April 30, 1929. L. B. GREEN 1,710,698

PRESSING APPARATUS

Filed Nov. 6, 1926 2 Sheets-Sheet 1

Fig. 1.

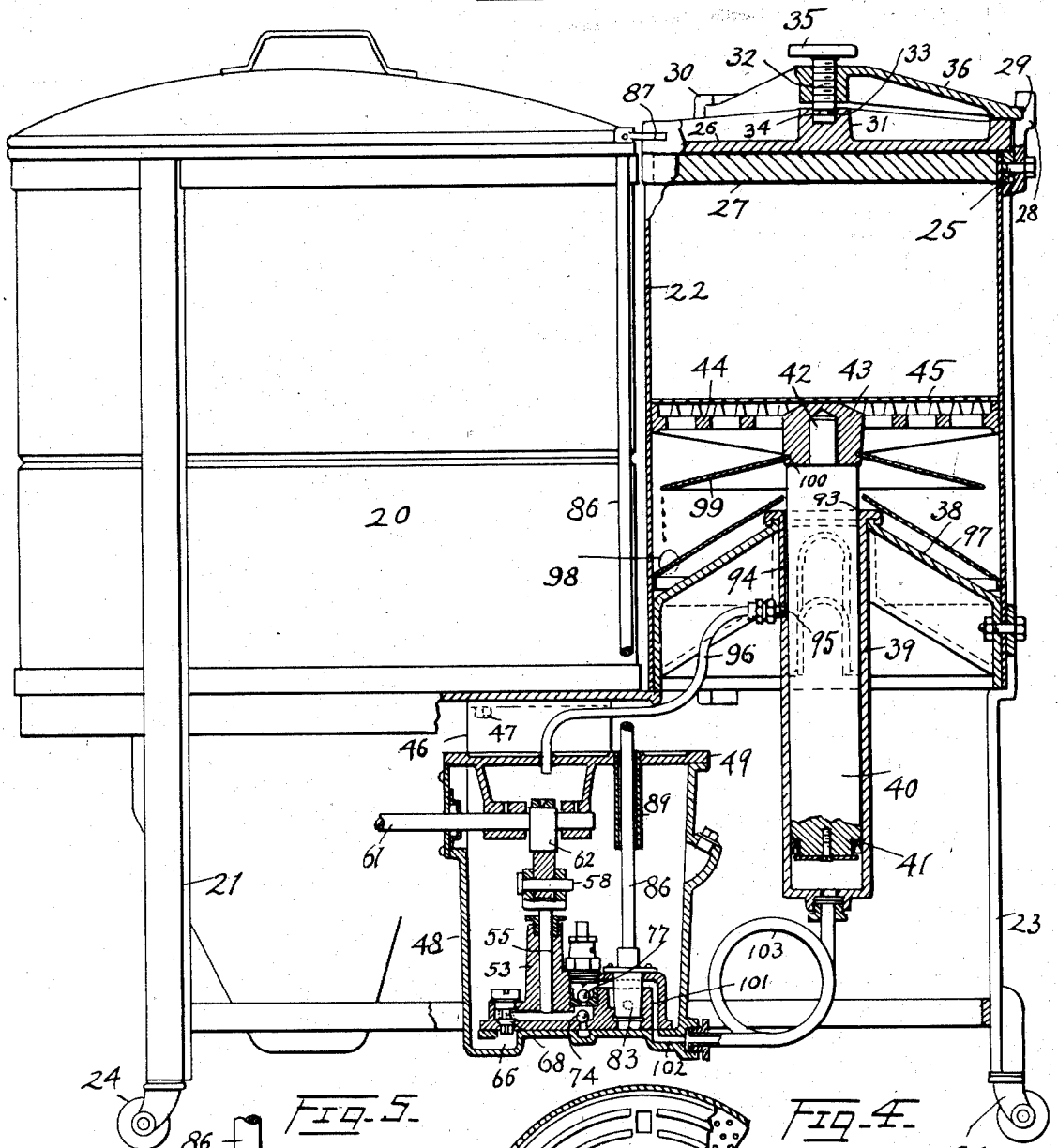


Fig. 5.

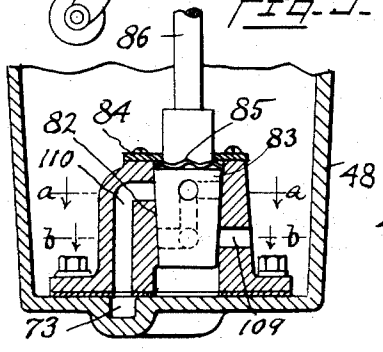
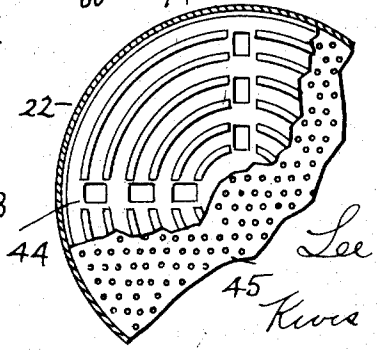


Fig. 4.



Inventor
Lee B. Green
Kerr Hudson & Kent
Attys.

April 30, 1929. L. B. GREEN 1,710,698

PRESSING APPARATUS

Filed Nov. 6, 1926 2 Sheets-Sheet 2

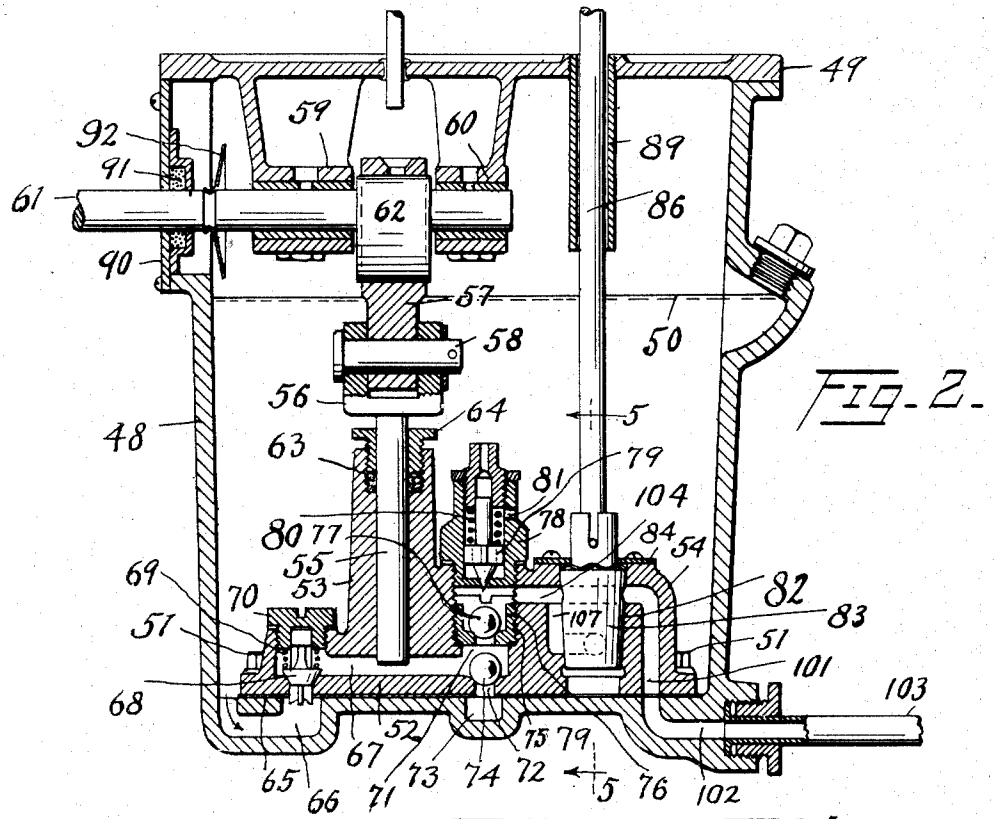


Fig. 2.

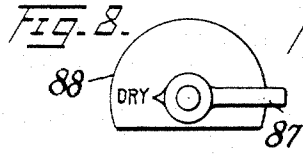


Fig. 8.

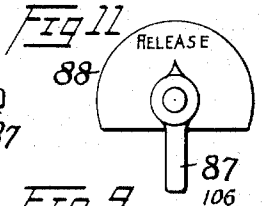


Fig. 11

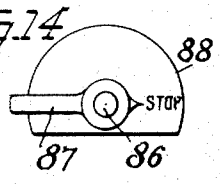


Fig. 14

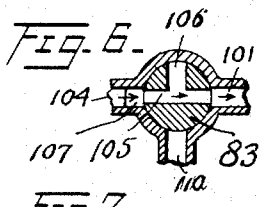


Fig. 6.

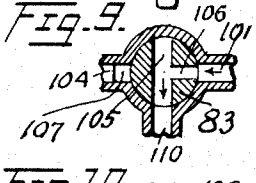


Fig. 9.

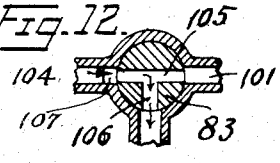


Fig. 12.

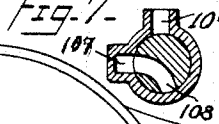


Fig. 7.

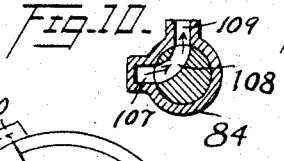


Fig. 10.



Fig. 13.

Fig. 3.

Inventor
Lee B. Green
Kerr Hudson & Kent
Attys.

Patented Apr. 30, 1929. 1,710,698

UNITED STATES PATENT OFFICE.

LEE B. GREEN, OF LAKEWOOD, OHIO, ASSIGNOR TO THE BORDEN COMPANY, OF WARREN, OHIO, A CORPORATION OF OHIO.

PRESSING APPARATUS.

Application filed November 6, 1926. Serial No. 146,747.

This invention relates to apparatus for pressing liquids out of materials and more particularly to apparatus for use in connection with a washing machine to press the water out of clothes.

While the invention relates particularly to apparatus for pressing water out of clothes, it is also adapted for pressing juices out of fruits and for other analogous purposes.

It is one of the objects of the invention to provide an apparatus, of the type referred to, that will be adapted to thoroughly remove liquids from the materials to be operated upon and which will be so constructed that it may be conveniently operated and require only a minimum of effort on the part of the operator.

A further object of the invention is to provide an apparatus, of the type referred to, that will have its wearing parts thoroughly lubricated and be so designed that the liquids that are pressed from the materials operated upon will be kept entirely free from the lubricant.

A further object of the invention is to provide a hydraulically operated apparatus, of the type referred to, including a motor driven pump and suitable control apparatus that will be so arranged that there will be no liability of leakage of oil out of the apparatus, when oil is used as the motive fluid.

A further object of the invention is to provide an apparatus, of the type referred to, that will be of comparatively simple design and adapted for production at a low cost, by modern manufacturing methods.

Other objects of the invention and the features of novelty will be apparent from the following description taken in connection with the accompanying drawings, of which:

Fig. 1 is a side elevation of a clothes washing machine with which there is associated a pressing apparatus embodying my invention, the pressing apparatus being shown in vertical section;

Fig. 2 is an enlargement of a portion of Fig. 1;

Fig. 3 is a plan view of the cover and the locking device therefor;

Fig. 4 is a plan view of a portion of the pressure plate or platen, with a portion broken away;

Fig. 5 is a detail section through the control valve on the line 5—5 of Fig. 2;

Fig. 6 is a detail section on the line *a*—*a*, of Fig. 5, and showing the setting of the control valve to admit the motive fluid to the pressing cylinder;

Fig. 7 is a detail section on the line *b*—*b*, of Fig. 5 and showing the control valve in the same position as in Fig. 6;

Fig. 8 is a plan view of the operating handle for the control valve, and showing it in the position corresponding to Figs. 6 and 7;

Figs. 9, 10 and 11 are views similar to Figs. 6, 7 and 8, respectively, but illustrating the control valve in the position to release the motive fluid from the pressing cylinder; and

Figs. 12, 13 and 14 are similar to Figs. 6, 7 and 8, respectively, but showing the position of the control valve for holding the pressing plunger stationary.

Referring to the drawings, 20 indicates the tub of a washing machine, which may be of any preferred design. The tub 20 is supported on suitable legs, one of which is indicated at 21, and has secured to the side thereof a cylindrical can or container 22 in which the clothes are pressed for the purpose of removing the water therefrom. The side of the container 22, that is remote from the tub 20, may be supported by a leg 23, this leg cooperating with the legs 21 to support the entire apparatus and, for convenience, these legs may be provided with casters 24. The container 22 is arranged in an upright position and has its upper edge reinforced by a ring 25. A removable cover 26 is arranged on top of the container 22 and carries, on its lower surface and within the container, a relatively thick pad 27 of rubber or other yielding material that will accommodate itself to irregularities in the arrangement of the clothes within the container, so that the pressure to which the clothes are subjected will be distributed uniformly throughout the mass. While I prefer to employ the pad 27, I do not consider it an essential element of the apparatus since pressure will be uniformly distributed over the mass of clothes if the latter are carefully placed within the container so as to be of uniform depth.

The leg 23 is preferably provided with an upwardly projecting lug 28 having a recess 29, on its inner surface, above the cover 26, and two or more similar lugs 30 are secured to the outer side of the container 22, at equally spaced points on its circumference. At the center of the cover, there is an upwardly projecting boss 31 in which a screw 32 is rotatably secured by means of the pin 33 and the cir-

cumferential groove 34 in the screw. The screw 32 has a knob 35 on its upper end and carries on its threads a spider 36, this spider having arms for cooperation with the recesses 29 in the lugs 28 and 30. By loosening the screw 32, the spider 36 may be rotated to disengage its arms from the recesses 29 which will permit the cover to be removed from the container 22. In replacing the cover, the spider is arranged with its arms in the recesses 29 and the screw 32 is then tightened, thereby causing the cover 26 to be tightly secured against the upper surface of the ring 25.

Secured within the lower part of the container 22, by bolts 37 or in any other suitable manner, is a strongly reinforced casting 38 which carries a vertically arranged cylinder 39, this cylinder being located on the axis of the container 22 and having a plunger 40 which is adapted to be reciprocated in the cylinder. At the lower end of the plunger 40 is the usual form of packing 41, for the purpose of preventing leakage of the pressure fluid upwardly along the outer side of the plunger. The upper end of the plunger 40 is reduced in diameter to provide the stud 42 on which the hub 43, of a circular plate or platen 44, is loosely mounted. The plate 44 is of strongly reinforced skeleton construction and is of slightly smaller diameter than the interior of the container 22 so as to be freely movable therein. On the upper surface of the plate 44, there is a plate 45 having relatively small perforations therein, this plate being, in effect, a screen to prevent the clothes, or other materials being pressed, from getting into the openings in the plate 44.

Secured to the bottom of the tub 20, by one or more brackets 46 and bolts 47 is a housing 48 having a removable cover 49. The housing 48 is used as a sump for the oil that is used as the motive fluid for operating the plunger 40 and the normal level of the oil in this sump is indicated at 50. Secured to the bottom wall of the housing 48, on the interior of the housing by bolts 51, is a casting 52. This casting has formed integral therewith an upwardly projecting cylinder 53 and a valve body 54. A plunger 55 is reciprocably arranged in the cylinder 53 and has a yoke 56, at its upper end, to which there is connected an eccentric rod 57 by means of the pivot 58. Bearings 59 and 60 project downwardly from the cover 49, within the housing 48, and support a shaft 61 having an eccentric 62 thereon, between the bearings 59 and 60, with which the eccentric rod 57 is connected so that the rotation of the shaft 61 will effect the reciprocation of the plunger 55. The shaft 61 may be driven from an electric motor (not shown) or in any other perferred manner.

At the upper end of the cylinder 53, I have provided the usual packing 63 and nut 64 for compressing this packing so as to prevent leakage of the motive fluid from the cylinder. Between the casting 52 and the bottom wall of the housing 48, there is arranged a suitable gasket 65 and an intake port 66 is provided in this bottom wall for conveying oil from the sump to the intake port 67 in the casting 52, the port 67 being controlled by the suction valve 68 which is loaded or pressed to its seat by a spring 69, for a purpose to be hereinafter described. A nut 70 is provided in the casting 52, above the valve 68, for the purpose of permitting access to the valve. The port 67 continues across the lower end of the cylinder 53 and has an upwardly extending branch 71 and a downwardly extending branch 72, the latter communicating with a port 73, in the bottom wall of the housing 48, and being controlled by a ball check valve 74. The port extension 71 has a threaded enlargement 75 in which there is arranged a seat member 76 for the ball check valve 77. Above the valve 77 there is screwed into the enlargement 75 the relief valve body 78 having a valve 79 therein, which is pressed against its seat by the spring 80. Above the valve 79, the body 78 has a relief port 81 through which oil, which is released by the valve 79, may be discharged into the sump.

The valve body 54 is provided with a taper bore 82 for the plug valve 83. A plate 84 is secured to the top of the valve body 54 and between this plate and the valve 83, there is a spring 85 which presses the valve 83 to its seat in the bore 82. A shaft 86, for rotating the valve 83, extends upwardly through the cover 49 to a point adjacent the top of the tub 20 and is there provided with a handle 87, this handle having associated therewith a stationary index plate 88 having indicia thereon to show the different seatings of the handle 87 which correspond with the different operating positions of the valve 83, these different positions being illustrated in Figs. 8, 11 and 14. The shaft 86 extends through a tube 89, which projects downwardly from the cover 49 and is spaced sufficiently from the shaft 86 to provide a vent for the interior of the housing 48.

The shaft 61 extends through a removable plate 90 that is secured on the side of the housing 48 and carries a packing ring 91 that prevents leakage of oil along the shaft. An oil deflecting disk 92 may be secured on the shaft 61, between the bearing 59 and the packing ring 91, to throw excess oil off from the shaft.

The upper end of the cylinder 39 is flared, as indicated at 93, to provide a space around the plunger 40 in which oil, which works up along the shaft may accumulate. A vertically extending groove 94, in the cylinder 39, conveys any accumulation of oil at 93, to a drain connection 95 which is located just above the highest point that may be reached by the packing 41, when the plunger 40 is at the upper limit of its travel. A pipe 96 leads

from the connection 95 through the cover 49 so as to drain this oil back into the sump.

Above the casting 38, the container 22 has a conical wall or partition 97 that has a central opening for the plunger 40, this opening being slightly larger than the plunger so that there will be no liability of oil being scraped from the plunger and running down the partition 97. The liquid, that is pressed from the clothes or other materials being operated upon, accumulates above the partition 97 and may be drained off through an opening 98 which may be controlled by a suitable valve not shown. The hub 43, of the plate 44, carries a conical baffle plate 99 which may be secured thereto in any preferred manner as by providing a groove 100 in the hub to receive the inner edge of the baffle. From Fig. 1, it will be apparent that the liquid which falls through the plate 44 will be intercepted by the baffle 99 so as to prevent it from running down along the plunger 40 or through the opening in the partition 97, the arrangement thus keeping the liquid, which is pressed out of the clothes or other materials, from coming in contact with any oil which may work up along the plunger 40.

The valve body 54 has a vertically extending port 101 which communicates with a port 102 in the bottom wall of the housing 48, and a pipe 103 connects the port 102 with the lower part of the cylinder 39.

In the operation of the apparatus, assuming that the pump plunger 55 is being reciprocated by the rotation of the shaft 61, and that the plunger 40 is at its lowest position and the clothes or other materials to be pressed or dried are arranged on the plate 45 and that the cover 26 is properly secured in its closed position, the handle 87, which controls the valve 83, is set in the position shown in Fig. 8. The oil pump, comprising the cylinder 53 and the plunger 55 will then draw oil from the sump, through the ports 66 and 67 and discharge it through the port 71 and the laterally extending port 104, the port 105 of the valve 83, the port 101 and pipe 103 to the cylinder 39 below the plunger 40. The plunger will be thereby forced upwardly and the clothes or other materials will be compressed between the plate 45 and the pad 27 and, the liquid pressed therefrom will fall through the plate 44 onto the baffle 99 and then collect in the space between the partition 97 and the baffle 99. When the clothes or other materials have reached the limit of their compression, the relief valve 79 will automatically open and return the oil to the sump by way of the port 81.

When it is desired to lower the plunger 40, the handle 87 is set in the position indicated in Fig. 11, the valve 83 then closing the port 104, as shown in Fig. 9. In this setting of the valve 83, the lateral port 106 thereof is in communication with the port 101, and the port 105 in communication with a port 110 that is in the valve body 54. Oil will then be drawn from the cylinder 39, through the pipe 103, ports 102, 101, 106, 105, 110, 73 and 72, past the valve 74, which acts as a check valve, and will be discharged through the port 71, past the valve 77, through the port 104 and the longitudinally extending port 107, in the valve body 84, and the port 108, in the valve 83, whence it passes out through the port 109, in the valve body 84, into the sump. The plunger 40 will thus be drawn down but its movement may be stopped at any time by turning the handle 87 to the position shown in Fig. 14. The valve 83 will then be in the position shown in Fig. 12, which will permit the pump to discharge the oil through the valve 83 and hence it will be returned through the port 73 to the pump. When the valve 83 is in the position shown in Fig. 9, and the pump is operating to withdraw oil from the cylinder 39, the spring 69 will hold the suction valve 68 in its closed position and prevent the pump from drawing in oil through the port 66, on its suction stroke. However, the spring 69 should be comparatively light for the reason that the plunger 40 tends to descend, by the action of gravity on it, so that the suction, in the system, while the plunger is descending, is comparatively slight. When there is no occasion to actuate the plunger, in either direction, the motor which drives the shaft 61 may be stopped.

Having thus described my invention, what I claim is:

1. In apparatus of the class described, the combination of a container, a removable cover on one end of said container, a perforated plate movable within said container toward and away from said cover, a cylinder at the opposite end of said container from said cover, a plunger in said cylinder to which said plate is attached, a partition in said container between said cylinder and said plate and having a central opening for said plunger, a baffle carried by said plunger between said partition and said plate and adapted to deflect liquid away from said opening in said partition, means for draining liquid from the space between said partition and said baffle, and means for actuating said plunger.

2. In apparatus of the class described, the combination of a vertically arranged cylindrical container, a removable cover at the top of said container, a vertically arranged cylinder secured within said container adjacent the bottom thereof, a plunger in said cylinder, a perforated plate carried on the upper end of said plunger, a conical partition arranged in said container with its apex upward, said partition having an opening therein for said plunger, a baffle carried by said plunger above said partition for deflecting liquid which falls through said plate away from said opening, means for draining liquid from the space

above said partition, and means for actuating said plunger.

3. In apparatus of the class described, the combination of a vertically arranged cylindrical container, a removable cover at the top of said container, a vertically movable plunger in said container having a perforated plate on its upper end, guiding means for said plunger at the bottom of said container, a baffle carried by said plunger to deflect liquid therefrom, and means for actuating said plunger.

4. In apparatus of the class described, the combination of a vertically arranged cylindrical container, a cylinder at the bottom of said container, a plunger in said cylinder having a presser plate on its upper end, said container having a partition above said cylinder provided with a central opening through which said plunger moves, a baffle on said plunger above said partition for deflecting liquid away from said opening, and means for supplying pressure fluid to said cylinder to actuate said plunger.

5. In apparatus of the class described, the combination of a vertically arranged cylindrical container, a cylinder at the bottom of said container, a plunger in said cylinder, said container having a partition above said cylinder provided with a central opening through which said plunger moves, a baffle on said plunger above said partition for deflecting liquid away from said opening, and means for moving said plunger in either direction.

In testimony whereof, I hereunto affix my signature.

LEE B. GREEN.