July 1, 1958 A. LODGE 2,841,260

DOMESTIC LAUNDERING MACHINES

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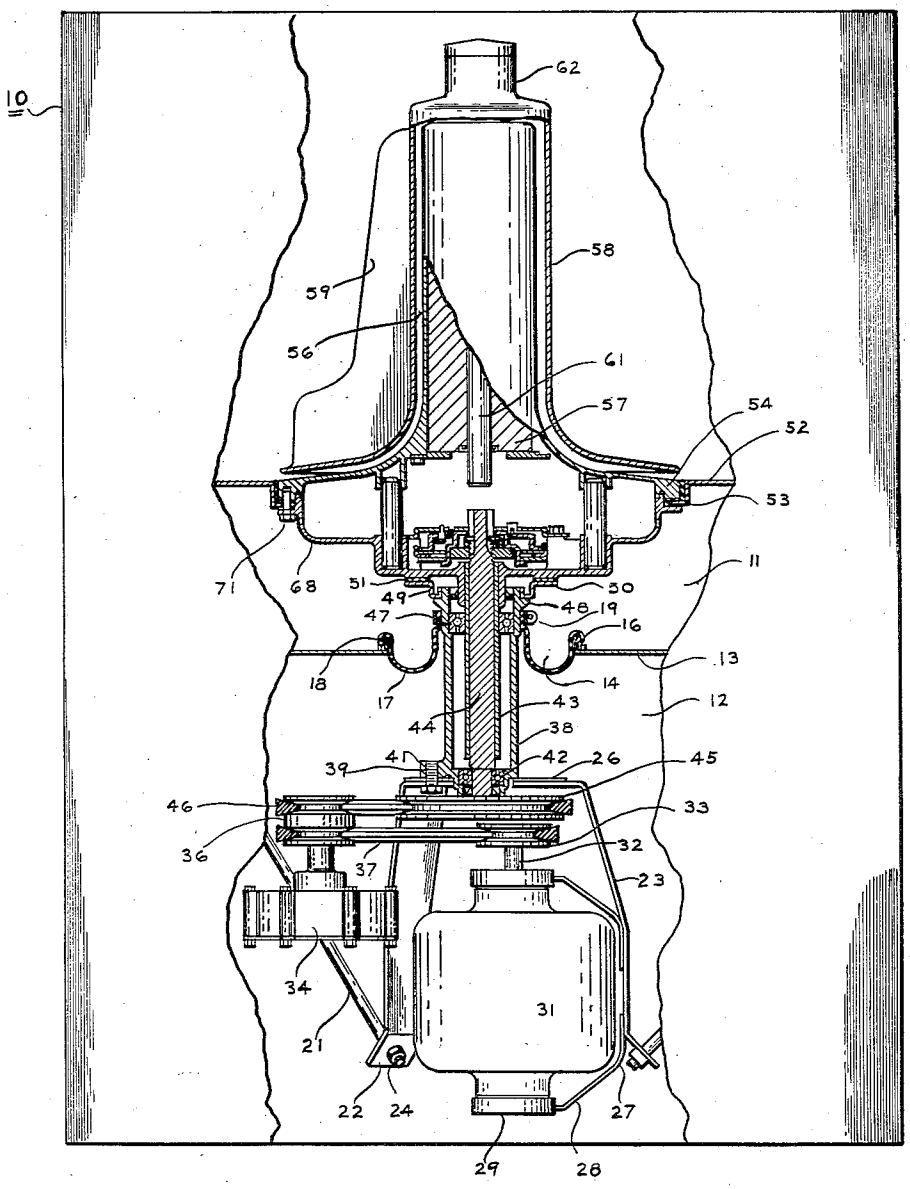


FIG.-1

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DOMESTIC LAUNDERING MACHINES

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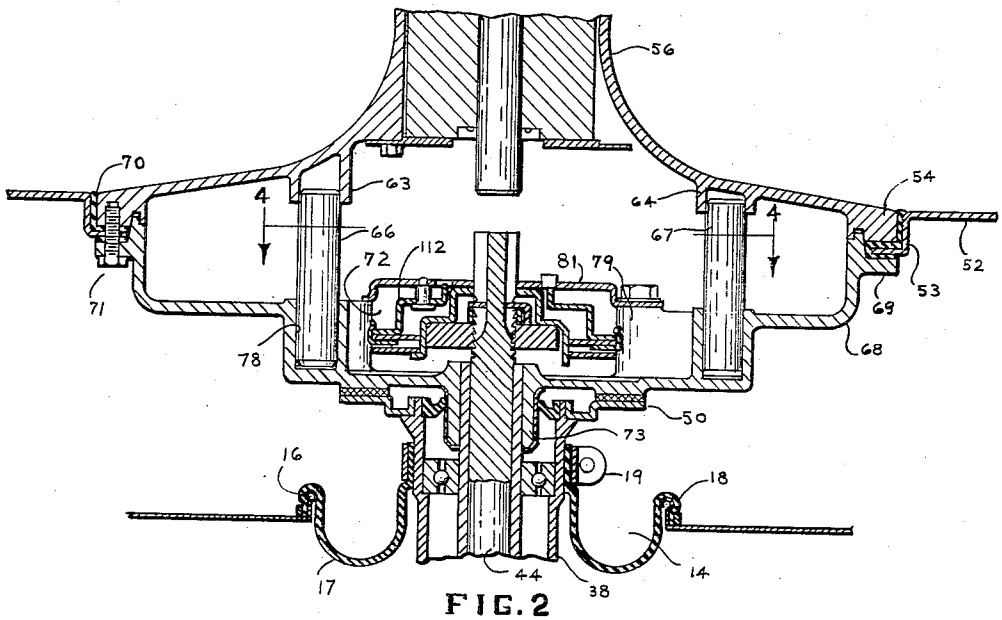


FIG. 2

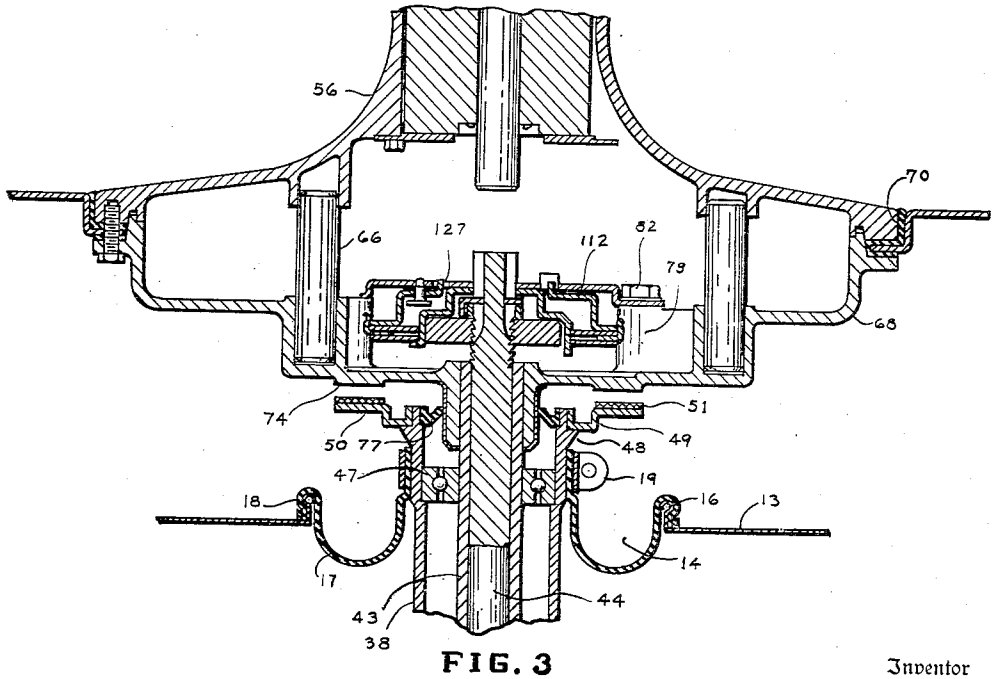


FIG. 3

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DOMESTIC LAUNDERING MACHINES

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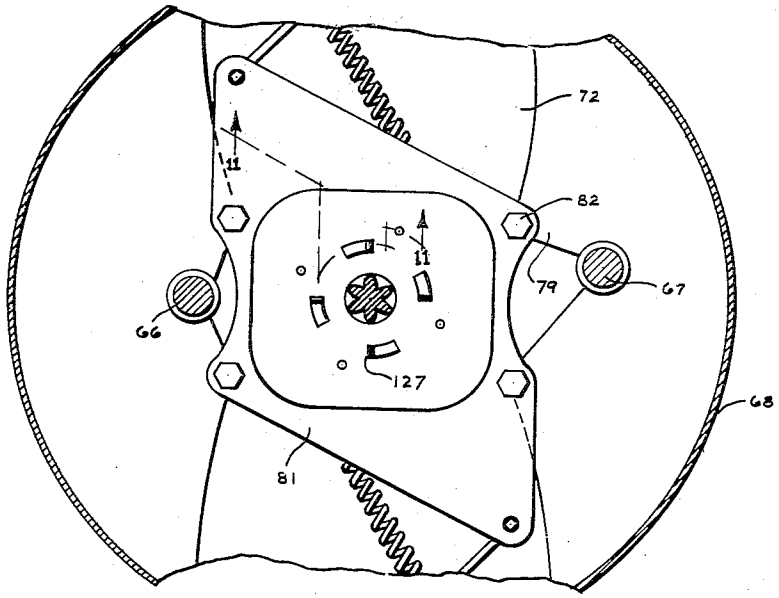


FIG. 4

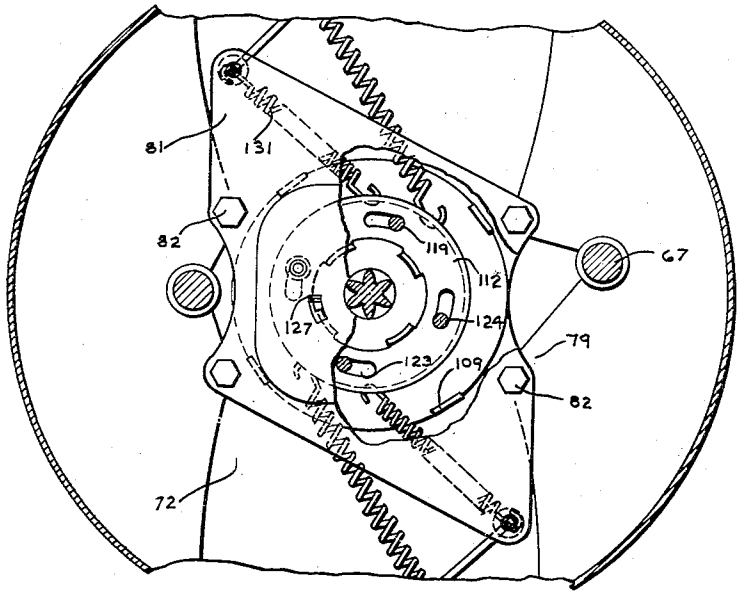


FIG. 5

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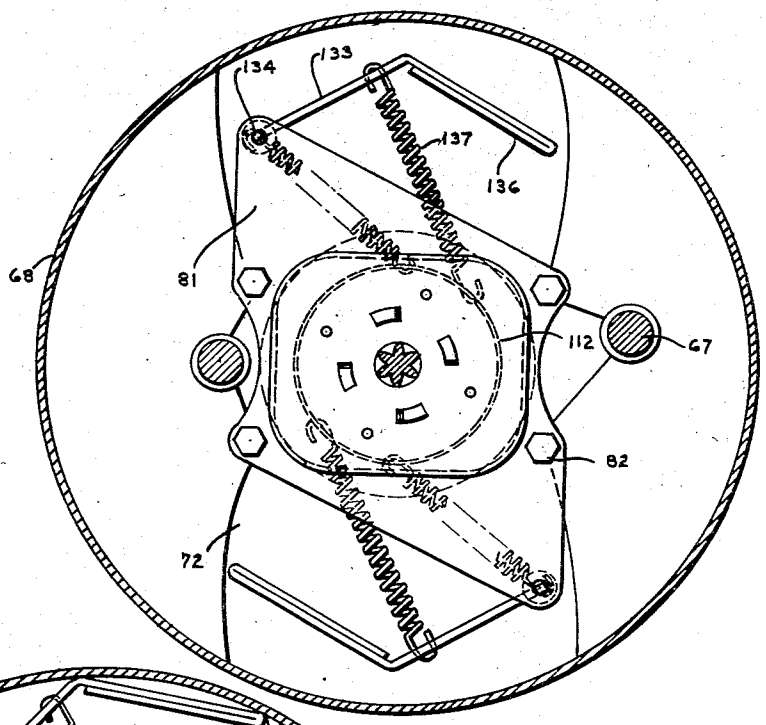
Attorney

July 1, 1958 A. LODGE 2,841,260

DOMESTIC LAUNDERING MACHINES

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FIG. 6



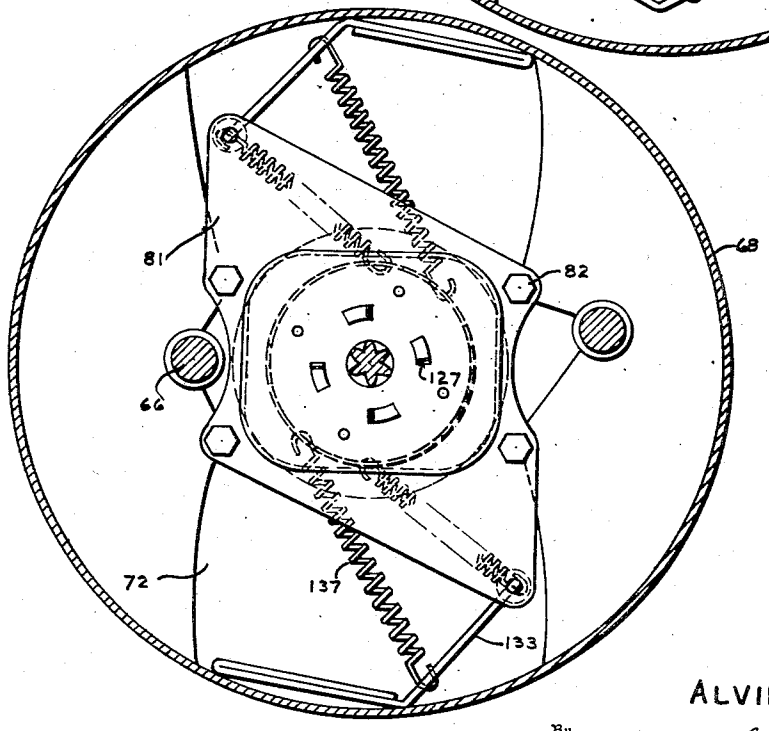


FIG. 7

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DOMESTIC LAUNDERING MACHINES

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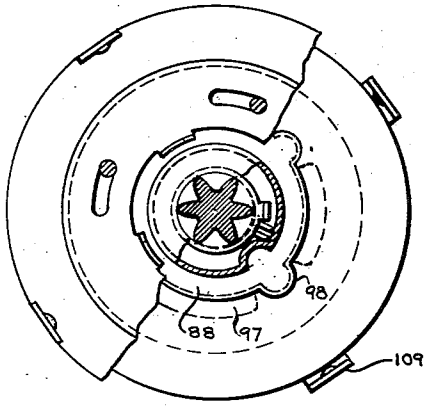


FIG. 8

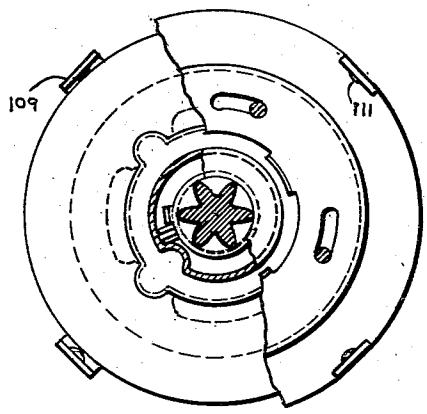


FIG. 9

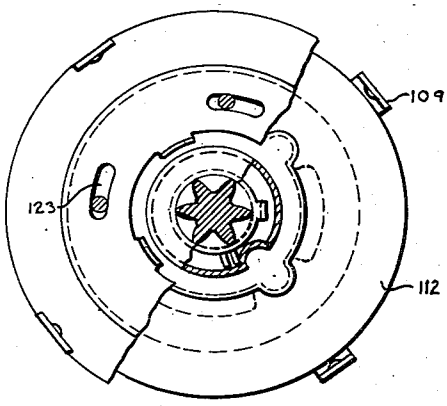


FIG. 10

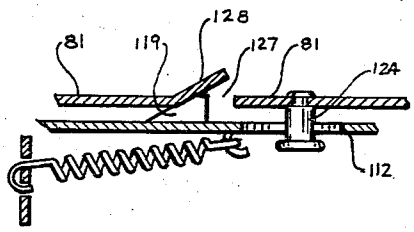


FIG. 12

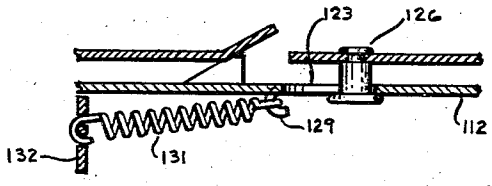


FIG. 13

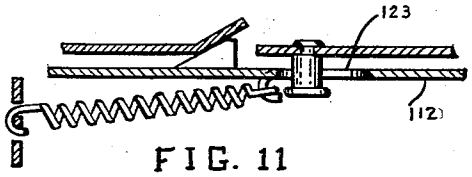


FIG. 11

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DOMESTIC LAUNDERING MACHINES

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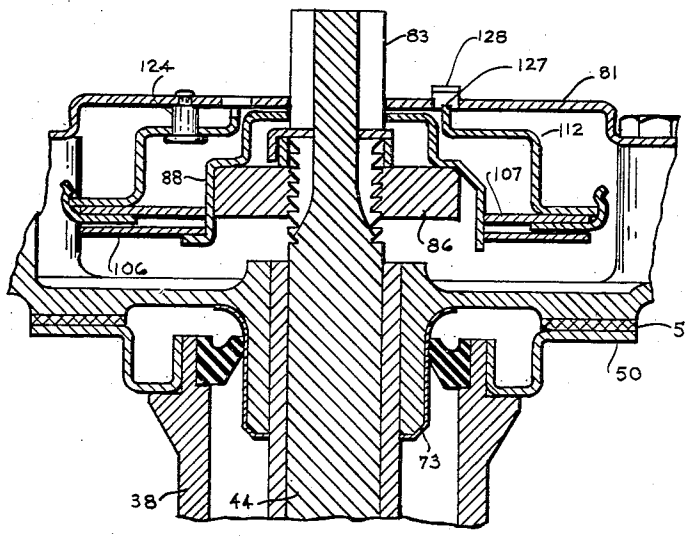


FIG. 14

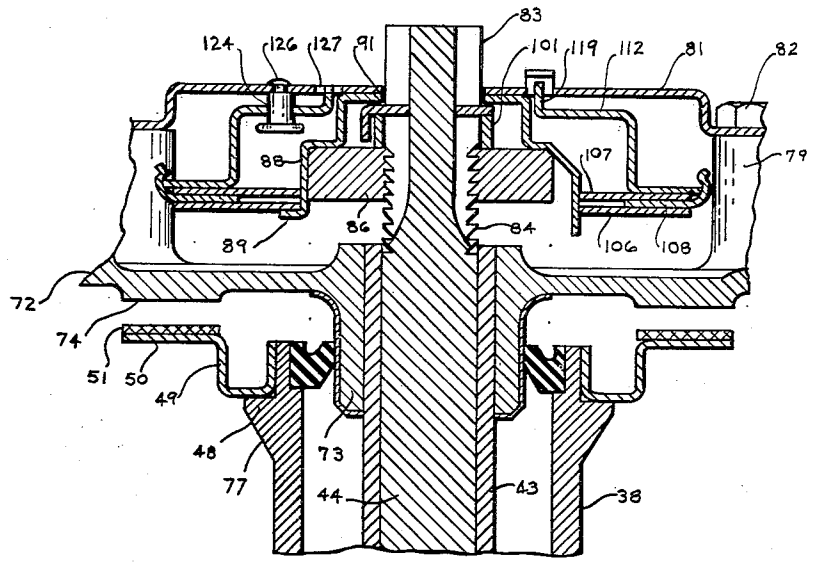


FIG. 15

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DOMESTIC LAUNDERING MACHINES

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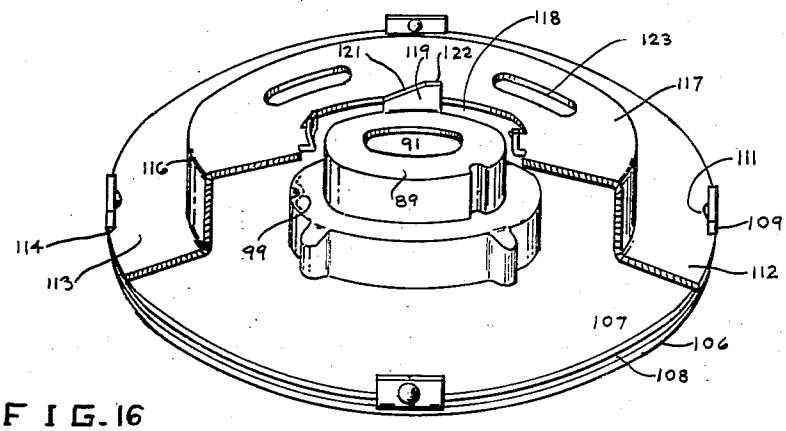


FIG. 16

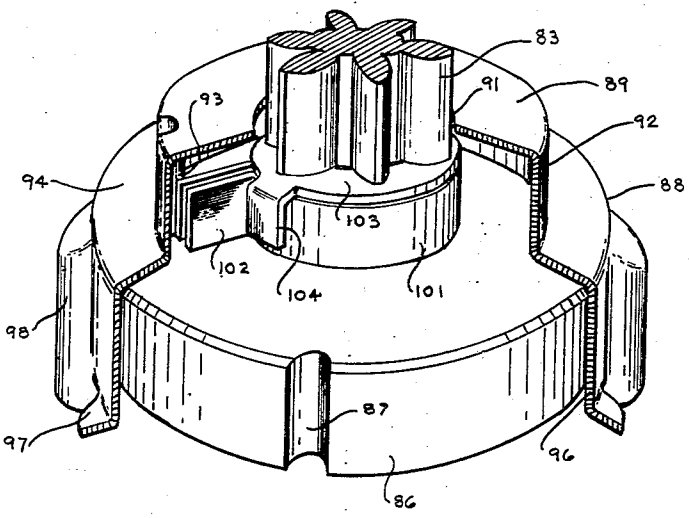


FIG. 17

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United States Patent Office

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Patented July 1, 1958

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DOMESTIC LAUNDERING MACHINES

Alvin Lodge, Erie, Pa., assignor to Blackstone Corporation, Jamestown, N. Y., a corporation of New York

Application November 8, 1954, Serial No. 467,335

14 Claims. (Cl. 192—54)

This invention relates to improvements in a domestic washing machine of the type in which a single receptacle is utilized for the operations of washing, rinsing, and centrifugally drying clothes, and is a refile of my abandoned application, Serial No. 277,474, filed March 19, 1952. More particularly, the invention is directed to structural features having to do with the operation of drying clothes.

Although single receptacle domestic washing machines have been in use for many years, it is believed that sufficient attention has not heretofore been directed to such structural and design features as would render them entirely satisfactory for their intended purpose. Of all the laundering operations, the most difficult one involves that of centrifugally drying the clothes. In this operation, a receptacle, containing a generally unevenly distributed load of wet clothes, is intended to rotate at a sufficiently high rate of speed to effect a required degree of dryness. Such rotation, of course, is accompanied by a considerable amount of vibration, not only of the unbalanced receptacle, but of the machine in its entirety. Many expedients have been employed for the purpose of reducing vibration of the receptacle, or preventing such vibration from being transmitted to the supporting structure. By way of example, these expedients include anchoring the machine to a prepared base, springing the receptacle support within a cabinet, or providing rubber mounts as between the cabinet and the receptacle support. Although in some instances the intensity or extent of critical vibration has been reduced, this has been largely due to the fact that the supporting parts were of extremely rugged construction. The inclusion of extra heavy supporting parts for a domestic machine is objectionable for the reason that the machine must not only be initially readily transportable, but should be of such weight and proportions as to enable it to be moved about for most convenient operative location by the user. Furthermore, current domestic machines are limited in size in order that they may be contained within cabinets so proportioned as to conform to other kitchen or laundry appliances, such as storage cabinets and clothes dryers. Commercial machines, as distinguished from domestic machines, can readily be constructed of sufficiently heavy or rugged parts as to overcome any uneven load distribution in a centrifugally drying receptacle. Also, commercial machines may be operated from a remote power source, thus enabling provision of adequate power to operate the heavier and more rugged mechanisms.

The present invention is, therefore, primarily directed to the provision of a single receptacle washing machine in which a receptacle, containing an unevenly distributed weight, can be rotated at such speed as to effect any desired drying of the clothes therein without appreciable vibration due to the fact that the center of gravity of the operating parts actually or nearly coincides with the center of rotation throughout such an operation, and this, therefore, constitutes one of the principal objects.

Another object of the invention lies in the provision of a single receptacle machine in which the required supporting and operative parts are so arranged as to serve as a part of the ballast in order to effect a smooth spin drying operation.

A further object of the invention lies in the provision of a machine in which a substantial part of the driving mechanism is incorporated into the base of the receptacle and serves as a part of the ballast therefor.

A further object of the invention lies in the provision of a driving mechanism for a receptacle that is so designed as to enable use of a relatively low rate power unit.

Another and further object of the invention lies in the provision of driving means for the receptacle that includes a clutch mechanism automatically operable to gradually bring the receptacle up to required rotational speed for a spin drying operation.

A still further object of the invention lies in the provision of means forming a part of the drive mechanism that is operable to raise the receptacle into position for a spin drying operation and lower said receptacle upon completion of such an operation into an "at rest" position.

Other objects and advantages of the invention will be more fully understood from a consideration of the following specification, taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a side elevational view of a cabinet enclosed washing machine in which one form of the present invention is embodied, a part of the side wall of said cabinet being broken away to disclose the location of the parts of the inventive structure.

Fig. 2 is an enlarged fragmentary vertical sectional view of the central portion of the receptacle base and mounting therefor, the receptacle being shown in an "at rest" or seated position;

Fig. 3 is a view similar to Fig. 2 and shows the position of the parts when the receptacle has been raised into position for a spinning operation;

Fig. 4 is a horizontal sectional view taken substantially as indicated by the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 4, with parts broken away to show certain of the details of the clutch mechanism;

Fig. 6 is a view similar to Fig. 4 and shows centrifugal weights in the position they occupy prior to the receptacle's reaching full speed rotation;

Fig. 7 is a view similar to Fig. 6 and shows the position of the weights when the receptacle is rotating at desired speed;

Fig. 8 is a fragmentary plan view of the clutch mechanism, being partly broken away and sectioned to show the relationship of the clutch parts when the receptacle is in spinning position;

Fig. 9 is a view similar to Fig. 8 and shows the position of certain of the clutch parts when the receptacle is in "at rest" position;

Fig. 10 is a view similar to Figs. 8 and 9 and shows certain of the operative parts during transition from "at rest" to "spin" positions;

Fig. 11 is an enlarged fragmentary vertical sectional view showing the position of certain of the clutch parts at the start of rotation of the receptacle, being taken substantially as suggested by the line 11—11 of Fig. 4;

Fig. 12 is a view similar to Fig. 11, showing these parts in receptacle spin position (see Fig. 8);

Fig. 13 is a further view similar to Fig. 11, showing the position of these parts when the receptacle is at rest (see Fig. 9);

Fig. 14 is a greatly enlarged vertical sectional view

of the operative parts of the clutch mechanism when the receptacle is at rest (see Fig. 2);

Fig. 15 is a view similar to Fig. 14, showing the relationship of the clutch parts when the receptacle is in spinning position (see Fig. 3);

Fig. 16 is an enlarged perspective view of the clutch mechanism, a part of the enclosing pressure plate being broken away to show the lift cup and clutch disks; and

Fig. 17 is a still further enlarged perspective view of the structure shown within the pressure plate in Fig. 16.

Referring more particularly to the drawings, the reference numeral 10 is employed to generally designate a rectangular cabinet in which a single receptacle washing, rinsing, and centrifugally drying machine, embodying the invention, is contained. The cabinet constitutes no part of the invention and is only illustrated for the purpose of disclosing the general proportions required to enclose the structure. The cabinet may be considered as divided into upper and lower compartments 11 and 12, respectively, by a partition 13. This partition is attached in any suitable manner to the cabinet walls and centrally terminates in a circular opening 14 that is defined by an upstanding rim 16. The opening 14, as hereinafter brought out, receives certain operative structure. The ring-like opening between flange 16 and this structure is bridged by a flexible boot 17 which is rolled upon and clamped to the flange 16 as suggested at 18. The inner edge of this boot is secured by a clamp 19 to a housing of the structure projecting through the opening 14.

The compartment 12 encloses the driving mechanism of the device. In the present instance, a suspension is provided for this mechanism which takes the form of a series of rods 21, the upper and outwardly directed ends of which are attached in any suitable manner to the walls of the cabinet. The lower, inner ends of these rods project through flanges 22 of depending straps 23 that form part of a motor support. Blocks 24 have threaded engagement with the ends of the rods 21 and enable adjustment to provide balanced relationship between the motor support and the cabinet. The straps 23, at their upper ends, are bent inwardly and permanently joined by a plate 26 which forms a top or cover to the motor support. Secured to one of the straps 23 is a bracket 27, the top and bottom arms 28 of which are engaged with the end housings 29 of a motor 31. As shown in the drawings, the motor 31 is vertically disposed with the drive shaft 32 thereof extending from the upper housing. Mounted on this shaft is a pulley 33. Another of the straps 23 supports a water pump 34. This pump includes a vertical shaft which carries a double pulley 36. The lower portion of this pulley and pulley 33 are operatively connected by a belt 37.

The lower end of a tubular member 38 seats on the plate 26, being secured thereto by a series of studs 39 which engage suitable laterally extending bosses 41. A bearing 42 is located in the lower end of the tubular member beneath a sleeve 43. Extending through the sleeve 43 is a drive shaft 44 that derives axial support from bearing 42. The lower end of this shaft projects beneath the plate 26 of the motor mount and carries a pulley 45. A belt 46 connects pulley 45 with the upper portion of the double pulley 36. Near the upper end of the tubular member 38 is a bearing 47 which gives lateral support to the sleeve 43. The upper end of the tubular member 38 includes an outer annular shoulder 48. This shoulder provides support for the annular flanged rim 49 of a plate 50. The upper surface of this plate mounts friction material 51 which will hereinafter be referred to as a brake disk. A clothes receptacle 52 is located in the upper compartment 11. The bottom wall of this receptacle has a central opening that is defined by a depending annular flange 53. Fitting into this opening, and seated on the flange, is the annular base 54 of the center post 56 of the receptacle. The post 56 may, as suggested in Fig. 1 of the drawings, be filled or integrally weighted, as at 57. Enclosing the post 56 is a hub 58, from which suitable agitator blades 59 extend in a generally radial direction. The agitator drive shaft 61 projects upwardly through the portion 57 and is connected with the post 58 within the cap 62. Inasmuch as the present invention is not directed to operation of the agitator, none of the details thereof are shown.

Depending from the base 54 of the receptacle hub are end bearings 63 and 64 that receive the upper ends of pins 66 and 67. These pins relate to the drive mechanism for the agitator and are only shown and briefly described to render the general organization more complete. The base of the post 56 cooperates with a recessed member 68 to provide a housing for certain operative parts of the machine. The member 68, or base of the housing, includes an annular rim 69 that is in the vertical plane of the flange 53. A suitable gasket 70 is interposed between the base 54, flange 53, and rim 69 to give a fluid-tight seal to the base of the receptacle 52. These parts are held together by studs 71. Member 68 includes a central, downwardly recessed area 72. Centrally of the base of this area is a depending collar 73. An annular dependent ledge 74 extends from this base, being in the vertical plane of the brake disk 51. Collar 73 receives the upper end of sleeve 43 and, shaft 44, extending beyond the sleeve, projects upwardly into the housing. Adequate seal between the tubular member 38 and the collar 73 is provided by a seal 77. Opposite portions of members 68 have pockets 78 which serve as end bearings for the lower ends of pins 66 and 67. The area 72 is relatively narrow but extends from one to the opposite side wall of member 68 (see Fig. 7). Bosses 79 provide support for a bridge member 81 which is held in place by studs 82.

Between the bridge member 81 and the base of the recessed area 72 is located the entire clutch mechanism through which the motor 31 is enabled to rotate the receptacle 52. The upper end of the drive shaft 44 projects beyond the collar 73 and through a central opening in the bridge member 81. The end of this shaft is cut to form a pinion 83. Between the pinion 83 and the collar 73, the shaft is threaded, as at 84. The pinion 83 of this shaft is intended to mesh with a gear (not shown) that constitutes a part of the agitator clutch and drive mechanism. As heretofore mentioned, this mechanism constitutes no part of the present invention and, therefore, is neither shown nor described. Threads 84 mount a lift nut 86. This nut is intended to move axially of the shaft, as well as to rotate with it during certain parts of the operation of the machine. The nut 86, as shown in Fig. 17, includes a vertical semicircular edge groove 87. A combined lift cup and nut retainer 88 includes a top wall 89 that is centrally apertured, as at 91, to pass the pinion 83 therethrough. A vertical annular wall 92, depending from wall 89, includes an inwardly directed rib 93. The wall 92 continues in a generally horizontal flange 94 and thence into another vertical wall 96. Flange 94 provides an interior step or annular shoulder against which the top of the nut 86 abuts. The vertical wall 96 terminates in a horizontal rim 97 which is non-continuous by reason of four uniformly distributed, radially outwardly extending ribs 98. Intermediate two of these ribs, vertical wall 96 is formed with an inwardly directed rib 99. When the nut 86 is mounted in the retainer 88, the groove 87 receives rib 99. Between the upper edge of the nut and the top wall 89 of the retainer 88 is sufficient space to locate a split ring 101. This ring loosely encircles that portion of the pinion 83 that is within the retainer 88, the ends being formed to produce a pair of laterally extending arms 102. These arms extend almost to the vertical wall 92 and are intended, in operation of the mechanism, to contact the inwardly directed rib 93 of this wall from one side or the other. Also within the upper part of the retainer 88, and directly above the ring 101, is located a stop washer 103. This washer has a central opening

proportioned to receive the teeth of the pinion **83** and includes a depending tab **104** that lies close to the ring and in the plane of the arms **102** thereof.

Two clutch disks **106** and **107** are provided. Each of these disks is centrally apertured to fit over the wall **96** of the retainer **88** and include lateral, semi-circular recesses on the edge of this opening to receive the radial ribs **98** of said retainer. In this manner these disks are made to rotate with the retainer but may, under certain circumstances, move axially with respect thereto. Interposed between the clutch disks **106** and **107** is a flat ring **108**. The perimeter of the ring is provided with several uniformly distributed upstanding lugs **109**, the end of each lug being formed with an inwardly directed dimple **111**. A pressure plate **112** is provided and includes an annular flange **113** that seats on the uppermost clutch disk **107**. Suitable notches **114**, in the perimeter of the flange **113**, receive the lugs **109**. An annular vertical wall **116** extends upwardly from the flange **113** and terminates in a flat portion **117**. This constitutes the top wall of the pressure plate and has a circular opening **118**, the diameter of which is sufficient to receive the upper portion of the retainer **88**. In other words, the top wall **89** of the retainer is enabled to move into abutment with the central under surface of the bridge **81**.

In the present disclosure the rim of the opening **118** is formed with four upstanding lugs **119**. Each of these lugs includes inclined, cam-like surfaces **121**. The cam surfaces **121** of all the lugs are inclined in the same direction. The top wall **117** also includes a series of arcuate slots **123**, arranged on a common radius about the axis of rotation of the shaft **44**. Headed pins **124** project through these slots and are anchored to the bridge **81** substantially as indicated by the numeral **126**. These pins support the pressure plate **112** in a manner to permit limited vertical movement thereof toward or away from the bridge **81**. The bridge **81** is formed with a series of arcuate slots **127**, arranged in a common radius about the axis of the shaft **44**. These slots are formed by cutting and bending out tabs **128**, these tabs forming inclined cam surfaces for lugs **119**. The details of this structure are clearly shown in Figs. 11 to 13, inclusive. Adjacent one end of each of the slots **123** of the top wall of the pressure plate is a depending hook **129** that is engaged by one end of a spring **131**. The other end of this spring is engaged with a suitable portion of the housing **68**. It will be noted, from examination of Figs. 4 and 5 of the drawings, that two springs **131** are provided, being so arranged as to create tension in a common direction.

Referring more particularly to Figs. 6 and 7 of the drawings, attention is now directed to the provision of a pair of centrifugal weights **133**. Each weight consists of a bent arm, one end of which is pivotally joined, as at **134**, to the housing **68**; the other or free end being return bent, as indicated at **136**, to provide desired swingable weight. One end of a spring **137** is engaged with each weight, the other end being secured to the pressure plate **112**. Springs **137** are so arranged as to cooperate with the springs **131**, the manner of this cooperation being hereinafter fully described.

To fully understand the advantages of the structure above described, the following description of its operation and the relative positions of the various parts involved in raising the receptacle, rotating it, and again lowering and stopping rotation, is set forth. Insofar as possible, the general disclosure of Fig. 1 represents the operative parts in position of rest. These operative parts are more clearly distinguishable in this position in Figs. 2, 5, 9, 13, and 14. It will be noted that the lift nut **86**, carried by drive shaft **44**, is approximately centrally the length of the threads **84** of the shaft and that the receptacle **52**, through the member **68**, rests upon and is supported by the brake disk **50**. The combined lift cup and retainer **88** is out of contact with the bridge **81**. The clutch disks **106**, **107**, ring **108**, and the rim **113** of pressure plate **112** have the relationship shown in Fig. 14, this being determined by the fact that plate **112** and ring **108** are suspended by the headed pins **124**. With the receptacle at rest, the springs urge the lugs **119** downwardly of the cam surfaces **128** (see Fig. 13). The top wall **89** of the lift cup is out of contact with the bridge **81**, the space or gap therebetween being greater than the total spread of the disks **106**, **107**, and ring **108**. Arms **102** of ring **101**, and tab **104** of washer **103** occupy the position shown in Fig. 9.

The motor **31** is started. The reduction drive pulleys and belts above described rotate shaft **44** in a clockwise direction for this particular operation. The first complete rotation of shaft **44** causes washer **103**, keyed thereto, to rotate substantially from the position of Fig. 9 to that of Fig. 10. At this point the tab **104** thereof contacts one of the arms of the ring **101** and, upon a second rotation of the washer, causes the ring to make its first substantially complete revolution, at which point one of the arms thereof comes into contact with the opposite side of rib **93** (compare Figs. 9 and 8). Due to the frictional contact of the pressure plate **112** and ring **108** with the clutch disks **106** and **107**, and the fact that the pressure plate is connected with the base of the receptacle, there is sufficient inertia in the nut **86**, during the above described rotation of the washer and ring, to effect movement of the nut **86** upwardly of the threads **84** of the shaft. This upward movement of the nut first causes the disks and ring to apply upward pressure against the plate **112** by closing the space or gap therebetween. This plate, at this point, resists upward movement by reason of the spring and cam association. The lift cup also being raised continues its upward movement, causing contact of top wall **89** thereof with the central portion of the bridge, raises the bridge and thus moves the receptacle from off the brake disk **51**.

Upon completion of this substantially two-turn relative rotation of shaft **44** and nut **86**, the lift cup becomes directly driven by the shaft. Also, since the disks **106** and **107** are keyed to the lift cup, they also rotate at shaft speed. It will be noted that the lift cup has not only raised the bridge **81** but has also, the pressure plate **112**. Consequently, the relationship of lugs **119** to cam surfaces **128**, if the parts were stopped at this position, would be as shown in Figs. 2 and 15. The pressure plate **112** is, of course, urged to rotate, but since it is connected with the receptacle through springs **131**, there is a sufficient inertia against such rotation to stretch the springs **131**. This change in relationship of the bridge **81** of the receptacle and the pressure plate causes the lugs **119** to move from the position of Fig. 2 to the position of Fig. 11. This change in position of the lugs, obviously, relieves the considerable frictional pressure contact as between the pressure plate, ring **108**, and disks **106** and **107**, and thus a certain measure of slippage occurs. This slippage is sufficient so that no excessive load is placed on the motor in the initial effort to overcome the inertia of the loaded receptacle to rotation. However, there is sufficient pressure contact to start rotation of the pressure plate which, through springs **131**, starts rotation of the receptacle. As the receptacle gains speed, torque transmitted by the clutch disks is maintained at a uniform value, since any tendency of the plate friction to vary is compensated by an increased clutch pressure due to springs **131** urging cams **119** down the inclined surfaces **128**. This increases the frictional contact as between the pressure plate and the disks **106** and **107** (see Fig. 12). In this manner, slippage is lessened and the receptacle continues to gain rotational speed. As the receptacle approaches full rotational speed, weights **133** are centrifugally urged to move about their pivots from the position of Fig. 6 to that of Fig. 7. This swinging movement of these weights stretches springs **137** and, since these springs are also joined to the pressure plate **112**, they combine with springs **131**

to urge lugs 119 further down the cam surfaces 128 into the position shown in Fig. 13. Thus additional pressure is applied as between the plate 112 and the clutch disks. This additional pressure is sufficient to now effect a substantially direct drive as between the shaft 44 and the receptacle 52.

From the foregoing it will be apparent that the receptacle 52 is, in effect, towed or pulled about its axis by the springs 131 and 137. If, for any reason, free rotation of the receptacle should be impaired, it will be evident that it would exert a drag and, possibly, do damage to the motor or other driving parts. However, the instant any such drag of the receptacle occurs, the rotational speed of the receptacle is obviously slowed down, first allowing the weights 133, under the contracting urge of springs 137, to move inwardly. The relieving of the tension of these springs places more of this load on springs 131 and, thus, springs 131 are again somewhat expanded. The immediate effect of this is to allow lugs 119 to ride upwardly of the cam surfaces 128, permitting the pressure plate to move upwardly and allow slippage of the clutch disks. Thus, although the shaft 44 may continue to rotate at full speed, no additional load is placed on the motor. In other words, the drag of the receptacle conditions the clutch parts in substantially the same manner as they are conditioned at the commencement of the operation of bringing the receptacle up to desired rotating speed.

Upon completion of a spinning operation, the motor 31 is shut off. The motor now is driven by rotation of the receptacle and serves as a drag to such rotation. Thus, the speed of the receptacle becomes increasingly retarded. This drag of the motor is transmitted through shaft 44 and, since this shaft carries the washer 103, the tab 104 thereof will have relative rotation with respect to the lift cup in a counter-clockwise direction. One complete rotation of this washer causes the tab 104 thereof to pick up one of the arms 102 of the ring 101 and causes this ring to have one substantially complete counter-clockwise rotation. The washer and ring have thus moved from the position indicated in Fig. 8 to that of Fig. 9. One of the arms of the ring now bears against the opposite face of rib 93. The receptacle being the only force to rotate the shaft, and since there is no rotational lag of the receptacle with respect to the shaft, lift nut 86 will rotate downwardly of the threads 84 and, in so doing, will withdraw the lift cup 88 from the bridge 81 and allow the surface 74 of the receptacle base to come into contact with the brake disks 51.

Although applicant has shown and described only one form of a complete domestic laundering machine with which the present invention has operative association, it will be understood that the invention, in its present or modified form, may be utilized with other machines of this class and that any such modifications or changes are considered to be within the spirit and scope of the invention insofar as they are set out in the annexed claims.

Having thus set forth my invention, what I claim as new and for which I desire protection by Letters Patent is:

1. In a washing machine, a receptacle rotatable about a vertical axis and axially movable into and out of position for rotation, a housing in the central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing a motor driven shaft having an end projecting into said housing, means in said housing for axially moving said receptacle into position for rotation and for rotating said receptacle, said means comprising a rotatable lift member carried by said shaft end and movable axially by rotation of said shaft to engage said housing and axially move said receptacle into position for rotation, a disk clutch in said housing actuable by said member upon rotation of said shaft to transmit rotation of said shaft to said receptacle, and means forming part of said clutch for varying the operative effectiveness thereof in accordance with the rotational speed of said receptacle.

2. In a washing machine, a receptacle rotatable about a vertical axis, a housing in the central base portion of said receptacle, the bottom of the receptacle forming at least one of the walls of said housing said receptacle being axially movable into and out of position for rotation, a motor driven shaft having an end extending into said housing, a rotatable lift member carried by said shaft end, clutch means in said housing operable to transmit rotation of said shaft in one direction to said receptacle, means operable by rotation of said shaft in said direction to axially move said lift member to raise said receptacle into position for rotation and said clutch means into an operative position, and other means for varying the effective operative position of said clutch means in accordance with the rotational speed of said receptacle.

3. In a washing machine, a receptacle rotatable about a vertical axis, a housing forming the central base portion of said receptacle, a motor driven shaft extending into said housing and being supported against axial displacement, a lift member located within said housing, means mounting said member on said shaft for axial movement with respect thereto, a multiple disk clutch carried by said member, means yieldingly connecting said clutch with the base portion of said receptacle, said last mentioned means, when said shaft rotates in a given direction, being operable by axial movement of said lift member and said clutch to effect a gradually increasing rotation of said receptacle up to synchronous speed with said shaft.

4. In a washing machine having a receptacle rotatable about a vertical axis and axially movable into and out of position for rotation, a housing in the central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing a motor driven shaft having an end extended into said housing and being supported against axial displacement, means in said housing comprising a rotatable lift member having threaded engagement with and being supported by said shaft end for axial movement relative thereto, clutch means carried by said member operable to transmit rotation of said member to said receptacle, means for initially limiting said member to axial movement to engage and move said receptacle into position for rotation upon rotation of said shaft in a given direction, and other means operable to progressively engage said clutch means and effect rotation of said receptacle by said shaft.

5. In a washing machine having a receptacle rotatable about a vertical axis, said receptacle having an at-rest position on a suitable support in said machine and being axially movable into a raised position for rotation a centrally recessed member secured along its margins to the bottom of said receptacle, said member and the receptacle bottom cooperating to form a depending housing, means in said housing for raising and rotating said receptacle comprising one end of a motor driven shaft mounted against axial displacement, a rotatable lift member mounted on said shaft end, said member being sequentially movable axially of said shaft to engage and raise said receptacle and thence rotatable with said shaft, a clutch carried by said member and operable to transmit rotation of said shaft to said receptacle, and means for progressively engaging said clutch whereby to effect rotation of said receptacle at the rate of rotation of said member.

6. Means for axially moving a receptacle that is rotatable about a vertical axis and for rotating said receptacle, said means comprising a driven shaft, a rotatable lift member mounted on and having threaded engagement with an end portion of said shaft for axial movement relative thereto, said member, upon initial rotation of said shaft, being axially movable and adapted to engage and move

said receptacle into position for rotation, mechanism rotated by said shaft engageable with and adapted to rotate with said member upon given axial movement of said member, clutch means carried by said member and operable to transmit rotation of said member to said receptacle, and means associated with said clutch means operable to vary the operative effectiveness thereof in proportion to the speed of rotation of said receptacle.

7. In a washing machine having a receptacle rotatable about a vertical axis, means for rotating said receptacle comprising a driven shaft, a receptacle lift member carried by said shaft, said member being axially movable of and rotatable with said shaft, clutch means carried by said member, yieldable means connecting a part of said clutch means with said receptacle, said yieldable means being operable on said clutch means to vary the effective engagement thereof as between said receptacle and said member in proportion to the speed of rotation of said receptacle.

8. In a washing machine having a receptacle rotatable about a vertical axis, said receptacle being axially movable into a position for rotation, a housing in the central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing, means within said housing for axially moving said receptacle into position for rotation and for rotating said receptacle, said means comprising a driven shaft extending into said housing, a lift member carried by said shaft, said member being axially movable of and rotatable with said shaft, clutch means carried by said member, yieldable means connecting a part of said clutch means with said receptacle, said yieldable means being initially effective to cause said member to move axially of said shaft to engage and move said receptacle into position for rotation, means on said shaft operable to transmit rotation of said shaft directly to said member when said member has axially moved, said yieldable means being operable on said clutch means to vary the operative effectiveness thereof as between said member and said receptacle in proportion to the speed of rotation of said receptacle.

9. In a washing machine, a receptacle rotatable about a vertical axis, said receptacle being axially movable into and out of position for rotation, a housing in a central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing, a motor driven shaft having an end projecting into said housing, clutch means within said housing for transmitting rotation of said shaft to said receptacle, a receptacle lift member threaded on said shaft end, said member, when said shaft is rotated, being axially movable of said shaft and sequentially engaging and moving said receptacle into position for rotation and engaging said clutch means whereby to effect such rotation.

10. In a washing machine, a receptacle rotatable about a vertical axis, said receptacle being axially movable into and out of position for rotation, a housing in a central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing, a motor driven shaft having an end projecting into said housing, clutch means within said housing for transmitting rotation of said shaft to said receptacle, a receptacle lift member on said shaft end, said member, when said shaft is rotated, being initially moved axially thereof to engage and raise said receptacle and engage said clutch means and then rotating with said shaft whereby to transmit rotation of said shaft to said receptacle through said clutch means.

11. In a washing machine, a receptacle rotatable about a vertical axis and axially movable into and out of position for rotation, a housing in the central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing, a supported motor

driven shaft having one end projecting into said housing, means contained entirely within said housing for effecting axial movement of said receptacle into position for rotation and for rotating said receptacle, said means comprising structure carried by said shaft end engageable with said housing, and a clutch operable to transmit rotation of said shaft through said structure to said housing when said structure has moved said receptacle into position for rotation.

12. In a washing machine, a receptacle rotatable about a vertical axis and axially movable into and out of position for rotation, a housing in a central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing, a motor driven shaft having an end projecting into said housing, shaft supported means in said housing for axially moving said receptacle into and out of position for rotation and for rotating said receptacle, said means comprising a rotatable lift member mounted on said shaft and a clutch carried by said lift member operable to transmit rotation of said shaft to said receptacle, means operable upon rotation of said shaft in one direction, to actuate said lift member to axially move said receptacle into position for rotation and said clutch into operative position, said last means being further operable, upon rotation of said shaft in the opposite direction, to axially withdraw said lift member from engagement with said receptacle and enable movement of said receptacle out of position for rotation and render said clutch inoperative.

13. In a washing machine having a receptacle rotatable about a vertical axis, said receptacle having an at-rest position on a suitable support in said machine and being axially movable into a raised position for rotation, a housing in the central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing, means contained in said housing for raising and rotating said receptacle comprising a motor driven shaft mounted against axial displacement and having one end projecting into said housing, a receptacle lift member threaded on said shaft end, said member being sequentially movable axially of said shaft to engage and raise said receptacle and rotatable with said shaft, and clutch means carried by and operable to transmit rotation of said member to said receptacle when said member has been moved axially of said shaft to a given extent.

14. In a washing machine, a receptacle rotatable about a vertical axis, said receptacle being axially movable into and out of position for rotation, a housing in the central base portion of said receptacle, the bottom of said receptacle forming at least one of the walls of said housing, a motor driven shaft having one end projecting into said housing, said shaft being supported against axial displacement, a lift member in said housing having threaded engagement with said shaft end and having limited axial movement with respect thereto when said shaft is rotated, said lift member, when said shaft is rotated, being engageable with and adapted to move said receptacle into position for rotation, and clutch means in said housing for transmitting rotation of said shaft through said lift member to said receptacle when said receptacle is in position for rotation.

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