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CONTROL MECHANISM FOR SPIN-DRY WASHING MACHINES

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4 Sheets-Sheet 1

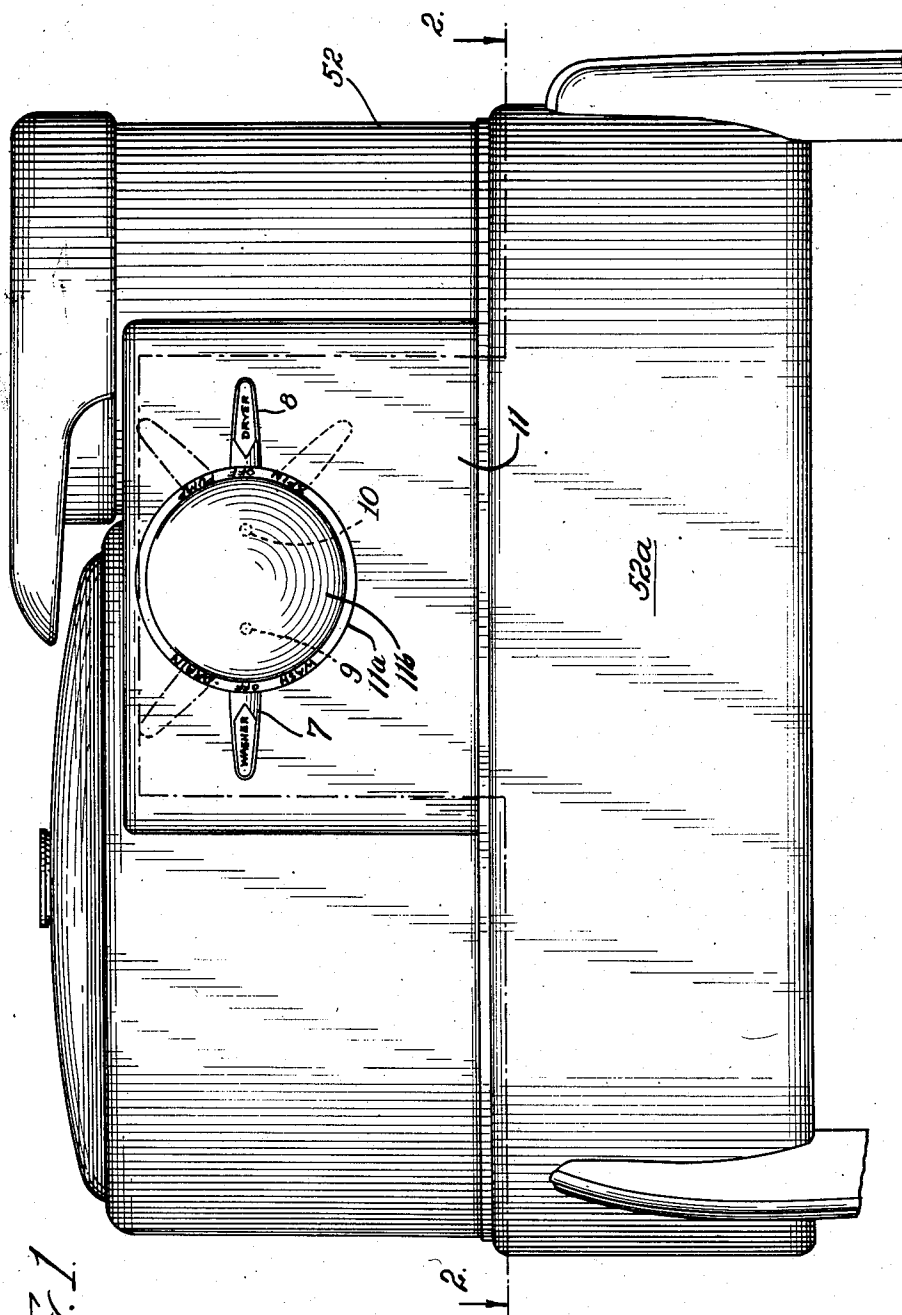


Fig. 1

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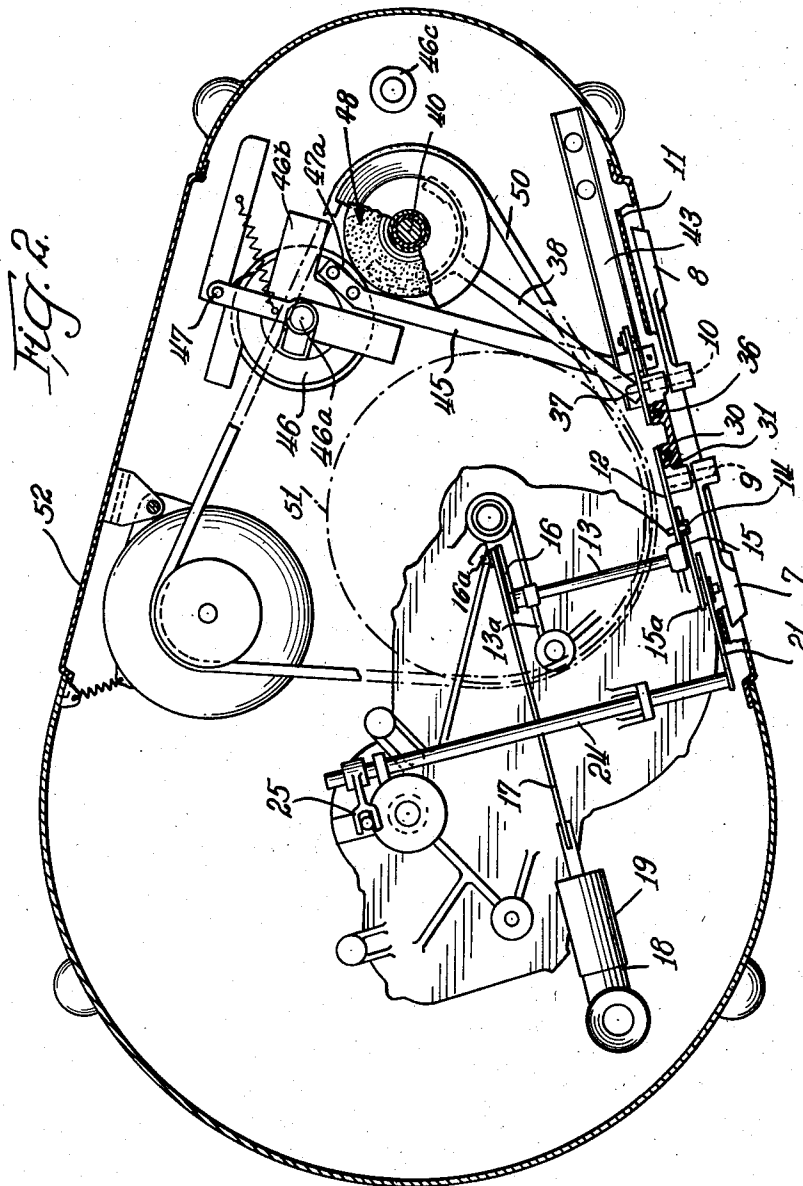
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4 Sheets-Sheet 2



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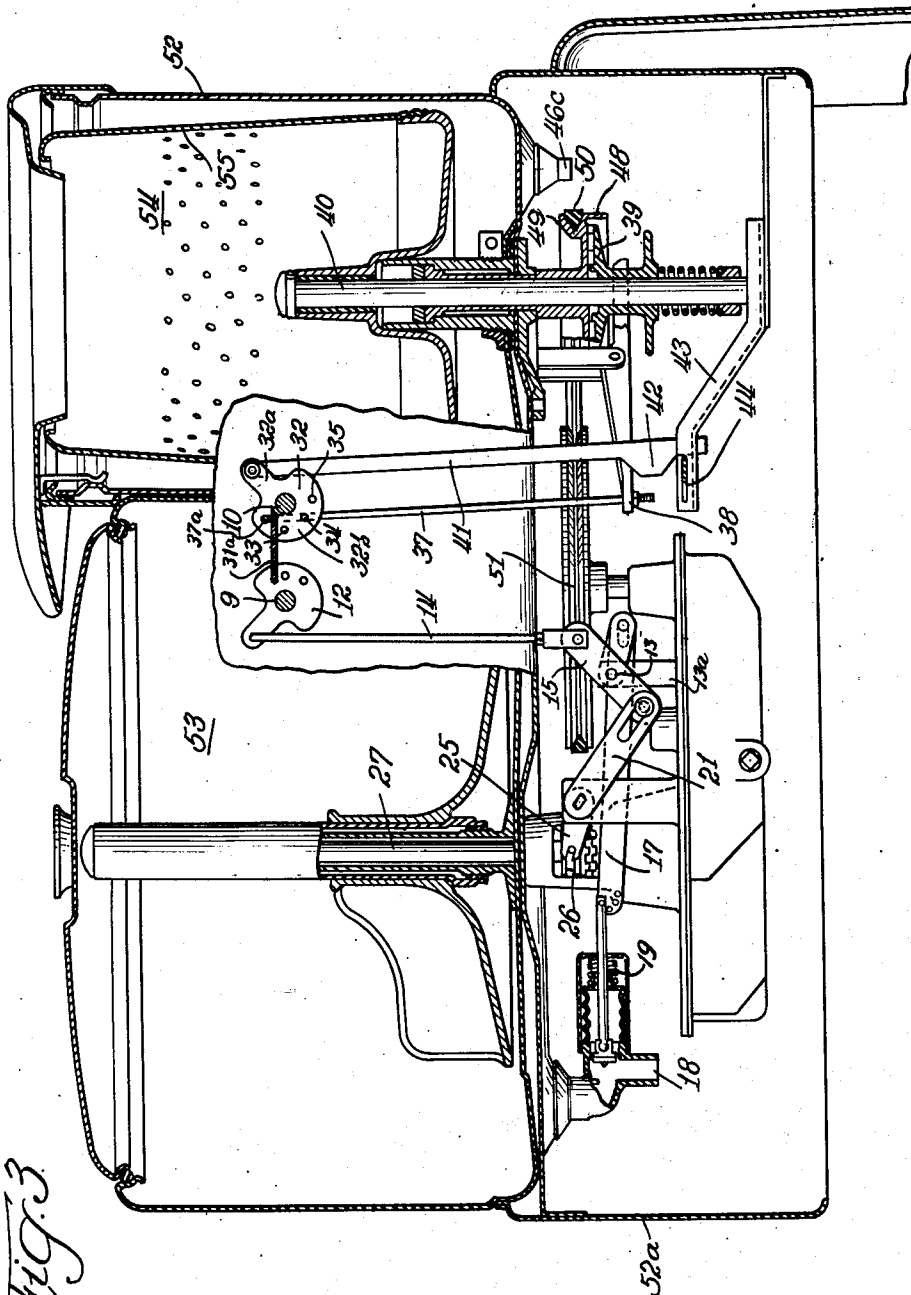
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4 Sheets-Sheet 3



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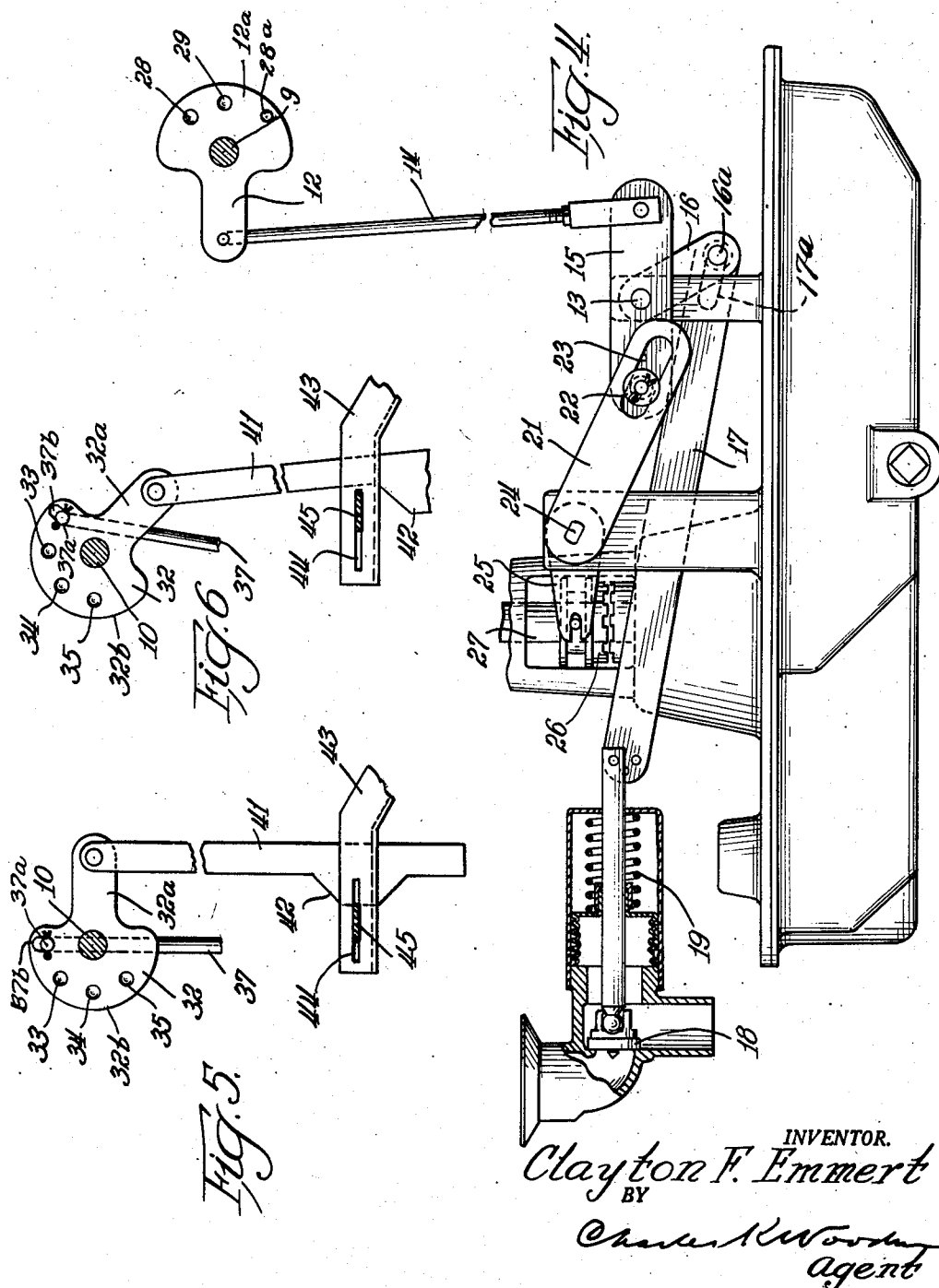
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CONTROL MECHANISM FOR SPIN-DRY WASHING MACHINES

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4 Sheets-Sheet 4



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CONTROL MECHANISM FOR SPIN-DRY
WASHING MACHINESClayton F. Emmert, Newton, Iowa, assignor to
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8 Claims. (Cl. 68—26)

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Domestic washing machines employing a washing unit in combination with a centrifugal extractor spinning unit commonly called "Spin Dry" washing machines are commonly complicated in their operation, for the housewife, with separated controls which make it confusing and inconvenient for prompt and effective control of the various washing operations.

This invention relates to a control mechanism for spin-dry washing machines and concerns itself primarily with a structure having a centralized control panel whereby an attendant can control the agitator, the spinner and the drain, in fact, all operations from a single location.

It is an object of this invention to position the control levers at a convenient location and height and in a centralized panel so that they can be operated to control all of the operations necessary to carry on a washing operation from a single location.

The invention comprises the novel structure and combination of parts hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawing which illustrates a preferred form of this invention and in which similar reference numerals refer to similar features in the different views:

Fig. 1 is an elevational view of a washing machine involving this invention;

Fig. 2 is a sectional view taken upon the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a vertical sectional view through the machine;

Fig. 4 is a part sectional and part elevational view of the drain control of the machine;

Fig. 5 is a fragmentary elevational view of a part of the control mechanism; and

Fig. 6 is a view similar to Fig. 5 but showing the parts in a different position.

In referring now to the drawing, there is shown in Figs. 1 and 2 two control levers 7 and 8. The lever 7 controls the agitator of the washing machine and the drain valve while the lever 8 controls the spinner and the drain pump. It will be noted that these levers are secured respectively to shafts or rods 9 and 10 which are located upon the side of the machine at a convenient height and in a centralized panel 11 having a bezel 11a for retaining a bevelled name plate 11b.

The shaft or rod 9 rigidly supports a lever 12 upon its inner end as shown in Fig. 4. Lever 12 is adapted to operate shaft 13 through a connection consisting of a lever 15 rigidly secured to

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shaft 13 and a link 14 which connects levers 12 and 15. The inner end of shaft 13 carries a crank arm 16 (Fig. 2) which is connected to a link 17 by means of a slot 17a and a pin 16a and which in turn is pivotally connected to drain valve 18 of the washing chamber. Thus rotation of lever 7 controls the drain valve 18. The valve 18 may consist of a rubber washer backed up by a spring 19 which normally tends to keep the drain valve closed. The shaft 13 is suitably supported in a bearing bracket 13a.

Lever 7 also controls the agitator through the lever 15 which actuates lever 21 through a pin 22 and slot 23 connection as shown in Fig. 4. Lever 21 is secured to a shaft 24 having a clutching shifting fork 25 for shifting clutch 26 which controls the agitator shaft 27 (Fig. 4).

It will be noted that lever 12 on shaft 9 has an arcuate portion 12a which extends upon the opposite side of the shaft 9 from the link 14. This arcuate portion contains two spaced detent depressions 28 and 29 as shown in Fig. 4. These depressions are adapted to be engaged by a yielding detent 30 (Fig. 2) for temporarily latching the lever in drain and neutral position respectively. The detent 30 is suitably mounted in the bearing bracket 31 of shaft 9. In one position of lever 12, the drain valve 18 will be open while in the other position the agitator shaft will be in neutral position. A third detent depression 28a may be added maintaining lever 7 in clutching position. Thus lever 7 must be swung in opposite directions from neutral for these purposes.

The shaft 10 (Figs. 2 and 6) upon which lever 8 is secured also carries a lever which is designated 32 and which consists of an arm 32a and an arcuate portion 32b which has three detent depressions 33, 34 and 35 which are adapted to be engaged by a yielding detent 36 mounted in the bearing bracket 31 (Fig. 2). This construction will allow the lever 8 to be temporarily latched in any of three positions. In one position, the clutch on the spinner shaft and pump will be engaged; in another position, the pump only will be engaged, as will presently appear.

A link 37 is pivoted at one end to the arcuate portion of the lever 32 adjacent one end of such arcuate portion and the other end is connected to a clutch control lever 38 (Figs. 2 and 3) for controlling a clutch 39 on the spinner shaft 40. Thus the operation of lever 8 through lever 32, link 37 and lever 38 controls the spinner clutch. In the position shown in Fig. 3, lever 32 is in pumping position and in this position the hook or bent portion 37a on link 37 engages a shelf or

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stop 31a on bracket 31 and prevents lever 32 from dropping and this prohibits the clutch lever 33 from being operated. This comes about because portion 31a of link 37 extends through a slot 37b in lever 32 whereby the shelf holds the link toward the top of the slot in Figure 3, but in Figure 6 the link is at the bottom of the slot, this difference in vertical position of the link being sufficient to operate the spinner clutch.

A cam link 41 is pivoted at one end to the arm 32a of lever 32 and is provided with a cam 42 at an intermediate point, slightly spaced from the lower end which is guided and supported in a bracket 43 which has a transverse slot 44 into which the end of a pump control lever 45 projects as shown in Figs. 5 and 6. The pump control lever 45 is attached at its remote end to pump assembly 46 which is pivoted as indicated at 47 so that it can swing on pivot 47 to engage or disengage drive element 48a on the pump and friction drive gear 48 on pulley 49 secured upon spinner-shaft 40, which in turn is driven by a belt 50 running from power shaft through pulley 51.

The pump assembly 46 comprises a pump having an inlet as at 46a and a discharge as at 46b. The inlet is connected, in a conventional manner, as by flexible hoses, with drain connection 18 of the washing tub and with drain connection 46c of the spinner compartment. These hoses are not shown, but the manner of installing them will be immediately evident to anyone versed in this art. Similarly, a flexible hose or the like can be connected to pump discharge 46b to provide a means to deliver the discharged fluid directly to a sewer or drain connection.

The above described mechanism is housed in a sectional casing 52, the upper portion of which is divided and formed into a washing chamber 53 and a spinning chamber 54 while the lower section 52a contains the driving and most of the operating mechanism.

In controlling the operation of this machine, the lever 7 which is shown in full lines in "off" position can be swung clockwise to its dotted line position (Fig. 1), in which position the lever 12 will be engaged in one depression by the spring detent 30. During this movement, lever 12 through links 16 and 17 will open the drain valve 18 from the washing chamber. However, if lever 7 is moved from its "off" position in a counterclockwise direction to the "wash" position, the lever 12 will engage the spring detent in the other depression. During this movement of lever 12, lever 15 will operate link 21 for throwing in the clutch on the agitator shaft, while pin 16a will ride idly in slot 17a without operating link 17.

The lever 8 which is shown in "off" position can be shifted in a clockwise position to the dotted line position and be latched in such position by the yielding detent. During this movement of the lever 8, the lever 32 will be shifted for operating link 37 and cam link 41 (Fig. 6), for throwing in the pump and spinner clutches and putting both the pump and spinner in operation. However, if lever 8 is swung in an anticlockwise direction as viewed in Fig. 1, to the dotted line position, cam link 41 will again be actuated for shifting lever 45 for swinging the pump assembly upon pivot 47 and putting the pump in operation, but, at this time, the spinner clutch will, of course, be disengaged because of the support provided for link 37 by shelf 31a as described above and as shown in Figure 3. Lever 8 should be in this latter position for draining the washing compartment.

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At the end of a washing operation when the operator desires to drain the water from the main washing compartment, it is only necessary to move lever 7 to the "drain" position which opens the drain valve and move lever 8 to the "pump" position for starting the drain pump.

When the soap and water have been spun out of the clothes in the spinner, the control lever 8 can be moved to its "off" position (Fig. 5) and the spinner compartment sprayed with water for a rinsing operation. When the rinsing operation is complete, the control lever 8 can be moved to its "pump" position for draining the water from the dryer compartment or to its "spin" position to spin the spinner basket and simultaneously to drain the dryer compartment. This operation may be repeated as many times as necessary in a simple manner.

An important advantage of this control system resides in the fact that in the event of a suds lock in the spinner compartment which occasionally occurs in all spinner type machines, the spinner basket 55 may be stopped by shifting the control lever 8 to the pump position and the excess water drained from the spinning compartment thereby easily breaking the suds lock.

The control system also allows spraying the spinner compartment with sufficient water to perform satisfactory manual rinsing and draining without imposing a severe load upon the driving motor because the dryer compartment can be drained before the spinner basket is started.

In addition to the foregoing, it will be evident that the centralization of the control levers 7 and 8 in a central panel at a convenient height renders it possible for the attendant to control the operation of the machine from a single location in a very easy manner. At the same time, the appearance of the machine is materially enhanced.

I am aware that many changes may be made and various details of construction may be modified without departing from the principles of this invention so I do not propose limiting the patent granted otherwise than necessitated by the appended claims.

I claim:

1. In a spin-dry washing machine, a washing compartment having a drain valve, means for opening said valve and draining fluid from said compartment comprising a control panel upon one side of said machine, a shaft journaled in said panel, a control lever upon the outer end of said shaft, a lever upon the inner end of said shaft, a link extending from said last-mentioned lever, an oscillatable lever connected to said link, means connecting said oscillatable lever and drain valve whereby movement of said first-mentioned lever will open said valve, a drain pump having an inlet adapted for connection with said drain valve, drive means for the pump, a clutch to connect the drive means to the pump, a second shaft journaled in said panel, a second control lever upon the outer end of said second shaft to turn the shaft, a lever upon the inner end of said second shaft movable therewith for actuating said clutch to start said pump for draining said compartment when said second control lever is moved to a predetermined position.

2. In a machine of the class described, a casing having a washing compartment with a chamber below said compartment, said compartment having a drain valve in said chamber and an agitator shaft in said compartment extending

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into said chamber, a clutch on said shaft, a control panel upon the side of said casing above said chamber, a stub shaft journaled in said panel, a manually operated lever upon the outer end of said shaft for turning the shaft, an operating lever secured to the inner end of said shaft, a link pivoted to the outer end of said operating lever and extending downwardly into said chamber, a rock shaft in said chamber, an oscillatable lever secured to said rock shaft at an intermediate point on the lever and connected at one end with said link, a connection between said rock shaft and said drain valve so movement of the rock shaft will control the valve, a shipper lever for said clutch, and a link connected to said shipper lever and having a slidable connection with the other end of said oscillatable lever said slidable connection being arranged to permit movement of the oscillatable lever beyond the position thereof where the said clutch is fully disengaged, and the connection between the rock shaft and the valve being effective during the last mentioned movement of said lever.

3. In a spin-dry washing machine, a casing having a washing compartment and a spinning basket and a chamber below said compartment and basket; a drain valve for said washing compartment and an agitator shaft, a drive shaft for said spinning basket, a drain pump, a drive motor in the machine, clutch means for connecting the motor with the agitator shaft, control means including a lever mounted on the side of said machine connected with said clutch and valve for selectively engaging said clutch or for opening said valve, second clutch means for connecting said motor with said drive shaft, third clutch means for connecting said pump with said motor, a second control lever mounted adjacent the first-mentioned control lever and connected with said second and third clutch means movable for selectively disengaging both of said second and third clutch means simultaneously or engaging, or for engaging only said third clutch means.

4. In a washing machine of the type described; a spinning basket, a drive shaft for the basket, a driven pulley rotatable on said shaft, a clutch on said shaft spring-urged toward a position to connect said shaft and pulley, a shifting lever pivoted in said machine connected with said clutch so movement of the lever will disengage the clutch against the action of said spring, a rotatable control lever on said machine, a link connecting said rotatable lever with said shifting lever, and a radial slot in said rotatable lever receiving the end of said link, said control lever having a central neutral position wherein said link passes over top center and is positioned to hold said shifting lever in position to maintain said clutch open, said control lever being shiftable in either direction from the said neutral position to move said link in a direction to release said clutch, and stop means positioned to engage said link when said control lever is shifted in one direction from the neutral position for stopping said link before the said clutch is engaged, the slot in the central lever permitting overtravel thereof when the link is so stopped.

5. In a washing machine of the type described having a washing compartment with an agitator and an agitator drive shaft and also having a drain connection; a clutch for connecting said shaft with a source of power, a valve for controlling said drain connection, an actuating lever member connected with said clutch and an actu-

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ating drag link member connected with said valve for shifting them between their operative positions, a lever pivoted in said machine adjacent the said actuating members, slot means in one of said lever and members and pin means on the other thereof extending therein to provide for a lost-motion connection between the lever and each of said members, said lever having an intermediate position where the pin between the lever and the drag link member has reached one limit of its movement in the associated slot so that movement of the lever in one direction will move the drag link to open the valve, while in the same lever position the pin between the lever and lever member is intermediate the ends of the associated slot and the lever member is positioned to hold the clutch open.

6. In a washing machine of the type described having a washing compartment with an agitator and an agitator drive shaft and also having a drain connection; a clutch for connecting said shaft with a source of power, a valve for controlling said drain connection, an actuating lever member connected with said clutch and an actuating drag link member connected with said valve for shifting them between their operative positions, a lever pivoted in said machine adjacent the said actuating members, slot means in one of said lever and members and pin means on the other thereof extending therein to provide for a lost-motion connection between the lever and each of said members, said lever having an intermediate position where the pin between the lever and the drag link member has reached one limit of its movement in the associated slot so that movement of the lever in one direction will move the drag link to open the valve, while in the same lever position the pin between the lever and lever member is intermediate the ends of the associated slot and the lever member is positioned to hold the clutch open, said lever and lever member intersecting at an obtuse angle disposed so as to decrease when the lever is moved in the said one direction, a rock shaft supporting said lever, and means to rock said shaft in either direction from its intermediate position for selectively opening said valve or closing said clutch.

7. In a washing machine of the type described having a washing compartment with an agitator and an agitator drive shaft and also having a drain connection; a clutch for connecting said shaft with a source of power, a valve for controlling said drain connection, an actuating lever member connected with said clutch and an actuating drag link member connected with said valve for shifting them between their operative positions, a lever pivoted in said machine adjacent the said actuating members, slot means in one of said lever and members and pin means on the other thereof extending therein to provide for a lost-motion connection between the lever and each of said members, said lever having an intermediate position where the pin between the lever and the drag link member has reached one limit of its movement in the associated slot so that movement of the lever in one direction will move the drag link to open the valve, while in the same lever position the pin between the lever and lever member is intermediate the ends of the associated slot and the lever member is positioned to hold the clutch open, said lever and lever member intersecting at an obtuse angle disposed so as to decrease when the lever is moved in the said one direction, a rock shaft supporting said lever, and means to rock said shaft in either direction

from its intermediate position for selectively opening said valve or closing said clutch, said machine comprising a cabinet enclosing the described mechanism, and a control lever on the outside of said cabinet having means extending therethrough and operatively connected to said rock shaft.

8. In a washing machine of the type described having a washing compartment with an agitator and an agitator drive shaft and also having a drain connection; a clutch for connecting said shaft with a source of power; a valve for controlling said drain connection; an actuating lever member connected with said clutch and an actuating drag link member connected with said valve for shifting them between their operative positions, a lever pivoted in said machine adjacent the said actuating members, slot means in one of said lever and members and pin means on the other thereof extending therein to provide for a lost-motion connection between the lever and each of said members, said lever having an intermediate position where the pin between the lever and the drag link member has reached one limit of its movement in the associated slot so that movement of the lever in one direction will move the drag link to open the valve, while in the same lever position the pin between the lever and lever member is intermediate the ends of the associated slot and the lever member is positioned to hold

the clutch open, said lever and lever member intersecting at an obtuse angle disposed so as to decrease when the lever is moved in the said one direction, a rock shaft supporting said lever, and means to rock said shaft in either direction from its intermediate position for selectively opening said valve or closing said clutch, said machine comprising a cabinet enclosing the described mechanism, and a control lever on the outside of said cabinet having means extending therethrough and operatively connected to said rock shaft, said means including detent means to predetermine the several operative positions of said control lever and rock shaft.

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