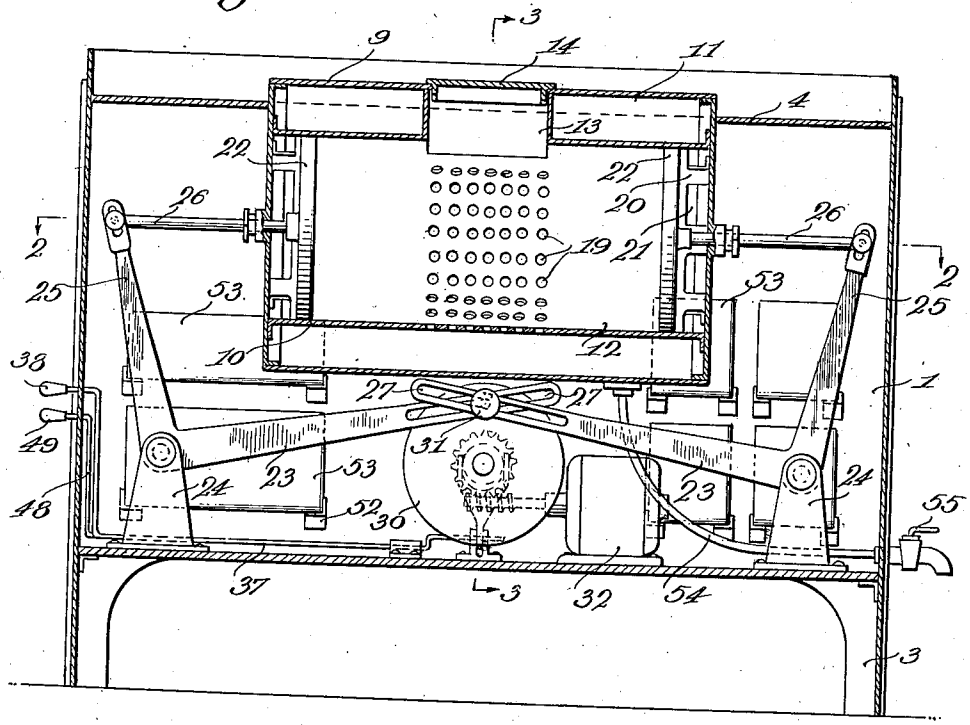
Feb. 4, 1941. T. E. ECKLER 2,230,533

WASHING MACHINE

Filed May 13, 1940 2 Sheets-Sheet 1

Fig. 1.



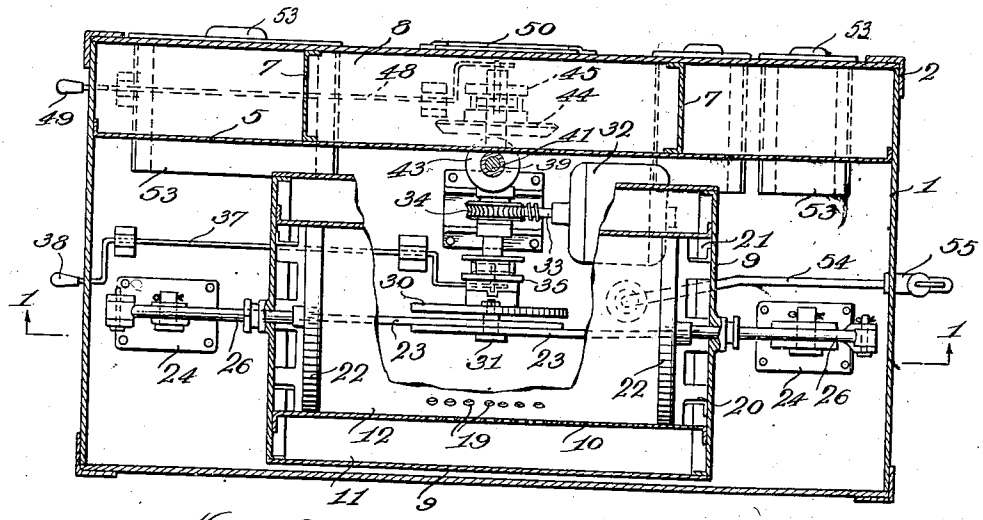


Fig. 2.

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Fig. 3

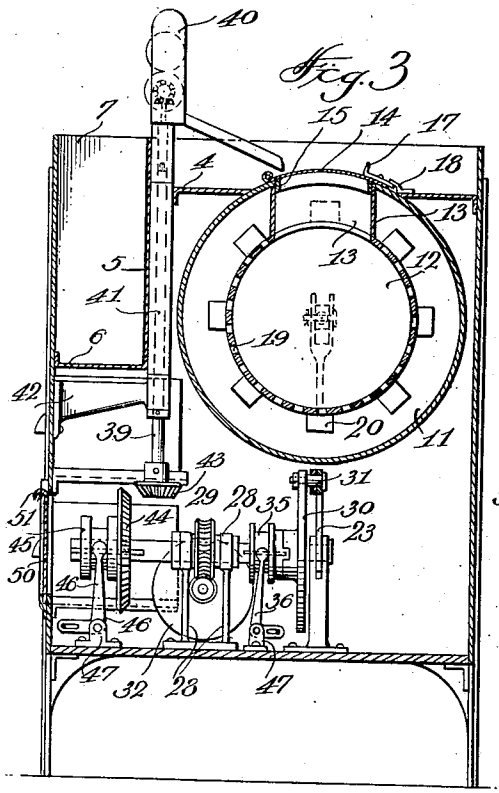
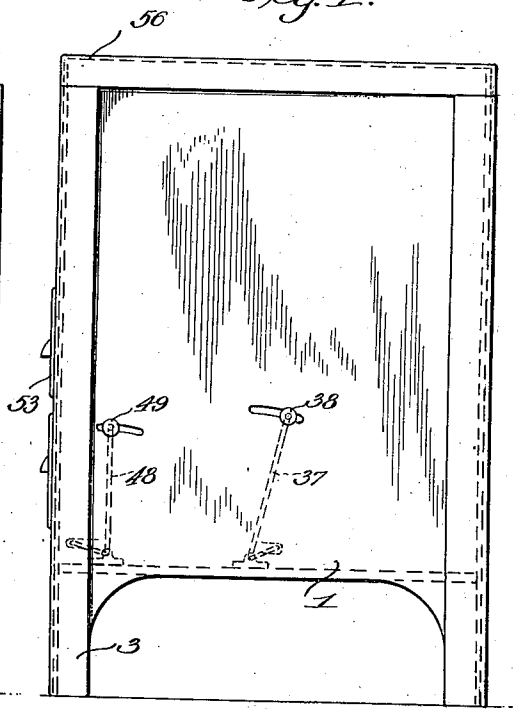


Fig. 4.



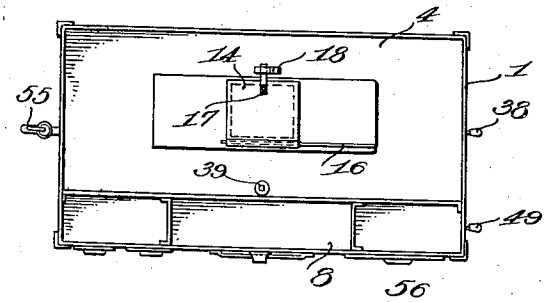


Fig. 5

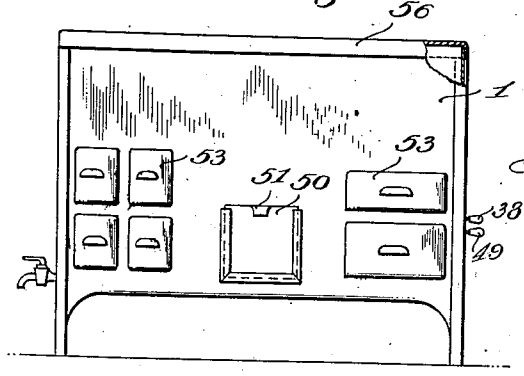


Fig. 6.

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Patented Feb. 4, 1941 2,230,533

UNITED STATES PATENT OFFICE

2,230,533

WASHING MACHINE

Thomas E. Eckler, Fort Madison, Iowa, assignor of one-half to Carl F. McFarlan, Fort Madison, Iowa

Application May 13, 1940, Serial No. 334,958

4 Claims. (Cl. 68—112)

This invention relates to washing machines, and its general object is to provide a machine for washing and rinsing clothes and the like in a manner whereby they are alternately squeezed together and separated, and that action not only forces the fluid through the clothes, but causes them to be agitated, so that all portions of the clothes will be subjected to an equal amount of fluid, thus assuring thorough and complete cleansing thereof without possibility of damage thereto, regardless of the delicacy of the fabric, as my machine is primarily designed to eliminate the clothes twisting, pounding or rubbing action of machines now in general use.

A further object is to provide a motor driven washing machine of the character set forth, in which the fluid is circulated for passage into and out of a clothes receiving chamber, thereby bringing about a continuous change of the fluid and that feature materially contributes toward the cleansing action of my machine.

Another object is to provide a washing machine that includes a perforated clothes receiving chamber within a fluid chamber, and pistons or plungers mounted for movement toward and away from each other, in the clothes chamber, to bring about the squeezing, separating and agitating action of the clothes and the circulation of the fluid, as above set forth.

A still further object is to provide a washing and rinsing machine for clothes and the like, that includes a plurality of rinsing chambers and article receiving drawers, which together with the clothes and fluid chambers and motor driven means for operating the pistons are all housed within a casing provided with a flat top removable lid or cover, so that when the machine is not in use, it can serve as a table.

Another object is to provide a machine of the character set forth, in which provision is made for a wringer that is detachable from its actuating means, so that it can be housed within one of the rinsing chambers when the machine is not in use for washing and rinsing purposes, and the wringer is operated by the motor driven means previously referred to.

A still further object is to provide a washing machine that is simple in construction, inexpensive to manufacture, and extremely efficient in operation, use and service.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a sectional view of my machine, taken approximately on line 1—1 of Figure 2, looking in the direction of the arrows.

Figure 2 is a sectional view taken approximately on line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a sectional view taken approximately on line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a view looking toward one end of the machine.

Figure 5 is a top plan view with the cover or lid removed.

Figure 6 is a front view.

Referring to the drawings in detail, it will be noted that the body of my machine is in the form of a rectangular casing 1 that includes a bottom, side and end walls and right angle reinforcing corner strips 2. The side and end walls have their lower portions cut away toward the ends thereof from below the bottom wall, to cooperate with the lower portions of the corner strips to provide legs 3, and the top wall 4 is disposed below the upper edges of the side and end walls, as well as extends laterally from the vertical portion 5 of a right angle partition that has its horizontal or lower portion 6 extending from the adjacent side wall, as best shown in Figure 3. The partition likewise extends longitudinally of the casing for the entire length thereof and arranged between the vertical portion 5 and the adjacent side wall of the casing is a pair of spaced partitions 7 cooperating with the right angle partition to provide rinsing chambers 8.

Secured to and depending from the top wall 4 to extend longitudinally within the casing, is a receptacle that includes an outer cylinder 9 and an inner cylinder 10, the latter being concentrically arranged within the outer cylinder and spaced from the cylindrical wall thereof to provide a fluid chamber 11, while the inner cylinder provides a clothes receiving chamber 12, the clothes being disposed within and removed from the chamber 12 through a passageway 13 opening through the upper portion of the outer cylinder, as clearly shown in Figures 1 and 3.

The closure for the passageway is in the form of a lid 14 curved to follow the curvature of the outer cylinder and has a marginal flange 15

formed thereon for engagement with the walls of the passageway for fitting association therewith, and the lid is hinged to and slidably mounted on a rod 16 that is fixed to and spaced from the outer cylinder, so that when the lid is moved to open position, it can be slid away from the passageway so as to allow free access to the clothes chamber, as will be obvious upon inspection of Figure 5. Pivoted latching means 17 is provided for the lid for cooperation with the keeper 18 for securing the lid in closed position.

The inner cylinder is centrally perforated as at 19 about the entire circumference thereof, and the ends of the inner cylinder are cut away to provide ears 20 fixed to the ends of the outer cylinder. The spaces 21 between the ears 20 cooperate with the perforations 19 to provide for the free passage of fluid between the chambers 11 and 12, as will be apparent upon inspection of Figure 1. Mounted for reciprocation within the inner cylinder for movement toward and away from each other is a pair of pistons 22 of a diameter for slidably fitting the inner cylinder, and by that construction, it will be obvious that the clothes will be squeezed together and separated. Such action not only forces the cleaning fluid or rinsing water through the clothes, but causes the latter to be agitated, and upon movement of the pistons toward each other, the fluid will be forced from the chamber 12, through the perforations 19 and within the chamber 12 through the open spaces 21. Upon outward movement of the pistons, a reverse action of the fluid takes place, consequently the fluid is being continually circulated, and that feature coupled with the action of the pistons with respect to the clothes, assures thorough cleansing of the latter without damage thereto, or removal of buttons or other fastening means therefrom. While the pistons are shown as having flat confronting faces, they may be concaved.

The pistons are reciprocated through the medium of bell crank levers 23 that are pivotally mounted at the juncture of the arms thereof on pins secured to the upper ends of upright brackets 24 fixed to and rising from the bottom wall of the casing, as best shown in Figure 1. The upper ends of the upright or short arms 25 of the bell crank levers are bifurcated and slotted longitudinally to receive pivot pins for the connecting rods 26 of the pistons, as clearly shown in Figure 1, while the other or long arms of the bell crank levers are directed toward each other and slotted longitudinally as at 27 from the free ends thereof for a considerable distance of their length, as clearly shown in Figure 1 for a purpose which will be later described.

Mounted in the upper ends of a pair of spaced parallel bearing brackets 28 that are secured to the bottom wall, is a shaft 29 extending transversely of the casing in the form as shown, and rotatably mounted on one end of the shaft 29 is a disk 30 having a headed stud 31 eccentrically secured thereto and extending outwardly therefrom, with the long arms of the bell crank levers mounted on the studs 31, through the medium of the slots 27, so that upon rotation of the disk, it will be obvious that the pistons are reciprocated toward and away from each other for the purpose set forth.

The shaft 29 is rotated by an electric motor 32, and for that purpose, the armature shaft of the motor is formed to provide a worm screw 33 that meshes with a worm gear 34 secured to the shaft 29 between the bearing brackets 28. Keyed to the shaft 29 is a clutch member 35 for connecting and disconnecting the disk 30 with the shaft 29 and the clutch member is operated by a fork 36 that is actuated by a crank rod 37 extending from the fork and through one end wall of the casing, with a knob 38 secured to its outer end, as best shown in Figure 7. An electric cord is provided for the motor for connecting the same with a suitable source of current.

I likewise provide a wringer shaft 39 extending vertically of the casing and through the top wall thereof to terminate in a square cornered upper end for detachably receiving the wringer 40 that includes a drain board, as shown. The wringer shaft is mounted within a sleeve housing 41 and a bracket 42 secured to and extending inwardly from the front wall of the casing. Fixed to the lower end of the wringer shaft 39 is a beveled gear 43 disposed in the path of a beveled gear 44 that is keyed to the shaft 29 for slidable movement thereon for disposal into and out of mesh with the gear 43. For that purpose, the gear 44 has formed thereon a clutch member 45 that has mounted therein the upper ends of a fork 46 which like the fork 36 is pivoted between spaced parallel ears 47 fixed to the bottom wall and is operated by a crank rod 48 which likewise extends through the same end wall as the crank rod 37 and the crank rod 48 has a knob 49 secured to the outer end thereof.

One side wall of the casing has an opening therein to allow access to the interior and the opening is preferably closed by a sliding door 50 mounted in suitable guides, and the door is provided with a handle 51. The latter mentioned side wall also has drawer receiving openings therein having drawer guides 52 extending inwardly therefrom and suitably supported within the casing for receiving drawers 53, there being two sets of drawers disposed upon opposite sides of the door closed opening, and the drawers are provided with handles, as shown.

In order to drain the receptacle, I provide a tube 54 connected to the bottom of the outer cylinder and extending to one end wall of the casing, with a drain valve in the form of a cock 55 secured thereto, as clearly shown in Figure 1.

A closure is provided for the upper end of the casing and it is in the form of a flanged flat top lid 56, so that when the machine is not in use, the closure can be applied and then the machine can serve in the capacity as a table, it being understood that the wringer is removed from its shaft and can be stored within one of the rinsing chambers 8.

From the above description and the disclosure in the drawings, it will be obvious that when it is desired to wash clothes and the like, they are placed within the chamber 12, after the receptacle has been partially filled with cleaning fluid, thence the pistons are put into operation by movement of the crank rod 37, so that the clutch will be engaged with the disk 30, to bring about reciprocation of the bell crank levers and consequently the pistons. While I have provided rinsing chambers 8, it will be further obvious that the cleaning fluid can be drained from the receptacle and rinsing water disposed therein for rinsing the clothes after they are washed, and when it is desired to use the wringer it is applied to its shaft and operated upon movement of the crank rod 48 for disposing the gear 44 in mesh with the gear 43.

It is thought from the foregoing description

that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:

1. A washing machine comprising a casing, a receptacle in the casing and including an outer imperforate cylinder, an inner cylinder within the outer cylinder and providing a clothes receiving chamber and a fluid chamber about the clothes chamber, said inner cylinder being circumferentially perforated centrally thereof and having circumferentially disposed openings about its ends to provide communication between the chambers, a pair of pistons mounted for reciprocation within the clothes chamber for squeezing and separating the clothes and to circulate fluid from one chamber to the other, access means for the clothes chamber and being in the form of a passageway between the chambers and opening through the top of the receptacle, a hinged and slidably mounted closure for the access means, and means for operating the pistons.

2. A washing machine comprising a rectangular casing, a receptacle in said casing and including an outer imperforate cylinder extending longitudinally of the casing, an inner cylinder in the outer cylinder and providing a clothes receiving chamber and a fluid chamber about the clothes chamber, said inner cylinder being circumferentially perforated centrally thereof and having its ends cut away to provide ears and spaces between the ears, said spaces and perforations providing communication between the chambers and said ears being fixed to the ends of the outer cylinder for securing the inner cylinder concentrically with respect thereto, means mounted for reciprocation toward and away from each other within the clothes chamber for squeezing and separating the clothes and to circulate fluid from one chamber to the other, access means for the clothes chamber and opening through the top of the receptacle, a closure for the access means, and means for operating the reciprocating means.

3. A washing machine comprising a casing, a receptacle in the casing, means providing a clothes receiving chamber within the receptacle and a fluid chamber about the clothes chamber, said chambers communicating with each other centrally thereof and at their ends, means mounted for reciprocation toward and away from each other within the clothes chamber for squeezing and separating the clothes and to circulate fluid from one chamber to the other, access means for the clothes chamber and opening through the top of the receptacle, a closure for the access means, means for operating the reciprocating means and including pivotally mounted bell crank levers having one of their arms connected to the reciprocating means, motor driven means within the casing and including a disk having the other arms eccentrically connected thereto, and clutch means for the driven means.

4. A washing machine comprising a casing, a receptacle in the casing, means providing a clothes receiving chamber within the receptacle and a fluid chamber about the clothes chamber, said chambers communicating with each other centrally thereof and at their ends, pistons mounted for reciprocation toward and away from each other within the clothes chamber for squeezing and separating the clothes and to circulate fluid from one chamber to the other, access means for the clothes chamber and opening through the top of the receptacle, a closure for the access means, connecting rods for the pistons and extending through the ends of the receptacle, bell crank levers pivoted within the casing between their ends and having upright arms pivoted to the connecting rods, motor driven means including a disk, a headed stud secured to the disk and extending eccentrically therefrom, the other arms being slotted from adjacent their free ends and having the stud mounted in the slots for swinging the bell crank levers on their pivots to reciprocate the pistons, and clutch means for the motor driven means.

THOMAS E. ECKLER.