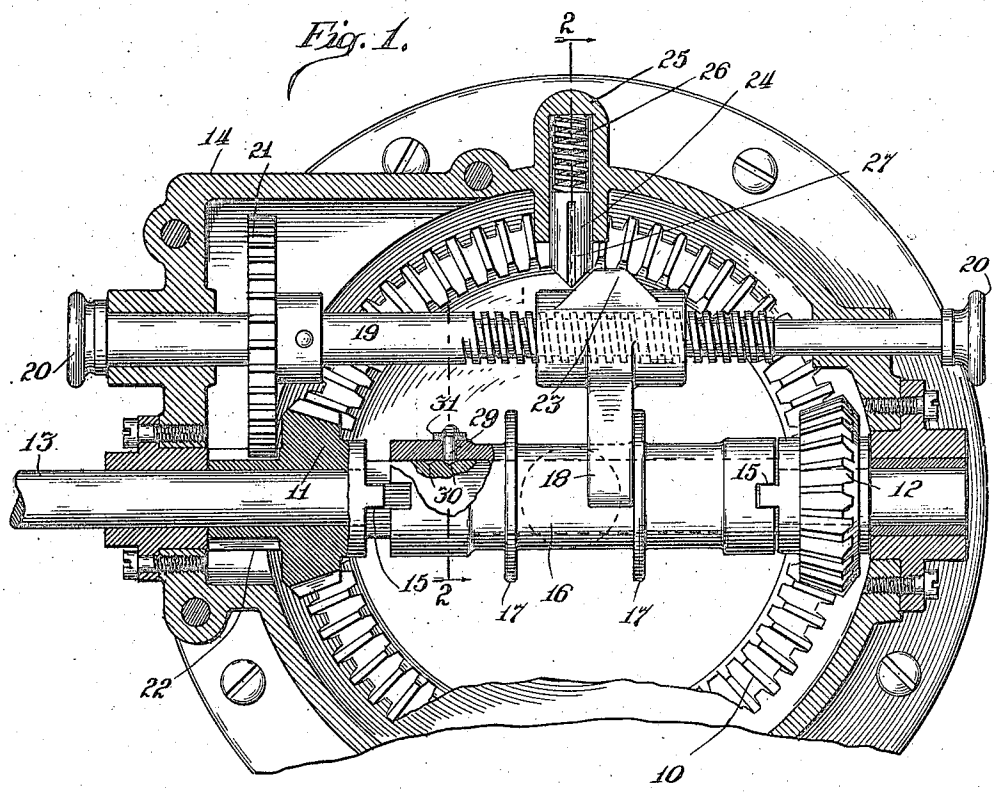
W. F. MORAN.

WASHING MACHINE DRIVING MECHANISM.

APPLICATION FILED MAY 22, 1920.

1,425,209. Patented Aug. 8, 1922.

Fig. 1.



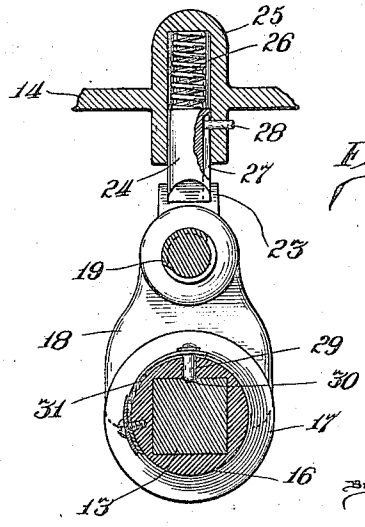


Fig. 2.

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WASHING-MACHINE-DRIVING MECHANISM.

1,425,209. Specification of Letters Patent. Patented Aug. 8, 1922.

Application filed May 22, 1920. Serial No. 383,365.

To all whom it may concern:

Be it known that I, WILLIAM F. MORAN, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Washing-Machine-Driving Mechanism, of which the following is a description, reference being had to the accompanying drawing, which forms a part of my specification.

My invention relates to the automatic reversing mechanism for actuating the drum or dasher, or other agitating element, of a power-operated washing machine. The invention relates more particularly to means whereby a positive operation or positioning of the mechanism, which controls the direction of motion imparted to the drum or agitator, is provided; that is to say, the means ensures a complete and effective intermeshing of the respective elements whereby the power is transmitted from the drive-shaft to the drum or agitator of the machine; the means at the same time being so arranged that an operative relation between the respective elements may be manually controlled in the event of an abnormal or accidental positioning or shifting of said elements.

One purpose of my invention is to provide mechanism, accomplishing the objects hereinbefore stated, which will be simple in construction and positive in action; the purpose and advantages of the invention being more readily comprehended from the detailed description of the accompanying drawing, wherein:—

Figure 1 is a side elevation and partial sectional view of my invention, with portions of casing and gear mechanism broken away.

Figure 2 is a detail sectional view taken substantially on the off-set line 2—2 of Figure 1, looking in the direction of the arrows, with the gears omitted.

My invention is especially adapted for use in connection with the type of driving mechanism which automatically reverses the direction of rotation of the drum or agitating member of the washing machine controlled by the large gear 10, which latter is likewise driven in reverse direction through the medium of the pinions 11 and 12 which mesh with gear 10 on opposite sides of the center thereof. The pinions 11 and 12 are both loosely mounted on the drive-shaft 13 which is disposed transversely within a suitable housing 14 which encloses all of the mechanism, and which will prevent movement of the pinions 11 and 12 in a direction away from the gear 10. The inwardly presented or opposing faces of the pinions 11 and 12, or their hubs, are both provided with lugs or clutch surfaces, as at 15, which are adapted to interlock or form clutching relation with the double clutch member or elongated sleeve 16 which is slidably mounted on the squared portion of the drive-shaft 13 and made to constantly rotate with the shaft 13. The double clutch member is of such length that when in clutching relation with one pinion, the other pinion will loosely rotate on the drive-shaft. The clutch member 16 is shown provided with a pair of spaced circumferential flanges 17, between which depends a yoke or member 18 which has its upper end provided with a tapped opening for the passage of a threaded rod or screw-shaft 19, which is disposed parallel with drive-shaft 13 and extends through the opposite side walls of the casing 14; the shaft 19 being mounted in the casing so as to have longitudinal movement and therefore the outer ends are provided with knobs or grasps 20.

The screw-shaft 19 at a suitable point within the casing 14 is provided with a gear 21, which meshes with a pinion 22 shown formed integral with pinion 11; the pinion 22 (which may constitute the hub of pinion 11) being made of sufficient length to permit lateral movement of gear 21 and still maintain intermeshing relation.

As pinion 11 is constantly in mesh with large gear 10—whether in operative relation with drive-shaft 13 or not—it is evident that shaft 19 will constantly rotate when the mechanism is in operation; except, of course, that the direction of rotation of pinion 11 and therefore also of pinion 22, will either be similar to shaft 13 or be in the opposite direction when controlled by large gear 10.

When pinion 11 is out of operative relation with drive-shaft 13, but is rotated by the large gear 10, it is evident that the direction of rotation of pinion 11 will be opposite to the direction of rotation of shaft 13, because in such instance the large gear 10 is being rotated by pinion 12 located on the opposite side of the center or axis of

large gear 10. It therefore follows that shaft 19 will also be driven in opposite directions because of the intermeshing relation between pinion 22 and gear 21. The gear 21 is so secured to shaft 19 that shaft 19 may have slight play in the casing 14 in a direction lengthwise of the shaft; the pinion 22 being of sufficient width to permit the shifting of gear 21 and still remain in meshing relation with pinion 22.

The upper screw-shaft receiving end or sleeve portion of the yoke or clutch-controlling member 18 is provided with a boss 23, disposed lengthwise of the sleeve-portion and having very gradually sloping opposite ends or sides, arranged in the path of and adapted to contact with a plunger 24 which is slidably mounted in a chambered portion or housing 25 of the casing 14. The outer end of the plunger 24, on opposite sides, is beveled or tapered in opposite directions; the inclination or taper corresponding with the gradual bevel or slope of the sides of boss 23 so as to permit a sliding relation between the end of plunger 24 and the ends of boss 23 when the latter is brought into contact with the plunger; the beveled surfaces being such that the plunger will be caused to slide downwardly through the action of slight downward pressure, provided by a suitable spring, as at 26. The spring 26 yieldingly maintains the plunger 24 in its outward or depressed position, namely in the path of the boss 23. The side of plunger 24 is preferably provided with a slot 27 disposed lengthwise thereof and adapted to receive the end of a suitable pin 28 which extends through an aperture in the side wall of the chamber or housing 25 and prevents displacement of the plunger.

With the yoke or clutch-controlling member 18 having straddling relation with the clutch sleeve 16, it is apparent that the yoke or clutch controlling member 18 will be held against rotation with the screw-shaft 19, with the result that the yoke or member 18 is forced to move lengthwise of screw-shaft 19 during rotation of the latter; the direction of travel of yoke or member 18 depending, of course, upon the direction of rotation of the screw-shaft 19.

With the elements positioned and associated as illustrated in Figure 1, it is evident that the rotation given to the screw-shaft 19, will cause the member or yoke 18 to move from the position shown in Figure 1 toward the left and therefore cause the plunger 24 to contact with the advanced or adjacent sloping end or side of boss 23, inducing the plunger to ride upward on the boss; allowing the clutch-controlling member or yoke 18 to continue its travel toward the left; the plunger 24 remaining in contact with the top of boss 23 until it reaches the opposite sloping end or side of boss 23, which will occur at a moment somewhat in advance of the contact of the yoke 18 with the opposite flange 17, namely the flange at the left-hand end of the sleeve clutch 16. The constant downward pressure exerted on plunger 24, by the spring 26, will cause the plunger to slide downwardly on the right-hand beveled end of boss 23. This downward pressure and movement of plunger 24 will exert a sidewise pressure on the yoke or member 18, namely a pressure in a direction lengthwise of screw-shaft 19. The downward movement of plunger 24 will cause the yoke or clutch-controlling member 18 with the screw-shaft 19 to be bodily shifted toward the left in Figure 1 and thereby induce a rapid shifting of the sleeve clutch 16 toward the left in Figure 1 so as to provide positive relation between pinion 11 and drive-shaft 13. In other words, the clutch member 16 will remain in clutching relation with the hub of pinion 12 at the right of the construction as illustrated in Figure 1, during the travel of yoke or member 18 toward the left on screw-shaft 19, until the plunger 24 causes a bodily shifting of the yoke or member 18 and the screw-shaft 19 a distance sufficient to de-clutch the double clutch sleeve 16 at the right and create a clutching relation with pinion 11 at the left. With this construction power will constantly be imparted to large gear 10, although periodically in opposite directions.

As the travel of yoke or member 18 lengthwise of screw-shaft 19 must necessarily be at comparatively slow speed to permit a predetermined number of revolutions to large gear 10 before changing its direction of rotation, it is evident that if the contact of the yoke or clutch-controlling member 18 with the flanges 17 of clutch 16 was merely depended on to shift the double clutch member, there would be an interval in the operation of the mechanism when neither pinion 11 nor 12 would be in operative relation with the drive-shaft 13 and as a result the drum or agitating element controlling gear 10 would not be driven or receive power during such moment. For this reason, means must be provided for inducing a quick and positive shift of the double clutch member 16 as soon as the clutch-controlling member or yoke is brought into intimate relation with the respective flanges 17 of the clutch sleeve. This result is accomplished by my improved mechanism, because simultaneously with the contacting of yoke 18 with a flange 17, or slightly in advance thereof, the beveled plunger 24 will be in contact with a sloping end or beveled side of the boss 23 and, through the action of spring 26, will force the member or yoke with screw-shaft 19 in

the direction in which the member 18 was traveling; the shifting being to an extent sufficient to move the double clutch member in similar direction and into clutching engagement with the opposite pinion and bring it into operative relation with the drive-shaft.

In order to prevent the double clutch sleeve 16 prematurely being forced out of clutching relation with either pinion, especially when the machine is running under a light load, I prefer to provide the sleeve 16, at a suitable point, with the small pin 29 which is adapted to enter either one of a pair of slight depressions or sockets 30 formed in the squared section of the drive-shaft 13 and arranged in alignment with each other a distance apart commensurate with the length of travel of the double clutch member or sleeve 16; the pin 29 being controlled by the flat spring 31. As this feature of the construction is identical with that disclosed in my prior application bearing Serial No. 312,654, a further detailed description need not be here entered into.

The ends of the screw-shaft 19, as previously stated, are shown provided with knobs or grasps 20, 20, which enables a manual shifting of the screw-shaft 19 when occasion requires; namely in the event that the mechanism has in any way become disarranged and the double clutch member moved into an intermediate position where neither pinion 11 nor 12 would be in operative relation with the driven-shaft 13. A proper positioning of the elements can be readily accomplished by grasping either end of screw-shaft 19 and manipulating it so as to cause the yoke to forcibly contact with either flange 17 of the clutch member 16 and thus induce a clutching relation with one of the pinions or gears.

I have shown and described what I believe to be the simplest embodiment and adaptation of my invention, but modifications may be made in certain details without departing from the spirit of my invention.

What I claim is:—

1. In mechanism of the character described, the combination of a drive-shaft, a pair of gears loosely mounted thereon in spaced relation with each other, a drum-controlling gear arranged in constant mesh with both of said pair of gears, a clutch member slidably mounted on the drive-shaft intermediate of the first mentioned gears and adapted to establish operative relation between said gears and said shaft, a screw-shaft disposed parallel with the drive-shaft and adapted to be rotated through the medium of one of said pair of gears, and a member threaded on said screw-shaft so as to move lengthwise thereof and adapted to control the clutch member, with spring-controlled means adapted to exert lateral pressure on the second mentioned member when the latter reaches a predetermined point in its travel lengthwise of the screw-shaft whereby said member with the screw-shaft will be shifted in the direction of travel of said member.

2. In mechanism of the class described, the combination of a drive-shaft, a pair of gears loosely mounted thereon in spaced relation with each other, a clutch-sleeve slidable intermediate of said gears and in operative relation with said shaft, a screw-shaft rotatably mounted in parallel relation with said clutch-sleeve, gears intermediate of the screw-shaft and one of said pair of gears whereby the screw-shaft is caused to rotate alternately in opposite directions, and a non-rotating member threaded on the screw-shaft and in sliding relation with the clutch-sleeve, adapted to effect operative relation with the latter when said member reaches one of two predetermined points in its travel lengthwise of the screw-shaft, with a spring-controlled plunger having a beveled end adapted to slide across said non-rotating member and cause the latter with said screw-shaft to shift in the direction of travel of said member and thereby shift the clutch-sleeve into clutching relation with the other gear.

3. In mechanism of the class described, the combination of a drive-shaft, a pair of gears loosely mounted thereon, a double clutch member slidable on said shaft intermediate of the gears, adapted to alternately establish operative relation between said gears and the shaft, a screw-shaft rotatably mounted in parallel relation with the first shaft and adapted to be rotated through the medium of one of said pair of gears, and a member threaded on the screw-shaft so as to travel lengthwise thereof, whereby the clutch-member is controlled when the member reaches either one of two positions, said member being provided with beveled surfaces at opposite sides thereof, with a spring controlled plunger arranged in the path of said member and provided with an outer end beveled substantially similar to the beveled surfaces on said member so as to slide thereon, whereby said member and the screw-shaft will be shifted laterally in the direction of travel of the member and the clutch member rapidly and positively shifted into clutching relation with the non-operative gear of said pair of gears.

4. In mechanism of the class described, the combination of a drive-shaft, a pair of gears loosely mounted thereon, a double clutch sleeve slidable on said shaft intermediate of the gears whereby operative relation between each gear and the shaft is alternately effected, a screw-shaft arranged parallel with said clutch-sleeve and adapted to be rotated through the medium of one of said gears, said shaft being also mounted to have

longitudinal movement, a member threaded on said screw-shaft and adapted to control said clutch-sleeve, said member being provided with oppositely beveled surfaces, with a spring-controlled plunger slidably arranged to extend into the path of the beveled surfaces of said member and have sliding engagement therewith so as to cause lateral pressure thereagainst, whereby the member and screw-shaft are bodily shifted and positive movement of the clutch-sleeve induced.

5. In mechanism of the class described, comprising a casing, a drive-shaft mounted transversely in the casing, a pair of gears loosely mounted on the shaft, a clutch-sleeve slidable on the shaft intermediate of the gears, adapted to alternately establish operative relation between the gears and shaft, a screw-shaft extending transversely of the casing in parallel relation with said clutch sleeve and arranged to be driven through the medium of one of said gears, said shaft being mounted to have slight longitudinal movement, a clutch-controlling member threaded on said screw-shaft so as to ride lengthwise thereof, said member being provided with oppositely beveled surfaces at opposite sides thereof, with a spring-controlled plunger mounted in said casing so as to yieldingly extend into the path of said member, the end of said plunger being beveled at an angle of inclination similar to that of the beveled surfaces on said member so as to slide on said surfaces, whereby the member and screw-shaft will be caused to shift laterally when the beveled surfaces of the plunger and member are brought into substantially aligned relation.

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