

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 483 909 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
20.03.1996 Bulletin 1996/12

(51) Int Cl.⁶: **D06F 37/30**

(21) Application number: **91202725.7**

(22) Date of filing: **22.10.1991**

(54) **Device for halting a drum in the loading and unloading position in a top-loading washing machine**

Vorrichtung zum Anhalten der Trommel einer mantelbeschickbaren Trommelwaschmaschine in der Beschickungsposition

Dispositif pour arrêter le tambour dans une position de chargement ou de déchargement d'une machine à laver à chargement par le dessus

(84) Designated Contracting States:
DE FR GB

(30) Priority: **30.10.1990 IT 2191590**

(43) Date of publication of application:
06.05.1992 Bulletin 1992/19

(73) Proprietor: **WHIRLPOOL EUROPE B.V.**
NL-5507 SK Veldhoven (NL)

(72) Inventor: **Turetta, Daniele**
c/o Internationaal Octrooibureau
NL-5656 AA Eindhoven (NL)

(74) Representative: **Guerri, Alessandro**
Whirlpool Europe S.r.l.
Patent Department
Località Cassinetta
I-21024 Biandronno (VA) (IT)

(56) References cited:
EP-A- 0 347 393 **FR-A- 1 526 873**
FR-A- 2 296 719

EP 0 483 909 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

DESCRIPTION

This invention relates to a top loading washing machine comprising a drum and a device for halting the drum in the loading and unloading position.

Various devices for obtaining this result are already known. Such devices are of the most widely varying types and although they attain their object they have various drawbacks. One of these is the imperfect centering of the drum aperture, due for example to excessive unbalance of the load placed in the drum. A further drawback is the sometimes high constructional cost of known devices.

EP-A-347393 discloses a device for halting the drum in the loading and unloading position comprising a movable member arranged to cooperate with a recess in the peripheral edge of the pulley associated with the drum. The movable member is driven by a cam rotated by a geared motor, which is independent from the main washing motor. FR-A-2296719 discloses a device for halting the electric motor of a washing machine comprising a sensor which cooperates with a cam rotating with the driving pulley. FR-A-1526837 discloses a device similar to that described in FR-A-2296719, in which the electro-mechanical sensor is replaced by an optical sensor.

An object of the present invention is to provide a device of the aforesaid type which is operationally reliable and provides precise halting of the drum in the loading and unloading position. A further object is to provide a device of the aforesaid type which is of low cost, of simple construction and can be fitted to washing machines of known construction with only slight modification to them.

These and further objects which will be apparent to the expert of the art by a device fitted to a washing machine of the aforesaid type, according to the appended claim 1.

The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which:

Figure 1 is a schematic perspective view of certain of the essential components of a washing machine comprising the device of the invention;

Figure 2 is a schematic front view of the washing machine of Figure 1;

Figure 3 is a schematic partial front view of the washing machine of Figure 1 provided with a modified embodiment of the device as shown in Figure 1.

With reference to Figures 1 and 2, a washing machine comprises a drum 1 provided with a loading-unloading aperture 2 having its own closure door 3 (shown in the open position in Figure 1).

A pulley 4 is fixed to the drum in any known manner, and is connected to a second pulley 5 by a belt 6 or similar transmission member.

The pulley 5 is connected to the output shaft 7 of a usual electric motor 8 which when operated in known manner by a timer 9 rotates the drum 1 during the various wash stages of the washing machine.

According to the invention, a device is associated with said machine to halt its drum in the loading and unloading position each time the machine stops.

Said device comprises a pin 15 carrying at one end 16 a roller or wheel 17 to cooperate with the peripheral edge 18 of the pulley 4 associated with the drum 1. This pulley comprises in its edge 18 a recess 19 in a position corresponding with the aperture 2 in said drum.

The pin 15 cooperates with a coil 20 within which said pin can slide (arrows F and G of Figure 1), said coil being connected to the timer 9 via an electrical line 9A.

At its other end 21, distant from the end 16, the pin 15 is provided with a collar 22 which retains one end 23 of a compression spring 24 mounted about said pin.

The other end 25 of the spring 24 cooperates with the coil 20 (or with a support member for it).

The end 23 of the pin 15 cooperates with a part 26, urged by a spring 26A, of a switch 27 connected to the power line (not shown) of the motor 8. The timer 9 is also connected to said motor 8 in known manner (for example via an electrical line 30).

The device of the invention is fitted in any known manner within the usual cabinet of the washing machine.

During the usual operation of said machine the pin 15 is kept distant from the pulley 4.

This is achieved by not allowing the timer 9 to power the coil 20, so that the spring 24 by acting on the end 21 of the pin 15 and reacting against the coil itself (or its support) maintains said pin 15 in the position shown in Figures 1 and 2, ie distant from the pulley 4.

On termination of the wash cycle, the timer 9 in known manner causes the motor 8 to rotate the drum at a very low speed (eg. 15 r.p.m.). At the same time the coil is powered with direct current so that the electromagnetic field generated within it draws the pin 15 close to the pulley 4.

In this manner the roller 17 reaches the edge 18 of said pulley and presses against it.

This situation lasts until the recess 19 reaches the roller 17. At this point, the roller penetrates into said recess and the motor 8 is halted.

This happens as a consequence of the movement of the pin 15 towards the pulley 4. By this movement, the end 21 of the pin 15 approaches the coil 20 to thus operate the switch 27.

Consequently, the switch interrupts the power feed to the motor 8 in known manner, so that it stops.

As the rotational speed of the drum is very low the stopping of the motor 8 results in virtually instantaneous stoppage of said drum.

As the recess 19 is provided in a position corresponding with the loading and unloading position of the aperture 2, this latter comes to rest in a position allowing these operations to be comfortably carried out by the us-

er.

It should be noted that during said operations the drum 1 is retained in the loading and unloading position either by coupling means of known type or by the pin 15. In this latter case, the timer 9 powers the coil 20 until power is totally switched off from the washing machine. This powering of the coil 20 enables the pin 15 to overcome the action of the spring 24 which would otherwise tend to return it to its initial position distanced from the pulley 4.

To maintain the pin 15 in the position in which the roller 17 cooperates with the recess 19, a permanent magnet can be associated with the end 16 of said pin (in proximity to the roller 17) to cooperate with another permanent magnet associated with the pulley 4 at said recess.

In this manner, the coil 20 is powered only for the time required to halt the motor 8. After power is switched off from the coil 20, the pin is retained at the pulley 4 by the cooperation between said permanent magnets.

In addition, whereas when said magnets are not provided the roller 17 separates from the recess 19 (by the action of the spring 24) only when the machine power is switched off, when the magnets are provided this separation is achieved by feeding a short current pulse to the coil 20. This current will be of opposite polarity to that which moves the pin 15 towards the pulley 4.

An embodiment of the invention has been described in which the movement of the pin 15 is achieved by powering a coil provided about it.

However, a further embodiment can comprise two superposed coils arranged about the pin, the first coil being powered by the timer 9 to draw the pin to the pulley 4, and the second coil being powered by the timer to withdraw it.

The actuator for moving the pin 15 can be of a type other than the described electromagnetic type.

One of such actuators is shown in Figure 3. In this figure parts corresponding to those of Figures 1 and 2 are indicated by the same reference numerals.

In Figure 3 the pin 15 is connected to one end 40 of an arm 44 pivoted at 42 to a fixed support element 43.

On the other end 44 of the arm 41 there rests the end 45 of a compression spring 46 advantageously arranged about a centering element 47 carried by said end 44.

The other end 48 of the spring 46 cooperates with a movable element 49 connected to a thermal actuator 50.

This latter can be of the known type containing a PTC (positive temperature coefficient) resistor which, when powered under the control of the timer 9 in any known manner, causes the element 49 to move towards the arm 41.

In this respect, it will be assumed that a wash cycle has just terminated.

At this point, in the manner already described, the drum 1 moves at very low speed and at the same time the timer 9 powers the PTC resistor. This generates heat

which causes a usual element positioned in proximity to it (or in contact with it) to expand, and act on the element 49 to cause it to move towards the arm 41. This movement firstly only compresses the spring 46, but then causes the end 44 of said arm to lower and the end 40 to rise, consequently moving the roller 17 to the edge 18 of the pulley. At this point the motor 8 stops when the roller penetrates into the recess 19, as already described.

In one embodiment the PTC resistor is immersed in a volume of wax which, on expanding under the heat generated by said electrical member, results in said movement of the element 49.

When the motor has stopped, and provided a drum retention element of known type is incorporated, the PTC resistor is no longer powered and the element 49 is able to return to its initial position to enable the pin 15 to separate from the pulley 4.

The thermal actuator has therefore the same purpose as the "electromagnetic" coil-type actuator of Figures 1 and 2. However, it has a different operating time, even though it is reliable. In the examples of operation of the device according to the invention the case in which the drum is positioned at the end of the washing machine wash cycle has been considered. However the operation of the device is identical when the user stops the machine during washing.

In such a case, the timer 9 is modified such that after stopping the washing machine, it operates the motor 8 in any known manner to rotate the drum at low speed and (in the already described manner) powers the device for halting the drum in the loading and unloading position.

The device of the invention is of simple construction, and can also be used on machines of usual production by slightly modifying them (for example in terms of the drum pulley).

The device is also reliable and enables the drum to be correctly halted in the loading and unloading position.

Some embodiments of the device have been described. However, other embodiments can be provided (for example in which sensor means other than a switch, such as optical sensors or the like, are used to determine when the roller has been inserted into the recess), all of which are assumed to fall within the scope of the present invention.

Claims

1. Top loading washing machine comprising a drum (1), an electric motor (8) for driving the drum through a belt (6) and pulleys (4, 5) and a device for halting the drum (1) in the loading and unloading position, such device comprising a movable member (15) arranged to cooperate with a recess (19) in the peripheral edge of the pulley (4) associated with the drum (1), such movable member (15) being able to assume at least two working positions, in one of

which it is inserted into said recess (19) for mechanically halting the drum (1) and in the second of which it is spaced therefrom, said movable member (15) cooperating with sensor means (27) arranged to operate on said motor (8) to halt it on sensing that one of said working positions has been attained by the movable member (15), said recess (19) being positioned advantageously such that said halting of the motor (8) and thus the rotation of the drum (1) takes place when this latter has its aperture (2) in the loading and unloading position, characterised in that the movable member (15) is driven by a thermal actuator (50) comprising a positive temperature control resistor powered via the timer (9) which programs the washing stages, the positive temperature control resistor being operationally connected to a movable element (49) arranged to cooperate with one end (44) of an arm (41) centrally pivoted, the movable member (15) being disposed at the other end (40) of said arm (41).

2. Washing machine as claimed in claim 1, characterised in that the movable member (15) carries at one end (16) a roller (17) or similar member arranged to cooperate with the edge (18) of the pulley (4) associated with the drum (1) and with the recess (19) provided therein.

3. Washing machine as claimed in claim 1, characterised by comprising means (24, 46) for enabling the movable member (15) to return from that working position close to the pulley (4) of the drum (1), to the other working position in which said member (15) is spaced from said pulley (4).

4. Washing machine as claimed in claims 1 and 3, characterised in that the return means are a compression spring (46) positioned about a centering element (47) associated with that end (44) of the arm (41) with which the movable element (49) operationally connected to the thermal actuator (27) cooperates.

5. Washing machine as claimed in claim 1, characterised in that the sensor means are a switch (27) provided with an arm (26) cooperating directly or indirectly with the movable member (15).

6. Washing machine as claimed in claim 1, characterised in that the sensor means are optical sensors.

Patentansprüche

1. Waschmaschine für Kopfladung mit einer Trommel (1), mit einem Elektromotor (8) zum Antrieb der Trommel mittels eines Riemens (6), mit Riemenscheiben (4, 5) und mit einer Vorrichtung zum Halten

der Trommel (1) in der Lade- und Entladestellung, wobei diese Vorrichtung ein bewegbares Glied (15) aufweist, das so angeordnet ist, daß es mit einer Kerbe (19) an der Umfangskante der mit der Trommel (1) verbundenen Riemenscheibe (4) zusammenarbeitet, und das mindestens zwei Arbeitspositionen einnehmen kann, wobei in der einen Arbeitsposition das Glied in der Kerbe (19) liegt und dabei die Trommel (1) mechanisch festhält und in der anderen Arbeitsposition das Glied von der Kerbe ferngehalten wird, wobei ferner das bewegliche Glied (15) mit Sensormitteln (27) zusammenarbeitet, die so angeordnet sind, daß sie auf den Motor (8) derart einwirken, daß sie ihn anhalten, wenn das Erreichen der einen Arbeitsposition des beweglichen Glieds (15) festgestellt worden ist, und wobei die Kerbe (19) in vorteilhafter Weise so angeordnet ist, daß das Anhalten des Motors (8) und damit der Drehung der Trommel (1) stattfindet, wenn die Öffnung (2) der Trommel sich in der Lade- und Entladestellung befindet, **dadurch gekennzeichnet**, daß das bewegliche Glied (15) von einem thermischen Betätigungsglied (50) angetrieben wird, das einen PTC-Widerstand mit positivem Temperaturkoeffizienten aufweist, daß dieser PTC-Widerstand über eine die Waschstufen programmierende Zeitschaltuhr (9) mit Strom versorgt wird und mit einem bewegbaren Element (49) betriebsmäßig verbunden ist, das so angeordnet ist, daß es mit einem Ende (44) eines um die Mitte drehbaren Arms (41) zusammenarbeitet, und daß das bewegbare Glied (15) am anderen Ende (40) des Arms (41) angeordnet ist.

2. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß das bewegbare Glied (15) an einem Ende (16) eine Rolle (17) oder ein ähnliches Glied trägt, das so angeordnet ist, daß es mit der Kante (18) der mit der Trommel (1) verbundenen Riemenscheibe (4) und mit der an dieser Riemenscheibe vorgesehenen Kerbe (19) zusammenarbeitet.

3. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß Mittel (24, 26) vorgesehen sind, die es dem bewegbaren Glied (15) ermöglichen, aus der Arbeitsposition, in der es dicht an der Riemenscheibe (4) der Trommel (1) liegt, zur anderen Arbeitsposition zurückzukehren, in der es fern von dieser Riemenscheibe (4) liegt.

4. Waschmaschine nach den Ansprüchen 1 und 3, dadurch gekennzeichnet, daß die Rückkehrmittel eine Druckfeder (46) umfassen, die um ein Innenelement (47) gewunden ist, das mit demjenigen Ende (44) des Arms (41) verbunden ist, mit dem das betriebsmäßig mit dem thermischen Betätigungsglied (27) verbundene, bewegbare Element (49)

zusammenarbeitet.

5. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß die Sensormittel einen Schalter (27) umfassen, der mit einem Arm (26) versehen ist, welcher direkt oder indirekt mit dem bewegbaren Glied (15) zusammenarbeitet.
6. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß die Sensormittel optische Sensoren sind.

Revendications

1. Machine à laver à chargement par le dessus, comprenant un tambour (1), un moteur électrique (8) pour entraîner le tambour via une courroie (6) et des poulies (4, 5), et un dispositif pour arrêter le tambour (1) dans la position de chargement/déchargement, ce dispositif comprenant un élément mobile (15) agencé de manière à coopérer avec un évidement (19) dans le bord périphérique de la poulie (4) associée au tambour (1), cet élément mobile (15) étant capable d'occuper au moins deux positions de travail, une première position dans laquelle il est introduit dans ledit évidement (19) pour arrêter mécaniquement le tambour (1), et une seconde position dans laquelle il est à distance de l'évidement, ledit élément mobile (15) coopérant avec des organes de détection (27) agencés de manière à commander ledit moteur (8) pour l'arrêter lorsqu'ils détectent que l'une desdites positions de travail a été atteinte par l'élément mobile (15), ledit évidement (19) étant avantageusement placé de telle manière que ledit arrêt du moteur (8), et ainsi de la rotation du tambour (1), se produit lorsque ce dernier présente son ouverture (2) dans la position de chargement/déchargement, caractérisée en ce que l'élément mobile (15) est entraîné par un dispositif d'actionnement thermique (50) qui comprend une résistance à commande positive en température, alimentée via le temporisateur (9) qui programme les étapes de lavage, la résistance à commande positive en température étant raccordée en option à un élément mobile (49) agencé de manière à coopérer avec une extrémité (44) d'un bras (41) pivoté au centre, l'élément mobile (15) étant disposé à l'autre extrémité (40) dudit bras (41).
2. Machine à laver selon la revendication 1, caractérisée en ce que l'élément mobile (15) porte à une extrémité (16) un galet (17) ou un élément semblable, agencé de manière à coopérer avec le bord (18) de la poulie (4) associée au tambour (1), et avec l'évidement (19) prévu dans celui-ci.
3. Machine à laver selon la revendication 1, caractérisée en ce qu'elle comprend des moyens (24, 46) pour permettre à l'élément mobile (15) de retourner depuis sa position de travail proche de la poulie (4) du tambour (1), jusqu'à l'autre position de travail dans lequel ledit élément (15) est espacé de ladite poulie (4).
4. Machine à laver selon les revendications 1 et 3, caractérisée en ce que les moyens de retour sont un ressort de compression (46) placé autour d'un élément de centrage (47) associé à l'extrémité (44) du bras (41) avec laquelle coopère l'élément mobile (49) fonctionnellement relié au dispositif d'actionnement thermique (27).
5. Machine à laver selon la revendication 1, caractérisée en ce que les moyens de détection sont constitués par un commutateur (27) pourvu d'un bras (26) qui coopère directement ou indirectement avec l'élément mobile (15).
6. Machine à laver selon la revendication 1, caractérisée en ce que les organes de détection sont des détecteurs optiques.

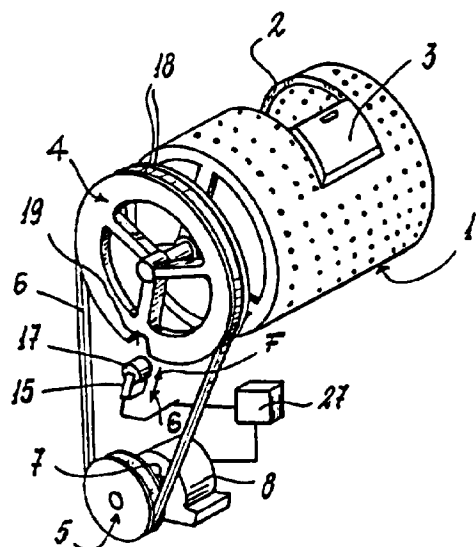


FIG.1

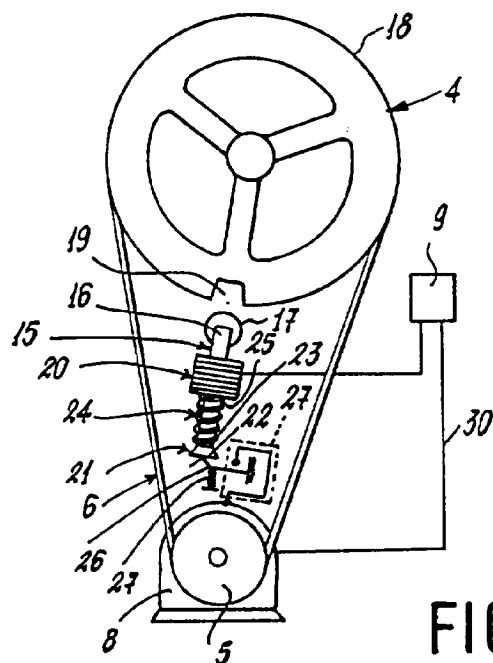


FIG.2

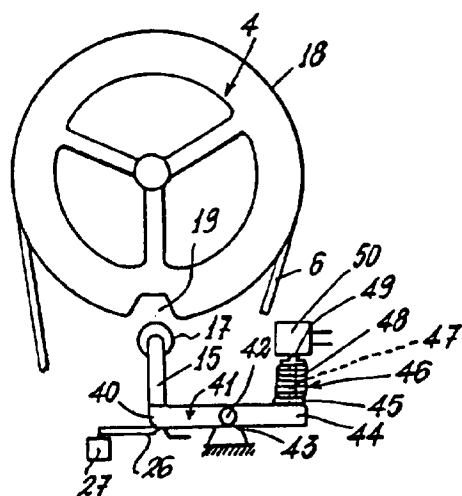


FIG.3