May 10, 1938. J. B. KIRBY 2,116,759

LAUNDRY MACHINE

Filed Dec. 11, 1933 3 Sheets-Sheet 1

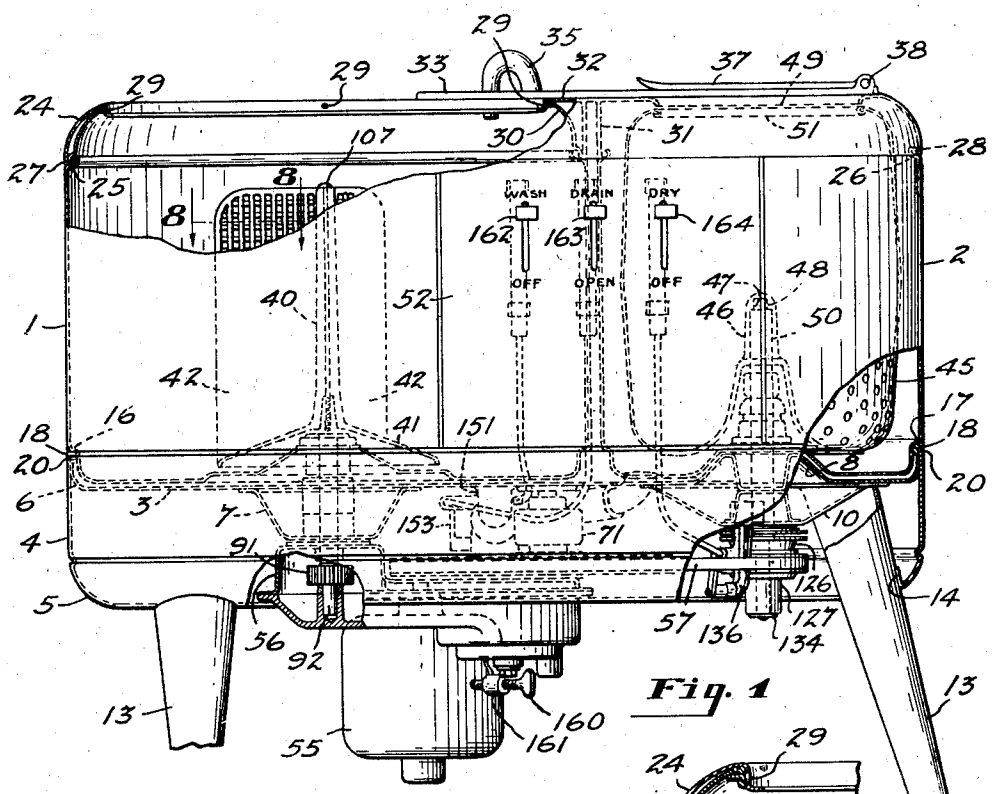


Fig. 1

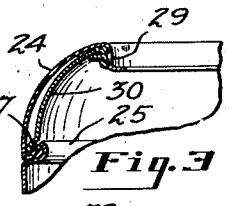


Fig. 3

Fig. 2

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LAUNDRY MACHINE

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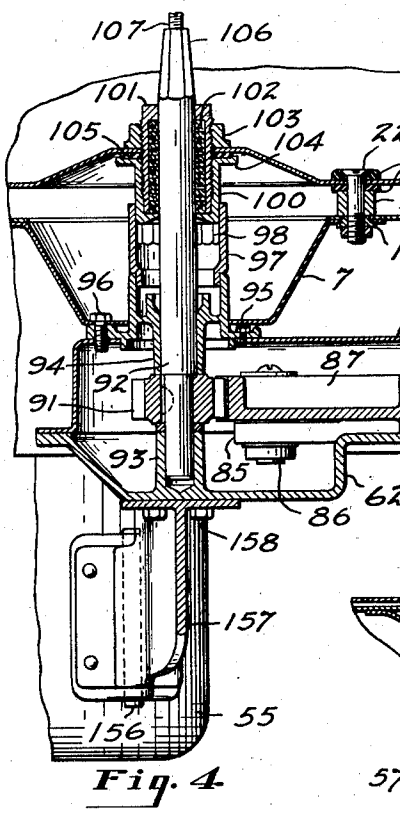


Fig. 4

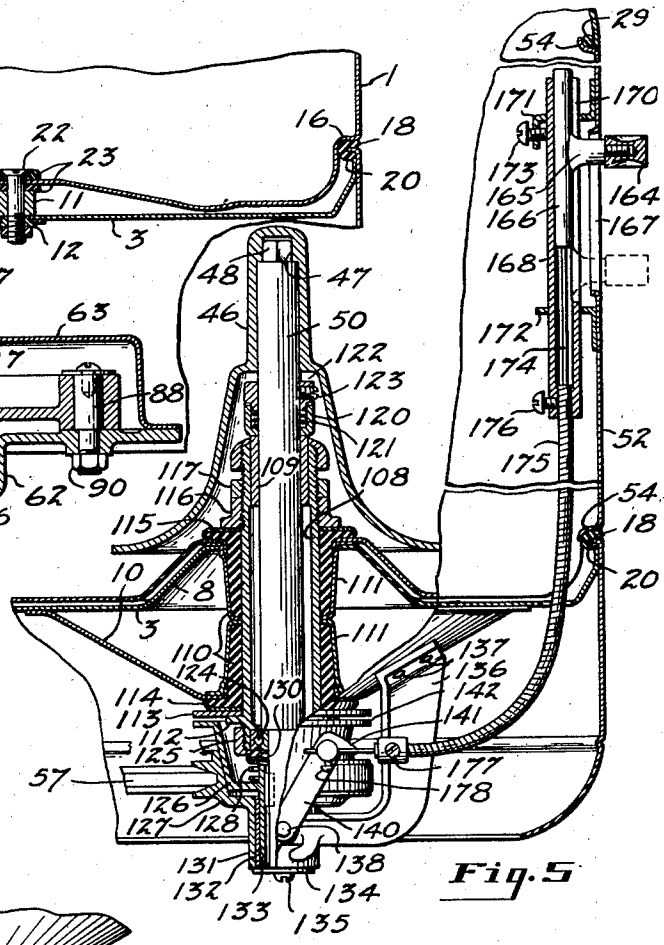


Fig. 5

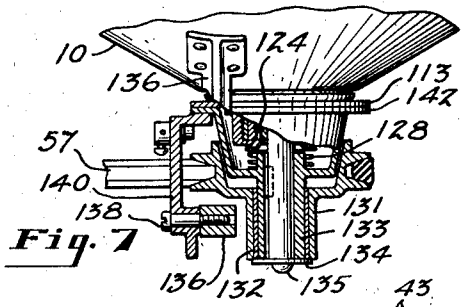


Fig. 7



Fig. 8

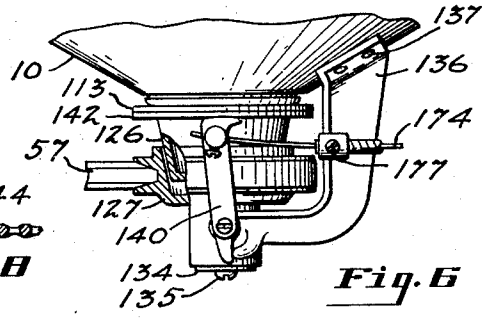


Fig. 6

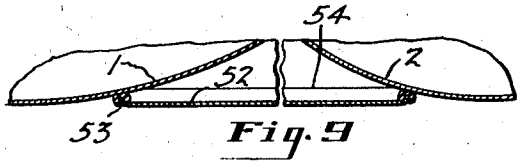


Fig. 9

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LAUNDRY MACHINE

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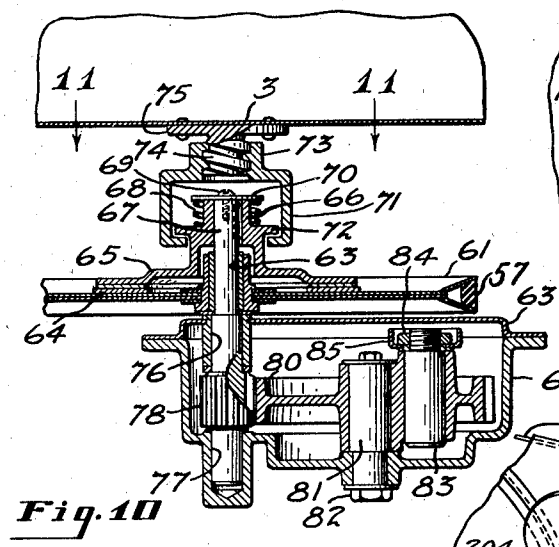


Fig. 10

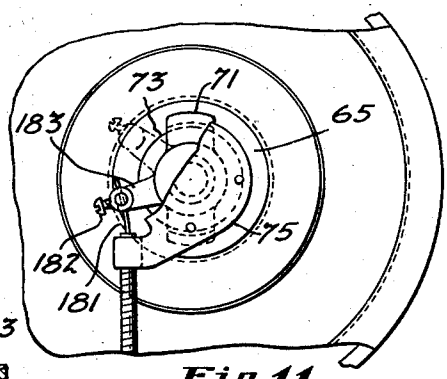


Fig. 11

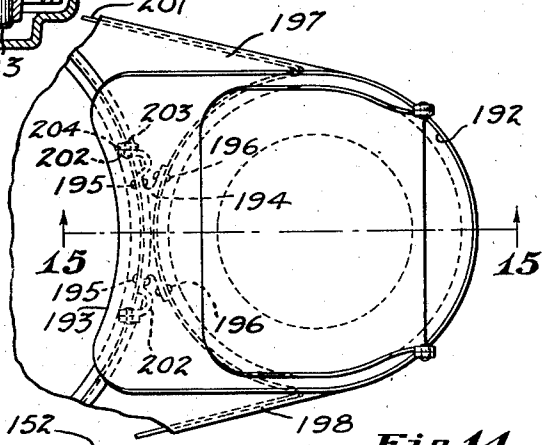


Fig. 14

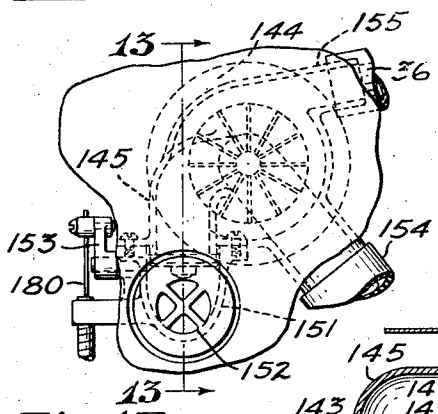


Fig. 12

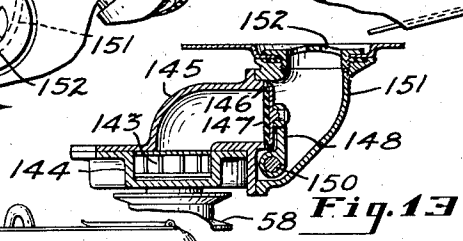


Fig. 13

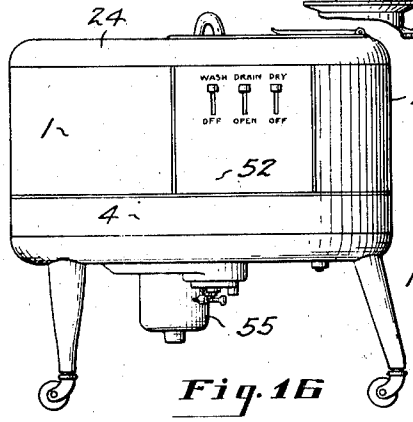


Fig. 16

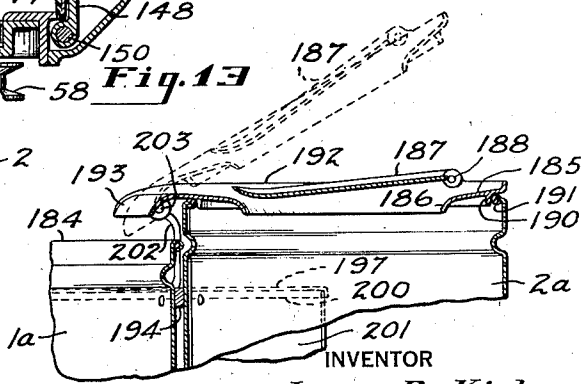


Fig. 15

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UNITED STATES PATENT OFFICE

2,116,759

LAUNDRY MACHINE

James B. Kirby, West Richfield, Ohio, assignor, by mesne assignments, to The Apex Electrical Manufacturing Company, Cleveland, Ohio, a corporation of Ohio, as trustee

Application December 11, 1933, Serial No. 701,853

16 Claims. (Cl. 68—26)

This invention relates to laundry machines and in particular to combined washing and extracting machines.

One of the objects of this invention is the provision of an improved supporting frame for a machine of the class described which may be fabricated from a number of easily formed inexpensive sheet metal parts, shaped so that they may be readily joined to each other to form a lightweight, rigid and relatively strong supporting structure for the machine.

Another object of this invention relates to the provision of certain improvements in the casing details of a machine of the type disclosed which improvements contemplate the use of a plurality of separately fabricated casing elements which may be readily joined together in assembled relation to provide a relatively inexpensive form of casing of enhanced appearance.

Another object of this invention is the provision of an improved and relatively inexpensive driving mechanism for a combined washing and extracting machine, which mechanism can be readily manufactured and assembled by a relatively unskilled class of labor, and which mechanism operates in a quiet and efficient manner.

Another object of this invention relates to the provision of an improved and simplified control system for the operating elements of a combined washing and extracting machine in which the control elements are grouped together and are arranged so that they may be correctly manipulated with a minimum of physical and mental effort on the part of the operator.

Another object of this invention relates to the provision of an improved and generally simplified inexpensive form of flexible mounting for the basket of a centrifugal extractor.

Another object relates to the provision of an improved form of clothes washing agitator with perforate blades which insure rubbing contact between such blades and the articles being washed.

A further object of this invention relates to certain improvements in methods of washing which include in addition to the agitation of the detergent fluid a positive, yet gentle scrubbing action on the materials being washed and a substantial relative movement of the detergent fluid with respect to the articles being washed both through and across the surfaces of the fabric of such articles.

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 my improved laundry machine.

Figure 2 is a plan view of the machine shown in Figure 1.

Figure 3 is a fragmentary view, in section, showing the details of the casing top plate securement means.

Figure 4 is an enlarged sectional view taken on line 4—4, Figure 2, showing some of the details of the agitator driving mechanism.

Figure 5 is an enlarged sectional view taken on line 5—5, Figure 2, showing some of the details of the extractor driving mechanism with the extractor clutch parts in their engaged position.

Figure 6 is a detail view of the extractor clutch mechanism shown in Figure 5, with the clutch parts in their disengaged position.

Figure 7 is a side elevational view partly in section, corresponding to Figure 6 with the parts thereof rotated ninety degrees.

Figure 8 is a detail sectional view of the agitator taken on line 8—8, Figure 1.

Figure 9 is an enlarged detail sectional view taken on a horizontal plane between the washer and extractor tubs, showing some of the details of the casing construction.

Figure 10 is an enlarged sectional view taken on line 10—10, Figure 2 showing certain details of the washer driving mechanism.

Figure 11 is a plan view taken on plane 11—11, Figure 10 showing some of the details of the clutch of the washer driving mechanism.

Figure 12 is an enlarged plan view showing some of the details of the pump and its control valve.

Figure 13 is a sectional view taken on line 13—13, Figure 12.

Figure 14 is a fragmentary plan view of a modified form of casing structure.

Figure 15 is a sectional view taken on line 15—15, Figure 14; and

Figure 16 is a side elevational view of reduced size, of the machine shown in Figures 1 and 2.

The form of the combined washing and extracting machine shown in Figures 1, 2, and 16, comprises a casing structure which includes a washer tub 1 and an extractor tub 2 which are supported side by side on a supporting base member 3. This member has a depending skirt portion 4 with an inturned lower edge 5 which in effect constitutes a continuation of the upper

part of the casing. The base and skirt portions are fabricated independently from sheet metal and then joined to each other so as to form a substantially integral base unit for the machine which is built-up from two or more pre-formed elements.

For convenience, the base parts 3 and 4 may be welded to each other along their line of contact and while it is preferred to effect the union of such parts by means of spot welds at the upper edge of the skirt, it is of course understood that the joining of these parts to each other can be effected in other ways just as well as in the manner proposed herewith.

The base member 3 has an up-turned outer edge part 6, an aperture beneath the center of the tub 1, and a raised portion 8 beneath the central part of the extractor tub 2. Beneath the upstanding portion 8 of the base, there is located a frusto-conical or dished member 10 which is welded or otherwise secured to the member 3 of the base. Beneath the aperture of the base located below the tub 1, a frusto-conical sheet-metal piece 7 is secured by means of a number of circumferentially spaced hollow sleeves 11 each having a reduced end 12 which is turned over and thus serves to rivet the part 7 to the base member 3.

The base is provided with three supporting legs 13 which are fixedly secured at their upper ends to the part 3 of the base, and at a point intermediate their length they are secured to an inturned portion 14 provided in the lower part of the skirt 4 of the base at places adjacent to each of the legs 13. Suitable casters 15 are provided at the lowermost extremities of the legs to facilitate the moving of the machine about from place to place. The lower edge portions of the washer and extractor tubs are of reduced cross-sectional diameter so as to provide shoulders 16 and 17 respectively which are utilized in effecting the support and securement of the stated tubs.

The shoulder 16 of one side of the washer tub rests upon a yielding gasket 18 carried by the inturned edge 20 of the skirt 4 and in a similar manner this gasket engages the shoulder 17 of a portion of the extractor tub. The washer tub is centrally secured by means of bolts 22 to the supporting base of the machine. Suitable leak-proof washers 23 are provided beneath the heads of the bolts 22 and beneath the tub at these points to prevent the escape of water from around the bolts. The washers at the underside of the tub rest upon the sleeves 11.

The washers 23 and the gasket 18 provide a relatively flexible mounting for the tub 1. By locating the bolts in the manner shown they are concealed beneath the agitator of the machine and thus the visible portion of the interior of the washer tub is free of exposed bolts or other tub securing devices. The extractor tub is also centrally secured to its support by means which will be described in detail in the latter part of this specification.

A top plate 24 is carried by the upper ends of the washer and extractor tubs. This plate constitutes in effect a continuation of the side walls of the two tubs and it is inturned from such side walls at its upper end and defines the top working openings of the two tubs upon which it is supported.

The top edges of the tubs 1 and 2 are inwardly offset at 25 and 26 to provide a seat for the gaskets 27 and 28. These gaskets are provided for effecting sealing engagement between the outwardly offset lower edge of the annular collar 30 and the wall part 31 and a portion of the rim of the top plate with the top edges of the aforesaid tubs 1 and 2 respectively. Suitable screws 29 spaced about the working opening of the tub 1, are provided for securing the top plate 24 to the collar 30 and for drawing the lower edge of the top plate into contact with the top part of the tubs. This result is accomplished by having the lower edges of such collars tightly gripping the gaskets 27 and 28 and by having the screws 29 engage with the underside of the top edge of the collar 30.

The space between the working openings of the tubs of the machine is spanned by a generally horizontal wall part 32 integrally formed with the top plate. This portion of the top plate has upturned flanges 33 at its outer edges and adjacent to one of such flanges a hole 34, located over the washer tub, is provided for the reception of the gooseneck nozzle 35 of a drain hose 36.

A combined cover and drainboard 37 is pivotally secured at 38 to one end of the top plate 24. In its closed position the cover 37 overlies the working opening of the extractor tub and in its open position it provides a clothes chute and drainboard for transferring articles from the extractor tub to a rinsing tub (not shown) or vice versa as the case may be.

Within the washer tub 1 there is provided an agitator 40, oscillatable about a vertical axis and having a base portion 41 and liquid agitating blades 42. Suitable mechanism, which will be described in detail presently, is provided for the oscillation of this agitator. The blades 42 of the agitator are of a perforate construction and they are formed from a series of parallel vertical rods 43, as best shown in Figure 7, which are joined to each other by means of small cross members 44. The vanes of the agitator have a grid-like appearance with pronounced corrugations by means of which the clothes are washed with a scrubbing-board action.

During the operation of the agitator, the clothes in front of the advancing side of the agitator blades are drawn against them by reason of their perforate construction whereby the detergent liquid is forced through the fabric of the articles being washed to a greater or less extent and at the same time that this is taking place, the clothes are gently scrubbed by contacting with the rods 43 as they move over the face of the agitator in response to the forces set up by the movement of the agitator during its operation.

By reason of the large number of perforations provided in the agitator blades there is a substantial tendency for the forcing of water through the fabric of the clothes and the clothes in contact with the advancing faces of the blades, actually form the water impelling faces of the blades and thus there is effected a greater relative movement between the articles being washed and the washing fluid than is possible where a generally imperforate form of blade is used, as in the latter case the clothes generally move about in accordance with the movement of the washing fluid and they do not have as much relative movement with respect to the washing fluid as is possible with the form of agitator proposed herewith.

It should be noted in this connection that the beneficial results just pointed out will not result

from the use of all forms of perforated agitator blades unless such blades are sufficiently perforated so that the clothes will have a strong tendency to adhere to the advancing part of the blade which results in a movement of the washing fluid both through the fabric of the articles being washed and laterally across the surfaces of such articles.

Within the extractor tub there is rotatably mounted a barrel-shaped perforated extractor basket 45 having a smoothly finished upstanding central conical portion 46 at the underside of which there is formed a prismatic socket 47 for the reception of the prismatic end 48 of the extractor basket driving shaft 50. The working opening 51 of the extractor basket is of the same or slightly smaller size than the working opening 49 of the top plate 24 which registers with the top opening of the extractor basket.

The marginal edges of the intermediate portion of the top plate 24 extend in a straight line tangentially to the side walls of the washer and extractor tubs and the open space or recess between the adjacent portions of the tubs is closed off by means of a pair of plates or panels 52 as is best shown in Figures 1, 9, and 16.

The panels 52 have inturned side edges 53 and inturned upper and lower edges 54, the latter of which is in contact with the gasket 18 which runs around the entire length of the upper rim or edge 20 of the base member 4. The upper edges of the panels contact with gaskets 29 which are in contact with the lower edge of the straight line portion of the top plate.

The power for driving the washer and extractor is supplied by means of an electric motor 55 which is adjustably and pivotally supported on a vertical axis beneath the machine with its armature shaft also arranged for rotation on a vertical axis. The shaft of the motor 55 is provided with a belt pulley 56 by means of which it drives a single belt 57 which engages with pulleys 58, 60 and 61. The pulley 58 is connected to the shaft of a pump. The pulley 60 forms a part of the extractor driving mechanism and the pulley 61 forms a part of the washer mechanism or gearing.

The washer mechanism comprises an oil or grease retaining gear case formed from a base portion 62 and a cover plate 63, by means of which lubricant may be provided for the operating parts of the mechanism. The washer mechanism driving pulley 61 is provided with a bearing 63 at the center thereof. This pulley is journaled on a pinion shaft 67. The web of the pulley 61 is provided on one side intermediate its center and edge with a friction face 64 which is fixed to the pulley and which constitutes one of the members of a clutch by means of which the agitator 40 of the machine is driven in a controllable manner.

The other element of this clutch consists of a plate 65 having a central upper raised sleeve-part 66 which is slidably splined to the shaft 67. A spring 68, held in place by means of a plate 70 carried by the shaft 67, is provided to urge clutch parts into driving engagement with each other. The plate 70 is secured to the shaft 67 by any suitable means such as the screw 69.

The release of the clutch is effected by means of a rotatable and vertically movable device having arms 71 with inturned ends which engage with a collar 72 carried by the clutch part 65. The arms 71 are joined at their upper ends to an internally threaded boss 73, carried on a threaded stub shaft 74, rigid with a plate 75 which is fixedly secured to the base member 3 of the machine.

From a consideration of the elements shown in Figures 10 and 11 it will be observed that when the clutch parts are rotated clockwise the clutch part 65 will be moved upwardly to its disengaged position and when the clutch arms 71 are rotated counterclockwise the clutch parts move to their engaged position. The manner of controlling the movement of the aforesaid clutch parts will be described in detail presently.

The shaft 67 to which the belt pulley 61 is journaled, extends into the gear case and is there journaled in upper and lower bearings 76 and 77. Intermediate these bearings the shaft has fixed thereon a pinion 78 which meshes with a reduction gear 80, journaled for rotation on a pin 81, secured at its lower end in the base 62 of the gear case by means of a nut 82. The gear 80 is formed with an eccentrically located bearing for reception of a pin 83, one end of which is secured by means of a nut 84 to the end of a pitman rod 85.

The other end of the pitman, as is best shown in Figures 2 and 4, is fixedly secured in a similar manner to a pin 86 which is received in a suitable eccentrically located bearing provided in a segmental gear 87, journaled for pivotal movement on a pin 88 which is secured to the base 62 of the gear case by means of the nut 90.

The segmental gear 87 meshes with a pinion 91 which is fixed on the agitator shaft 92. The lower end of this shaft is received in a bearing 93 provided in the base 62 of the gear case. An upper bearing 94 carried by the gear case cover 63 is provided for the reception of the portion of the shaft 92 located just above the pinion 91. The bearing 94 for convenience may be in the form of a die casting which is fastened by means of circumferentially spaced bolts 95 to the gear case cover 63. A second group of circumferentially spaced bolts 96 are provided for fixedly securing the portion of the gear case adjacent to the bearing 94 to the frusto-conical member 7 of the casing supporting base.

The upper end of the bearing member 94 has fixedly secured to it at this point a tubular extension 97 having flatted sides 98 formed on its inner upper surface. The sides 98 co-act with surfaces of complementary form on an internally threaded cup-shaped member 100 in which is threadably received a member 101. The members 100 and 101 serve as adjustable retainers for packing material 102 by means of which leakage about the agitator shaft 92 at the place where it enters the washer tub is prevented. The members 97 and 100 are slidably and non-rotatably fitted with respect to each other to compensate for manufacturing irregularities, to avoid the use of a rigid connection at this point and to hold the part 100 from turning and thus to facilitate the assembly of the shaft seal.

The cups 100 and 101 are fixedly secured in place in a central bottom opening of the washer tub by means of a nut 103 which engages with the exposed threaded portion of the member 101 and serves to draw the flanged part 104 of the member 100 and a gasket 105 carried by this part against the bottom of the washer tub in leakproof relation. The upper end of the shaft 92 is formed with a prismatic head 106 which is received in a socket of complementary form formed in the underside of the agitator 40. A long bolt 107, threadably received in the upper end of the

agitator shaft, is provided for removably securing the agitator 40 in place on its shaft.

The extractor driving shaft 50 is mounted for rotation in a tube 108 having a bearing 109 at its upper end. The tube 108 is flexibly mounted in a pair of identical sleeves 110, formed from a soft yielding elastic material as for example rubber, the purpose of which is to permit the shaft 50 and its bearing 108 to have a slight amount of lateral and angular movement in order to reduce the transmission of the vibrations of the extractor basket to the frame of the machine. The flexible mounting just described also permits the extractor basket to gyrate a slight amount and this also serves to reduce the vibration of the machine as a whole.

The rubber sleeves 110 are enclosed within and carried by a pair of apertured cup-like members 111 which are also identical in form. The lower end of the tube 108 has a flange 112 located below a washer 113 which carries a cupped washer 114 in contact with the bottom of the lower rubber sleeve 110. The top of the upper of these sleeves is engaged by a flanged washer 115 and all of the aforesaid extractor shaft bearing parts are held in assembled relation by means of a nut 116 and its lock nut 117 which are threaded to the upper end of the tube 108.

The bushing or bearing member 109 is preferably formed from a material which does not require oiling as for example a mixture of oil impregnated graphite and bronze. The upper edge of the bushing 109 is contacted by a cup-shaped frictional sealing ring 120 pressed thereagainst by means of a spring 121. The sealing ring is secured against rotational movement with respect to the shaft 50 by means of a collar 122 which is fastened to the shaft by means of a set screw 123. The sealing ring 120 and the collar 122 have slidable interfitting provisions whereby the ring can move longitudinally of the shaft while at the same time it is constrained to rotate with this shaft.

An anti-friction thrust bearing 124 is secured to the lower end of the extractor shaft 50. The cup of this bearing is secured to the lower end of the tube 108 by means of an apertured nut 125. The inner part 126 of a conical friction clutch is splined and slidably fitted to the lower end of the shaft 50. The clutch member 126 is urged to engaged position with its cooperating clutch member 127 by means of a spring 128 which abuts at one end against the clutch member 126 and at its other end it abuts against a washer 130 in contact with the inner race or cone of the bearing 124.

The extractor belt pulley 60 forms the outer part of the clutch member 127. This combined pulley and clutch member has a depending sleeve 131 journaled on an anti-friction bushing 132 which is interposed between the portion 131 of the combined clutch and pulley member and a similarly formed depending sleeve 133 of the inner clutch member 126. The aforesaid clutch parts are held in their assembled relation on the shaft 50 by means of a plate 134 which is secured to the lowermost end of this shaft by means of a screw 135.

An arm 136 is secured by means of bolts or rivets 137 to the conically depressed part 10 of the casing supporting base member 3. The lower end of the arm 136 carries a pin 138 which pivotally supports a clutch operating arm 140. The upper end of the arm 140 is formed with a curved face 141 which contacts with the under side of a flange 142 formed on the upper end of the clutch member 126. The direction of rotation of the clutch member 126 is such that when the contacting face 141 of the clutch controlling member 140 is moved to its clutch disengaging position the friction on the face 141 tends to move the member 140 in the same direction and in this manner a part of the energy of the moving clutch parts is utilized in disengaging the clutch.

An impeller 143 is fixed to rotate with the pump driving pulley 58 to effect the emptying of the washer and extractor tubs and to return soapy water from the extractor tub to the washer tub. The impeller of the pump is mounted for rotation in a pump case 144. The central part of the impeller is presented to the discharge outlet opening of a pair of ducts formed by a branched fitting 145 and this opening constitutes the inlet of the pump. The inlet opening of one of the ducts of this fitting is in the form of a valve seat 146 which cooperates with a valve member 147 located on an arm 148. The arm 148 is fixed to an operating shaft 150 which is journaled in a second hollow fitting 151 which latter fitting provides a duct from the pump inlet to a drain opening provided in the bottom of the washer tub.

The upper end of the fitting 151 is internally threaded for reception of an externally threaded apertured nut or screen member 152 by means of which the pump is secured in position in the drain opening of the bottom of the washer tub. The shaft 150, provided for the operation of the pump valve, has affixed to its outer end an operating arm 153 by means of which the valve is shifted from its open to closed position and vice versa.

The duct formed by the other branch of the fitting 145 is connected by means of a hose or conduit 154 directly to a drain opening in the bottom of the extractor tub. This connection is free and open as it is preferred in the operation of a machine of this type to keep the extractor tub free of water at all times. The pump case 144 has a tangential discharge outlet 155 which is connected to the drain hose 36, the discharge end of which carries the gooseneck 35.

The aforesaid operating elements of the washer, namely: the washer and extractor mechanisms and the pump mechanism are all driven by means of the single belt 57 which is engaged by the driving pulley 56 of the motor 55. The motor is pivoted at 156 to a bracket 157 secured by means of bolts 158 to the lowermost side of the gear case base 62. A thumb screw 160 threaded in a member 161, which is also carried by the gear case base, contacts with the casing of the motor to the side of its pivotal support which lies below the area defined by the belt 57 so that when the thumb screw 160 is forced against the side of the motor the belt is tightened and in this manner its adjustment may be readily effected.

All of the controls of this machine, namely: the pump valve control, the washer mechanism clutch control and the extractor clutch control are assembled on one of the panels 52 which for convenience is called the control panel. The aforesaid controls are of what may be called the push button type and they have operating members 162, 163, 164 located closely adjacent to each other and carried by the control panel. The member 162 controls the operation of the agitator, the member 163 controls the draining of

the wash tub; and the member 164 controls the operation of the extractor basket.

The aforesaid operating members are of substantially identical construction with respect to the portion thereof carried by the control panel and a description of one of these devices will suffice for all three. As is best shown in Figure 5 the extractor control button 164 is carried by an arm 165 which is rigid with and offset from a cylindrical member 166. The arm 165 projects through a slot 167 formed in the control panel 52. The cylinder 166 is slidably received in a tube 168 having a portion of its length slotted as at 170. The slot 170 registers with the slot 167 and it is provided for the accommodation of the arm 165.

Upper and lower apertured brackets 171 and 172, fixedly secured to the panel 52 as for example by welding, are provided for supporting the tube 168. A set screw 173 carried by the upper bracket 171 is provided to secure the tube 168 in its adjusted position. A flexible wire 174 is brazed or otherwise secured to the lower end of the cylinder 166. This wire is slidably received in a flexible tube 175, the upper end of which is secured by means of a set screw 176 in the lower end of the tube 168.

The other end of the flexible tube 175 is adjustably secured by a screw 177 to a part carried by the bracket 136 and the projecting end of the wire 174 is secured by a screw 178 to a part pivotally carried by the upper end of the extractor clutch operating arm 140. From a consideration of the foregoing it will be apparent that when the button 164 is moved downwardly the extractor control clutch parts are moved to their disengaged position as illustrated in Figures 6 and 7. The rotational movement of the rotating clutch parts assists in effecting their disengagement as previously mentioned. When the control button 164 is moved to its upper position the control arm 140 is shifted to the position shown in Figure 5 and the clutch parts then assume their engaged position as is shown in this figure.

In much the same manner the control button 163 is connected by means of a wire 180 to the operating arm 153 of the pump valve so that movement of the button 163 to its upper position shifts the valve 147 into contact with its seat 146 and the pump then serves to pump water from the extractor tub 2 only and to expel it through the drain hose 36. When the button 163 is moved to its lower position the pump valve is opened and the pump is then in connection with both the extractor and the washer tubs and the contents thereof are then emptied by way of the drain hose 36 to a drain or waste water receptacle (not shown).

In a similar manner the washer control button 162 is connected by a wire 181 and a screw 182 to the arm 183 of the threaded clutch operating member 73. When the washer control button 162 is in its upper position the washer clutch parts occupy the agitator driving position as is shown in Figures 10 and 11 and when the button 162 is moved downwardly the washer mechanism clutch parts occupy the dotted line position shown in Figure 11. This latter position of the control button corresponds to the disengaged position of the clutch parts 64 and 65 at which time the agitator is stopped and inoperative.

The movement of the clutch parts of the washer mechanism is also utilized in facilitating the disengagement of the washer clutch parts. The rotation of the pulley 61 and the associated clutch members 64 and 65 is in a clockwise direction as viewed in Figure 11 so that when the clutch control members 183, 71 and 73 are rotated in a clockwise direction the frictional engagement of the parts 71 and 72 tends to assist in the clockwise turning of the members 71, 73 and 183. The operation of the washer and extractor controls is thus facilitated by utilizing some of the energy of the driven parts of the machine in effecting the disengagement of the clutches of the aforesaid mechanisms.

In this connection it should also be noted that the clutch disengaging operations take place when the control wires are operated under compression and the movement of the control parts requiring exertion of the greater amount of force is always in a direction so that the control wires are under tension. The operation of the pump valve does not require the exertion of any great amount of force and hence no special means such as the above are provided to facilitate its manipulation.

Figures 14 and 15 illustrate a modified form of top plate construction. In this arrangement the top plate does not entirely surround the washer tub 1^a which is slightly shorter than the extractor tub 2^a. The washer tub is provided with a rolled-over upper edge 184. The top plate in this case comprises an apertured plate 185 having an opening 186 registering with the open top of the extractor basket. A cover 187 is pivoted at 188 to the member 185 which at its under side is formed with a flanged part 190 which engages with a gasket 191 carried on the upper edge of the extractor tub 2^a.

The member 185 has an upturned edge 192 at three of its marginal edges and at its other edge it has a down-turned lip 193 located over the open top of the washer tub. Interposed between the adjacent portions of the washing and extracting tub there is fitted a member 194, the opposite sides of which contact with and are of the same contour as the contacting tubs. The ends of the member 194 have provisions for receiving bolts or rivets 195 and 196 by means of which the tubs are secured to the aforesaid member and to each other.

A pair of horizontal plate-like segments 197, 198 are integrally formed with the member 194. The outer edge of each of these plates forms a line which is a common tangent to both tubs and at their upper edges the plates are turned over as shown at 200 for the plate 197, for the purpose of holding a panel 201 in position against the sides of the tub. The panels used in the machine shown in Figs. 14 and 15 are similar to the panels used in connection with the casing construction shown in Figures 1 and 2.

A pair of spaced arms 202 project upwardly from the member 194 and at their upper ends they are apertured for reception of bearing pins 203 which are in turn received in apertured lugs 204 carried by the underside of the member 185, by means of which the cover member 185 is pivoted on a horizontal axis to permit its being turned as indicated in the dotted line position shown in Figure 14 whereby the extractor basket may be removed from the extractor tub for cleaning and other purposes.

The foregoing forms of washing machine construction permit marked saving in the way of weight and cost. By fabricating the supporting base of the machine in the manner disclosed it is

possible to use a relatively light weight gauge of sheet steel for the base unit and at the same time by reason of the form of construction shown, the necessary rigidity can be obtained. This form of construction is also relatively inexpensive as compared with heavy castings and one-piece stampings.

The form of supporting base shown also materially enhances the appearance of the machine and it gives the effect of a much larger tub than is actually used. The top plate and the side panels used in connection with the form of machine shown in Figures 1, 2, and 16 also enhance the appearance of the machine and they achieve the effect of an unbroken continuation of the washer and extractor tub surfaces which smoothly merges into the top working openings of such tubs. This form of casing has the added utility of being very easy to keep clean.

The driving mechanism is of generally simplified and inexpensive construction. The use of expensive worm reduction gears has been eliminated and a single belt is utilized in driving both the washer and extractor mechanism as well as the pump. This form of power transmission has the advantage of flexibility, low cost, and extreme quietness in operation and in addition to these advantages it permits greater manufacturing tolerances than can be used where the driving connection between the washing and extracting mechanism is effected by shaft means.

The mounting for the extractor basket also exhibits the advantages of low cost and increased efficiency and extreme quietness in operation with a great reduction in vibration by reason of the flexible mounting provided for the extractor basket shaft and its bearings. This form of mounting is made possible without greatly increased cost by reason of the belt drive used in connection with the driving of the extractor. If a shaft drive were used to drive the extractor, the flexible mounting of the extractor would probably necessitate the use of universal joints or flexible drive shaft couplings.

The operation of the machine is also greatly facilitated by reason of the assembled relation of the controls and the manner in which they are manipulated. The operation of such controls requires the exertion of but a light force on the part of the operator and the panels upon which they are mounted provides ample space for operating instructions.

The form of agitator used also contributes to improve the washing action of the machine by reason of the positive scrubbing of the articles being washed and also by reason of the forced flow of washing fluid relative to and through the fabric of the articles being washed.

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 departure from this invention as described in the appended claims.

Having thus described my invention what I claim is:

1. In a laundry machine, a casing structure, operating mechanism beneath said casing structure, and a built-up sheet-metal supporting structure for said casing structure and mechanism, said supporting structure comprising a generally horizontal sheet-metal base member, a separately formed sheet-metal skirt member fixedly attached at its upper end to said base member so as to stiffen and reinforce the base member and angularly disposed supporting legs for said base member fixedly secured at their upper ends to said base member inwardly of said skirt member and fixedly secured at a point intermediate their height to the lower edge of said skirt to form an angular reinforcement for the supporting structure.

2. In a laundry machine, in combination, a supporting structure, a pair of tubs carried by said supporting structure in a side-by-side manner, said tubs having lower side wall portions of reduced diameter to provide a shoulder near the bottom of each of the tubs, a relatively soft yielding packing member interposed between said supporting structure and the shoulders of said tubs whereby the tubs are carried on said packing member by said supporting structure from a point adjacent their outer edges, means for securing said tubs to said supporting structure, and a pair of shields in the form of vertically disposed plates in contact at their opposite vertical edges with the side walls of said tubs for providing a substantially continuous and unbroken side-wall surface with said tubs corresponding in plan outline to the plan outline of said support.

3. In a laundry machine, a pair of tubs, a base for supporting said tubs in a side-by-side manner, and wall members in the form of vertically disposed plates with a portion lying alongside of each of said tubs and cooperating with the side walls of said tubs so as to form a continuous and substantially unbroken peripheral surface therewith, said base having a tub-supporting, upright outer wall part which forms in effect a continuation of said wall members and the side walls of said tubs.

4. In a laundry machine, in combination, a supporting structure, a pair of cylindrical tubs carried side-by-side on said supporting structure, and an elongated horizontal top-plate carried above the upper edges of said tubs, the peripheral portion of said top-plate being downwardly and outwardly rounded and engaging at its edge the top part of said tubs and having formed in its horizontal portion a pair of working openings, one for each of said tubs, the marginal outline of said top-plate conforming at its opposite ends to the outline of said tubs with such end parts connected to each other along a continuous and unbroken line, the intermediate portion of said top-plate providing a generally horizontal wall over the space between the tubs.

5. In a laundry machine, in combination, a supporting structure, a pair of cylindrical tubs carried side-by-side on said supporting structure, means for securing said tubs to each other at their upper ends, an apertured top-plate at one end of the machine overlying one of said tubs, and means for attaching said top-plate solely to said means.

6. In a laundry machine, in combination, a supporting structure, a pair of tubs carried side-by-side on said supporting structure, means between said tubs for securing them to each other at their upper ends, an apertured top-plate at one end of the machine attached solely to said means and overlying one of said tubs, and a pivoted cover carried by said top-plate, the aperture of said top-plate registering with the top opening of said last named tub and having a downturned lip overlying a top edge portion of the other of said tubs.

7. In a laundry machine, in combination, a supporting structure, a pair of tubs carried side-by-side on said supporting structure, means for securing said tubs to each other at their upper ends, and an apertured top-plate overlying one of said tubs and pivotally attached to said tub-securing means for movement about a horizontal axis, the aperture of said top-plate permitting access to the top working opening of the tub which it overlies.

8. In a laundry machine, in combination, a supporting structure, a pair of tubs carried side-by-side on said supporting structure, means for securing said tubs to each other at their upper ends, an apertured top-plate attached to said means and overlying one of said tubs, the attachment of said top-plate to said means being effected by means of a pivotal connection to permit the top-plate to be swung away from the tub which it normally overlies, and a pivoted cover carried by said top-plate, the aperture of said top-plate registering with the top opening of one of said tubs and having a downturned lip overlying a top edge portion of the other of said tubs.

9. In a laundry machine, the combination with a tub having a shoulder extending around the tub near the bottom thereof, of a built-up supporting structure therefor comprising a horizontally disposed plate with an upturned edge which underlies said shoulder for supporting the tub, a separately formed skirt portion attached to and depending from the upturned edge of said plate and a separately formed offset reinforcing member attached to said plate beneath the bottom of said tub, said plate having a portion opposite to said member which is offset in a direction away from said member.

10. In a laundry machine, the combination with a pair of tubs having shoulders extending around the tubs near the bottom thereof, of a built-up supporting structure therefor comprising a horizontally disposed plate with an upturned edge which underlies said shoulders for supporting the tubs, a separately formed skirt portion attached to and depending from the upturned edge of said plate and separately formed offset reinforcing members attached to said plate beneath the bottom of each of said tubs, said plate having a portion opposite to one of said members which is offset in a direction away from such member.

11. In a machine of the type disclosed, a casing structure comprising a pair of cylindrical tubs located side-by-side, a support therefor, vertically disposed panel means extending from the sidewall of one tub to the sidewall of the other adjacent to the contiguous portions of the tubs to define therewith a three-sided space or enclosure, and mechanism associated with the machine carried by the rear side of said panel means in such space.

12. In a machine of the type disclosed, a casing structure comprising a pair of cylindrical tubs located side-by-side, a support therefor, vertically disposed panel means extending from the sidewall of one tub to the sidewall of the other adjacent to the contiguous portions of the tubs to define therewith a three-sided space or enclosure, mechanism associated with the machine carried by the rear side of said panel means in such space, and operating members at the front side of said panel means operatively connected with said mechanism.

13. In a machine of the type disclosed, a casing structure comprising a pair of cylindrical tubs located side-by-side, a support therefor, vertically disposed panel means extending from the sidewall of one tub to the sidewall of the other adjacent to the contiguous portions of the tubs to define therewith a three-sided space or enclosure, means for securing said panel means in place in a readily displaceable manner, mechanism associated with the machine carried by the rear side of said panel means in such space, and operating members at the front side of said panel means operatively connected with said mechanism.

14. A washing machine casing structure comprising, a pair of generally cylindrical tubs mounted one alongside of the other, a supporting structure for said tubs, a horizontally disposed member at the top of said tubs having portions extending over the space between the side walls of said tubs where they are contiguous to each other so as to provide a drain plate or chute between the tubs for facilitating the transferring of clothes from one tub to the other, and vertically disposed wall means extending below the aforesaid portions of said top member alongside of said tubs at each side of the machine and defining with the adjacent sides of the tubs a generally triangular space or enclosure at the opposite sides of the machine.

15. In a machine of the type disclosed, a pair of generally cylindrical tubs located side-by-side, support means for said tubs, vertically disposed wall means adjacent to the contiguous portions of said tubs at one side of the machine and defining with the sides of the tubs a space or enclosure, control mechanism for the machine located in such space or enclosure behind said wall means, one or more operating members for said control mechanism at the front side of said wall means in convenient location for manipulation by the operator of the machine, and means traversing said wall means for connecting said operating member or members to said control mechanism.

16. A laundry machine comprising, a pair of generally cylindrical tubs located one alongside of the other, support means for said tubs, operating mechanism for the machine, vertically disposed wall means adjacent to the contiguous portions of said tubs at one side of the machine and defining with the sides of the tubs a space or enclosure, one or more manually operable control members for said mechanism at the front side of said wall means in convenient location for manipulation by the operator of the machine, operative connections between said control members and said mechanism including structure located in said space or enclosure and concealed behind said wall means.

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