

Sept. 1, 1936.

J. J. McCABE

2,053,158

WASHING MACHINE

Filed Oct. 8, 1934

3 Sheets-Sheet 1

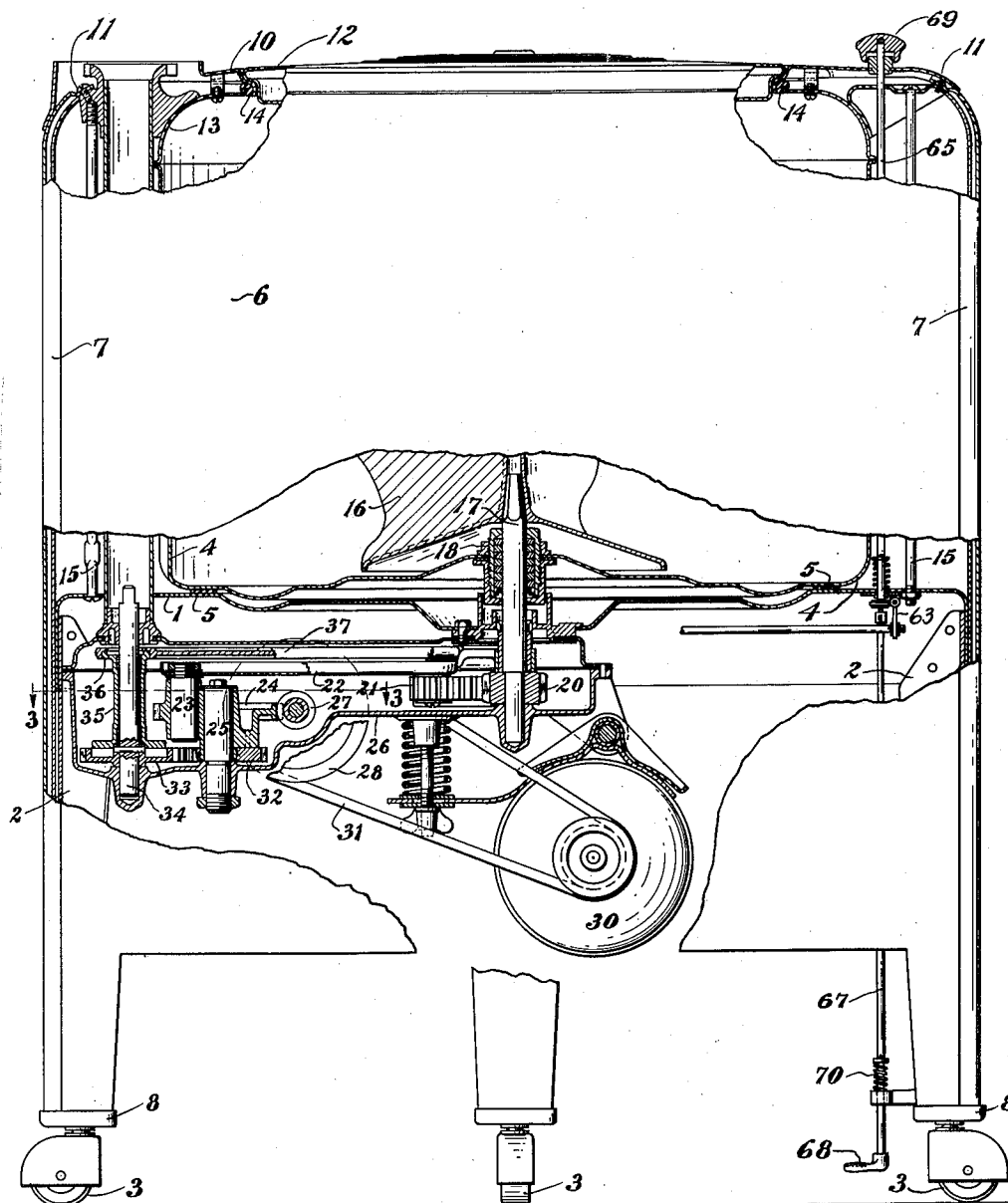


FIG-1

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3 Sheets-Sheet 2

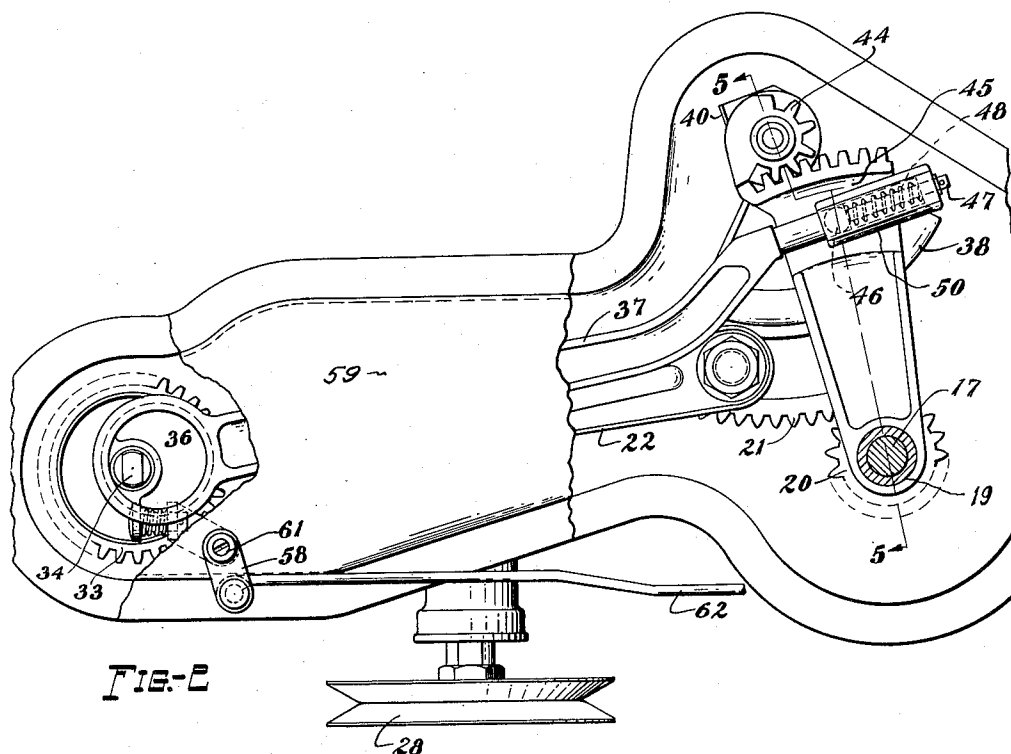


FIG. 2

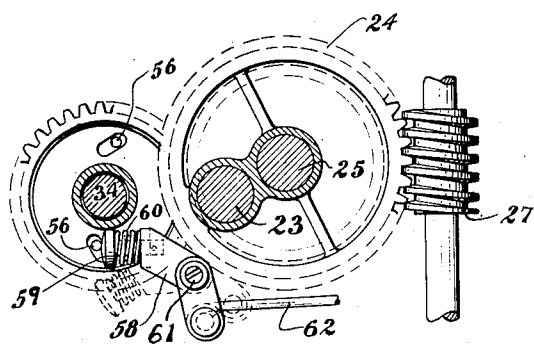


FIG. 3

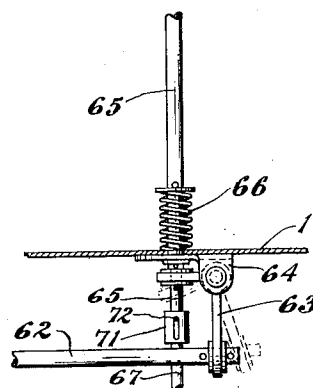


FIG. 4

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3 Sheets-Sheet 3

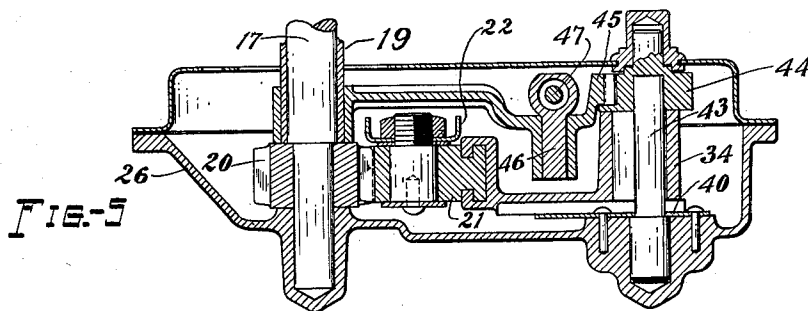


FIG. 5

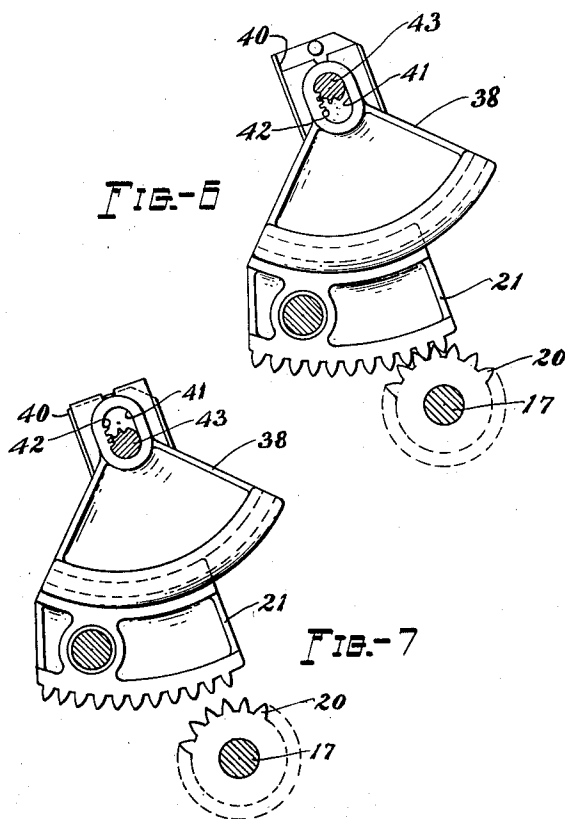


FIG. 6

FIG. 7

FIG. 8

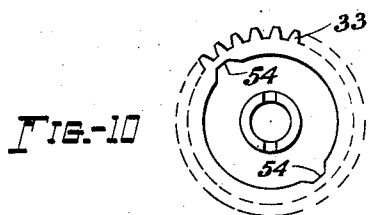


FIG. 9

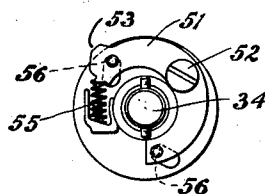


FIG. 10

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UNITED STATES PATENT OFFICE

2,053,158

WASHING MACHINE

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Application October 8, 1934, Serial No. 747,390

18 Claims. (Cl. 74—81)

This invention relates to washing machines and it has for its object the provision of an improved control for starting and stopping the washing instrumentalities of the machine, such control being arranged so as to afford a greater ease and convenience in the manipulation of the controls of a machine of the class described.

With these and other objects in view, the invention consists in the novel construction, arrangement and combination of parts, hereinafter illustrated and described in some of its embodiments in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevational view, partly in section, of a washing machine illustrating one embodiment of the invention; Figure 2 is an enlarged detail plan view of the gear mechanism of the machine shown in Figure 1 with certain of the parts broken away for the sake of clearness; Figure 3 is a detail plan view taken on line 3—3, Figure 1; Figure 4 is an enlarged side elevational view of certain details of the washing machine control; Figure 5 is a detail sectional view taken on line 5—5, Figure 2; Figures 6 and 7 are detail plan views showing the agitator shaft pinion and its driving gear in their operative and inoperative driving positions respectively; Figures 8 and 9 are side elevational and plan views respectively, of some of the parts of the manually operable clutch; and Figure 10 is a plan view of the driven gear in which is formed one of the cooperating parts of the manually operable clutch.

The washing machine selected for purposes of illustrating this invention, comprises a supporting base 1 to which is fixedly secured a plurality of supporting legs 2 having casters 3 at their lower ends. Upon the base 1 there is carried a tub 4 which rests upon yielding pads 5 preferably formed of rubber and interposed between the tub and the base.

The machine shown is square in cross-sectional outline with supporting legs located one at each corner of the machine. The tub legs and supporting base are concealed behind shields or panels 6, one of which is provided for each side of the machine. These panels are bent over the tub at their upper ends and extend from the top of the machine to a point a considerable distance below the bottom of the tub 4 and base 1 so that all of the operating parts of the machine are concealed from view.

The shields or panels 6 are held in place by means of four finishing strips 7, one of which is provided at each corner of the machine. The

lower end of each of the finishing strips is held in place by means of a collar 8 carried at the bottom of each of the machine legs 2. The finishing strips are secured at their upper ends with respect to a top plate 10 by any suitable means such as the screws 11.

The top plate 10 may be in the form of an annular ring having four radial arms extending outwardly therefrom. The annular ring of the top plate defines a general opening provided for the reception of a tub cover 12. The radial arms of the top plate cover the meeting edges of the top part of the panels 6 as well as covering the upper ends of the finishing strips 7.

The top part of the tub 4 is formed by an inverted annular shield 13, the bottom of which rests upon the upper edge of the tub. The upper edge of this shield is engaged by the top plate 10 and interposed between these parts there is provided an annular gasket 14 preferably of a yielding material, as for example, rubber. The top plate 10 is urged against the top of the shield 13 by a number of threaded rods or elongated bolts 15 which engage with the base 1 of the machine. In this manner the tub is securely yet yieldingly held in place by the rubber supporting pads 5 and the gasket 14.

An agitator 16 is carried inside the tub on a shaft 17 traversing a seal or packing device 18 carried by the tub bottom so as to prevent leakage of water from the tub at this point. An upper bearing 19, carried by the gear case is provided for the shaft 17 and a pinion 20 is secured to the lower end of this shaft. This pinion is adapted for meshing engagement with a curved rack bar 21. The rack bar is connected for movement with one end of a pitman 22, the other end of which is fixed to a pin 23 mounted eccentrically in a worm gear 24 carried on a shaft 25 fixed to the bottom 26 of a gear case within which the gearing just described is enclosed. The worm gear 24 is driven by a worm 27 fixed with respect to a belt pulley 28 which is driven by a motor 30 through a belt 31.

A gear 32, coaxial with the gear 24, is secured for movement therewith. This gear is in constant mesh with a second gear 33 which is fixed to a vertical shaft 34 by which the wringer mechanism (not shown) of the machine is driven. An elongated sleeve 35 is loosely mounted on the wringer driving shaft 34. The sleeve 35 is provided with an eccentric 36 at its upper end and this eccentric is received in one end of an eccentric rod 37. The eccentric and its associated rod are provided for utilizing the power of the

motor 30 to move the gears 20 and 21 into mesh with each other as will be described in detail presently.

The curved rack bar 21 is carried in a channeled guideway 38 itself mounted for rectilinear movement in a channeled guideway 40. The rack bar guideway 38 is traversed at one end by an elliptical opening 41 having gear teeth 42 formed on one side thereof for intermeshing engagement with the teeth of a mutilated pinion 43 which is rotatably carried in the gear case, so that when the pinion 43 is turned in a counter-clockwise direction as viewed from the top of the machine, the gear 21 is moved into engagement with the pinion 20 as shown in Figure 6, and when the mutilated pinion 43 is moved in a clockwise direction, the gears 20 and 21 are disengaged and moved to the position shown in Figure 7.

Apparatus for effecting the aforesaid operations includes a second mutilated gear 44 fixed to one end of the mutilated pinion 43. The mutilated gear 44 is in mesh with the teeth at one end of a gear segment 45, the other end of which is journaled for movement on and about the upper bearing 19 of the agitator shaft 17. Intermediate the ends of the segmental gear 45 there is provided an aperture for reception of a pin 46 having a sleeved part 50 fixed thereto in the opening of which is received the reduced end section 47 of the eccentric rod 37 and the spring 48.

The spring 48 is provided to normally maintain the eccentric rod 37 in the position shown in Figure 2 with reference to the pin 46 and by reason of this arrangement, positive means are provided for moving the segmental gear 45 in one direction, and resilient means are provided for moving the same in a reverse direction, such directions corresponding respectively to the engaging and disengaging movement of the curved rack bar 21 with respect to the pinion 20.

When the eccentric 36 is rotated 180° from the position shown in Figure 2, the spring 48 will operate to provide a resilient means for shifting the rack bar 21 through the operation of the segmental gear 45, the mutilated gears 44 and 43 and the curved guideway 34 which carries the curved rack bar 21, and in this manner the gear 21 is moved from the position shown in Figures 2 and 7 to the position shown in Figure 6. When the eccentric 36 completes the next half of its movement, the segmental gear 45 and the associated elements are positively moved so as to shift the gear 21 from the position shown in Figure 6 to the position shown in Figures 2 and 7.

The operation of the eccentric 36 is effected and controlled in the following manner. At the bottom of the sleeve 35 which carries the eccentric 36 there is provided a clutch dog 51 mounted for movement on the shoulder of a screw 52. The clutch dog 51 is provided with a radial extending part 53 which is arranged to be moved into and out of engagement with suitable notches 54 formed internally of the gear 33 and it is urged to its driving position by means of a spring 55. The clutch dog has a pair of pins 56 which project through apertures in a radially offset cup 57 carried at the bottom of the sleeve 35 for reception of the clutch dog and its associated spring and screw.

The pins 56 are arranged for contact with a plunger 59 carried by one arm of a crank member 58. The plunger 59 is urged to its outermost position by means of a spring 60. The tension 75 built up in the spring 60 when the manually con-

trolled clutch is operated, is utilized to completely move the part 53 of the clutch dog out of contact with the gear 33 after its disengagement therefrom. The shaft 61 of the crank member 58 is journaled for movement in the cover 59 of the gear case so that one of its arms is inside the gear case and its other arm is outside the same. The outer arm of the crank 58 is arranged to engage one end of a control rod 62, the other end of which is pivotally attached to a bell crank 63 pivotally supported by a bracket 64 carried by the base member 1 of the machine. The other arm of the bell crank is engaged by a push rod 65 having a spring 66 at its lower end to normally maintain it in the position shown in full lines in Figure 4.

At the upper end of the rod 65 there is provided a push button 69 by means of which the rod is manually moved. Additional means including a rod 67 having a foot pedal 68 at its lower end and a spring 70 to urge it upwardly, is provided for actuating the rod 65, the bell crank 63 and the parts associated therewith. The connection between the rod 67 and the rod 65 is by way of a loosely fitting collar 71 fixed to the rod 67, having a slot for reception of a pin 72 fixed with respect to the rod 65 so that when the push button 69 is depressed this operation will not affect the movement of the rod 67 and the associated foot treadle. The purpose of this arrangement is to have the push button operate with the lightest possible pressure.

When either the button 69 or the treadle 68 is depressed, the crank 58 is moved from the full to the dotted line position shown in Figure 3, whereby the plunger 59 is moved away from one or the other of the pins 56, whereupon the clutch spring 55 serves to move the part 53 of the clutch dog into engagement with one of the other of the notches 54 of the gear 33. After this takes place, the driven clutch parts and the sleeve 35 and the eccentric 36 are rotated 180° whereupon the other pin 56 moves into engagement with the plunger 59 to disengage the clutch. This action normally takes place as the operating members formed by the push button 66 or the foot pedal 68 are only momentarily depressed to effect the control of the machine.

The aforesaid control greatly facilitates the operation of the washing machine both by reason of the ease of its operation and by reason of the convenient location of the push button and pedal forming the operating members of the control. The foot pedal is particularly useful in case the hands of the operator are otherwise engaged, as for example, in loading or removing clothes from the tub.

Furthermore, it is to be understood that the particular forms of washing machine shown and described, and the particular procedure set forth are presented for purposes of explanation and that various modifications of said apparatus and procedure can be made without departure from this invention as described in the appended claims.

Having thus described my invention what I claim is:

1. In a power operated, manually controlled gearing; a lubricant retaining gear case, a rotatable shaft traversing a wall of said gear case, power means outside said gear case for driving said shaft, a second rotatable shaft having a part at least inside said gear case, speed reducing gearing connecting said first shaft to said second shaft, a third shaft also having a part at

least inside said gear case and mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means for connecting said speed reducing gearing to said third shaft for oscillating the same, and power operated control means including a manually operable clutch for connecting and disconnecting said disconnectible driving means with respect to said third shaft.

2. In a power operated, manually controlled gearing; a lubricant retaining gear case, a rotatable shaft traversing a wall of said gear case, power means outside said gear case for driving said shaft, a second rotatable shaft having a part at least inside said gear case, speed reducing gearing connecting said first shaft to said second shaft, a third shaft also having a part at least inside said gear case and mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means for connecting said speed reducing gearing to said third shaft for oscillating the same, power operated means for connecting and disconnecting said disconnectible driving means with respect to said third shaft, and a manually operable clutch associated with said first shaft for controlling the operation of said power operated means.

3. In a power operated, manually controlled gearing; a lubricant retaining gear case, a rotatable shaft traversing the wall of said gear case, power means outside said gear case for driving said shaft, a second rotatable shaft having a part at least inside said gear case, speed reducing gearing connecting said first shaft to said second shaft, a third shaft also having a part at least inside said gear case and mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means including a pitman and a pair of gears adapted to be oscillated by said pitman for connecting said speed reducing gearing to said third shaft for oscillating the same, and power operated control means including a manually operable clutch for effecting the connection and disconnection of said disconnectible driving means with respect to said third shaft.

4. In a power operated, manually controlled gearing; a lubricant retaining gear case, a rotatable shaft traversing the wall of said gear case, power means outside said gear case for driving said shaft, a second rotatable shaft having a part at least inside said gear case, speed reducing gearing connecting said first shaft to said second shaft, a third shaft also in part at least inside said gear case and mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means including a pitman and a pair of gears adapted to be oscillated by said pitman for connecting said speed reducing gearing to said third shaft for oscillating the same, power operated means for effecting relative movement of said oscillatable gears into and out of mesh with each other, and a manually operable clutch for controlling the shifting of said oscillatable gears by said power operated means.

5. In a power operated, manually controlled gearing; a lubricant retaining gear case, a rotatable shaft traversing the wall of said gear case, power means outside said gear case for driving said shaft, a second rotatable shaft having a part at least inside said gear case, speed reducing gearing connecting said first shaft to said second shaft, a third shaft also having a part at least inside said gear case and mounted for movement

about an axis parallel to the axis of said second shaft, disconnectible driving means for connecting said speed reducing gearing to said third shaft for oscillating the same, and power operated control means including a manually operable clutch, an eccentric and a member driven by said eccentric for effecting the connection and disconnection of said disconnectible driving means with respect to said third shaft.

6. In a power operated, manually controlled gearing; a lubricant retaining gear case, a rotatable shaft traversing the wall of said gear case, power means outside said gear case for driving said shaft, a second rotatable shaft having a part at least inside said gear case, speed reducing gearing connecting said first shaft to said second shaft, a third shaft also having a part at least inside said gear case and mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means for connecting said speed reducing gearing to said third shaft for oscillating the same, an eccentric adapted to be driven by said speed reducing gearing, a clutch for controlling the movement of said eccentric, and means driven by said eccentric for effecting the connection and disconnection of said disconnectible driving means with respect to said third shaft.

7. In a power operated, manually controlled gearing; a lubricant retaining gear case, a rotatable shaft traversing the wall of said gear case, power means outside said gear case for driving said shaft, a second rotatable shaft having a part at least inside said gear case, speed reducing gearing connecting said first shaft to said second shaft, a third shaft also having a part at least inside said gear case and mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means for connecting said speed reducing gearing to said third shaft for oscillating the same, an eccentric adapted to be driven by said speed reducing gearing, a clutch for controlling the movement of said eccentric, a connecting rod operated by said eccentric, and means connected to the end of said rod and remote from said eccentric for effecting the connection and disconnection of said disconnectible driving means with respect to said third shaft.

8. In a power operated, manually controlled gearing; a rotatable shaft, power means for driving said shaft, a second rotatable shaft, speed reducing gearing connecting said first shaft to said second shaft, a third shaft mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means for connecting said speed reducing gearing to said third shaft for oscillating the same, an eccentric adapted to be driven by said speed reducing gearing, a clutch for controlling the movement of said eccentric, a connecting rod operated by said eccentric, and means including a segmental gear connected to the end of the rod remote from said eccentric for effecting the connection and disconnection of said disconnectible driving means with respect to said third shaft.

9. In a power operated, manually controlled gearing; a rotatable shaft, power means for driving said shaft, a second rotatable shaft, speed reducing gearing connecting said first shaft to said second shaft, a third shaft mounted for movement about an axis parallel to the axis of said second shaft, disconnectible driving means for connecting said speed reducing gearing to said third shaft for oscillating the same, an eccentric adapted to be driven by said speed reduc-

ing gearing, a clutch associated with said first named shaft for controlling the movement of said eccentric, and means driven by said eccentric for effecting the connection and disconnection of
5 said disconnectible driving means with respect to said third shaft.

10. The combination with a gear mechanism having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving said
10 rotatable driving shaft, a disconnectible motion-converting driving connection between said shafts, and operator-operated means for utilizing said power means in effecting the operation of said disconnectible driving connection.

15 11. The combination with a gear mechanism having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving said rotatable driving shaft, motion-converting means including gears for connecting said shafts
20 to each other, certain of said gears being relatively movable into and out of meshing engagement with each other, and operator-operated means for utilizing said power means for effecting the engagement and disengagement of said
25 gears.

12. The combination with a gear mechanism having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving said rotatable driving shaft, motion-converting
30 means including gears for connecting said shafts to each other, certain of said gears being relatively shiftable into and out of meshing engagement with each other, and means including a clutch having a manually operated control member
35 for utilizing said power means for effecting the relative shifting of said gears.

13. The combination with a gear mechanism having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving
40 said rotatable driving shaft, motion-converting mechanism including a disconnectible driving connection for connecting said shafts to each other, and operator-operated means for utilizing said power means for controlling the operation
45 of said driven shaft.

14. The combination with a gear mechanism having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving said rotatable driving shaft, motion-converting means
50 providing a disconnectible driving connection between said shafts, and operator-operated means for utilizing said power means in effecting the operation of said disconnectible driving connection; said last named means including a control
55 member responsive to very slight pressure by the operator for effecting the stated operations.

15. The combination with a gear mechanism having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving

said rotatable driving shaft, a pinion on said driven shaft, a toothed member adapted for meshing engagement therewith, a pitman operatively connected to said driving shaft for driving said
5 toothed member, power operated means for moving said toothed member into and out of meshing engagement with said pinion, and manually operable means for controlling the operation of said power operated control means.

16. The combination with a gear mechanism
10 having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving said rotatable driving shaft, a pinion on said driven shaft, a toothed member adapted for meshing engagement therewith, a pitman operatively
15 connected to said driving shaft for driving said toothed member, power operated means for moving said toothed member into and out of meshing engagement with said pinion, and a manually operable clutch driven by said power means for
20 moving said toothed member into and out of meshing engagement with said pinion.

17. The combination with a gear mechanism having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving said
25 rotatable driving shaft, a pinion on said driven shaft, a toothed member adapted for meshing engagement therewith, a pitman operatively connected to said driving shaft for driving said
30 toothed member, power operated means for moving said toothed member into and out of meshing engagement with said pinion, and a manually operable clutch driven by said power means for
35 moving said toothed member into and out of meshing engagement with said pinion, said clutch including resilient connecting means for positively shifting the toothed member in one direction and for resiliently moving it in an opposite direction.

18. The combination with a gear mechanism
40 having a rotatable driving shaft and an oscillatable driven shaft, of power means for driving said rotatable driving shaft, a pinion on said driven shaft, a toothed member adapted for meshing engagement therewith, a pitman operatively connected to said driving shaft for driving said
45 toothed member, power operated means for moving said toothed member into and out of meshing engagement with said pinion, and a manually operable clutch driven by said power means for
50 moving said toothed member into and out of meshing engagement with said pinion, said clutch including resilient connecting means for positively moving said toothed member out of engagement with said pinion and for resiliently moving
55 said toothed member into engagement with said pinion.

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