

Dec. 12, 1950

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2,533,888

CLEANING OR LAUNDRY MACHINE

Filed Dec. 23, 1943

4 Sheets-Sheet 1

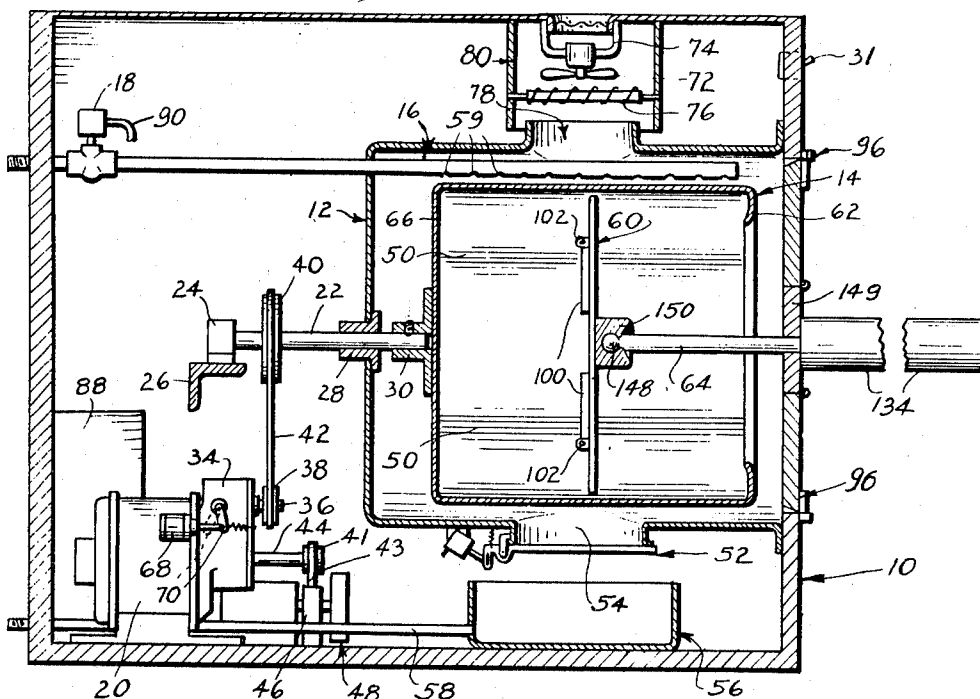


Fig. 1.

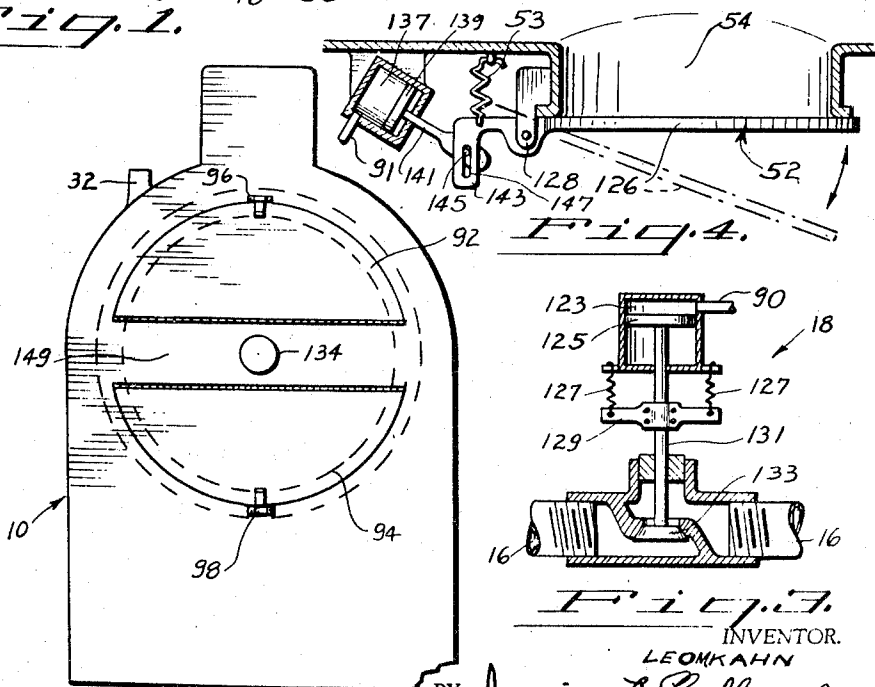


Fig. 2.

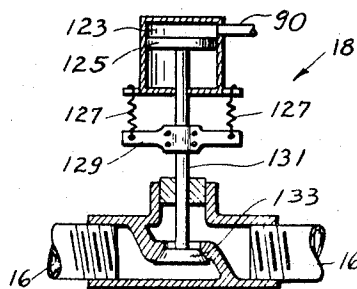


Fig. 3.

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4 Sheets-Sheet 2

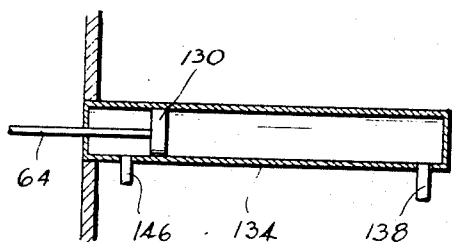


Fig. 5.

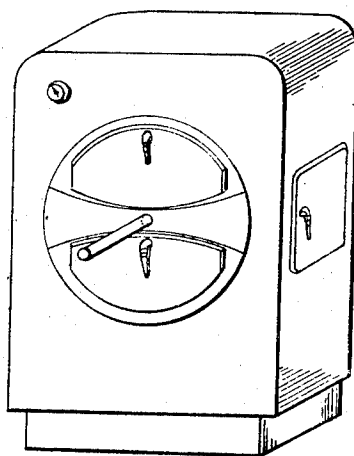


Fig. 6.

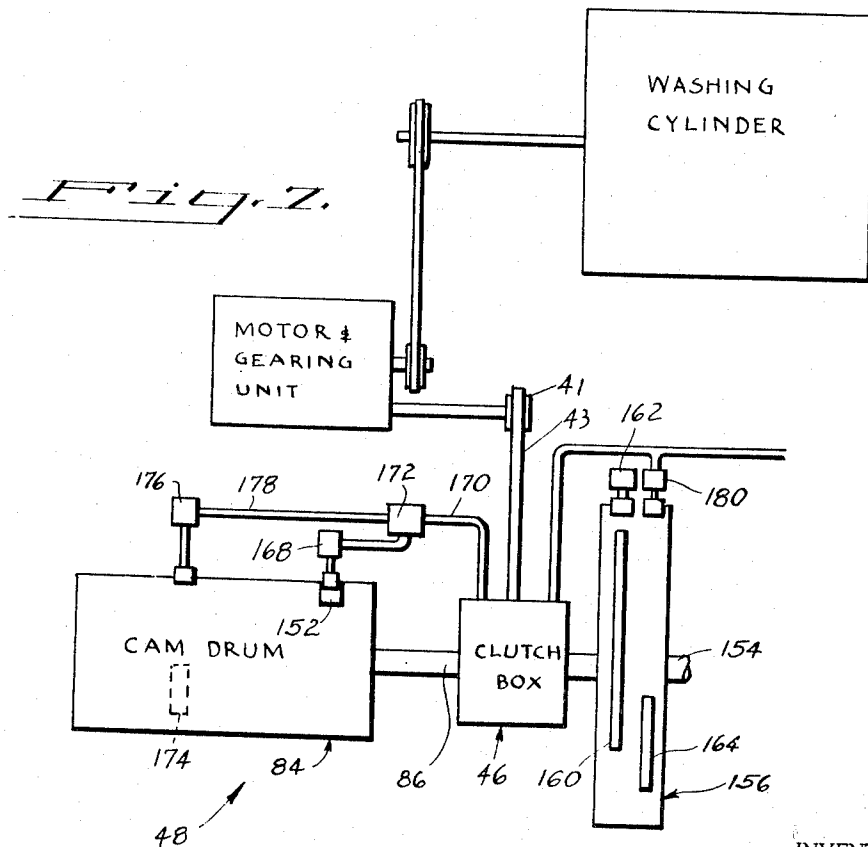


Fig. 7.

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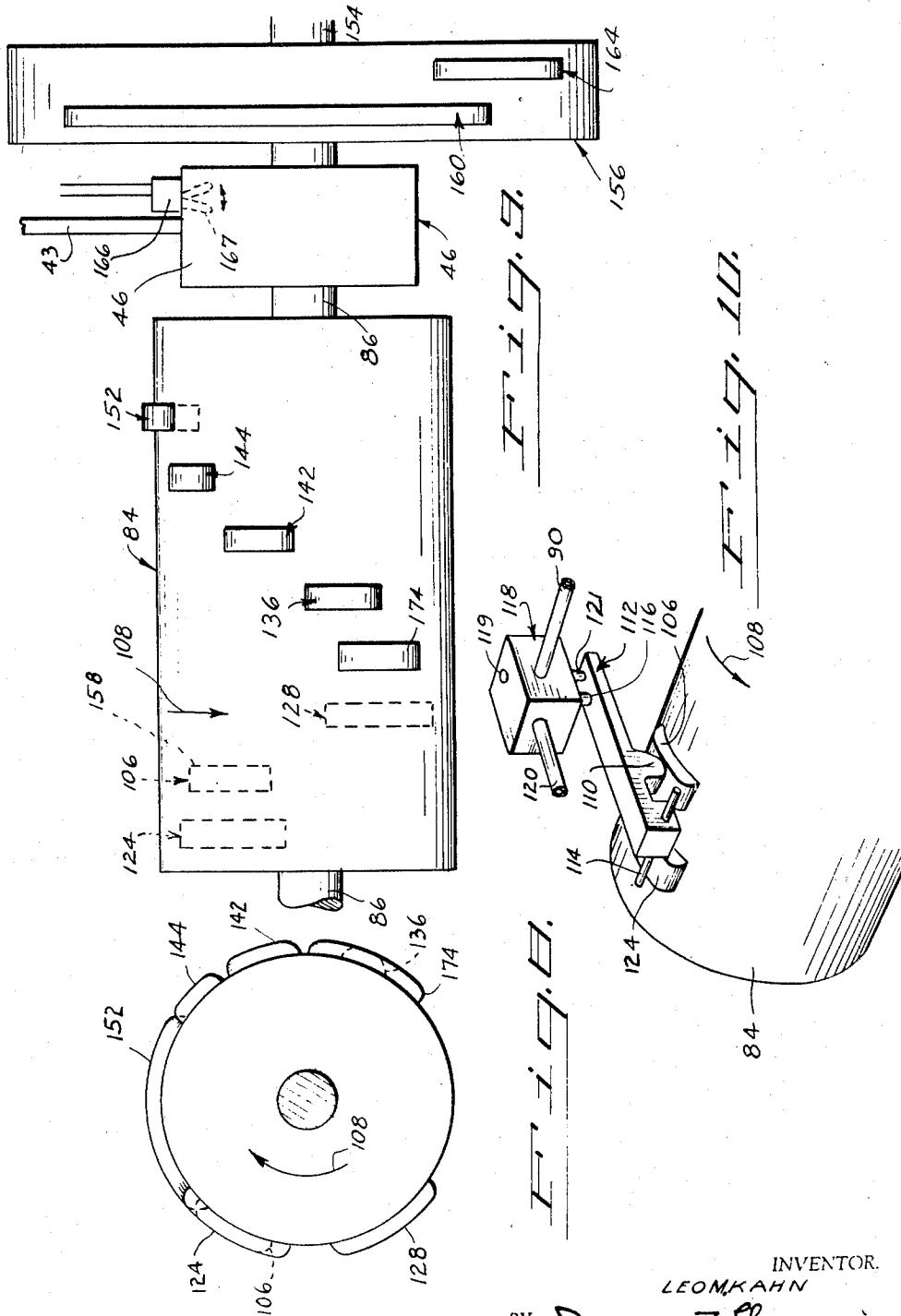
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CLEANING OR LAUNDRY MACHINE

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CLEANING OR LAUNDRY MACHINE

Filed Dec. 23, 1943

4 Sheets-Sheet 4

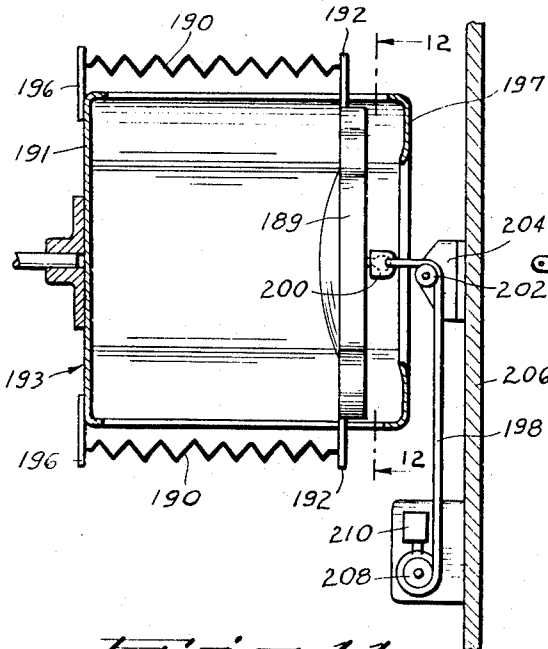


Fig. 11.

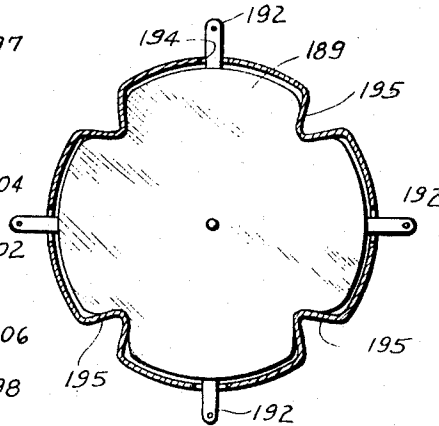


Fig. 12.

Fig. 13.

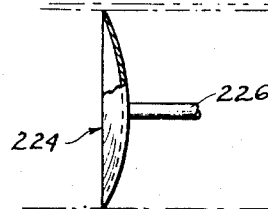
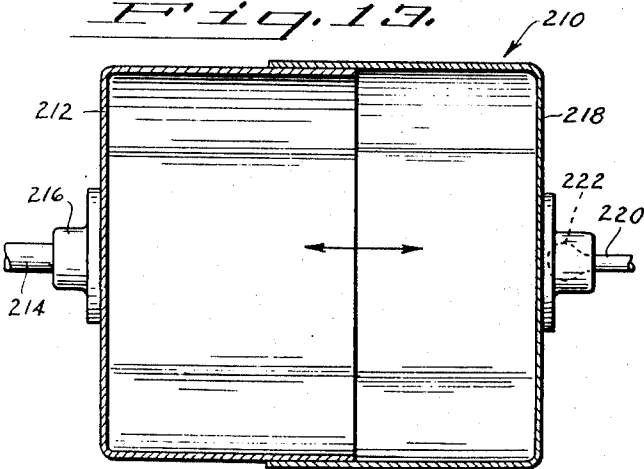


Fig. 14.

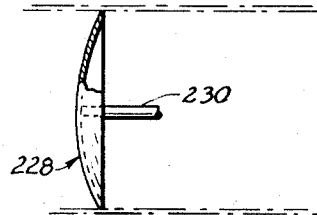


Fig. 15.

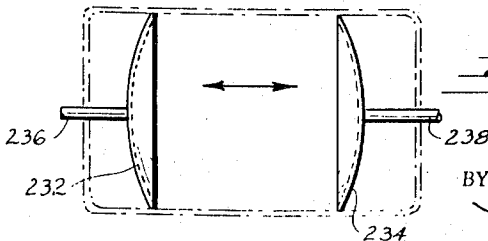


Fig. 16.

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UNITED STATES PATENT OFFICE

2,533,888

CLEANING OR LAUNDRY MACHINE

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Application December 23, 1943, Serial No. 515,356

6 Claims. (Cl. 68—12)

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The present invention relates to cleaning or laundry machines and more particularly to such machines having a cylinder in which the soiled articles have been placed and which rotates at one speed for one cleaning operation and at a considerably higher speed for another cleaning operation.

In conventional laundry machines, the articles to be washed are placed in a cylinder which is then rotated for a selected period at a relatively low speed, in a shell or housing filled with the cleaning fluid, such as soap and water; the articles tumbling about in the cylinder by reason of its motion to be thereby thoroughly washed or cleaned.

After this washing operation, the washed or cleaned articles carried in the cylinder are rinsed and the cylinder then rotated at a somewhat higher speed in the absence of any cleaning fluid or water which has been discharged from the shell, to extract therefrom moisture, which has saturated the articles in the washing and rinsing operation. Due to the fact that the articles do not distribute themselves uniformly about the inside of the cylinder against the inner face thereof, as they are thrown thereagainst by the centrifugal force generated by its rotation, a relatively large imbalance results causing the machine to shudder and shake, that is vibrate excessively. This further limits both the operative size of the cylinder and reduces the speed at which it may be rotated for the moisture extracting operation, since the resulting imbalance would otherwise be increased beyond practical operative limits, particularly in the relatively light machines built for household use.

The present invention, therefore, contemplates the provision of a means which will uniformly arrange the articles in the cylinder for a moisture extracting operation so that imbalance will be substantially eliminated or for practical purposes reduced when the cylinder is operated for the moisture extracting operation. The provision of such a means not only permits the use of a larger cylinder than heretofore possible but also makes possible considerably greater cylinder rotational speeds resulting in the articles being relatively dry (only damp) when they are removed from the laundry machine in contradistinction to the relatively moist condition of such articles, when removed from prior art laundry machines.

In most laundry machines which are so operated as a centrifuge to extract moisture, the articles thereafter removed therefrom will still be moist enough to require hanging up to dry.

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My invention, therefore, further contemplates the provision of means for "fluff drying" the articles by circulating a stream of air, preferably heated, through the cylinder containing them after the moisture extracting operation has been completed and the cylinder again operated at low speed.

The present invention still further contemplates the provision of means for automatically actuating in sequence operation, the laundry machine to accomplish the washing, rinsing, moisture extracting and fluff drying operation.

The present invention yet further contemplates the provision of means whereby the washing, rinsing and moisture extracting operation may be automatically repeated before automatically commencing the fluff drying operations.

The present invention still further contemplates providing a member, which is normally positioned at the outer end of the cylinder for each of the washing, rinsing and fluff drying operations and is movable toward the inner end of the cylinder for the moisture extracting operation. Means are further provided for automatically moving the member into these respective positions for the corresponding cylinder operation, the member being of such form and construction as to facilitate uniform, even and proper distribution of the articles in the cylinder as it is operatively rotated.

The present invention also contemplates the provision of an automatic control means for the sequence operation of various parts of a cleaning or laundry machine concerned with here by means of a fluid, for example compressed air, operated mechanism.

Further objects, uses and advantages of the present invention will be clear from the description which follows and the drawings appended thereto, in which:

Fig. 1 is a vertical section of a laundry machine according to my invention;

Fig. 2 is an end view thereof;

Fig. 3 is a section of an air piston operated water inlet valve that may be used for the practice of my invention;

Fig. 4 is a section of an air operated dump valve that may be used in the practice of my invention;

Fig. 5 is a section in enlarged scale, on the line 5—5 of Fig. 1;

Fig. 6 is a perspective view of a modification of my invention, showing the doors to the interior thereof in open position;

Fig. 7 is a schematic detail of the automatic control means;

Fig. 8 is an end view of one of the cam drums of the control means;

Fig. 9 is a front elevation of the cam drums of the automatic control means;

Fig. 10 is a perspective view of a cam and follower for operating an air control valve;

Fig. 11 is an elevation and partial section of a modification of my invention;

Fig. 12 is a section on the line 12—12 of Fig. 11;

Fig. 13 is a side elevation of modified cylinder, according to my invention;

Fig. 14 is a modified form of the movable cylinder end member;

Fig. 15 is a further modified form thereof;

Fig. 16 is a modification of my invention.

Referring now to the drawings, the operating elements of a washing machine according to my invention are arranged in a housing 10, of any suitable design and construction, the details of which do not form part of the present invention.

Arranged for rotation in the shell 12, in the interior of the housing 10, I provide the conventional cylinder 14 in which the articles are washed or cleaned. This cylinder is perforated and constructed in the conventional manner, the details of which, since they form no part of the invention, need not be shown. It will, of course, be understood that the present invention may as well be applied to a machine having a cylinder which oscillates.

The shell 12 is filled with water by means of the perforated pipe 16, which may be connected in any suitable manner to a source of water supply and which pipe preferably extends at least through the length of the cylinder 14, the valve 18 controlling the flow of the water in the manner to be explained further.

In operation, the source of motive power for the cylinder 14, as well as the automatic control, which latter will be explained in greater detail hereinbelow, may be provided by any conventional electric motor 20.

The cylinder operating shaft 22 at one end is journaled in the bearing 24 carried on the cross piece 26 supported in the housing 10 and adjacent to the other end is journaled in the bearing 28 carried by the stationary shell 12, which latter is secured to the housing 10.

The shaft 22 is keyed in any suitable manner at its said other end in the collar 30 on the cylinder 14 so that rotation of the shaft correspondingly rotates the cylinder.

Soap or other cleaning fluid is inserted into the shell 12 through the funnel 32. To operate the laundry machine, a conventional switch 31 is thrown to commence operation of the motor 20, which rotates the cylinder 14 through the gear shift box 34, of any well known construction (the purpose of which will be explained) the power drive or varying speed shaft 36 of which is connected to the shaft 22 as by means of the pulleys 38 and 40 and belt 42. The power input or constant speed shaft 44 of the gear shift 34 is connected as by means of a pulley 41 and belt 43 to power shaft (not shown) of the clutch box 46, included in the automatic control means, the latter generally indicated at 48.

As will be explained the control means 48 automatically closes the dump valve 52, which is normally held open by any suitable spring or tension member 53, and then concurrently automatically opens the valve 18 to permit a sufficient quan-

tity of water to flow through the perforated pipe 16 into the closed shell 12, after which the valve 18 is automatically closed to shut off the water supply.

Concurrently the cylinder 14 is rotated by the motor at its lower speed, and in order to assure that the articles being washed are carried through the water by the rotation of the cylinder 14, it (the cylinder) is conventionally provided with the ribs 50, extending down the selected distance in the interior.

After the washing operation has taken place for the selected length of time, the dump valve 52 automatically is permitted to open by the control means 48 so that the water in the shell 12 is discharged through the outlet 54 into the waste water pan 56 which is connected to a drain by means of the pipe 58.

Concurrently the valve 18 is again opened by the control means 48 to permit the water to again flow into the shell 12 for a rinsing operation, the dump valve 52 being in its normal open condition. This rinsing operation is continued for a selected period of time by the control means 48.

Since the pipe perforations 50 extend completely across the cylinder 14 and the articles are tumbled about therein by the concurrent rotation thereof, after a selected time each article will become thoroughly rinsed.

Heretofore, after the rinsing operation, the cylinder 14 was rotated at a somewhat higher speed in order to centrifugally extract from the articles the moisture with which they had become saturated. Due to the non-uniform distribution of the articles in the rotating cylinder 14, the rotative speed thereof was extremely limited.

When the water is discharged from the shell, the wet articles in the cylinder assume a much smaller volume than they occupied therein when dry, and therefore, they are not uniformly distributed throughout the cylinder causing it to be out of balance when rotating. This imbalance, particularly since the wet articles are now much heavier, causes the rotating cylinder to vibrate excessively resulting in the machine chattering and shaking so that the operator often must shut it down.

Such vibration increases with increased diameter and rotative speed of the cylinder, limitation of the latter reducing the amount of moisture extraction.

I have overcome this by providing a member 60 which is normally disposed at the outer end 62 of the cylinder 14 during the washing and rinsing operations. The member 60 is carried on the arm 64 which is supported on the housing 10, as will be further described, for movement toward the other wall 66 of the cylinder.

Upon completion of the rinsing operation the control means 48 causes the member 60 to move inwardly thereby forcing the articles against the wall 66. As a result, since the cylinder is concurrently rotated, the articles are pushed by the member into a much smaller space while they are tumbled about to distribute themselves uniformly about the axis of rotation. Thus, the effective volume of the cylinder is reduced to a degree corresponding to the bulk of the concentrated clothes, the term "effective volume" referring to that volume of the cylinder which is accorded the clothes, or in other words, the volume of the cylinder between the wall 66 and the member 60.

It will also be apparent that the articles are thereby positioned closer to the bearing 28 to reduce the overhanging weight thereof on the bearing so that the out of balance effect of a rotating cylinder is greatly reduced.

The control means is arranged to again shut the valve 18, the dump valve 52 remaining open, after the rinsing operation and upon moving the member 60 inwardly, the gear shift 34 is operated by the air piston chamber 68, as will be further explained, to throw the arm 70 into high gear and thereby rotate the cylinder 14 at the high speed.

While, in the embodiment here illustrated, I use only a high and low speed, it will be understood that an intermediate rotative speed may be employed to tumble the articles about prior to moving the member 60 toward the wall 66, and thereby effect a more uniform distribution of the articles about the axis of rotation.

The moisture extracting operation is continued for the selected length of time, resulting in a relatively damp dry washed article by the centrifuge action of the relatively high speed of rotation of the cylinder.

If desired, air may then be circulated through the shell 12 by means of a conventional fan 72 which is carried on the housing 12 by means of the arms 74. The control means 48 is operated, as will be explained, to move the member 60 back to normal position at the end 62 of the cylinder and to shift the arm 70 to low gear and concurrently start the fan 72. If, desired, a heating element 76 may be arranged above the air inlet 78 in the fan housing 80 so that warm air is circulated through the shell 12. This operation "fluff dries" the washed articles thereby resulting in completely dried articles being removed from the machine.

It is one of the objects of my invention to accomplish the above operations automatically in proper sequence and I, therefore, provide the automatic control means 48 which I shall now describe.

Upon commencing the operation of the motor 20 rotation of the automatic control means shaft is concurrently effected through the drive means, such as a belt which operatively connects the motor shaft 44 to the power shaft (not shown) of the clutch box 46, the details of the latter not being given since it is of any conventional and well known type.

The control means 48 consists of the cam drum 84 arranged on the shaft 86 which is driven through the clutch box 46. As will be further described, the cam drum 84 controls all of the washing and moisture extracting operations and is operated at a relatively low speed through the clutch box 46 so that the entire sequence of washing operations will be completed through one revolution of the cam drum 84. The diameter of the drum 84 is selected of relatively small magnitude so that it will fit within the housing and therefore must be operated at a comparatively low speed.

The various elements of the washing machine such as the water valve 18, the dump valve 52 and the member 60 are preferably controlled to operate in the selected sequence by compressed air and therefore an air compressor and tank, generally indicated by the rectangle 88 are arranged in the housing 10. The details thereof are conventional and it will be understood that the compressor is automatically operated to maintain the required air pressure in the tank.

The water inlet valve 18 is of a conventional type and is normally closed, except so modified that it is opened by the pressure of air circulated through the pipe line 90 and the dump valve, is also of conventional type, normally open, and likewise modified so that it is closed by the pressure of air circulated through pipe line 91.

To commence operation of the machine, articles to be washed are placed into the inner cylinder through the doors 92 and 94, which are water tight and seal the shell 12 when held closed by any suitable latch means 96 and 98. The outer end 62 of the cylinder 14 is open so that the articles may be inserted into it. The member 60 also is provided with doors 100, which are preferably hinged at 102 intermediately of the member so that they may be swung away from the member 60 to admit the articles into the interior of the cylinder 14. It will, of course, be understood that the member 60 has been automatically positioned adjacent the outer end 62 of the cylinder prior to the commencement of the sequence of washing operations.

After the inner cylinder has been filled with the articles to be washed and the doors 92, 94 and 100 closed, operation of the motor 20 is started by manually throwing in the electrical switch 31 thereby commencing rotation of cylinder 14 and the control means cam drum 84, which latter is provided at one end with the cam surfaces 124 and 106, respectively operating the dump and water inlet valves.

As the drum is rotated in the direction of the arrow 108, the cam 106 is brought against the nose 110 of the follower arm 112 which is carried on the pivot rod 114.

The cam follower arm 112 is normally tensioned downward by the finger 116 against which it rides and which extends from the air valve 118, which valve is normally held closed by suitable spring tension.

As the cam 106 engages the nose 110 the arm is rotated upwardly about the pivot 114 causing the valve 118 to be opened and permitting air to circulate through the air inlet pipe 120 and the pipe 90 into the water inlet valve 18.

The inlet valve 118 is provided with an air escape or vent 119, normally open and connected by the finger 121, secured to the arm 112. The air escape or vent 119 is spontaneously closed by the finger 121 as the arm 112 is moved up by the cam surface 106 to open the air valve 118.

As the air enters the chamber 123 (Fig. 3) it forces the piston 125 down against the springs 127, one end of which is connected to the bracket 129 carried by the connecting rod and valve stem 131, thereby moving the valve gate 133 away from its seat to open the valve 18 and permit water to flow through the pipe 16.

The water valve 18 will remain open so long as the air valve 118 is held open by the cam surface 106 and cam follower to subject the piston 125 to air pressure from the compressor and tank.

The length of the cam 106 is selected, of dimension such that the cam follower nose will be released when the shell has been filled with sufficient water thereby permitting the air valve 118 and the vent or air escape 119 to open, which latter permits air to be expelled by the piston 125 so that it may be returned to normal position by the spring 127 to shut the valve 18.

As pointed out, the dump valve 52 is normally held open and therefore it must be closed just prior to filling the shell 14 with water and held closed during the washing operation.

In order to accomplish this, I provide an air valve similar in construction to valve 118 and which therefore need not be described or illustrated. The cam follower (not shown) of this valve is engaged and operated by the cam 124 arranged on the drum 84 between the end thereof and the cam 106 in advance thereof so that the dump valve 52 will be closed before the water valve 18 is opened by the cam 106.

Referring now to Fig. 4, the gate 126 of the dump valve is hinged to the lug 128 and is normally held open by the spring 53. As the corresponding air valve (not shown) is opened by the cam 124, air is admitted through the pipe 91 into the chamber 137, forcing the piston 139 down from its normal position.

The piston rod 141 is connected to the ear 143 of the gate 126, to which ear the spring 53 is secured, by means of the pin 145 which rides in the slot 147.

Downward movement of the piston 139 swings the gate 126 against the spring 135 in which position it is held by air pressure so long as air is admitted to the chamber 137.

The cylinder 14 is then rotated with the dump valve 52 held closed for the required period of time to wash the articles, whereupon the laundry machine is automatically arranged to accomplish the rinsing operation. This is done by first opening the dump valve 52 to discharge the dirty water from the shell 12.

The dump valve 52 is opened when air is shut off from the chamber 137 when the controlling air valve is shut and its air vent opened by release of its cam follower from the cam 124, which permits return of the piston 139 to its normal position by the spring 135.

Therefore, the cam 124 is just long enough to hold the dump valve closed during the washing operation.

When sufficient time has elapsed to open the dump valve and release the water from the shell, the inlet water valve 18 is again opened by compressed air which is directed thereto by the cam 128 and an air valve (not shown but similar to valve 118) which it controls.

It will be recognized that throughout these operations the cylinder 14 is being rotated so that the articles are tumbled about while clean water is sprayed over them and circulated through the shell 12.

After the rinsing operation has been performed for the selected time, the valve 18 is again closed when the corresponding cam follower is released by the cam 128.

In order to shorten the length of the cylinder 14 for a moisture extracting operation and thereby prevent any imbalance in the rotation thereof the member 60 is moved toward the outer cylinder wall 66 as the cylinder 14 continues to rotate. The member 60 thereby carries the articles with it forcing them to distribute themselves about the axis of cylinder rotation between the shorter confines of the member 60 and the wall 66.

I preferably accomplish this by means of an air driven piston 130 which is connected to the member 60 by means of the connecting rod 64 (Fig. 5).

The piston cylinder 134, which need not be large, is carried by the cross-piece 149, extending across the housing on the outside thereof. The piston cylinder 134 may extend from the cross-piece into the interiors of the shell to support the connecting arm 64 as it pushes the member 60 forward and, if desired, may on the exterior

thereof form a bearing on which the wall 62 may be journaled to thereby support the rotating cylinder 14 at each end.

In order to circulate air into the piston cylinder 134 I arrange on the cam drum 84 the cam 136 which through a cam follower opens an air valve (such as valve 118) which is connected to the cylinder inlet 138. Air forces the piston 130 forward, carrying the member 60 into moisture extracting position, where it is held by the air pressure admitted by the valve.

At this time the cylinder 12 is rotated at its highest speed so that it serves as a centrifuge for the moisture extracting operation and the arm 70 is moved into the high speed position to properly shift the gears in the gear box 34. This is accomplished by arranging a cam 142 on the drum 84 to operate an air valve (such as 118) which admits air into the piston chamber 68 to move the arm 70 into high speed position.

After the cylinder 14 has been rotated at high speed for the selected length of time to extract moisture from the articles, air is shut off from the chamber 68 when the cam follower rides off from the cam 142, thereby permitting the arm 70, which is controlled by spring 159, to return to its normal low speed position. Upon returning the cylinder 14 to low speed operation, the member 60 is returned to its outermost position against the end 62 of the cylinder 14.

This is accomplished by first shutting off air through the inlet 138 to the piston 130 when the corresponding air valve (not shown) is closed as it is released by cam 136 to permit the piston 130 to be returned to its normal outermost position in the cylinder 134. The return of the piston is accomplished by means of the cam 144 which engages a corresponding cam follower controlling an air valve (such as 118) which admits air through the inlet 146 to the cylinder 134 (see Fig. 5). The air forces the piston 130 toward the outer end of the piston cylinder thereby carrying the member 60 with it to normal position it against the wall 62, whereupon the cam follower rides off of the cam 144.

It will be understood that the member 60 rotates along with cylinder 12 and therefore to prevent corresponding movement of the piston 130 and connecting rod 64, I connect them together by any suitable means such as the ball 148 on the end of the connecting rod housed in the socket 150 extending from the member 60.

Where it is desired to provide a fluff drying arrangement I provide the cam 152 on the drum 84 which operates an air valve (such as 116) connected to the clutch box 46 and throws the shaft 154 carrying the drum 156 into operation and disconnects the shaft 86. The cam 152 is arranged so that it is positioned just beyond the forward nose 158 of the cam 106 so that they will overlap.

As the shaft 154 is rotated, operation of the shaft 86 is stopped so that the control means now works with the cam cylinder 156 which controls the fluff drying operation. Since such fluff drying operation requires a relatively long time, the diameter of the drum 156 is comparatively large, the entire fluff drying operation being completed upon one complete revolution of the drum.

It will be understood the dump valve 52 is still open and the cylinder 14 still rotated. The drum 156 is provided with the cam 160 which controls an air valve 162 which opens a switch which concurrently starts operation of the heater 76 and fan 72. It will be understood, of course, that the

heater 76 may be eliminated and cold air circulated through the shell. As the air is circulated through the shell 12, the cylinder 14 is concurrently being rotated, thereby tumbling the articles about and completely exposing them to the air.

Upon completion of the fluff drying operation, the cam 164 on the drum 156 upon completing a revolution engages an air valve (such as 118) which returns the clutch to position to operate the shaft 86, to its original starting position.

Operation of the machine is stopped (Fig. 9) as by means of a relay 166 which is thrown by the return of the arm 167 with the clutch 46 to open the switch 31.

In certain cases, where the articles to be cleaned are more soiled than usual, the operator of my laundry or cleaning machine may desire to repeat the washing or cleaning operation before finally subjecting the articles to the fluff drying operation.

I have schematically illustrated in Fig. 7, a means whereby the control means 48 may be set so that the entire washing, rinsing and damp drying operations are automatically repeated by my machine before the automatic control means 48 automatically arranges it to perform the fluff drying operation.

To accomplish this, I arrange between the air valve 168 and the clutch 46 in the pipe line 170 leading thereto, a manually operated or hand set by-pass 172.

To repeat the washing operations the valve 172 is set so that air normally admitted by the valve 168, under the influence of the cam 152, to the corresponding gear shift plunger (not shown) of the gear shift 46, is by-passed therefrom so that the drive is not shifted to operate the drum 156.

As a result the machine continues to operate with the drum 84 again commencing a complete revolution, automatically operating in sequence the water inlet valve, the dump valve, the movable member and the gear shift.

Since the by-pass 172 is hand set, it must be automatically reset after the second run of the drum 84 is commenced so that when the revolution thereof is again completed, air from the valve 168 will not again be by-passed but will be operating the gear shift 46 so that the drum 156 will be operated in proper sequence.

I accomplish this by arranging on the drum 84, a cam 174, which operates the air valve 176 (such as valve 118) to admit air through pipe 178 and actuate a plunger (not shown) which resets or closes the by-pass 172. The drum 156 will then be shifted into operation by the clutch 46, since the air from the valve 168 will not be by-passed and it (the drum 156) is then completely rotated, the cam 164 at the completion operating the air valve 180 (such as valve 118) to shift the clutch box 46 and return the drum 84 into rotative operation again and concurrently shut off the motor 20, as previously described.

It will be recognized that the entire automatic operation is accomplished by means of compressed air alone which provides a particularly safe mechanism for use with a cleaning machine in which a relatively highly volatile explosive cleaning compound is employed.

Referring now to Fig. 6, I have there shown a modification of my invention in which the doors 92 and 94 on the end of the housing 10 and the corresponding doors 100 on the member 60 have been eliminated. With this construction, the cylinder (not shown) may be filled from the top through the door 182 on a side of the housing 184

to which it may be locked and sealed by any suitable latch means 186. The rotating cylinder (not shown) is also provided on one side with a corresponding latched door 188.

Referring now to Figs. 11 and 12, I have shown there a modification of my invention in which the movable member 189 is moved toward the end wall 191 of the rotating cylinder 193 by means of the springs 190.

Extending at each quadrant from the member 189 between the cutaway portions thereof into which the ribs 195 fit, I provide the ears 192, which reciprocate in the slots 194. One end of the springs 190 is secured to the ears 192 on the movable member 189 and the other end to the ears 196 on the stationary wall 191 so that, unless restrained, the springs will spontaneously pull the member 189 toward the cylinder end wall 191 for the moisture extracting operation.

The member 189 is pulled toward and held at the outer end 197 of the cylinder against the tension of the springs 190 by any suitable means such as the cable 198, which is secured to the socket 200 on the movable member at its centre, so that the member may rotate with the cylinder without affecting the cable.

The cable 198 passes over the pulley 202 carried by the bracket 204 on the housing 206 and is normally held taut to pull the member 189 into normal position at the front wall of the rotating cylinder by any suitable means such as the wound cable drum 208, which is automatically released at the proper time by a suitable air valve 210. The air valve 210, after completion of the moisture extracting operation, then permits the cable drum 208 to pull the member to its normal position.

Referring now to Fig. 13, I have there illustrated an embodiment of my invention in which the movable member is dispensed with but in which the cylinder nevertheless is reduced in volume for the moisture extracting operation.

In this embodiment the rotating cylinder 210 comprises two telescopic members the stationary member 212, which is rotated by the operating shaft 214 keyed to the collar 216 and the reciprocable member 218 to which the piston rod 220 is connected by means of the socket 222.

For the moisture extracting operation, the piston rod 220 moves the member 218 towards the member 212 to shorten the cylinder and returns it to its normal full cylinder volume forming position illustrated when the moisture extracting operation is completed.

If, desired, a movable member 224 (Fig. 14), which is convex in cross section, connected to a piston rod 226, may be used so that the articles will be directed toward the center of the rotating cylinder as the piston rod moves the member 224 toward the rear wall thereof for the moisture extracting operation.

In Fig. 15, I show a movable member 228 which is concave in cross-section, connected to a piston rod 230, which may be used to direct the articles toward the outside of the rotating cylinder as the piston rod moves the member 228 toward the rear thereof for the moisture extracting operation.

In another embodiment of my invention, illustrated in Fig. 16, a movable member 232 is normally positioned adjacent one end of the rotating cylinder and a second movable member 234 adjacent the other end of the cylinder. Means are connected respectively to the rod 236 and the rod 238 for automatically moving the

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members 232 and 234 toward each other for the moisture extracting operation, the members being returned to their normal position at the completion thereof. While the movable members are illustrated as concave in cross-section in Fig. 16, it will be understood that they may be straight or convex in form.

While I have described in specific detail certain embodiments of my invention, I do not intend to be limited thereto but intend to claim the invention as broadly as the following claims and the state of the prior art will permit, since further modifications thereof will readily occur to those skilled in the art.

I claim:

1. In a laundry machine, a cylinder rotated at a low or tumbling speed for a washing operation and at a substantially higher speed for a moisture extracting operation, means for circulating water into said cylinder, a member normally disposed in a position at one end of the cylinder during the washing operation, means for moving said member toward the other end of the cylinder to assume a second position for a centrifugal force moisture extracting operation, and automatic means for performing in selected sequence, the water circulating means operation, the operation of moving the member out of said normal position, and the operations of rotating the cylinder at said low speed and at said higher speed, said automatic means being operative to effect a return of the member to said normal position for a succeeding operation of the machine.

2. The laundry machine of claim 1 and including means for circulating air through the cylinder after completing the moisture extracting operation, said automatic means operating in said selected sequence the air circulating means.

3. The laundry machine of claim 1 and including means for circulating heated air through the cylinder upon completing the moisture extracting operation, said automatic means operating in said selected sequence the said air circulating means.

4. A clothes distributing and drying apparatus adapted for high speed centrifugal drying of water-saturated fabric articles, said apparatus comprising a perforated cylinder for both tumbling and centrifugally drying said articles and arranged for rotation on a horizontal axis, means to rotate said cylinder at a speed to effect tumbling of said articles therein, a pressure disc movable axially in said cylinder, drive means to actuate said pressure disc against the articles while tumbling so as to concentrate them into a limited portion of said cylinder preparatory to high speed centrifugal drying operations so as to effect a substantially balanced distribution of such articles about such axis of rotation, means for thereafter instituting high speed rotation of said cylinder whereby said articles are centrifugally forced outwardly towards the periphery of said cylinder and the water saturating said articles is centrifugally ejected from the cylinder perforations, means to retract said pressure disc so as to release such articles from said limited portion of said cylinder, means to thereafter decrease the speed of rotation of said cylinder to a tumbling speed, and means to circulate heated air against said centrifugally dried and tumbling articles so as to substantially remove all water therefrom.

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5. A clothes distributing and drying apparatus adapted for high speed centrifugal drying of water saturated fabric articles, said apparatus comprising a perforated cylinder for both tumbling and centrifugally drying said articles and arranged for rotation on a horizontal axis, means to rotate said cylinder at a speed to effect tumbling of said articles therein, a pressure disc movable axially in said cylinder, drive means to actuate said pressure disc against the articles while tumbling so as to concentrate them into a limited portion of said cylinder preparatory to high speed centrifugal drying operations so as to effect a substantially balanced distribution of such articles about such axis of rotation, means for thereafter instituting high speed rotation of said cylinder whereby said articles are centrifugally forced outwardly towards the periphery of said cylinder and the water saturating said articles is centrifugally ejected from the cylinder perforations, means to retract said pressure disc so as to release such articles from said limited portion of said cylinder, means to thereafter decrease the speed of rotation of said cylinder to a tumbling speed, means to circulate heated air against said centrifugally dried and tumbling articles so as to substantially remove all water therefrom, and timing means for automatically instituting in selected sequence the tumbling speed rotation of said cylinder while actuating said pressure disc, the retraction of said pressure disc, the decrease of cylinder rotation speed to a tumbling speed, and the circulation of heated air against said tumbling articles thereafter.

6. In a cleaning machine having a cylinder rotatable in a bearing arranged at one end of the cylinder, said cylinder being operated at a low speed for a cleaning operation and at a relatively higher speed for a centrifugal drying operation, a member normally disposed at the other end of the cylinder for the cleaning operation, and fluid operated means for automatically moving the member toward the bearing end for the centrifugal drying operation.

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