May 16, 1950 T. R. SMITH 2,508,046

CAM ACTION WRINGER CLUTCH

Filed March 29, 1946 2 Sheets-Sheet 1

Fig. 1

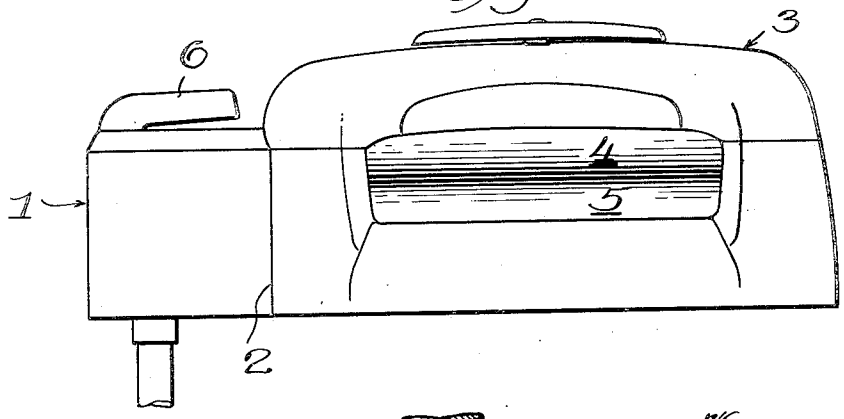


Fig. 2

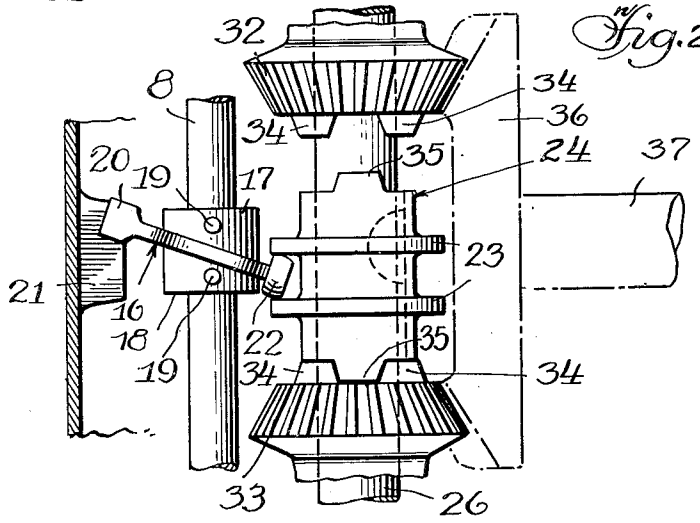
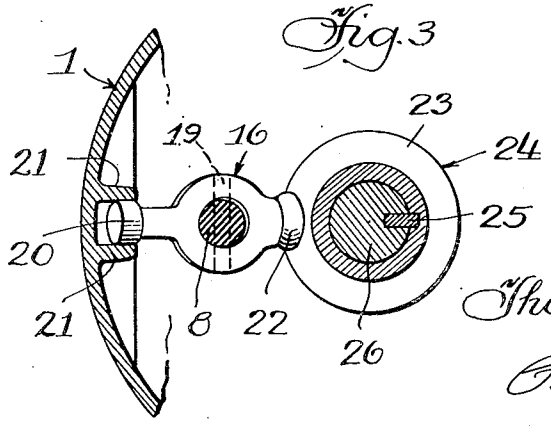


Fig. 3



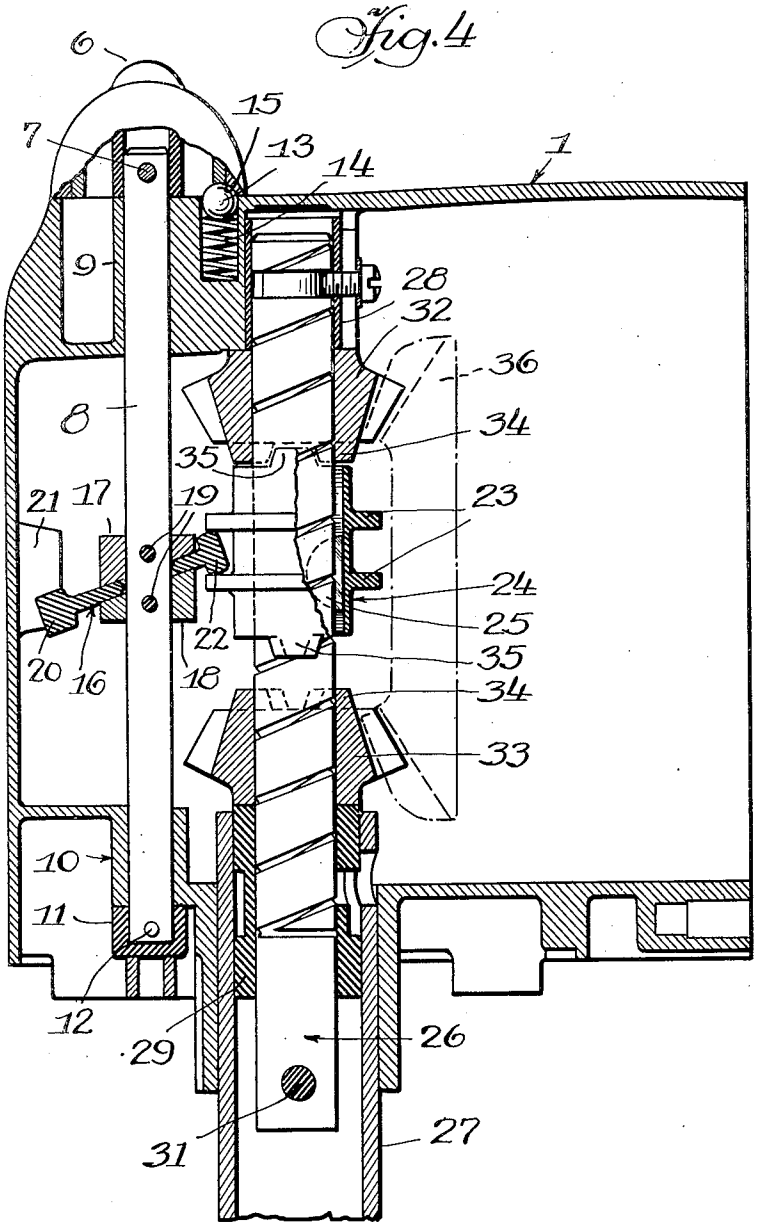
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CAM ACTION WRINGER CLUTCH

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Fig. 4



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CAM ACTION WRINGER CLUTCH

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11 Claims. (Cl. 74—378)

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The present invention relates to wringer operating mechanism for a washing machine, and especially to a novel cam action wringer clutch for controlling the power to the wringer rolls.

The novel invention comprehends a cam actuating means and mechanism for clutching the wringer rolls to the power drive to thereby drive or rotate the rolls in either direction.

It is a further object of the present invention to provide novel control mechanism for the wringer rolls which is conveniently positioned and which is simple and positive in operation. In the novel embodiment the control handle is mounted at the top of the wringer gear housing upon a control shaft extending parallel to the drive shaft carrying the gear clutch.

Another object of the present invention is the provision of a novel means and manner of shifting a clutch rotatably mounted upon a vertical power shaft. This is accomplished by means of a simple wobble plate construction guided in its movement in such manner that rotation of the handle through a predetermined arc in either direction from its neutral or inoperative position causes movement of the clutch vertically upon the drive shaft and into clutching engagement with one or the other of a pair of opposed gears loose upon this shaft.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawings, and while there is shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawings:

Figure 1 is a view in front elevation of a wringer for a washing machine equipped with the present invention.

Fig. 2 is a fragmentary view in side elevation of the wringer gear assembly with the clutch moved into clutching engagement with the lower of a pair of gears.

Fig. 3 is a fragmentary view showing in top plan the novel wobble plate and cam follower and its association with the gear case and clutch.

Fig. 4 is an enlarged view, part in vertical cross-

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section and part in side elevation, through the novel assembly, the clutch having been moved into clutching engagement with the upper gear.

Referring more particularly to the embodiment shown in the drawings to illustrate the present invention, the novel cam action wringer clutch is enclosed within a wringer head 1 adapted to be suitably bolted or otherwise connected at 2 to a wringer 3 provided with an upper roll 4 and a lower roll 5 mounted for rotation in either direction under the control of a handle 6. As shown in Fig. 4, this handle is pinned or otherwise secured at 7 to the upper end of a shifter shaft or rod 8 journalled adjacent its upper end in a bushing or bearing 9 and at its lower end in a bearing sleeve 10. A cap 11 is secured to the lower end of this shaft by a groove pin 12 and locks this shaft against endwise movement.

A ball 13 actuated by a spring 14 is adapted to seat in spaced recesses provided in the underside 15 of the wringer control handle 6 for retaining this handle in adjusted position and against accidental dislodgment or movement. As shown, the handle is in neutral or inoperative position when it projects substantially parallel to the wringer frame as in Fig. 1. When this handle is moved approximately 90° in either direction from this neutral position, the wringer rolls rotate in one or the other direction.

Clutching and rotation of the rolls is accomplished by means of a wobble plate cam follower 16 loose upon the shaft or rod 8 but mounted between an upper cam 17 and a lower cam 18, each pinned to the shaft by a groove pin 19. The wobble plate is provided with an enlarged outer end 20 positioned and guided in a slot formed by a pair of spaced projections 21, 21 on the interior of the wringer head 1, and an enlarged inner end 22 comformably received between a pair of spaced flanges 23, 23 on a clutch member 24. This clutch member is keyed at 25 to a vertical drive shaft 26 but is freely shiftable thereon by movement of the inner end 22 of the wobble plate 16.

By this construction and arrangement of the loosely mounted wobble plate or cam follower 16 between the inclined cam faces of the rotatable upper and lower cams 17 and 18, respectively, the wobble plate or cam follower is free to pivot about the control or shifter shaft 8 and the opposite ends 20 and 22 thereof are moved vertically by the adjoining and contacting cam faces as the control or shifter shaft 8 and its cams 17 and 18 which are pinned thereto are manually rotated by movement of the handle 6. At the same time rotation of the wobble plate or cam follower about

the axis of the control shaft is prevented by the spaced vertical projections 21, 21 which provide a vertical slot or guide passage receiving and confining the end 20 and limiting its movement to a vertical plane. The vertical movement of the end 22 of the wobble plate or cam follower seating between the spaced annular flanges or portions 23 of the clutch member 24 causes the clutch member to move axially along the drive shaft 26 to its raised or lowered clutching position.

The vertical drive shaft 26 is journalled in a wringer stem 27 by means of an upper bearing sleeve 28 and a lower bearing sleeve 29 pressed into the wringer stem. At its lower end the shaft 26 is provided with a groove pin 31 for detachably mounting this shaft upon the upper end of an aligned drive shaft (not shown) as is customary with wringer type washing machines to permit the wringer to be lifted off and removed, when desired. The wringer drive shaft 26 is shown in Fig. 4 as provided with spirally arranged lubricating grooves while in Fig. 2 such grooves have been omitted. However, it is to be understood that the shaft may be formed or provided either with or without such grooves, as desired.

Loosely mounted upon the upper drive shaft 26 and in spaced, opposed relation, are a pair of bevel gears 32 and 33 disposed adjacent to but normally spaced from the opposite ends of the clutch member 24. Each gear is provided with a clutching face having spaced lugs 34 for receiving lugs 35 on the opposite ends of the clutch member. These gears 32 and 33 are so spaced apart as to be retained in continuous meshing engagement with a large bevel gear 36 on the end of a driven shaft 37 suitably connected to the wringer rolls for rotating these rolls in either direction of travel.

Normally, the shifter handle is disposed in neutral or inactive position as shown in Fig. 1. In that position, the upper drive shaft 26 will be rotating if the motor is operating, but as the gears 32 and 33 are free upon the shaft, such rotation will not be transmitted to the common gear 36 and the wringer rolls will remain stationary. If the control or shifter handle 6 is moved to the left or counter-clockwise through an arc of approximately 90° as shown in Fig. 4, it will rotate the shaft 8 and cams 17 and 18 sufficiently for the wobble plate cam follower 16 to elevate the clutch by means of the enlarged inner end 22 to engage the upper gear 32 whereby the shaft 26 will rotate the clutch member 24 and the gear 32 clutched thereto, and the latter in turn will drive the common gear 36 and driven shaft 37 for rotating the wringer rolls in the desired direction.

Turning the control or shifter handle through an arc of approximately 90° in a clockwise direction from the position shown in Fig. 1, the shifter shaft 8, cams 17 and 18 and wobble plate cam follower 16 will move the clutch to the position shown in Fig. 2 in which it engages the gear 33 and rotates the common gear 36 and driven shaft 37 in the reverse direction from that shown in Fig. 4.

The present novel construction provides a simplified and unique assembly in which the control handle is placed on top of the wringer head where it is most accessible and convenient to operate.

Having thus disclosed my invention, I claim:

1. In a wringer head construction, a vertical drive shaft, a pair of opposed gears loose upon the shaft and in continuous mesh with a common driven gear for operating the wringer rolls, a clutch keyed upon the drive shaft intermediate said gears and adapted to be moved into clutching engagement with either of the opposed gears, a vertically disposed shifter shaft, a control handle for the shifter shaft located on the top of the wringer head, spaced cam members secured upon and rotatable with the shifter shaft, and a cam follower loose upon the shifter shaft and disposed between the adjacent cam faces on said members whereby rotation of the shifter shaft and cam members transmits movement to the cam follower, and a projection on the cam follower engaging the clutch for transmitting such movement to the clutch.

2. In a wringer head construction, mechanism therein for driving cooperating wringer rolls in either direction and including a drive shaft, opposed gears loose on the shaft and disposed in spaced relation, means for clutching either of said gears to the drive shaft for rotating the wringer rolls, and shifter mechanism for actuating the clutching means into clutching engagement with either of said gears to drive the rolls in either direction, said shifter mechanism including a shifter shaft disposed alongside the drive shaft and parallel thereto, a control handle positioned at the top of the wringer head and secured upon the outer end of the shifter shaft, cams secured to the shifter shaft, a wobble plate cam follower associated with the clutching means and actuated by the cams upon movement of the handle and shifter shaft to move the clutching means into clutching engagement with either gear, and a slot in the wringer head for guiding the movement of the cam follower.

3. In a wringer head construction, mechanism therein for selectively operating the wringer rolls and including a drive shaft, a clutch member keyed to the shaft for rotation therewith and provided with spaced flanges, gears loose on the drive shaft, a control shaft mounted in parallel relation with the drive shaft, a cam actuated follower plate mounted for pivotal movement on the control shaft and having a projection disposed between the flanges for moving the clutch into clutching engagement with either of said gears for rotating the wringer rolls in the desired direction of travel, and a handle positioned upon the upper end of the wringer head for operating the control shaft.

4. Mechanism for selectively controlling the operation of the rolls of a wringer, comprising a wringer head, a drive shaft vertically arranged in the wringer head, a clutch member keyed to the drive shaft but shiftable longitudinally thereof, a pair of gears loose on the drive shaft and disposed adjacent the opposite ends of the clutch member, and shifter mechanism for actuating the clutch into clutching engagement with either of said gears to drive the rolls in either direction, said shifter mechanism including a vertically arranged shifter shaft, a control handle connected to the upper end of the shifter shaft and positioned at the top of the wringer head, cams secured to the shifter shaft in spaced relation and a cam follower disposed intermediate the spaced cams and having a part associated with the clutch member and actuated by the cams upon movement of the handle and shifter shaft to thereby move the clutch into clutching engagement with either gear.

5. In a shifting mechanism for a wringer head construction, a drive shaft for operating the

wringer rolls, a clutch keyed to the drive shaft but shiftable longitudinally thereon, gears loose upon the shaft and positioned adjacent each end of the clutch, complementary clutching faces on the clutch and gears, and means for actuating the clutch into engagement with either of said gears, said means including a control handle mounted at the top of the wringer head, a shifter shaft positioned parallel to the drive shaft, a cam follower loose upon and a cam secured to the shifter shaft on the opposite sides of the follower for causing the follower to pivot about an axis transverse of the shifter shaft as the handle and shifter shaft are moved in either direction from a neutral, inactive position, said follower having a part engaging the clutch for moving the latter into clutching engagement with either of the gears.

6. In a wringer head construction, a vertical drive shaft, a horizontal driven shaft, motion transmitting mechanism between the drive and driven shafts for rotating the driven shaft in opposite directions, a rotatable and slidable clutch member having spaced annular abutments mounted on one of said shafts for selectively engaging the motion transmitting mechanism to rotate the driven shaft in opposite directions, a control shaft mounted parallel to the axis of the clutch member, a pair of spaced cams having parallel adjacent surfaces disposed at an angle to its axis of rotation, a pair of lugs formed in the wringer head defining a guide passage disposed parallel to the control shaft, a cam actuated follower plate loosely mounted on the control shaft between the spaced adjacent cam surfaces for slidable and pivotal movement, said cam follower plate being provided with a pair of oppositely projecting portions, one of said projecting portions being disposed between the spaced abutments on the clutch member to move the same axially and the other projecting into the guide passage to prevent its rotation about the control shaft, and a handle positioned on the outer portion of the wringer head with a connection thereto for rotating the control shaft.

7. In a wringer head construction, mechanism therein for selectively operating the wringer rolls in either direction and including a drive shaft, a driven shaft, motion transmitting mechanism including driving and driven gears and a movable clutch member provided with spaced abutments keyed to one of said shafts for transmitting motion from the drive to the driven shaft, a control shaft mounted parallel to the clutch member, a pair of spaced cams having spaced parallel adjustment surfaces disposed at an angle to its axis of rotation, a pair of lugs formed in the wringer head for defining a guide passage, a cam actuated follower plate loosely mounted on the control shaft between the spaced adjacent cam surfaces for slidable and pivotal movement, said cam follower plate being provided with a pair of oppositely projecting portions, one of said projections being disposed between the spaced abutments on the clutch member to move the same axially into engagement with one of the gears and the other projecting into the guide passage to prevent rotation about the control shaft, and a handle positioned on the outer portion of the wringer head with a connection thereto for operating the control shaft.

8. In a wringer head construction, a vertical drive shaft, a horizontal driven shaft, a pair of opposed gears loose upon one of said shafts and

in mesh with a common gear for operating the driven shaft and the wringer rolls, a clutch on the shaft between the opposed gears and keyed to the shaft for rotatable and slidable movement thereon, and adapted to be moved into clutching engagement with either of the opposed gears, a shifter shaft disposed parallel to the clutch and opposed gears, a control handle for the shifter shaft located on the outer portion of the wringer head, spaced cam members secured upon and rotatable with the shifter shaft and provided with adjacent cam surfaces, and a cam follower loose upon the shifter shaft and disposed between the adjacent cam surfaces on said members whereby rotation of the shifter shaft and cam members transmits movement to the cam follower, a projection on the cam follower engaging the clutch for transmitting axial movement to the clutch, and a second projection on the cam follower preventing rotation of the cam follower about the shifter shaft.

9. In a shifting mechanism for a wringer head, a drive shaft, a longitudinally shiftable clutch having annular spaced abutments thereon keyed to the drive shaft, a driven shaft for operating the wringer rolls, gears associated with the clutch and the driven shaft to rotate the driven shaft in opposite directions, and means for actuating the clutch to control the operation of the driven shaft, said means including a control shaft positioned parallel to the drive shaft, a pair of spaced cams rigidly secured to the control shaft and having spaced parallel adjacent surfaces disposed at an angle to its axis of rotation, a pair of lugs formed in the wringer head for defining a guide passage disposed parallel to the control shaft, a cam actuated follower plate loosely mounted on the control shaft between the spaced adjacent cam surfaces for slidable and pivotal movement, said cam follower plate being provided with a pair of oppositely projecting portions, one of said projecting portions being disposed between the spaced abutments on the clutch member for moving the same vertically to cause the driven shaft to rotate in opposite directions and the other projecting into the guide passage to prevent its rotation about the control shaft, and a handle positioned on the outer portion of the wringer head for operating the control shaft.

10. In a shifting mechanism for a wringer head construction, a vertical drive shaft for operating the wringer rolls, a clutch keyed to the drive shaft but vertically shiftable thereon, gears loose upon the shaft and disposed adjacent each end of the clutch, complementary clutching faces on the clutch and gears, and means for shifting the clutch into engagement with either of the gears, including a shifter shaft disposed adjacent the drive shaft, a cam actuated wobble plate mounted for pivotal movement on the shifter shaft and having a projecting part engaging and shifting the clutch vertically on the drive shaft into engagement with either of the gears as the shifter shaft is moved to raise or lower the projecting part, and a control handle for moving the shifter shaft.

11. In a shifting mechanism for a wringer head construction, a drive shaft for operating the wringer rolls, a clutch keyed to the drive shaft but shiftable longitudinally thereon, gears loose upon the shaft and disposed adjacent each end of the clutch, complementary clutching faces on the clutch and gears, and means for actuating the clutch into engagement with either of said gears including a shifter shaft positioned adjacent the

drive shaft, a control handle for rotating the shifter shaft, and a cam actuated follower plate mounted for pivotal movement on the shifter shaft and having a projecting part engaging the clutch whereby movement of the handle to rotate the shifter shaft in either direction causes the projecting part to move the clutch into clutching engagement with one or the other of the gears.

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