Dec. 11, 1923. 1,476,792

T. W. BEHAN ET AL

DRIVING MECHANISM FOR WASHING MACHINES

Filed Dec. 15. 1922 3 Sheets-Sheet 1

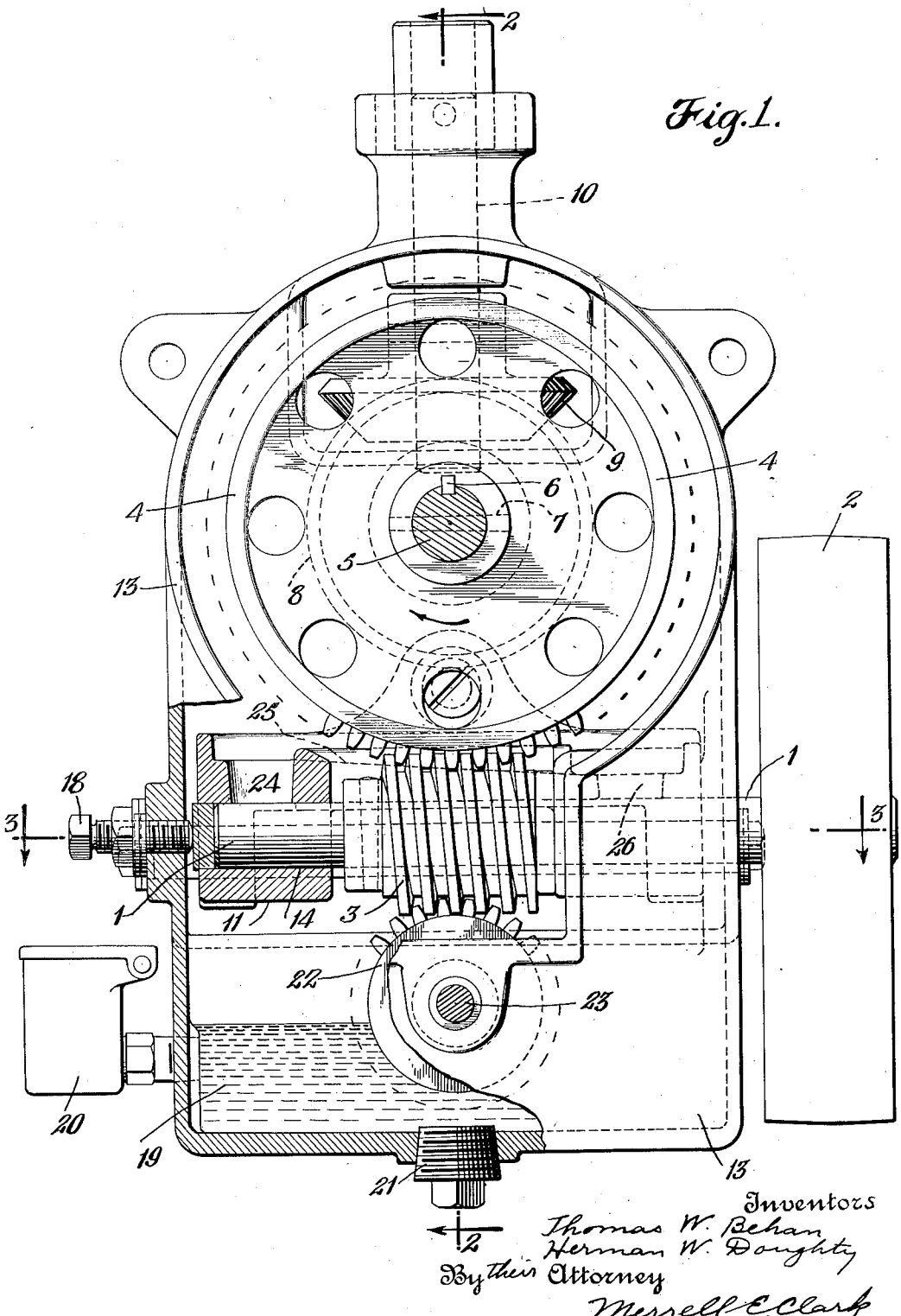


Fig. 1.

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Herman W. Doughty
By their Attorney
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Filed Dec. 15. 1922 3 Sheets-Sheet 2

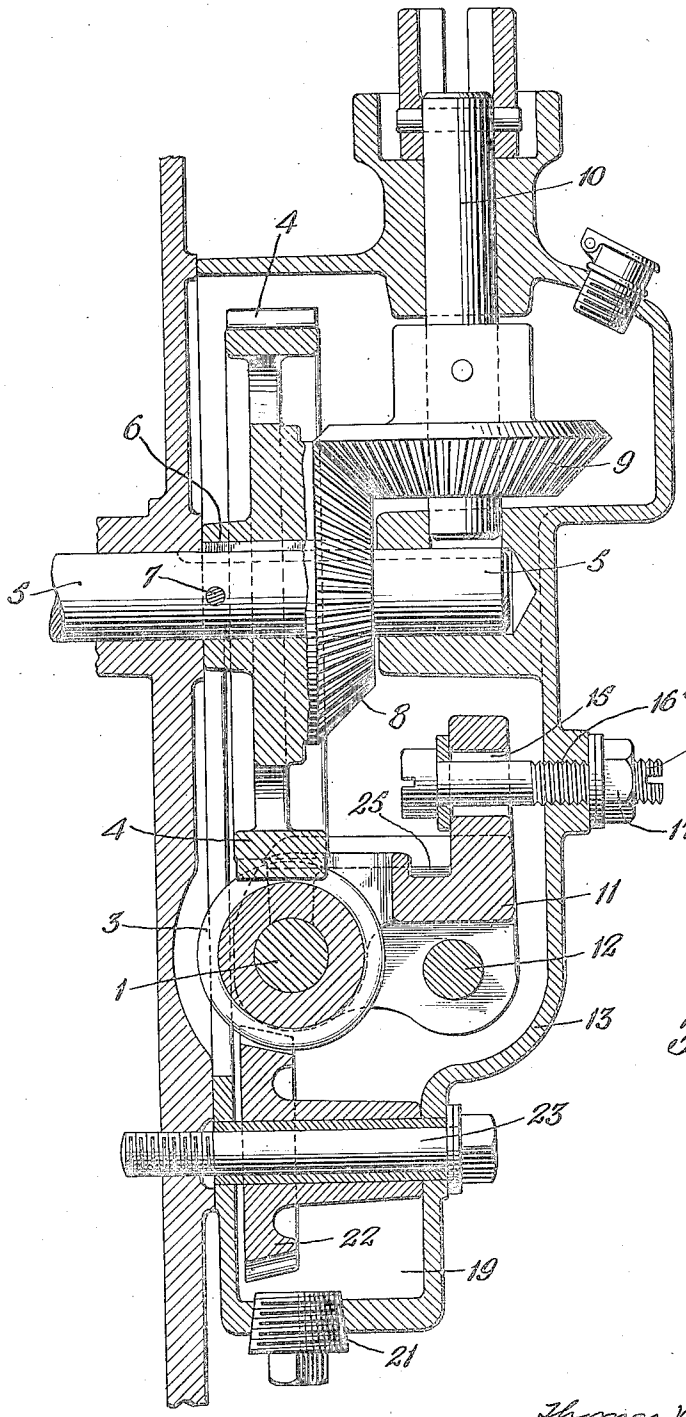


Fig. 2.

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BY Merrell E. Clark, their ATTORNEY

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Filed Dec. 15, 1922 3 Sheets-Sheet 3

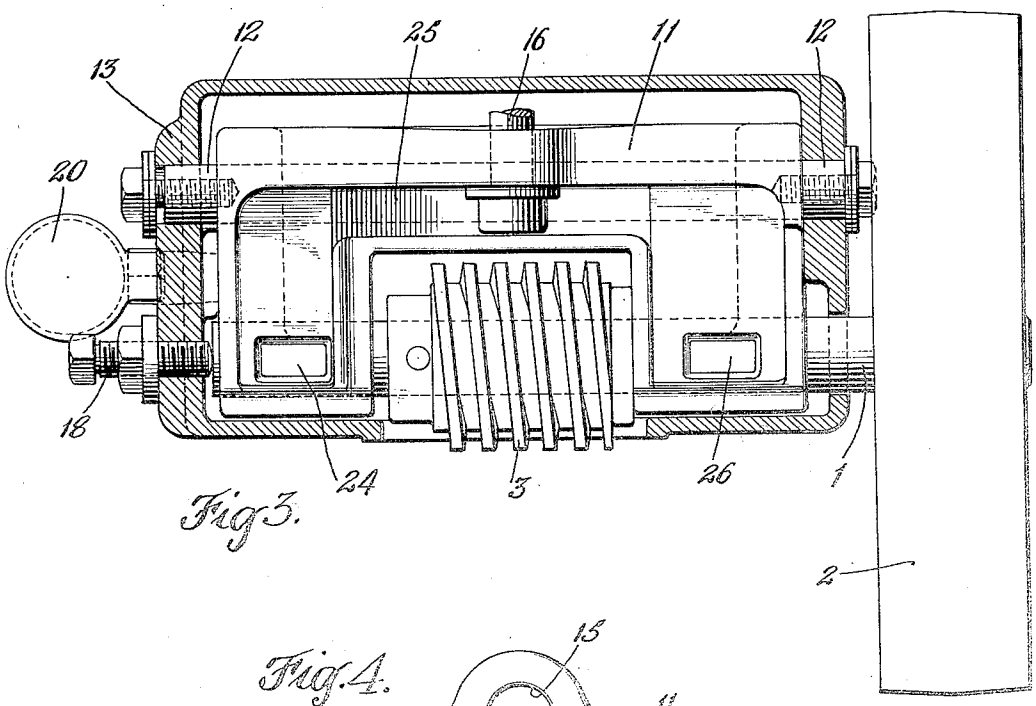


Fig. 3.

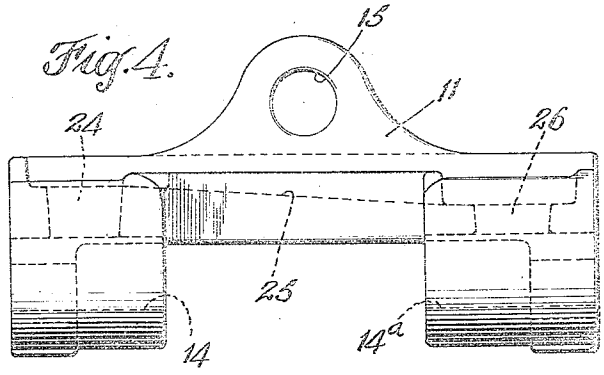


Fig. 4.

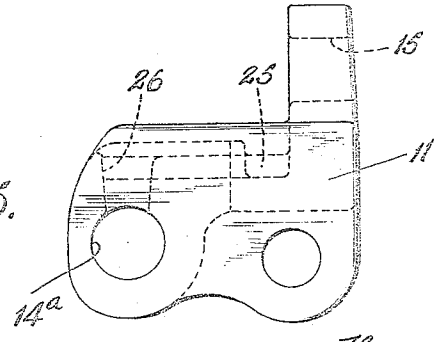


Fig. 5.

Inventors
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Patented Dec. 11, 1923. 1,476,792

UNITED STATES PATENT OFFICE.

THOMAS W. BEHAN AND HERMAN W. DOUGHTY, OF BINGHAMTON, NEW YORK.

DRIVING MECHANISM FOR WASHING MACHINES.

Application filed December 15, 1922. Serial No. 607,133.

To all whom it may concern:

Be it known that we, THOMAS W. BEHAN and HERMAN W. DOUGHTY, citizens of the United States, and residents of Binghamton, county of Broome, and State of New York, have jointly invented certain new and useful Improvements in Driving Mechanisms for Washing Machines, of which the following is a description.

While our invention in its broad aspects relates to driving mechanisms for any type of washing machine, our particular object has been to provide a driving mechanism which is particularly well adapted for use in connection with washing machines of the oscillating tub type, an example of such machines being the machine illustrated in the United States patent to Wearne, No. 1,319,314, October 21, 1919.

Washing machines of this character are provided with an oscillating tub which, when clothes are being washed, is partially filled with clothes and water. And, of course, the weight of the oscillating tub depends upon the amount of water and clothes therein. Because of the sudden changes of direction resulting from the oscillation of the tub, it is customary to interpose springs between the driving member and the tub in order to take up the shock and reduce the noise that would otherwise occur. The strength of these springs is customarily made sufficient to meet the conditions which arise when the tub is full (that is, filled up to the predetermined water-line) with water and clothes, or, in other words, when the machine is loaded. The result is, however, that when the machine is run light, i. e., with the tub empty or practically so, as for example, in store demonstrations, etc., the springs are excessively strong and take up the back lash of the gearing so suddenly at each reversal of movement that a loud and objectionable noise results.

One of the specific objects of our invention is to provide a driving mechanism which will be free from this objectionable noise, irrespective of the load conditions under which the machine is run.

Another object is to provide a driving mechanism which shall have convenient means for compensating wear.

Still another object of our invention is the provision of an efficient oiling system for such a driving mechanism.

With these and other objects in view, as will more fully appear hereinafter, our invention includes the various parts, elements, devices and combinations, described herein, and more particularly set forth in the appended claims.

In the annexed drawing which is intended merely as an illustration of one embodiment of our invention:

Fig. 1 is a front elevation, partly in section.

Fig. 2 is a longitudinal sectional view on line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view on line 3—3 of Fig. 1.

Fig. 4 is a front elevation of the yoke which supports the worm.

Fig. 5 is a side elevation of the yoke.

Referring to the drawings, 1 designates the driving shaft which receives its power from a pulley 2, or other suitable source, the pulley 2 usually being driven by an electric motor. Upon this shaft 1 is mounted the worm 3 which meshes with and drives the worm wheel 4 mounted upon the driven shaft 5 to which it is secured by means of the key 6 or the pin 7 or both. This driven shaft 5 may be the main drive shaft of the washing machine, and to it may be connected, as, for example, through the bevel gears 8 and 9, the vertical shaft 10 adapted to drive the usual wringer mechanism.

As we have stated above, one of the objects of our invention is to eliminate the noise due to back lash which results from the operation, when light, of the present day oscillating machine. In order to accomplish this it is necessary that the worm 3 and wheel 4 be held in tight contact so that there will be no appreciable back lash. Such tight contact requires two things, first, very efficient lubrication to prevent excessive wear, and, second, means for compensating for such wear as does take place.

We will first describe the means for compensating for the wear. These means comprise the pivoted yoke 11 and the means for mounting and adjusting this yoke. This yoke 11, as best seen in Fig. 2, is pivotally mounted upon the pintle 12 which is secured at its ends to the casing 13 as shown, for example, in Fig. 3. The bearings 14, 14ª, in which the shaft 1 is mounted are formed in the yoke 11 at points eccentric from the pintle 12 upon which the yoke is mounted. The upper extension of the yoke is provided with an aperture 15 through which the adjusting

bolt 16 passes. This bolt also passes through the tapped hole 16ª of the frame 13 and is provided with the lock nut 17. By adjusting this bolt 16 the yoke may be swung about the pintle 12 as an axis to bring the worm 3 into closer contact with the worm wheel 4 when desired, thus compensating for any wear that may have occured. After the bolt 16 has been thus adjusted it is locked in position by the lock nut 17. Because the yoke merely abuts against the head of the bolt 16 it possesses the necessary freedom of movement to allow the worm 3 to turn without undue friction against the worm wheel 4. The adjustable bolt 18 is provided to take up any end play which might otherwise exist in the shaft 1.

The adjusting means which we have just described for taking up wear between the worm and wheel are simple in construction and convenient in operation so that any user of the machine, if it is found that wear has occurred, may, by the simple adjustment above described, make complete compensation for it.

This brings us to the lubricating mechanism which we have devised for preventing excessive wear between the worm and wheel. The oil or other lubricant employed for this purpose is retained within the oil reservoir 19 formed in the bottom of the casing 13. We preferably provide the casing at this point with an oil cup 20 for introducing the oil, and with a drain plug 21 by means of which the oil may be withdrawn if desired. Partially submerged in the oil within this reservoir 19 is the idler worm wheel 22 mounted at 23 within the casing and meshing with and driven by the worm 3. We have found in practice that this worm wheel 22 when driven in the oil bath 19 carries up to the worm 3 and thence to the worm wheel 4 quantities of oil well in excess of what is required to properly lubricate those gears. The gear system is normally so operated that the worm wheel 4 rotates in the clockwise direction indicated in Fig. 1. In so rotating it carries with it large quantities of oil which it has received from the wheel 22 and worm 3. A large part of the excess of the oil so carried by the worm wheel 4 drops off of that wheel at its left hand side as viewed in Fig. 1. The oil so dropped falls upon the left hand portion of the yoke 11 which is provided at that end with an aperture 24 communicating with the left hand bearing of shaft 1. A portion of the oil falling upon the left hand portion of the yoke drops through this aperture 24 and passes thence to the bearing 14 for the shaft 1. The remainder of the oil dropping upon the yoke passes through the inclined channel 25 formed in the yoke and thence to the bearing 14ª through the aperture 26.

It will be apparent that the above description that by means of the idler gear 22 and the construction of the yoke 11 as above described oil in abundant quantities is not only supplied to the worm and wheel 3 and 4, but also to the bearings 14, 14ª of the shaft 1. Accordingly, even though the worm 3 and wheel 4 are maintained in such tight contact as to render the operation of the washing machine substantially noiseless even when the machine is running light, the wear upon the parts is very slight. And it will be apparent, also, that such wear as does occur may very readily be compensated for by a simple adjustment of the yoke 11.

Our invention, though simple and inexpensive in character, constitutes, to our mind, an important improvement in driving mechanisms for washing machines, since, as I have said, it makes possible the noiseless operation of such machine irrespective of the load carried thereby.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any equivalent of the features shown and described, or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What we claim is:

1. A driving mechanism for the purpose described, comprising a driving shaft, a yoke provided with bearings in which said shaft is mounted, a gear mounted upon said shaft, a second gear driven thereby, an oil reservoir located below said shaft, and a third gear driven by said first gear and adapted to be partially submerged in oil contained in said reservoir and to feed oil constantly to the other two gears, said yoke being provided with means for directing a portion of said oil to each of said bearings.

2. A driving mechanism for the purpose described, comprising a driving shaft, a yoke provided with bearings in which said shaft is mounted, a gear mounted upon said shaft, a second gear driven thereby, an oil reservior located below said shaft, and a third gear driven by said first gear and adapted to be partially submerged in oil contained in said reservoir and to feed oil constantly to the other two gears, said yoke being provided with an aperture above each of said bearings and an inclined channel leading to one of said apertures whereby a portion of said oil is directed to each of said bearings.

3. A driving mechanism for the purpose described, comprising a driving shaft, a gear mounted thereon, a second gear driven by the first gear, and means for adjusting the relative positions of said gears, comprising an L-shaped yoke pivoted adjacent the inter-

section of its two legs, one of said legs being provided with two bearings in which said driving shaft is mounted, and the other of said legs being provided with means for adjusting said yoke about its pivot, and means for securing said yoke in adjusted position.

4. A driving mechanism for the purpose described, comprising a driving shaft, a gear mounted thereon, a second gear driven by the first gear, and means for adjusting the relative positions of said gears, comprising an L-shaped yoke pivoted adjacent the intersection of its two legs, one of said legs being provided with two bearings in which said driving shaft is mounted and with means for directing to both of said bearings lubricant applied to the yoke adjacent to one of them, and the other of said legs being provided with means for adjusting said yoke about its pivot, and means for securing said yoke in adjusted position.

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HERMAN W. DOUGHTY.