Aug. 13, 1940. J. OAKLEY 2,210,948

WASHING MACHINE

Filed Aug. 28, 1939

Fig. 1.

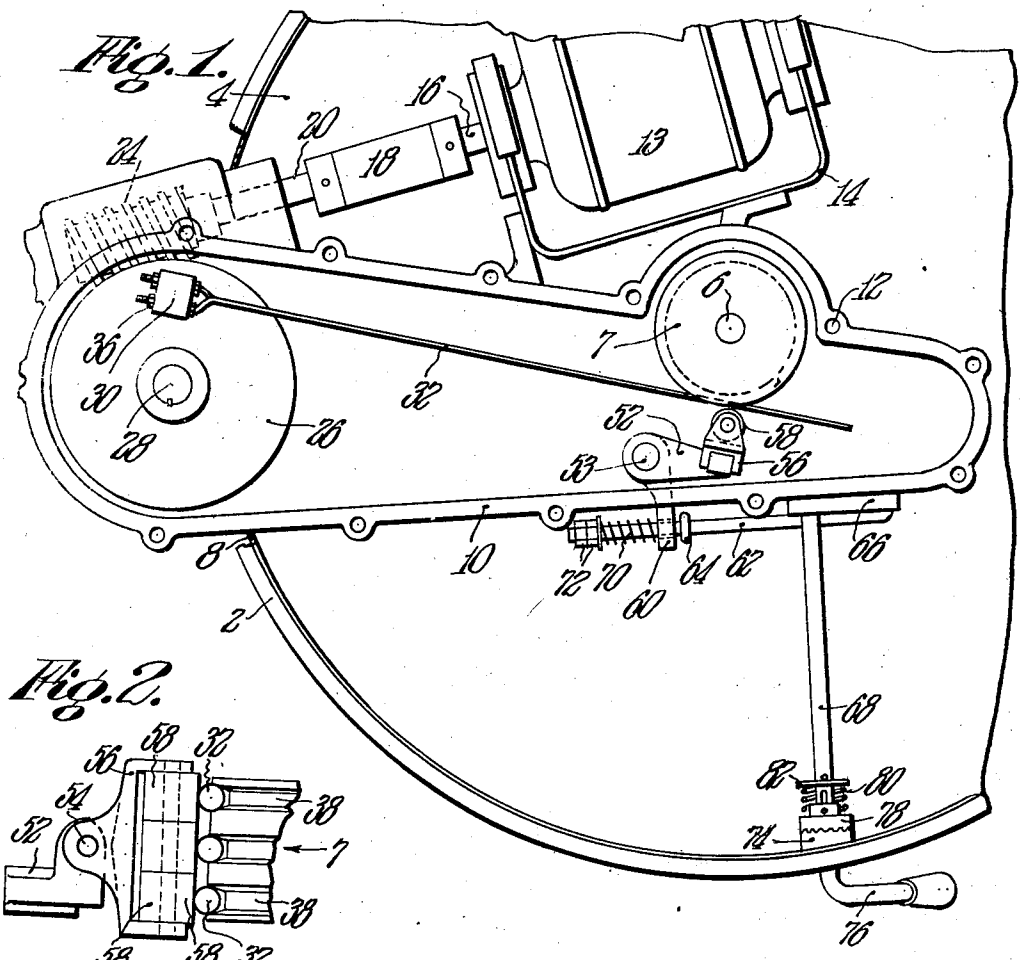


Fig. 2.

Fig. 3.

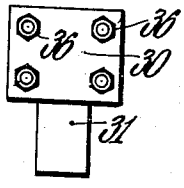
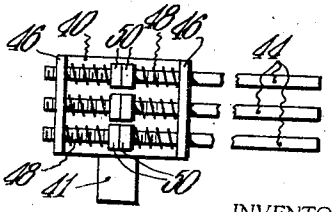


Fig. 4.



Fig. 5.



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WASHING MACHINE

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8 Claims. (Cl. 74—76)

This invention relates to improvements in washing machines and the like and pertains more particularly to a washing machine having improved operating means for the agitator or agitator shaft therefor.

The principal objects of the invention are directed to a washing machine which among other features includes novel driving means for the agitator thereof that is variable so that the agitator may be oscillated through various angles. At the same time the driving mechanism is such that in case of overloading of the agitator the mechanism operates, or is allowed to operate, in such a way that damage and injury to the materials being washed and to the mechanism is obviated.

According to a special object of the invention, the novel operating mechanism for the agitator includes driving and driven members that may be operatively engaged with a frictional action to obtain various driving effects. The driving member includes a plurality of separate elements to provide a plurality of faces or surfaces which are adapted to frictionally engage a plurality of cooperating faces or surfaces on a driven member or members so that there are multiple contact or frictionally engageable faces.

This has been found to be desirable for many reasons, among which are that the pressure required to be exerted on the plurality of elements for the driving action is more effective than when applied to a single element and the contacting or frictionally engageable faces of the elements may be relatively less in area than is required where such a single driving element is employed. In this manner, wear of the parts is reduced and the mechanism is adapted to operate with the desired smoothness, quietness, and efficiency.

According to another special feature of the invention, the plural driving elements are mounted or associated with the propeller therefor in such a way that they are relatively yieldable longitudinally whereby the stresses and strains are equalized which contributes to smooth, quiet, and efficient operation.

Various other novel objects and advantages of the invention will be hereinafter referred to in connection with the accompanying description of the invention in the form at present preferred with reference to the drawing, wherein

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

Fig. 2 is an end elevational view of the driving and driven elements of the operating mechanism of the invention with means for holding or urging the same into frictional engagement;

Fig. 3 is an end elevational view of the driving member of the operating mechanism;

Fig. 4 is a plan view of one of the driving elements; and

Fig. 5 is a side elevational view showing a modified form of driving member.

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

A tub is shown at 2 and its bottom wall 4 is provided with the usual and necessary bearing in which is oscillatable an agitator shaft 6. The wall of the tub is represented by 8 and as usual the agitator is located in said tub above wall 4 so that as the shaft 6 is oscillated the agitator is oscillated within the tub.

The construction just described is well known in the art and need not be further described since the present invention has to do with the operating mechanism for the agitator shaft 6.

A housing or casing 10 is provided which is secured in some suitable manner to the tub and a cover, not shown, is provided for the casing which may be secured thereto by any well known means such as bolts extending through openings, such as, 10. The cover when secured in place on the housing provides therewith a support and oil-tight lubricant compartment for the operating mechanism of the invention.

A motor is represented by 13 which may be carried by a bracket or the like 14 that is secured to the housing 10, as well as to the tub, if desired. A shaft 16 of the motor is connected as by a coupling 18 to a shaft 20 which is rotatable in the housing.

A worm 24 is associated with the shaft 20 which is in mesh with a worm gear 26 fixed on a shaft 28. The said shaft 28 is journalled in the housing and extends upwardly at a side of the tub. The shaft 28 corresponds to that usually provided for a washing machine and will be adapted for driving a wringer or the like mounted at the upper side of the tub. The worm gear 26 functions as the propeller for the operating means and it has associated therewith a driver which, according to the invention, includes a head such as 30 that is pivotally connected to the propeller 26 as by a pivot or shaft 31 journalled in said propeller.

From the driver head 30 there extend a plurality of separate driving elements 32 which frictionally engage a driven member 7 on the agitator shaft 6. The driving elements 32 are arranged relative to one another throughout their

free ends or parts that engage the driven element, so that they are in vertical alignment or parallelism while their opposite ends 34 which are secured to the head 30 are relatively offset, as shown in Fig. 4.

It is desired that the driving elements 32 be more or less yielding longitudinally and to that end, as in Figs. 1 and 4, the offset ends 34 thereof provide the yieldability desired.

The said ends 34 of the elements 32 are threaded and extend through the head 30 while nuts 36 or other means engage the said threaded ends to secure them to the head. Other means may be employed to secure or associate the driving elements with the head.

The members 32, by being offset as described, provide the desired longitudinal yieldability and make it possible to align the free or working ends of the driving elements and locate them in rather closely spaced relation. The said driving elements are shown as being round in cross section but may be of any other shape and they may be solid or tubular.

The driven element 7 is provided with a plurality of circumferential grooves 38 which have converging friction sides or surfaces. The elements 32 are received in the grooves 38 and when round in cross-section as stated portions of the peripheries or outer surfaces thereof may frictionally engage the converging sides of said grooves.

The included angle of the sides of the grooves are preferably in the neighborhood of seven degrees and the portions of the elements 32 which engage the sides of the grooves provide therewith relatively narrow frictionally engageable contact areas approaching single line contacts.

The elements 32 may be yieldingly held in frictional contact with the driven member by any suitable means but the means to be later described will be found to be adapted for the purpose.

The modification of the invention shown in Fig. 5 includes a head 40 having a pivot or shaft 41 adapted to be journalled in the member 26. Driving elements 44, corresponding to the elements 32 previously described, have threaded ends which are slidable in portions 46 of head 40 while springs 48 around said threaded ends are disposed between adjusting nuts 50 and the portions 46.

The nuts 50 may be adjusted along the threaded ends of the elements 44 so as to vary the tension and effectiveness of the springs and thereby adjust or control the longitudinal yieldability of the elements 44 independently of one another. The elements 44 have free or working ends, similarly to the elements 32, which are engageable with the grooves 38 of the driven element, such as 7.

As stated, the driving elements may take the form of rods or tubes of any desired cross section. The round rod-like elements shown are relatively small in diameter and their contact with the sides of the grooves will be more or less of a line contact which is preferably narrow.

There may be slight wear of the portions of the elements contacting with the driven member so that there will be a narrow longitudinally extending area for contacting the grooves. If desired, round elements may be provided with narrow longitudinally extending areas or the elements may be formed in various ways to provide the friction surfaces which according to the invention are narrow and there may be as many elements such as 32 as may be desired.

The elements are yieldable longitudinally relative to the members 30 and 40 so that the stresses and strains may be equalized. It may be difficult to provide driving elements and grooves of uniform dimensions whereof one element may be called upon to do more work or operate under different stresses and strains than another, wherefor the yieldability provides the equalizing means to overcome any difficulties in that respect.

An arm 52 on a shaft 53 which is journalled in the housing 12 has a bracket 56 pivoted thereto at 54 on an axis substantially parallel to the axis of the elements 32. In the bracket 56 are rotatable a plurality of rolls 58 that are adapted to act or press on the elements 32. There may be a separate roll for each element 32.

The arm 52 may be acted on with more or less pressure so that rolls 58 act with more or less pressure on the elements 32 and, according to the pressure, control or vary the frictional action of the driving and driven elements.

A lever 60 is fixed to shaft 53 outside of and above the housing 10 and a rod 62 is freely slidable in the outer end thereof. The rod 62 carries an abutment 64 adjacent one end and its opposite end is pivoted in the outer end of a lever 66.

Said lever 60 is fixed on a control rod 68 that is journalled in a suitable bearing or bearings associated with the housing as shown. The free or non-pivoted end of rod 62 is threaded and a compression spring 70 therearound is disposed between lever 60 while nuts 72 thereon are provided for tensioning or controlling the tension of said spring 70.

The control rod 68 is journalled in a suitable bearing 74 and has an upwardly-extending, manually-engageable part 76 which lies along a side of the tub.

With motor 12 in operation the propeller 26 is in rotation to rotate head 30 so that the driving elements 32 are reciprocated back and forth. With the parts in the position shown in Fig. 1, spring 70 acts on lever 60 to cause rolls 58 to yieldingly bear on the driving elements 32 whereby the driving elements yieldingly and frictionally engage the driven element 7 and oscillate said element and shaft 6.

To disengage the driving and driven elements the control shaft 68 is oscillated clockwise, as viewed in Fig. 1, so that lever 66 swings downwardly to move rod 62 to the left whereby abutment 64 swings lever 60 clockwise to move rolls 58 away from driven element 7, thereby releasing the pressure applied to the driving elements so that member 7 is not oscillated by the members 32. Engagement of the driving elements 32 with member 7 is effected by counterclockwise movement of control member 68 to bring about counterclockwise movement of lever 52 which causes rolls 58 to act on members 32 so that they frictionally engage member 7.

A slight movement only of rod 62 is necessary to initially frictionally engage members 32 and 7 while further movements will load spring 70 to the desired extent so that the driving and driven members are yieldingly engaged to the desired degree. To hold member 68 in the desired position or so that a certain pressure is applied to the elements 32, there is provided a member 78 on rod 68 which has a toothed face for engaging a toothed face of bearing 74, as shown. The member 78 is slidable on rod 68 but is held against ro-

tation relative thereto by means of the pin and slot, as shown. A compression spring 80 is disposed around rod 68 beneath a washer 82 on said rod so as to urge member 78 towards bearing 74.

The mechanism described permits manual oscillation of rod 68 and functions with a clutching action to prevent accidental movement thereof while releasably holding rod 68 in the position of adjustment desired.

The rod 68 may be moved from the disengaged position of members 32 and 7, where it is in an inoperating position, to various operating positions so as to load spring to any desired degree and thereby obtain any desired pressure against members 32, the members 74 and 78 being adapted to releasably hold member 68 in the position to which it is set.

From the foregoing it will be observed that there is provided a driving or operating mechanism which is characterized by a plurality of driving elements longtudinally yieldable relative to a head. The driving elements may be elongated rod-like members which are relatively small and they may be solid or tubular and of various desired cross-sectional shapes in order to provide plural frictionally engageable surfaces or faces that are relatively narrow transversely thereof.

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. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator, a drive element, a plurality of driving elements mounted on said drive element for longitudinal yielding movements, the said driven and driving elements having frictionally engageable surfaces, and yielding means for yieldingly urging the driving and driven elements into operative engagement.

2. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator, a drive element, a plurality of separate driving elements associated with the drive element adapted to yield longitudinally relative thereto, and yielding means for urging the driving and driven elements into frictional engagement.

3. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator, a drive element, a plurality of separate driving elements associated with the drive element adapted to yield longitudinally relative thereto, and yielding means for urging the driving and driven elements into frictional engagement, the said driving elements consisting of a plurality of elongated members, and cooperating with the driven element to provide a multiplicity of contact areas.

4. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator, a drive element, a plurality of separate driving elements associated with the drive element adapted to yield longitudinally relative thereto, and yielding means for urging the driving and driven elements into frictional engagement, the said driving elements including a plurality of elongated members each independently mounted on the drive element.

5. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator having opposed friction surfaces, a drive element, a plurality of elongated members extending from said drive element having relatively narrow longitudinally extending friction surfaces for engaging the friction surfaces of said driven member, said driving elements longitudinally yieldable relative to said drive element, and yielding means for urging said elements and driven members into frictional engagement.

6. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator having opposed friction surfaces, a drive element, a plurality of elongated members extending from said drive element having relatively narrow longitudinally extending friction surfaces for engaging the friction surfaces of said driven member, said driving elements being offset from the main body thereof adjacent said drive element to provide longitudinal yieldability, and yielding means for urging said elements and driven member into frictional engagement.

7. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator having opposed friction surfaces, a drive element, a plurality of elongated members extending from said drive element having relatively narrow longitudinally extending friction surfaces for engaging the friction surfaces of said driven element, said driving elements being offset from the main body thereof adjacent said drive element to provide longitudinal yieldability thereto, and yielding means for urging said elements and driven member into frictional engagement, said yielding means including a pivoted bracket carrying relatively movable members for bearing on said driving elements.

8. Driving mechanism for the agitator of a washing machine comprising in combination, a driven element for said agitator, having friction faces, a drive element, a plurality of elongated members for frictionally engaging said driven member that are adjustably and yieldingly mounted on said drive element, and yielding means acting on said driving elements for urging said driving and driven elements into frictional engagement.

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