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(54) Improved system for balancing the door of a household appliance

Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine

Dispositif pour équilibrer la porte d'une machine domestique

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(56) References cited:
DE-A- 3 140 039 **DE-U- 8 329 611**
DE-U- 8 709 496 **DE-U- 8 905 682**
FR-A- 2 462 140

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Description

Present invention refers to an improved system for balancing the door of a household appliance, particularly of a dishwashing machine, comprising means for hinging the door to the appliance body, hooking means connected to the door, anchor means integral with the appliance body, elastic means connected between the hooking means and the anchor means, in order to deliver to the door a balancing couple counteracting its opening, adjusting means for varying the strength of said elastic means, and transmission means, working together with said elastic and adjusting means.

A system of the above said type is known from the Italian patent application No. 67615 A/87; said application describes a balancing system for the door of a dishwashing machine, which is of the above said type.

In such a system the transmission means is represented by a pulley, located in the rear part of the machine, which connects, by means of a metal cord, the tensioning spring to the adjusting screw.

As a consequence, such a system is not very suitable for a dishwashing machine, or more generally, for a household appliance, having overall dimensions, particularly the depth, as small as possible, as required by the today market; said appliances, indeed, beside the need of overall dimensions as small as possible, generally show the lower front part noticeably recessed in respect of the door, for aesthetic and functional reasons.

Moreover, when the appliance is of the built-in type, the described inconveniences are even more disadvantageous.

It is known from Germany utility model DE-U-8709496 a system of the described type, in which the adjustment of the spring strength can be realised by acting on a bolt which moves a slide, to which a spring end is secured, movable on a guide; this system requires a certain force on the bolt for carrying out the adjustment and the bolt head is not easily accessible.

It is also known from Germany utility model DE-U-83 29 611 a system according to the preamble of claim 1 of the above described type, wherein said transmission means comprise a small lever pivotally connected to the appliance body and to said adjusting means in order to allow the adjustment of the balancing couple delivered to the door; this known system, however shows two additional connecting pieces between the elastic means and the door and the adjusting means are represented by a bolt directly screwed in the appliance body and acting on the said small lever; as a consequence this system is rather complicated and has very limited flexibility due to the obliged positions of the spring and the bolt.

It is an object of the present invention to avoid the indicated inconveniences of known systems, teaching how it is possible to achieve a simple yet functional balancing system, suitable for a reduced size and/or built-in appliance.

To achieve the said object, the subject of the present invention is a system balancing the door of a household appliance as specified in the attached claim 1. The dependent claims concern further particular embodiments.

Other objects and advantages of the present invention will be clear from the detailed description which follows and from the attached drawings, which are supplied only as an explanatory and not limiting example, wherein the sole figure shows a system for balancing the door of a dishwashing machine, according to the invention.

In the figure, which shows schematically a top view and a cross section of a system for balancing the door of a dishwashing machine, according to the invention, reference number 1 indicates the body or frame of a dishwashing machine.

Reference number 3 indicates a bracket, which is one out of two symmetric brackets, integral with the machine door; the door is shown both in the open and in the closed position.

A helicoidal tension spring, indicated with reference number 4, is hooked to bracket 3; spring 4 is hooked, at its other end, to a small connecting lever, indicated with reference number 7.

The door is hinged to body 1 by means of a second couple of brackets, one of them, indicated with reference number 11, being fastened to said body.

Intermediate part of small lever 7 is pivotally connected to body 1, so that it builds a first class lever, whose arms, indicated with reference numbers 9 and 10 respectively, are of different length.

Spring 4 is hooked to the upper longer arm 9, while the lower shorter arm 10 shows at its end a housing for a cylindrical nut, indicated with reference number 2, in order to allow a rotation during the adjusting movement; said nut is screwed onto the shank of a bolt, indicated with reference number 8. Bolt 8 is used to adjust the tensioning of the spring in order to balance the door during opening and closing movements; such adjustment is necessary also in order to compensate for the different door weight, in case a panel is applied to it; the panel may be of different thickness or size, depending upon the desired aesthetics.

Adjustment shall be made on the front of the appliance, i.e. without moving the machine.

Adjustment bolt 8 passes through a hole on the front wall of frame 1, so that it may oscillate in order to allow for the movement of small lever 7 during the adjustment.

Oscillation of lever 7 is limited in a way that, even if bolt 8 is completely unscrewed, lever 7 is stopped resting on the lower body surface, indicated with reference number 12, in order to avoid the detachment of spring 4.

Characteristics of the described system are clear from the description given and from the attached drawings.

As shown, spring 4, transmission system 7 and

adjusting bolt 8 are all located in the lower front area of the machine, so leaving room for other components of the appliance.

Also clear are the advantages of the balancing system according to the present invention.

Particularly they are represented by the facts that room is left to other machine components, so that the machine will be less cumbersome, and that the spring 4 strength adjustment may be made.

Claims

1. System for balancing the door of a household appliance, particularly of a dishwashing machine, comprising means (11) for hinging the door to the appliance body (1), elastic means (4) connected between hooking means (3) connected with the door and anchor means integral with the appliance body (1), said elastic means (4) being provided in order to deliver to the door a balancing couple counteracting its opening, and adjusting means (8) operable for varying, through transmission means (7), the strength of said elastic means, whereby said elastic means (4) and said transmission means (7) are located in the front part of the appliance and said transmission means comprises a small lever (7) pivotally connected to the appliance body (1), said small lever being interposed between and connected with said adjusting means (8) and with said elastic means (4) characterised in that said hooking means (3) are integral with the door and in that said small lever is connected at one end (10) to the adjusting means (8) and shows on that end a housing for a nut (2), which is screwed onto a bolt (8), which is part of said adjusting means, and that said bolt (8) can oscillate, in order to allow for the movement of said small lever (7) during the adjustment.
2. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 1, characterised in that said small lever (7) is pivotally connected at its intermediate part to the appliance body (1) and connected at one end with said adjusting means (8) and on the other end with said elastic means (4).
3. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 1 or 2, characterised in that said elastic means (4) are directly attached to said hooking means (3) integral with the door.
4. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 2, characterised in that said small lever (7) builds a first class lever, with the two arms (9, 10) having different lengths.

5. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claims 1 and 3, characterised in that said small lever (7) is connected at one end (10) to the adjusting bolt (8) through a rod with a threaded hole, wherein said bolt (8) is screwed.
6. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to at least one of the previous claims, characterised in that stopping means (12) are provided for said small lever (7) which, when a complete unscrewing of the bolt (8) occurs, avoid the detachment of the elastic means (4).
7. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 1, characterised in that said adjusting means (8) are directly accessible from the front part of the appliance and located in a zone normally hidden from view, so that the adjustment can be carried out without the necessity of removing any functional and/or aesthetical components of the appliance.

Patentansprüche

1. Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine, insbesondere einer Geschirrspülmaschine, bestehend aus Vorrichtungen (11) zum Einhängen der Tür in den Maschinenkörper (1), elastischen Vorrichtungen (4), die zwischen Einhakvorrichtungen (3) und Vorrichtungen zur Verankerung verbunden sind, wobei die Einhakvorrichtungen (3) Bestandteil der Tür und die Vorrichtungen zur Verankerung Bestandteil des Maschinenkörpers (1) sind, wobei die elastischen Vorrichtungen (4) vorgesehen sind, um der Tür eine Ausgleichskraft zu geben, um beim Öffnen entgegenzuwirken, und Einstellvorrichtungen (8) zum Variieren der Festigkeit der elastischen Vorrichtungen durch Übertragungsvorrichtungen (7) im vorderen Teil der Maschine vorgesehen sind, und die Übertragungsvorrichtungen einen kleinen Hebel (7) aufweisen, der drehbar an dem Maschinenkörper (1) gelagert ist, wobei der kleine Hebel zwischen den Einstellvorrichtungen (8) und den elastischen Vorrichtungen (4) eingesetzt und mit diesen verbunden ist, dadurch gekennzeichnet, daß die Einhakvorrichtungen (3) Bestandteil der Tür sind, und daß der kleine Hebel (7) an einem Ende (10) mit der Einstellvorrichtungen (8) verbunden ist und an diesem Ende eine Lagervorrichtung für eine Schraubenmutter (2) aufweist, die auf eine Schraube (8) geschraubt ist, wobei die Schraube (8) Bestandteil der Einstellvorrichtungen ist, und daß die Schraube (8) schwingen kann, um die Bewegung des kleinen Hebels (7) während des

Einstellens zu ermöglichen.

2. Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine, insbesondere einer Geschirrspülmaschine, nach Anspruch 1, dadurch gekennzeichnet, daß der kleine Hebel (7) drehbar an seinem Zwischenteil mit dem Maschinenkörper (1) und an einem Ende mit den Einstellvorrichtungen (8) und an dem anderen Ende mit den elastischen Vorrichtungen (4) verbunden ist. 5 10
3. Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine, insbesondere einer Geschirrspülmaschine, nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die elastischen Vorrichtungen (4) unmittelbar mit den Einhakvorrichtungen (3) verbunden sind, wobei die Einhakvorrichtungen (3) Bestandteil der Tür sind. 15
4. Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine, insbesondere einer Geschirrspülmaschine, nach Anspruch 2, dadurch gekennzeichnet, daß der kleine Hebel (7) einen doppelschenkigen Hebel mit zwei unterschiedliche Längen aufweisenden Armen (9, 10) bildet. 20 25
5. Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine, insbesondere einer Geschirrspülmaschine, nach Ansprüchen 1 und 3, dadurch gekennzeichnet, daß der kleine Hebel (7) an einem Ende (10) über eine Stange mit einer Gewindebohrung, in das die Schraube (8) eingeschraubt ist, mit der Einstellschraube (8) verbunden ist. 30
6. Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine, insbesondere einer Geschirrspülmaschine, nach mindestens einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß Arretiervorrichtungen (12) für den kleinen Hebel (7) vorgesehen sind, die, wenn die Schraube (8) vollständig herausgeschraubt wird, das Lösen der elastischen Vorrichtungen (4) verhindern. 35 40
7. Vorrichtung zum Gewichtsausgleich der Tür einer Haushaltsmaschine, insbesondere einer Geschirrspülmaschine, nach Anspruch 1, dadurch gekennzeichnet, daß die Einstellvorrichtungen (8) direkt vom Frontteil der Maschine zugänglich und in einem üblicherweise nicht sichtbaren Bereich angeordnet sind, so daß die Einstellung erfolgen kann, ohne irgendwelche funktionalen und/oder der Ästhetik dienenden Bauteile des Gerätes entfernen zu müssen. 45 50

Revendications 55

1. Système d'équilibrage pour la porte d'un appareil ménager, en particulier d'une machine lave-linge,

comprenant des moyens (11) qui articulent la porte au corps (1) de l'appareil, des moyens élastiques (4) montés entre des moyens d'accrochage (3) reliés à la porte et des moyens d'ancrage solidaires du corps (1) de l'appareil, lesdits moyens élastiques (4) étant prévus pour exercer sur la porte un couple d'équilibrage antagoniste à son ouverture, et des moyens de réglage (8) permettant de faire varier la forces desdits moyens élastiques, en agissant par l'intermédiaire de moyens de transmission (7), lesdits moyens élastiques (4) et lesdits moyens de transmission (7) étant placés dans la partie avant de l'appareil et lesdits moyens de transmission comprennent un petit levier (7) articulé au corps (1) de l'appareil, ledit petit lever étant interposé entre lesdits moyens de réglage (8) et lesdits moyens élastiques (4) et relié à ces moyens, caractérisé en ce que lesdits moyens d'accrochage (3) sont solidaires de la porte (1), que ledit petit levier (7) est relié aux moyens de réglage (8) par une extrémité (10) et présente, sur cette extrémité, un logement recevant un écrou (2) qui est vissé une vis (8), qui est partie desdits moyens de réglage, et que ladite vis (8) peut osciller, pour admettre le mouvement dudit petit levier (7) pendant le réglage.

2. Système d'équilibrage pour la porte d'un appareil ménager, en particulier d'une machine lave-linge, selon la revendication 1, caractérisé en ce que ledit petit levier (7) est articulé au corps (1) de l'appareil en un point intermédiaire de sa longueur et est relié auxdits moyens de réglage (8) par une extrémité et auxdits moyens élastiques (4) par l'autre extrémité.
3. Système d'équilibrage pour la porte d'un appareil ménager, en particulier d'une machine lave-linge, selon la revendication 1 ou 2, caractérisé en ce que lesdits moyens élastiques (4) sont reliés directement auxdits moyens d'accrochage (3) solidaires de la porte (1).
4. Système d'équilibrage pour la porte d'un appareil ménager, en particulier d'une machine lave-linge, selon la revendication 2, caractérisé en ce que ledit petit lever (7) constitue un lever du premier genre et possède deux bras (9, 10) ayant des longueurs différentes.
5. Système d'équilibrage pour la porte d'un appareil ménager, en particulier d'une machine lave-linge, selon les revendications 1 et 3, caractérisé en ce que ledit petit levier (7) est relié à la vis de réglage (8) par une extrémité (10) par l'intermédiaire d'une tige présentant un trou fileté dans lequel ladite vis (8) est vissée.

6. Système d'équilibrage pour la porte d'un appareil ménager, en particulier d'une machine lave-linge,

selon au moins une des revendications précédentes, caractérisé en ce qu'il est prévu des moyens d'arrêt (12) pour ledit petit lever (7), moyens qui évitent que les moyens élastiques (4) ne se détachent en cas de dévissage complet de la vis (8).

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7. Système d'équilibrage pour la porte d'un appareil ménager, en particulier d'une machine lave-linge, selon la revendication 1, caractérisé en ce que lesdits moyens de réglage (8) sont directement accessibles par la partie avant de l'appareil et placés dans une zone normalement dissimulée à la vue, de sorte que le réglage peut s'effectuer sans qu'il soit nécessaire d'enlever des composants fonctionnels et/ou esthétiques de l'appareil.

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