Aug. 14, 1956 W. G. LANDWIER 2,758,479

MECHANISM FOR ACTUATING THE AGITATOR CLUTCH OF A WASHING MACHINE

Filed March 30, 1953

FIG. 1.

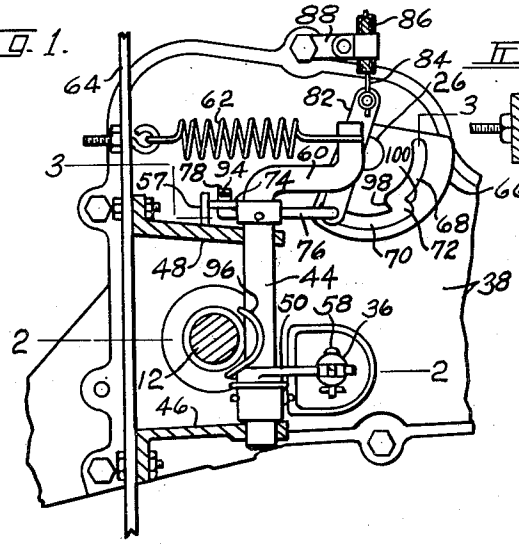


FIG. 3.

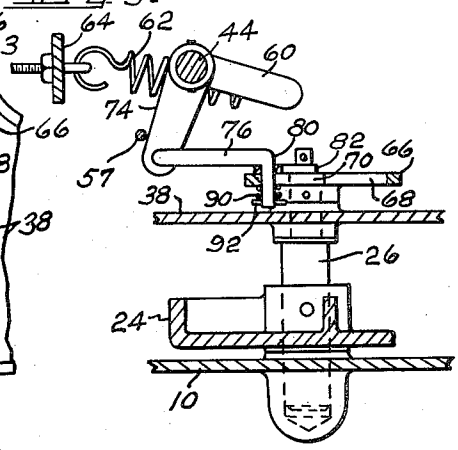


FIG. 2.

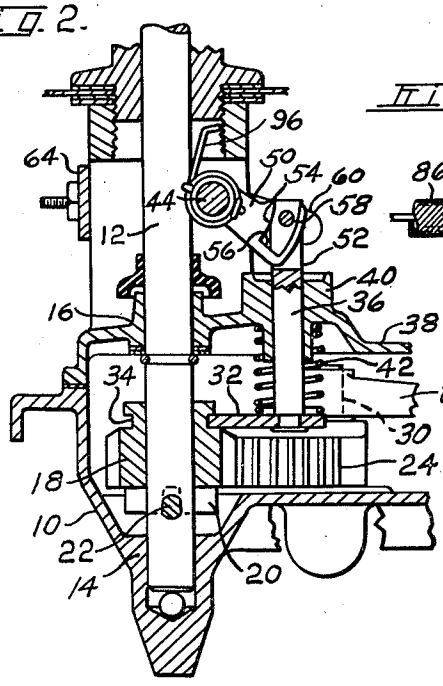


FIG. 4.

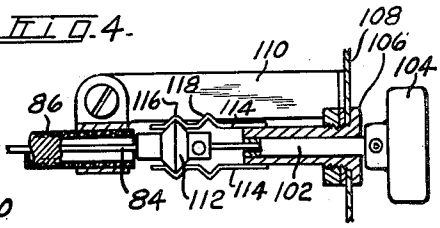


FIG. 5.

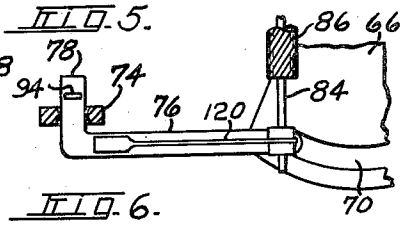
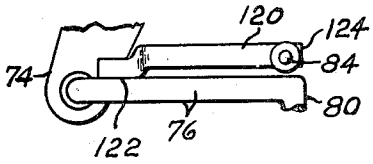


FIG. 6.



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United States Patent Office 2,758,479 Patented Aug. 14, 1956

2,758,479

MECHANISM FOR ACTUATING THE AGITATOR CLUTCH OF A WASHING MACHINE

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Application March 30, 1953, Serial No. 345,454

5 Claims. (Cl. 74—79)

This invention relates to washing machines, and more particularly to a mechanism for actuating the agitator clutch at will by power from the driving motor.

In Geldhof Patent 2,111,143, there is disclosed a washing machine transmission having an eccentric-driven oscillating sector gear, which sector gear meshes with a pinion on an agitator shaft to provide oscillatory agitator movement in a wash tub. In the arrangement shown, the sector gear oscillates continuously through a fixed angle and remains in constant mesh with the driven pinion upon the agitator shaft. The pinion is castellated at one end and axially movable on the shaft so that the castellated end may engage or disengage a cross pin in the shaft while remaining in constant mesh with the sector gear. In such disclosure, manual means are employed for shifting the pinion on the shaft to effect a clutching and declutching of the agitator shaft to start and stop the agitator.

The present invention is directed to an arrangement for deriving power from the oscillating sector gear to effect engagement and disengagement of the clutch, control over the application of such power being effected manually. The invention further has to do with the provision of a link and arcuate offset slot mechanism for directly operating the clutch control from power derived from the sector gear of transmissions of the type above referred to. The invention further has to do with the elimination of complicated manual control mechanism and the application of a manual controller for controlling the application of power to the agitator clutch.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings, wherein like reference characters indicate like parts:

Figure 1 is a fragmentary plan view, with parts in section, of the power-actuated clutch control;

Figure 2 is a vertical section taken substantially on the line 2—2 of Figure 1;

Figure 3 is a vertical section taken substantially on the line 3—3 of Figure 1;

Figure 4 is a sectional view through a control knob;

Figure 5 is a fragmentary plan view of a modified form, showing the control connection to the power link; and

Figure 6 is a fragmentary elevational view of the modification of Figure 5.

Referring to Figures 1–3 of the drawings, there is shown a transmission casing 10 having a vertical agitator shaft 12 journaled in lower and upper bearings 14 and 16. The agitator shaft has slidably positioned thereon within the transmission a driven pinion 18, the lower end of which is castellated to provide diametrically extending

slots 20. Such slots are adapted to engage a diametrically disposed pin 22 extending through a suitable aperture in the agitator shaft 12.

The pinion 18 is adapted to be oscillated by a sector gear 24, which sector gear is pivoted on a stub shaft 26. The sector gear is oscillated by an eccentric mechanism connected to a pitman arm 28, the free end of which is pivoted upon a crank pin 30 in the sector gear 24. It will be understood that the sector gear 24 is caused to oscillate through a definite angle at a speed of 50 to 60 oscillations per minute, as shown in the aforesaid Patent No. 2,111,143, and that the driven pinion 18 will thus oscillate the agitator shaft 12. Since the sector gear 24 oscillates continuously, it is desirable to provide a clutch for stopping the motion of the agitator shaft. Such clutch is constituted by the axial sliding of the pinion 18 upon the shaft 12 to engage or disengage the castellated end of the pinion with the cross pin 22. Axial movement of the pinion 18 is effected by a yoke member 32 riding in an annular groove 34 on the upper side of the pinion, such yoke member being affixed to a slide rod 36 projecting upwardly through the transmission cover plate 38, and more particularly through a boss 40 formed integral therewith. The rod 36 slides in a direction substantially parallel to the axis of the shaft 12, and there is positioned about the rod a compression spring 42, the ends of which engage the yoke member 32 and the under side of the cover plate 38.

It will be understood that in lifting the pinion 18 sufficiently to disengage the castellated end 20 thereof from the pin 22, the lower ends of the teeth of the pinion remain in engagement with the sector gear 24, so that the pinion and sector gear remain in mesh at all times.

Mounted above the cover plate 38 is a transverse control shaft 44, such shaft being journaled in spaced web members 46 and 48 formed as an integral part of the transmission cover plate 38. The shaft is provided with an arm 50 extending into the bifurcated upper end 52 of the rod 36, such arm having an open slot 54, the closed end 56 of which is adapted to engage a pin 58 extending transversely across the open bifurcated end 52 of the rod 36. The shaft 44 at one end is provided with a crank 60 to which is secured a tension spring 62, one end of which is fixed to a support bar 64, the latter being secured to the webs 46 and 48. The spring 62 and the crank 60 are so disposed that at opposite limits of the rocking movement of the shaft 44, the spring serves as an over-center spring to effect a snap action of the rock shaft 44 when rotated over the dead center position.

The sector gear shaft 26 is extended through the upper plate 38 of the transmission and is provided with a sector plate 66, the sector plate being pinned to the shaft 26 and the shaft 26 being pinned to the sector gear 24. The plate 66 is provided with two arcuate slots 68 and 70, differing in radius by the approximate width of the slots, which slots overlap and connect in a radial offset slot 72. The rock shaft 44 is provided with a crank arm 74 rotating in a plane which extends substantially tangential to the inner circular margin of the slot 70 and outer circular margin of the slot 68. A link 76 having an end 78 pivoted in the crank arm 74 is provided also with a downwardly extending portion 80 at its other end of a diameter approximately that of the radial width of the slots 68 and 70, such end extending into either one of the slots 68 and 70 and being adapted to ride in either slot 68 or 70 or be transferred from one slot to the other through the offset slot 72. It will be understood that the arcuate length of slot 70 and the arcuate length of slot 68 are similar and at least as great as the angular movement of the sector gear in its oscillatory motion.

Manual means are provided for moving the depending link end 80 radially from one slot to the other of slots 68

and 70. Such means comprises a link 82 having one end pivoted upon the end 80 and the other end pivotally connected to the cable 84 of a cable end conduit control, the conduit being indicated at 86 and being fixed to the transmission casing by a bracket 88. The extreme lower end of the portion 80 of the link 76 is provided with resilient washers 90 and a cotter key 92, and the end 78 is secured in place in the crank arm 74 by a cotter key 94. The ends 80 and 76 are allowed sufficient universal movement in the slots and crank arm 74 to avoid binding during actuation.

The rock shaft 44 is provided with a stop 57 to limit its clockwise motion as shown in Figures 1 and 3, and is provided with a shaft-engaging brake arm 96 which acts as a limit for its counterclockwise rotation, it being understood that the spring 62 is over-center above the shaft 44 when the brake 96 is applied, braking pressure being derived from the spring 62, and under center when the rod 36 is in the position shown in Figure 2. As shown in Figure 1, the sector 66 is at its approximate limit of counterclockwise rotation, and during normal operation will rotate in a clockwise direction bringing the offset 72 in alignment with the link end 80. If it be desired to disengage the clutch, a pull on the cable 84 will, when the end 80 is aligned with the offset 72, transfer the end 80 to the radius of the inner slot 68, and upon the subsequent counterclockwise movement of the sector 66, the shoulder 98 will carry the link end 80 to the right from the position shown in Figure 1, swinging the rock shaft 44 counterclockwise as shown in Figures 2 and 3, after which the end 80 will ride freely in the slot 68 during the further oscillation of the sector 66. If it be desired to reengage the clutch, pressure is applied to the cable 84 to move end 80 of the pin radially outward, and as soon as the offset slot 72 aligns itself with the end 80, the link 76 is moved outwardly and the shoulder 100 will engage the end 80, and on the subsequent angular movement of the sector 66, the link 80 will be moved to the position shown in Figure 1, allowing the clutch to reengage under the compression of the spring 42.

The cable and conduit may terminate in a manual control button as shown in Figure 4, the cable being connected to a pull rod 102 having a knob 104. The pull rod 102 is slidably mounted in a sleeve fitting 106 mounted on a control panel 108 of a washing machine and the conduit 86 is anchored to such panel 108 by a bracket 110. The control cable 84 is provided with an annular collar 112 adapted to cooperate with leaf springs 114 having detent V-portions 116 and 118, whereby the control cable 84 is held in one position or the other of the two end positions required to shift the link 76 from one or the other of the slots 68 or 70. In practice, the cable and conduit may have sufficient resiliency to permit the control knob 104 to be moved from one detent position to the other prior to the registering of the offset slot 72 with the link end 80. However, the resiliency and tension of the system will, when registry occurs, snap the link end 80 radially through the offset to the other arcuate slot.

If desired, resiliency may be introduced into the manual control as is shown in Figure 5, by applying to the link 76 a spring leaf 120, such lead being affixed as at 122 to the link 76 and the free end 124 thereof being affixed to the control cable 84. Through such an arrangement, the end of the conduit 86 is allowed to swing with each actuation and the resiliency of the arm 120 permits the control knob to be freely moved from one position to the other in advance of registry of the offset slot 70 with the link end 80.

It will be appreciated that the movement of the sector 66 is substantially simple harmonic motion, and that when the end 80 is shifted through the offset, such sector 66 is substantially stopped prior to being gradually accelerated into the next half cycle of its oscillatory movement. Thus, the shifting of the clutch control rock shaft 44 is effected without severe stress or strain, and the action is positive.

While a single embodiment of the invention has been illustrated and described, it is to be understood that the

invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In a driving mechanism for an oscillatable washing element, a gear casing, a washer shaft projecting from said casing, a washer gear in said casing loosely mounted on said washer shaft, an oscillating power-driven sector gear pivotally mounted in said casing and in constant mesh with said washer gear, pins on said washer shaft and notches on said washer gear, means for disengaging the notches from the pins while retaining the sector gear in mesh with the washer drive gear, said means comprising a rock shaft, movable from an engaged position to a disengaged position, a sector plate mounted for oscillating movement with said sector gear, a pair of angularly overlapping substantially arcuate slots in said sector plate of different radius having a radial offset slot connecting the overlapping portions of said arcuate slots, a link having a member adapted to project into either of said arcuate slots, and connected to said rock shaft, and means for moving said member from one slot to the other through said offset slot.

2. In a driving mechanism for an oscillatable washing element, a gear casing, a washer shaft projecting from said casing, a washer gear in said casing loosely mounted on said washer shaft, an oscillating power-driven sector gear pivotally mounted in said casing and in constant mesh with said washer gear, clutch means for engaging and disengaging said washer gear with said shaft while retaining the sector gear in mesh with the washer drive gear, said means comprising a rock shaft, movable from an engaged position to a disengaged position, a sector plate mounted for oscillating movement with said sector gear, a pair of angularly overlapping substantially arcuate slots in said sector plate of different radius and having a radial offset slot connecting the overlapping portions of said arcuate slots, a link extending in part tangentially from said plate, having a member adapted to project into either of said arcuate slots, and connected to said rock shaft, and means for moving said member from one slot to the other through said offset slot.

3. In a driving mechanism for an oscillatable washing element, a gear casing, a washer shaft projecting from said casing, a washer gear in said casing loosely mounted on said washer shaft, an oscillating power-driven sector gear pivotally mounted in said casing and in constant mesh with said washer gear, clutch means for engaging or disengaging said washer gear with said shaft while retaining the sector gear in mesh with the washer drive gear, said means comprising a rock shaft, movable from an engaged position to a disengaged position, a sector plate mounted for oscillating movement with said sector gear, a pair of angularly overlapping substantially arcuate slots in said sector plate of different radius and having a radial offset slot connecting the overlapping portions of said arcuate slots, means associated with said rock shaft having a member adapted to project into either of said arcuate slots, and means for moving said member from one slot to the other through said offset slot to move said rock shaft from said one position to the other.

4. In a driving mechanism for an oscillatable washing element, a gear casing, a washer shaft projecting from said casing, a washer gear in said casing loosely mounted on said washer shaft, an oscillating power-driven sector gear pivotally mounted in said casing and in constant mesh with said washer gear, clutch means for engaging or disengaging said washer gear with said shaft while retaining the sector gear in mesh with the washer drive gear, said means comprising an operative member, movable from an engaged position to a disengaged position, a sector plate mounted for oscillating movement with said sector

gear, a pair of angularly overlapping substantially arcuate slots in said sector plate of different radius and having a radial offset slot connecting the overlapping portions of said arcuate slots, said member having means adapted to project into either of said arcuate slots, and being mounted for movement substantially tangential to the mid-portion of the arc of movement of said offset slot, and means for moving said last-named means from one slot to the other through said offset slot to move said member from said one position to the other.

5. In a driving mechanism for an oscillatable washing element, a gear casing, a washer shaft projecting from said casing, a clutch for engaging and disengaging said shaft, an oscillating power-driven sector gear pivotally mounted in said casing, means for engaging and disengaging said clutch, said means comprising an operative member, movable from an engaged position to a disengaged position, a sector plate mounted for oscillating movement with said sector gear, a pair of angularly overlapping substantially arcuate slots in said sector plate of different radius and having a radial offset slot connecting the overlapping portions of said arcuate slots, said member having means adapted to project into either of said arcuate slots, and being mounted for movement substantially tangential to the mid-portion of the arc of movement of said offset slot, and means for moving said last-named means from one slot to the other through said offset slot to move said member from said one position to the other.

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