June 8, 1937. H. F. MacMILLIN ET AL 2,083,032

FLUID PRESSURE OPERATED CURB PRESS

Filed Oct. 10, 1932 2 Sheets-Sheet 1

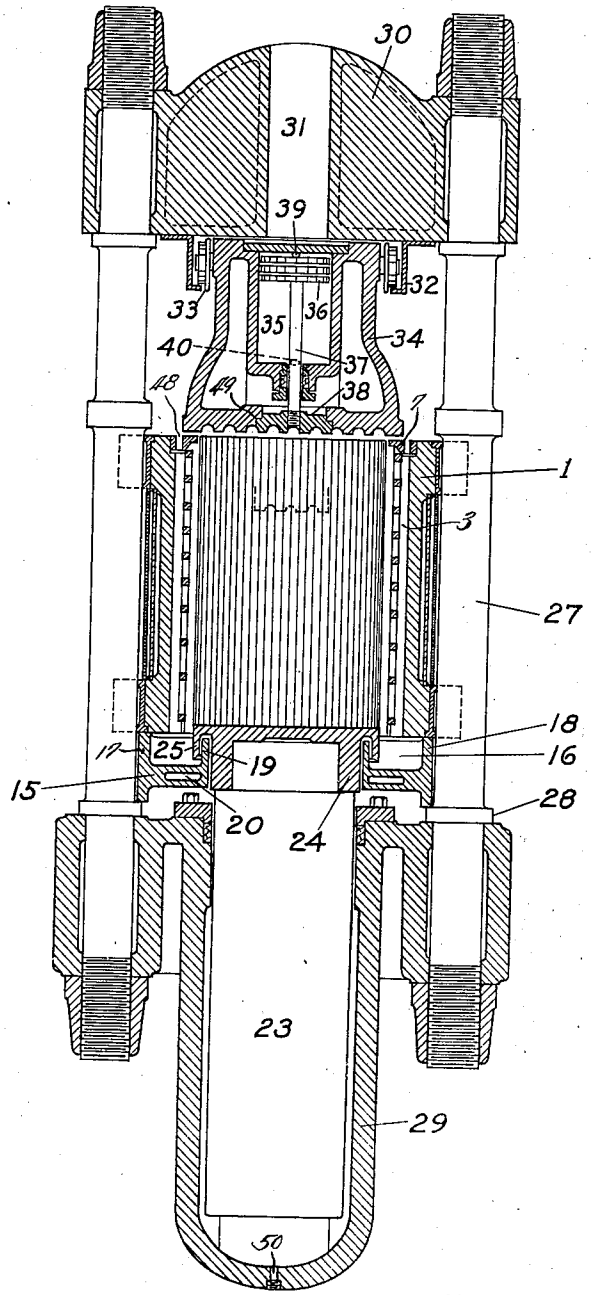

Fig. 1

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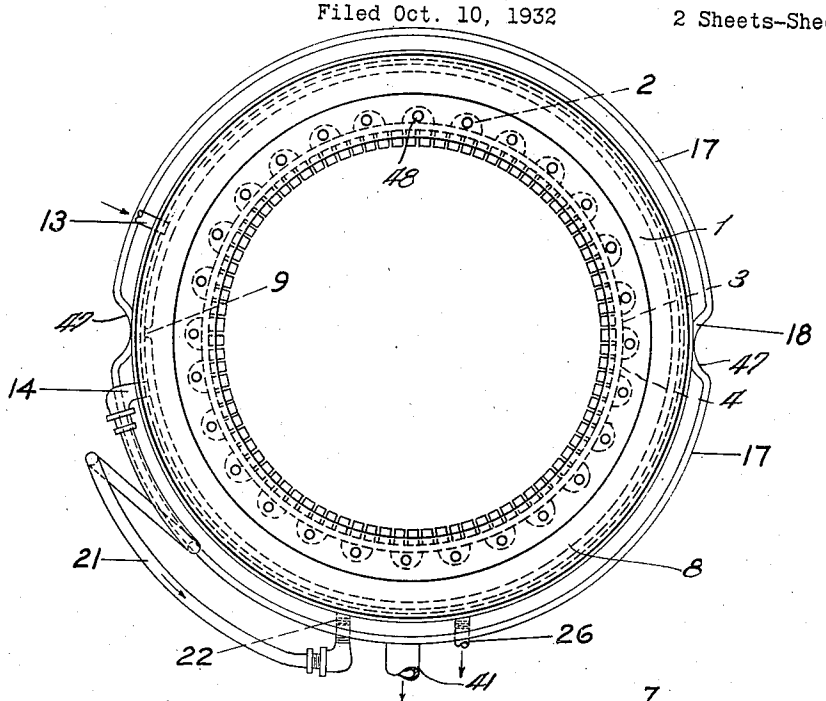

Fig. 2

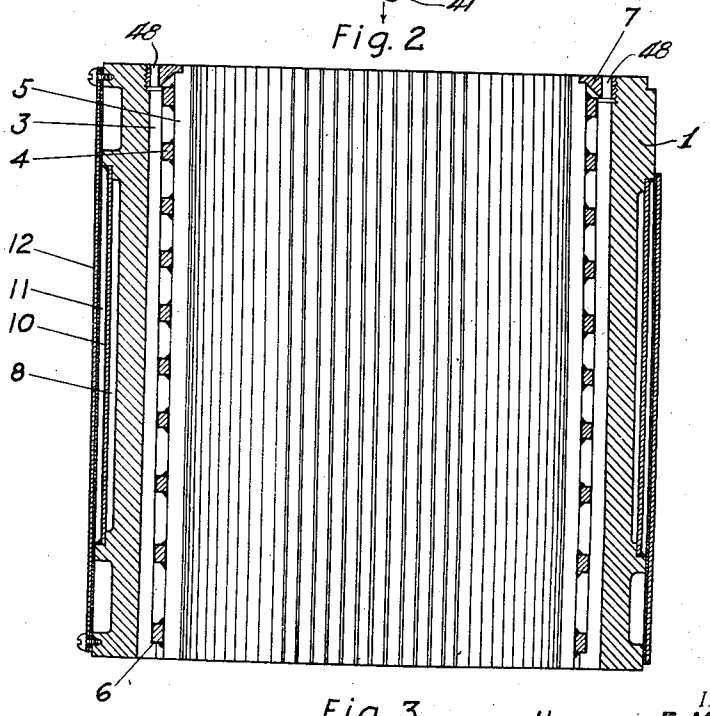

Fig. 3

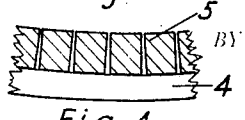

Fig. 4

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FLUID PRESSURE OPERATED CURB PRESS

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Application October 10, 1932, Serial No. 637,110

2 Claims. (Cl. 100—50)

The invention to be hereinafter described relates to fluid pressure operated curb presses.

This type of press has wide use for extracting grease, oil, etc., from the waste in packing plants; and for extracting oil from fish in the fish industry. While the above uses are general and wide spread, applicants refer to them merely as illustrations of several uses of the invention. There are many other uses. In using such presses in packing plants, the curb or cage is charged with the material and pressure applied to extract the grease or oil which flows away through suitable drains. As is well known, heat assists extraction of oils, grease, etc. Accordingly, it is usual to provide a steam jacket or the like to heat the contents of the curb, during the operation. Near or at the base of the curb, a reservoir or saucer is provided to gather the accumulation between the periods of removal. Necessarily, pressing to extract grease, oil, etc., is far slower than pressing for the purpose of compressing or reducing size. The grease or oil must be given time to flow. So, since each pressing operation must be slow, it is desirable to have the curb as completely and as compactly filled as practicable, before the pressing starts. At the present time, in one type of curb press, the curb is first loosely filled by simply dumping or otherwise filling the material in from the top, either through an opening through the head of the machine, or directly into the upper open end of the curb or cage. When thus loosely filled, the upper plunger or ram head is swung over the open end of the curb and the whole curb and contents is lifted up, by power, against it, to "tamp" the contents. This is repeated as often as desired. Among the serious disadvantages of such a construction are the total lifting of the entire curb and all its contents for every tamping of the contents. Other obvious disadvantages are the multiplicity of operating parts and their controls.

The main purposes of the present invention are to overcome the above and other objections and provide a simple, efficient, compact, and economical curb press which will answer fully all possible requirements.

In order to more clearly disclose the construction, operation, and use of the invention, reference should be had to the accompanying drawings forming part of the present application.

Throughout the several figures of the drawings, like reference characters designate the same parts in the several views.

In the drawings:

Fig. 1 is a central vertical cross section;

Fig. 2 is a top plan view of the curb;

Fig. 3 is a central vertical cross section of the curb; and

Fig. 4 is a fragmentary detail of the curb structure.

For purposes of illustration, a simple, medium sized press has been shown, of the type used in packing plants. The operation and construction of the compressing or extracting plunger is well known and need not be referred to in detail. It will, therefore, be mentioned only in brief or skeleton statement. The power may be air, steam, water or any other fluid, and controlled in any well known manner. The term fluid will be understood as including all such, whether liquid or gaseous. Obviously too, a wide range of materials, designs, and proportions may be resorted to according to the work to be done by the particular press.

Such machinery, of course, when installed, is mounted on a suitable base or framework varying according to the particular circumstances. No such foundation or framework is shown, as those skilled in the art will readily supply the one desired, according to individual taste and requirements.

Referring to the drawings in detail, 1 indicates the cylindrical or other shaped metal body or press chamber of the press. It is formed with parallel longitudinal or vertical grooves 2, or channels, separated by webs or ribs 3, for a purpose to be later disclosed. Within the press chamber or body 1 is mounted the curb or cage which really constitutes a liner or inner sleeve for the chamber. It is made of a plurality of spaced narrow plates 4 shaped to fit the inside wall of the press body (here shown as cylindrical). To the inner faces or edges of these plates are welded or otherwise secured a plurality of strong metal staves 5 extending, preferably, the full length of the chamber. These staves are so assembled, relative to each other and to the plates 4 as to provide a very simple and very economical grid or strainer construction which is automatically clearing or non-clogging. The staves are very slightly spaced at the inner faces to provide very narrow vertical or lengthwise openings through the inner or operative wall of the curb—between the successive staves. The staves, as shown in the drawings, especially Fig. 4, may be of the same horizontal width throughout, outwardly from the centre of the press chamber. This would result in the inner curb wall of each stave having the same width as the outer curb wall of the same stave. The staves,

to give the desired strength, must be of appreciable dimensions, outwardly from the centre of the press chamber. Consequently, the distance between the inner and outer face of each stave, in a cylindrical press chamber, the width of those two faces being the same, results in greater spacing between the outer or rear vertical edges of adjacent staves than between the corresponding inner vertical edges. The spaces between staves in cylindrical press chambers are wedges or wedge shaped, increasing in radially outward direction. Obviously, material forced through the inner and narrower openings will have increasingly greater freedom of passage outwardly. The curb, therefore, is self clearing and can not become choked or clogged. To support the curb in place, so that it will not drop through the chamber, each web or rib **3**, or a considerable number of them, is provided with a shoulder **6** so positioned as to engage the lower horizontal band or plate **4**, as the curb or cage becomes completely seated—actually, the curb seats, vertically, on those shoulders. To prevent the curb being carried upwardly out of position, during operation of the press, a retainer bar or plate **7** is provided. The upper end of the body **1** is bored out, in the case illustrated, and threaded internally to receive this plate flush with the press chamber end. It extends inwardly to partially overlie the upper ends of the staves **5**. To the extent that it does so overlie the staves, each stave is notched to provide a shoulder, the depth of the notches being such as to exactly receive the plate flush with the stave end when it is screwed in and seated flush with the press chamber end. So, when the curb has been seated on shoulders **6**, and the plate **7** has been made flush with the press chamber end, the curb will extend from end to end thereof, flush with the ends and will present a continuous self-clearing grid or strainer surface. The lower ends of the grooves or channels **2** are open, as clearly shown. To allow quick and free escape of air upwardly through the channels **2**, during pressing, the retainer plate may be provided with suitable openings **48**, preferably, one above the upper end of each of the grooves. After considerable use, if it is desired to clean the curb, or the chamber, or both, it is only necessary to remove plate **7** and remove the curb. Or they may be cleaned in place by a jet. Also, in case of repair, or renewal, or change, the curb is quickly and easily removable.

In order to warm the contents of the curb during pressing, to assist the flow, it is steam-jacketed in usual manner, as is well understood. In this instance, the wall is cored out to form a steam chamber **8**, leaving a partition or web **9** to assure circulation—the steam inlet being connected at one side of the web and the outlet at the opposite side, though not necessarily very close to the web. The outer wall of the steam chamber is formed by a sheet metal plate **10** welded or otherwise suitably secured in place. To properly insulate this steam jacket, an air chamber or space **11** is provided by securing an asbestos backed or covered shell or sheet metal plate **12** to the press chamber, slightly spaced relatively to the plate **10**. The asbestos may be as a separate sheet against the plate **12**, it may be as a layer or coating on the plate, or it may be entirely independent. One efficient arrangement for circulating the steam is indicated in the top plan view of the curb. Here, steam enters the chamber **8** through a suitable steam inlet pipe **13**, passing about the body or press chamber to the opposite side of the web **9**. Near the web **9** but at the opposite side to the inlet, is an outlet pipe **14**. That heats the press chamber, only, however.

To receive and accumulate the liquid pressed out, a reservoir **15** is provided. It has an outlet **41**, by which the entire contents may be periodically drawn off. This reservoir may be in the form of a U-shaped channel of an annular saucer having an outer wall or flange **17** and being of form and dimensions as indicated at **47** adapted to fit snugly between the strain rods to seat on the collars **28** thereof, and engage the lower edge of the press chamber **1** at points **18** to support it. Fitting of the saucer wall snugly about the strain rods also acts to definitely retain the saucer in proper operative position, as will be understood. Corresponding to the wall **17** and forming the opposite leg of the U-channel, is the inner wall or flange **19**. Chilling of oil or grease in the saucer causes clogging and interruption of production. To avoid this, the saucer **15** is heated by a steam chamber **20** underlying the U-shaped channel **16**. Steam for heating this chamber is led from the outlet **14**, through a pipe **21**. After circulating through chamber **20**, the steam exhausts through the outlet **26**. Pipe **21**, leading from the outlet **14**, as will be seen, connects to the inlet pipe **22**, leading into the chamber **20** beneath the saucer channel **16**. The central opening through the saucer is large enough to fully receive the main plunger **23** of the press, as it operates, but of considerably less area than the inside cross section of the cage or curb. Likewise, the inside cross section of the curb is of substantially the same cross sectional area as that of the ram head carried by the main operating plunger. But, the outside dimension of the flange **19** is considerably less than the inside dimension of the curb. So, the plunger or piston **23** carries a ram head **24** having a maximum area substantially equal to the inside cross section of the curb. This head, therefore, extends outwardly beyond the piston and beyond flange **19**. Where it overlaps flange **19** it is provided with a skirt flange **25**, the two flanges cooperating to form a closure or seal to lessen chance of back flow of the saucer contents between the flange **19** and piston.

Suitable strain rods **27** are provided for assembling and for sustaining the operating strains, babbitted guide blocks on the chamber serving to maintain it in proper position relatively to the rods and other parts of the press, in well known manner.

Removably connected to the lower ends of the strain rods, through any suitable means, is the power or pressure chamber **29** in which the main plunger or piston operates in usual and well known manner, fluid pressure being alternately admitted to and exhausted from the lower side of the plunger at aperture **50** by operation of the well known two-way valve which requires no further disclosure.

The press head **30** with filling opening **31** is mounted in usual and well known manner, on the upper ends of the strain rods above the curb, which may be filled through such opening. In the present invention, the head of the press carries a laterally traversible head—ram head—which, in turn, carries, therewithin, a vertically reciprocable tamping plunger for repeatedly downwardly tamping the curb contents. To the underside of the press head, are secured suitable

tracks 32 which are extended far enough to enable the ram head to be run bodily out from above the curb end, as will be clearly understood. Suitable rollers, wheels, or other anti-friction devices 33, travelling freely on said rails and secured to the upper part of the ram head 34, carry it back and forth as desired. When in position directly above the curb, it may cooperate with plunger 23 in the operation of the press in the well known manner. Within the body of the ram head 34 is the cylinder 35 of the tamping mechanism. This comprises a piston 36 reciprocable within cylinder 35, with a piston rod 37 extending beyond the cylinder and carrying the tamping head 38, seated in recess 49. The cylinder, piston, and piston rod are disposed substantially centrally of the ram head 34 and so that they are approximately alined with the longitudinal center or axis of the curb when the ram head 34 is in operative position, above the curb end. It will be noticed that the tamping head actually comprises the central portion of the ram head 34 and that it is shouldered to seat on cooperating shoulders of the ram head so that it can not be forced beyond a predetermined upward position relatively to that ram head. The piston 36 is reciprocated by fluid pressure admitted to and exhausted from the cylinder through suitable ports 39 and 40. These ports each are both inlet and exhaust, alternately, as will be readily understood. Fluid pressure is alternately admitted to and exhausted from them by the well known four-way valve commonly used in the press industry. These fluid pressure circuits and the four-way valve control are well known in the art and need no further disclosure or illustration here.

It will be noticed that the body of the saucer is of appreciably greater dimension than the interior of the press chamber. At the point where the press is mounted on its strain rods, however, the saucer dimension must be reduced to that of the exterior of the press chamber.

On reference to Fig. 1 it will be seen that the ram head 34 is slightly greater in area than the inside area of the curb—cross sectional area. It overlaps the retaining plate. This overlap makes a very complete and sure closure and avoids possible squeezing out of the material of the cake between the apposed heads. Also, when operating at maximum capacity, should there be any tendency to carry the press chamber upwardly with the main ram head, it will be positively engaged and stopped by the ram head 34, as will be obvious, so that there will be no lost motion and no defective operation.

It will be seen that the construction disclosed enables maximum capacity with minimum power consumption. In the tamping operation neither the press chamber nor its contents is lifted. The small tamping head is capable of relatively high speed operation and, being the only part power-operated in tamping, it consumes the minimum of power. So, every charge of the curb may be completed in the least time; every charge may be the greatest possible contents and compactness of the material in its curb, and every charge may utilize the least power consumption. One reason for lower power use is that this press, in its tamping operations, cooperates with gravity instead of operating against it.

It will be seen that the total number of parts is very small and that each part is very simple, giving a total machine assembly of approximately maximum simplicity, efficiency and economy, with minimum construction, operation and upkeep.

Friction, and the consequent wear by friction are greatly reduced, first by reducing the number of relatively moving parts; second, by reducing the size and contact areas of those parts; and, third, by reducing the load.

The assembly is extremely simple. The saucer is separate from the chamber which simply sets on it. The upper ram head and tamping head are a unit carried by and quickly removable from the head. The head is slipped on one end of the strain rods and the main cylinder with its piston and ram head are slipped on the opposite ends.

Briefly, the operation of the invention is as follows:—Assume that the press has been erected and is ready for operation. The parts will be in the positions shown in Fig. 1. Ram head 34 is traversed bodily, from between the head 30 and curb. Material is now filled into the curb either through opening 31 or directly into the upper end of the curb. It gathers on the head 24 (in the bottom) of course. When sufficient has gathered to tamp or to be packed, the ram head 34 is rolled back above the curb. As it reaches position, the control valve of cylinder 35 is operated, performing the tamping operation. After that operation, the valve is operated to raise the head 38 and retain it raised. The ram head is then run out to inoperative position. This procedure is repeated until the curb is sufficiently filled and packed. At this point, the ram head is left in position above the curb and power is applied to piston 23 for the pressing operation. As it is forced upwardly toward the ram head 34, the liquids in the mass will be forced out through the openings between staves and into the grooves or channels in the inner wall of the press chamber. The heat of the jacket will keep them fluid and assist the flow. The oils, grease, etc., will accumulate in the saucer in which they will be kept fluid by the heat of chamber 20. From time to time, the accumulation in the saucer may be drawn off through the outlet 41. As the pressing action reaches the limit, as may be readily determined by those skilled in the art, it is stopped, and the ram head 34 is again run out. When this ram head is now out of the path of the pressing ram, the upward movement of piston 23 is resumed to upwardly eject the resulting "cake", and the press chamber will be ready to receive another charge, as before.

While a cylindrical press chamber has been illustrated it will be understood that any desired cross sectional shape may be used.

It is believed that the construction, operation and use of the invention will be clear from the preceding detailed description.

Many changes may be made in the form, construction, arrangement and disposition of the various parts of the invention within the scope of the appended claims, without in any degree departing from the field and scope of the invention and it is meant to include all such within this application wherein only a single form has been disclosed in the drawings, purely by way of illustration and with no thought or intent to limit the application by such illustration.

Having thus described our invention, what we claim and desire to protect by Letters Patent of the United States is:—

1. A press comprising a press chamber open at both ends, a main ram operable therewithin, a ram head traversable across the path of opera-

tion of said main ram, said ram head having an aperture centrally thereof and a hydraulic piston and cylinder assembly therein, a tamper connected to said piston and countersunk in said ram head aperture whereby during one operation of the device the tamper contacts the material in the press chamber independent of the ram head and during another operation of the device coacts with the ram head for mutual engagement with the material in the chamber.

2. A press comprising a press chamber with its opposite ends having apertures to receive tamping and pressing devices, a main ram operable therein, a ram head traversable laterally across said press chamber, a tamping member mounted on said ram head, said ram head having an aperture centrally thereof and a hydraulic piston and cylinder assembly therein, said tamping member being connected to said piston and countersunk in said ram head aperture, whereby during one operation of the device the tamper contacts the material in the press chamber independent of the ram head and during another operation of the device coacts with the ram head for mutual engagement with the material in the chamber.

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