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(54) **OPEN LID/CLOSED LID STRUCTURE OF WASHING MACHINE AND WASHING MACHINE**

(57) An opening and closing lid structure of a washing machine and a washing machine, which the lid structure includes a cover (3), a seat (4) and a control device, a turning shaft (12) of the cover being mounted to the seat, the control device includes a slide groove (1) and an elastic support (2). The slide groove (1) is arranged on the turning shaft (12) of the cover (3) along a rotating direction. The elastic support (2) has a lower end mounted to the seat (4), and an upper end slidably supported in the slide groove (1). The slide groove (1) is provided with a restraint slot (5) therein, into which the elastic support (2) slides to prevent the cover (3) from automatic closure after being opened. When being completely closed, the cover (3) is in a stable clamped state and can be opened with a slight force, which preventing the washing machine from generating a noise owing to a collision between the cover (3) and seat (4) during a spinning phase of the washing machine. When being completely opened, the cover (3) is in a stable clamped state and not liable to be closed. The cover (3) cannot easily closed, making it more convenient for a user to load or unload clothing, and preventing the cover (3) from colliding with and im-

pacting on the seat (4) after automatically closed.

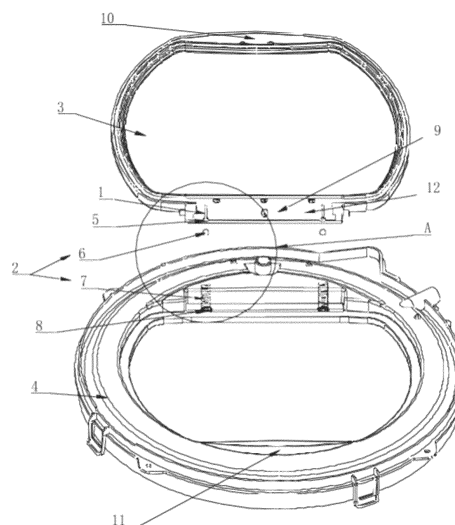


Fig. 2

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of washing machines, and in particular relates to an opening and closing lid structure of a washing machine and a washing machine.

BACKGROUND

[0002] For most washing machines with lids in the market at present, they adopt means of controlling the angle between the lid after being opened and a horizontal direction which is larger than 90 degrees. A gravity center position of the opened lid is adjusted to make the lid come into a vertical state after being opened. In this way, after being opened, the cover is very likely to be automatically closed, causing inconvenience for taking out clothes.

[0003] Chinese patent with application No. CN200910118744.2 provides a washing machine lid structure, which does not generate a striking noise during opening and closing and allows smooth opening and closing operation on the washing machine lid. The structure includes: a lid capable of being opened and closed freely which is arranged above a top cap located at an upper part of a washing machine body; a toggle spring which allows switching of an applied force between an opening or closing direction of the lid; and a rotary buffer damper capable of attenuating rotation of the lid. The buffer damper is arranged in a damper holder in a freely rotating and sliding manner, with a free rotation range at a specified angle provided in a rotating direction between the damper holder and the buffer damper. At an initial stage of an opening operation and a closing operating of the lid, the attenuation force of the buffer damper has no effect on the rotation of the lid due to the presence of the free rotation range. So at the initial stage of the opening operation and the closing operating of the lid, a user only needs to perform a force capable of resisting the load of the toggle spring to perform the opening and closing operation on the lid, which is very convenient for the opening and closing operation. However, it cannot solve the problem that the lid is very likely to be automatically closed after being opened.

[0004] In view of this, the present disclosure is proposed.

SUMMARY

[0005] An object of the present disclosure is to overcome the shortcomings of the prior art, and provide an opening and closing lid structure of a washing machine and a washing machine.

[0006] To achieve the above object, the present disclosure adopts the following technical solution: an opening and closing lid structure of a washing machine including a cover, a seat and a control device, a turning shaft

of the cover being mounted to the seat. Wherein the control device includes a slide groove and an elastic support; the slide groove is arranged on the turning shaft of the cover along a rotating direction; a lower end of the elastic support is mounted to the seat, and an upper end of the elastic support is slidably supported in the slide groove; and the slide groove is provided with a restraint slot therein, into which the elastic support slides to prevent the cover from automatic closure after being opened.

[0007] The elastic support comprises a rigid ball and a spring, the rigid ball is supported on the spring, and is supported in the slide groove, and the spring is supported on the seat.

[0008] The spring is in a pre-compressed state.

[0009] A mounting hole for the elastic support is formed at a position on the seat facing the turning shaft, one end of the elastic support is arranged in the mounting hole, and the other end of the elastic support faces the turning shaft and is supported in the slide groove.

[0010] From complete closure of the cover to turning to the largest angle of the cover, the slide groove at least covers a movement region of the elastic support on the turning shaft, and the slide groove is a smooth guide rail recessed toward to the interior of the turning shaft.

[0011] A first restraint slot is formed at a position on the slide groove right facing the elastic support when the cover is turned to the largest angle.

[0012] A second restraint slot is formed at a position on the slide groove right facing the elastic support when the cover is completely closed.

[0013] The restraint slot is a recess that is recessed toward to the interior of the turning shaft and is matched with the rigid ball, and the recess and the slide groove have a smooth transition there between.

[0014] The turning shaft is further provided with a damper buffer structure therein; and a magnet/iron sheet is arranged at the foremost end of the cover, and an iron sheet/magnet is arranged at a corresponding position of the seat.

[0015] The present disclosure provides a washing machine with the opening and closing lid structure described above.

[0016] By adopting the technical solutions of the present disclosure, the following beneficial effects are achieved:

When being completely closed, the cover is in a stable clamped state and can be opened with a slight force, which can avoid generating a noise by collision between the cover and the seat caused by shaking of the washing machine during dewatering. When being completely opened, the cover is in a stable clamped state and not liable to be closed, which facilitates taking out clothes, and can avoid impacting and striking the seat in automatic closure of the cover.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Fig. 1 is a connection diagram of a lid structure of the present disclosure.

Fig. 2 is an exploded view of a lid structure of the present disclosure.

Fig. 3 is an enlarged view at A of Fig. 2.

[0018] Reference signs: 1 - slide groove, 2 - elastic support, 3 - cover, 4 - seat, 5 - restraint slot, 6 - rigid ball, 7 - spring, 8 - mounting hole, 9 - damper buffer structure, 10 - magnet, 11 - iron sheet, 12 - turning shaft.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0019] Specific embodiments of the present disclosure are further described in detail below in conjunction with the accompanying drawings.

[0020] For most washing machines at present, after a lid is opened, the angle between cover and a horizontal direction is controlled to be equal to or slightly larger than 90 degrees, and a gravity center position is controlled so that the lid is in a vertical state after being opened. In this way, the lid is very likely to be automatically closed, and the lid strikes a seat while being closed to generate a noise and cause inconvenience for taking out clothes. In order to solve the above problem, in the present disclosure, a hinge of a washing machine is provided with a structure for positioning after a lid is opened, so that the lid, when being completely opened, is in a stable clamped state and not likely to be freely closed.

[0021] The present disclosure provides an opening and closing lid structure of a washing machine, the opening and closing lid structure includes a cover, a seat and a control device. A turning shaft 12 of the cover 3 is mounted to the seat 4, wherein the control device includes a slide groove 1 and an elastic support 2; the slide groove 1 is arranged on the turning shaft 12 of the cover along a rotating direction. A lower end of the elastic support 2 is mounted to the seat 4, and an upper end is slidably supported in the slide groove 1. The slide groove 1 is provided with a restraint slot 5 therein, into which the elastic support 2 slides to prevent the cover 3 from automatic closing after being opened. When the cover 3 is being opened, the elastic support 2 slides in the slide groove 1; and when the cover 3 is opened to the largest angle, the elastic support 2 is pushed into the restraint slot 5 and supported in the restraint slot 5 to prevent free closure of the cover 3.

[0022] The elastic support 2 includes a rigid ball 6 and a spring 7, one end of the rigid ball 6 is supported on the spring 7 and the other end of the rigid ball 6 is supported in the slide groove 1, and the spring 7 is supported on the seat 4. Supported by the spring 7, the rigid ball 6

abuts against the slide groove 1, and in this case, the spring 7 is in a compressed state; and when the cover is opened to the largest angle, the rigid ball 6, supported by the spring 7, abuts against the restraint slot 5, and in this case, the spring 7 is in a compressed state.

[0023] A mounting hole 8 for the elastic support 2 is formed at a position on the seat 4 facing the turning shaft 12. One end of the elastic support 2 is arranged in the mounting hole 8, and the other end of the elastic support faces the turning shaft 12 and is supported in the slide groove 1. Most the spring 7 and the rigid ball 6 are located in the mounting hole 8, and a part of the rigid ball 6 is exposed from the mounting hole 8 and the slide groove 1, or the restraint slot 5.

[0024] From complete closure of the cover 3 to turning to the largest angle of the cover 3, the slide groove 1 is at least covers a movement region of the elastic support 2 on the turning shaft 12. And the slide groove 1 is a smooth guide rail recessed toward to the interior of the turning shaft 12. The slide groove 1 can be so formed as to encircle the turnover shaft 12 along the rotating direction, but from complete closure of the cover 3 to turning to the largest angle of the cover 3, only the part of slide groove 1 covers the movement region of the elastic support 2 on the turning shaft 12 functions. So from the complete closure of the cover 3 to turning to the largest angle of the cover 3, the slide groove 1 at least covers a movement region of the elastic support 2 on the turning shaft 12. And the slide groove 1 is a smooth guide rail recessed toward the interior of the turning shaft, to ensure sliding of the rigid ball 6 in the slide groove 1.

[0025] A first restraint slot is formed at a position on the slide groove 1 right facing the elastic support 2 when the cover 3 is turned to the largest angle. When the cover is turned to the largest angle, the rigid ball of the elastic support 2 is right popped into the first restraint slot to limit the cover in this position. So that the cover, when being completely opened, is in a stable clamped state and cannot be freely closed. Thus, it facilitates users taking out clothes, and impact and striking between the cover and the seat in automatic closure are avoided.

[0026] A second restraint slot is formed at a position on the slide groove 1 just facing the elastic support 2 when the cover is completely closed. When the cover is completely closed, the rigid ball 6 of the elastic support 2 is just pushed into the second restraint slot to limit the cover in this position, so that the cover, when being completely closed, is in a stable clamped state and can be opened with a slight force, which can avoid generating a noise by collision between the cover and the seat caused by shaking of the washing machine during dewatering.

[0027] The restraint slot 5 is a recess that is recessed toward to the interior of the turning shaft 12 and matched with the rigid ball, and the recess and the slide groove have a smooth transition there between. This ensures a smooth and stable transition of the rigid ball between the restraint slot and the slide groove, to avoid very large vibration.

[0028] The turning shaft 12 is further provided with a damper buffer structure 9 therein, to ensure the cover to produce a buffering effect during closure thereof so as not to generate a noise. And a magnet/iron sheet is arranged at the foremost end of the cover, such that under the effect of a magnetic force of the magnet, the cover can be well fixed to the seat and can be opened with a slight force, which can avoid to generate a noise by collision between the cover and the seat caused by shaking of the washing machine during dewatering.

[0029] The operating principle of the positioning structure for the cover in the present disclosure is as follows: the spring 7 is mounted into the mounting hole 8 of the seat 4, and the rigid ball 6 is mounted to the slide groove 1 which is below the cover 3 and together with the cover as a whole to mount on the seat 4. It is ensured that the rigid ball 6 is mounted to the spring 7. Such that when the cover is in a closed state, the spring 7 is in a compressed state, and the rigid ball 6 is located in the slide groove 1 or in the second restraint slot. And during opening of the cover, the rigid ball slides along the slide rail below the cover, and when the rigid ball just slides to the first restraint slot of the cover slide groove, the cover is completely opened. And the rigid ball is clamped into the first restraint slot, so that the cover comes into a stable, completely vertical state.

[0030] In the present disclosure, the damper buffer structure 9 is mounted into the turning shaft 12 of the cover, which can ensure the cover 3 is under a buffering effect during closure thereof so as not to generate a noise. The magnet 10 is mounted to the cover, and the iron sheet 11 is mounted to the seat 4, such that under the effect of a magnetic force of the magnet, the cover 3 can be well fixed to the seat 4.

[0031] An outstanding feature of this structure is using the spring, the rigid ball and the rigid ball slide groove structure to solve the problem that after being opened, the cover of the washing machine is very likely to be automatically closed to cause inconvenience for taking out clothes.

[0032] The present disclosure provides a washing machine with the opening and closing lid structure described above. When the cover is completely closed, the cover is in a stable clamped state and can be opened with a slight force, which can avoid generating a noise by collision between the cover and the seat caused by shaking of the washing machine during dewatering. When the cover is completely opened, the cover is in a stable clamped state and not liable to be closed, which facilitates taking out clothes, and can avoid impacting and striking the seat in automatic closure of the cover.

[0033] Described above are only preferred embodiments of the present disclosure, and it should be noted that to those of ordinary skill in the art, various modifications and improvements may also be made without departing from principles of the present disclosure, and these modifications and improvements should also be encompassed within the protection scope of the present

disclosure.

Claims

1. An opening and closing lid structure of a washing machine, comprising a cover, a seat and a control device, a turning shaft of the cover being mounted to the seat, wherein the control device includes a slide groove and an elastic support; the slide groove is arranged on the turning shaft of the cover along a rotating direction of the turning shaft; a lower end of the elastic support is mounted to the seat, and an upper end is slidably supported in the slide groove; and the slide groove is provided with a restraint slot therein, and the elastic support slides into the restraint slot to prevent the cover from automatic closure after being opened.
2. The opening and closing lid structure of a washing machine according to claim 1, wherein the elastic support comprises a rigid ball and a spring, the rigid ball is supported on the spring and is supported in the slide groove, and the spring is supported on the seat.
3. The opening and closing lid structure of a washing machine according to claim 2, wherein the spring is in a pre-compressed state.
4. The opening and closing lid structure of a washing machine according to any one of claims 1-3, wherein a mounting hole for the elastic support is formed at a position on the seat facing the turning shaft, one end of the elastic support is arranged in the mounting hole, and another end of the elastic support faces the turning shaft and is supported in the slide groove.
5. The opening and closing lid structure of a washing machine according to any one of claims 1-4, wherein from a complete closure of the cover to turning to the largest angle of the cover, the slide groove at least covers a movement region of the elastic support on the turning shaft, and the slide groove is a smooth guide rail recessed toward to an interior of the turning shaft.
6. The opening and closing lid structure of a washing machine according to any one of claims 1-5, wherein a first restraint slot is formed at a position on the slide groove right facing the elastic support when the cover is turned to a largest angle.
7. The opening and closing lid structure of a washing

machine according to any one of claims 1-6, wherein a second restraint slot is formed at a position on the slide groove right facing the elastic support when the cover is completely closed.

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8. The opening and closing lid structure of a washing machine according to claim 6 or 7, wherein the restraint slot is a recess that is recessed toward to the interior of the turning shaft and is matched with the rigid ball, and the recess and the slide groove have a smooth transition there between. 10
9. The opening and closing lid structure of a washing machine according to any one of claims 1-8, wherein a magnet or an iron sheet is arranged at a foremost end of the cover, and an iron sheet or a magnet is arranged at a corresponding position of the seat. 15
10. A washing machine with the opening and closing lid structure according to any one of claims 1-9. 20

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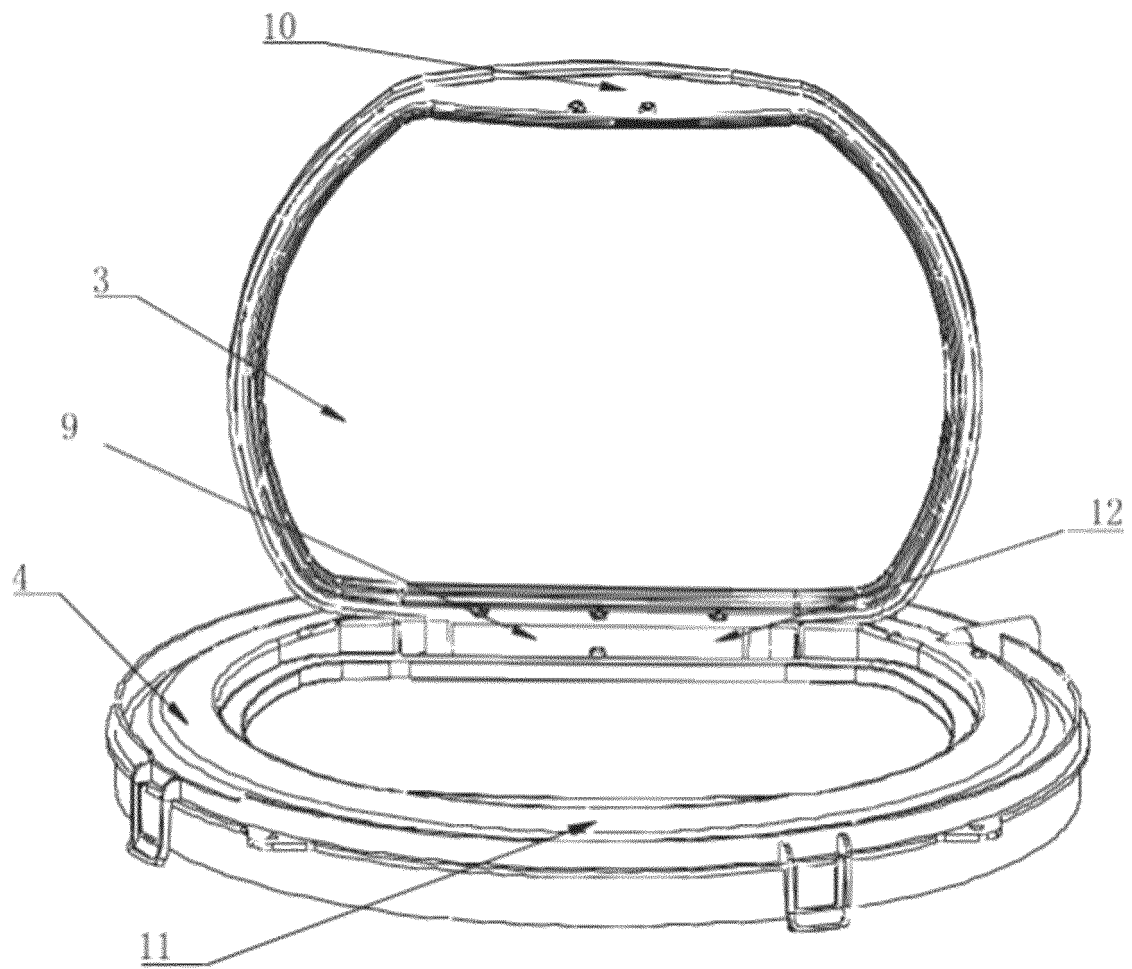


Fig. 1

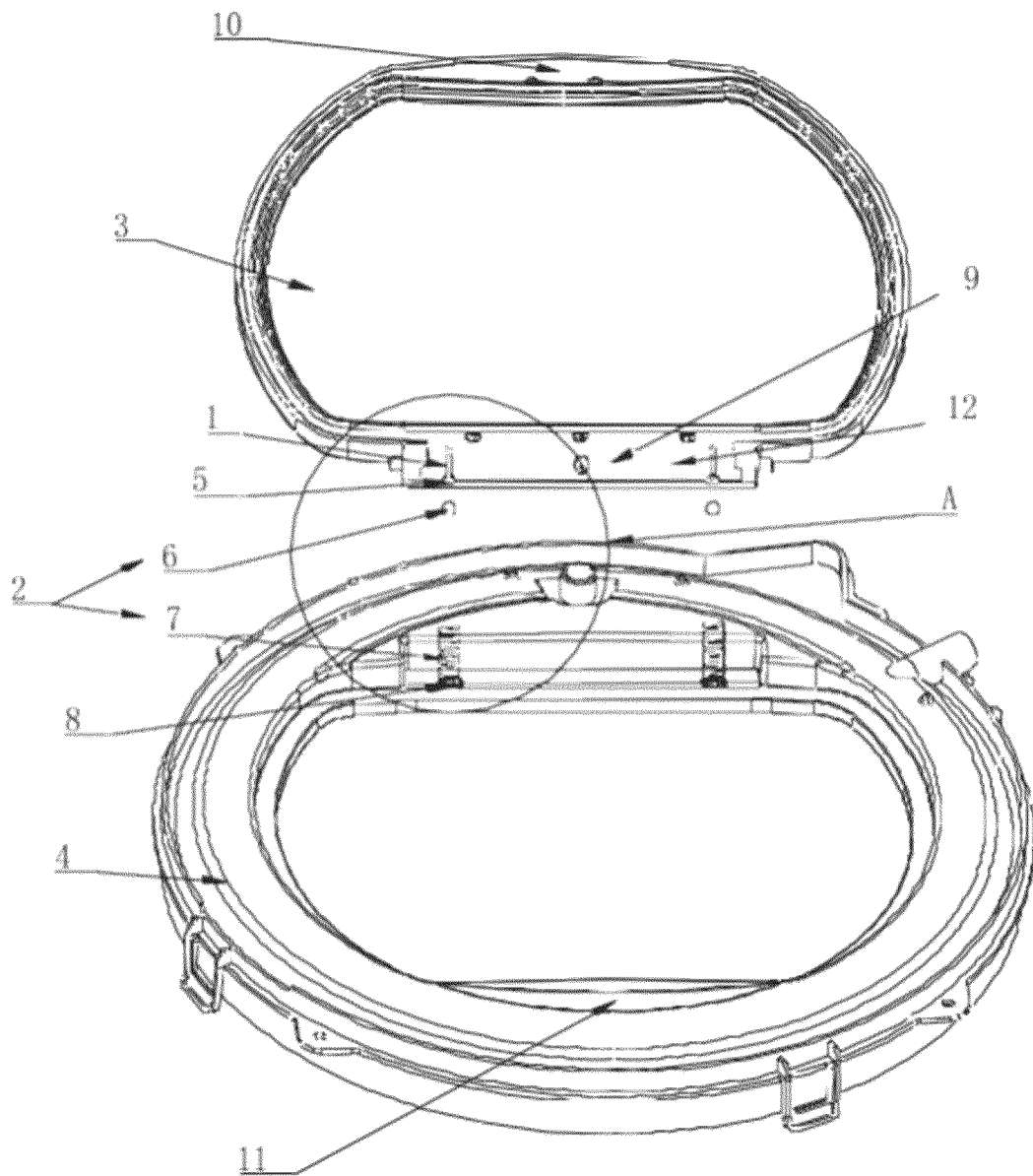


Fig. 2

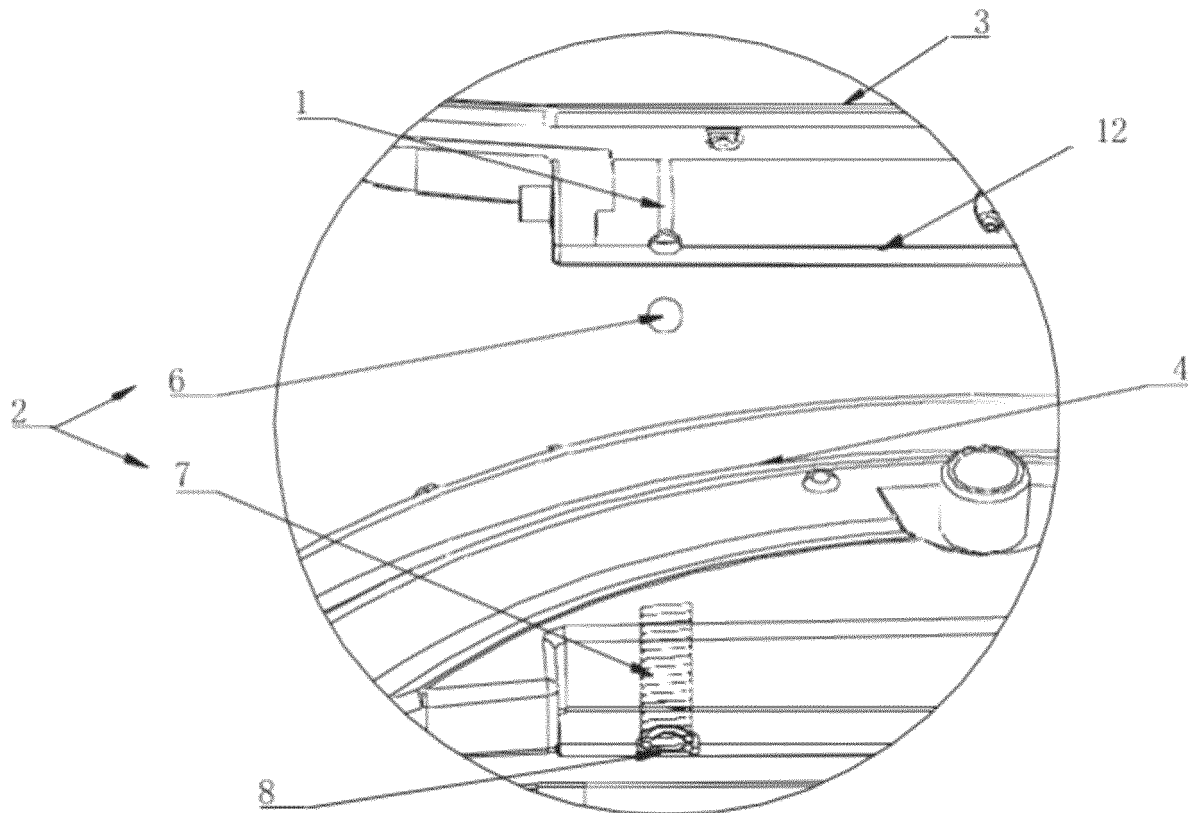


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/079408

A. CLASSIFICATION OF SUBJECT MATTER

D06F 39/14 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, CNKI, CNTXT, DWPI, SIPOABS, washing machine, cover, spring, elasticity, slide, groove, slot, limit

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 202576941 U (HISENSE RONSHEN GUANGDONG REFRIGERATORS CO., LTD.) 05 December 2012 (05.12.2012) description, paragraphs [0032]-[0040], and figures 3-6	1-10
A	CN 101525832 A (MATSUSHITA ELECTRIC IND CO., LTD.) 09 September 2009 (09.09.2009) the whole document	1-10
A	CN 202671904 U (HISENSE RONSHEN GUANGDONG REFRIGERATORS CO., LTD.) 16 January 2013 (16.01.2013) the whole document	1-10
A	JP 2000167290 A (TOSHIBA CORP.) 20 June 2000 (20.06.2000) the whole document	1-10
A	EP 2107152 B1 (ELECTROLUX HOME PROD CORP NV) 11 June 2014 (11.06.2014) the whole document	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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“&” document member of the same patent family

Date of the actual completion of the international search
12 June 2016

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INTERNATIONAL SEARCH REPORT
 Information on patent family members

 International application No.
 PCT/CN2016/079408

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 202576941 U	05 December 2012	None	
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		EP 2107152 A1	07 October 2009
		EP 2481845 A1	01 August 2012

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 200910118744 [0003]