

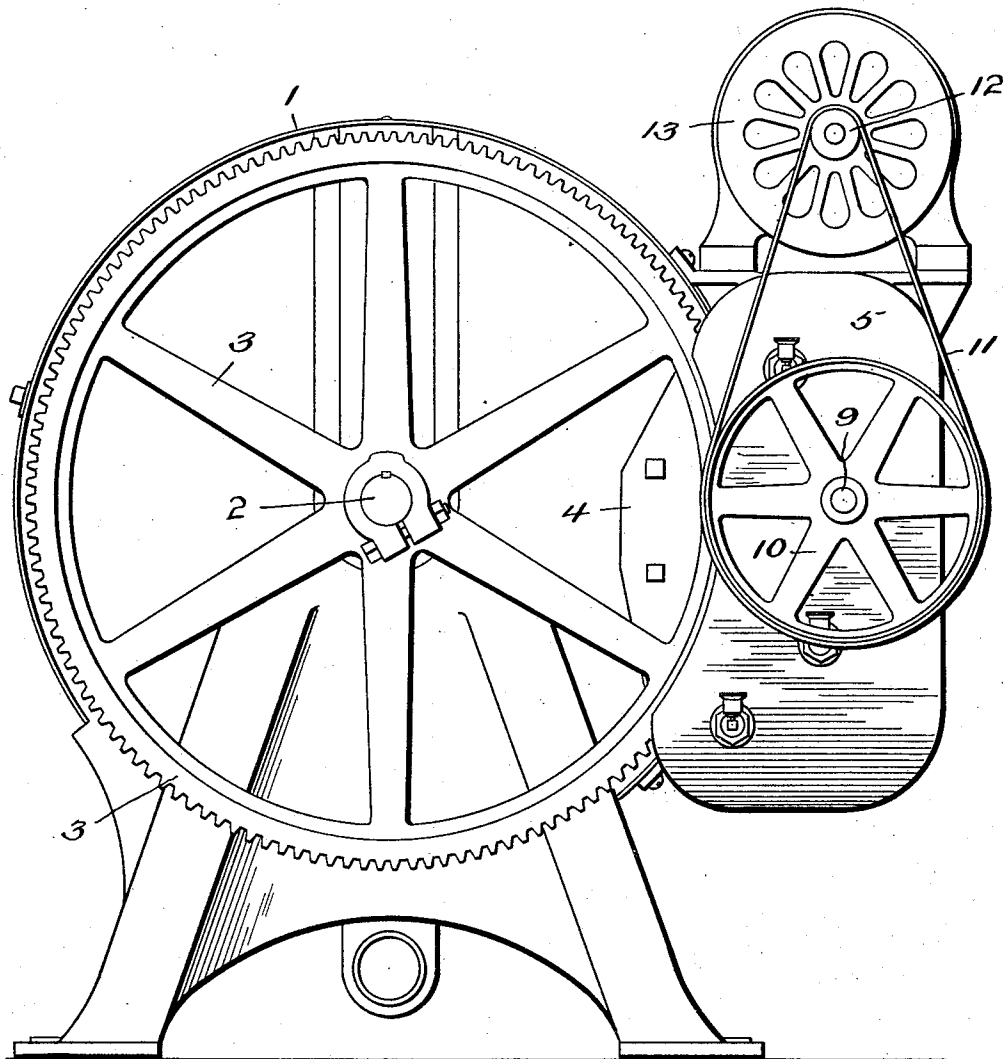
W. BARTHOLOMEW.
DRIVING AND REVERSING MECHANISM.
APPLICATION FILED FEB. 25, 1911.

1,012,184.

Patented Dec. 19, 1911.

5 SHEETS-SHEET 1.

FIG. 1.



WITNESSES.

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A. Albright

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BY

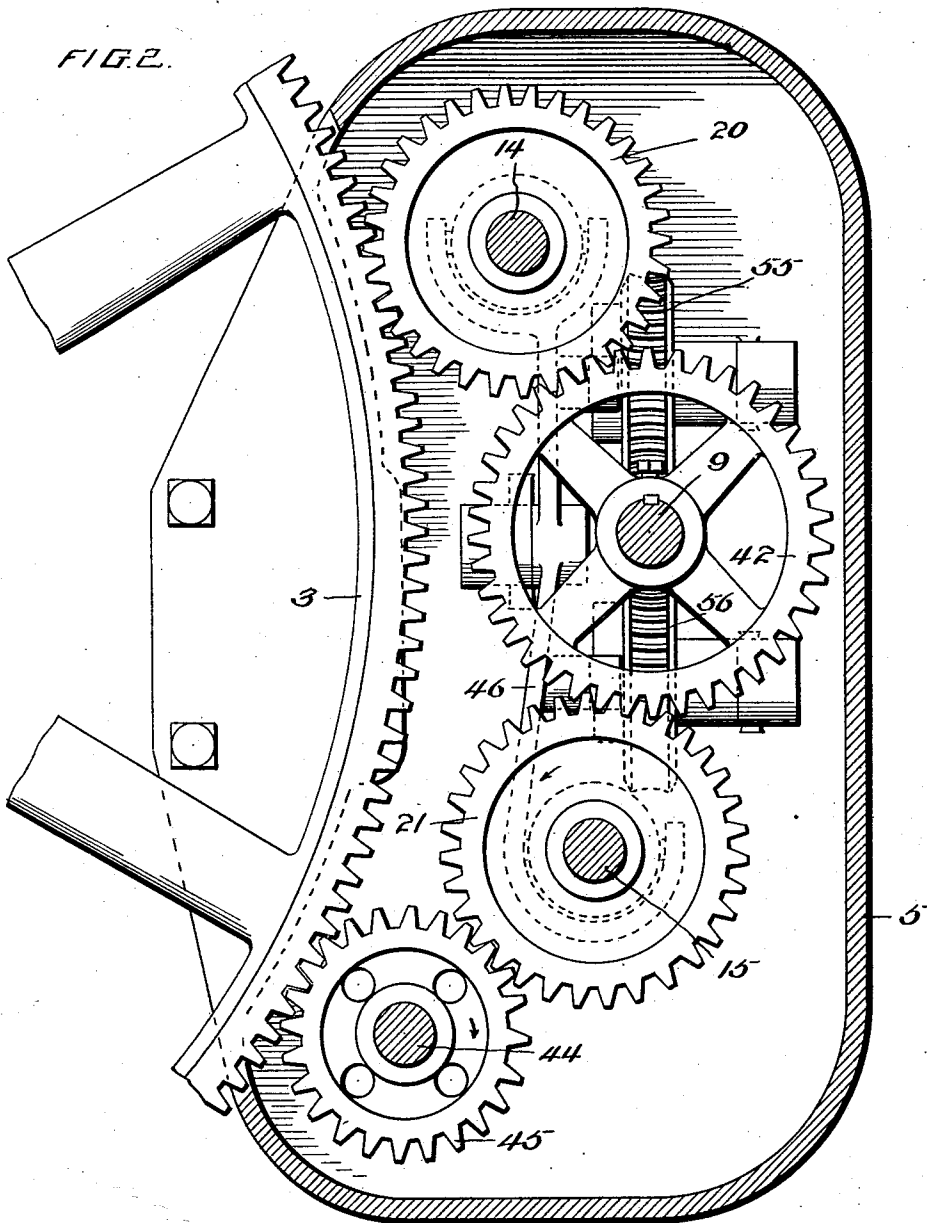
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5 SHEETS—SHEET 2.



WITNESSES

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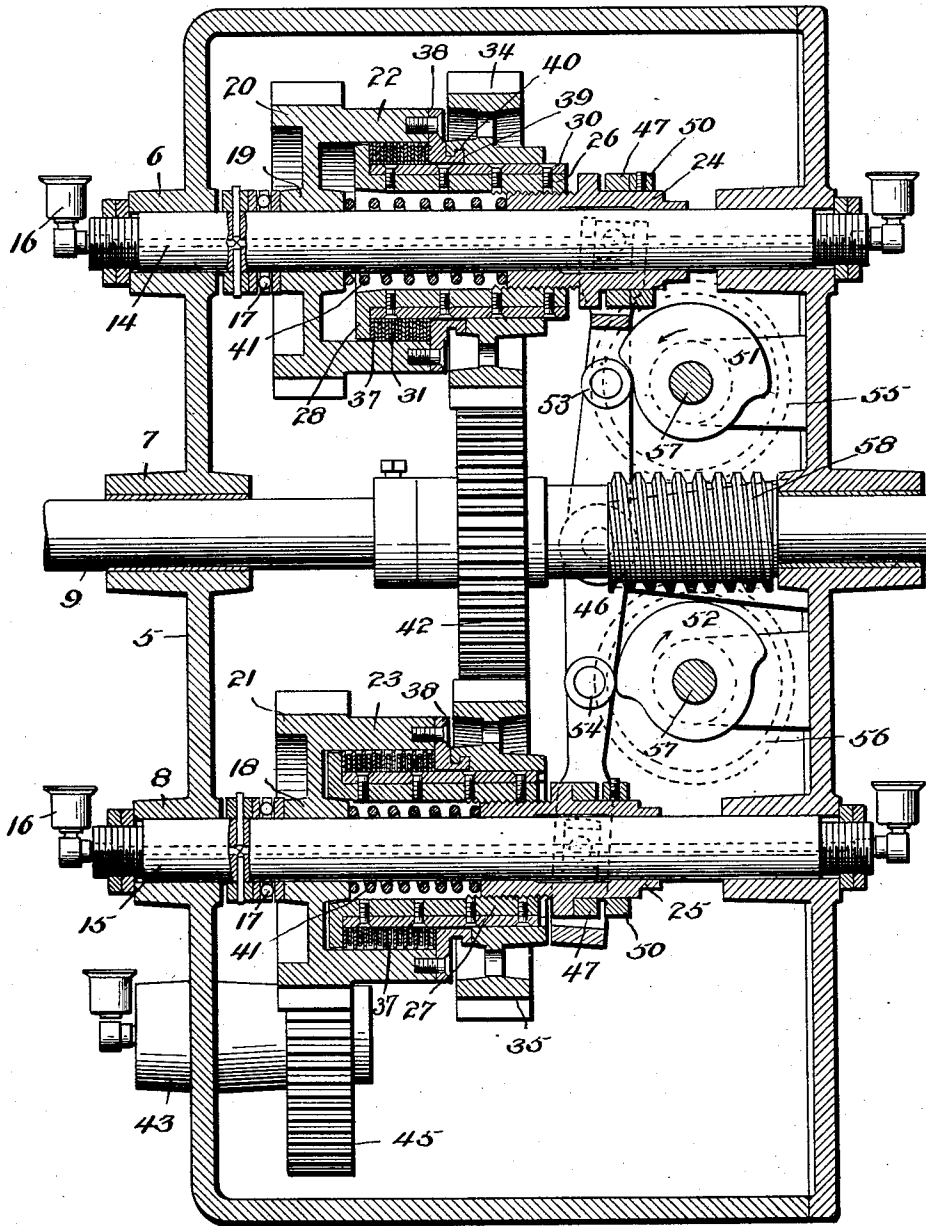
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5 SHEETS—SHEET 3.

FIG. 3.



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5 SHEETS—SHEET 4.

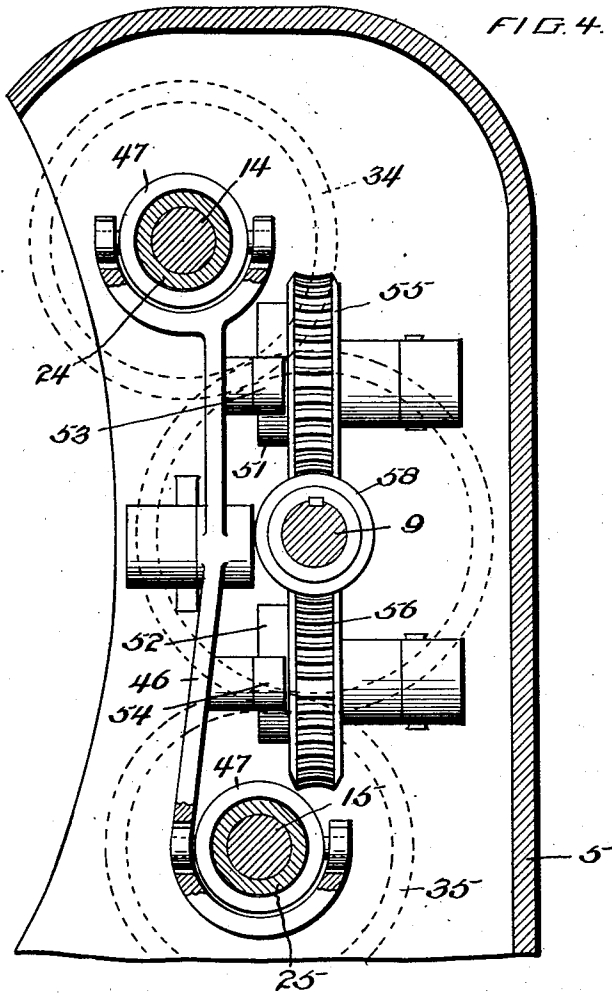
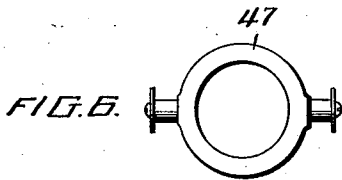
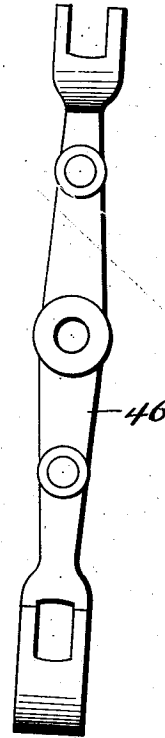


FIG. 5.



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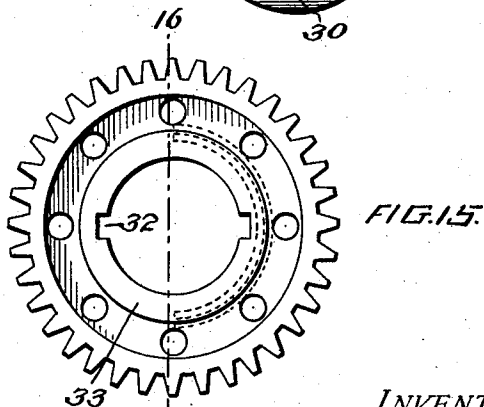
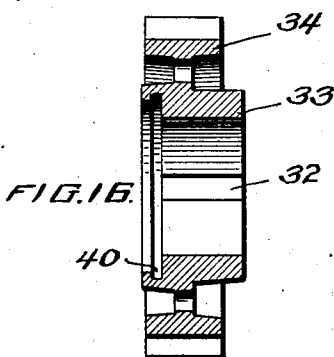
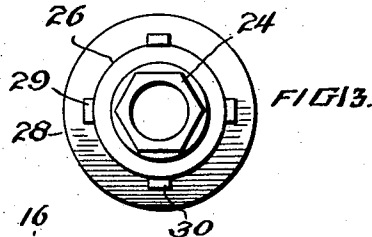
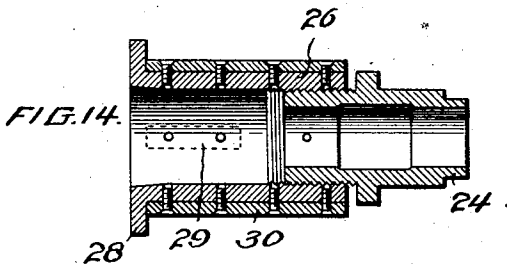
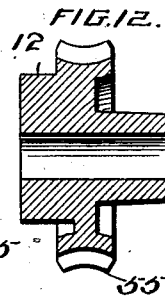
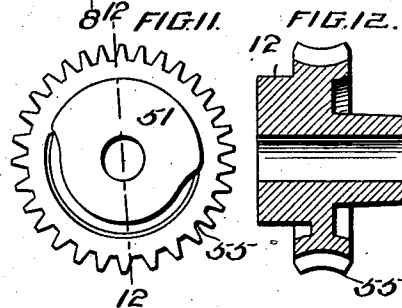
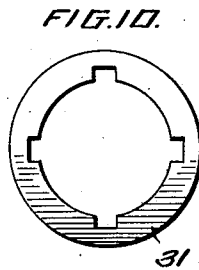
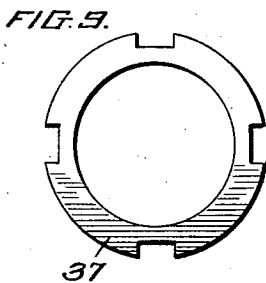
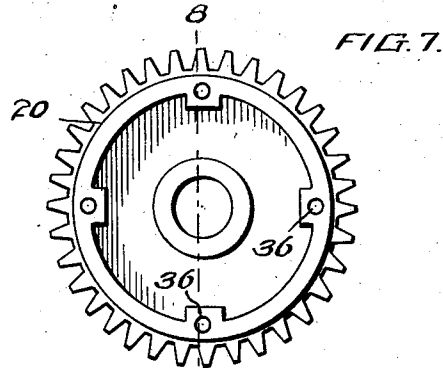
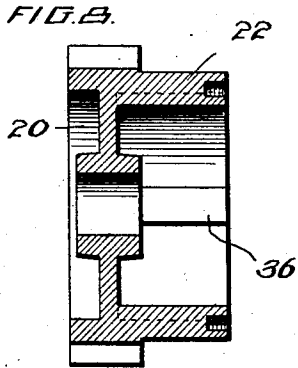
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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DRIVING AND REVERSING MECHANISM.

1,012,184.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed February 25, 1911. Serial No. 610,762.

To all whom it may concern:

Be it known that I, WILLIAM BARTHOLOMEW, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Driving and Reversing Mechanism, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to driving and reversing mechanisms for all kinds of machinery wherein a positive movement in either direction is desired and is herein shown as applied to a rotary washing machine, the object being to provide mechanism whereby the cylinder will be rotated a predetermined number of revolutions in one direction and then reversed automatically and rotated the same number of revolutions
20 in a reverse direction.

Another object of the invention is to provide mechanism which is exceedingly simple and cheap in construction, the parts being so arranged and connected together that a very compact and efficient mechanism is formed.

A still further object of the invention is to provide a driving and reversing mechanism especially constructed to be used in connection with a single belt drive, said mechanism being mounted upon the shell of a washing machine and operated in such a manner that the machine will be driven smoothly in one direction and reversed gradually so as to overcome the disadvantages now existing with machines in which the operating mechanism is suddenly reversed.

Another object of the invention is to provide mechanism in which the driving gears are controlled by spring actuated frictional clutches which are released alternately by a rock lever operated by cams.

Another object of the invention is to provide a novel form of a multiple disk clutch in which the co-acting disks are thrown into contact by the action of a spring, means being provided for adjusting the tension of said spring whereby the reversing of the cylinder is made gradually.

50 Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings—Figure 1 is an end ele-

55 vation of my improved driving and reversing mechanism showing the application of the same to a rotary washing machine; Fig. 2 is a vertical section showing the driving gears of the mechanism in mesh with the master gear of the washing machine; Fig. 60 3 is a vertical transverse section taken at right angles to that of Fig. 2; Fig. 4 is a detail vertical section showing the manner of connecting the rock lever to the clutch members; Fig. 5 is a plan view of the rock lever; Fig. 6 is a plan view of the rock lever connecting ring; Fig. 7 is an end view of the female clutch gear; Fig. 8 is a section taken on line 8—8 of Fig. 7; Figs. 9 and 10 are plan views of the respective frictional disks; Fig. 11 is an end view of one of the worm gears showing the cam carried there-
70 by; Fig. 12 is a section taken on line 12—12 of Fig. 11; Fig. 13 is an end view of the male clutch member and bearing sleeve; Fig. 14 is a longitudinal section through the same; Fig. 15 is an end view of one of the gears; and Fig. 16 is a section taken on line 16—16 of Fig. 15.

Like numerals of reference refer to like parts in the several figures of the drawings.

In the drawings, 1 indicates the outer shell of an ordinary rotary washing machine in which is mounted the usual perforated cylinder, not shown, carried by the shaft 2, upon the outer end of which is mounted the master gear 3 for driving the same as will be later described, the above description being given so that the operation of my improved driving and reversing mechanism
90 can be more readily understood.

Secured to the end of the shell 1 is an outwardly projecting lip 4 of a housing 5 in which my improved mechanism is inclosed, said housing being provided with an open side into which extends a portion of the driving gear 3. The housing is preferably formed with a removable front and is provided with suitable bearings 6, 7 and 8. Mounted in the bearing 7 is a drive shaft 9 which extends outwardly and is provided with a pulley 10 over which passes a drive belt 11 carried by a drive pulley 12 mounted on the shaft of a motor 13 arranged upon the top of the housing as clearly shown, said motor being preferably an electric motor, as clearly shown.

Mounted in the bearings 6 and 8 are

shafts 14 and 15 provided with lubricating cups 16 as clearly shown and having thrust ball-bearings 17 arranged thereon, against which the hub portions 18 and 19 of gears 20 and 21 are adapted to bear, said gears being loosely mounted upon said shafts. The gears 20 and 21 are provided with sleeve portions 22 and 23 forming the female portions of clutches as will be later described. Mounted loosely on each of the shafts 14 and 15 are sleeves 24 and 25 provided with threaded portions on which are mounted the threaded ends of male members 26 and 27 of the clutches which are provided with flanged ends 28 and have longitudinal strips 29 and 30 secured thereon as clearly shown, forming ribs of different lengths, the ribs 29 receiving the notched frictional disk 31 and the ribs 30 extending into longitudinal grooves 32 formed in the hub portions 33 of idle gears 34 and 35 mounted upon the respective male members of the clutches. The sleeve portions forming the female members of the clutches are provided with internal longitudinal ribs 36 adapted to receive the notched frictional disks 37 which are arranged thereon, said disks extending between the disk 31 as clearly shown. Arranged over the end of the female members of the clutches are rings 38 which are provided with semi-annular flanges 39 which are adapted to fit within substantially semi-circular grooves 40 formed in the hubs of the idle gear 35 in such a manner that when in the position shown, the gears will be locked to the female members of the clutches. It will be seen that by this construction, by oscillating the gears in respect to the female members, they can be detached therefrom.

Surrounding the shafts 14 and 15 are coiled springs 41 which bear against the hubs of the respective gears 20 and 21 in the respective sleeves 24 and 25 in such a manner that the frictional disks 31 and 37 are thrown into contact so as to lock the clutch members together. As the springs force the sleeves away from the hubs of the gears, the flanges 28 force the frictional disks together against the rings 38 and in order to release the clutch members, it is necessary to force the female members toward the gears, means being provided to accomplish this result as will be later described.

The sleeves 24 and 25 are mounted loosely upon the shafts so as to rotate freely thereon and the driving shaft 9 carries a gear 42 which meshes with the respective gears 34 and 35 in order to drive the same and it will be seen that when the clutch members are thrown out of engagement, the gears and sleeve will run loose upon the shafts.

Mounted in a suitable bearing 43, formed

in the housing, is a shaft 44 carrying an idler gear 45 which meshes with the master gear 3 which extends into the housing, as clearly shown in Fig. 2, and said master gear also meshes with the gear 20, the idle gear being used so as to reverse the driving of the washing machine as will be later described.

Mounted within the housing is a rock lever 46 which is provided with forked ends which straddle the sleeves 24 and 25, said sleeves having rings 47 loosely mounted thereon which are provided with stud pins which extend into openings formed in the forks of the levers, this connection being ordinarily used in clutches and the like. The rings 47 are held in position upon the sleeves by collars 50 which are secured thereto by set screws, as clearly shown. This connection allows the sleeves to run free and at the same time, the ends of the lever are loosely connected thereto in such a manner that when the lever is rocked, first one and then the other of the clutch members will be released so as to allow the springs to act upon the clutches and set the same. For rocking the lever so as to release one clutch and set the other at a predetermined time, so that the washing machine will make a certain number of revolutions in one direction and then be stopped gradually and then make the same number of revolutions in the reverse direction, I provide a pair of cams 51 and 52 which act upon anti-friction rollers 53 and 54 carried by the respective ends of the lever 46, said cams being formed integral with worm gears 55 and 56 mounted upon shafts 57, said worm gears meshing with a worm 58 fixed on the shaft 9 whereby the worm gears will be rotated so that the cams carried thereby will be alternately thrown into engagement with the anti-friction rollers so as to release one clutch member and hold the other out of operation. The number of revolutions of the washing machine in either direction can be varied by changing the pitch of the worm and the number of teeth on the worm gear.

The operation of the mechanism is as follows. The motor, being started, the shaft 9 is driven and, assuming that the clutch members are in the position shown in Fig. 3, which shows the gear 20 with its clutch locked, the washing machine will be rotated in one direction until the cams have made a partial revolution which will reverse the position of the lever so as to unlock the previously locked clutched against the tension of the spring and allow the spring of the other clutch to force the frictional disk into contact so as to lock the clutch and, through the medium of the idle gear 45, the washing machine will be rotated in a reverse direction and it will be seen that this operation

will be repeated as long as the shaft 9 is driven.

By this construction, I provide mechanism for driving washing machines first in one direction and then in the reverse direction in which the reversing of the driving is made gradually so as to prevent stripping of the teeth.

Having described my invention and set forth its merits what I claim and desire to secure by Letters Patent is—

1. In a driving and reversing mechanism, the combination with driving gears, of idle gears, spring actuated clutches for locking said gears together, and a rock lever for holding and releasing said clutches.

2. A driving and reversing mechanism, comprising driving gears and idle gears, clutches disposed between said gears, a driving shaft, a gear carried by said driving shaft for actuating said idle gears, a mechanism operated by said driving shaft for alternately locking and releasing said clutches.

3. A mechanism of the kind described, the combination with a gear to be driven, of a driving gear meshing with said gear, a second driving gear, an intermediate gear arranged between said second driving gear and gear to be driven, a driving shaft, a gear carried by said shaft for operating said gears, a mechanism operated by said driving shaft for releasing and locking said driving and idle gears alternately so as to drive the first mentioned gear first in one direction and then in the reverse direction.

4. The combination with a gear to be driven, of a driving gear meshing with said gear, a second driving gear, an intermediate gear arranged between said second driving gear and gear to be driven, a driving shaft, a gear carried by said shaft for driving said idle gears, clutches for locking said driving and idle gears, and a rock shaft operated by said driving shaft for releasing and locking said gears.

5. The combination with a gear to be driven, of a pair of driving gears, one of said gears meshing with said first mentioned gear, an idle gear disposed between said first mentioned gear and the other gear of said pair, a driving shaft, a gear carried by said driving shaft, idle gears meshing with the gear carried by said driving shaft, clutches disposed between said idle gears and the driving gears, and a rock lever operated by said driving shaft for alternately releasing and locking said clutches.

6. In a driving and reversing mechanism, the combination with a pair of drive gears, clutch members carried by said gears, of a pair of co-acting clutch members, idle gears carried by said clutch members, springs for normally holding said clutch members in engagement, a drive shaft, a gear carried

by said shaft for driving the gears carried by said clutch members, and a rock lever operated by said drive shaft for releasing said clutch members.

7. In a driving and reversing mechanism, the combination with a gear to be driven, of drive gears, one of said drive gears meshing with the first mentioned gear, an intermediate gear disposed between the other drive gear and gear to be driven, clutch members carried by said drive gears, co-acting clutch members, gears carried by said co-acting clutch members, a drive shaft, a gear carried by a drive shaft for driving the last mentioned gears, and a rock lever operated by said drive shaft for alternately releasing and locking said clutches.

8. In a driving and reversing mechanism, the combination with a pair of shafts, of gears loosely mounted on said shafts provided with clutch members, sleeves mounted on said shafts carrying co-acting clutch members, springs for holding said clutch members in engagement, gears carried by said clutch members, a driving shaft, a gear carried by said driving shaft for driving said last mentioned gears, and a cam operated rock lever co-acting with said sleeves.

9. In a driving and reversing mechanism, the combination with a shaft adapted to be driven in one direction, of a gear carried by said shaft, idle gears driven by said gear, drive gears capable of being driven by said idle gears, clutches disposed between said drive and idle gears, and a rock lever operated by said drive shaft for actuating said clutches.

10. In a driving and reversing mechanism, the combination with a housing, of a driving shaft mounted in said housing, drive gears driven by said shaft, idle gears, clutches disposed between the idle gears, drive gears, a rock lever for operating said clutches and cams actuated by the drive shaft for rocking said lever.

11. In a driving and reversing mechanism, the combination with a drive shaft, a gear mounted on said shaft, of idle gears meshing with said gear, drive gears, clutches disposed between said drive gears and idle gears, springs for throwing said clutches into a locked position, a rock lever for releasing and locking said clutches and means operated by the drive shaft for rocking said lever.

12. A driving and reversing mechanism having loosely mounted drive gears, idle gears, clutches for connecting said gears, a drive shaft, a gear carried by said drive shaft for driving said idle gears, a worm carried by said drive shaft, worm gears meshing with said worm, cams carried by said worm gears, and a rock lever connected to said clutches actuated by said cams.

13. In a driving and reversing mechanism, the combination with a pair of shafts, gears loosely mounted on said shafts, clutch members carried by said gears, sleeves
5 mounted upon said shafts, co-acting clutch members carried by said sleeves, a drive shaft, a gear carried by said drive shaft meshing with said gears, a rock lever for actuating said clutch members, cams for
10 actuating said rock lever, said cams being actuated by said drive shaft.

14. A driving and reversing mechanism having driving gears, a drive shaft, a gear carried thereby for driving said gears, idle
15 gears co-acting with said driving gears, a rocking member for alternately releasing and locking said driving gears to said idle gears, and means actuated by said drive shaft for operating said rocking member.

20 15. In a driving and reversing mechanism, a pair of shafts, driving gears loosely mounted on said shafts, idle gears carried by said shafts, clutches disposed between said driving gears and idle gears, a rock
25 lever for operating said clutches, anti-friction rollers carried by said rock lever, a driving shaft, a gear carried by the driving shaft for driving said gears, a worm carried by said drive shaft, worm gears meshing
30 with said worm and cams carried by said gears engaging said anti-friction rollers.

35 16. In a driving and reversing mechanism, a clutch release comprising a rock lever, antifriction rollers mounted upon said rock lever, gears, cams carried by said gears co-acting with said antifriction rollers, a

drive shaft, and a gear carried by said drive shaft meshing with said gears.

17. In a driving and reversing mechanism, the combination with a gear to be
40 driven, of a housing having an open side to receive said gear, spaced shafts mounted in said housing, driving gears loosely mounted on said shafts, idle gears mounted on
45 said shafts, one of said gears meshing with the gear to be driven, an idle gear disposed between the other drive gear and the gear to be driven, a drive shaft adapted to be rotated in one direction, a gear carried by
50 said drive shaft meshing with said drive gears, and means actuated by said drive shaft for alternately releasing and locking said drive gears to said idle gears.

18. In a driving and reversing mechanism, the combination with a gear to be
55 driven, of a drive gear meshing with said gear, a second drive gear, an intermediate gear disposed between said second drive gear and gear to be driven, idle gears, mechanism for locking and releasing said drive
60 and idle gears having a member rotating in a reverse direction, a drive shaft adapted to be driven in one direction, a gear carried by said drive shaft meshing with said idle gears, and means operated by the drive shaft
65 for actuating said mechanism.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM BARTHOLOMEW.

Witnesses:

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E. M. GLEASON.