Oct. 16, 1951 B. A. BUSS 2,571,197

STOP CONTROL FOR PARTITIONED WASHERS

Filed Oct. 26, 1949 2 Sheets-Sheet 1

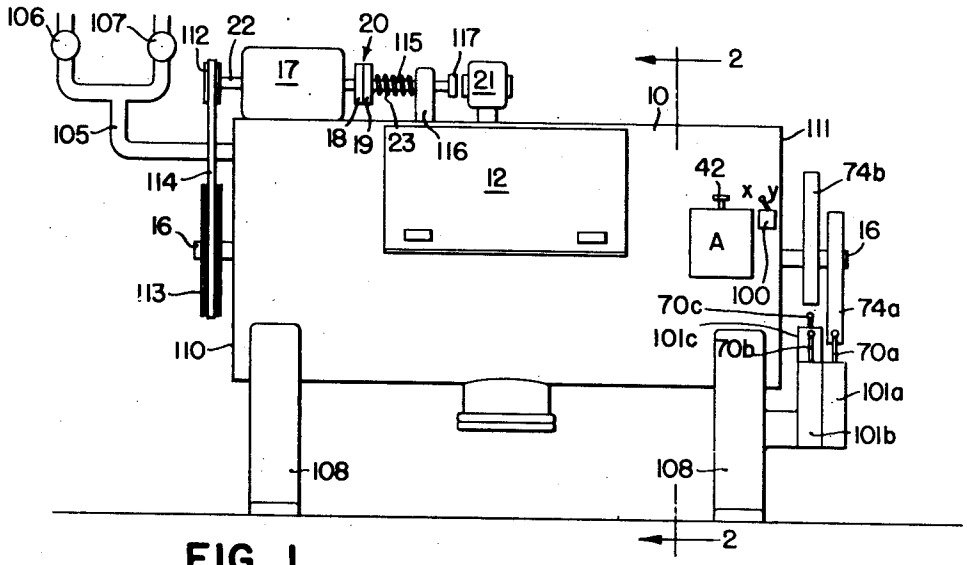


FIG. 1

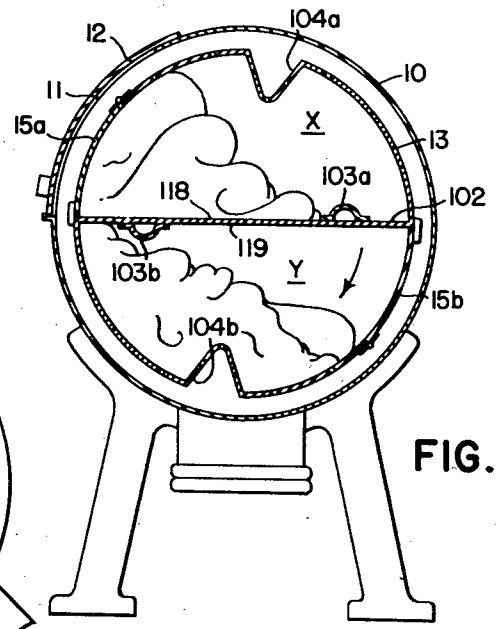


FIG. 2

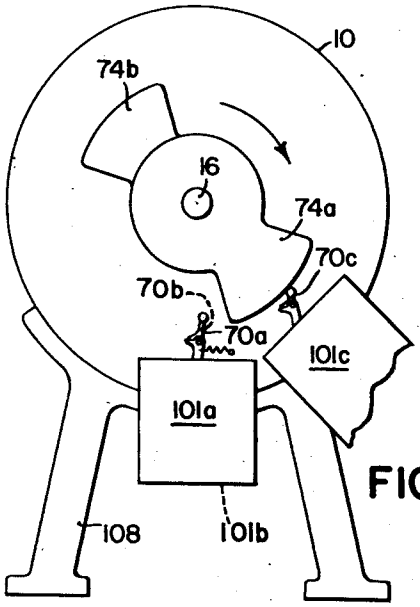


FIG. 3

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STOP CONTROL FOR PARTITIONED WASHERS

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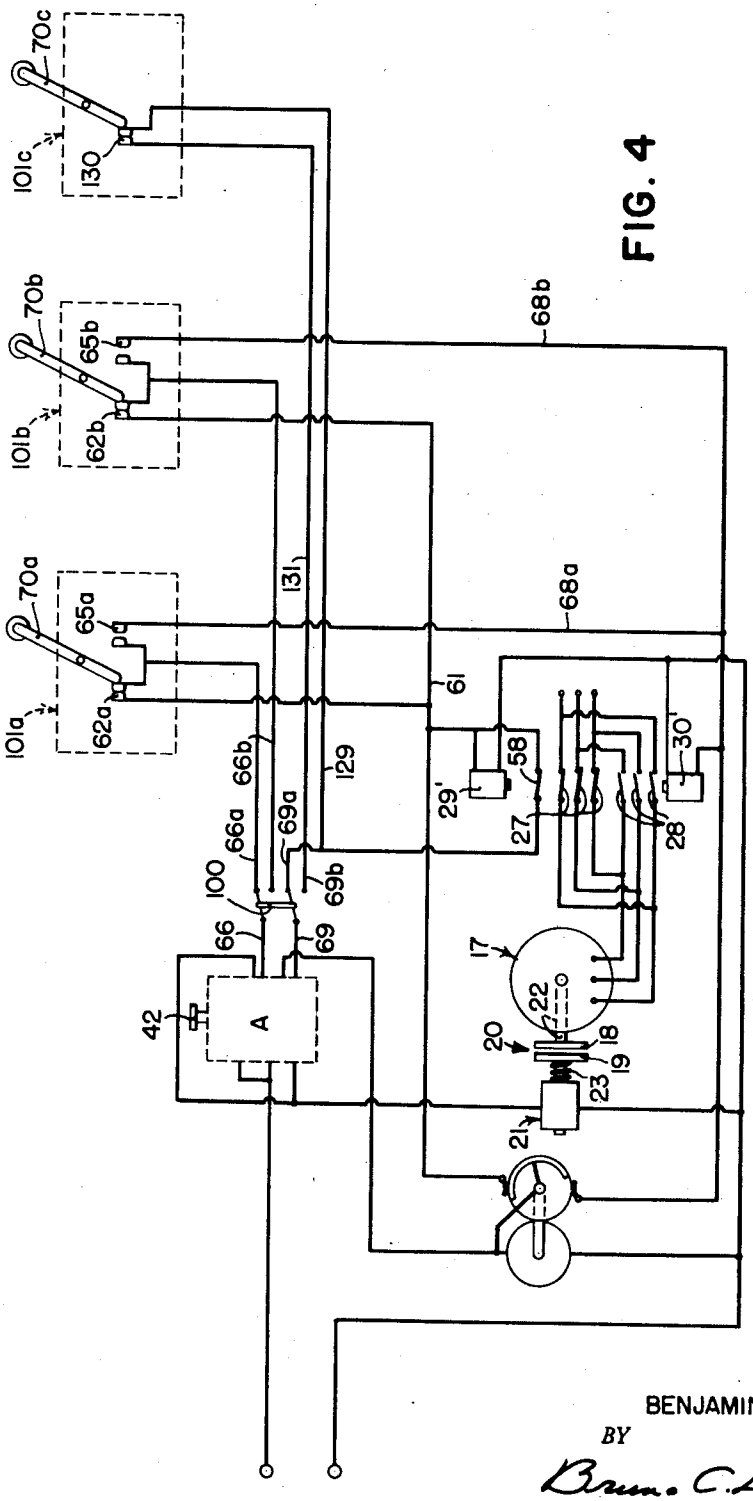


FIG. 4

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STOP CONTROL FOR PARTITIONED WASHERS

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Application October 26, 1949, Serial No. 123,681

8 Claims. (Cl. 68—143)

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This invention relates to commercial washing machines of the type wherein a reversible electromotor rotates a horizontal cylinder within a stationary shell alternatingly in one direction for a number of times and then in the opposite direction, usually for the same number of times.

The United States Patent 2,479,153 of Benjamin Alvin Buss, entitled "Reversing and Stop Control for Electric Motors," which issued August 16, 1949, discloses for a washing machine of the type mentioned which uses a radially undivided cylinder with a single door a control device for automatically positioning and stopping the cylinder within a limited angular control range so that, when the cylinder has come to rest, its door is in register with a door provided in the stationary shell. Upon actuation of a stop button or the like while the machine is in action, the control device will cut off the driving power and apply a brake to the electromotor as soon as the cylinder door enters the mentioned limited angular range in a particular direction of rotation, namely that direction of rotation which brings the cylinder door to the shell door up from below. If the stop button is actuated at a time when the cylinder is revolving counter to the direction just mentioned, the control device will permit the regular operation of the washing machine to continue until the motor reverses the rotation of the cylinder and in moving in this reversed direction the cylinder door enters the control range. Whenever after the first entry of the cylinder door into the control range in the direction from below the inertia of the cylinder and the load contained therein carries the cylinder past the control range mentioned, the control device causes reversal of the current to the motor. The reversed motor plus the brake bring the cylinder to a stop and thereafter the motor turns the cylinder in the direction opposite to that in which it moved before to bring the door back into the control range. For a more detailed description of the construction and mode of operation of the door registering device according to Patent 2,479,153 reference is made to the specification of said patent

Whereas the door registering device as disclosed in Patent 2,479,153 works very satisfactorily for a washing machine in which the cylinder is undivided in radial direction, special problems arise where the revolving cylinder is divided into two compartments separated from each other by a partition extending diametrically through the axis of the cylinder. When in a so subdivided cylinder the cylinder door comes up from below

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into register with the shell door, the partition is in horizontal position and the clothes in the compartment whose door is in alignment with the shell door are piled up on the partition and against the door. This location of the clothes is desirable for the removal of the clothes from the cylinder. However, without any further provisions the clothes will not remain in this position for the reason that the cylinder, after its stopping having been initiated, does not stop immediately upon its partition having reached the horizontal position for the first time, but is carried by inertia beyond the predetermined stopping range. In so doing, the partition tilts down backwardly and the clothes tend to slide to the rear corner of the compartment to be unloaded. Whereas up to that time the weight of the clothes in that compartment has been assisting in stopping the cylinder, the load now suddenly opposes the brake with the result that stopping becomes uncertain and unreliable as the load slides about on top of the partition.

It is an object of the present invention to provide a washing machine whose horizontal cylinder is divided by an axial partition into two semi-cylindrical compartments each having a door and automatic registering means including a brake, the registering means being adapted to position either door in a specified unloading position with the load in the compartment close to the door.

To prevent sliding of the load into positions in which it will oppose the action of the brake while the cylinder is performing oscillations about its desired stopping position under control by the reversible motor and the brake, I use a partition whose two sides have each an uninterrupted flat surface over that half which extends from the axis of the cylinder towards the door of the compartment of which the particular side of the partition forms the bottom, whereas from the other half of each side restraining means extend up to substantially such a height only as is necessary to restrain the relatively small tendency of sliding to the rear end of the partition the load will have during the small-amplitude oscillations the cylinder carries out after stopping has been initiated. In a preferred form of the invention a low ridge on each side of the partition is used as such restraining means. The height of these ridges is much smaller than the height of the ribs commonly employed for turning and beating the clothes while the washing machine is in normal operation.

A further object of the invention is to provide

a washing machine of the kind just indicated wherein by the operation of a selector the attendant can select the cylinder door which he desires to be stopped automatically in register with the door in the shell.

Another object of the invention is to provide a washing machine whose rotatable cylinder is divided into two semi-cylindrical compartments each having a door which for loading or unloading of that particular compartment is stopped in register with the door in the shell by automatic door registering means and wherein the oscillations which the cylinder carries out after its stopping has selectively been initiated for the one or the other of the two cylinder doors in register with the shell door are kept to a small amplitude by such means as will counteract the tendency of the load in that particular compartment to slide to the rear corner of the latter.

A further object of the invention is to provide a speedily and reliably working stop control for both the compartments of the rotatable cylinder. It has been found that with a washer cylinder which is divided into two semi-cylindrical compartments there arises a special problem in stopping the cylinder after one of the two compartments has been unloaded. As long as both compartments are filled, the positioning of the compartment desired to be unloaded first is facilitated by the fact that the load in this compartment is balanced in part by the weight of the load in the other compartment. But after one compartment has been unloaded, all the remaining load is above the partition and toward the front of the cylinder as the partition approaches the horizontal position. This location of the load makes for increased sensitivity and if the cylinder overshoots the registering position appreciably, tilting the partition down backwards, the load may slide to the back of the cylinder which makes it difficult to complete the registering operation. To counteract this tendency towards increased sensitivity after the first compartment has been unloaded, the control mechanism for positioning the second compartment provides for the application of the brake some time before the door of the second compartment which is rising up toward its registering position has actually reached that position.

A further object of the invention is to provide a washing machine of the kind referred to wherein to each of the two semi-cylindrical compartments there is coordinated a cam-actuated switch mechanism for causing stopping of the cylinder in the aligned position in the manner described in Patent No. 2,479,153 and to at least one of the two compartments there is coordinated an additional mechanism for causing a braking action upon the motor prior to the entry of the door of that particular compartment into the stopping range.

Another object of the invention is to arrange in a washing machine whose rotatable cylinder is divided into two semi-cylindrical compartments, each having a door which for loading and unloading of the coordinated compartment is stopped in register with the door in the shell by automatic door registering means, for the stopping of the two compartments in a definite order, so that always the same compartment is positioned for unloading first and the other compartment thereafter.

Other objects of the invention will appear as the description proceeds, reference being had to the accompanying drawing which in a diagrammatic manner illustrates one embodiment of the invention. Where in the drawing of this application parts are identical with parts illustrated in the drawing of Buss' Patent 2,479,153, these parts have been denoted in this application by the same numbers they have in said patent.

In the drawing:

Fig. 1 shows a side elevation of a washing machine equipped with the invention;

Fig. 2 is a cross-section on the line 2—2 in Fig. 1 at a larger scale;

Fig. 3 is an end elevation of the washing machine; and

Fig. 4 shows a circuit diagram.

Supported on legs 108 is a shell 10 having a door 12 which, when open, gives access to an opening 11 in the shell. Through the two end walls 110 and 111 of the shell 10 there pass trunnions 16 carried by a cylinder 13. Through the end wall 110 of the shell there also passes the water feed conduit 105, to which the individual hot and cold water conduits, controlled by valves 106 and 107, respectively lead. The cylinder 13 is rotatably connected with a shaft 22 of a reversible electromotor 17 by any suitable gear, which in the example shown is indicated as consisting of a pulley 112 on the shaft 22 connected to a wheel 113 on the trunnion 16 by means of a belt 114. A brake, generally denoted as 20, stops, when applied, the rotation of the motor 17 and thereby also of the cylinder 13. The brake 20 is shown here as comprising a disc 18 revolving with the motor shaft 22 and a braking surface 19 mounted on a square shaft 115 which is slidably mounted in a support 116. The square shaft 115 is urged to the left by a compression spring 23 to bring the braking surface 19 into braking contact with the disc 18. A solenoid 21 has an armature 117 which is attached to the shaft 115. When the solenoid 21 is energized, the armature 117 is attracted so as to release the brake 20.

The cylinder 13, whose cylindrical wall is perforated, is provided with a partition wall 102 extending diametrically through the cylinder so as to divide the cylinder 13 into two semi-cylindrical compartments X and Y. The compartment X is accessible through a door 15*a* and the compartment Y through a door 15*b*. The doors 15*a*, 15*b* may be either sliding doors or, as shown, hinged doors. One rib 104*a* and 104*b* of conventional shape and size extending from the cylindrical wall of the cylinder 13 towards the axis thereof is provided for each of the two compartments X, Y, respectively.

The partition 102 has on each of its two sides an uninterrupted flat surface, indicated in Fig. 2 as 118 and 119, over that half which extends from the axis of the cylinder 13 towards the door 15*a* or 15*b* of the compartment X or Y of which that particular side 118 or 119 forms the bottom. To the other half of the side 118 of the partition 102 there is attached a low ridge 103*a* and to the other half of the side 119 a low ridge 103*b*. The height of the ridges 103*a* and 103*b* is much smaller than the height of the ribs 104*a* and 104*b*.

The trunnion 16 on the right hand end of the cylinder 13 (as seen in Fig. 1) carries two cams 74*a* and 74*b* instead of one cam 74 as in the earlier patent. These cams 74*a* and 74*b* are displaced 180 degrees and situated in two parallel planes so that the cam 74*a* cooperates with a switch actuating member 70*a* and the cam 74*b* cooperates with two switch actuating members

70b and 70c. The switch actuating member 70a closes in one end position a contact pair 62a and in the other end position a contact pair 65a, the two contact pairs 62a and 65a being contained in a switch housing 101a. The switch actuating member 70b cooperates with two contact pairs 62b and 65b contained in a switch housing 101b, whereas the member 70c cooperates with a contact pair 130 in a switch housing 101c. The cam 74a together with the switch 101a controls the stopping of the cylinder within a definite angular range so that it will be in position for unloading the compartment X, whereas the cam 74b together with the two switches 101b and 101c controls the stopping of the cylinder when the unloading of the Y compartment is desired. The device for the stopping of the X compartment is the same as the one described in Patent No. 2,479,153 except that in the present case a selector 100 in the form of two-pole switch has been added. This selector 100 is mounted on the outer shell 10 adjacent to the master switch A which is identical with the master switch A in the prior patent. The positions of the selector 100 are marked *x* and *y*.

As explained in Patent 2,479,153, the registering action starts, even though stopping has been initiated, only when the cylinder is revolving in such direction as to bring the cylinder door to the shell door up from below. This direction is indicated in Fig. 2 and Fig. 3 by an arrow.

The circuits shown in Fig. 4 permits the unloading of the compartment X first and of the compartment Y second and the stopping of either of said two compartments within a given range. To stop the cylinder with the cylinder door 15a in register with the shell opening 11, that is to say, for unloading of the compartment X, the selector 100 is brought into the position shown in Fig. 4 and the button 42 of the master switch A is elevated.

By placing the selector switch 100 and the button 42 in the position described current is supplied through lines 66 and 66a to the switch housing 101a where it traverses the closed contact pair 62a. From here, the current flows through line 61 and the solenoid 29', the latter keeping the contacts 27 for the forward drive of the motor 17 closed to rotate the cylinder in the direction of the arrow in Fig. 3. Current also flows across switch 58 to a contact 69a held closed by the selector 100 and thence to line 69 leading to a contact (not shown) of the master switch A. As shown in the earlier patent, when the handle 42 is elevated, the circuit through 69 supplies current to the solenoid 21 which keeps the motor brake 20 dis-engaged.

When the partition 102 approaches the horizontal position with the compartment X above the partition, the cam 74a coordinated to that compartment engages the switch actuating member 70a so as to break the connection at the contact pair 62a. This deenergizes the forward solenoid 29' and by opening of the contact 58 deenergizes the solenoid 21 whereby the brake 20 is applied. While the brake is so applied the partition 102 moves upward at the left in Fig. 2 through a short range. At the end of this short range, the cam 74a has forced the switch actuating member 70a to close the contact pair 65a, so that current is provided through the lines 66, 66a and 68a to the reverse solenoid 30' which closes the motor contacts 28 for the rotation of the motor in reverse direction. The cylinder 13 is eventually brought to a stop in the

desired aligned position of the door 15a in the manner described in the prior patent and the compartment X can be unloaded. While the positioning of the compartment X takes place in like manner, it is to be observed that the presence of the diametral partition 102 establishes particular conditions for the load in the cylinder 13 which will be discussed now. When the partition 102 is in or near its horizontal position with its side 118 looking upwards, it carries the load in the compartment X on this side 118. Even though the movement of the cylinder is reduced to small amplitude oscillations about the stopping range when the stopping of the cylinder 13 has been initiated, the load supported on the surface 118 on the partition 102 will tend to slide backwards to the rear end of the surface end 118 when the latter assumes a rearwardly inclined position. If such sliding back to the rear end of the compartment X were permitted, there would be introduced a strong tendency of the load to tilt the partition further out of alignment with the lower edge of the shell door opening 11 and to oppose the action of the brake 20.

Such sliding back to the rear end of the compartment during the stopping phase is effectively prevented by the ridge 103a. While the height of this ridge would be insufficient to prevent the load in the compartment X from reaching the rear end of the partition when the latter assumes a steep angle as is the case during normal operation of the machine, and this ridge actually must not even interfere with the tumbling of the load during the regular rotation of the cylinder which is controlled by the rib 104a on the cylindrical wall of the cylinder 13, the ridge 103a becomes effective for the purpose mentioned when the registering mechanism has come into play and thereby the movement of the cylinder does not longer take place in the form of full rotations but is reduced to oscillations of relatively small amplitude. This amplitude will grow smaller with each oscillation, provided the weight of the load is unable to counteract to any appreciable extent the reversing and braking actions of the motor and brake. The ridge 103a, by preventing the load from reaching the rear end of the partition 102 while the cylinder is carrying out the "spotting" oscillations of small amplitude, assures that the momentum exerted by the weight of the load can counteract the action of the brake to but a negligible extent so that the cylinder will come to rest almost instantly after the selector switch 100 has been operated and the cylinder 13 has turned into the direction of the arrow in Fig. 2. When so coming to rest the selected cylinder door 15a is in proper register with the shell door.

After the compartment X has been unloaded with button 42 still elevated, the operator moves the selector switch 100 into the position *y* (which in Fig. 4 is the depressed position) for connecting line 66 to line 66b and line 69 to a point 69b. The line 66b connects to the switch housing 101b containing the two contact pairs 62b and 65b as well as the switch actuating member 70b. Of these two contact pairs, the pair 62b is normally closed whereas the contact pair 65b is normally opened and becomes closed under the action of the cam 74b when the latter strikes the switch actuating member 70b which occurs when the door 15b of the compartment Y enters the range of alignment. If only the switch 101b were provided for actuation by the cam 74b, the positioning of the cylinder door 15b would take place in the same manner

and by the same means as have been mentioned in connection with the positioning of the cylinder door 15a. If, however, at the time the compartment Y is to be unloaded the compartment X is already empty, and, therefore, a greater unbalance is present than when the cylinder is to be stopped while there are loads in both compartments X and Y, the restraining effect of the low ridge 103b in the compartment Y may in some cases not be sufficient to prevent the load in that compartment from sliding past this ridge. To prevent this, the additional switch housing 101c is provided. The contact pair 130 in this switch housing 101c is opened prior to the closing of the contact pair 65b in the switch housing 101b due to the fact that the cam 74b, before it engages the switch actuating member 70b, engages the switch actuating member 70c. By so opening the contact pair 130 a circuit through the brake solenoid 21, which in the depressed position of the selector 100 extended from line 66, selector 100, line 66b, switch contact 62b, line 61, switch 58, thence through lines 129 and 131 contact 69b, line 69, then through A and then through brake release solenoid 21, is interrupted so that the brake solenoid 21 becomes deenergized and the brake 20 is applied by means of the spring 23. This takes place while the motor 17 is still moving the cylinder 13 in the direction of the arrow in Fig. 3 and while the partition 102 has not yet reached the horizontal position in its movement up from below. While the brake 20 will at this stage not be strong enough to stop the motor 17, it will exercise sufficient brake power to slow down the speed at which the cylinder is moving. Thus the speed of the cylinder is already reduced when the cam 74b reaches the switch actuating member 70b for opening of the contact pair 62b so as to cut off the current from the motor 17. The cylinder coasts through the allowable range with the motor cut off and the brake applied until the switch actuating member 70b closes the contact pair 65b whereby reversing current is supplied to the motor through line 68b while the brake is still applied.

From the foregoing description it will be seen that in the example shown in the drawing the means for stopping the cylinder 13 for the unloading of the compartment X are different from the means provided for stopping the cylinder with the door of the compartment Y in alignment with the shell door. When aligning the compartment Y, braking power is applied during a phase of the cylinder movement which is left uninfluenced by the brake 20 during the positioning of the compartment X.

With the stopping mechanisms as illustrated in Figs. 3 and 4, the two compartments X and Y should be always unloaded so that first the compartment X and then the compartment Y is unloaded. Should it be considered desirable to be independent as to the order in which the unloading of the two compartments is to be carried out, an additional switch 101c of the kind shown in Fig. 4 in combination with the switch 101b may be provided for each of the switches 101a and 101b. In this case not only the cam 74b would cooperate with the two switch actuating members but also the cam 74a. In general, however, the structure shown in the drawing comprising different positioning means for the two compartments X and Y will be preferable.

It will be appreciated that the washer embodying the invention is of such a nature as to render the unloading of the contents of the washer particularly convenient and labor-saving. Due to the fact that the mechanism described assures that the load in each of the two cylinder compartments, after having been brought to the unloading station stacked proximate to the door of that compartment, remains in that stacked-to-the-door position during the leveling operation, so that this load is still in that position when the cylinder has come to a standstill with the cylinder partition in horizontal position, the load can be withdrawn from the compartment to be unloaded without reaching to the bottom or to the rear of the cylinder.

While I have shown in the drawing one particular embodiment of the invention, I desire it to be understood that this embodiment has been given by way of example only, and that various modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:

1. A horizontal washer comprising, in combination, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, an unloading station substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded at the same station with said partition in substantially horizontal position, a door for each of said openings, means for turning said cylinder in such direction that the load in each compartment, after falling to the bottom of said cylinder, will be carried up to the level of said unloading station stacked proximate to the door of that compartment, a device for stopping said cylinder with one or the other of said two doors in alignment with said unloading station, said device including means for selecting the compartment whose door is to be stopped in alignment with said unloading station, means for initiating stopping and automatic leveling means adapted to become effective when, after initiation of stopping, said turning means turn said cylinder in said direction, and to thereafter reverse the direction of rotation of said cylinder each time the door of the selected compartment rises or falls below the limits of a limited angular range, thereby confining the movement of said cylinder to oscillations of limited amplitude, and a restraining means extending up from each face of said partition, each of said restraining means being located toward the rear of the compartment as seen from the coordinated door, to prevent the stacked load in the selected compartment from sliding toward the rear end of that compartment during said oscillations of limited amplitude.

2. A horizontal washer comprising, in combination, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, an unloading station substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded at the same station with said partition in substantially horizontal position, a door for each of said openings, a reversible motor for turning said cylinder about its axis, a device for stopping said cylinder with one or the other of said two doors in alignment with said unloading station, said device including a brake, means for selecting the compartment whose door is to be stopped in alignment with said unloading station,

means for initiating stopping and automatic leveling means adapted to become effective when, after initiation of stopping, said reversible motor turns said cylinder in such direction that the load in the selected compartment, after falling to the bottom of said cylinder, is carried up to the level of said unloading station stacked proximate to the door of that compartment, said automatic leveling means including means coordinated to each of said cylinder doors for cutting off the power supply to said motor and for applying said brake to said motor when said door of said selected compartment enters a limited angular range and means to reverse the direction of rotation of said cylinder as the door of the selected compartment rises above or falls below the limits of said angular range by a fixed amount, thereby confining the movement of said cylinder to oscillations of limited amplitude, and additional control means coordinated to at least one of said two compartments for causing application of said brake some time before the door to which said additional control means is coordinated enters said limited range after initiation of stopping for that particular door.

3. A horizontal washer comprising, in combination, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, an unloading station substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded at the same station with said partition in substantially horizontal position, a door for each of said openings, a reversible motor for turning said cylinder about its axis, a device for stopping said cylinder with one or the other of said two doors within a limited angular range substantially in alignment with said unloading station, said device including a brake, means for selecting the compartment whose door is to be stopped in alignment with said unloading station, means for initiating stopping and automatic leveling means adapted to become effective when, after initiation of stopping, said reversible motor turns said cylinder in such direction that the load in the selected compartment, after falling to the bottom of said cylinder, is carried up to the level of said unloading station, stacked proximate to the door of said compartment, said automatic leveling means including for each of said two compartments a cam connected for rotation with said cylinder and a switching device operable by said cam to cut off the power supply and apply said brake to said motor when the door of the compartment coordinated to that particular cam enters said angular range and to reverse the direction of rotation of said cylinder as this door rises above or falls below the limits of said range by a fixed amount, thereby confining the movement of said cylinder to oscillations of limited amplitude, and an additional switch coordinated to at least one of said two compartments and operable by the same cam which operates the afore-mentioned switching device coordinated to that compartment for applying said brake some time before the door of that compartment, after initiation of its stopping, reaches said angular range while coming up to said unloading station from below.

4. A horizontal washer comprising, in combination, a stationary shell, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, a door in said shell having its bottom substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded through said shell door with said partition in substantially horizontal position, a door for each of said cylinder openings, a reversible motor for turning said cylinder about its axis, a device for stopping said cylinder with one or the other of said two doors within a limited angular range substantially in alignment with said shell door, said device including a brake, means for selecting the compartment whose door is to be stopped in alignment with said shell door, means for initiating stopping and automatic leveling means adapted to become effective when after initiation of stopping said reversible motor turns said cylinder in such direction that the load in the selected compartment, after falling to the bottom of said cylinder, is carried up to the level of said shell door stacked proximate to the door of said compartment, said automatic leveling means including for each of said two compartments a cam connected for rotation with said cylinder and a switching device operable by said cam to cut off the power supply and apply said brake to said motor when the door of the compartment coordinated to that particular cam enters said angular range and to reverse the direction of rotation of said cylinder as this door rises above or falls below the limits of said range by a fixed amount, thereby confining the movement of said cylinder to oscillations of limited amplitude, and an additional switch coordinated to at least one of said two compartments and operable by the same cam which operates the afore-mentioned switching device coordinated to that compartment for applying said brake some time before the door of that compartment, after initiation of its stopping, reaches said angular range while coming up to said unloading station from below.

5. A horizontal washer comprising, in combination, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, an unloading station substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded at the same station with said partition in substantially horizontal position, a door for each of said openings, a reversible motor for turning said cylinder about its axis, a device for stopping said cylinder with one or the other of said two doors in alignment with said unloading station, said device including a brake, means for selecting the compartment whose door is to be stopped in alignment with said unloading station, means for initiating stopping and automatic leveling means adapted to become effective when, after initiation of stopping, said reversible motor turns said cylinder in such direction that the load in the selected compartment, after falling to the bottom of said cylinder, is carried up to the level of said unloading station stacked proximate to the door of that compartment, said automatic leveling means including means coordinated to each of said cylinder doors for cutting off the power supply to said motor and to apply said brake to said motor when said door of said selected compartment enters a limited angular range and

means to reverse the direction of rotation of said cylinder as the door of the selected compartment rises above or falls below the limits of said angular range by a fixed amount, thereby confining the movement of said cylinder to oscillations of limited amplitude, and additional control means coordinated to at least one of said two compartments for causing application of said brake some time before the door to which said additional control means is coordinated enters said limited range after initiation of stopping for that particular door, and a restraining means extending up from each face of said partition, each of said restraining means being located toward the rear of the compartment as seen from the coordinated door, to prevent the stacked load in the selected compartment from sliding toward the rear end of that compartment during said oscillations of limited amplitude.

6. A horizontal washer comprising, in combination, a stationary shell, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, a door in said shell having its bottom substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded through said shell door with said partition in substantially horizontal position, a door for each of said cylinder openings, a reversible motor for turning said cylinder about its axis, a device for stopping said cylinder with one or the other of said two doors in alignment with said shell door, said device including a brake, means for selecting the compartment whose door is to be stopped in alignment with said shell door, means for initiating stopping and automatic leveling means adapted to become effective when, after initiation of stopping, said reversible motor turns said cylinder in such direction that the load in the selected compartment, after falling to the bottom of said cylinder, is carried up to the level of said shell door stacked proximate to the door of that compartment, said automatic leveling means including means coordinated to each of said cylinder doors for cutting off the power supply to said motor and for applying said brake to said motor when said door of said selected compartment enters a limited angular range substantially in register with said shell door and means for reversing the direction of rotation of said cylinder as the door of the selected compartment rises above or falls below the limits of said angular range by a fixed amount, thereby confining the movement of said cylinder to oscillations of limited amplitude, and additional control means coordinated to at least one of said two compartments for causing application of said brake sometime before the door to which said additional control means is coordinated enters said limited range after initiation of stopping for that particular compartment, and a restraining means extending up from each face of said partition, each of said restraining means being located toward the rear of the compartment as seen from the coordinated door, to prevent the stacked load in the selected compartment from sliding toward the rear end of that compartment during said oscillations of limited amplitude.

7. A horizontal washer comprising, in combination, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, an unloading station substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded at the same station with said partition in substantially horizontal position, a door for each of said openings, a reversible motor for turning said cylinder about its axis, a device for stopping said cylinder with one or the other of said two doors within a limited angular range substantially in alignment with said unloading station, said device including a brake, means for selecting the compartment whose door is to be stopped in alignment with said unloading station, means for initiating stopping and automatic leveling means adapted to become effective when, after initiation of stopping, said reversible motor turns said cylinder in such direction that the load in the selected compartment, after falling to the bottom of said cylinder, is carried up to the level of said unloading station, stacked proximate to the door of said compartment, said automatic leveling means including for each of said two compartments a cam connected for rotation with said cylinder and a switching device operable by said cam to cut off the power supply and apply said brake to said motor when the door of the compartment coordinated to that particular cam enters said angular range and to reverse the direction of rotation of said cylinder as this door rises above or falls below the limits of said range by a fixed amount, thereby confining the movement of said cylinder to oscillations of limited amplitude, and an additional switch coordinated to at least one of said two compartments and operable by the same cam which operates the afore-mentioned switching device coordinated to that compartment for applying said brake some time before the door of that compartment, after initiation of its stopping, reaches said angular range while coming up to said unloading station from below, and a low ridge on each face of said partition, each of said ridges being located toward the rear of the compartment as seen from the coordinated door, to prevent the stacked load in the selected compartment from sliding toward the rear end of that compartment during said oscillations of limited amplitude.

8. A horizontal washer comprising, in combination, a stationary shell, a cylinder rotatable about its horizontal axis, a flat partition including said axis dividing said cylinder into two compartments, a door in said shell having its bottom substantially at the level of said cylinder axis located to one side of said cylinder, two openings in the side of said cylinder so placed relative to said partition that each compartment may be unloaded through said shell door with said partition in substantially horizontal position, a door for each of said cylinder openings, a reversible motor for turning said cylinder about its axis, a device for stopping said cylinder with one or the other of said two doors within a limited angular range substantially in alignment with said shell door, said device including a brake, means for selecting the compartment whose door is to be stopped in alignment with said shell door, means for initiating stopping and automatic leveling means adapted to become effective when, after initiation of stopping, said reversible motor turns said cylinder in such direction that the load in the selected compartment, after falling to the bottom of said cylinder, is carried up to the level of said shell door,

stacked proximate to the door of said compartment, said automatic leveling means including for each of said two compartments a cam connected for rotation with said cylinder and a switching device operable by said cam to cut off the power supply and apply said brake to said motor when the door of the compartment coordinated to that particular cam enters said angular range and to reverse the direction of rotation of said cylinder as this door rises above or falls below the limits of said range by a fixed amount, thereby confining the movement of said cylinder to oscillations of limited amplitude, and an additional switch coordinated to one of said two compartments and operable by the same cam which operates the afore-mentioned switching device coordinated to that compartment for applying said brake some time before the door of that compartment, after initiation of its stopping, reaches said angular range while coming up to said unloading station from below, and a

low ridge on each face of said partition, each of said ridges being located toward the rear of the compartment as seen from the coordinated door, to prevent the stacked load in the selected compartment from sliding toward the rear end of that compartment during said oscillations of limited amplitude.

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