Aug. 26, 1941. H. D. CROFT 2,253,894

WASHING MACHINE DRIVE

Filed Dec. 2, 1939

Fig. 1.

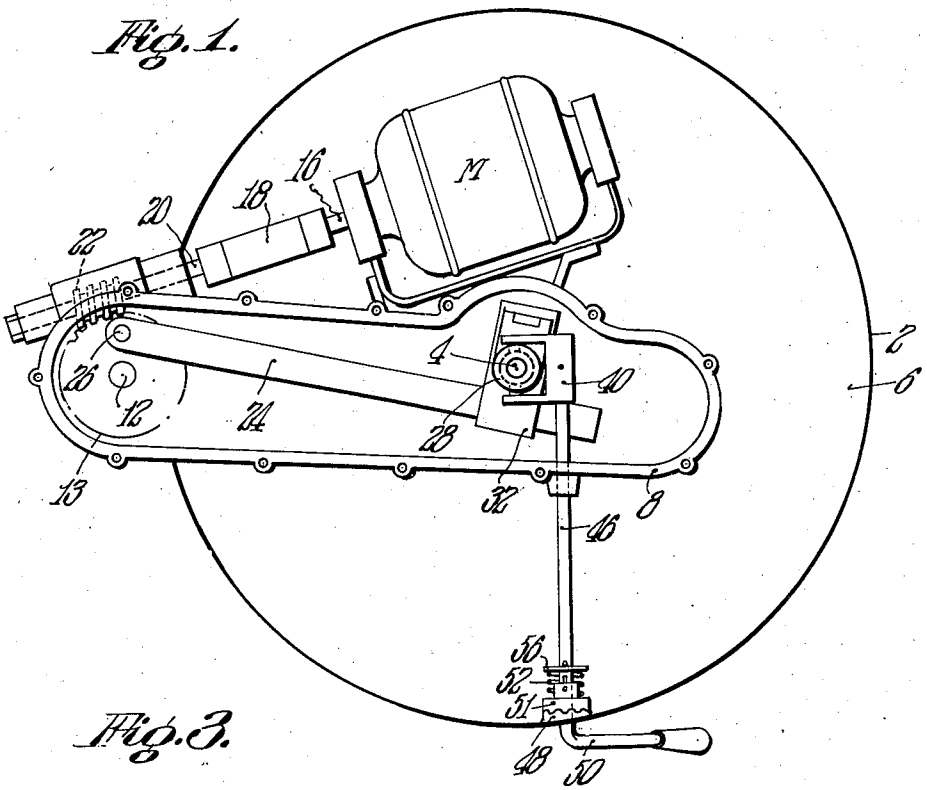
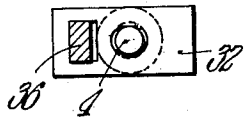


Fig. 3.



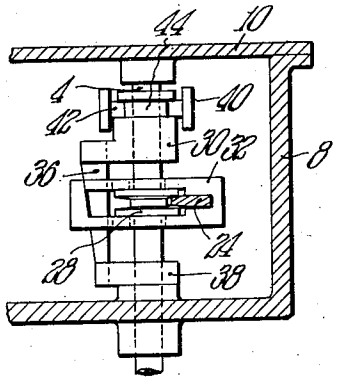


Fig. 2.

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WASHING MACHINE DRIVE

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9 Claims. (Cl. 74—78)

This invention relates to improvements in washing machines or the like and is directed particularly to washing machines having a new and novel operating mechanism for the agitator or paddle and shaft thereof.

The principal objects of the invention are directed to the provision of a washing machine which is characterized by mechanism including frictionally-engageable driving and driven members for oscillating the agitator, as distinguished from positive means such as gears, and novel means for controlling the action of said members or for causing said mechanism to produce the desired action of the agitator and shaft to the end that the same may be oscillated back and forth through various angles while being load-responsive.

In connection with washing machines having the novel operating mechanism wherein frictionally engageable members are employed, it is desired that the mechanism be responsive to the load applied to the agitator and be adjustable to accommodate or operate on various kinds of material being washed thereby to avoid injury and damage to the materials and the mechanism as well.

Some materials for best results require a more or less violent washing action than others. The frictionally engageable members make it possible to operate the agitator through various angles of oscillation to accommodate the materials being washed. The novel control means for the engageable members assures the desired smooth and efficient action of the mechanism so as to not only avoid injury and damage to the clothes and the mechanism but makes it possible to accurately control the mechanism and provide the desired angle of oscillation and washing action and at the same time eliminate undesirable jerking when the agitator reverses its direction of movement. When operating at a relatively narrow angle of oscillation as when operating on materials and clothes requiring comparatively little washing action, the action is such that the agitator and shaft oscillate back and forth smoothly without undue strains and jerkiness and it is possible to readily and easily vary the angle of oscillation.

According to special features of the invention novel means is provided for urging the driving and driven members into engagement which requires but little manual effort in operation and yet is so constructed and arranged as to provide accuracy of control whereby the desired degree of oscillation, however slight, may be obtained. Not only is the mechanism responsive to load applied to the agitator so as to safeguard both the mechanism and the material being washed, but it is adapted for various degrees of oscillation and may be adjusted for any predetermined oscillations.

Various novel features and advantages of the invention will be hereinafter more fully referred to in connection with the accompanying description of the present preferred form thereof with reference to the drawing, wherein:

Fig. 1 is an inverted plan view of a washing machine tub having the novel operating mechanism of the invention associated therewith;

Fig. 2 is a partial enlarged sectional elevational view through the operating mechanism shown in Fig. 1; and

Fig. 3 is a plan view of certain parts of the operating mechanism shown in Figs. 1 and 2.

Referring to the drawing more in detail, the invention will be fully described.

A tub of a washing machine is represented by 2 and is shown in inverted relation. A shaft for the agitator is represented by 4 which extends upwardly through the lower wall 6 of the tub 2 for carrying the usual paddle or agitator within the tub.

The lower end of shaft 4 extends downwardly into a casing or housing 8. The housing 8 is for enclosing the operating mechanism and is secured to the tub in some suitable manner while a cover 10 is provided for the housing so as to provide a lubricant-tight casing.

A shaft 12 is journalled in the housing 8 and it extends upwardly alongside of the tub in the usual way for operating a wringer mechanism. This shaft 12 has fixed thereto in some suitable manner a worm gear member 13.

A motor 14 is secured as by the bracket 15 to the housing 8 and its shaft 16 is connected as by a coupling 18 to a worm shaft 20 which is rotatable in the housing. A worm 22 on shaft 20 is in operative engagement with worm gear 12.

A driver or driving member 24 is pivoted to gear 13 at 26 and this has a free end portion which frictionally engages a driven member 28 on agitator shaft 4. As member 12 rotates, the member 24 is restrained for substantially reciprocating movements. It will be obvious that the member 24 may be reciprocated by other means than that shown.

The members 4 28 are frictionally engageable surfaces or faces. In the form of the invention shown, member 4 has a circumferential groove 30 provided with tapering or relatively in-

clined faces while the upper and lower side faces of member 24 at its end portion are complemental to the surfaces of the driven member so that when the members 4 and 28 are held in frictional engagement the driven member will be oscillated back and forth by the driving member and thereby shaft 4 and the agitator carried thereby is agitated.

The degree of oscillation of member 4 or its angle of oscillation will depend more or less upon the pressure employed to hold the members 4 and 28 in frictional engagement. To control that pressure and thereby control the oscillatory movements of the agitator and shaft 4, the means to be hereinafter described is provided.

It will be noted that, as the member 13 rotates to reciprocate member 24, the angle of member 24 is constantly changing. For instance, with reference to a certain line such as a line passing through the axes of shafts 4 and 16 the angle of member 24 with reference to said line is constantly changing during a revolution of member 12.

To provide the desired smoothness of operation, uniformity of speed and non-jerkiness or non-snapping action the driving and driven members are held in frictional engagement and their action is controlled by the following:

A shoe member 32 is slotted longitudinally to slidably receive the outer end of the driving member 24 so that it may reciprocate therein and be urged thereby towards the driven member 28.

The member 32 is provided with an elongated opening which receives shaft 4, the parts being arranged so that member 32 may move relatively thereto in the direction of its length and not in a transverse direction.

A wedge member 34 is slidable up and down on shaft 4 and it has a wedge part 36 which extends downwardly through member 32 with its lower end slidably guided on a member 38 on said shaft 4. The wedge part 36 and member 32 are so arranged that as the member 34 is moved downwardly the drive member is urged towards the driven member when member 36 is moved upwardly pressure is released.

By moving member up or down the frictionally engaging numbers are caused to function to produce more or less of an angle of oscillation of shaft 4. The axial movement of the member from a position where the angle of oscillation of shaft 4 is zero to a position where the angle is greatest is slight since the angle of wedge part 36 and member 32 are so constructed.

The member 34 may be operated in various ways but in the form of the invention illustrated a fork 40 has parts 42 in a groove 44 at the upper end of part 32 and said fork 40 is fixed to an operating shaft 46 oscillatable in a side of housing 8. As shaft 46 is oscillated in one direction or the other the member 30 is raised or lowered to vary the pressure applied to the drive member and in that way the angle of oscillation of shaft 4 is varied.

The outer portion of shaft 46 is journalled in a bearing 48 and an extension 50 of said shaft may be extended upwardly at a side of the tub for manual engagement to oscillate said shaft 46. A member 52 slidable on said shaft 46 and held against rotation relative thereto by means of the pin and slot, shown, has a serrated surface engageable with a similar surface on bearing 48.

The member 52 is urged towards bearing 48 by means of a spring 54 disposed between said member 54 and a member 56 on said shaft 46. As said operating lever 50 is swung from one position to the other to adjust or control the action of the frictionally engageable members it is held in such position by the members 48 56 described.

It will be noted that the parts are arranged in such a way that pressure is applied readily and quickly so that it is possible to obtain the desired angle of oscillation of shaft 4, whether a small or great angle, depending on the materials being washed. The parts are so constructed and arranged that the member 24 in its reciprocation and changing angularity does not interfere with or change the pressure so that the oscillations which are predetermined are constant and uniform.

While I have described the invention in great detail and with respect to the present preferred form thereof, it is not desired to be limited thereto since changes and modifications may be made therein without departing from the spirit and scope of the invention. The invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

1. In a washing machine, a support, an oscillatable agitator shaft, and means for oscillating said shaft through various angles, comprising in combination, a driven member on said shaft, a drive member and means to reciprocate the same, said drive and driven members having complemental angularly disposed frictionally engageable faces whereby the latter is oscillated through various angles of oscillation according to pressure applied to urge said drive and driven members towards one another, a pressure member operable against said drive member as it reciprocates to urge the same towards said driven member, and means movable transversely to the plane of reciprocation of the drive member acting on said pressure member to urge said member towards said drive member.

2. In a washing machine, a support, an oscillatable agitator shaft, and means for oscillating said shaft through various angles, comprising in combination, a driven member on said shaft, a drive member and means to reciprocate the same, said drive and driven members having complemental angularly disposed frictionally engageable faces whereby the latter is oscillated through various angles of oscillation according to pressure applied to urge said drive and driven members towards one another, and variable means for urging said drive and driven members towards one another including, a pressure member relative to which said drive member reciprocates acting on said member, and means acting on said member associated with said agitator shaft operable in a plane parallel to the axis of said shaft.

3. In a washing machine, a support, an oscillatable agitator shaft, and means for oscillating said shaft through various angles, comprising

in combination, a driven member on said shaft, a drive member and means to reciprocate the same, said drive and driven members having relatively angularly disposed frictionally engageable faces whereby the latter is oscillated through various angles of oscillation according to pressure applied to urge said drive and driven members towards one another, a pressure member associated with said agitator shaft and driven member movable back and forth transversely of said shaft in which said drive member is reciprocable for urging said drive and driven members into engagement, and variable means acting on said pressure member to move it in one direction to urge the driving and driven member into engagement.

4. In a washing machine, a support, an oscillable agitator shaft, and means for oscillating said shaft through various angles, comprising in combination, a driven member on said shaft, a drive member and means to reciprocate the same, said drive and driven members having relatively angularly disposed frictionally engageable faces whereby the latter is oscillated through various angles of oscillation according to pressure applied to urge said drive and driven members towards one another, a pressure member associated with said agitator shaft and driven member movable back and forth transversely of said shaft in which said drive member is reciprocable for urging said drive and driven members into engagement, and means acting on said pressure member transversely to the direction of movement of said pressure member to move it in one direction to urge the driving and driven member into engagement, said means including a slidable member movable axially of said agitator shaft having an angularly disposed part acting on said pressure member.

5. In a washing machine, a support, an oscillatable agitator shaft, and means for oscillating said shaft through various angles, comprising in combination, a driven member on said shaft, a drive member and means to reciprocate the same, said drive and driven members having angularly disposed frictionally engageable faces whereby the latter is oscillated through various angles of oscillation according to pressure applied to urge said drive and driven members towards one another, a pressure member associated with said agitator shaft and driven member movable back and forth transversely of said shaft in which said drive member is reciprocable for urging said drive and driven members into engagement, and means acting on said pressure member to move it in one direction to urge the driving and driven member into engagement, said means including a slidable member movable axially of said agitator shaft having an angularly disposed part acting on said pressure member, and operating means for moving said slidable member and releasably holding the same in various positions of adjustment.

6. In a washing machine, a support, an oscillatable agitator shaft, and means for oscillating said shaft through various angles, comprising in combination, a driven member on said shaft, a drive member and means to reciprocate the same, said drive and driven members having angularly disposed frictionally engageable faces whereby the latter is oscillated through various angles of oscillation according to pressure applied to urge said drive and driven members towards one another, a pressure member movable transversely of the agitator shaft in which said drive member is reciprocable to urge said driving and driven members into frictional engagement, a member movable axially of said agitator shaft acting on said pressure member to urge said pressure member in pressure applying direction, and adjustable operating means for said last named member.

7. Mechanism for oscillating the agitator shaft of a washing machine or the like comprising in combination, a rotatable member having a driving member pivoted thereto at one end, a driven member, said driven and driving member having angularly disposed complemental engageable faces adapted to be wedged together for frictional action by wedging pressure whereby said driven member may be oscillated by the driving member through various angles according to the degree of wedging pressure, and means for applying wedging pressure including a pressure member engaging the rear face of said driving member movable toward said driven member and a wedge member movable parallel to the axis of said shaft, said wedge member and pressure member having complemental angular faces whereby as the wedge member is moved in one direction the pressure member is moved towards said shaft.

8. The combination with the oscillatable agitator and drive shafts of a washing machine of means for driving the former from the latter comprising, a member on said drive shaft, a drive member pivotally connected to said member, a driven member on said agitator shaft, said drive and driven members having engageable complemental frictionally engageable faces, a pressure member slidable transversely of said agitator shaft in which said drive member is reciprocably guided for urging the same towards said driven member, a member reciprocable on said agitator shaft having a member engaging said pressure member, said pressure member and last named member provided with angularly disposed engageable wedge faces whereby as the last named member is moved axially of said agitator shaft in one direction the pressure member is moved towards said agitator shaft.

9. The combination with the oscillatable agitator and drive shafts of a washing machine of means for driving the former from the latter comprising, a member on said drive shaft, a drive member pivotally connected to said member, a driven member on said agitator shaft, said drive and driven members having engageable complemental frictionally engageable faces, a pressure member slidable transversely of said agitator shaft in which said drive member is reciprocably guided for urging the same towards said driven member, a member reciprocable on said agitator shaft having a member engaging said pressure member, said pressure member and last named member provided with angularly disposed engageable wedge faces whereby as the last named member is moved axially of said agitator shaft in one direction the pressure member is moved towards said agitator shaft, and means for moving said last named member along the agitator shaft to various positions of adjustment.

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