

July 20, 1937.

W. A. FRANTZ ET AL
LAUNDRY MACHINE

2,087,571

Filed Feb. 13, 1933

3 Sheets-Sheet 1

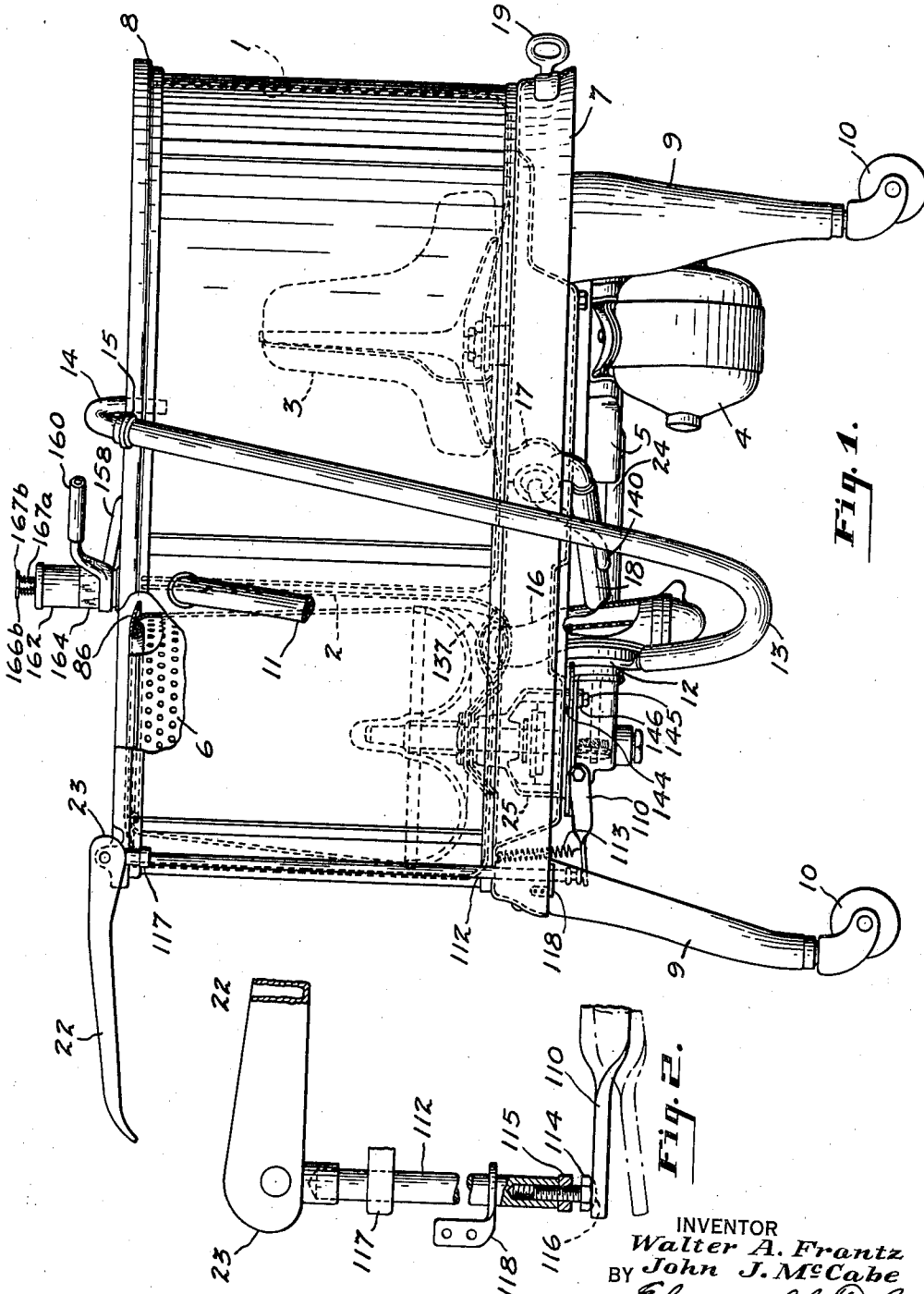


Fig. 1.

Fig. 2.

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3 Sheets-Sheet 3

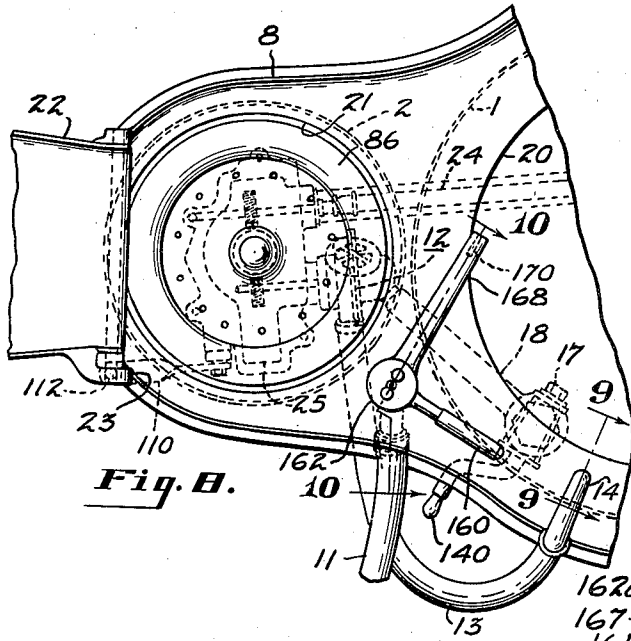


Fig. 8.

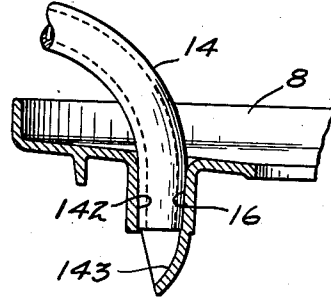


Fig. 9.

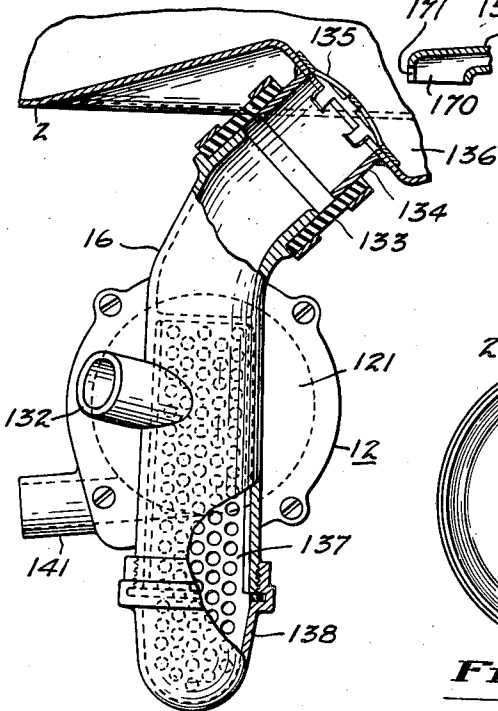


Fig. 12.

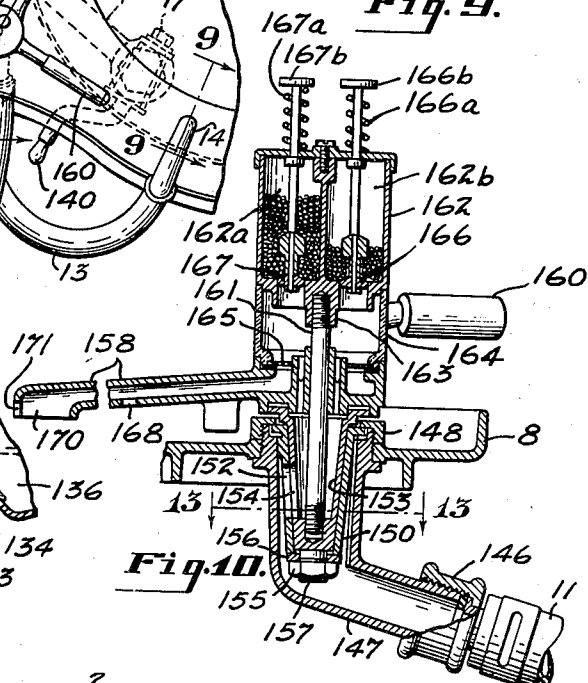


Fig. 10.

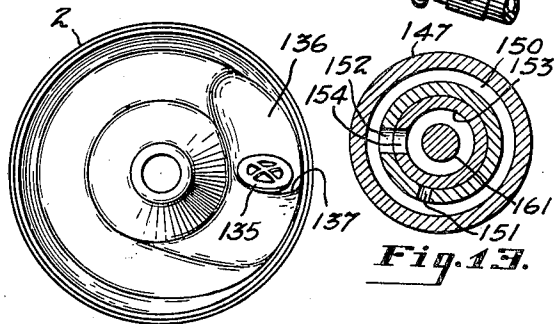


Fig. 11.

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2,087,571

LAUNDRY MACHINE

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Application February 13, 1933, Serial No. 656,404

9 Claims. (Cl. 210—75)

This invention relates to laundry machines, and in particular, laundry machines which employ a centrifugal extractor for performing the clothes drying operation. The present invention is a continuation in part of our co-pending application Serial No. 614,001, filed May 27, 1932 for Combined washer and drying machine.

One of the objects of this invention is to provide in a machine of the type disclosed, novel means for rinsing, bluing and sterilizing the clothes after the washing operation has been performed.

Another object of this invention is to provide an extractor mechanism of unitary construction, in which the operating elements of the mechanism can be assembled and tested as a unit separate from the other parts of the machine.

Another object of this invention is to provide in a machine of the type disclosed, an improved extractor tub construction in which the tub is shaped so that the rotation of the extractor basket and the flow of liquid in the tub cooperate to facilitate the emptying of the extractor tub.

Another object of this invention is to provide in a machine of the type disclosed, an improved pump, pump drive and liquid disposal means.

Another object of this invention is to provide in a machine of the type disclosed, an improved means for handling the supply of liquid used in effecting the washing and rinsing operations.

Another object of this invention is to provide in a machine of the type described, a combined valve and strainer through which fresh water may be supplied to the tubs of the machine.

Another object of this invention is to provide a self-contained multi-chamber washer, having supply water control and directing means and provisions for connecting the machine to a source of hot and cold water supply and to a drain.

Another object of this invention is to provide in a machine of the type disclosed, an improved form of extractor driving mechanism.

Another object of this invention is to provide in a machine of the type disclosed, an improved form of oiling system for the mechanism of an extractor drive.

Another object of this invention is to provide in a machine of the type disclosed, an improved form of extractor basket and extractor casing.

Another object of this invention is to provide in a machine of the type disclosed, an improved water supply system embodying provisions for filtering, and chemically treating the supply water.

Another object of this invention is to provide

in a machine of the type disclosed, an improved extractor driving mechanism having driving and driven shafts projecting from a gear case with provisions for preventing the escape of lubricant from about the bearings of such shafts.

Another object of this invention is to provide in a machine of the type disclosed, an improved flexible mounting for the operating parts of a centrifugal extractor.

Another object of this invention is to provide in a machine of the type disclosed, an improved dispensing device for furnishing measured quantities of soluble materials to the water supplied to the machine.

Another object of this invention relates to the provision of an improved form of bearing construction having means for preventing grit and dirt from getting into the bearing and other means for preventing the escape of lubricant from about the shaft carried by such bearing.

A further object of this invention is to provide in a machine of the type disclosed, a generally improved laundry machine embodying special provisions for the control of the operating parts of the machine and improved liquid supply, liquid treating, and liquid disposal means.

With these and other objects in view, the invention consists in the novel construction, arrangement and combination of parts, hereinafter illustrated and described in some of its embodiments in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a side elevational view, partly in section, of our improved washing machine.

Figure 2 is an enlarged detail view partly in section, showing certain features of the extractor control mechanism.

Figure 3 is an enlarged plan view partly in section, of the pump and extractor driving mechanism.

Figure 4 is a sectional view taken on line 4—4, Figure 3.

Figure 5 is a sectional view taken on line 5—5, Figure 3.

Figure 6 is an enlarged sectional view of the agitator shaft bearing seal.

Figure 7 is an enlarged sectional view of a modified form of agitator shaft bearing seal.

Figure 8 is a fragmentary plan top view of the extractor end of our improved washing machine.

Figure 9 is an enlarged sectional view taken on line 9—9, Figure 8, showing the means pro-

vided for supporting the gooseneck of the drain hose.

Figure 10 is an enlarged sectional view taken on line 10—10, Figure 8, showing the details of the rinse water supply valve, the strainer and the water treatment material dispensing device.

Figure 11 is a plan view of the extractor casing.

Figure 12 is an enlarged view partly in section showing the details of the pump strainer and dirt trap; and

Figure 13 is an enlarged sectional view of the water supply valve taken on line 13—13, Figure 10.

Referring to the complete washing machine illustrated in Figure 1, the numeral 1 indicates a washer tub which is provided for the purpose of receiving clothes and other articles to be washed. Beside the washer tub, there is positioned an extractor tub 2, in which adherent liquid is separated from the clothes after they have been washed or rinsed. The tubs 1 and 2 may be formed from steel stampings and finished with a coating of vitreous enamel.

The washing operation is effected by means of an oscillatable dasher or agitator 3, which extends upwardly from the bottom of the washer tub 1, and which is mounted for movement about a vertical axis. The agitator 3, is driven by a motor 4, which is supported beneath the washing compartment 1, and it is connected in driving relation to the agitator 3 through suitable gearing carried in a gear case 5.

The agitator or dasher 3, operates with a reversely rotary movement about a vertical axis and swings through an arc of substantially one hundred and eighty degrees during its operation. A perforated extractor basket 6, is mounted for rotation in the extractor tub 2, and it is also driven by the motor 4, through suitable mechanism which is housed and supported beneath the extractor tub.

The extractor tub 2, and the washer tub 1, are secured in place between a stamped metal base member 7, and a die-cast apertured metal top plate 8. Three supporting legs 9 are secured directly to the base member. The supporting legs are provided with casters 10, to facilitate moving the machine about from place to place.

The extractor tub and the washer tub are supported on the base member 7 and are secured thereon in any suitable manner such as by clamping them between the top plate and the base member as is described in detail in our co-pending application above referred to.

A water supply hose 11, connects the machine with hot and cold water service supply lines (not shown). The top plate 8, pivotally supports a combined water treatment material dispenser, valve, strainer and spray nozzle structure. The valve and spray nozzle are arranged so that the water supplied by way of the hose 11, may be controlled and directed into either the washing container 1, or into the extractor basket 6.

The machine is provided with a pump 12, which is connected to a drain hose 13, that terminates in a gooseneck 14. The gooseneck is connected to the hose by means of a swivel coupling 15. The gooseneck is provided for the purpose of holding the hose in position to discharge into the washer tub or elsewhere as desired. The bottom of the extractor tub 2 has a drain opening which is directly connected to the pump inlet by the conduit 16 and it is continually drained by the pump during the operation of the machine. The draining of the washer tub 1, is under control of

a valve 17 which is connected at its inlet side to a drain opening in the tub bottom and which communicates at its outlet side with the pump 12 by way of the conduit 18.

The operation of the agitator 3, is controlled by means of a suitable control lever, to which is secured a hand grip or handle 19. The handle 19 is capable of occupying three different control positions. In the first position, the motor 4 is inoperative. In the second position, the motor is connected to an electric circuit and thus placed in operation. In the third position of the control lever, the washing machine agitator 3 is connected in operated relation with the gear mechanism in the case 5 and with the driving motor.

The top plate 8, is provided with openings 20 and 21, which register with the washer and extractor tubs, respectively. A removable cover may be provided for the tub opening 20 if desired. A cover 22, is pivotally supported by the top plate 8 on a horizontal axis adjacent to the extractor opening 21. The opening and closing of the cover 22 stops and starts the rotation of the extractor basket 6. The control of the extractor basket is accomplished by means of a cam 23, which is integrally formed with the cover 22, and by other mechanism which will be described in detail in the latter part of this specification.

The arrangement of the extractor control is such that when the extractor cover 22 is in its open position, as shown in Figure 1, the extractor basket 6 is disconnected from its driving mechanism and a brake is applied to prevent its rotation. In the closed position of the extractor cover, the brake is automatically released, and the extractor basket is connected in driven relation with its driving mechanism.

The motor 4 is connected in driving relation to the operating elements located in the gear case 4 by any suitable power transmission means. The gearing in the gear case 5 connects the agitator 3 to the motor 4 and such connection may be made or broken by means of the control handle 9 which also controls the operation of the motor 4. A drive shaft 24 extending from the gear case 5, connects the motor 4 with the extractor mechanism and furnishes the power for driving the extractor container 6.

The operating elements of the extractor driving mechanism are housed in a gear case formed from upper and lower mating halves 25 and 26 respectively. A worm shaft 27 extends from the gear case and is connected at its outer end to the horizontal drive shaft 24 by means of a universal joint 28. The universal joint is provided with a dust-excluding, grease-retaining cover 29. A spring 30 is carried in one end of the drive shaft 24 to take up end play and prevent the vibration of the shaft when it operates. The inner end of the shaft 27 is journaled in a plain bearing 31 and at its opposite end it is received in an anti-friction bearing 32 carried by the extractor gear case base 26. A helical gear 33 is rigidly fixed on the shaft 27 at a point intermediate the ends thereof. An oil sealing member 34 prevents the escape of oil from about the bearing 32. The helical gear 33 engages a second helical gear 35, mounted for rotation about a vertical axis. A third helical gear 36, 70 carried by the horizontal pump shaft 37 meshes with the helical gear 35 for the purpose of driving the pump 12. A ball thrust bearing 38 is provided to take the end thrust of the shaft 27.

The oil sealing member 34 is formed from a

leather washer having a flanged portion for contacting with the outer surface of the coupling member 39. A garter spring 40 maintains the flanged portion of the washer 34 in sealing contact with the coupling member 39. A sheet metal cup 41, having a pressed fit in the seal receiving aperture of the gear case, serves to hold the washer 34 and its spring 40 in place.

A shallow helical groove 42 is formed on the surface of the coupling member 39 at the place where it is in contact with the washer 34. During the rotation of the shaft 24 and the coupling member 39, the groove 42 wipes oil off the washer 34 and returns it to the gear case.

The coupling member 39 is threaded to the shaft 27 and serves to hold the inner race 43 of the bearing 32 on this shaft. The outer race 44 of this bearing is held in the gear case by the threaded cup 45. A pressed metal cup 46 is gripped by the outer race 44 of the anti-friction bearing while its inner race 43 holds a washer 47 in position on the shaft 25 at a point adjacent to the mouth of the cup 46. A washer 48 of fibrous packing material is carried in the cup 46. This washer cooperates with the cup 46 and the washer 47 in preventing dirt and grit from being carried by the oil in the gear case to the bearing 32.

The portion of the shaft 27 which is received in the bearing 31 is provided with a helical groove 27^a on its bearing surface. This groove serves to pump oil inwardly along the bearing 31 and then upwardly through the communicating cored passageways 49 and 50 and formed respectively in the lower and upper halves 26 and 25 of the gear case. The upper passageway 50 communicates with a vertical slot 51 formed in the extractor shaft bearing 52 by way of a hole 53 drilled through the bearing 52. The slot 51 serves to feed oil to the top of the bearing from whence it is returned to the gear case by means of a second slot 54 formed in the opposite side of the bearing. By reason of the arrangement just described the bearing surface of the bearing 52 is supplied under pressure with an adequate amount of lubricant during the operation of the shaft 27.

An extractor basket supporting shaft 55 is journaled in the bearing 52 and at its lower end it has an anti-friction bearing 56. This bearing is fitted in a suitable opening provided in the bottom half of the extractor gear case. A closure cap 57 secures the bearing 56 in place in the gear case base 26. The extractor shaft 55 is provided with a threaded lower end for reception of a lock nut 58, by means of which the shaft is secured to the inner race of the anti-friction bearing 56 and is thus held against axial movement.

A shaft seal is provided at the upper end of the extractor shaft bearing 52 to prevent the ingress of water into the extractor gear case and to prevent the escape of oil from such gear case to the extractor tub. This seal is formed with an annular ring 60 of graphite bronze fitted over the end of the bearing 52 in a leak-proof manner such as by soldering, and an annular member 61 having a smoothly finished face 62 forms sealing contact with the ring at this point. The annular member 61 is urged against the ring by means of a spring 63 abutting at its upper end against a washer 64 engaging a flexible packing member 65. The packing member 65 at its side opposite to the washer 64, engages the V-shaped edge 66 of a ring 67 which is secured to the shaft 55 by means of a set screw

68. The flexible packing member 65 is thus urged in sealing relation against the surface of the shaft 55 and against the annular member 61 and a single spring serves to maintain the packing member 65 and the face 62 in sealing contact with the associated parts of the device.

The modified form of seal shown in Figure 7 comprises a metallic bellows 70 which is sealed and secured at its upper end to the extractor shaft 55. The lower end of the bellows is fitted with a sealing ring 71, which frictionally engages the smoothly finished end 72 of the extractor shaft bearing 52. The bellows 70 is slightly compressed so that its natural resiliency will urge the ring 71 into sealing contact with the end 72 of the bearing 52 and thus provide a liquid tight seal at this point.

The lower half of the gear case or base 26, is formed with a bearing 73 for a control shaft 74. The cover or upper half 25 of the extractor gear case is formed with a central opening, for reception of the upper bearing 52 of the extractor shaft 55. The extractor shaft bearing 52 is exteriorly threaded at a point intermediate its height and it is also provided with an outwardly extending flange 75, at its lower end. A nut 76, engaging the threaded part of the bearing 52, is provided for securing the extractor gear case to the frame of the machine and to the extractor tub. Suitable gaskets 77 are provided to prevent leakage of water about the central opening in the extractor tub through which the bearing 52 projects. The gaskets 77 are formed from a soft yielding material such as soft rubber to provide a flexible joint at this point.

The extractor shaft 55 is provided with a frusto-conical upper end 78, which is received in the frusto-conical socket 80 of the extractor basket base 81. The extractor basket 6 may be readily removed from the shaft 55 by reason of the form of coupling used which constitutes a detachable frictional driving connection between the basket and its driving shaft. A breather pipe 79, communicating with the interior of the extractor gear case is carried by the upper half 25 thereof.

The extractor basket base 81 is in the form of a bell-shaped die casting. The side wall of the basket is formed by an inwardly tapering sheet metal conical drum 82 which is secured to the base by the rivets 83. The taper of the shaft end 78 is such that the weight of the basket when loaded with work is sufficient to provide for a good frictional driving connection at this point, while at the same time, permitting a slight amount of slippage in starting and stopping the rotation of the basket.

Perforations 84 are formed in the side walls of the basket to permit the expelling of water from the basket during its operation. The base portion of the extractor basket is provided with a plurality of holes 85, to permit the drainage of water from this portion of the basket. The upper end of the extractor basket carries an annular ring 86, which is provided to prevent clothes from dropping between the extractor basket and its tub 2. This ring may be of stamped metal construction and is pressed or spun into position on the rim of the extractor basket.

The helical gear 35 is fixedly secured to a clutch member 87, which is freely journaled on the extractor shaft 55. At its upper end the clutch member 87 is provided with a conical clutch face 88. The member 87 is held against

axial movement by the shaft shoulder 90 and the shaft collar 91.

Cooperating with the clutch member 87, there is provided a second or driven clutch member 92, which has a lower conical clutch face 93, provided for cooperation with the clutch face 88 of the aforesaid member. The clutch member 92 is slotted at 95, for loosely receiving the shaft key 96. In this manner the member 92 is mounted for rotation with the shaft 55 and for axially slidable movement thereon.

A spring 97 is compressed between the top of the clutch member 92 and a washer 98, which is held in position on the shaft 55 by means of a pin 100. The upper end of the vertically slidable clutch member 92 is formed with a frusto-conical brake face 101, which engages a brake member 102 having a brake face 103 of similar contour. The brake member 102 is provided with a pair of radially extending ledges 104, in which are provided for engagement by the fingers 105, of the clutch shifting fork 106. The brake member 102 has a pair of vertically channeled guideways 107 in which are received the guide members 108 which serve to prevent the rotation of the member 102.

The shifting fork 106 is fixedly secured to the rod 74, by means of a set screw 109. The rod 74 is journaled in a bearing 73, which is formed in the gear case base 26 and at its outer end it is provided with a crank arm 110. An oil seal 110^a is fitted in the outer end of the bearing 73, to prevent the escape of oil from the gear case at this point. The crank arm 110 is rigidly secured to the end of the rod 74 and held thereon by means of the nut 111. The crank arm 110 is engaged by the lower end of a rod 112, which is operated by means of the cam 23, provided by the extractor cover 22. Contact is maintained between the rod 112, the cam 23 and arm 110, by means of the tension spring 113, which is secured at its ends to the crank 110 and to the washing machine base 7.

The lower end of the rod 112 is threaded for the reception of the bolt 114, by means of which its length can be readily adjusted. A lock nut 115 is provided for the bolt 114. The head of the bolt is received in a shallow cup 116, which is formed in the end of the crank arm 110. The washing machine top 8 has an apertured arm 117 integrally formed therewith for receiving and guiding the upper end of the rod 112. The lower end of this rod is guided in a bracket 118 which is carried by the machine base 7.

During the operation of the motor 4, with the parts in the position they occupy in Figure 1, the extractor basket will be at rest with the braking surfaces 101 and 103 in contact with each other. To start the rotation of the basket 6, it is only necessary to close the lid 22, whereupon the movement of the cam 23 allows the rod 112 and the crank arm 110 to rise under influence of the spring 113.

The movement of the crank arm 110 is transmitted to the shaft or rod 74, and its associated shifting fork 106, which is thereby moved downwardly, lowering the brake member 102 out of contact with the brake surface 101, of the combined clutch and brake member 92. Coincidentally with this operation, the spring 97 moves the clutch member downwardly, bringing the frictional clutch faces 88 and 93 into engagement, whereupon the basket 6 is driven by the rotating member 87.

The stopping of the extractor is accomplished

by opening the lid 22. This operation moves the aforesaid extractor control elements in a reverse manner to that just explained, to separate the clutch surfaces 88 and 93 and to bring the braking surfaces 101 and 103 into engagement where- by the basket is quickly brought to rest.

The pump 12 is of the impeller type and it comprises a pump case 120 and a pump cover 121, which inclose a bladed impeller 122. The pump case 120 has an extended portion in which is formed a bearing 123 and a packing chamber through which the pump shaft 37 extends. The pump case is secured to the extractor gear case base 26 by means of the screws 124.

The packing chamber of the pump case is arranged to receive in the order named, a spiral spring 125, a loosely fitted packing gland 126, the packing material 127 and a gland nut 128. The packing gland 126 is loosely fitted in the packing chamber so that it is free to be moved by the spiral spring 125, to force the packing material 127 into sealing relation with the pump shaft 37. The extended portion of the pump case projects into the interior of the extractor gear case and the pump shaft and its bearing by reason of this arrangement, are lubricated by the oil carried in the extractor gear case.

The end of the pump shaft is threaded at 139, for receiving the bladed impeller 122 of the pump. The pump cover 121 is provided with a central inlet opening 131, which communicates with two branched conduits 132 and 16. The branch 132 connects with the valve 17 and the branch 16 connects with a nipple 134 provided in the bottom of the extractor tub.

These connections are made by means of flexible hose couplings 18 and 133, respectively, which are suitably secured at their ends to the branches 132 and 16, and to the aforesaid parts. The fitting connecting the pump with the extractor tub, comprises a nipple 134 which is welded to the bottom of the tub 2. A screen member 135 is frictionally held in the nipple 134.

The bottom portion of the extractor tub is formed at one side with an apertured trough-like depression 136, so that the nipple just mentioned, enters the tub tangentially and on an angle of about forty-five degrees with the horizontal. The side wall of the tub is bent inwardly at a point opposite to the drain opening as indicated by the numeral 137, so that the drain opening is located in a well defined pocket formed by the bottom and side walls of the tub 2. By this arrangement the rotation of the basket tends to force the liquid in the tub out through the stated drain opening provided for carrying away the water in the extractor tub. The natural movement of the water in the extractor tub is in a direction so that it tends to escape from the extractor tub by way of the stated drain opening.

The pump cover 121 carries a trap for solid materials. The trap is fitted with a removable screen 137, which is held in position by means of the removable closure cap 138. The screen is located in the cover between the pump inlet and the conduits communicating with the tub drain openings and it serves to prevent small articles of clothing and other materials from getting into the pump case.

The draining of water from the washer compartment is under control of the valve 17. This valve is of the plug type and its plug is connected for rotational movement to a control handle 140. For the position of the handle as shown in Figure 1, the valve is in its open position and

when the handle is turned about ninety degrees in a counter-clockwise direction, the valve is closed. The pump case is of snail-shape construction and has a tangential outlet 141, on its periphery for connection with the drain hose 13.

The top plate 8 is formed with an opening 142, for receiving the gooseneck 14, of the drain hose 13. As best shown in Figure 9, this hole terminates in a curved lip 143, which acts as a sort of a guard or trap to prevent the escape of water from the tub when the agitator 3 is working and when the gooseneck is not in its hole 142.

The lower half 26, of the extractor gear case is provided with three apertured ears, upon the upper surface of which are carried rubber pads or washers 144. The pads are apertured for receiving the bolts 145 which engage with nuts riveted to the base 7 by means of which the gear case is secured to the base 6. Rubber washers 146 are also provided between the bolt heads and the gear case so that the case is secured to the base 7 in a resilient and yielding manner. This arrangement cooperates with the flexible attachment of the extractor bearing 52 to the casing 2 to permit the extractor and its driving mechanism to have a limited amount of movement with respect to the rest of the machine which allows the extractor to gyrate a slight amount and generally serves to reduce vibration and lessen the strains imposed on the machine during the operation of the extractor.

A water supply conduit 11 is connected by means of a coupling 146, to the terminal portion of an L shaped fitting 147, which extends from the side of the machine. The fitting 147 is connected at its opposite or upper end to the top plate 8 of the machine, by means of a lock nut 148, which engages with the threaded end portion of the fitting, whereby to secure it in place on the top plate 7. The lock nut 148 also serves to hold a ported sleeve 150 in position in the fitting 147.

The sleeve 150 is of tapered construction and has a pair of spaced ports or openings 151 and 152 provided for communication with the fitting 147. A hollow tapered valve plug 153 is journaled in the member 150. The valve plug has a port 154, which can be brought into registry with either of the ports 151 or 152 of the member 150, and thus provide for fluid flow through the valve. The plug 153 is held in sealing relation with the member 150, by means of a nut 155 and washer 156, which are secured to the threaded end portion 157 of the plug and which engage the member 150.

An integrally formed nozzle 158 and operating handle 160 are fixedly secured to the plug member 153, by means of a threaded rod 161 and a container 162 which receives the rod in a threaded boss 163 formed in the bottom thereof. A glass cylinder 164 is thus clamped between the container 162 and the nozzle 158. A removable filter screen 165 is held in place by the cylinder 164 over the inlet opening of the nozzle 158, for the purpose of preventing solid particles of dirt and foreign material from passing through the nozzle 158 and staining the clothes. The screen 165 cooperates with the cylinder 164 to hold water soluble granular materials discharged from the compartments 162^a and 162^b of the container and which are provided to sterilize, blue or otherwise treat the clothes in the extractor basket or to treat the water supplied to the washer tub. These materials may be in the form of a water soluble bluing material, a water softener com-

pound, pulverized or granular soap or any other soluble material which it might be desirable to add to the water supplied to the different compartments of the machine.

The discharge of material from the compartments 162^a and 162^b is under control of a pair of valves 166 and 167. This arrangement permits the carrying of two different materials, one for the treatment of the wash water and the other for the treatment of the rinse water. The valves 166 and 167 have springs 166^a and 167^a to hold them in closed position. The valves are arranged to discharge a measured quantity of material when their exposed ends 166^b and 167^b are depressed.

In using the water treating device the compartments of the container are first filled with suitable materials such as bluing for one compartment and soap for the other. When the nozzle is turned to discharge water into the wash tub a measured quantity of soap can be discharged into the compartment surrounded by the glass cylinder 164 where it is there dissolved and carried into the washer tub by the water passing through such compartment. In a similar manner when the nozzle is turned to discharge into the extractor basket for rinsing purposes, a measured amount of bluing can be added to the rinse water discharged by the nozzle 158.

In Figures 1 and 8, the spin-rinse valve parts are shown in the position they occupy when water is being discharged into the washer tub. When the handle is rotated so as to bring the end of the nozzle over the extractor container 6, the valve plug port 154 registers with the relatively small port 151 of the sleeve 150, and a limited flow of water is discharged into the extractor tub for the purpose of rinsing and sterilizing the clothes contained therein, during the rotation of the extractor basket. The nozzle 158 and the cover 22 are arranged so that the nozzle can be swung under the cover when in its closed position.

The amount of water discharged into the extractor during the spin rinse operation is limited by the size of the valve port 151, so as to be slightly less than the maximum flow that the pump 12 is able to handle. In directing the nozzle 158 to discharge into the different compartments of the machine, the port 154 is brought into registry with either the small port 151 or the large port 152, in accordance with the position of the nozzle. When the end of the nozzle overlies the portion of the top plate 8, which separates its openings 20 and 21, the valve ports are in a closed position and no water flows through the nozzle.

The spray nozzle is provided with a small opening 168 intermediate its length which serves to discharge a small stream of water between the side walls of the extractor container and the extractor casing when the nozzle is in position to discharge into the extractor. The purpose of supplying water at this point is to wash away accumulations of soap suds which might gather between the adjacent parts of the extractor container and its surrounding casing. The main discharge outlet 170 of the nozzle is in the form of a tapered slot extending through the end wall thereof at 171 and arranged so as to discharge a fan-shaped stream of water which impinges against the extractor side wall from the top to the bottom thereof and in this manner supplies fresh rinse water to the entire contents of the container.

The spin-rinsing device just described makes it

possible to perform all of the customary washing and rinsing operations on the clothes without removing the clothes from the machine. In addition to these advantages, the spin-rinse device permits the use of scalding hot water and disinfectants to sterilize the clothes.

Furthermore it is to be understood that the particular forms of apparatus shown and described, and the particular procedure set forth are presented for purposes of explanation and that various modifications of said apparatus and procedure can be made without departing from our invention as described in the appended claims.

Having thus described our invention what we claim is:

1. A laundry machine comprising, a support, a casing carried by said support, a rotatable extractor container in said casing, a shaft for supporting said container, bearing and driving means for said shaft fixedly secured to said support, and means for flexibly securing said casing with respect to said bearing means and said support.

2. In a laundry machine, an extractor casing, and a centrifuge in said casing, said casing having a drain opening in its bottom disposed on an angle with the horizontal and facing in a direction opposite to the direction of rotation of the liquid in said casing whereby to intercept and divert and drain the swirling liquid from said casing during the operation of the said centrifuge.

3. In a laundry machine, an extractor casing, and a centrifuge in said casing, said casing having a drain opening in its bottom disposed on an angle with the horizontal and facing in a direction opposite to the direction of rotation of the liquid in said casing whereby to intercept and divert and drain the swirling liquid from said casing during the operation of the said centrifuge, the drain opening of said casing having portions both above and below the plane defined by the bottom of said casing.

4. In a laundry machine, an extractor casing, and a centrifuge in said casing, said casing having a drain opening in its bottom disposed on an angle with the horizontal and facing in a direction opposite to the direction of rotation of the liquid in said casing whereby to intercept and divert and drain the swirling liquid from said casing during the operation of the said centrifuge, the bottom of said casing having an upwardly inclined portion and an adjacent downwardly inclined portion and a portion joining the upper and lower ends of the respective inclined portions and defining the drain opening.

5. In combination, a liquid holding casing having a drain opening in its bottom, a device operable in said casing, and a combined driving and pumping unit for the device and casing located beneath said casing and comprising a lubricant retaining gear case, a drive shaft projecting from said device through the bottom of said casing, gearing in said gear case adapted to be connected and disconnected with respect to said shaft and a pump secured to and carried by said gear case, said pump being connected to said gearing independently of the connection of said gearing to said shaft, said pump having a case with an inlet and an outlet opening and a bearing exposed to the lubricant in said gear case, means

for driving said gearing, and means for connecting the inlet opening of said pump case to the drain opening of said casing.

6. In combination, a liquid holding casing having a drain opening in its bottom, a device operable in said casing, and a combined driving and pumping unit for the device and casing located beneath said casing and comprising a lubricant retaining gear case, a drive shaft projecting from said device through the bottom of said casing, gearing in said gear case adapted to be connected and disconnected with respect to said shaft, a pump case having an inlet and an outlet opening secured to and carried by said gear case, a shaft for said pump projecting from said pump case into said gear case and operatively connected to said gearing independently of the connection of said gearing to said drive shaft and a bearing for said pump shaft supplied with lubricant from said gear case, means for driving said gearing, and means for connecting the inlet opening of said pump case to the drain opening of said casing.

7. In combination, a liquid holding casing having a drain opening in its bottom, a device operable in said casing, and a combined driving and pumping unit for the device and casing located beneath said casing and comprising a lubricant retaining gear case, a drive shaft projecting from said device through the bottom of said casing, gearing in said gear case adapted to be connected and disconnected with respect to said shaft, a pump case having an inlet and an outlet opening secured to and carried by said gear case, a shaft for said pump projecting from said pump case into said gear case and operatively connected to said gearing independently of the connection of said gearing to said drive shaft, and a bearing for said pump shaft having one end opening into said gear case whereat it is supplied with lubricant and packing means at the other end of said bearing for preventing intermingling of the lubricant and the liquid handled by the pump, means for driving said gearing, and means for connecting the inlet opening of said pump case to the drain opening of said casing.

8. A laundry machine comprising, a support, a casing carried by said support, a rotatable extractor container in said casing, a shaft for supporting said container, bearing and driving means for said shaft fixedly secured to said support, and means for flexibly securing said casing with respect to said bearing means and said support, said means including flexible sealing means interposed between said bearing and the bottom of said casing.

9. A laundry machine comprising, a support, a casing carried by said support, a rotatable extractor container in said casing, a shaft for supporting said container, bearing and driving means for said shaft fixedly secured to said support, and means for flexibly securing said casing with respect to said bearing means and said support comprising resilient members engaging the upper and lower surfaces of the bottom of said casing.

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