July 23, 1929. E. B. HOFF 1,721,956

WASHING MACHINE

Filed Jan. 15, 1927

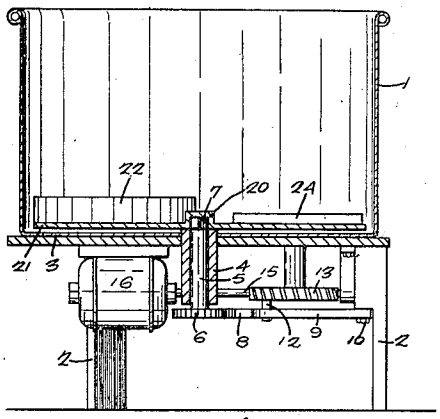


Fig. 1

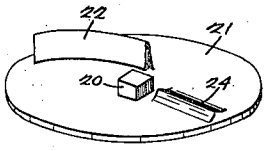


Fig. 4

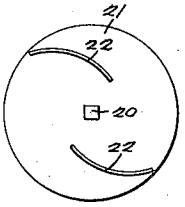


Fig. 5

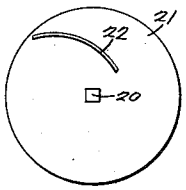


Fig. 6

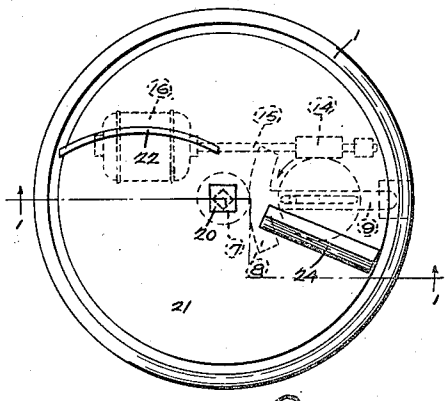


Fig. 2

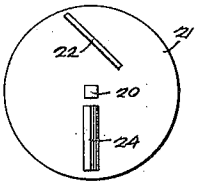


Fig. 7

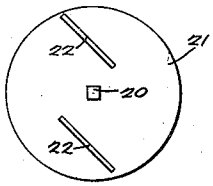


Fig. 8

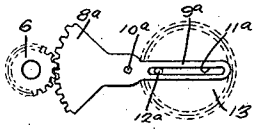


Fig. 9

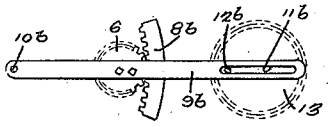


Fig. 10

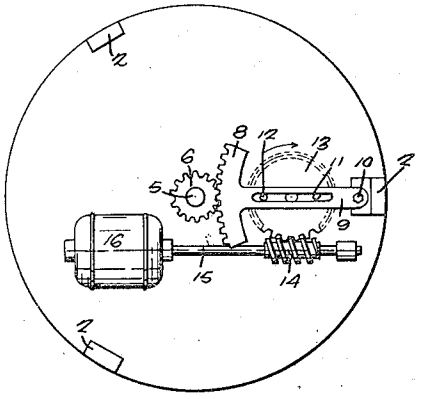


Fig. 3

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UNITED STATES PATENT OFFICE.

EARL B. HOFF, OF CLEVELAND HEIGHTS, OHIO, ASSIGNOR TO THE APEX ELECTRICAL MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

WASHING MACHINE.

Application filed January 15, 1927. Serial No. 161,301.

This invention relates to washing machines and has for its object the provision of a new, improved and simplified dasher which will wash clothing quickly and thoroughly and without tearing or snarling. More specifically the invention relates to a combination of a peculiar form of dasher with a peculiar type of operating mechanism which cooperate to produce a progressive movement of the clothes or fabrics being washed instead of a mere to and fro movement, and this with a substantially uniform load on the motor.

In the drawings accompanying and forming a part of this application, Fig. 1 is a central vertical section through a simple form of washing machine containing my improvements; Fig. 2 is a top plan view and Fig. 3 a bottom plan view of the same; Fig. 4 is a perspective view of the dasher shown in Figs. 1 and 2; Figs. 5, 6, 7, and 8 are plan views of modified forms of dasher; and Figs. 9 and 10 illustrate modified mechanical movements.

The washing machine comprises an upright casing 1 carried by legs 2 and having a bottom 3 formed with a water-tight vertical bearing 4 in which is journaled a shaft 5 provided at its lower end with a pinion 6 and at its upper end with a prismatic head 7. Meshing with the pinion is a toothed segment 8 carried on a lever 9 pivoted at 10 and having a slot 11 receiving the pin 12 carried by the rotary disk 13, which in the present embodiment is toothed for engagement with the worm 14 carried by the shaft 15 of the motor 16. This lever can be either of the third class as shown in Figs. 1 to 3, or of the first class as shown in Fig. 9 or of the second class as shown in Fig. 10. In any case the rate of movement in opposite directions will be unequal owing to the varying leverage.

Secured to the upper end of the shaft as by a socket 20 loosely placed thereon is a circular disk 21 having thereon one or more asymmetrically arranged vanes 22. Preferably only a single vane is used the same being inclined to the radius as shown in Fig. 2 so that one end is circumferentially advanced more than the other, and also generally curved from end to end with its concave side facing inwardly. The direction of inclination is so chosen that during the slow phase of its oscillation the vane swings in the direction in which its outer end is advanced beyond its inner end.

It is not necessary to have the vane curved since it can be made straight without departing from my invention as shown in Figs. 7 and 8, but ordinarily it is desirable to curve the same in order to secure a uniform load on the motor. Owing to the slanted and asymmetrical position of the vane the disk can rotate more easily in one direction than in the other at a given speed and at some speed will largely counterbalance the effect of the variable leverage on the oscillating mechanism and thus secure a uniform power consumption. In case the balancing does not occur at the desired speed a proper curving of the blade as herein suggested will usually accomplish it. This is not necessary for the washing operation but is desirable from a power standpoint.

One vane is best but more can be used as shown in Figs. 5 and 8. It is also permissible and sometimes advantageous to add another vane such as shown at 24 in Figs. 1, 2, 4 and 7, which is slanted in a different direction. Here I have shown it as having its longest dimension radial and having its two sides equally slanted. The disk can be made conical if desired.

The operation is as follows: the casing being supplied with washing liquid and clothes, the forward movement of the dasher, that is, counterclockwise in Fig. 2, causes thrusting of the clothes toward the center of the tub, after which the back swing occurs with comparatively high speed and small displacing effect on the clothes after which the next forward thrust catches a new supply of clothes and thrusts them after the first batch. The result is that the clothes are caused to progress continuously in one direction and all parts are subjected to washing action. The blades 24 if used exhibit the same effect in each direction, namely an upward throwing of the clothes which tends to increase the distribution of the same.

The important feature of my invention resides in the slanted position and consequent unsymmetrical effect of the vanes 22, especially when taken in conjunction with an oscillating mechanism so designed as to compensate for the variable rate of doing work and equalize the load on the motor. While I have illustrated certain simple mechanical movements for this purpose it will be understood that I do not limit myself thereto since many types of intermittent and variable

gears are known which can be used for this purpose, and I do not limit myself in this or other respects except as specifically recited in my several claims.

Having thus described my invention what I claim is:

1. In a washing machine, a dasher comprising a disk having on its face only one single, upright vane whose two ends are unequally distant from the axis, one of said ends being also advanced circumferentially beyond the other end, and oscillating gearing operatively connected to said disk for oscillating the same about its axis.

2. In a washing machine, in combination a vertical shaft, a dasher carried thereby and having a vane whose two ends are unequally distant from the axis of said shaft, one of said ends being also advanced circumferentially beyond the other end, and means for imparting to said shaft an oscillating movement wherein the rate of angular movement in the two directions is unequal.

3. In a washing machine, in combination, a casing having a vertical bearing in its bottom, a shaft journaled therein, a dasher carried by the upper end of said shaft, said dasher comprising a circular disk located near the bottom of said casing and one only upright vane carried by the upper face of said disk whose two ends are spaced at unequal distances radially from the disk axis and at unequal angular positions circumferentially of said axis, and oscillating mechanism located below said casing operatively connected to said shaft.

4. In a washing machine, in combination, a casing having a vertical bearing in its bottom, a shaft journaled therein, a dasher carried by the upper end of said shaft, said dasher comprising a circular disk located near the bottom of said casing and an upright vane carried by the upper face of said disk, the two ends of said vane being spaced at unequal distances radially from the disk axis and at unequal angular positions circumferentially of said axis, and means for oscillating said shaft at a speed varying with the direction of its movement, the greater speed occurring at times when the inner end of said vane precedes the outer end thereof in its angular movement.

5. In a washing machine, in combination, a casing, a vertical shaft therein, means for oscillating said shaft at unequal speeds in its to and fro movements, and a dasher carried by said shaft having a vane inclined to the radius of oscillation.

6. In a washing machine, in combination, a casing, a vertical shaft therein, means for oscillating said shaft at unequal speeds in its to and fro movements, and a dasher carried by the upper end of said shaft comprising a circular disk having on its upper face and wholly to one side of its axis a single upright vane having its two ends unequally spaced radially and unequally advanced angularly, the direction of its inclination being such that the end nearest the axis is most advanced angularly during the more rapid phase of the oscillation.

7. In a washing machine, a dasher comprising a disk having on its face, at one side of its axis, a vane whose two ends are unequally distant from the axis, one of said ends being also advanced circumferentially beyond the other end, said disk also having on its face at the opposite side of the axis a radially extending, upwardly projecting slant-sided rib.

8. In a washing machine, in combination, a casing having a vertical bearing in its bottom, a shaft journaled therein, a dasher carried by the upper end of said shaft, said dasher comprising a circular disk located near the bottom of said casing, one only upright vane carried by the upper face of said disk at one side of the axis, and a radial slant-sided rib carried by the upper face of said disk at the opposite side of the center from said vane, and oscillating mechanism below said casing operatively connected to said shaft.

In testimony whereof I hereunto affix my signature.

EARL B. HOFF.