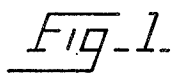


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3 Sheets-Sheet 1



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APPARATUS FOR EXPRESSING OIL

Filed Oct. 20, 1947

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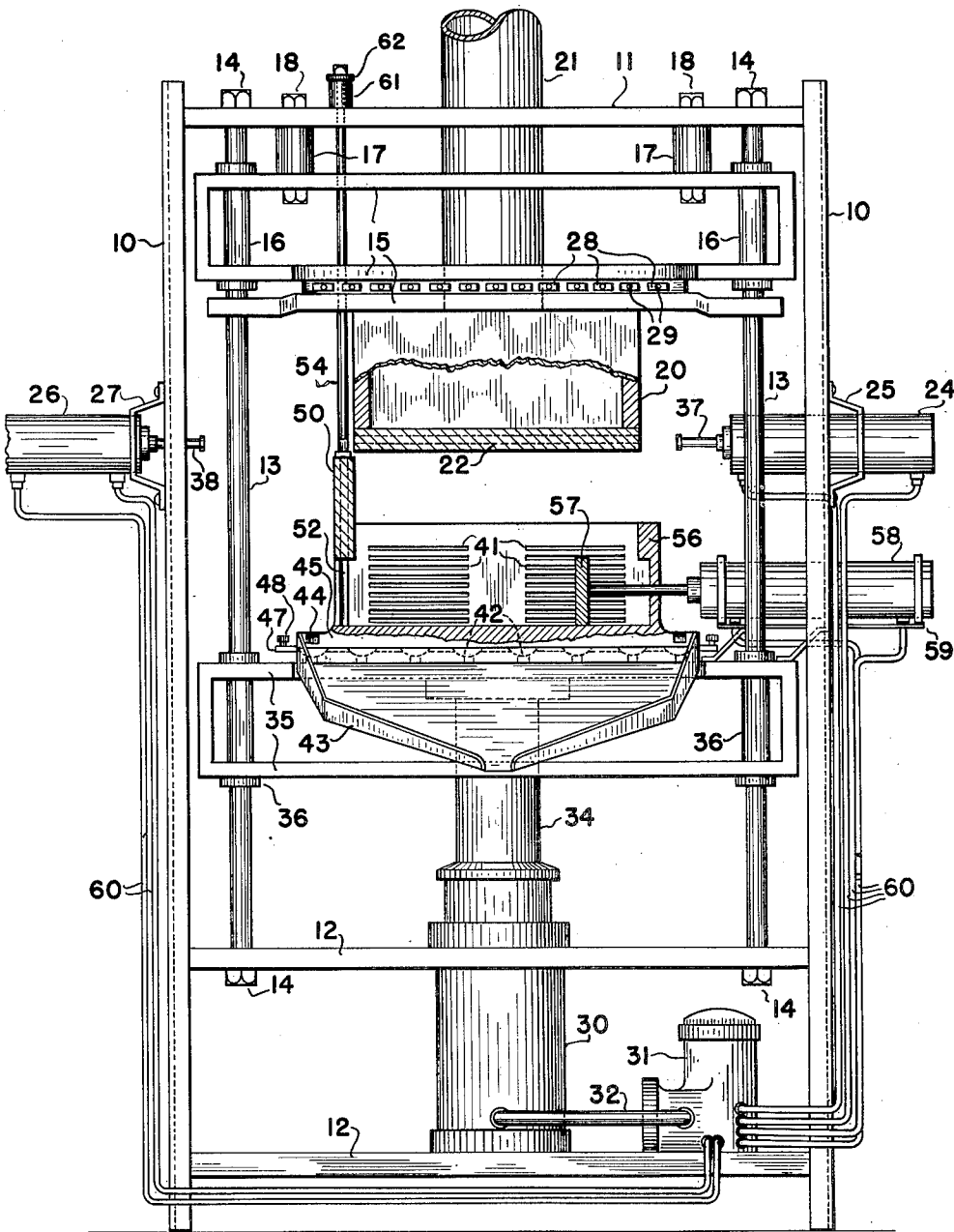


Fig. 3.

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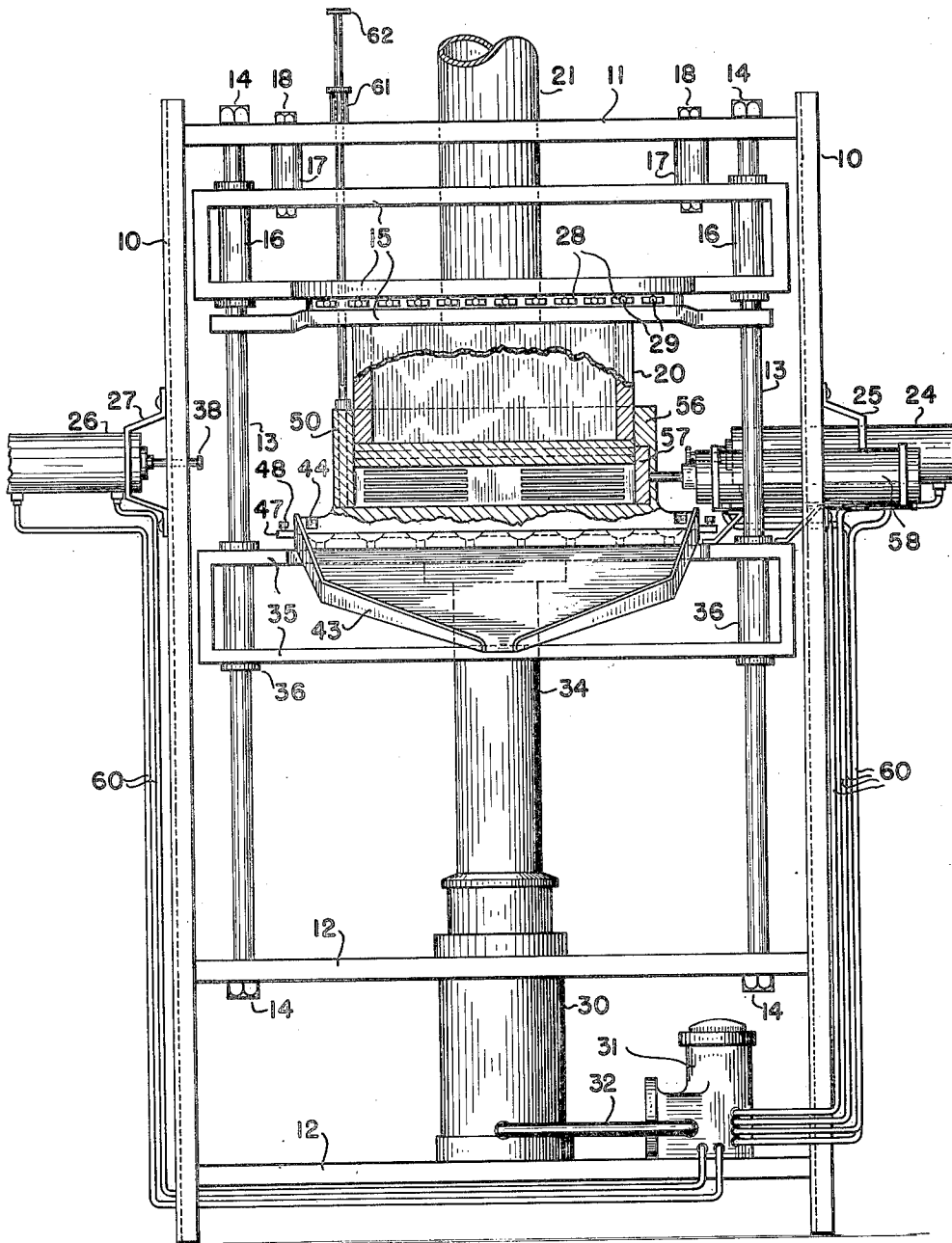


Fig. 2.

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APPARATUS FOR EXPRESSING OIL

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4 Claims. (Cl. 100—92)

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This invention relates to expressing apparatus of the type used in the manufacture of oil from oil-bearing seed and/or nut shells.

As is well known in the manufacture of oil from sources just indicated, it is the practice generally to first cook the meal or ground seed and then place the cooked meal in the oil press in layers, separated by press plates and press cloths, the oil being extracted from the meal during the cycle of operation of the oil press.

This method of extracting oil is far from being satisfactory from a commercial standpoint, because it is time and labor consuming; full advantage of the pressure applied to the meal is lost for the reason that the meal is not sufficiently confined and is permitted a certain amount of spread in response to the pressure being applied thereto; and, also, during the expressing cycle there is a marked continuous drop in the temperature of the meal which adversely affects the cycle of operation both as to time and oil yield.

Another and extensively used method of extracting oil is that involving screw type expellers. The use of this type of expeller is limited to extracting oils from soft meaty materials. The use of a screw type expeller, where coarse and abrasive meal is employed, is impracticable due to the need of constant replacement of parts that quickly wear as a result of the high degree of attrition characteristic of this method of oil expressing.

An object of the present invention is to provide apparatus for expressing oil which will be free of the objections to present methods; and in which the operating cycle is materially reduced in time; there is no appreciable heating loss at any state in the cycle of operation; manpower requirements are reduced to a minimum; and oil yield is materially increased.

Other objects will be apparent to those skilled in the art from the following description taken together with the appended drawings, wherein—

Figure 1 is a front elevational view of an apparatus for expressing oil from oil-bearing seeds, nuts, or nut shells. The view shows the position of the parts of the apparatus during the first stage of the cycle of operation; a corner of the charge box is broken away to show details of construction;

Figure 2 is a front elevational view of the same showing the position of the parts during an intermediate stage of the cycle of operation. Parts of the charge box and the press cage are broken away to show their inter-engagement;

Figure 3 is a front elevational view of the same

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showing the apparatus during a final stage of the cycle of operation. Parts of the charge box and press cage are broken away to show the manner of expelling the cake from the press cage.

Referring now in greater detail to the drawings, the apparatus comprises a skeleton frame consisting of vertical angle iron members 10, top cross plate 11 and bottom cross plates 12. Four vertical guide rods 13 are secured at the inside corners of the machine to the top and bottom cross plates 11 and 12 by means of nuts 14. An upper fixed carriage structure 15 has four bushings 16 mounted therein and sleeved on the four guide rods 13. Spacer blocks 17 are provided between top plate 11 and upper carriage structure 15, and through these are trained bolts 18, which permanently secure the carriage structure 15 in stationary position.

A charge box 20 is permanently secured to the bottom of carriage structure 15 and is in communication with the source of material worked on by means of pipe 21. The charge box 20 is preferably made of steel plate having substantial thickness and it is provided with a sliding platen or bottom 22 having lateral tongues in slidable engagement with grooves 23 in the box. Platen or bottom 22 is automatically moved to the open position by means of hydraulic or pneumatic actuator 24 which is mounted on frame member 10 through the medium of bracket 25. Platen or bottom 22 is returned to the closed position in response to action thereon of hydraulic or pneumatic actuator 26 which is mounted on frame member 10 by means of bracket 27.

Heating elements 28 having electrical terminals 29 are disposed on the bottom of carriage 15 for the purpose of heating the charge box 20 and the contents thereof.

Bottom plates 12 support an hydraulic or pneumatic ram 30 supplied with actuating fluid or air from source 31 through connection 32. The piston 34 of ram 30 acts on a lower carriage structure 35 which is free to reciprocate on guide rods 13, the carriage 35 being provided with bushings 36 for engagement with guide rods 13. A press cage or box 40 is securely mounted on the top of carriage 35. The front and back sides of press cage 40 are provided with slots 41 from which the expressed oil emerges to pass through holes 42 and down shute 43 to a collecting container (not shown). Expressed oil from slots 41 on the back side of cage 40 flows down grooves 44 to shute 43.

The base 45 of press cage 40 is provided with heating elements 47 having electrical terminals

48, the heating elements serving to maintain the press cage and the contents thereof at a temperature high enough to facilitate the free flow of expressed oil. End wall 50 of press cage 40 has tongues 51 in slidable engagement with grooves 52 in opposed side walls of the press cage. A linkage rod 54 is secured to the end wall 50 of the press cage and works through guide 61 rising from top plate 11. A stop 62 on the upper end of rod 54 is arranged to abut guide 61 to limit downward movement of the rod for a purpose herein-after explained.

End wall 56 of press cage 40 is provided with an internal recess which normally accommodates a cake expeller 57 which is operatively connected with hydraulic or pneumatic actuator 58. The actuator 58 is mounted on lower carriage 35 by means of brackets 59.

Actuators 24, 26 and 58 are supplied with actuating fluid or air through flexible conduits 60 from source 31. The source 31 may include either automatic or manually operated valves for controlling the fluid or air supplied in such a way as to properly synchronize the action of the various elements of the apparatus during the cycle of operation.

The operation of the apparatus will now be described. Material from which oil is to be expressed is fed into the charge box 20 through pipe 21 in measured quantities, the platen or bottom 22 of the charge box being normally closed as shown in Figures 2 and 3. The material stays in the charge box 20 long enough to be heated to the proper temperature by heating elements 28. Piston rod 37 of actuator 24 then pushes bottom 22 to the side as shown in Figure 1. This allows the heated material to drop down into press cage 40 which is maintained in heated condition by means of heating elements 47. Piston rod 38 of actuator 26 then returns bottom 22 of the charge box 20 to its closed position, and another supply of material is fed through pipe 21 to charge box 20. The material remains in the charge box and becomes thoroughly heated during the subsequent stages of the cycle of operation. In other words, a charge of material is heated in the charge box during the process of expressing oil from the preceding charge.

The ram 30 is next energized causing ram piston 34 to move lower carriage 35 and press cage 40 upwardly and into engagement with stationary charge box 20. The material in the press cage 40 is compressed between the bottom of the press cage and the platen 22 of the charge box 20, the apparatus then being as shown in Figure 2. The oil expressed from the material passes out of the press cage through slots 41 and down shute 43 to a collecting container.

Ram 30 is then de-energized allowing the press cage 40 to return to its lower position out of engagement with charge box 20. As the press cage 40 goes down, the stop 62 on linkage rod 54 moves into engagement with guide 61, and prevents the end wall 50 of the press cage from following all the way, thereby opening the end of the press cage as shown to advantage in Figure 3. Actuator 58 is then energized causing cake expeller 57 to push the cake, resulting from the compression of the oil-bearing material, out of the press cage through the open end. Figure 3 shows the apparatus during the process of expelling the cake (not shown) from the press cage.

Cake expeller 57 is then returned to its position in the recess in end 56 of the press cage and ram 30 is energized causing the press cage to

rise. When the press cage has risen enough so that end 50 of the press cage is in closed position, actuator 24 is energized thereby moving bottom or platen 22 and allowing the heated material in the charge box 20 to drop into the press cage 40. The cycle of operation is then repeated. It is within the contemplation of the invention that the apparatus be completely automatic and operate continuously without human attention.

It is apparent from the foregoing description that charge box 20 serves as a heater for a charge of material and as a platen for expressing oil from the previous charge in the press box 40. Since the platen 22 is maintained in a heated condition and since the material is heated before oil is expressed therefrom, great economies result from combining the two heating operations. By means of the apparatus and method described it is possible to apply heat and pressure to oil-bearing material in a most effective and economical manner and the cycle of operation is performed in a minimum time with little or no human effort. Also, by reason of the minimum clearance $\frac{3}{1000}$ of an inch between the corresponding parts of charge box 20 and press box 40, maximum pressure is exerted on the material, with the result that the flow of oil is rapid, and, consequently, the time period for the cycle of operation is comparatively very short.

While I have shown and described one form of my invention, it is to be understood that I am not to be limited thereto and that many changes could be made without departing from the scope of the claims hereto appended.

What I claim is:

1. A press for expressing oil from oil containing material comprising a press cage having an open end and openings in the wall defining the cage through which expressed fluid flows, a pre-heating container disposed above the cage in position to telescope therein for compression of material within the cage, said container being formed as a compartment for receiving material to be expressed and having a bottom wall slidable transversely between open and closed positions and which, when in closed position, operates as a platen and to seal the bottom of the container and which, while in open position, permits material from the container to fall by gravity into the cage, and means for effecting relative movement between the cage and container between telescoped and retracted positions of adjustment.

2. A press for expressing oil from oil containing material comprising a press cage open at the top and having openings in the walls defining the cage through which the expressed oils flow, means for actuating the cage in the endwise direction, a container stationarily positioned adjacent the open end of the cage and dimensioned to telescope therein when the cage is actuated in the direction toward the container, said container being formed with a compartment for receiving and precooking material to be expressed and having a bottom wall slidable transversely between open and closed positions and which, when in position of use, functions as a platen and as a closure for the container and which, when in open position, permits the precooked material to pass from the container into the cage.

3. A press as claimed in claim 2 in which heating elements are provided in the container for preheating the material contained therein in advance of introduction into the press cage.

4. A press as claimed in claim 1 in which the press cage comprises a displaceable end and an

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expeller normally forming part of the opposite end, and means for operating the expeller to displace the cake that is formed through the open end of the cage.

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