Feb. 7, 1928. 1,658,274

O. B. WOODROW

GEARING MECHANISM FOR WASHING MACHINES

Original Filed April 13, 1925 2 Sheets-Sheet 1

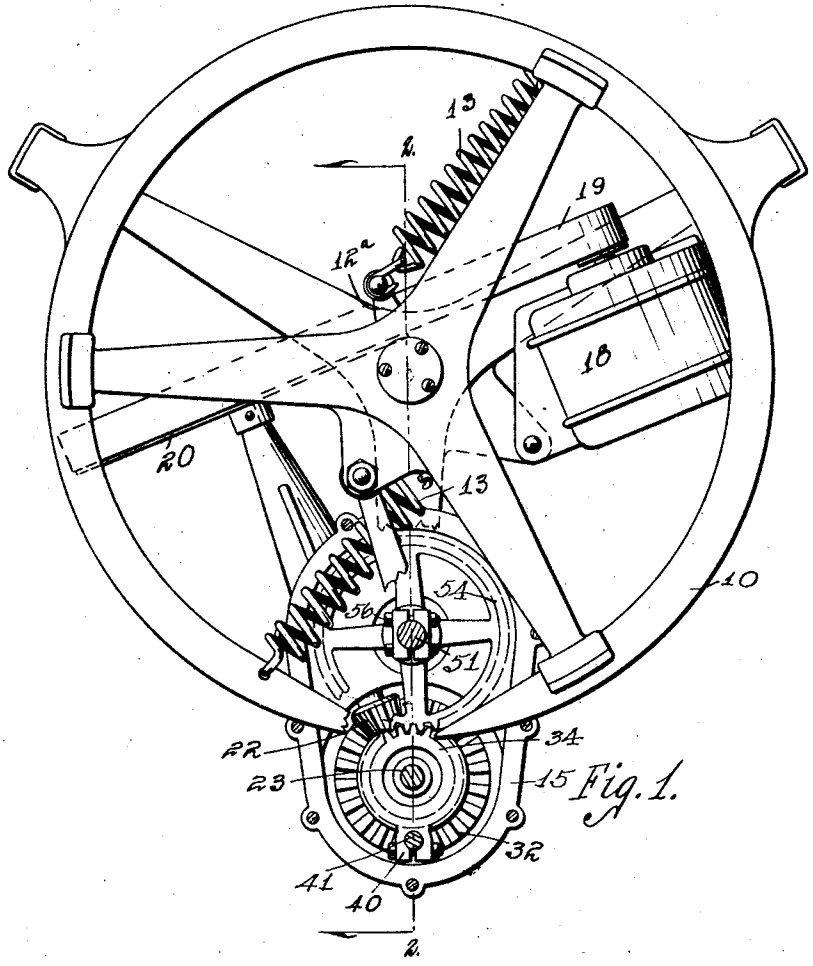

Fig. 1.

Inventor
Oliver B. Woodrow.
by Irwin & Hagar Attys.

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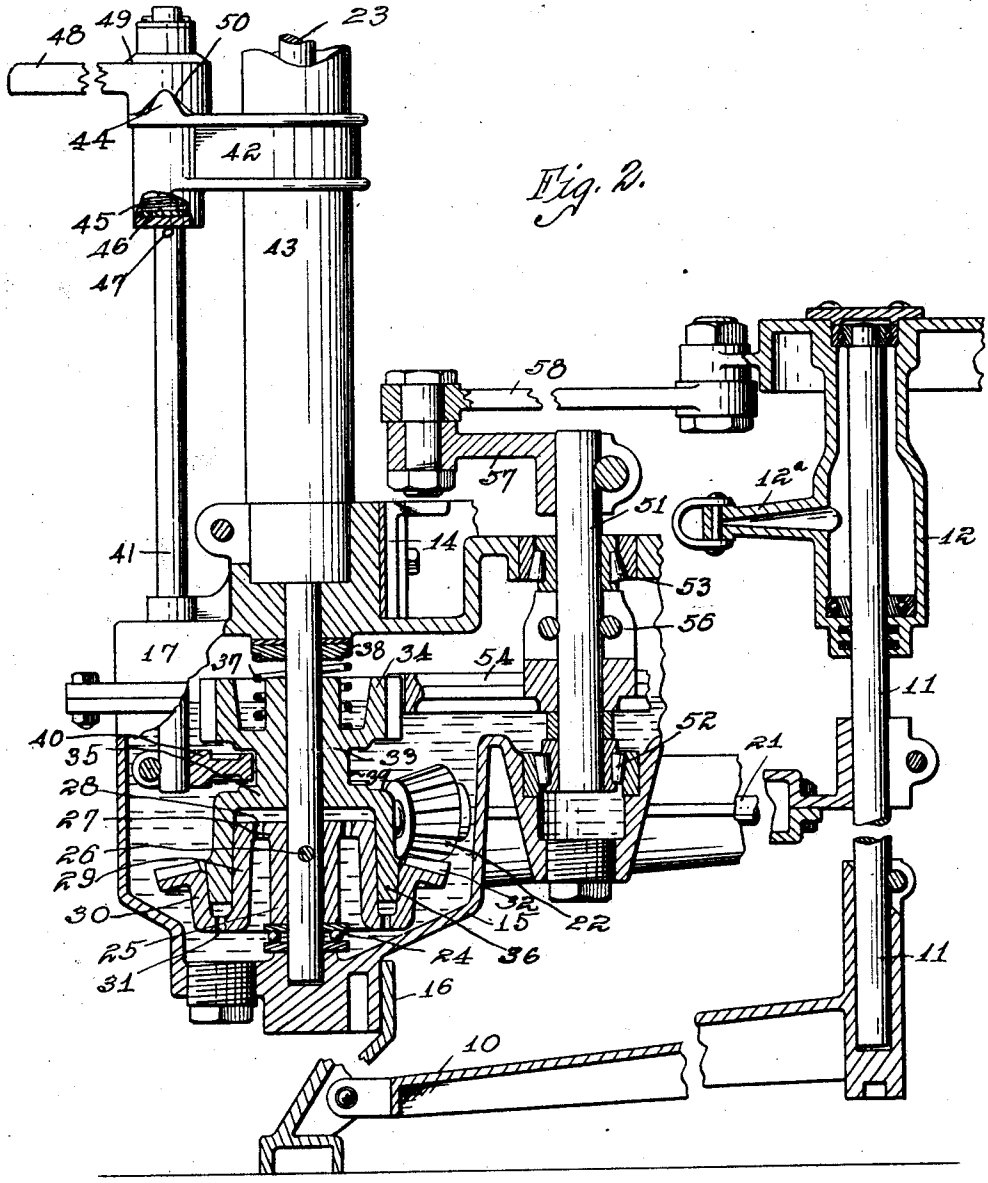

Fig. 2.

Inventor
Oliver B. Woodrow
by Ewing & Hague Attys.

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UNITED STATES PATENT OFFICE.

OLIVER B. WOODROW, OF NEWTON, IOWA, ASSIGNOR TO WOODROW WASHING MACHINE COMPANY, OF PELLA, IOWA, A CORPORATION OF IOWA.

GEARING MECHANISM FOR WASHING MACHINES.

Original application filed April 13, 1925, Serial No. 22,797. Divided and this application filed November 2, 1925. Serial No. 66,348.

This invention relates to improvements in washing machines, and particularly to that type which is driven through a power device such as an electric motor, having a wringer driving shaft and an oscillating agitator mechanism, and is a divisional application of my copending application for Letters Patent on a driving mechanism for washing machines, filed April 13, 1925, Serial Number 22,797.

The object of my invention is to provide an improved gearing mechanism for throwing either the agitator mechanism or the wringer driving shaft into and out of operation with the washing machine driving power.

More specifically it is my object to provide a mechanism of this class in which the parts most subject to wear are grouped and assembled in a small space and all contained within a gear case which may be filled with oil so that said working parts run continuously in oil with obviously advantageous results.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which:

Figure 1 shows a top or plan view of a stationary base member for a washing machine or the like and a movable frame member mounted thereon designed to receive a tub to be moved in a vertical oscillating manner. Said view also shows the electric motor and the gear case enclosing the drive mechanism, the top of the gear case being removed.

Figure 2 shows an enlarged, detail, vertical, sectional view taken on a line centered at the vertical drive shaft for the washer and the vertical drive shaft for the wringer.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate a stationary supporting frame preferably of the kind having three legs extended outwardly from the central body portion, and supported at the central portion of this stationary frame is an upright shaft 11. Rotatively mounted upon the upper portion of the shaft 11 is a hollow frame member 12. This rotatable frame member 12 is designed to receive a small amount of grease and to carry a washing machine tub or other article to be horizontally oscillated. Carried by the frame 12 are radially extending arms 12^a, each of said arms being provided with a spring 13.

The lower gear case member is indicated generally by the reference numeral 15 and is stationarily supported at its lower end by means of the frame member 16 which is part of the frame 10. The top of the gear case member, indicated generally by the numeral 17, is secured to the circular angle bar member 14, thus rigidly securing together the various parts of the stationary frame member and the gear case, and forming an assembly that may be readily and easily put together.

Mounted upon a part of the stationary frame member is an electric motor or other prime mover indicated by the numeral 18 and connected by a belt 19 with a pulley 20 on the shaft 21 which enters the gear case, and has a beveled driving pinion 22 on its end within the gear case.

Extended vertically through the gear case is a wringer drive shaft 23 having at its lower end a ball bearing 24. Fixed to this shaft 23 near its lower end is a combined clutch member and bevel gear device which comprises a hub portion 25 rigidly connected by a pin 26 to the shaft 23. At the top of the hub portion is an outwardly extended part 27 formed with a series of oil passageways 28. At the outer end of the part 27 is a downwardly projecting conical clutch flange member 29, and at the lower end of the member 29 is a flange extended outwardly and then upwardly at 30, thus forming a substantially V-shaped groove, both adjacent faces of which provide clutching surfaces for the mating clutch member. This flange is formed at its bottom with oil passageways 31 and at the outer upper portion of the flange 30 there is formed a bevel gear 32, the latter being arranged in mesh with the bevel pinion 22.

The coacting clutch member comprises a body portion 33 loosely mounted upon the shaft 23 above the clutch member 29. This body portion 33 is formed at its upper end with a gear wheel 34 and at its lower end it is formed with an outwardly extended flange 35 above the oil passageways 28, and

also with a downwardly extended conical clutch member 36 shaped to coact with the conical clutch member 29 and also to enter the space between the parts 29 and 30, and when in its lower position it tightly fits both adjacent faces of the parts 29 and 30, and forms clutching contact therewith. This clutch member 33 is yieldingly held in position in clutching engagement with the clutch member 29 by a coil spring 37 interposed between the central portion of the gear wheel 34 at its lower end and a washer 38 at its upper end, which washer bears against the gear case cover 17 through which the shaft 23 is projected.

Formed in the central portion of the clutch member 33 is an annular groove 39 into which is projected an arm 40 fixed to a shaft 41 which is slidingly mounted in the gear case cover 17, and it serves the purpose of elevating the upper clutch member to position out of clutching engagement with the lower clutch member.

The means for raising and lowering the shaft 41 preferably comprises a stationary bracket 42 mounted on the tubular housing 43 for the shaft 23. This bracket 42 is preferably provided with a stationary cam shaped lug 44 at its upper end, and also is provided with a coil spring 45 at its lower end engaging the bracket 42 at its top, and also engaging a washer 46 at its bottom, which washer is secured by a pin 47 to the shaft 41, thus tending to yieldingly hold the shaft 41 at its downward limit of movement.

Rotatively mounted upon the shaft 41 is a lever 48 having a circular head 49 surrounding the upper end of the shaft 41 and also having a cam shaped flange 50 extending downwardly and designed to engage and coact with the cam shaped lug 44. When the lever 48 is in the position shown in Figure 2, then the shaft 41 is in position held by the spring 45 at its downward limit of movement, but when this lever 48 is moved laterally in either direction, the cam 50, traveling upon the cam 44, elevates the shaft 41 against pressure of the spring 45 and holds it in such elevated position.

Rotatively mounted within the gear case is the upright drive shaft 51 for the washing machine. This drive shaft is mounted with its lower end in a thrust roller bearing 52 at the lower part of the gear case, and with its upper end in a roller bearing 53 in the gear case cover. Fixed to its central portion within the gear case is a gear wheel 54 in mesh with the gear wheel 34, and these gear wheels are of such relative size that they will always remain in mesh when the gear wheel 34 is either in its elevated or its lowered position. The gear wheel 54 is preferably firmly fixed to the shaft 51 by pins 56.

Fixed to the upper end of the shaft 51 above the gear case is a short crank 57 connected by a pitman 58 to the rotatable frame member 12 on the shaft 11.

In practical use attention is called to the fact that with my improved construction and arrangement of parts, all of the gear devices, and the clutch for transmitting power from the drive shaft 21 to either the wringer drive shaft 23 or the washing machine drive shaft 51, are contained within a tightly enclosed gear case, which is filled with oil so that all of these parts are constantly lubricated and the oil is prevented from working out of the gear case in such manner as might come in contact with the garments being used in connection with the washing machine. Furthermore, the gear case itself forms a part of, and is firmly connected with, the stationary frame of the machine, in that the lower end of the gear case is securely fixed to the lower stationary frame member 10 and the upper end of the gear case is firmly fixed to the frame member 14. Furthermore, if for any reason it should be necessary to provide access to any of these gear devices, this may be done by simply removing the gear case cover.

The combination of the clutch members with the integral gears on each of them, together with the co-operating parts thereof, is highly advantageous in a structure of this character. With my improved construction the main drive shaft 21 constantly rotates the wringer shaft 23 through the gears 22 and 32. This gear 32 is formed as an integral part of the lower clutch member, which in turn is fixed to the shaft 23, thus making an extremely simple, durable and efficient means for driving the shaft 23, but in addition to its function of driving the shaft 23, the gear 32 is formed with a clutch member, which clutch member is machined in such a manner as to be accurately centered relative to the gear 32. The upper clutch member is formed with a clutch device to coact with the lower clutch member, and is formed with an integral gear wheel 34 to drive the washing machine operating shaft 51, and by this arrangement the driving mechanism for the washing machine is extremely simple, durable and efficient in construction, regardless of the clutch element. In other words, a simple, durable and efficient clutching mechanism is provided in the combination, without the addition of any separate parts that are liable to get out of alinement, or that need separate bearings and attachments; and furthermore all of said working parts are closely assembled and constantly run in oil in the same gear case.

In addition to the foregoing advantages, my improved clutch element of itself is a very efficient structure. When immersed in oil, and assuming that the upper clutch is

elevated out of working engagement with the lower clutch, and that the shaft 23 is running and the shaft 51 is stationary, and assuming further that it is desired to rotate the shaft 51 which is designed to be connected to, say for instance, a tub full of water and clothes, and which requires a relatively great initial force in order to start it, then the operator moves the upper clutch member downwardly. When so doing the oil, that is contained between the part 27 of the lower clutch member and the adjacent part of the upper clutch member, is slowly forced out through the openings 28 and in addition to this the oil, that is contained within the cup shaped portion 34 of the lower clutch member, will be slowly driven out through the openings 37 in the lower clutch member by the clutching flange 36 of the upper clutch member.

It is obvious that in the event that there was no oil in the gear case, and the upper clutch member was moved rapidly downwardly, it would quickly assume a clutched condition with relation to the lower clutch member, and a heavy overload would instantly be thrown on the electric motor or other prime mover with obviously disastrous results. However, by means of this retarding action of the oil it is obvious that when the upper clutch member approaches gripping contact with the lower clutch member, it will reach first a relatively slight driving engagement with the lower clutch member, and this driving engagement will continue in intensity for a considerable period, depending on the size of the oil discharge openings until finally a complete clutch engagement has been attained, and during this time that has elapsed from the time when the clutch is only slightly in engagement until full clutching engagement has been attained, the load of the washing machine will have been gradually started and will slowly reach its maximum load without subjecting the electric motor to undue strains for starting purposes.

I claim as my invention:

In a gearing mechanism of the class described, the combination of a stationary frame, a body mounted thereon and capable of rotary reciprocating motion, a gear case fixed to the stationary frame, a beveled pinion projected into the interior of the gear case and having its bearing therein, means for operating the beveled pinion, a continuously rotating vertical shaft, a clutch member fixed thereon and designed to be driven by said beveled pinion, a coacting clutch member slidingly mounted on said shaft and within the gear case, a shaft geared to said sliding clutch member, a crank fixed to said shaft, a pitman connected to the crank and also connected to the said body mounted for the rotary reciprocating motion, two arms fixed centrally to said body and below it and extended in opposite directions, and contractable coil springs fixed to said arms and extended outwardly in opposite directions and fixed at their outer ends to the stationary frame, substantially as and for the purposes stated.

Des Moines, Iowa, October 23, 1925.

OLIVER B. WOODROW.