Dec. 31, 1929. J. B. KIRBY 1,741,317

CLOTHES WASHING MACHINE

Filed May 29, 1928

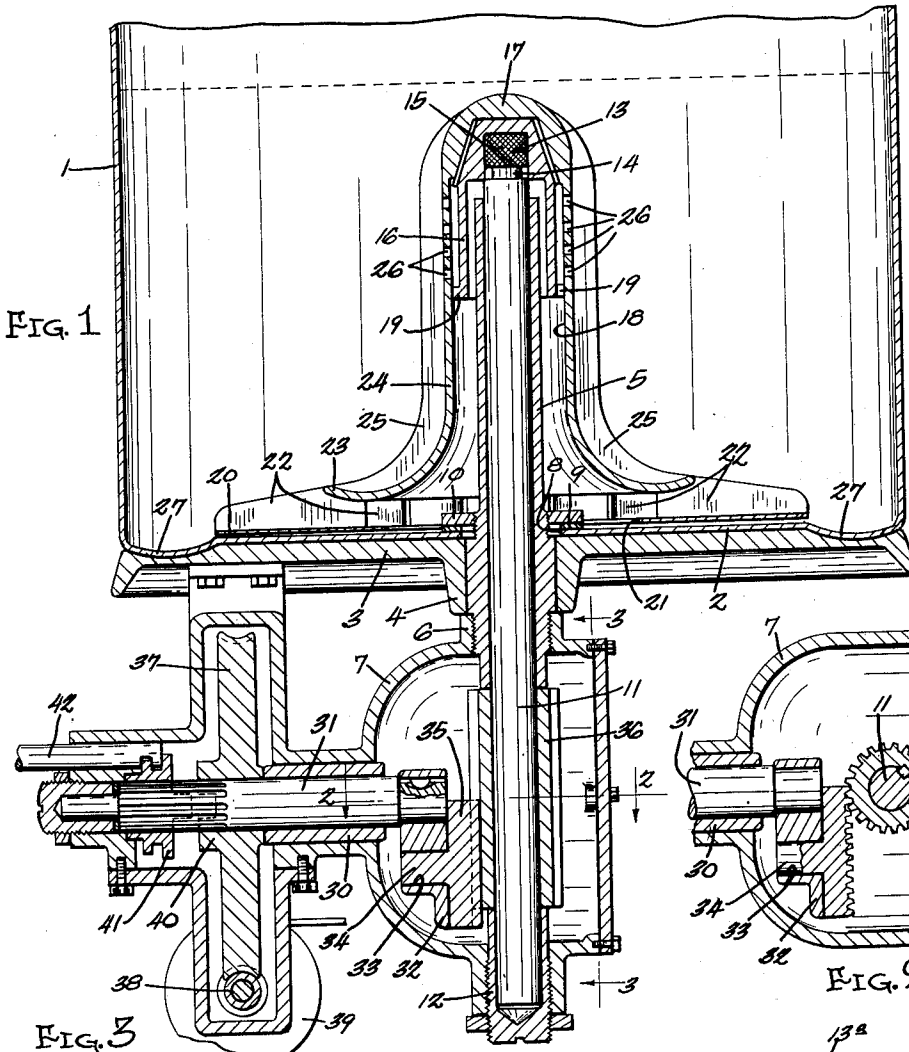


FIG. 1



FIG. 2

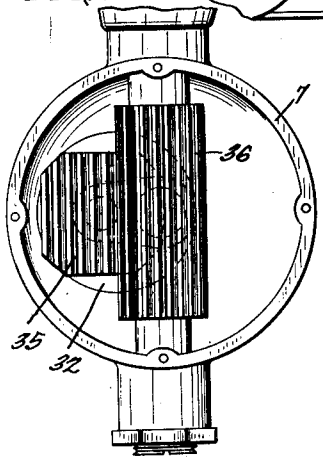


FIG. 3

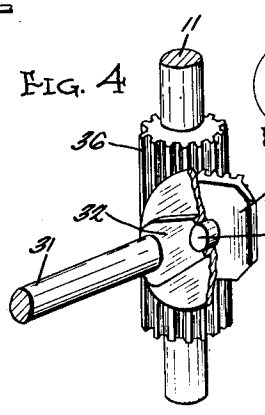


FIG. 4

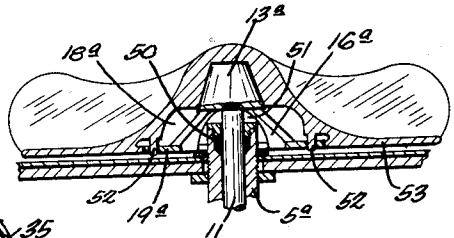


FIG. 5

JAMES B. KIRBY
INVENTOR
BY Smith and Freeman
ATTORNEYS

Patented Dec. 31, 1929 1,741,317

# UNITED STATES PATENT OFFICE

JAMES B. KIRBY, OF WEST RICHFIELD, OHIO

## CLOTHES-WASHING MACHINE

Application filed May 29, 1928. Serial No. 281,455.

This invention relates to clothes washing machines and has for its object the provision of a new, improved and simplified construction for supporting, attaching, guiding, and operating an agitator, and for preventing leakage between the tub interior and the bearing in either direction. Another object of this invention is the provision of an improved agitator and the provision of means for preventing entrance of clothes, etc. beneath the same. Further objects and advantages of the invention will become apparent as the description proceeds.

In the drawings accompanying and forming a part of this application, Fig. 1 is a vertical sectional view through the essential parts of a clothes washing machine containing my improvements; Figs. 2 and 3 are sectional views corresponding to the lines 2—2 and 3—3 respectively of Fig. 1; Fig. 4 is a perspective view of a part of the driving device, portions being broken away; and Fig. 5 illustrates a modified arrangement for supporting and driving the dasher from its operating shaft.

The washing machine here shown for purposes of illustration comprises a liquid-holding tub or casing having a side wall 1 and a bottom wall 2 mounted on a supporting member 3 which is formed with a central hub 4 in which is secured an upright hollow sleeve 5 whose lower end is screwed into the threaded top-neck 6 of a gear casing 7. The tub is formed with a central aperture 8 for this sleeve, leakage being prevented by the gasket 9 and movement by a nut 10. Journaled in the sleeve 5 is an upright rock shaft 11 whose lower end is journaled in and supported by a suitable thrust-bearing 12 in the bottom of the casing 7, and whose upper end rises above the top of the sleeve 5 where it is provided with a driving head 13. This head is preferably made of a metal which shrinks upon cooling and is cast around the upper end of the shaft so as to grip the same tightly upon setting, the shaft being also preferably grooved as at 14 and knurled as at 15 to increase the solidity of its attachment. This head is formed with an imperforate sleeve-part 16 depending over and around the upper end of the sleeve so as to form a kind of air-bell which shall prevent the washing liquid from rising to the top of the sleeve no matter how deeply said sleeve may be submerged.

Detachably mounted on said head so as to be supported and driven thereby is a dasher which may, within my invention, take any one of many forms. Whatever the shape and construction of the dasher in other respects, the same is formed with an upstanding central part or hub terminating in a socket 17 tightly receiving the head 13, and the exterior of said head and interior of the socket are preferably formed with cooperating flutes for driving purposes. The hub of the dasher is also formed with a central recess 18 surrounding the sleeve 16, and said sleeve is preferably provided near its lower end with suitable projections 19 which engage the interior of said hub in guiding and steadying relation.

The particular dasher shown in Fig. 1, exhibits, in addition to those features which characterize its association with the driving shaft, certain other features of independent value. The bottom of said dasher comprises a flat annular disk 20 closely overhanging the bottom wall of the tub and formed at its center with an aperture 21 for the nut 10. Carried by this disk are a plurality of spaced radial vanes or blades 22 and spaced vertically above the disk 20 and of smaller diameter but concentric therewith is another circular disk 23 which is integral with the upstanding hollow hub 24 which terminates in the socket 16 heretofore mentioned. The exterior of this hub is formed with vertical, spaced, radial blades or ribs 25, and its body is formed between those ribs with perforations 26 for the ingress of washing liquid. When the shaft and dasher are oscillated, the blades 22 produce a certain circulation of liquid, inwardly through the perforations 26 and outwardly across the top of the disk 2, in such wise as to inhibit the entrance of fabrics beneath that disk. Further to protect against this ingress, and also to constitute a safeguard against gravel, nails, buttons, and the like finding their way beneath the dasher,

the tub bottom is formed outside of that dasher with an annular depression 27.

While it is obvious that any one of many mechanical movements can be employed for oscillating the shaft 11 I have here illustrated a movement which I find particularly simple, quiet, efficient, and inexpensive. Journaled in the bearing 30 carried by one side of the housing 7 is a horizontal shaft 31 having at its end a crank-disk 32 formed at one side of said shaft with an aperture 33 parallel to said shaft in which is journaled a stud 34 projecting from the rear face of a rack-section 35 meshing with an elongated pinion 36 keyed to the shaft 11. The length of the pinion 36 is sufficiently great to accommodate the parallax of the crank, while the engagement between the teeth of the rack and pinion prevents said rack from rotating.

For driving the shaft 31 I have shown a worm gear 37 loosely sleeved thereon and meshing with a worm 38 driven by the belt-pulley 39. The hub 40 of the worm gear 37 is formed with clutch teeth adapted to cooperate with companion teeth carried by the clutch-spool 41 which is slidably splined on the shaft 31 and operated by the manually movable clutch-shifter 42.

In Fig. 5 I have illustrated another modified form of shaft-head and dasher drive. In this modification the sleeve $5^a$ terminates only a short distance above the bottom of the tub and is there provided with a packing box 50 to prevent leakage along the shaft in case of the removal of the dasher. Cast on the upper end of the shaft 11 is a rigid head $13^a$ and depending from this head over and around the upper end of said sleeve is a hollow part $16^a$, terminating in a circular rim $19^a$. In this case, however, I have shown the part $16^a$ as formed with apertures 51 for access to the stuffing box, and the rim $19^a$ as recessed for the reception of driving fingers 52 carried by the dasher 53, while the head $13^a$ and the socket which receives the same are here shown as smooth, so as to have merely a supporting function while the entire driving function is performed by the rim and fingers. In this case I have also shown the dasher as recessed at $18^a$ forming an air-bell, which in this instance is not perforated and, while said dasher is in place, pockets sufficient air to depress the water level below the top of the sleeve.

Certain features of construction of the dasher are reserved for the claims of my copending application filed January 28, 1929, Serial No. 335,490.

It will be understood that many changes in the different details and appearances may be made without departing from my inventive idea and I do not limit myself except as specifically recited in my several claims which I desire may be construed broadly each independent of limitations contained in other claims.

Having thus described my invention what I claim is:

1. In a clothes washing machine, in combination, a casing having an upright sleeve in its bottom, a shaft journaled in said sleeve, a head rigid with said shaft, an imperforate part depending over and around the upper end of said sleeve and defining an air-bell, and a dasher detachably mounted on said head and around said imperforate part.

2. In a clothes washing machine, in combination, a casing having an upright sleeve in its bottom, a shaft journaled in said sleeve and projecting above the upper end of the same, a head fastened to the projecting end of said shaft and having an annular flange depending around the upper end of said sleeve and spaced laterally from said sleeve so as to define an air-bell, and a dasher detachably mounted on said head, the upper part of the chamber defined by said flange being air-tight and the exterior of said head being non-circular and fitting said dasher in driving relation.

3. In a clothes washing machine, in combination, a casing having an upright sleeve in its bottom, a shaft journaled in said sleeve, a head rigid with said shaft, a part depending over and around the upper end of said sleeve, and a dasher having a hollow part removably seated on said head, the walls of said hollow part engaging the exterior of said depending part in guiding relation.

4. In a clothes washing machine, in combination, a casing having an upright sleeve in its bottom, a shaft journaled in said sleeve and having an irregular upper end projecting above the top of said sleeve, a head of material which contracts on solidification cast on said shaft and comprising a hollow portion depending over and around the upper end of said sleeve, the exterior of said sleeve being formed to receive a dasher, and a dasher detachably mounted on said head.

In testimony whereof I hereunto affix my signature.

JAMES B. KIRBY.