined value.

A second hydraulic cylinder **28** (hereafter termed the closure or abutment ram cylinder) arranged colinearly with curb **10** and opposite the forward end of the latter, is fitted with a slidable ram or piston **29** (hereafter termed the abutment ram or a closure piston) which extends rearwardly towards the curb and is provided at its free end with an enlarged head **29'** adapted when said piston **29** is fully projected to a forward position to abut against and form a closure for said discharge end of the curb. This closure head **29'** has a conical outer end **29²**, which serves to break up the compressed cake of solid matter outside of the curb when the solid matter is being discharged as hereafter described.

The cylinders **17** and **28** are secured together by longitudinally extending tie bolts **40** which also support the intermediately disposed curb **10** and filling chamber portion **12** as shown in Figure 2.

The cylinder **28** is relatively short in length and has its closed inner end connected by a pipe **30** to one port of a valve **31**. A diametrically opposed port of said valve **31** is connected to the aforesaid supply pipe **22** for the liquid under pressure. This valve is adapted in one position thereof to connect the supply pipe **22** to the closure cylinder **28**, as shown in Figure 5 and in another position thereof, shown in Figures 1 and 4 to close the connecting pipe **30** so as to prevent the discharge of liquid from the cylinder and thereby prevent retracting movements of the closure piston **29**.

The valves **21** and **31** are operated repeatedly in sequence by actuating means which in the illustrated embodiment comprise a cam shaft **32** arranged to be rotated continuously at a uniform but regulatable speed, by electric motor driven gearing **81**, the time of each complete revolution of the cam shaft **32** being the period of each cycle of operation of the press.

This cam shaft **32**, as shown in Figures 3 and 8, is fitted with two spaced valve operating cams **33** and **34** of which the latter is arranged to operate the aforesaid valve **21** for controlling the operation of the pressing ram or piston **18** while the other cam **33** operates the valve **31** which controls the operation of the abutment ram or closure piston. The cam shaft **32** is illustrated only diagrammatically in Figure 8.

The electric motor **16** for driving the screw feeder **14** is controlled by a plunger type switch diagrammatically indicated at **35** in Figure 3, such switch being opened and closed at the requisite times by a cam **36** on the cam shaft **32**.

The valves **21** and **31** may be of any suitable type and, for convenience of illustration, are represented in the drawings as semi-rotary plug valves, while likewise

the cams for operating said valves and the feed motor control switch may be of any convenient type and so are merely shown diagrammatically in Figure 3 as plate cams.

The cam 34 being preferably formed so that the corresponding valve 21 is actuated one or more times during the operation of filling the curb, whereby the pressing piston 18 is reciprocated to tamp and compact the material progressively supplied to the curb while the abutment ram or closure member 29 is held by fluid pressure against the cake discharge opening of the curb. Figure 6 is a diagram showing the times of operation of the said valves and switch throughout each cycle of operation.

In operation the cam shaft 32 is rotated continuously and at the commencement of a cycle the pressing ram piston 18 is fully retracted to its rear position while the abutment ram or closure piston 29 is fully projected to forward position so that the conical head 29^2 is in engagement with the adjacent discharge end of the curb as shown in Figure 1. At this stage, see Figures 6 and 8, the valve 31 is closed so that the oil contained within the closure cylinder 28 cannot escape therefrom, with the result that the closure ram 29 is locked in its said fully projected operative position.

As the pressing ram piston 18 is fully retracted at this time, the rear end of the corresponding cylinder 17 is connected to the reservoir 26 by the respective cam operated valve 21, so that the pressing ram piston is held in its retracted position by the liquid in the narrow annular space 23 around the ram piston and within the cylinder and which as previously explained is always maintained under pressure throughout the cycle.

At this time also, the switch 35 for the driving motor 16 for the screw 14 in the hopper 13 is closed, so that this screw is operating to force the material to be treated downwardly from the hopper into the filling chamber piston 12 and from the latter into the curb 10. As the cam shaft continues to rotate, the valve 31 remains closed and the valve 21 is opened so that liquid under pressure passes into the outer end of the cylinder 17 and operates on the outer face of head 18' of the pressing ram piston. The force then acting on the ram piston 18 for moving it forwardly, that is, to the left of the drawing is considerably greater than the force acting against the face or end of flange 18' extending radially outwardly of the ram piston. This is due to the different cross-sectional areas of the head or flange 18' establishing differential hydraulic pressure conditions so that the ram piston 18 commences its forward projecting movement. This projecting movement of the ram piston may continue without interruption until the material is fully compressed but preferably the ram is reciprocated several times through a short distance to tamp or compact the material within the curb and thereby assure that the same is sufficiently filled before the pressing operation is completed. For this purpose the screw 14 is operated each time the ram piston is retracted to uncover the discharge throat of the hopper.

These tamping movements of the pressing ram piston are effected by actuating the valve 21 so as to place the outer end of the ram cylinder 17 into communication with pressure and exhaust alternately at short intervals of time, the operating cam 34 being suitably shaped, see Figure 8, for this purpose. Thus the timing diagram, Figure 6, shows two such tamping movements.

Likewise the cam 36 for operating the switch 35 for the screw driving motor 16 is appropriately shaped and arranged relatively to the cam 34 to switch the motor on and off as required and as indicated in Figure 8.

After the casing and curb have been filled as described, fluid under pressure is supplied for an appreciable period to the outer end of the ram cylinder 17, so that the pressing ram piston moves continuously forward, that is to the left in the drawing the material enclosed within the curb being thus subjected to pressure, whereby the fat or oil content is expressed therefrom and is discharged through the periphery of the curb into the receptacle 11. Figure 4 shows the position of the pressing ram piston as it completes its pressing or projecting stroke, the length of which is of course determined by the compressibility of the material.

Throughout this time the valve 31 controlling fluid flow to the closure cylinder 28 of the abutment ram or piston 29 has remained in its closed position, so that such ram has been locked in its fully projected or forward position to close the discharge opening or left hand end of the curb, and withstand the pressure exerted by the pressing ram piston 18. When, however, the material in the curb has been subjected to pressure for a predetermined period the valve 31 is opened by means of the corresponding cam 33, so as to re-establish communication between the cylinder 28 and the supply pipe 22. The abutment ram piston is then subjected to the same intensity of pressure as the pressing ram piston, but as the abutment ram piston is of smaller cross-sectional area, it is forced towards its retracted or rear position, by the relatively greater total pressure of the pressing ram piston 18 transmitted through the interposed cake of compressed material.

Accordingly, when the valve 31 is opened, the pressing ram piston continues its projecting movement, whereby the compressed cake of material, substantially free of oil or fat, is expelled through the discharge end of the curb, and broken up against the conical head of the abutment ram or closure piston, which though retracted, is maintained under pressure. The discharged material is forced outwardly in moving over the conical head of the closure piston 29 and is broken thereby into fragments which fall into the receptacle R as shown in Figure 5.

After the pressing ram piston 18 has been fully projected to discharge and break-up the compressed material or solid matter outside the curb or compression chamber as shown in Figure 5, the control valve 21 is operated by the associated cam 34 to connect the outer end of the respective cylinder 17 to the reservoir 26. Thus the ram piston 18 is retracted by the constant pressure of the liquid within the inner end of the cylinder 17, while at the same time the closure piston 29, which is still subjected to the pressure of the liquid in the left-hand end of its cylinder, again moves forwardly to its fully projected position so as to engage and close the solid matter discharge opening at the left-hand end of the curb, following which the control valve 31 is again closed to lock said closure piston in its projected position, thereby completing one cycle of operation.

Figure 8 discloses the shape of cams 34, 33 and 36 which respectively actuate the valves 21 and 31 and switch 35. Valve 21 is actuated by a conventional cam follower mechanism reciprocating responsive to the high and low areas of cam 34. This follower mechanism includes a follower roller 50, carried by rod 51 which is guided for reciprocation in a guide 52. The rod is coupled to linkage 53 for rocking the valve body 54 to the right against the action of spring 55 when the follower 50 rides up a high portion of the cam. Valve 31 is similarly actuated since rod 61, movable through guide 62, is moved responsive to the engagement of follower roller 60 with the cam 33. The spring 65 normally urges valve body 64 to move to closed position.

The switch 35 is actuated by the cooperation of cam 36 with switch plunger 70. As is conventional in such switches the plunger is spring urged outwardly and to circuit breaking position, thus as shown the switch is on since the plunger is on a high area of cam 36.

Figure 9 (and 10) illustrate cams 33' and 34' as two-part cams, or cams of relatively adjustable sections whereby the relative periods during which valves 31 and 21 are opened and closed may be varied. These cams include fixed sections 34*f* and 33*f* each keyed to

cam shaft 32' and movable sections 34*m* and 33*m* coupled to the fixed sections for adjustable movement.

The fixed section of each cam has diametrically opposite internally threaded holes 82 therein, while the movable section of each cam has a pair of arcuate slots 83 therein. A threaded bolt 84 passes through each slot and into threaded engagement with each hole 82. Thus, and as clear from Figure 10 by backing off bolts 84, section 33*m* can be moved relative to section 33*f*. The other cam 34' is similarly adjustable and if desired, cam 36 can be similarly constructed. Also the several cams may be separately adjusted angularly on the cam shaft while the period of the cycle is also capable of regulation.

If desired, either the pressing ram piston or the closure or abutment ram piston may be provided with an axial extension of relatively small diameter which extends axially through the curb and is received slidably within a corresponding recess or bore therefor formed axially in the other piston. Figure 7 shows a construction in which the pressing ram piston 18 is formed with an axial extension or rod 18^2 projecting therefrom and having its free end received slidably within a corresponding axial hole 79^1 formed in the hollow abutment ram or closure piston 79 so that the cake of compressed material produced within the curb has a central through hole formed therein with the result that the maximum radial distance through which the expressed oil must pass to the periphery of the curb is reduced, whereby a higher efficiency of extraction is obtained at the expense of a comparatively small reduction in the capacity of the curb.

Figure 7 also shows a modification of the hydraulic control system for the closure piston 79. In this modification, a non-return valve 41 is arranged between the oil pressure pipe 22 and the valve 31 so that even when the latter is open to pressure as shown in the figure, the piston 79 cannot be forced backwards by the pressure exerted by the ram 18 during the compression stroke of the latter. It will be noted also that in this construction the valve 31 has a discharge port which is connected to the discharge pipe 21^1 so that upon turning the valve 31 through a 90° turn in a counterclockwise direction from the position shown, this discharge port communicates with the cylinder 28, the closure piston is forced rearwardly by means of the pressing ram piston 18. The valve 27, as in Fig. 1, is a relief valve. It will be evident that when this hydraulic system is employed, it is not necessary for the closure piston 79 to be of smaller diameter than the ram piston 18 as the cylinder 28 communicates with the reservoir 26 during the retracting movement of the closure piston. On the other hand, this modified control system has the disadvantage that the oil displaced by the retraction of the closure piston 79 is returned to the reservoir 26 instead of to the pressure pipe 22 as in the system shown in Figure 1. The volume of oil thus discharged in each cycle, however, is small.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

I claim:

1. In an extraction press of the type having a vertically directed feed opening, a ram piston adapted to be reciprocated horizontally in a ram cylinder across a cylindrical compression chamber located under the feed opening, a closure piston adapted to be reciprocated horizontally in a closure cylinder colinearly with the ram piston and in confronting relation therewith, said closure piston having a conical head, means adapted to collect discharged solid matter and means adapted to collect extracted liquid, conduit means connecting said cylinders to a reservoir for hydraulic fluid, to valves including control means therefor adapted to control the operation of said pistons and to a pump adapted to supply hydraulic pressure for said conduit means, the improvement comprising a flange on the end of the ram piston opposite the ram portion thereof, said ram cylinder having a port whereby hydraulic pressure may be applied against the end of the ram piston and to the end of the flange to move the ram to effect compression of matter fed into the compression chamber, said ram cylinder having a second port whereby hydraulic pressure may be applied only to the end of the flange extending radially outwardly of the ram piston so that said piston may be withdrawn from the compression chamber, said ram cylinder, ram piston and compression chamber each having a length such that the ram piston may extend partly in the ram cylinder and completely through the compression chamber to discharge matter therefrom and so that the apex portion of the conical head of the closure piston may break up discharged solid matter against the head of the ram piston outside the compression chamber.

2. In an extraction press as claimed in claim 1 and said closure piston having an axially extending bore therein extending rearwardly from its conical head, said ram piston having a rod extending forwardly of the outer end thereof and said rod being reciprocable in the bore in the closure piston whereby the solid matter is centrally apertured.

3. In an extraction press as claimed in claim 1 in which said valves include a valve located in the conduit means for each cylinder, each said valve including a movable element and the control means adapted to control operation of said pistons comprising a timing mechanism including continuously movable cam means for moving the respective movable elements of the respective valves so that hydraulic fluid sequentially effects plural reciprocations of said ram piston relative to the closure piston with the closure piston closing the compression chamber, movement of said ram piston toward the closure piston with the latter held by hydraulic pressure in extended position, simultaneous movement of said ram piston and closure piston in the same direction to move the head of the ram piston completely through the compression chamber to discharge matter therefrom and break up discharged solid matter outside the compression chamber and finally opposite movement of said ram piston to a position clear of the feed opening and forward movement of the closure piston to close the compression chamber, following which the cycle of piston movement is repeated.

4. In an extraction press as claimed in claim 3 and in which said continuously movable cam means are adjustable so that the duration of operation of the valves can be adjusted to effect variations in the separate movements of the ram and closure pistons within the cycle of operation.

5. In an extraction press as claimed in claim 1 and further including drivable means for intermittently feeding material through said feed opening and said control means including independently driven means operably associated with the valves to control operation of the pistons as to periodically and successively effect movement of said ram piston relative to said closure piston while the latter is held by fluid pressure in a position to close the compression chamber so that the ram piston effects compression of matter fed into the compression chamber and extracts liquid therefrom, to thereafter move the ram piston and closure piston simultaneously to extend the head of the ram piston completely through the compression chamber to discharge solid matter therefrom, to thereafter reverse movement of both pistons to move the closure piston to a position closing the compression chamber and move the ram piston clear of the feed opening and said independently driven means including means for actuating said drivable means to feed material when the ram piston is clear of the feed opening, and to stop feeding when the ram piston commences to move toward the closure piston.

6. In an extraction press as claimed in claim 5 and said independently driven means including a variable speed motor, a cam shaft driven thereby, and independent cam means carried by said cam shaft and respectively associated with the valves for the respective pistons and the drivable means for intermittently feeding material.

7. In an extraction unit of the nature described, an elongated horizontal casing means having a compacting chamber portion therein with a discharge opening at one end and a feed opening adjacent to the other end of the chamber, means adapted to collect discharged solid matter, means associated with the casing means and adapted to collect extracted liquid, a reciprocable closure member supported coaxially of the discharge opening of the chamber, a reciprocable compacting member supported coaxially of the chamber on the other side of the feed opening from said discharge opening, a fluid motor means adapted to move the closure member in a direction to close said discharge opening, a fluid motor means adapted to reciprocate said compacting member relative to said chamber, said compacting member being longer than the portion of the casing that extends from said feed opening to said discharge opening and said second fluid motor means being capable of moving the compacting member towards said discharge opening a distance such as to dispose the face of said compacting member at least flush with said discharge opening, controllable means for supplying pressure fluid to said second motor means to move said compacting member towards said discharge opening while simultaneously supplying pressure fluid to said first motor means to hold said closure member stationary against the discharge opening and against thrust exerted by said second motor means, said controllable means being subsequently operable to effect simultaneous movement of the compacting member toward the closure member and withdrawal of the closure member from said discharge opening and movement of said compacting member through the casing to effect discharge of compacted material through the discharge opening by the compacting member, and said controllable means being operable after discharge of material to reverse movement of both members to return the closure member and compacting member to their original positions.

8. In an extraction unit as claimed in claim 7 and the controllable means for supplying pressure fluid to the respective fluid motor means including a source of fluid under pressure, conduit means through which fluid flows to the respective fluid motor means and from at least the second fluid motor means, valve means for controlling the actuation of the fluid motor means and a timing mechanism including continuously operable means for actuating the valves to effect plural reciprocations of the compacting member relative to the closure member with the closure member being held by fluid under pressure in a position to close the discharge opening, the valves effecting movement of the compacting member toward the closure member with the latter still held by fluid under pressure, simultaneous movement of the compacting member and closure member in the same direction to move the head of the compacting member completely through the casing to discharge solid matter therefrom and finally opposite movement of the compacting member to a position clear of the feed opening and forward movement of the closure member to a position to close the discharge opening following which the cycle of movement of the respective members is repeated.

9. In an extraction unit as claimed in claim 7 and one of said compacting members having an axially extending bore therein extending rearwardly from its head and the other of said members having a rod extending forwardly thereof and said rod being reciprocable in the said bore whereby the solid matter is centrally apertured.

10. In an extraction press as claimed in claim 7 and said respective compacting and closure members each including a piston portion, said respective piston portions constituting part of the respective fluid motor means and the piston portion of the closure member having smaller cross-sectional area than the piston portion of the compacting member, whereby when both members are subjected to the same hydraulic pressure, the closure member will be forced away from the discharge opening by the relatively greater pressure of the compacting member.

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