(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 386 725 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90104341.4**

(51) Int. Cl.5: **A47L 15/42, F24C 15/02**

(22) Date of filing: **07.03.90**

(30) Priority: **07.03.89 IT 6715489**

(43) Date of publication of application:
12.09.90 Bulletin 90/37

(84) Designated Contracting States:
DE ES FR GB

(71) Applicant: **MERLONI ELETTRODOMESTICI S.p.A.**
Viale Aristide Merloni, 45
I-60044 Fabriano (AN)(IT)

(72) Inventor: **Bongini, Dino**
Via Marconi 36
I-60044 Fabriano (AN)(IT)
Inventor: **Burattini, Geniale**
Via Salvoni 3
I-Jesi (AN)(IT)

(74) Representative: **Gustorf, Gerhard, Dipl.-Ing.**
Patentanwalt Dipl.-Ing. Gerhard Gustorf
Bachstrasse 6 A
D-8300 Landshut(DE)

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

(57) Present invention refers to a 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 (3) connected to the door, anchor means (11) integral with the appliance body, elastic means (4) connected between the hooking means and the anchor means, in order to deliver to the door a balancing couple counteracting its opening, adjusting means (8) for varying the strength of said elastic means, and transmission means (7), working together with said elastic and adjusting means; the main characteristic of the invention consists in that said elastic means and said transmission means are located in the front part of the appliance.

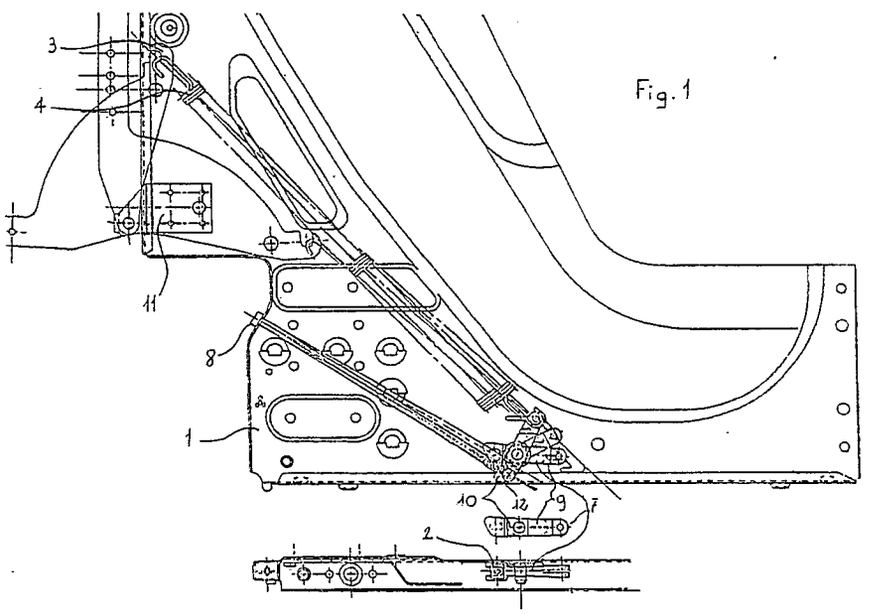


Fig. 1

EP 0 386 725 A1

IMPROVED SYSTEM FOR BALANCING THE DOOR OF A HOUSEHOLD APPLIANCE.

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 inconvenience is even more disadvantageous.

It is an object of the present invention to avoid the indicated inconvenience of the known system, 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 present invention is 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, characterized in that said elastic means and said transmission means are located in the front part of the appliance.

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 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 without the need to access the back side of the machine.

It is clear that many variations to the balancing system described as an example are possible to the skilled in the art, without departing from the novelty principles inherent to the invention.

Claims

1. 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 (3) connected to the door, anchor means (11) integral with the appliance body, elastic means (4) connected between the hooking means and the anchor means, in order to deliver to the door a balancing couple counteracting its opening, adjusting means (8) for varying the strength of said elastic means, and transmission means (7), working together with said elastic and adjusting means, characterized in that said elastic means (4) and said transmission means (7) are located in the front part of the appliance.

2. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 1, characterized in that said transmission means comprises a small connecting lever (7), pivotally connected by its intermediate part to the appliance body (1).

3. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 1, characterized in that said adjusting means comprises a bolt (8), which can be accessed on the front of the appliance.

4. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 2, characterized in that said small lever (7) builds a first class lever, with the two arms (9, 10) having different length.

5. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claims 2 and 3, characterized in that said small lever (7) is connected at one end (10) to the adjusting bolt (8) and shows on that end a housing for a nut (2), which is screwed onto said bolt.

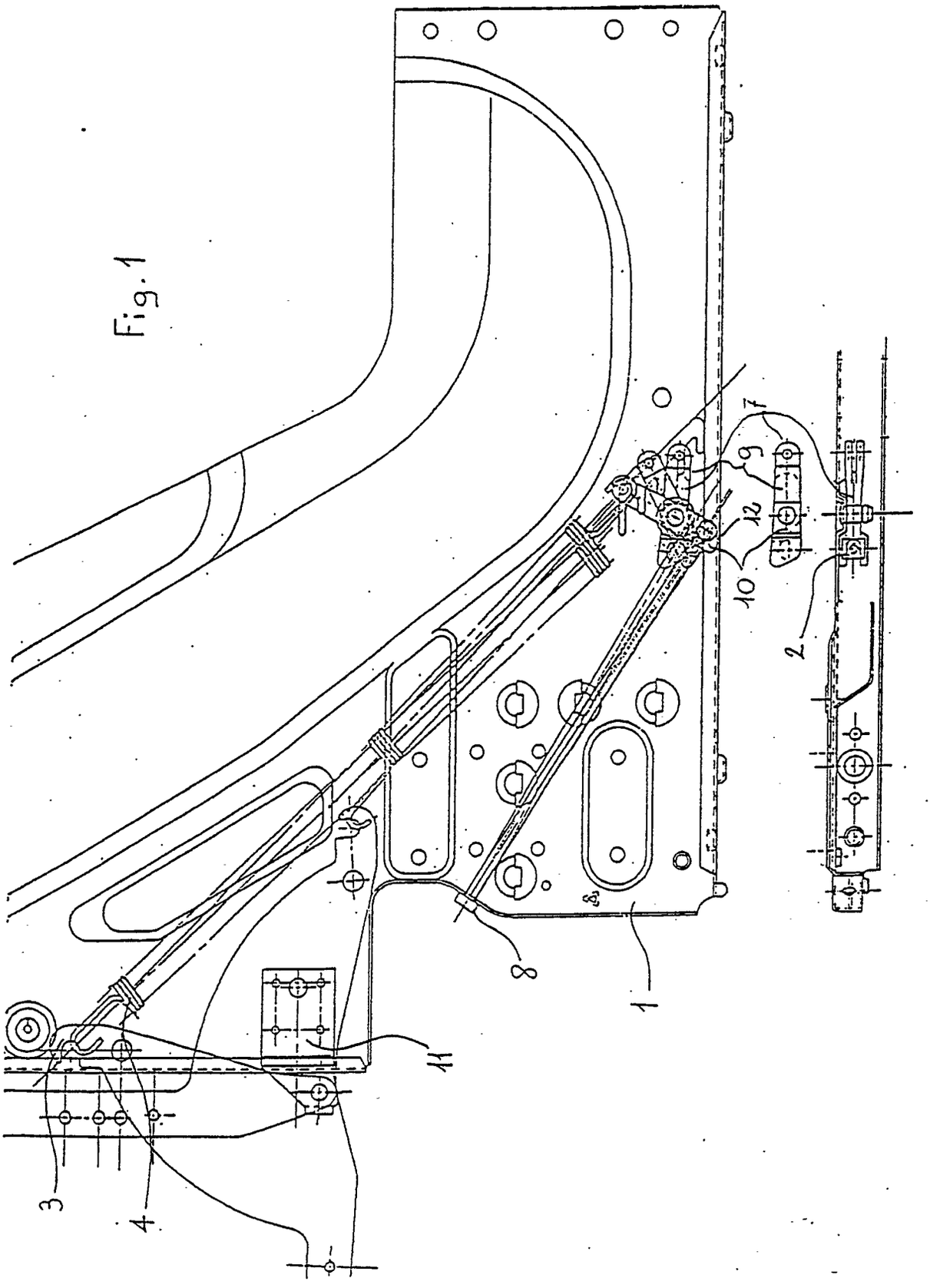
6. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claims 2 and 3, characterized in that said small lever (7) is connected at one end (10) to the adjusting bolt (8) through a rod with a threaded hole, wherein said bolt is screwed.

7. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claim 2, characterized in that said small lever (7) is connected at one end (10) to said adjusting means (8) and at the other end to a spring (4).

8. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claims 2 and 3, characterized in that there are provided stopping means (12) for said small lever (7) which, when a complete unscrewing of the bolt (8) occurs, avoid the detachment of the spring (4).

9. System for balancing the door of a household appliance, particularly of a dishwashing machine, according to claims 2 and 3, characterized in that said bolt (8) passes trough a hole on the front wall of the appliance (1) so that it may oscillate, in order to allow for changes of the small lever (7) position.

Fig. 1



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 10 4341

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-U-8709496 (MIELE & CIE) * claims 1, 6; figure 2 *	1, 3	A47L15/42 F24C15/02
X	DE-A-3140039 (BOSCH-SIEMENS) * claim 3; figure *	1, 3	
P,X	DE-U-8905682 (ZANUSSI) * the whole document *	1-8	
A	FR-A-2462140 (ZANUSSI) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A47L
F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05 JUNE 1990	SCHARTZ J.

1

EPO FORM 1503 03.82 (P0401)

. CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document