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2,970,464

COMBINATION WASHER AND DRYER WITH IMPROVED CLOTHES RECEPTACLE

Filed Dec. 19, 1958

4 Sheets-Sheet 1

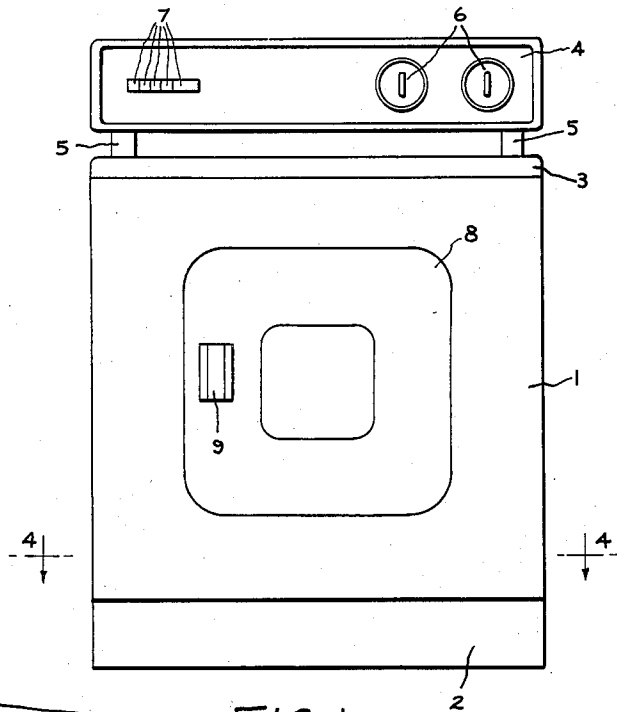


FIG. 1

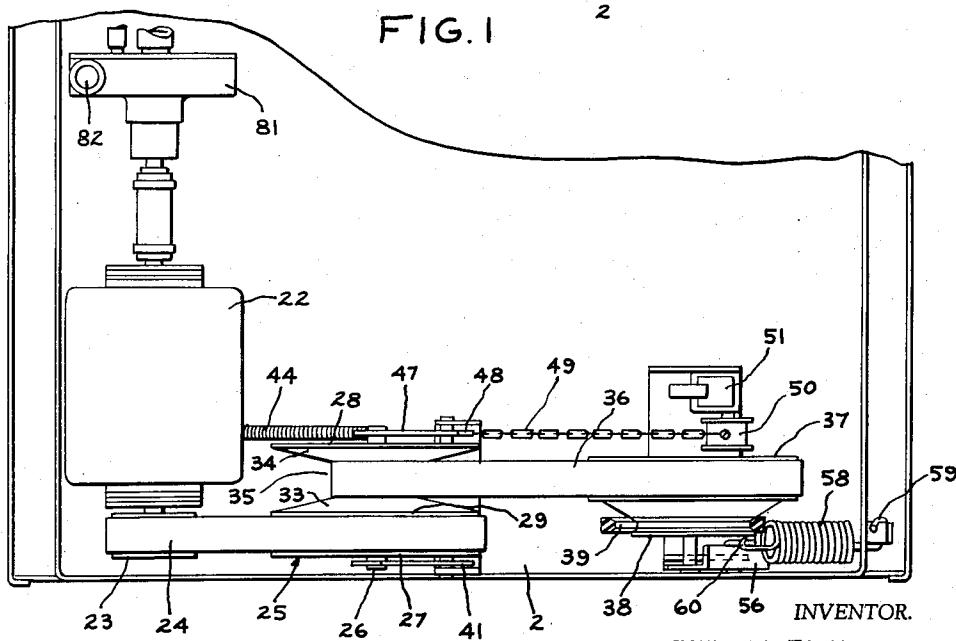


FIG. 4

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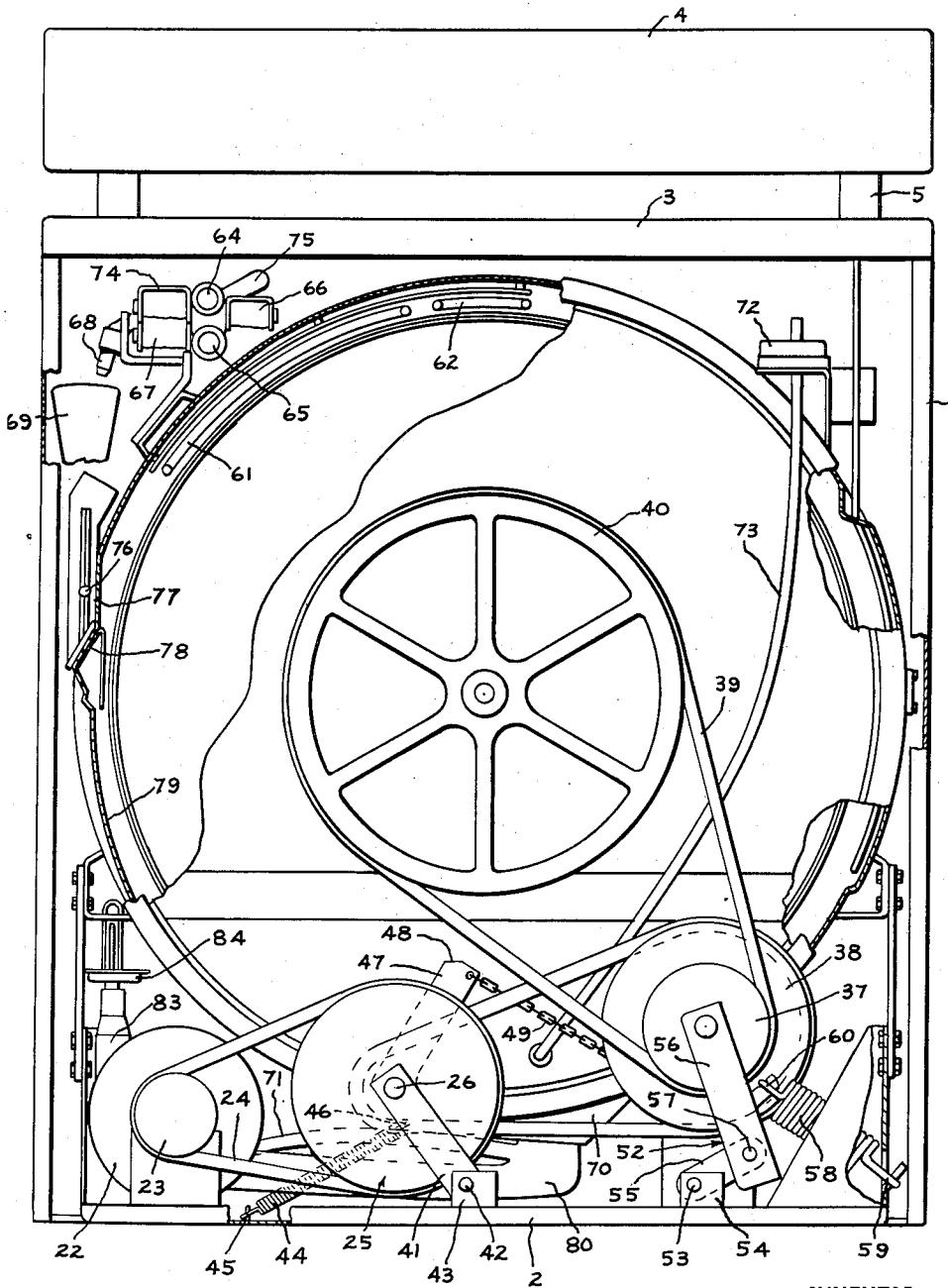
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

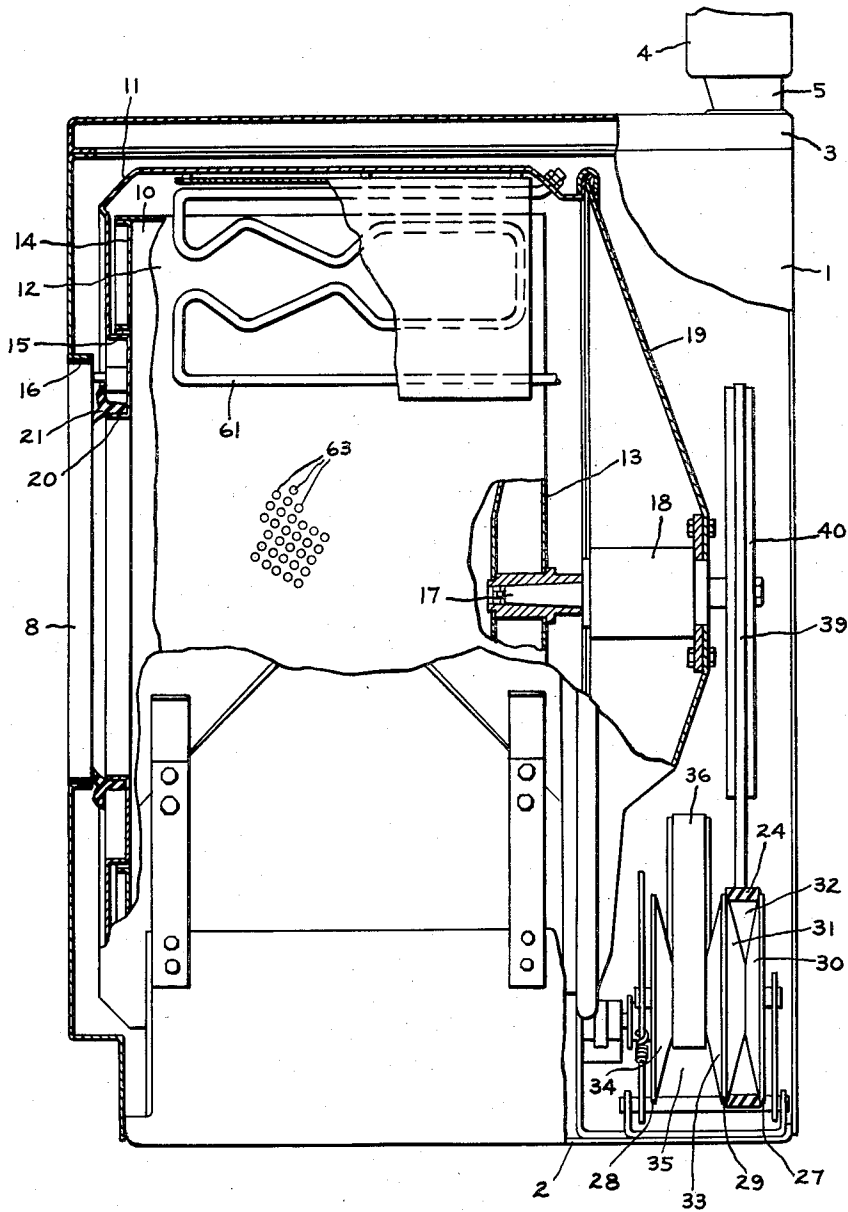


FIG. 3

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4 Sheets-Sheet 4

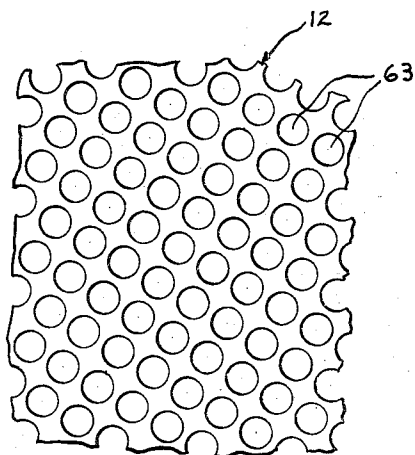


FIG. 5

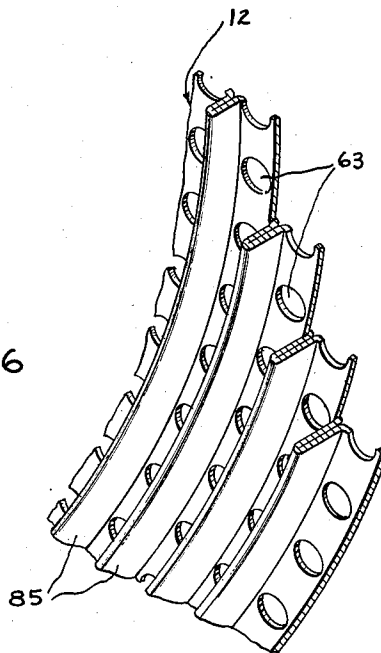


FIG. 6

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COMBINATION WASHER AND DRYER WITH IMPROVED CLOTHES RECEPTACLE

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7 Claims. (Cl. 68—19)

This invention relates to combination washers and dryers of the type which provide a washing cycle including centrifugal extraction of liquid from the clothes, followed if so desired by a heat drying cycle. More particularly, it relates to an arrangement for inhibiting sticking of the clothes to the inner surface of the basket or receptacle of the machine after the termination of the centrifugal extraction phase of the operation.

Combination washer-dryers are able to perform the combined functions of washing machines and drying machines, i.e., the same machine washes the clothes and then, if the operator so desires, dries them completely. Such machines normally make the drying operation optional, so that if the operator so desires the drying operation may be omitted and the clothes may be taken out of the machine directly after the centrifugal extraction phase of the washing operation.

The washing portion of the sequence, as provided in combination washer-dryers, approximates that of standard washing machines in that it includes a washing cycle, at least one rinse cycle to get rid of the washing liquid completely, and a centrifuging or spin operation to get most of the liquid out of the clothes. In combination machines, these operations are immediately followed by the drying operation, when such a function is elected. This function consists of providing heat to vaporize moisture from the clothes as they are tumbled in a rotating clothes receptacle, the same one in which the clothes were washed. One problem which has presented itself in such machines is the tendency of the clothes in the rotating receptacle to adhere to the walls thereof after the centrifuging operation. Where centrifuging is conducted at a sufficiently high speed to remove a substantial proportion of the liquid in the clothes, this sticking may occur to the extent that, if no corrective measures are taken, the clothes remain in a tight annulus, adhering to the inner basket surface during heat drying.

In some machines, an attempt to solve the problem has been made by keeping the centrifuging speed under the "sticking speed"; this, of course, solves the problem of sticking but leaves more liquid remaining in the clothes than if a higher speed were permissible, unless the machine is operated for quite long periods of time. Retention by the clothes of relatively large quantities of liquid, as a sufficient quantity to drip when handled may have two adverse results: if drying is omitted, the dripping may well be objectionable to the operator; and if drying is elected, so much retained liquid may make the power consumption for the heat drying operation quite high.

Other solutions to the sticking problem have to date tended to be somewhat complex; these include, for instance, movable means in the clothes basket for mechanically removing the clothes from engagement with the basket wall, and compound spin cycles where the unsticking effect is provided by a predetermined variation in the centrifuging speed of rotation of the basket. In any event, all combination machines need to meet the problem in some manner or other; the clothes should not

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remain stuck to the periphery of the receptacle after the last spin of the washing portion of the operation or they will not present enough surface to the heat for drying to be effected as desired.

It is accordingly a primary object of this invention to provide a new simple improved construction in a combination washer-dryer machine which permits suitably high centrifuging speeds to be attained without sticking.

A further object of the invention is to provide a combination washer-dryer machine with an improved clothes receptacle formed to inhibit sticking of clothes thereto after a centrifuging operation.

Yet a further object of the invention is to provide a combination washer-dryer machine having a clothes receptacle formed to prevent sticking of clothes thereto after a centrifuging operation even though the operation is conducted at a speed sufficiently high to prevent any appreciable dripping of liquid from the clothes if they are removed from the machine without a heat drying operation.

According to my invention, I provide a clothes washing machine with a substantially cylindrical clothes receptacle which is rotatable on a non-vertical axis. The cylindrical wall of the clothes receptacle is perforated and is formed so as to limit contact between the wall and the clothes in the receptacle to a maximum of approximately 60% of the area of the cylindrical wall. The machine is provided with transmission means arranged to rotate the receptacle at two different speeds: the first of these is a tumble speed, that is, a speed below that required to exert a centrifuging force of 1 G (one gravity) on the clothes; the second speed is one suitable for centrifugal extraction of liquid from the clothes. More specifically, it is a speed which is sufficient to eliminate objectionable dripping of any type of clothes load normally handled by domestic laundry machines if the clothes should be removed from the receptacle subsequent to the washing operation. Such a speed has been found to be one which exerts a centrifugal force of at least 21 G's at the inner surface of the peripheral wall of the receptacle.

In addition, I provide in the usual manner means for introducing liquid into the receptacle, heating means, and suitable control means for controlling the proper sequence of operation of the other machine components. The control means causes the receptacle to be rotated at the first speed both in the presence of liquid in order to effect the desired clothes treating function such as washing or rinsing, and during operation of the heating means. The control means also causes the receptacle to be rotated at the second speed after the washing operation, and before a heat drying operation.

I have discovered that the speed at which clothes stick is substantially affected by the amount of area of the cylindrical wall of the receptacle with which the clothes are allowed to come into contact. Pursuing this line of thought further, I have discovered that 60% of the cylindrical wall area is the maximum permissible contact area with the clothes if one is to attain a speed sufficient to prevent undesirable dripping of the clothes without running the risk of the clothes which as found in the type of loads generally encountered sticking to the basket wall. This represents a very substantial change from the presently provided basket or receptacle for washer-dryers; at the present time the machines on the market which are known to me have receptacle formations which permit contact of the clothes with the cylindrical wall over 80% or more of its surface.

The subject matter which constitutes my invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. The invention itself, however, both as to organization and method of

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operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawings.

In the drawings:

Figure 1 is a front elevational view of a combination washer-dryer;

Figure 2 is a rear elevational view of a combination washer-dryer with the rear panel removed to illustrate details;

Figure 3 is a side elevational view of the machine, partly in section and with certain surfaces broken away to show details;

Figure 4 is a fragmentary view in cross-section along line 4—4 in Figure 1, with the clothes basket and tub of the machine removed in order to illustrate details of the drive of the machine;

Figure 5 is an enlarged fragmentary view of a portion of the cylindrical wall of a preferred embodiment of the clothes receptacle of the machine; and

Figure 6 is an enlarged fragmentary perspective view of a portion of the cylindrical wall of a modified embodiment of the clothes receptacle of my improved machine.

Referring now to Figures 1, 2 and 3 of the drawings, there is shown a combination clothes washing and drying machine wherein the operating elements of the machine are included within an outer cabinet structure having a central wrap-around section 1. Section 1 is supported on a base and toe board assembly 2 and carries a separate top 3 on which is supported a back splash panel 4 which may, as shown, be mounted on posts 5. Control panel 4 is provided with appropriate control devices such, as for instance, dials 6 which may be provided for controlling various types of washing and drying sequences, and various drying temperatures, and such as buttons 7 which may control various other functions such as water temperature, omission of dryer function, etc. Access to the interior of the machine is provided by a door 8 formed in section 1 which is mounted on concealed hinges and is opened by means of a knee operated latch control 9. As best shown in Figure 3, the machine is of the non-vertical axis type, in this particular case the axis being horizontal. In other words, the machine has a substantially cylindrical clothes basket or receptacle 10 mounted for rotation on a generally horizontal axis within an outer enclosing tub structure 11. Basket 10 comprises a cylindrical wall 12 which is closed at its rear end by means of a suitable wall or plate 13. The basket also includes a front wall 14 which is formed so as to define an access or loading opening 15 in registry with an opening 16 in wrap-around section 1 provided for door 8. The basket is rotatably supported by a shaft 17 which is mounted in an elongated bearing 18 supported from rear wall 19 of tub 11. The tub is also provided with an opening 20 aligned with opening 16 and opening 15 so that clothes may be placed into and removed from the basket when door 8 is opened. The door seals against a suitable gasket 21 during operation of the machine.

Referring now particularly to Figure 4, and also to Figures 2 and 3, during the operation of the machine the basket 10 is driven from an electric motor 22. The drive from the motor to the basket includes a pulley 23 which is secured to the motor shaft so as to rotate therewith and over which passes a belt 24 which drives an adjustable sheave assembly 25. The adjustable sheave assembly includes a shaft 26 to which are rigidly secured two sheave plates 27 and 28. An intermediate sheave plate 29 is keyed on shaft 26 so as to be movable along the shaft 26 to varying distances from sheaves 27 and 28. It will be observed (Figure 3) that sheave plate 27 has a sloping surface 30 which, in cooperation with sloping surface 31 on movable sheave plate 29, forms a groove 32 of adjustable width. Sim-

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ilarly, on its other side, movable sheave plate 29 is provided with a sloping surface 33 which cooperates with sloping surface 34 of rigidly secured sheave plate 28 to form a second groove 35 of adjustable width.

Since belt 24 has a predetermined width, it can be seen that movement of sheave plate 29 relative to sheave plate 27 will cause the belt 24 to seat in groove 32 at a distance from the center of shaft 26 which is determined by the distance of sheave plate 29 from sheave plate 27. The linear speed of belt 24 is constant, assuming the speed of motor 22 to be substantially constant, and therefore the rotational speed of the adjustable sheave assembly 25 is dependent on the effective sheave diameter provided by the cooperation of sheave plates 27 and 29. When the sheave plates 27 and 29 are in the position shown in the figures, sheave assembly 25 is rotating at a relatively low speed. If sheave plate 29 is moved to the left as viewed in Figure 3, away from the sheave plate 27, then belt 24 will move in radially toward shaft 26 as groove 32 widens, and will cause a greater rotational speed of the sheave assembly 25 for a given rotational speed of pulley 23 by motor 22.

A second belt 36 is driven in groove 35 by the sheave formed by the cooperation of sheave plates 29 and 28. When adjustable sheave plate 29 is in the position shown so that groove 35 is quite wide belt 36 has to move in radially toward shaft 26 a substantial amount before it seats on the surfaces 33 and 34 of sheave plates 29 and 28 respectively. This means that for a given rotational speed of the adjustable sheave assembly (as imparted to it by belt 24), belt 36 will be traveling at a relatively low rate of linear speed. If sheave plate 29 is moved to the left so that belt 36 is forced outwardly in groove 35, then for a given rotational speed of the sheave assembly a relatively high linear speed of belt 36 is provided. Thus, by controlling the position of sheave plate 29, an infinite variety of speeds between the two limits of position of the sheave plate may be provided, with the arrangement shown in Figure 3 providing the lowest output speed to belt 36 since belt 24 is causing the lowest rate of rotation of sheave assembly 25 and rotation of the sheave assembly 25 is causing the lowest linear speed of belt 36. The highest rate of speed will be provided if sheave plate 29 is moved as far as possible to the left, in which case belt 24 moves inwardly as far as possible to provide the highest rotational speed of the assembly 25 for a given linear speed of belt 24, and the output linear speed of belt 36 is the highest possible for a given rotational speed of assembly 25.

Belt 36 passes over a sheave 37 which forms part of a unitary assembly with a sheave 38 which drives a belt 39. Referring now primarily to Figures 2 and 3, it will be seen that belt 39 drives a sheave 40 which is rigidly secured to the end of shaft 17 so as to rotate basket 10.

Returning now to the adjustable sheave assembly 25, and with particular reference to Figure 2, it will be observed that the assembly is mounted on an arm 41 which is pivotably secured on a pin 42 within a bracket 43 secured to the base 2 of the machine. A spring 44 has one end 45 secured to the machine base and has its other end 46 secured to shaft 26 so as to bias assembly 25 to the left. A second arm 47 is also secured to the sheave assembly 25, and at its outer end 48 there is secured a chain member 49. At its other end (Figure 4) chain member 49 is secured to a pulley 50 operated through a small electric motor and gear train assembly 51. It will be seen that when pulley 50 is caused to rotate by assembly 51 it will wind up chain 49 and, through arm 47, will move the entire adjustable sheave assembly to the right causing arm 41 to pivot to the right as viewed in Figure 2. Since belt 24 cannot stretch, it will be apparent that when this occurs belt 24 will move inwardly within groove 32 forcing sheave 29 to the left (as viewed in Figure 3) to effect an increase in the

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speed transmitted to sheave 40 and basket 10. When motor and gear train assembly 51 is shut off, the spring 44 overcomes the motor and pulls the adjustable sheave 25 back to the position shown in the figures to reduce the speed. The assembly of sheaves 37 and 38 is also movably mounted on a linkage assembly 52 pivotally mounted on a pin 53 mounted within a bracket 54 secured to the base. The linkage arrangement includes two arms 55 and 56 which are pivotably secured together by pin 57. A spring 58 secured at one end 59 to base 2 of the machine is secured at its other end 60 to the assembly of sheaves 37 and 38 so as to bias them downwardly and to the right (as viewed in Figure 2) in order to effect a belt tensioning function for belts 36 and 39.

The proportioning of the various parts of the drive assembly above described is such as to provide an appropriate range of speeds. In order to effect an appropriate tumbling pattern of the clothes within the basket for washing and heat drying purposes, it is necessary that the basket 10 be rotated at a speed which provides somewhat less than one G of centrifugal force tending to plaster the clothes against the cylindrical wall of the basket. For instance, it has been found that where basket 10 has a diameter of twenty-six inches, a tumbling speed of approximately forty-seven r.p.m., which provides 0.81 G's of centrifugal force, is the optimum insofar as effecting a suitable tumbling pattern of the clothes concerned. In the other extreme position of the drive assembly, basket 10 is rotated at a speed which is sufficient to extract enough liquid from the clothes in the basket so that there will be substantially no tendency for the clothes to drip if they should be removed from the basket subsequent to a centrifugal extraction step. It has been determined that a centrifugal force of approximately 21 G's is necessary in order to ensure this amount of liquid extraction from the variety of clothes loads which may be encountered in a spin operation limited to a period of six minutes or less. With the twenty-six inch diameter basket previously described, this centrifugal force requires a speed of approximately two hundred and forty r.p.m. Thus, with the construction shown in the figures, i.e., with basket 10 having a diameter of twenty-six inches, a speed of approximately forty-seven r.p.m. is provided to the bracket when the drive mechanism is in the position shown, while in the other extreme position a speed of approximately two hundred and forty r.p.m. is provided to the basket.

It will, of course, be recognized that while the centrifugal force of 21 G's represents the minimum which will prevent substantial dripping of the clothes, higher centrifugal forces provided by higher speeds will effect even greater removal of liquid from the clothes. Thus, for instance, if a force of 33 G's, provided for a twenty-six inch basket by a speed of three hundred r.p.m., should be achieved the clothes are even dryer to the touch and if left in the basket for a drying operation by the machine will require even less power consumption.

To heat the clothes during the drying portion of the cycle, there is provided in the machine a heater assembly including two heaters 61 and 62. These heaters are mounted within the upper portion of tub 11 so that when energized they heat the basket 10. When the heaters are energized during the drying cycle, the heat is transferred to the clothes basket which then passes the heat on to the clothes to cause vapor migration out of the clothes. In addition, the outer cylindrical wall of the basket is perforated by a great many small spaced openings 63 and thus some of the heat from heating elements 61 and 62 passes directly to the clothes by radiation.

The means whereby the water is admitted to and discharged from tub 11 during operation of the machine are particularly shown in Figure 2. The water supply means includes connections 64 and 65 through which

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hot and cold water is supplied to the machine for the washing operation. A valve controlled by a solenoid 66 admits hot water to the machine and a valve controlled by an opposed solenoid 67 admits cold water to the machine. The hot and cold water valves under control of the solenoids 66 and 67 discharge through a common outlet conduit 68, through a suitable air gap, and into a funnel 69 to a sump 70 formed at the bottom of tub 11. Connection of the funnel to the sump may be made through a suitable conduit 71, a portion of which is shown adjacent the sump in Figure 2. The air gap provided by the funnel 69 makes it impossible for the water to be siphoned from the machine and thus to contaminate the incoming water supply line. A pressure actuated sensing device, or water level control, 72 controls both solenoids 66 and 67 to maintain the proper water level in the machine during the washing operation. Sensing device 72 is connected to the interior of tub 11 by a suitable line 73.

The illustrated machine is of the type which provides cold water during the drying cycle for condensing the moisture extracted from the clothes. The condenser water is admitted to the machine through an additional solenoid actuated valve 74 which is energized during the drying operation so that the valve passes water at a slow rate sufficient to condense from the air the moisture vaporized from the clothes. As shown, the condenser water valve discharges into a conduit 75. From this conduit, the water flows through an appropriate air gap (not shown) and then through another conduit (not shown) to the inlet 76 of a vent trap 77 which is of the type commonly provided in connection with machines of this type in order to seal off the tub and basket from atmosphere during heat drying of the clothes while leaving the tub vented to atmosphere at other times. An appropriate construction for vent trap 77 is for instance, fully described and claimed in Patent 2,800,008—Raczynski, issued on July 23, 1957 and assigned to the General Electric Company, owner of the present invention. From the vent trap 77, the condenser water flows into the tub 11 through an opening 78 and then flows in a thin sheet down the lower left wall 79 (Figure 2) so as to cool a substantial portion of the area of the side wall and provide a large cool surface for condensing the moisture extracted from the clothes.

The wash and rinse water used during the washing portion of the operation, and the condenser water and the moisture extracted from the clothes during the drying operation, are discharged from the machine through the sump 70 mounted at the bottom of the tub. A suitable discharge hose 80 leads from the sump to a motor driven drain pump 81 which may, as shown in Figure 4, be driven directly from motor 22 and which discharges through an outlet opening 82 to a conduit 83 (Figure 2) leading to a drain valve 84 controlled by a suitable solenoid (not shown). Since pump 81 is continually operated, the draining of water from sump 70 is controlled by the drain valve, draining occurring upon energization of the solenoid.

With the apparatus described, any suitable sequence derived from the basic sequence of washing, rinsing, and spinning may be utilized to effect the washing operation of the cycle and may be followed, where so desired by the operator, by suitable heating of the clothes as they are tumbled in basket 10. As stated above, in order to make the clothes dry as fast as possible in the heat drying operation, it is necessary that the last operation of the washing portion of the cycle, that is, the spin, be conducted at a relatively high centrifuging speed to extract as much moisture as possible from the clothes. Also, as mentioned, an important criterion is that, since the operator may frequently omit the heat drying operation, the clothes should have enough moisture removed from the centrifugal extraction sequence so that they will not have any appreciable tendency to drip when removed from the

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machine. As stated, a centrifugal force of at least 21 G's is required in order to effect this degree of liquid removal from the clothes. In a basket having a twenty-six inch diameter, as in the present case, this means that the speed must reach at least two hundred and forty r.p.m. for a period of several minutes. However, it is known that, with presently provided basket construction, the problem of sticking for the generally encountered types of clothes loads occurs at speeds close to two hundred and ten r.p.m. (16 G's), so that there is a substantial difference between the minimum speed possible to make the clothes dry enough to prevent substantial dripping for all the usual types of loads and the maximum speed permissible without any danger in some of the types of loads of sticking.

In order to permit a relatively high spin speed without the attendant difficulty of the clothes sticking to wall 12 of the basket 10 after the speed drops back to tumble or after the machine stops, the following arrangement is provided in accordance with this invention. The cylindrical wall 12 of the basket is so formed that a maximum of sixty percent thereof contacts the clothes during the centrifugal extraction operation. It has been discovered that by keeping the contact area to a maximum of sixty percent, speeds permitting centrifugal forces from the critical value of 21 G's and higher may be obtained without sticking. For instance, at the sixty percent contact level with a twenty-six inch basket, a speed of two hundred and forty r.p.m. (which provided the critical figure of 21 G's) was provided without sticking occurring in a load of diapers, an article of clothing which exhibits a strong sticking tendency. In the same receptacle at the same speed, a load of turkish towels, known for their tendency to drip, exhibited no objectionable dripping at all. When the percent contact area was decreased still further to forty percent, the permissible speed with a twenty-six inch basket, that is, the speed which could be provided without sticking of the clothes, then became three hundred r.p.m., providing a centrifugal force of 33 G's.

Referring now to Figure 3 and 5, there is shown a preferred embodiment of my invention which effects a decreased contact area between the wall 12 of the basket and the clothes therein. Specifically, the perforations or holes 63 with which the wall 12 is provided over its entire surface are formed of such a size and close enough together so that they constitute at least forty percent of the surface area of wall 12. Of course, with such an arrangement there is only a sixty percent metal surface provided for contact with the clothes, and the desired criterion of sixty percent contact is met thereby permitting a speed of two hundred and forty r.p.m. to provide 21 G's. As a specific example, when openings 63 were formed as quarter inch diameter circles spaced .31 inch from center to center, they provided a fifty-eight percent hole area thereby decreasing the contact area to forty-two percent. This construction permitted without sticking a maximum speed of 300 r.p.m., i.e., a centrifugal force of 33 G's.

With the embodiment of Figure 5 it will, of course, be recognized that the upper limits, on the size of holes 63 and on the percentage of the cylindrical wall area which they constitute are governed by the necessity for structural strength in the basket 10 and the fact that the holes must not be large enough to permit a substantial tendency for clothes in the basket to extrude themselves through the holes during centrifugal extraction. These are, of course, practical limitations and are governed to a very substantial extent by the nature and weight of the clothes normally washed in the machine.

The above described configuration of wall 12 of basket 10, as shown in Figure 5, marks a substantial deviation from any known washer-dryer basket. At the present time, perforations in the basket generally form a maximum of about twenty percent of the cylindrical wall

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area. However, with no increase in the thickness of the wall the hole area can readily be increased to the 60% mark while retaining sufficient structural strength in the basket for the purposes of the machine. Thus, with the 58% hole area provided above, sufficient structural strength was provided by the cylindrical wall of the basket with the usual thickness of .040 inch.

Referring now to Figure 6 of the drawing, a second method of obtaining the decreased basket area of contact is provided. In this case, parallel ribs 85 are formed in the basket wall projecting inwardly and sufficiently close together so that they prevent any contact between the clothes in the basket and the main portion of the basket wall where the perforations 63 are provided. The amount of spacing of ribs 85, is, of course, a function of the type of clothes being washed in the machine. However, it has been found that for the usual type of clothes loads washed in domestic clothes washing machines a spacing of $\frac{1}{8}$ of an inch is effective with ribs $\frac{1}{4}$ inch high to prevent any substantial contact between the clothes and the main part of the wall of the basket. The rib configuration provides a ready means of obtaining a very low contact area, percentwise, between the clothes and the basket wall. In fact, where the ribs are spaced $\frac{1}{8}$ of an inch apart, and the basket is formed of sheet metal .030 inch in thickness, an effective contact area of only 30% is provided between the clothes and the basket. This permits, in a twenty-six inch basket, a speed of over 300 r.p.m. or 33 G's of centrifugal force. Of course, the ribs may readily be provided closer together where so desired at the expense of a relatively small increase in contact surface.

It will readily be observed that openings 63 may be spaced substantially as in the presently provided washer-dryer baskets, that is, spaced to a substantially greater extent than is shown in Figure 5. Also it will be readily observed that the forming of the ribs in the basket provides a very strong construction permitting the use of relatively thin material. It will be understood that while the ribs have been shown as extending circumferentially in Figure 6, the same general results will be obtained by ribs which extend axially or, for that matter, by ribs extending in both directions and crossing each other.

It will be seen from the foregoing that my invention provides a novel and economical method of inhibiting sticking of clothes to the surface of a clothes container during centrifuging thereof; more particularly, it provides a construction which permits the clothes to be removed with sufficient moisture extracted therefrom to prevent dripping while at the same time, should a heating operation be desired, there is no danger of the clothes being stuck to the periphery of the basket during the heating operation.

While in accordance with the patent statutes I have described what at present are considered to be the preferred embodiments of my invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and I therefore aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a laundry machine, a clothes receptacle having a perforated substantially cylindrical peripheral wall formed to limit surface contact with clothes in said receptacle to a maximum of approximately sixty percent of its inner area, said receptacle being rotatable on a non-vertical axis, means for rotating said receptacle at a first speed below that required to exert a centrifugal force of one G and at a second speed exerting a centrifugal force of at least 21 G's at the inner surface of the peripheral wall of said receptacle, said first speed being effective to tumble clothes in said receptacle, said second

speed being effective to extract sufficient liquid from the clothes to prevent appreciable dripping of the clothes when they are removed from said receptacle, means for introducing liquid into said receptacle, control means for controlling the speed of said rotating means, to rotate said receptacle at said first speed in the presence of liquid for clothes treating purposes and at said second speed to extract liquid from the clothes, and means for heating clothes in said receptacle subsequent to rotation of said receptacle at said second speed.

2. The apparatus defined in claim 1 wherein said cylindrical wall has a plurality of closely spaced substantially parallel inwardly extending ribs formed therein, and the spacing of said ribs and the height thereof are such as to make the inner surfaces of said ribs the only clothes contacting part of said cylindrical wall.

3. The apparatus defined in claim 2 wherein said basket is formed of sheet metal of 0.030 inch in thickness and said ribs are spaced $\frac{1}{16}$ inch apart.

4. The apparatus defined in claim 2 wherein said parallel ribs extend circumferentially around said cylindrical wall.

5. The apparatus defined in claim 1 wherein said cylindrical wall has a substantially smooth inner surface, and the perforations in said wall form at least forty percent of said surface.

6. The apparatus defined in claim 1 wherein said cylindrical wall has a substantially smooth inner surface, and the perforations formed in said surface are approximately circular with a quarter-inch diameter.

7. The apparatus defined in claim 1 wherein said control means also functions to control said rotating means to rotate said receptacle at said first speed during operation of said heating means.

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