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(54) Benævnelse: **Blokeringsindretning med to positioner til en vasketromle**

(56) Fremdragne publikationer:
EP-A2- 0 347 393
EP-A2- 0 681 050
WO-A1-2013/117244
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DESCRIPTION

Description

Background of the invention

[0001] The invention concerns the automatic positioning device of washing drums, intended to secure blocking of rotation of a washing drum in a starting, predetermined position, where after it is blocked spontaneous rotation of the drum is denied.

State of the art

[0002] In the present time different systems intended for blocking washing drums in a required position are used, in particular systems, where a friction break is used. Disadvantage of the system is, that the final position is not defined in a precise way, because of different breaking distance.

[0003] Another group of the blocking systems contains a mechanism, which requires manual impact, in the other words, which are not automatic. The systems are operated by a lever arranged in an area of a door of a washing machine. Disadvantage of the solution is, that the washing drum has to be turned to the blocking position manually. In EP 2 812 476 A1 an automatic device is presented, where two sensors intended for monitoring a position of a washing drum are used, and which comprises a blocking element with cut-out sections. The device uses tooth like protrusions with cut-out sections. The solution is demanding on a control system, because parallel signals dispatched from the two sensors have to be watched in real time. Furthermore, defining of a superposition of a washing drum is difficult. Furthermore, the device is expensive because the sensors are expensive, as well as milling or machining of the blocking mechanism. The document doesn't deal with an idea of interconnection of a positioning system with other systems of a washing machine, which is an important aspect for function of the device in view of its correct functionality.

[0004] DE 100 03 474 A1 presents a top-loading washing machine drum locating and stopping procedure and mechanism using locating peg deployed and engaged with notches in drum. Disadvantage of the blocking system is, that a control system has no information, that the washing machine is blocked, and about a position of the blocking element.

[0005] The aim of the present invention is to present a device, which removes above mentioned disadvantages of the state of the art. Feature of the Invention

[0006] The above mentioned disadvantages are considerably eliminated by a two-positioning blocking device of a washing drum according to claim 1.

Description of the drawings

[0007] The invention will be further explained by use of drawings, in which Fig. 1 presents the blocking mechanism of the automatic positioning device according to the invention, Fig. 2 presents the automatic positioning device according to the invention without the belt pulley, Fig. 3 presents the view of a rear side of the blocking mechanism of the automatic positioning device according to the invention, and Fig. 4 presents a detailed cross section of the blocking mechanism according to the Fig. 3 along the axis X, where connection of the blocking element with the scroll bar is depicted.

Preferred embodiments of the invention

[0008] The positioning device of a washing drum according to the invention, presented in Fig. 1 and 2, comprises:

- at least one sensor 1 of a position of a washing drum,
- at least one blocking disc 2 with at least one cut-out section 2a, 2b and with at least one positioning strip 16 performed on its circumference, where the strip 16 is firmly connected to a rotary part of a composition of a washing drum,
- at least one blocking element 4 intended to be inserted into the cut-out section 1a, 2b of the blocking disc 2, controlled by at least one actuating member, connected to a control system of a washing machine,
- whereas the blocking mechanism 4 is controlled directly by a scroll bar 6,
- at least two controlling micro-switches 13, 15, which are intended to signalize a position of the blocking element 4, which are able to communicate with the control system of a washing machine.

[0009] The sensor 1 of a position of a washing drum is arranged in a such place, where it is easy to set its position with regards to the blocking disk 2, in the other words, where ease of maintenance is ensured.

[0010] Preferably, the blocking element 4 is made of plastic.

[0011] Preferably, the blocking disk 2 is integrated into a pulley 3 casting.

[0012] The control system of a washing machine evaluates up warding and down warding edges of a digital signal from the sensor 1 of a position of a washing drum by the positioning

strip 16 arranged on the blocking disk 2.

[0013] The positioning device according to the invention uses micro-switches 12, 14 arranged in such place, where they are able to inform the control system by its signal about an actual position of the blocking element 4.

[0014] Apparently, the positioning device according to the invention comprises an electromotor 8, which turns a moving screw 9, which moves with a positioning nut 10, which is inserted into a hexagonal opening in the scroll bar 6. The hexagonal opening prevents spinning of the positioning nut 10 to ensure only sliding movement of the positioning nut 10 along direction of the axis X of the moving screw 9. The positioning nut 10 excites even into an inner opening of a spring 7 to provide a proper position of the spring 7. An opposite end of the spring 7 is placed in a resting base 11, to which the spring 7 is resting.

[0015] Force caused by the spring 7 in a direction D2 acts against the scroll bar 6, as presented in the Fig. 3 or 4.

[0016] The electromotor 8 is connected to the driving control unit, which prevents activation of the electromotor 8 as long as rotational speed of a washing drum differs from the predetermined one.

[0017] The scroll bar 6 with the fixed blocking element 4 is controlled by at least one spring 7 and by the positioning nut 10, which is shifting on the moving screw 9 arranged on a shaft of the electromotor 8.

[0018] The positioning strip 16 is arranged on the blocking disk 2 in such way, that it is able to generate an up warding or a down warding edge of the digital signal of the sensor 1 of position of a washing drum.

[0019] If all conditions are fulfilled, the control system receives a signal from the sensor 1 of position of a washing drum about the up warding edge, the electromotor 8 is activated and the positioning nut 10 is starting to move in the direction D2. The electromotor 8 is activated for a precisely defined period. After that the electromotor 8 is deactivated by the control system of a washing machine.

[0020] The scroll bar 6 is pushed by the spring 7 and moved with the positioning nut 10 towards the blocking disk 2. After that, the blocking element 4 gets contact with the blocking disk 2. The mutual touch is achieved in a sufficient distance before the cut-out section arranged in the blocking disk 2a or 2b, to ensure enough time for the positioning nut 10 to get a position, where it can't limit movement of the scroll bar 6 directed towards the termination position, to ensure optimal blocking of the blocking disk 2 by inserting of the blocking element 4 into the cut-out section 2a or 2b. Inserting speed of the blocking element into the cut-out section 2a or 2b depends only on force of the pushing spring, whereas friction resistance is almost negligible.

[0021] The blocking element 4 is in touch with the blocking disk 2 and slides into a position, where it is inserted in the cut-out section 2a or 2b of the blocking disk 2 by impact of force of the spring 7.

[0022] The micro-switches 14 and 15 are switched on during inserting of the blocking element into the cut-out section 2a or 2b. The first micro-switch 14 is switched on after minimal insert of the blocking element 4 is performed. The first micro-switch 14 is connected directly to the control unit of a driver of a washing drum, which immediately performs interruption of the driver of the washing drum.

[0023] The second micro-switch 15 is switched on after sufficient entry of the blocking element 4 into the cut-out section 2a or 2b is performed. The second micro-switch 15 informs the control system of a washing machine about blocking of the washing drum of a washing machine. After that the blocking process is accomplished.

[0024] In case of a mistake an order to spin the blocked drum is issued by the control system of a washing drum. The actuator drive unit will not take it into account. The actuator drive unit of the washing machine will accept the order only if the drum is unlocked.

[0025] If the positioning nut 10 is moving in the direction D1 the positioning nut 10 leans on the scroll bar 6, so it is shifted in the direction D1. In the same time the spring 7 is pushed down. The movement of the scroll bar 6 is limited by termination barriers and also by third micro-sensor 12, which disconnects source of electronic power from the electromotor 8, when the predetermined position of the scroll bar 6 is reached. The third micro-switch 12 is mechanically connected to the fourth micro-switch 13, which when switched signalizes to the control system that the blocking element 4 is positioned in an unlocked position. In this position the blocking disk 2 is able to rotate freely with the shaft and with the washing drum.

[0026] During reversal movement of the positioning nut 10 in the direction D2 the scroll bar 6 is shifted towards the blocking disk 2 by force of the spring 7. The positioning nut 10 don't need any stopper in the direction D2. The positioning nut 10 is shifted in the direction D2 in a limited time. The time limit is constant and adjustable by the control system of the washing machine. The positioning nut 10 is shifting in the direction D2 for a predetermined time, so it stops always at the same place. The time limit is long enough to accept loss of speed of the positioning nut 10 caused by mechanical friction or delay of response of the driving system. The positioning screw 9 is long enough to elongate the time interval of movement of the positioning nut 10. The time limit is elongated to ensure shift of the positioning nut 10 in to the right position on the positioning screw 9, where it doesn't prevent moving of the scroll bar 6 to a blocked position in the direction D2.

[0027] Blockage of the blocking disk 2 is a complex process, which uses more systems at one time. First of all the control software of a washing machine finds out the actual position of the blocking element 4 by the micro-switch 13 or 15. If all is correctly done the control software

sets up a speed of rotation of the washing drum via the actuator drive unit of the washing drum. After that the control unit of a washing machine is waiting for a right moment for activation of the electromotor 8. The right moment is discovered by the sensor 1 of a washing drum.

REFERENCES CITED IN THE DESCRIPTION

Cited references

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Patent documents cited in the description

- EP2812476A1 [0003]
- DE10003474A1 [0004]

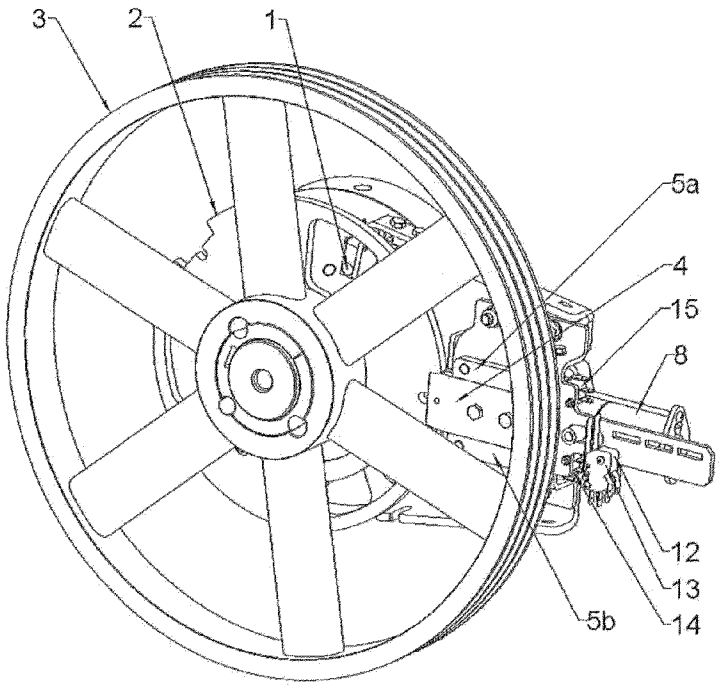
Krav:

1. Blokeringsindretning med to positioner til en vasketromle, omfattende
   - mindst en blokeringsskive (2) med
     - mindst to udskårne sektioner (2a, 2b) udført på dens periferi, og
     - mindst et positioneringsbånd (16),
     - hvori båndet (16) er konfigureret til at være fast forbundet med en roterende del af en vasketromlebestanddel,
   - mindst én sensor (1) til
     - detektering af en position af vasketromlen ved detektering af en position af positioneringsbåndet (16) i forhold til sensoren (1), hvori sensoren (1) tilvejebringer en stigende eller en faldende kant i sit digitale signal, og
     - transmittering af et blokeringssignal til en elektromotor (8), hvis en forudbestemt position detekteres,
   - mindst et blokeringselement (4) til indsættelse i en af blokeringsskivens (2) udskårne sektioner (2a, 2b), **kendetegnet ved at** det mindst ene blokeringselement (4) styres af en positioneringsindretning omfattende elektromotoren (8), som drejer en bevægelig skrue (9), som bevæger sig med en positioneringsmøtrik (10), som er indsat i en sekskantet åbning i en rullestang (6), hvori den sekskantede åbning forhindrer rotation af positioneringsmøtrikken (10) for at sikre kun glidende bevægelse af positioneringsmøtrikken (10) langs retningen af den bevægelige skrues (9) akse (X), hvori positioneringsmøtrikken (10) fremkaldes jævnt ind i en indre åbning i en fjeder (7) for at tilvejebringe en korrekt position af fjederen (7), hvori en modstående ende af fjederen (7) er placeret i en hvilebase (11), hvorpå fjederen (7) hviler, hvori kraft forårsaget af fjederen (7) i en retning (D2) virker mod rullestangen (6),
   - rullestangen (6) med det fastgjorte blokeringselement (4) styres af mindst én fjeder (7) og af positioneringsmøtrikken (10), som forskydes på den bevægelige skrue (9), som er arrangeret på en aksel i elektromotoren (8),
   - hvori blokeringsindretning med to positioner til en vasketromle yderligere omfatter
     - en anden mikroswitch (15)
       - som er i stand til at blive tilsluttet efter tilstrækkelig indføring af blokeringselementet (4) ind i den udskårne sektion (2a, 2b) er udført,
       - og er konfigureret til at informere vaskemaskinens styresystem om, at vaskemaskinens vasketromle er blokeret,
     - en tredje mikroswitch (12) til at afbryde kilden til elektrisk strøm fra elektromotoren (8), når en forudbestemt position af rullestangen (6) nås,

- en fjerde mikroswitch (13), som når den tilsluttes, signalerer til styresystemet, at blokeringselementet (4) er anbragt i en ulåst position,
- hvori den tredje mikroswitch (12) er mekanisk forbundet med den fjerde mikroswitch (13),
- en første mikroswitch (14) konfigureret til at blive forbundet direkte til styreenheden til vasketromlens drev,
  - for at blive tilsluttet efter minimal indføring af blokeringselementet (4) er udført,
  - til straks at udføre afbrydelse af vasketromlens drev.

DRAWINGS

Drawing



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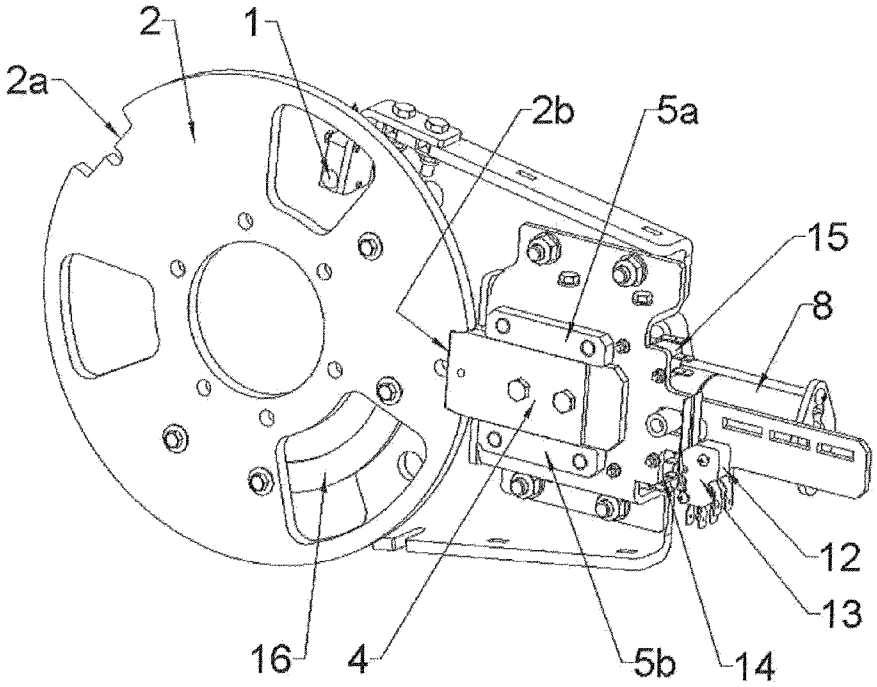

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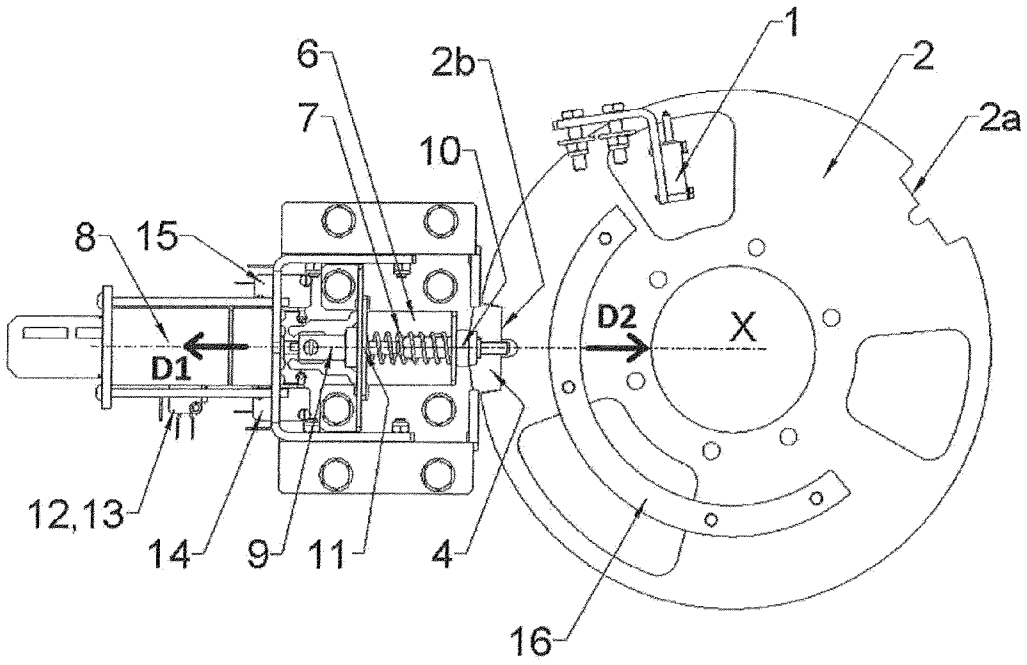

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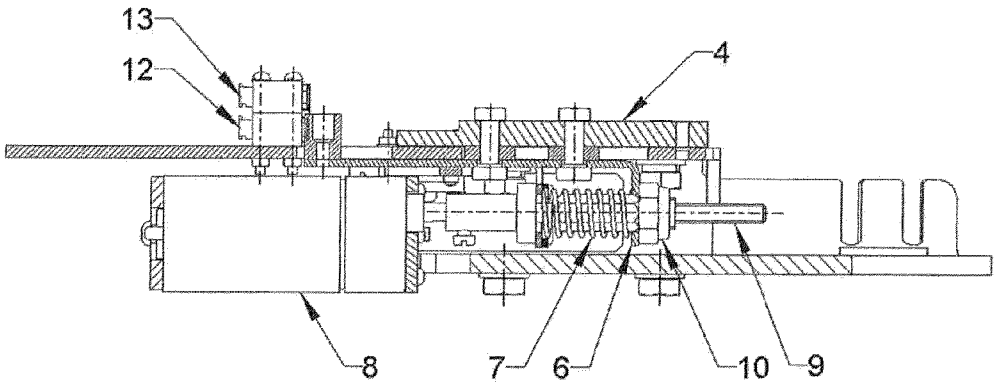

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