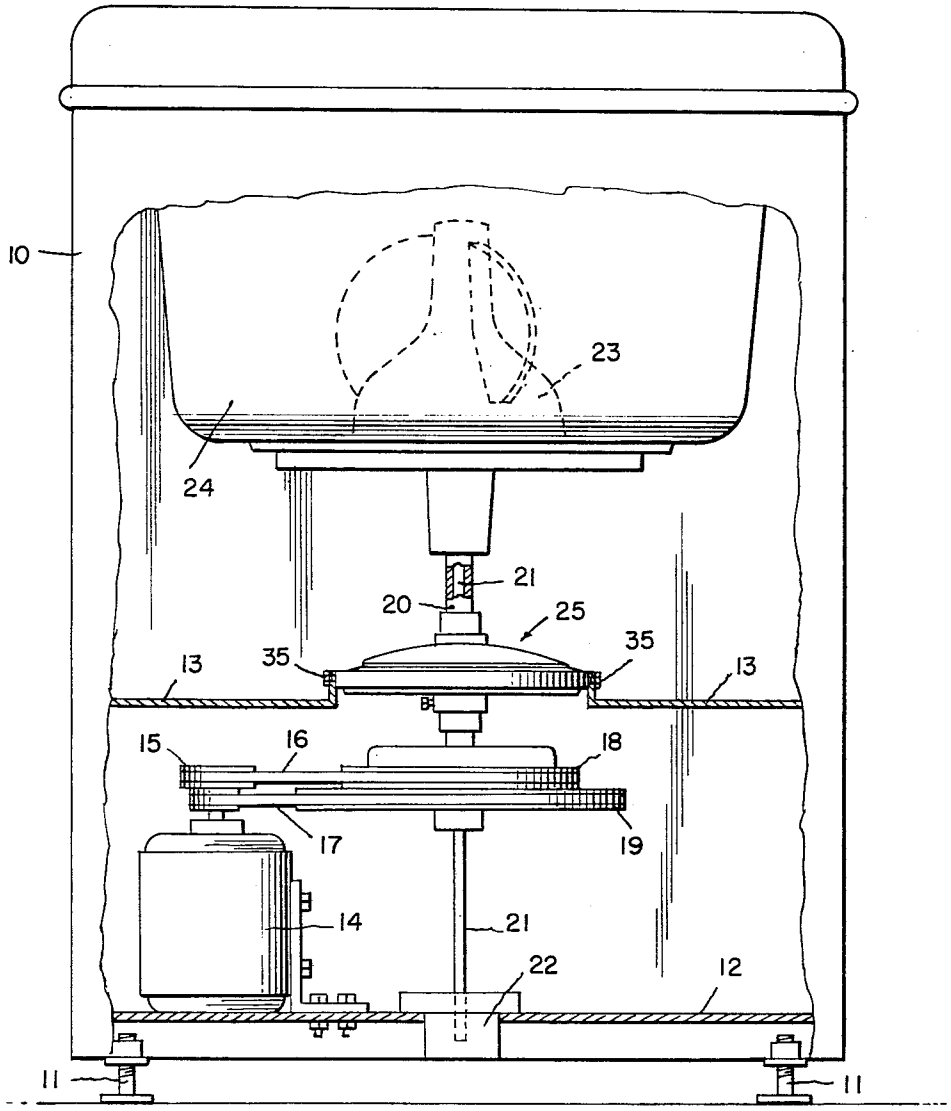
June 2, 1964 P. ANTINORI 3,135,689

DAMPENER ASSEMBLY

Filed Sept. 19, 1958 2 Sheets-Sheet 1

FIG. 1



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Filed Sept. 19, 1958 2 Sheets-Sheet 2

FIG.2

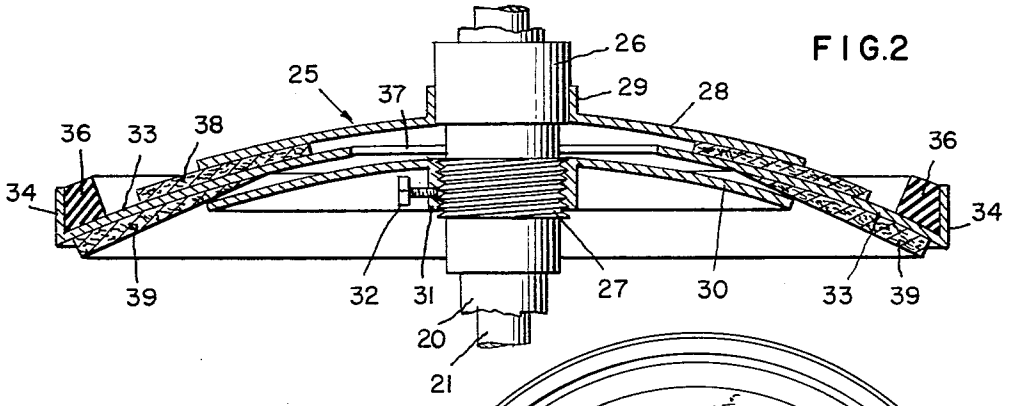
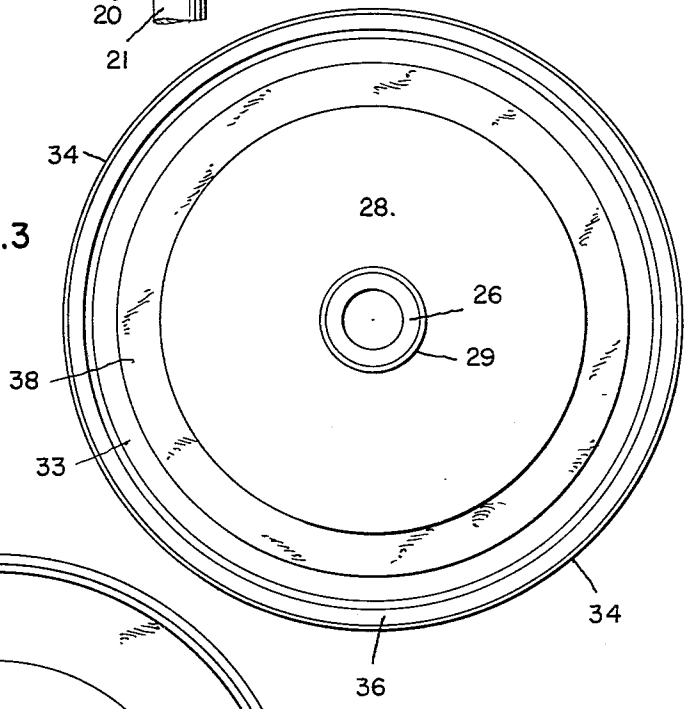


FIG.3



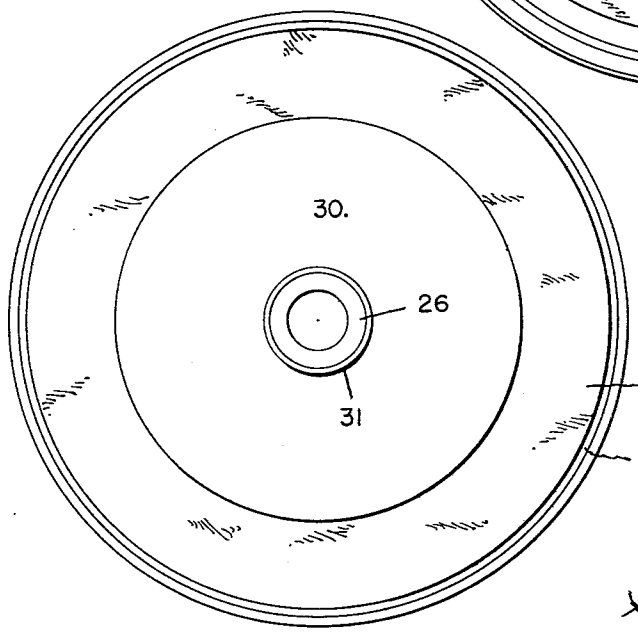


FIG.4

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3,135,689

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3,135,689
DAMPENER ASSEMBLY

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7 Claims. (Cl. 210—365)

This invention relates to a device for dampening the gyratory motion of a rotating power shaft which imparts rotary motion to an attached receptacle, and is particularly adapted for connection to the drive unit of an automatic washing machine of the centrifugal drying type.

It is the principal object of this invention to provide apparatus for controlling the gyratory motion of the vertical drive unit and clothes basket of a washing machine when the load in the basket is unequally distributed during the spin cycle, which apparatus positively limits the orbital movement of the drive unit and basket, thereby obviating the need for an automatic cut-off switch heretofore constituting standard equipment on such machines.

Other objects are to eliminate noise and vibration of the washing machine and to prevent contact of gyrating members with stationary parts of the machine and consequent damage thereto; to provide a dampener requiring no springs and including stationary members adapted to frictionally engage a large surface area of the assembly's moving parts; and to provide a dampener comprised of a minimum number of readily assembled parts adapted to be installed in machines of varying construction.

Other objects of the invention will be manifest from the following description of the present preferred form of the invention, taken in connection with the accompanying drawings, wherein:

FIG. 1 is a side elevational view of a washing machine embodying the dampener of the present invention, a portion of the casing being removed to disclose details of construction;

FIG. 2 is an enlarged horizontal sectional view of the dampener assembly per se;

FIG. 3 is an enlarged top plan view of the dampener assembly; and

FIG. 4 is an enlarged bottom plan view of the same.

Referring now in greater detail to the drawings, there is shown in FIG. 1, a washing machine including a casing 10 supported by feet 11 and having a perforate bottom wall 12 in spaced parallel relation to which is an intermediate perforate wall 13. An electric motor 14 is mounted in any suitable manner on bottom wall 12 to the shaft of which motor is affixed a double pulley 15. Drive belts 16 and 17 are connected to double pulley 15 and extend into engagement with a pair of pulleys 18 and 19. Pulleys 18 and 19 are, in turn, fixed to a conventional drive sleeve 20 and a drive shaft 21 comprising the drive unit. The lower terminal of drive shaft 21 is mounted in a suitable bearing 22 in wall 12 which permits gyratory movement of the drive shaft. An agitator 23 is mounted on and rotated by the upper terminal of drive shaft 21. The clothes basket or tub 24 of the machine is suitably connected to the upper terminal of drive sleeve 20 for rotating the former in a well known manner. Mounted on drive sleeve 20 intermediate pulley 18 and clothes basket 24 is the dampener assembly of the present invention, which is generally designated 25.

Referring now to FIG. 2, dampener assembly 25 includes a cylindrical housing 26 within which are conventional shaft bearings (not shown) which permit free rotation of the drive sleeve within the housing. The outer lower surface of the shaft housing is threaded at 27 for reasons which will be hereinafter more fully set out.

A concavo-convex, centrally perforated disc 28 having an upturned flange 29 adjacent the perforate section thereof is fixedly mounted on the upper outer wall of shaft housing 26. A second concavo-convex, centrally perforated disc 30 having a downwardly directed, internally threaded flange 31 adjacent the perforate section is adjustably engaged with threads 27 of shaft housing 26. A setscrew 32 extending through flange 31 into engagement with threads 27 prevents accidental relative movement of disc 30 with respect to shaft housing 26. Disc 30 has substantially the same radius of curvature as disc 28, is in spaced parallel relation thereto and has its outer periphery coextensive therewith.

Adapted to coact with discs 28 and 30 is a restraining unit which includes a concavo-convex frame disc 33 of substantially the same radius of curvature as discs 28 and 30, the outer periphery of which extends beyond the outer periphery of discs 28 and 30 and terminates in an upwardly directed flange 34. Flange 34 is affixed at intervals to intermediate wall 13 of casing 10 by suitable means 35. A safety buffer ring 36 (preferably of a resilient material such as rubber) is mounted on disc 33 in abutting engagement with flange 34. It will be noted from FIG. 2 that disc 33 is provided with a central circular opening 37, the diameter of which is considerably larger than the diameter of drive sleeve 20, to allow freedom of motion of the drive unit therein. To the upper convex face of disc 33 is applied a ring 38 of any suitable friction material, such as brake lining, which is located intermediate the inner and outer limits of the disc. The concave underface of disc 33 is provided with a second ring 39 of friction material which is also placed intermediate the inner and outer limits of disc 33. Friction material 39 tapers from the outer to the inner limit to provide a wedge for initiating dampening action of the assembly.

In use in an automatic washing machine of the centrifugal drying type, as shown in FIG. 1 dampener assembly 25 is located intermediate clothes basket 24 and pulley 18. Lower disc 30 is threaded on shaft housing 26 until it reaches a point where the distance between it and upper disc 28 is such that a lateral movement of shaft housing 26 causes them to come in close contact with upper friction ring 38 and lower friction ring 39 (see FIG. 2).

When the washing machine enters the spin cycle, an unbalanced load of clothes in the clothes backet exerts a force on the rotating basket and connected drive unit initiating a gyratory motion of these members, and corresponding motion of discs 28 and 30. This causes the upper face of disc 30 to bear upon the tapered friction material 39 to initiate a dampening effect thereon which is supplemented by frictional engagement of the underface of disc 28 with friction ring 38 through 360°. This combination of forces serves to effectively control orbital movement of the discs, drive unit and clothes basket under normal conditions.

In the event that the gyratory motion generated in the washing machine is extreme so that the outer peripheral edge of disc 28 moves beyond the outer limit of friction ring 38, then resilient buffer ring 36 fixedly located in the path of disc 28, positively limits the outward movement of the latter, thereby preventing damage which would otherwise occur due to contact of moving parts of the machine with stationary parts thereof. This furthermore obviates the need for an automatic cut-off switch which has heretofore constituted standard equipment on such machines.

By constructing a dampener in accordance with the present invention, no springs, with their obvious shortcomings, which have been used on prior dampeners, are necessary. Furthermore, effective dampening is assured by 360° frictional contact with two discs.

While the dampener assembly of the present invention has been shown and described as incorporated in a washing machine, and is particularly adapted for the ABC and Kelvinator washing machines, it is to be understood that it may readily be employed in other make washing machines of varying construction. Various additional uses may be made thereof in other machines where it is desired to dampen the gyratory motion created by a drive unit used to impart rotary motion to a connected receptacle or the like.

Other changes may be made in the present invention, without departing from the spirit and scope of the claims hereto appended.

What I claim is:

1. In combination with a drive shaft unit for imparting rotary motion to a receptacle connected thereto, and having means for effecting gyratory movement thereof upon imbalance of the receptacle, a dampener assembly carried by said drive shaft unit for controlling the gyratory movement of the receptacle and drive shaft unit, including a pair of superimposed discs having central perforations through which the drive shaft unit passes, said discs being mounted on the shaft in spaced relation, and wedge means interposed between said discs, and in frictional engagement therewith for progressively increasing the dampening force on said discs and drive shaft unit upon deviation of the latter from its normal axis.

2. In combination with a drive shaft unit for imparting rotary motion to a receptacle connected thereto, and having means to effect gyratory movement thereof upon imbalance of the receptacle, a dampener assembly carried by said drive shaft unit for controlling the gyratory movement of the receptacle and drive shaft unit, including a pair of superimposed spaced discs having central perforations through whicht he drive shaft unit passes, one of said discs being fixed to said drive shaft unit and the other of said discs being threadedly engaged with the drive shaft unit, and wedge means interposed between said discs, and in frictional engagement therewith, for progressively increasing the dampening force on said discs and drive shaft unit upon deviation of the latter from its normal axis.

3. In combination with a drive shaft unit for imparting rotary motion to a receptacle connected thereto, and having means to effect gyratory movement thereof upon imbalance of the receptacle, a dampener assembly carried by said drive shaft unit for controlling the gyratory movement of the receptacle and drive shaft unit, including a pair of like discs having central perforations through which the drive shaft unit passes, said discs being positioned on said drive shaft unit in superimposed spaced relation, and a fixed annular restraining unit interposed between said discs and in frictional engagement with said discs, said restraining unit extending beyond the peripheral limit of said discs and including a friction surface of gradually increasing thickness from its inner to its outer limit, the thickness of said annular restraining unit being less than the distance between said discs at its inner periphery, and greater than the distance between said discs at its outer periphery, for progressively increasing the dampening force on said discs and drive shaft unit upon deviation of the drive shaft unit from its normal axis.

4. The dampener assembly of claim 3 with the addition of a resilient buffer member carried by said annular restraining unit and in the path of movement of one of said discs, for positively limiting the deviation of the drive shaft unit from its normal axis.

5. The dampener assembly of claim 3 wherein one of said discs is fixed to said drive shaft unit and the other of said discs is threadedly engaged with the drive shaft unit.

6. In a washing machine having a drive shaft unit for imparting rotary motion to a clothes basket connected thereto, and having means to effect gyratory movement thereof upon imbalance of the receptacle, a dampener assembly for controlling the gyratory motion of the drive shaft unit and clothes basket, said dampener assembly comprising a pair of perforated concavo-convex discs concentrically mounted on the drive shaft unit in predetermined spaced relation, one of said discs being fixed to said drive shaft unit and the other of said discs being threadedly engaged with the drive shaft unit, the dampener assembly further including an annular restraining unit of concavo-convex shape interposed between said spaced concavo-convex discs and fixed to a stationary part of the washing machine, the restraining unit including friction means of wedge shape in cross section engageable with opposed faces of said discs, the thickness of said annular restraining unit being less than the distance between said discs at its inner periphery and greater than the distance between said discs at its outer periphery, for progressively increasing the dampening force on said discs and drive shaft unit upon deviation of the latter from its normal axis, and a resilient buffer ring carried by said restraining unit in predetermined spaced relation to, and in the path of movement of, one of said discs, to positively limit the deviation of the drive shaft unit from its normal axis.

7. In combination with a drive shaft unit for imparting rotary motion to a receptacle connected thereto, the unit including a housing, a portion of which is externally threaded, a dampener assembly carried by said drive shaft unit for controlling the gyratory movement of the receptacle and drive shaft unit, including a pair of superimposed spaced discs having central perforations through which the drive shaft unit passes one of said discs being fixed to said drive shaft unit and the other of said discs being threaded on the externally threaded portion of the drive shaft unit housing, to provide adjustment of one disc relative to the other, and a fixed restraining unit interposed between said discs, and in frictional engagement therewith.

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