

July 25, 1939.

H. E. PAGE

2,167,086

WASHING APPARATUS

Filed April 5, 1937

2 Sheets-Sheet 1

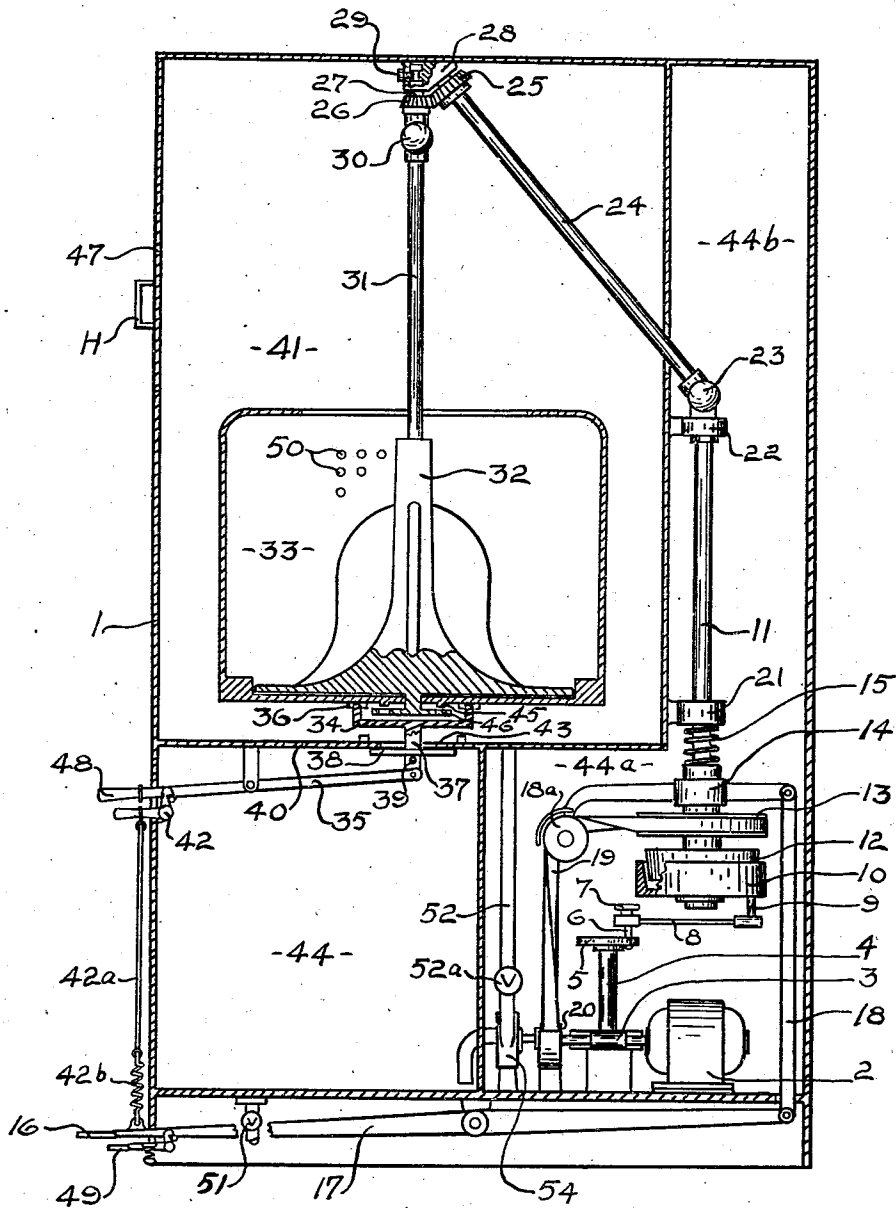


Fig. 1.

INVENTOR.

A. E. Page

July 25, 1939.

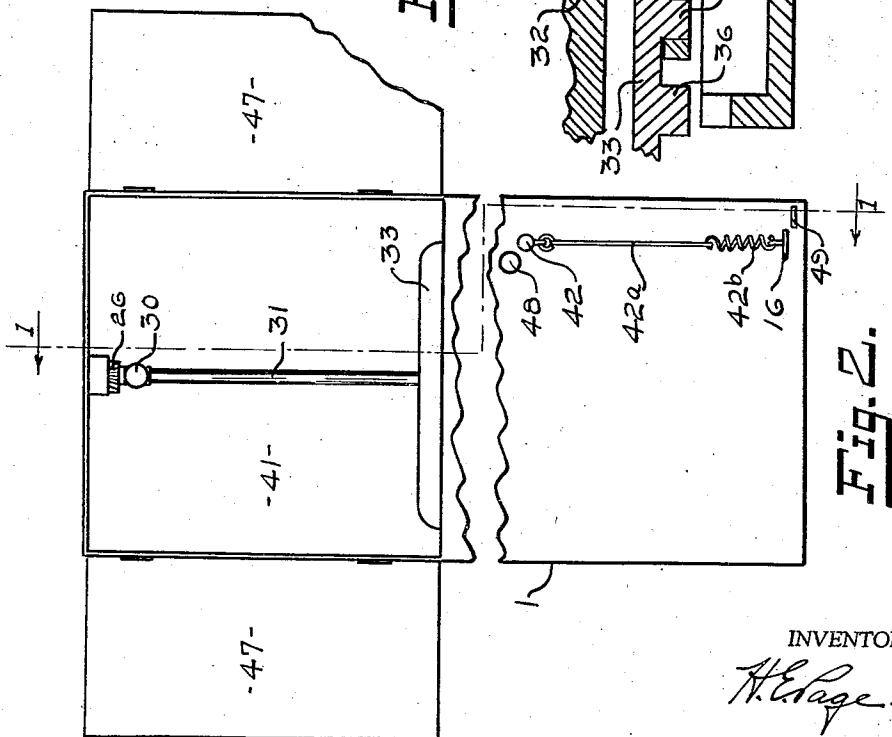
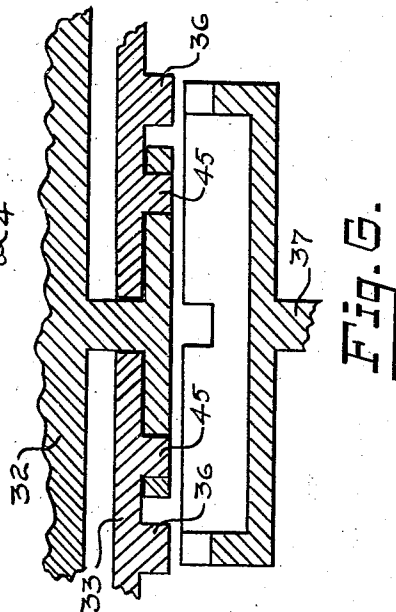
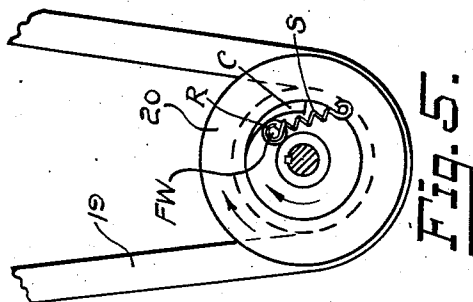
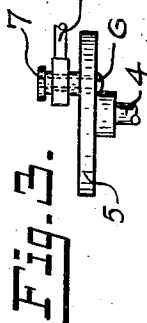
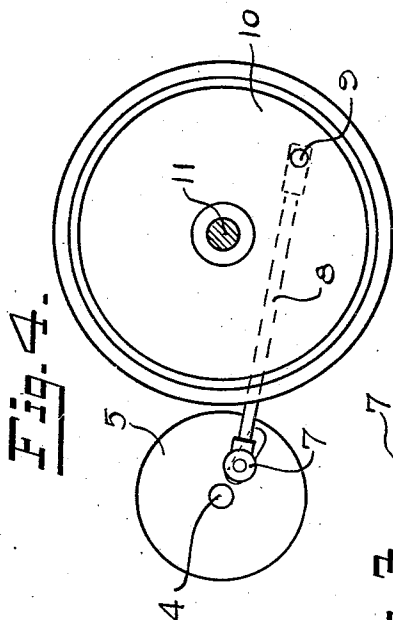
H. E. PAGE

2,167,086

WASHING APPARATUS

Filed April 5, 1937

2 Sheets-Sheet 2



INVENTOR.
H. E. Page.

UNITED STATES PATENT OFFICE

2,167,086

WASHING APPARATUS

Herbert E. Page, Syracuse, N. Y.

Application April 5, 1937, Serial No. 135,050

4 Claims. (CL 68-23)

This invention appertains to cleaning machines and particularly to those in which the articles to be cleaned do not have to be moved from one container to another during the entire cycle of the cleaning operation.

It has for its object a simple and compact arrangement in a casing of the various compartments for washing and extracting and for the actuating and motion transmitting mechanisms.

It also has for its object a simple and efficient means for cleaning and extracting the cleaning fluid from the articles being cleaned without the necessity of the operator having to handle said articles during the above operations.

Another object is to provide means for eliminating or greatly reducing the vibration during the extraction cycle.

Another object is a simple actuating mechanism readily operable to change from an oscillating washing operation to a rotating extracting operation, and vice-versa.

Other objects appear throughout the specification.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is an enlarged sectional view taken approximately on the plane of line I—I, Figure 2.

Figure 2 is a front elevation, partly broken away, of this machine, the doors being shown as open.

Figures 3 and 4 are detail views of the rotary driving member and the driving clutch section, illustrating the adjustable link connection between said driving part and the driving clutch thereon.

Figure 5 is a detail view of one of the pulleys used when rotating the agitator and clothes container at extracting speed showing the free wheeling or over-running clutch therein.

Figure 6 is an enlarged detail view of the clutch between the agitator and the clothes container and between the clothes container and the bottom of the compartment for the washing liquid.

The invention comprises, generally, a washing apparatus including a casing formed with a compartment for receiving a washing liquid, or a rinsing liquid, a clothes container or basket mounted in the casing, an agitator extending into the container with the container and agitator

being mounted to move about a common upright axis with the agitator suspended from the top wall of the compartment, so as to seek its own axis of rotation, actuating means connected to the agitator to oscillate it about its axis or to rotate it about its axis, with suitable means for controlling the operation of the agitator as to oscillation and rotation, and means operable to hold the container from movement with the agitator or to connect the container to the agitator to move about an axis, as a unit therewith. The washing liquid may be water with or without a suitable soap or solvent, or any other solvent, as a dry cleaning fluid.

During the washing operation, the agitator is oscillated, the clothes container is held from movement therewith, so that the clothes are agitated within the container. During the extracting or drying operation, the clothes container or basket is clutched to the agitator to rotate as a unit therewith, the rotation being at a comparatively high extracting speed. During the extracting operation, a drain passage leading from the washing compartment is opened, and the valve for this drain passage is controlled by the mechanism, which operates to clutch the container to the agitator or to unclutch it from the agitator and hold the same stationary. This operating means operates to close this valve during the washing operation, when the container is unclutched from the agitator, and to open the valve when the container is clutched to the agitator. Preferably, the casing of the apparatus is a unitary structure with a washing compartment having a door or doors in its front through which the clothes are loaded and unloaded into and out of the basket or container, compartments below the clothes compartment into one of which the liquid from the clothes compartment may be drained, and in the other of which the motor and two sets of motion transmitting means are located. The casing also includes a rear compartment leading from the lower compartment in which the motor is located, through which a motion transmitting member extends, this being connected to the agitator through another motion transmitting member which extends into the upper portion of the washing compartment. The drain compartment in the lower part of the casing may have a suitable drain valve and also may be provided with a pump of any suitable description for transferring the liquid from the drain compartment back up into the washing compartment, if desired for re-use.

In said drawings, 1 is the casing, and in the

lower rear portion of said casing is mounted the motor 2, which is here shown as connected by means of a worm and gear reduction unit 3 to the shaft 4, Figure 1.

At the top of the shaft 4 is mounted a driving part or disk 5 having a crank pin 6 so mounted in a slot in the disk 5 that said crank pin 6 may be fixed at various radial distances from the center of the disk 5 by means of the adjustment handle 7 for purposes presently to be described, Figure 1.

A connecting rod or link 8 connects the pin 6 with a crank pin 9 on the driving section or pan 10 of a cone clutch, said pan being mounted so as to revolve freely on the lower end of a shaft 11, Figure 1.

A driven clutch section, as a cone 12, adapted to engage with the driving clutch section or pan 10 is slidably keyed on the lower end of the shaft 11, Figure 1.

A pulley 13 is rigidly connected to the shiftable clutch section or cone 12 and both pulley and cone are free to revolve in a operating or shifting member 14, but any movement of the operating member or shifter 14 in line with the axis of the shaft 11 will either raise or lower the cone 12 and the pulley 13, Figure 1.

A spring 15 acts to normally keep the clutch section or cone 12 engaged with the section or pan 10, and in order to disengage them the operator must depress a pedal 16 of a lever 17, thus raising a connecting link 18, the upper end of which is connected to the rear arm of the shifting member 14; therefore, the member 14 is raised and carries the pulley 13 and the cone 12 with it, thus releasing the engagement between the clutch section or cone 12 and the section or pan 10, Figure 1.

Idler pulleys, as 18^a, are rotatably mounted on a forward projection of the member 14 and move up and down with said member, thus causing a belt 19, which runs over a pulley 20 on the motor shaft, the pulley 13 and the idlers 18^a to tighten when the idler pulleys 18^a are raised and to loosen when they are lowered. In this manner, the pulley 20 on the end of the motor shaft is caused to drive the pulley 13 when the shifting member 14 is raised and is allowed to revolve freely when the shifting member 14 is lowered, Figure 1.

Figure 1 shows the member 14 raised with the cone 12 disengaged from the pan or section 10 and the belt 19 tightened, and thus providing a driving connection between the pulley 20 and the pulley 13 for purposes later described.

The shaft 11 is rotatably mounted in bearings 21 and 22 mounted in the rear compartment of the casing 1 and the upper end of the shaft 11 terminates in a universal joint 23. The shaft 11 extends upward from a lower compartment 44^a of the casing through the upright rear compartment 44^b.

The universal joint 23 connects the shaft 11 with another shaft 24, and on the upper end of the shaft 24 is mounted a bevel gear 25 which engages with another bevel gear 26. The latter gear is mounted on a shaft 27, said shaft 27 and shaft 24 both terminating in an upper bearing 28 located at the top of the casing 1, Figure 1.

The shaft 27 is retained in place in any suitable manner, here shown for the purpose of illustration, by the set screw 29 which engages in a groove in the shaft 27 and prevents said shaft from dropping out of the bearing 28, Figure 1.

Another universal joint 30 is located on the lower end of the shaft 27 and connects said shaft with a shaft 31, the upper end of an upright shaft

on the lower end of which an agitator 32 is mounted, so that any motion of the shaft 31 is transmitted directly to said agitator 32, Figure 1. The agitator is thus supported from above or suspended, so as to seek its own axis, when rotating, and eliminate vibration.

The unit 3, shaft 4, disk 5, connecting rod 8, clutch pan 10 and cone 12 constitute one set of motion transmitting means between the motor and the motion transmitting member of shaft 11 to transmit an oscillating washing movement to the agitator 32. The belt 19 and pulleys constitute another set for transmitting a high extracting speed to the agitator and clothes container or basket clutched to the agitator.

Rotatably mounted at the bottom of the agitator 32 is an extractor basket and clothes container 33, and the bottom of said basket is adapted to engage with a clutch member 34 when the clutch member 34 is held in a raised position by means of a lever 35, as shown in Figure 1.

When the basket 33 is held in this position, the member 34 engages with the jaws or projections 36 on the bottom of the basket, thus maintaining the basket in the position, as shown in Figure 1, and preventing any oscillation or rotation about its axis. However, it will be noted that with the basket in this position, the agitator 32 can oscillate freely.

On a stem 37 of the member 34 is mounted a drain valve or plate 38 held in place by the pin 39, and it will be noted that when the member 34 is raised by the lever 35 and the basket 33 is held in the cleaning position, that is, with the agitator 32 free to oscillate, the pin 39 presses the plate 38 up against the bottom surface 40 of the container 41, and thus cleaning liquid is kept in the washing container 41 during the washing operation.

However, when the lever 35 is released by releasing the latch 42, then the valve plate 38 is allowed to drop away from the surface 40 and expose the opening 43, then the cleansing fluid contained in the container 41 can flow down into the lower container 44, and at the same time, the basket 33 will be allowed to drop vertically until pins or jaws 45 on the bottom thereof engage with the holes 46 in a clutch plate rigid with and spaced from the lower side of the agitator 32 and also spaced from the lower side or bottom of the container 33, and now the agitator 32 and the basket 33 are locked together and will move about an axis as a single unit for purposes presently described, Figures 1 and 6.

The member 34 constitutes a clutch operable to raise and lower the container or basket, and when raised, to hold the basket from movement about its axis during oscillating of the agitator 32, because of the member 34 being interlocked with the jaws 36 in the bottom of the container 33. The pins or jaws 45 and the holes 46 in the clutch plate, rigid with the agitator, constitute a clutch operable to lock the container 33 and agitator 32 together to rotate as a unit, when the container is dropped to disengage the clutch member 34 from the jaws 36 on the bottom of the container. These two clutch means are operative alternately by the lever 35. When the handle end of the lever 35 is depressed, the member 34 is elevated and also elevates the container 33, and the member 34 engages the jaws 36 on the bottom of the container 33. This lifting movement disengages the jaws or pins 45 from the holes 46 of the clutch plate depending from the agitator 32. Lifting of the handle end of the

lever 35 lowers the clutch member 34, releases it from the jaws 36, permits the container 33 to drop, and the pins or jaws 45 to enter the holes 46 of the clutch plate depending from the agitator (Figures 1 and 6).

As the drain valve 38 should be open when the basket 33 is clutched to the agitator, an interconnection is provided between the latch 42 of the lever 35 and the pedal lever 17, so that when the lever is depressed to tighten the belt 19 and open the clutch consisting of the sections 10, 12, the latch 42 will be released, permitting the drain valve 38 to open and causing the basket 33 to be clutched to the agitator. The connection is here shown as a link 42^a connected to the latch and the lever 17, the link being elastic or having a spring 42^b therein. In Figure 1, the spring has stretched to a point where it is about to trip the latch 42 with a snap action.

Handles, as H, are affixed to the doors, as 47, to permit the operator to place articles to be cleaned in, and remove them from, the basket 33, Figure 1. The compartment 44 has a drain valve 51 operable in any well known manner, and also a valve controlled by-pass 52 leading therefrom into the washing compartment 41, the by-pass having a motor driven pump 54 therein operable from the shaft of the motor 2. When the valve 52^a in the by-pass is closed, the pump merely idles.

In the operation of this device, the operator first places the articles to be cleaned in the basket 33, and then depresses the handle 48 until it is locked in position as shown by the latch 42. Cleaning fluid is then allowed to enter the container 41, until the proper level is reached. The foot release pedal 49 is then depressed which allows the rear arm of the lever 17 to drop downwardly, carrying the link 18 and the member 14 with it. The spring 15 assists this motion, and the cone 12 is caused to engage with the pan 10 and at the same time the idler pulleys 18 are also lowered and the tension on the belt 19 is released, thus disconnecting the driving effect of the pulley 20 with the pulley 13, Figure 1.

The motor is now started, and causes the disk 5 to revolve by means of the worm gear reduction unit 3 and the shaft 4. The revolving motion of the disk 5 is transformed into an oscillating motion on the pan 10 by means of the connecting rod 8, since the throw of the crank pin 6 is much less than the throw of the pin 9. The oscillating motion of the pan 10 is transmitted through the cone 12 and the shafts 11 and 24 through the gears 25 and 26 and the shaft 31 to the agitator 32, Figures 1 and 4.

Since the basket 33 is held up in the position, as shown, by the member 34, said basket is now held stationary, and the agitator 32 is free to agitate and thus perform the cleansing action on the articles being cleaned, Figure 1.

After the cleaning cycle has been completed, the operator stops the motor 2 and releases the latch 42, thus connecting the basket 33 with the agitator 32 and allowing the cleaning fluid to flow out of the container 41 into the container 44, as previously described, Figure 1, or he may depress the pedal 17 through the link 42^a. If the motor is not stopped, the depression of the pedal lever 17 will throw out the clutch sections 10 and 12, tighten the belt 19, and clutch the basket 33 to the agitator 32 for the extracting operation.

The changing of the cleaning fluid from the container 41 down to the container 44 tends to lower the center of gravity of the entire unit and

prepares the machine for the extracting cycle by further stabilizing it against any possible extractor vibration, and the operator now depresses the pedal 16, until it is locked in place by the latch 49, Figure 1.

This movement of the pedal 6 causes the rear arm of the lever 17 to rise, thus raising the link 18 and the member 14, disengaging the cone 12 from the pan 10. The idler pulleys 18 are also raised, thus taking up any slack in the belt 19 and producing a tension in the same, and the pulley 20 now has a driving connection through the belt 19 with the pulley 13, Figure 1.

With the motor 2 running, the pulley 20 drives the pulley 13 in a rotary motion, and this motion is transferred through the shafts 11 and 24 and the gears 25 and 26 and the shaft 31, to the agitator 32, and, since the agitator 32 is locked together with the basket 33, the rotary motion is transmitted finally to the extractor basket 33 and thus the cleaning fluid left in the articles being cleaned by the cleaning cycle is thrown out through the holes, as 50, in the extractor basket 33, Figure 1.

Since the agitator 32 and the basket 33, during the extraction cycle are free to hang on the shaft 31, as a unit, then, by means of the universal joint 30, they are allowed to swing and seek any new axis of rotation, due to the articles being not uniformly arranged in the basket 33, Figure 1.

In Figure 5, a "free wheeling" or "over-running" clutch FW is provided in the pulley 20, in order to further eliminate any vibration of the extractor 32 being carried back to the motor 2, and thus set up a series of vibration frequencies working against the driving impulses of the motor 2. When the extraction cycle is completed, the operator cuts off the motor current and releases the pedal 17, by depressing the latch 49, thus engaging the clutches 12 and 10, said clutches now acting as a brake to stop the extractor. Any free wheeling or over-running clutch may be used and the construction of the over-running clutch forms no part of the invention. The free wheeling clutch is here shown diagrammatically and the operation is as follows: With the parts running in the direction of the arrows and the inner part being the driver, the rotation of the inner part moves the shiftable roller R forwardly, with respect to the direction of rotation, in the contracted space between a cam C on one side of the outer member and the periphery of the hub of the inner member, causing the inner member to drive the outer member. The roller is urged into wedging position, that is, the contracted portion of said space, by a spring S. When the outer member 20 rotates faster than or over-runs the inner driving member, the cam tends to relieve the wedging action of the roller. When, however, the speed of the outer driven member becomes the same or slightly less than that of the inner driving member, the roller again wedges into the narrower portion in the space between the hub of the inner member and the outer driving member.

What I claim is:

1. In a washing apparatus, a casing having a compartment for receiving a washing liquid, a clothes container in the compartment, an agitator extending into the container, the container and the agitator being mounted to move about a common axis, actuating means including a motor, motion transmitting means between the motor and the agitator and interchangeable operable to

transmit oscillating and rotary movement to the agitator, means for controlling the operation of the motion transmitting means, means operable to clutch the agitator and the container together, 5
 whereby the container moves about an axis, as a unit, with the agitator, and also operable, so that the container is held stationary during the movement of the agitator, and a drain valve for the compartment operable by the last means to 10
 closed position, when the last means is operated to hold the container stationary.

2. In a washing apparatus, a compartment for receiving a washing liquid, a clothes container in the compartment, an agitator extending into the 15
 container, the container and the agitator being mounted to move about a common upright axis, actuating means operable to interchangeably oscillate and rotate the agitator about its axis, clutch means operable to clutch the container to 20
 the agitator, whereby it moves as a unit therewith and into another position to clutch the container to the casing and hold the container stationary, and a drain valve for the casing operable by the last means into open position, when said 25
 last means is operated to clutch the agitator and the container together.

3. In a washing apparatus, an upright casing having a first compartment for receiving a washing liquid, a second and a third compartment in 30
 the lower portion of the casing, and a rear compartment extending upwardly along the first compartment from the third lower compartment, a clothes container in the first compartment, and an agitator extending into the container, means 35
 for suspending the agitator from the top of the casing including a universal joint, a motor mounted in the third compartment, motion transmitting members extending through the rear compartment and into the first compartment and 40
 connected to the suspending means for the agitator, two sets of motion transmitting means between the motor and one of said members, one set operating through said members to oscillate

the agitator and the other through said members to rotate the agitator, means operable to select either one or the other of the sets of motion transmitting means, and means operable into one 5
 position to clutch the agitator and the container together, whereby they move about the axis of the agitator as a unit, and into another position to hold the container stationary, and a valve controlled passage between the first compartment and the second compartment. 10

4. In a washing apparatus, a casing having an upright casing having a first compartment for receiving a washing liquid, a second and a third compartment in the lower portion of the casing, and a rear compartment extending upwardly 15
 along the first compartment from the third lower compartment, a clothes container in the first compartment and an agitator extending into the container, means for suspending the agitator from the top of the casing including a universal joint, a 20
 motor mounted in the third compartment, motion transmitting members extending through the rear compartment and into the first compartment and connected to the suspending means for the agitator, two sets of motion transmitting means be- 25
 tween the motor and one of said members, one set operating through said members to oscillate the agitator and the other to rotate the agitator through said members, means operable to select 30
 either one or the other of the sets of motion transmitting means, and clutch means operable into one position to clutch the agitator and the container together, whereby they move about 35
 an axis as a unit and into another position to hold the container stationary, an operating element for the clutch means, and a drain passage between the first and second compartments, and a valve for controlling said passage operable by said 40
 element, to open said passage when the clutch means is operated to a position to clutch the container and the agitator together as a unit.

HERBERT E. PAGE.