

[54] **PULLEY DRIVE FOR A SIDE-LOADED
DRUM TYPE WASHING MACHINE**

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[58] Field of Search..... 68/140, 139, 210;
74/230.3, 230.01

[56] **References Cited**

UNITED STATES PATENTS

2,553,791 5/1951 Smith..... 74/230.3

FOREIGN PATENTS OR APPLICATIONS

560,105 9/1923 France..... 74/230.01

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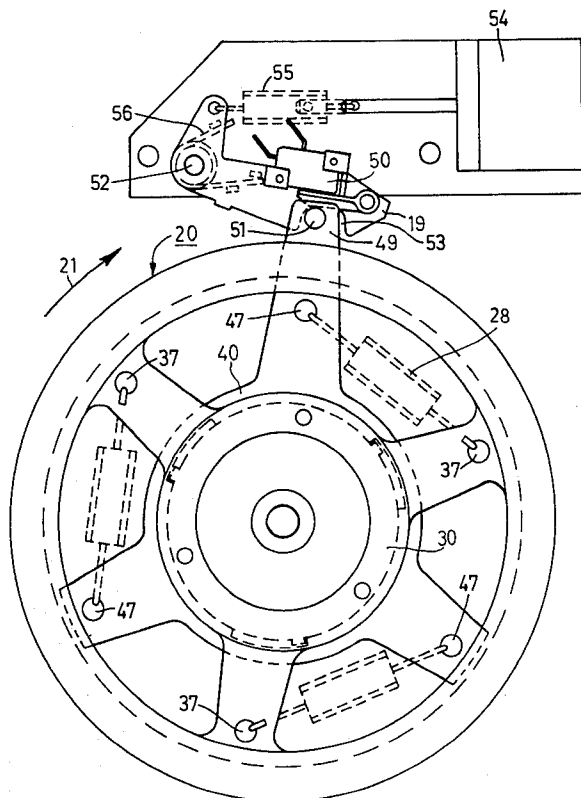
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[57] **ABSTRACT**

In a drum type washing machine, an improved pulley drive comprising a first annular pulley part fixed to a shaft on which the machine drum is mounted for coupling a drive arrangement thereto; an annular rim, mounted on the first pulley part in concentric disposition with respect thereto, which includes a plurality of lug members extending radially outwardly from the periphery thereof; and a second pulley part which includes a ring-shaped body portion having a radially inner edge adapted for slidable disposal over the annular rim. The second pulley part includes a plurality of radially outwardly extending lug members, including at least one which is greater in axial lengths than the others and a plurality of circumferentially spaced apart recesses disposed in the body portion along the inner edge which receive the lug members on the rim. Tension springs are coupled to the pulley parts for absorbing the rotational momentum of the drum during stopping and for aligning the housing and drum loading openings subsequent thereto.

5 Claims, 4 Drawing Figures



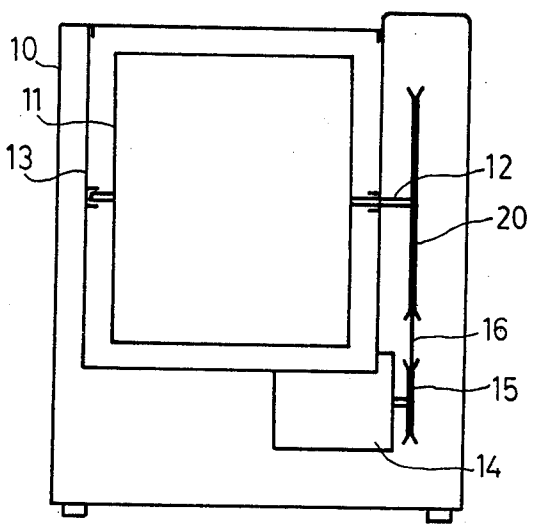


Fig. 1

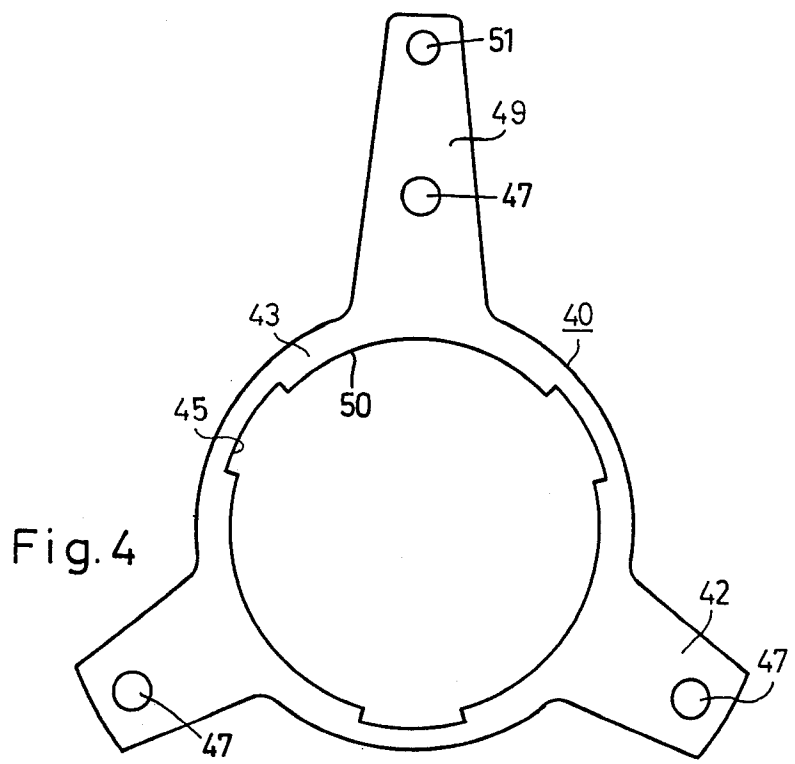


Fig. 4

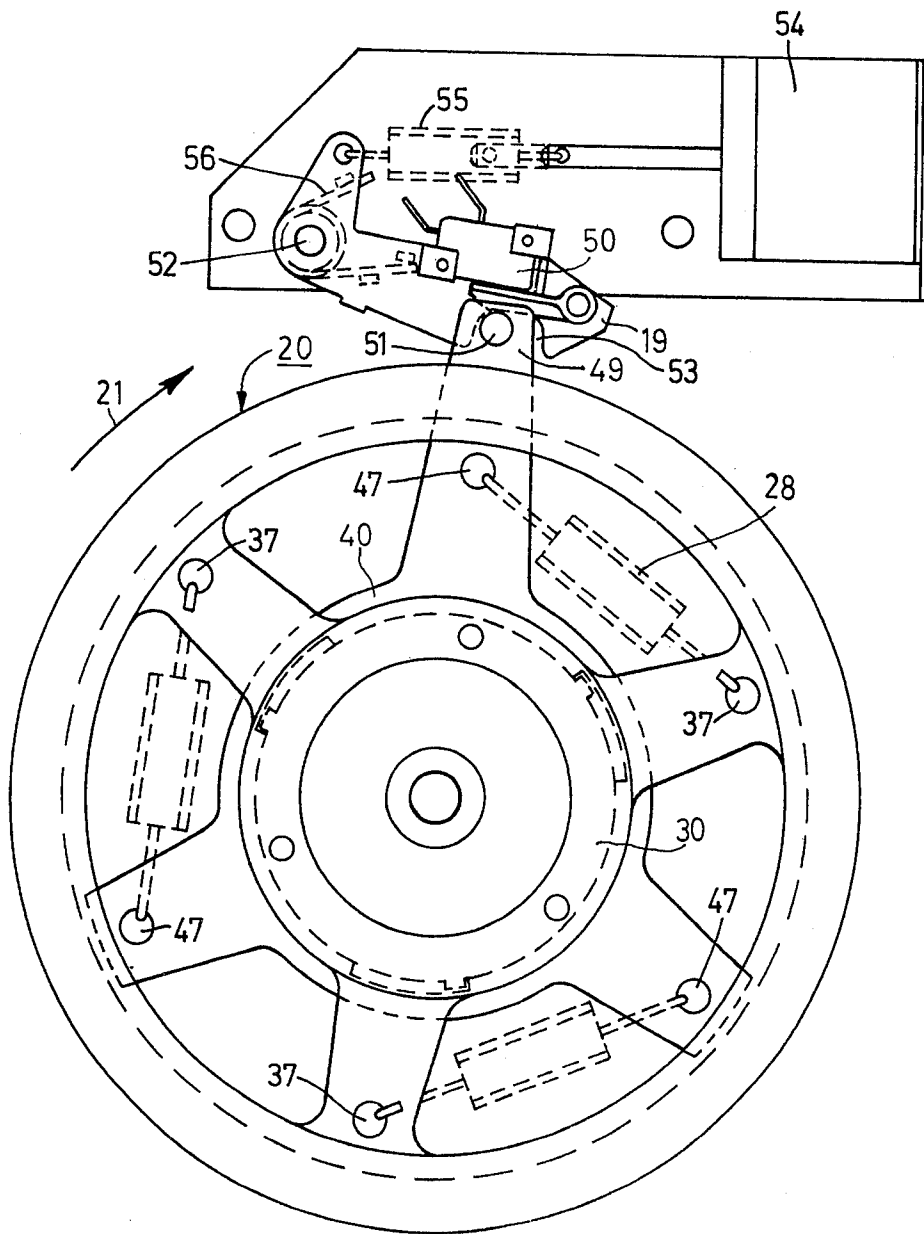


Fig. 2

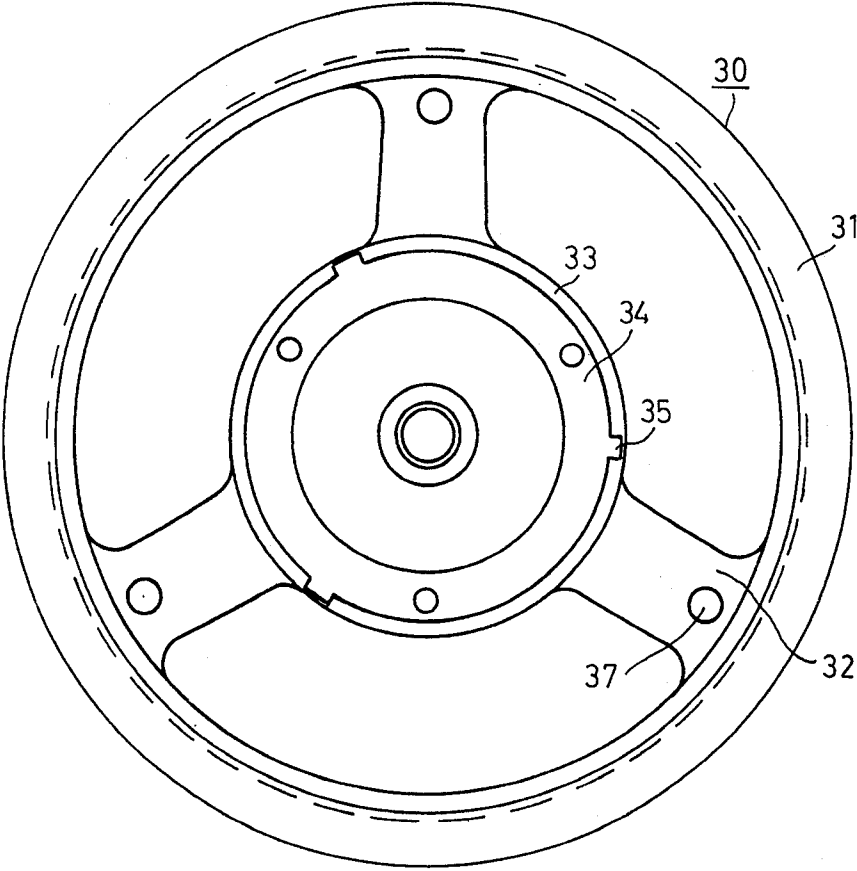


Fig. 3

PULLEY DRIVE FOR A SIDE-LOADED DRUM TYPE WASHING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to drum stopping mechanisms for side-loaded drum type washing machines, and in particular to an improved drum pulley drive for such mechanisms.

2. Description of the Prior Art

In side-loaded drum type washing machines not including a drum stopping control system, the drum thereof, in most instances, stops after the wash cycle of the machine is completed in a position in which the drum loading opening is not accessible by means of the machine housing opening. As a result, manual alignment of the loading openings is necessary. So-called "parking" circuits, however, have been developed in order to carry out automatic alignment of the loading openings when the wash cycle is completed. For example, German Design Pat. No. 1,795,233 discloses a machine in which a bead provided with a recess is mounted on the surface of the drum. A solenoid-operated pin mounted in the machine housing engages this recess in the bead, and contacts disposed on the pin are opened, thus interrupting the drum drive motor circuit. The cost of this circuit, however, is a significant disadvantage. German Design Pat. No. 6,603,447 discloses another drum type washing machine in which a braking system is utilized to slowly coast the machine drum into its aligned position. This system, however, is also expensive. Other drum type machines are also known which the drum is slowed, prior to stopping, to a speed which is substantially lower than that of the drum during the wash cycle. Sudden stopping of the drum in its aligned position is thus possible due to the significant reduction of drum momentum effected. The provision of a drive mechanism, however, with this additional speed control, is also unduly costly.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a simple and inexpensive pulley drive for a side loaded drum type washing machine.

This and other objects of the invention are achieved by the provision of an improved pulley drive for such a machine which comprises a first annular pulley part fixed to a shaft on which the drum is mounted for coupling a pulley drive arrangement thereto; an annular rim mounted on the first pulley part in concentric disposition with respect thereto, which rim includes a plurality of lug members extending radially outwardly from the periphery thereof; and a second pulley part including a ring-shaped body portion which has a radially inner edge adapted for slidable disposal over the rim. A plurality of radially outwardly extending lug members, including at least one stopping lug member of greater axial length than the other lug members, are disposed about the body portion. The latter also includes a plurality of circumferentially spaced apart recesses disposed along the radially inner edge which receive the lug members of the annular rim. Resilient tension means, which may comprise a plurality of tension springs, are coupled to the first and second pulley parts, for absorbing the rotational momentum of the drum during stopping and for aligning the drum and machine

housing loading openings subsequent to the stopping of the drum.

BRIEF DESCRIPTION OF THE DRAWINGS

5 FIG. 1 is a schematic side view illustration of a typical side-loaded drum type washing machine;

FIG. 2 is a plan view of an improved pulley drive constructed according to the invention illustrated in conjunction with the drum stopping means of the machine;

10 FIG. 3 is a plan view of the first pulley part of the pulley drive of the invention; and

FIG. 4 is a plan view of the second pulley part of the pulley drive of the invention.

DETAILED DESCRIPTION

15 Referring now to the drawings, and in particular to FIG. 1, there is shown a typical side-loaded drum type washing machine which includes a housing 10, a washing liquid container 13 disposed therein, and a washing drum 11 which is fixed to a rotatable shaft 12. A pulley belt drive arrangement, consisting of a drum drive pulley 20 fixed to the end of shaft 12, and a motor drive pulley 15 fixed to the shaft of a drive motor 14 mounted in housing 10, rotates the washing drum within container 13. Both the drum 11 and the housing 10 are provided with loading openings (not shown) for loading and unloading laundry. Means for stopping the drum with the loading opening therein aligned with respect to the loading opening of the housing is also provided and will be described in detail later on herein.

20 As shown in FIGS. 2-4, the inventive pulley drive comprises a first annular pulley part (illustrated in FIG. 3) generally designated 30 which is fixed to the drum shaft 12 and couples the pulley drive arrangement thereto. Pulley part 30 comprises an annular hub portion 33 from which a plurality of spoke members 32 extend radially outwardly, and an annular peripheral portion 31 provided with a circumferential groove for receiving a drive belt. The spoke members each include at least one circular aperture 37 disposed therein at the radially outer ends thereof. An annular rim 34 is mounted on the hub portion 33 of pulley part 30 in concentric disposition with respect thereto, and includes a plurality of circumferentially spaced apart lug members which extend radially outwardly from the periphery thereof. The function of rim 34 and lug members 35 will be described after the following description of the second pulley part of the invention.

25 FIG. 4 illustrates the second pulley part of the pulley drive. This part comprises a ring-shaped body portion, generally designated 40, from which a plurality of lug members 42 extend radially outwardly. At least one of these lug members, illustrated as member 49, has an axial length which is greater than that of the other lug members, and each includes a circular aperture 47 disposed, except for member 49, at the radially outer end thereof. The aperture in member 49 is instead disposed at approximately the same radial position with respect to body portion 40 as the other apertures. Ring-shaped portion 40 also includes a radially inner edge 50 and circumferentially spaced apart recesses 45 disposed therealong which is adapted for slidable disposal over rim 34 on first pulley part 30. A cylindrical pin 51 is affixed to the radially outer end of lug member 49 for operational engagement with the drum stopping means of the machine, which is described later on herein.

FIG. 2 illustrates the assembled pulley drive which assembly is effected simply by slidably disposing second pulley part 40 over rim 34 on first pulley part 30 so that lug members 35 are received by recesses 45. The second pulley part is thus movable relative to the first pulley part, but is limited in its rotational movement by the peripheral length of recesses 45. Resilient tension means, illustrated as a plurality of tension springs 28 coupled to respective adjacent spoke and lug members of the pulley parts by means of the apertures 37 and 47 provided therein, absorb the rotational momentum of the machine drum during stopping thereof and subsequently align the loading openings of the drum and machine openings. The drum stopping means includes a drop latch 19 pivotably mounted on the machine housing adjacent the drum pulley drive about an axis 52 so as to be movable between extended and retracted positions. The drop latch is illustrated in the drawing in its extended position, and may be controlled by, for example, either a Bowden wire or an electromagnet. A recess 53 is provided in the drop latch for receiving pin 51 on lug member 49 when the latch is disposed in its extended position. In the embodiment of the invention illustrated, latch 19 is coupled to a solenoid 54 by a tension spring 55, and is resiliently held in its extended position by a bias spring 56 disposed about axis 52. The latch also carries switch means, illustrated as end switch 50, coupled to the drive motor circuit of the machine, for deenergizing the drive motor in response to engagement with lug member 49. As shown in the drawing, lug member 49 extends radially outwardly past the periphery of first pulley part 30 to facilitate engagement with the drop latch and switch.

In operation, the drive motor drives pulley parts 30 and 40, shaft 12, and drum 11 sequentially in alternate directions during the washing cycle. Thus, the drum stopping circuit is designed to effect termination of the wash cycle during only one of those alternate directions of rotation, which is illustrated in FIG. 2 by arrow 21. During rotation of the drum in this direction, the drop latch 19 is positioned in its extended position by the drum stopping circuit. As lug member 49 passes latch 19, pin 51 thereon engages the latch and lifts it upwardly until it reaches recess 53, whereupon the pin snaps into the recess and restrains pulley part 40 from further rotational movement. Simultaneously, the radially outer end of member 49 engages switch 50 and deenergizes the motor circuit. However, due to the rotational momentum of the drum, first pulley part 30 continues to rotate with the drum and shaft 12. Tension springs 28 absorb this additional rotational momentum and gradually bring the drum to a stop. The amount of rotation of the pulley part 30 after pin 51 is detented in recess 53 is limited by the length of recesses 45 in which lug members 35 move. A length which permits between about 20° and 70° of rotation is preferable. After the forward momentum of the drum is stopped, the expanded tension springs retract and rotate first pulley part 30 and the drum backwardly until the lug members 35 abut the end of recesses 45 and are thereby restrained from further movement. The drum is fixed to shaft 12 so that when the pulley parts are in this relative position the housing and loading openings are aligned. Automatic alignment of the loading open-

ings is thereby achieved.

In the foregoing specification, the invention has been described with reference to specific exemplary embodiments thereof. It will be evident, however, that variations and modifications may be made thereunto without departing from the broader spirit and scope of the invention as set forth in the appended claims. The specification and drawing are, accordingly, to be regarded in an illustrative rather than in a restrictive sense.

What is claimed is:

1. In a drum type washing machine which is loaded through a loading opening provided in the side surface thereof, said drum being mounted on a rotatable shaft within the machine housing and being driven by a drive motor coupled thereto by a pulley belt drive arrangement, and including means for stopping the drum with the loading opening therein aligned with respect to a loading opening provided in the machine housing, an improved pulley drive, comprising:

a first annular pulley part fixed to said drum shaft for coupling said pulley drive arrangement to said drum shaft;

an annular rim, mounted on said first pulley part in concentric disposition with respect thereto, and including a plurality of lug members extending radially outwardly from the periphery thereof;

a second pulley part including a ring-shaped body portion having a radially inner edge adapted for slidable disposal over said rim, and a plurality of radially outwardly extending lug members, including at least one stopping lug member of greater axial length than the others of said lug members, said radially inner edge including a plurality of circumferentially spaced apart recesses disposed in said body portion for receiving said annular rim lug members; and

resilient tension means, coupled to said first and second pulley parts, for absorbing the rotational momentum of the drum during stopping and for aligning said drum and machine housing loading openings subsequent to the stopping of said drum.

2. The pulley drive recited in claim 1, wherein said first pulley part comprises an annular hub portion on which said annular rim is mounted, a plurality of spoke members extending radially outwardly therefrom, and an annular peripheral portion including a circumferential groove disposed therein for receiving a drive belt.

3. The pulley drive recited in claim 2, wherein said resilient tension means comprises a plurality of tension springs coupled to respective adjacent spoke and lug members of said first and second pulley parts.

4. The pulley drive recited in claim 2, wherein said second pulley part stopping lug member extends radially outwardly therefrom past the periphery of said first pulley part, and wherein said drum stopping means includes a controlled drop latch, mounted adjacent the pulley drive, and movable between extended and withdrawn positions so as to engage said stopping lug member in its extended position.

5. The pulley drive recited in claim 4, wherein said drop latch includes switch means for deenergizing said drive motor when said latch is engaged by said stopping lug member.

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