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2,609,697

DRIVE MECHANISM FOR WASHING MACHINES AND THE LIKE

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2 SHEETS—SHEET 1

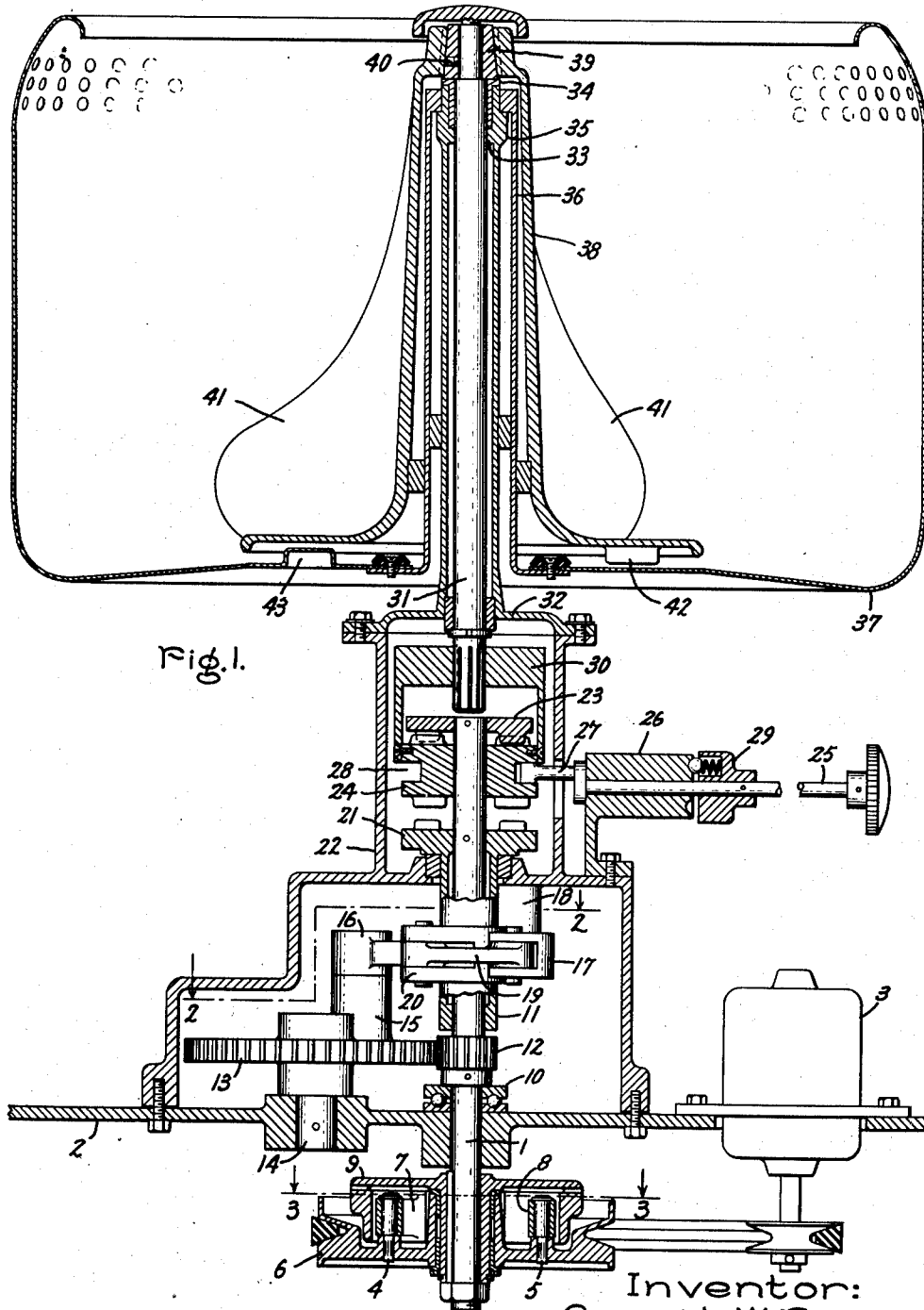


Fig. 1.

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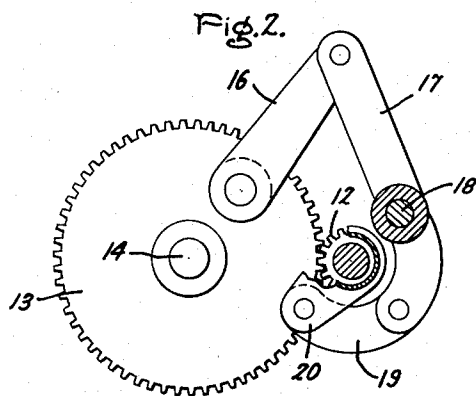
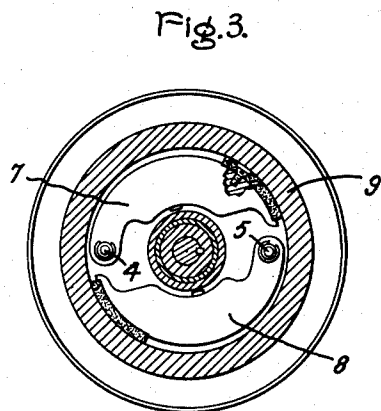
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DRIVE MECHANISM FOR WASHING MACHINES AND THE LIKE

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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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DRIVE MECHANISM FOR WASHING
MACHINES AND THE LIKEGarnet W. Ruscoe, Trumbull, Conn., assignor to
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1 Claim. (Cl. 74—70)

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My invention relates to drive mechanisms and, more particularly, to drive mechanisms as used in clothes washing machines and the like having a unidirectional rotation drive and an oscillatory rotation drive.

The drive mechanisms currently employed in washing machines which wash clothes and then partially dry them by centrifugal extraction are exceedingly complex and expensive. The complexity arises from the fact that during the washing cycle the agitator must move in oscillatory rotation to stir the clothes about in the water, and during the extraction cycle the basket must move in unidirectional rotation at a high speed.

Therefore, an important object of my invention is to provide a low-cost mechanism for driving a washing machine which employs an agitation cycle and a centrifugal extraction cycle.

In carrying out my invention in one embodiment thereof, a washing machine is provided with a clothes-receiving basket, an agitator, and a motor for driving a first shaft in continuous rotation. A two-gear mechanism cooperating with a rocker arm and link mechanism converts the rotation of the first shaft to oscillatory rotation and transmits the oscillatory rotation to a second shaft. A clutch mechanism selects either the rotating or oscillating mode of operation and transmits the selected mode of operation through a third shaft to the agitator disposed within the washing machine basket. During continuous rotation, a drive dog on the bottom of the agitator engages a similar drive dog on the bottom of the basket and causes the basket to follow the agitator in rotation.

For additional objects and advantages and for a better understanding of my invention, attention is now directed to the following description and the accompanying drawing and also to the appended claim in which the feature of my invention believed to be novel are particularly pointed out. Fig. 1 is a sectional view in elevation of my invention; Fig. 2 is a section of Fig. 1 taken along lines 2—2 and showing a plan view of the mechanism for converting unidirectional rotation to oscillatory rotation; Fig. 3 is a section of Fig. 1 taken along line 3—3 and showing a plan view of the centrifugal clutch mechanism employed in my invention.

Referring to the drawings, the shaft 1 is mounted vertically for rotation in the washer casing 2. Shaft 1 is driven in rotation by the motor 3 through a centrifugal clutch mechanism and a system of belts and sheaves or the like.

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The centrifugal clutch mechanism slips when the mechanism is initially put into the spin position, thereby allowing the motor to accelerate the basket to full spinning speed without being overloaded. The pins 4 and 5 are mounted on pulley 6 diametrically opposite one another. The clutch shoes 7 and 8 are pivotally mounted on pins 4 and 5 respectively. As pulley 6 is rotated about shaft 1, clutch shoes 7 and 8 are revolved about shaft 1 and pivot about their respective axes at the same time. As shoes 7 and 8 pivot about their axes, they are thrown against clutch drum 9, and the forces of friction between the clutch shoes and drum 9 drag drum 9 in rotation with pulley 6. Shaft 1 is keyed to drum 9.

The thrust bearing 10 transmits the weight of shaft 1 and the mechanism attached to shaft 1 to washer casing 2. The shaft 11 is disposed concentrically around shaft 1. The unidirectional rotation of shaft 1 is converted to oscillatory rotation and transmitted to shaft 11 by the pinion gear 12 pinned to shaft 1, the spur gear 13 rotatably mounted on the stud 14, the pin 15 mounted on the face of gear 13, the link 16, the rocker arm 17 pivotally mounted on the stud 18, the link 19, and the arm 20 secured to shaft 11. The distance between stud 14 and pin 15 is controlled by the amplitude of oscillation of the shaft 11 desired. The clutch plate 21, driven in oscillatory rotation by shaft 11, is secured to the upper end of shaft 11 and is suitably journaled in housing 22. The clutch member 23 is secured to the upper end of shaft 1 and is driven in continuous rotation by shaft 1.

Pinion gear 12 is driven in rotation by shaft 1 and in turn drives spur gear 13 in rotation. The end of link 16 pivotally mounted on pin 15 is caused to follow pin 15 as it is revolved about stud 14. Link 16 causes rocker arm 17 to oscillate about stud 18. The oscillations of rocker arm 17 are transmitted to shaft 11 through link 19 and arm 20.

The clutch member 24 is slideably mounted on shaft 1 between clutch members 21 and 23. The shift lever 25 is supported in the collar device 26. Shift lever 25 is provided with the offset portion 27 to engage clutch member 24 in the groove 28 on the circumference of clutch member 24. The longitudinal position of clutch member 24 with respect to shaft 1 is changed by rotating the lever 25. Pinned to lever 25 is a ball and detent mechanism 29 which bears on the end surface of collar 26. Detents are provided in the end surface of collar 26 to hold lever 25 in posi-

tion for the neutral, the agitate, and the rotate modes of operation.

In Fig. 1, clutch member 24 is shown engaging clutch member 23 for the rotate mode of operation. As shown in Fig. 1, the drive dogs on the upper surface of clutch member 24 engage the drive dogs on the lower surface of clutch member 23, and clutch member 24 is thereby driven in rotation. If lever 25 is turned through one quarter of a revolution, clutch member 24 is moved down shaft 1 to the neutral position. If lever 25 is turned another quarter of a revolution in the same direction, clutch member 24 is moved further down shaft 1. The drive dogs on the lower surface of clutch member 24 engage the drive dogs on the upper surface of clutch member 21, and clutch member 24 is thereby driven in oscillatory rotation.

An inverted cup-shaped member 30 is secured to clutch member 24 and engages the shaft 31 by means of a longitudinally sliding fit with the splines on the lower end of shaft 31. As clutch member 24 is moved up or down, member 30 also moves up or down but remains in engagement with shaft 31. The housing 32 is concentric about shaft 31 and is secured to the upper end of housing 22. A circumferential lip 33 around the inside of concentric housing 32 serves as partial support for the thrust bearing 34. The circumferential shoulder 35 around the upper end of concentric housing 32 supports the sleeve 36 to which the basket 37 is secured. The agitator 38 is secured to the bearing 39 and the shaft 31 by a set screw 40. The vanes 41 on agitator 38 stir the clothes and the water in basket 37 during the agitate cycle.

During the continuous rotation cycle, the drive dog 42 on the bottom of agitator 38 engages the drive dog 43 on the bottom of basket 37 and causes basket 37 to follow agitator 38. At the beginning of the agitate cycle, dog 42 engages dog 43 and drives basket 37 to such a position that dogs 42 and 43 do not engage during the subsequent oscillations of agitator 39.

It will be seen that as long as motor 3 is driving shaft 1, clutch member 23 is driven continuously in unidirectional rotation and that clutch member 21 is driven continuously in oscillatory rotation. When lever 25 is rotated, clutch member 24 is moved longitudinally along shaft 1 to engage either rotating clutch member 23 or oscillating clutch member 21. The rotating or oscillating motion is transmitted through inverted cup-shaped member 30, shaft 31, and bearing 39 to agitator 38.

While the present invention has been described by reference to particular embodiments thereof, it will be understood that this is by way of illustration of the principles involved and that those skilled in the art may make many modifications in the arrangement and mode of operation. Therefore, I contemplate by the appended claim to cover any such modifications as fall within the true spirit and scope of this invention.

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

A drive mechanism for transmitting rotary and oscillatory motion to a driven shaft, comprising a first and second drive shaft, said second drive shaft having an axial bore therein for receiving said first drive shaft, means for rotatably driving said first drive shaft, means connected to said first drive shaft for driving said second shaft oscillatably, a first clutch device secured to said first shaft and having a plurality of radial drive dogs secured to one face thereof, a second clutch device secured to said second shaft and provided with a passageway through which said first shaft extends and having a plurality of radial drive dogs secured to one face thereof, a third clutch device having a circumferential groove therearound and a plurality of radial drive dogs secured to each face thereof, said third clutch device slidably mounted on said first drive shaft between said first and second clutch devices, a shift lever mechanism engaging said third clutch device in said circumferential groove and operative to slide said third clutch device along said first shaft selectively to engage said first clutch device or said second clutch device, and an inverted cup-shaped member extending concentrically around said first clutch device and secured to said third clutch device, said driven shaft being secured at one end to said inverted cup-shaped member.

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