DRIVE MECHANISM FOR CLOTHES WASHING MACHINES

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This application is a substitute for my application Serial No. 748,327, filed May 15, 1947 (now abandoned).

This invention relates to clothes washing machines, and particularly to a drive mechanism for washing machines employing dashers rotated in an orbital path.

In my prior patent, No. 2,416,611, granted Feb. 25, 1947, I fully described and illustrated a washing machine employing a dasher power driven in an orbital path within the washing machine tub without substantial axial rotation. The mechanism for so driving the dasher included a center post extending from the bottom of the tub to approximately the top of the dasher. Through this center post the dasher was both power driven and supported.

Analysis of the structure readily discloses that the entire dasher drive is through a single crank pin located on the top of the center post and that the comparatively tall and slender center post must withstand all the reaction stresses resulting from the dasher contact with the clothes. It will be appreciated also that the interior of the dasher is so filled with mechanism that the space within the dasher is not available for any other purpose should such a need develop.

It is a particular object of the present invention to provide a drive mechanism for an orbital movement dasher that will eliminate the conventional center post and concentrate the mechanism in the bottom of the dasher closely adjacent the bottom of the tub.

Another object is to provide a simple sturdy mechanism for driving an orbital movement dasher without axial rotation.

A further object is to provide a dasher drive mechanism wherein the dasher is completely supported from its base.

A further object is to provide a dasher driven mechanism wherein the need for a hollow center section of the dasher is eliminated.

A still further object is to provide a mechanism for driving an orbital movement dasher wherein the drive shaft of the mechanism may be offset from the dasher and the tub center to provide more compact and better balanced drive.

Other objects and benefits will be disclosed in the following description and in the drawings in which:

Fig. 1 is a broken front elevation view of a washing machine, partly in section, to disclose my new compact orbital dasher drive;

Fig. 2 is a broken top plan view of the washing machine shown in Fig. 1;

Fig. 3 is an enlarged central sectional view on the line 3—3 in Fig. 4, of an optional form of my drive mechanism wherein the drive shaft is offset from the center of a dasher having radiating blades without any hollow center stem section;

Fig. 4 is a top plan view of the mechanism in Fig. 3;

Fig. 5 is a similar enlarged broken elevation view, partly in section, showing an optional form of driven mechanism wherein gears are employed;

Fig. 6 is a top plan view of the mechanism shown in Fig. 5; and

Fig. 6a is a smaller somewhat diagrammatic view of an optional form of mechanism, as shown in Figs. 5 and 6, wherein the drive gears are arranged to provide speed reduction from the drive motor.

Now, referring to Fig. 1, I show a conventional washing machine tub 10 mounted on a base 11 with an orbital movement dasher 12 driven within the tub 10 mounted in the base 11, connected to a conventional reduction gear case 14 and drives a drive shaft 15 at reduced speed for the driving of the dasher 12. The drive shaft 15 is mounted in a conventional type of gland bearing base 16 through conventional support and sealing structure 17—18 as shown. The gland base bearing 16 is provided with suitable bearings and water seals to provide proper lubrication and sealing for the shaft 15.

On the upper end of the shaft 15 is mounted a crank member 19 having a crank pin 20 connected to a base support drive-member 21 as shown. The drive-member 21 is secured at its periphery 21a to the periphery of the base of the dasher 12 and extends across the base of the dasher, as shown in Fig. 1.

At four spaced points, as clearly shown in Fig. 2, the dasher drive-member 21 is supported on four parallel crank members 22 having the same throw as the driven crank 19 to support effectively and to rotate the dasher base member 21 in the orbital circular movement determined by the throw of the supporting crank members 22. It will be appreciated fully of course that the crank members are of the same throw and are arranged in parallel relationship. Thus, all points on the base member 21 are rotated in a uniform circular path as indicated by the circles 25 in Fig. 2.

The dasher 12 is mounted on the base member 21 by the support flange 21b and the clamping action of nut 26 through the rod 27 and thumb nut 28. Thus the dasher 12 is effectively clamped on the base member 21 and the supported points of the dasher move uniformly with the base member 21 in the circular path 25 as previously described. It will be understood and appreciated that the washer 12 is rotated in an orbital path within the tub 10 without axial rotation.

Now referring to Figs. 3 and 4, I show a variation of my orbital motion mechanism wherein the motor 13 through a belt and pulley drives mechanism 29 drives the drive shaft 30 through the bearing gland base 31 attached to the tub 10 in a conventional manner through nut 33 and gasket 32. On the top of the drive shaft 30 is mounted a drive crank 34 having a crank pin 35 rotatably connected in a conventional manner to the dasher base casting 36. This dasher base casting 36 is supported on the crank members 34—35 as well as three similar supporting crank members 37—38—39 as clearly shown in Fig. 4. By this structure the cranks 37 of the dasher base member 36 are rotated in circular orbital paths 25 exactly similar to the paths indicated in Fig. 2, as described above.

It will be appreciated further that the offset drive shaft 30 enables the motor 13 to be mounted in a compact manner directly under the washer tub while providing ample belt length 29 as shown.

In this optional structure, the dasher 12v has no hollow central stem section and consists of a flat base 70 with radiating blades 71. It is mounted on the base member 36 by resting on the flange portion 360 where it is securely held in place by three ball and spring retainer members 40—41 with the balls 40 entering into openings 42 in the base of the dasher 12v. These spring retainers securely hold the dasher 12v against all normal stresses encountered in the washing but permit the dasher to be removed by a sharp transverse hand stroke. It will be
appreciated that in this structure the blade section of the dasher 12 must be entirely free of mechanism.

Now referring to Figs. 5 and 6 I show another optional form of my orbital motion mechanism wherein the motor 13 through the coupling 44 drives the drive shaft 45 conventionally mounted in a gland base casing 46 attached to the tub 10 in a conventional manner by the nut 47 and gasket 48. The drive shaft 45 is directly attached to a drive gear 49 meshing with three driven gears 50, 51 and 52 as clearly shown in Fig. 6. These gears are rotatably mounted on the base casing 46 by stub shafts 53, 54 and 55 as shown. The gears 50, 51 and 52 also carry crank pins 56, 57 and 58 eccentrically thereof, respectively, and journaled in the dasher base member 59 as shown and exactly similar to the structures previously explained for the other dasher base members shown in Figs. 1 and 3. It will be fully understood and appreciated that by this structure the cranks that support the dasher base member 59 are rotated in similar orbital paths 25 as previously described and that the dasher 12 is moved in the same orbital path without axial rotation. It will also be understood that I may choose any of the gears as the drive gear and effect similar orbital motion.

Also in this mechanism I have mounted the dasher 12x on the flange 59 of the base member 59 by thumb screws 60 as clearly shown in Fig. 5. The structure permits the dasher to be securely mounted on the base member 59, leaving the interior of the dasher entire free of mechanism and available for any other purpose that may seem proper and convenient.

Now referring to Fig. 6a, I show somewhat diagrammatically on a reduced scale an optional form of gear driving mechanism wherein the drive gear 149 is much smaller than the driven gears 150, 151 and 152, thus to accomplish speed reduction when such reduction is desirable. The driven gears 150, 151 and 152 have similar pivot bearings and crank pins 153 and 156, 154 and 157, 155 and 158. Although these gears are driven at a slower speed, the dasher will be driven in exactly a similar manner as previously described. Although in the embodiment of Fig. 6a the drive gear 149 is centrally located with respect to the gears 150, 151 and 152, it will be understood that the drive gear 149 need not be centrally located and, if desired, may only engage one of the follower gears 150, 151 and 152 without affecting the path of travel of the dasher 124.

From the foregoing, it will be appreciated that I have shown and described orbital driving mechanism wherein the mechanism is confined to a narrow area within the base of the dasher closely adjacent the washer tub. This mechanism can be driven by drive shaft means either centrally or offset from the center of the dasher and the tub. The mechanism may be constructed in various ways with all the drive mechanism concentrated in the base of the dasher leaving the interior of the dasher free of mechanism and available for any purpose that may seem desirable.

Having thus described my invention, I now claim as new:

1. A washing machine comprising a tub, a drive shaft extending upwardly through the bottom of said tub, a drive crank mounted on the drive shaft, a dasher disposed within said tub, a drive connection between said drive crank and said dasher, a plurality of dasher supporting cranks pivotally supported with respect to said tub, said support cranks having equal throws and said dasher being mounted on said cranks whereby said dasher traverses an orbital path within said tub.
2. A washing machine comprising a tub, a drive shaft extending into said tub, multiple crank means spaced around the drive shaft, means connecting the drive shaft to said crank means to rotate the crank means in uniform parallel circular paths, a dasher disposed within said tub, and means to mount said dasher on the crank means.
3. A washing machine comprising a tub, a dasher disposed within said tub, a drive shaft extending upwardly through the bottom of said tub, a drive gear mounted on said drive shaft, and driven gear means having crank pins engaging with the drive gear for moving the crank pins in parallel equal movement, said dasher being pivotally mounted on the crank pins for orbital movement within said tub without axial rotation thereof upon rotation of the drive gear.
4. A washing machine comprising a tub, a dasher disposed within said tub, a drive shaft extending through the bottom of said tub, a sealing gland bearing base mounted in the bottom of the tub for rotatably supporting the drive shaft, a drive gear mounted on top of the drive shaft, driven gears having crank pins respectively mounted at corresponding positions thereon, said driven gears engaging with the drive gear to move the crank pins in parallel equal cranking movement, and means for rotatably mounting the dasher on the crank pins whereby upon rotation of the drive gear said dasher traverses a circular path with respect to the tub without axial rotation of the dasher.
5. A washing machine comprising a washtub, a drive shaft extending through the bottom of said tub, a sealing gland bearing base mounted in the bottom of the tub and rotatably supporting the drive shaft, a drive gear mounted on the drive shaft within said tub, plurality of driven gear means having crank pins mounted thereon, said driven gear means being disposed for coaction with the drive gear to drive the crank pins in parallel equal cranking movement, and a dasher disposed within said tub and rotatably mounted on said crank pins for orbital movement within the tub without axial rotation thereof upon rotation of the drive gear.
6. A washing machine comprising a tub, a dasher mounted adjacent the bottom of said tub, a stationary base member mounted in the bottom of said tub, a drive shaft extending through the center of said tub and base member, a drive gear mounted on said drive shaft, a plurality of gears meshing with said drive gear, causing eccentric driving means mounted on said plurality of gears, means for supporting said dasher, said last mentioned means including bearings engaging the eccentric driving means, said gears, said eccentric driving means and said means for supporting said dasher cooperating with one another to impart a bodily orbital movement to the dasher in response to rotation of said drive shaft.
7. A clothes washing machine comprising a receptacle, a drive shaft extending into said receptacle, a drive gear mounted on said drive shaft for rotation therewith, follower gears pivotally supported on said receptacle in engagement with said drive gear, a dasher disposed within said receptacle, and connector means pivotally connecting said follower gears to said dasher at points on said follower gears equally displaced from the axes of rotation thereof.

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