



- (51) **International Patent Classification:**
D06F 39/02 (2006.01)
- (21) **International Application Number:**
PCT/IB2013/051854
- (22) **International Filing Date:**
8 March 2013 (08.03.2013)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
201210068695.8 12 March 2012 (12.03.2012) CN
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- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) **Title:** DETERGENT BOX OF WASHING MACHINE

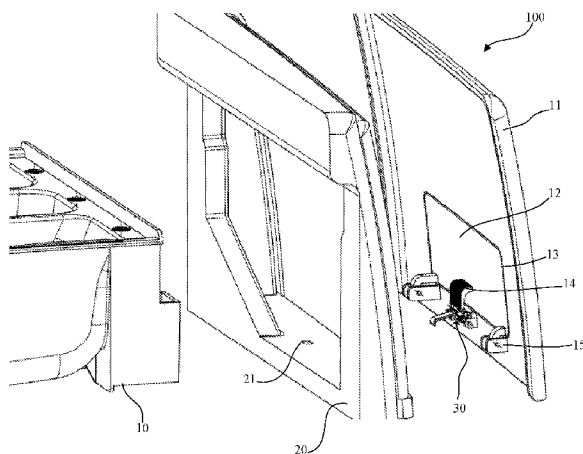


FIG. 1

(57) **Abstract:** The present invention provides a detergent box 100 of a washing machine, which includes a box body 10 for receiving detergent, a front plate 11 formed at a front end of the box body 10, an opening 13 disposed on the front plate 11 and for insertion of a hand therein, and a movable cover plate 12 for opening and closing the opening 13. A fastening device 30 linked to the movable cover plate 12 is disposed on an inner side wall of the front plate 11 or of the movable cover plate 12, and the fastening device 30 is capable of being fastened to a housing 20 of the washing machine when the detergent box 100 is inserted into the washing machine; and the movable cover plate 12 is used to release the fastening device 30 when driving the fastening device 30. Therefore, the problem of wearing during use when a detergent box in the prior art is inserted into or pulled out of a washing machine and the problem of automatic escape from the washing machine are solved.



DETERGENT BOX OF WASHING MACHINE

The present invention relates to a detergent box of a washing machine.

5 A washing machine is a device using water and detergent to remove dirt sticking to laundry in a drum such as clothes and a quilt through a series of washing procedures such as washing, rinsing, dehydration, and possibly drying. The washing machine normally includes: a housing that forms the outward appearance and has one side provided with a laundry input opening; a washing machine door, mounted on the housing and used
10 to open and close the laundry input opening; a washing barrel, disposed in the housing and for being filled with washing liquid; a drum, rotatably mounted in the washing barrel and used to receive the laundry; a motor, used to rotate the drum. Further, a detergent box having two or three separate chambers is usually further disposed on the washing machine.

15 In the prior art, a protrusion may be disposed on a side of a detergent box, and a groove may be formed on a side of a plate of a washing machine in a position corresponding to the protrusion. When the detergent box is inserted into the washing machine, the protrusion is just fastened into the groove to form an escape-preventing structure, so
20 that the inserted detergent box does not escape to the outside when the washing machine tilts or when the drum shakes. However, the escape-preventing structure has the following problems. After repeated operation of inserting and pulling out the detergent box, the protrusion portion disposed on the side of the detergent box is worn, so that the inserted detergent box cannot be held tight and is likely to fall off automatically. Further, different
25 products require different pulling forces to pull the detergent box out, some pulling forces are large, and some pulling forces are small, thereby resulting in poor hand feeling.

In the prior art, a detergent box of a washing machine is usually disposed in a washing machine body by inserting or drawing. The detergent box usually has a front plate and
30 a box body. A receiving slot for receiving detergent is disposed in the box body. The front plate is usually provided with an opening for insertion of a hand. After being inserted into the opening, the hand may grip the front plate to draw the detergent box. The opening is likely to accumulate water during washing and to accumulate dust during non-washing

time. Long time of accumulation is likely to result in breeding of bacteria, which is not conducive to health of a user. Further, the opening disposed on the smooth front plate affects the outward appearance of the washing machine. A protrusion is disposed on a side of the detergent box, and a groove is formed on a side of a plate of the washing machine in a position corresponding to the protrusion. When the detergent box is inserted into the washing machine, the protrusion is just fastened into the groove to form an escape-preventing structure, so that the inserted detergent box does not escape to the outside when the washing machine tilts or when the drum shakes. But the design has the following problems. After repeated operation of inserting and pulling out the detergent box, the protrusion portion disposed on the side of the detergent box is seriously worn, so that the inserted detergent box cannot be held tight and is likely to fall off automatically. Further, different products require different pulling forces to pull the detergent box out, some pulling forces are large, and some pulling forces are small, thereby resulting in poor hand feeling.

Therefore, in response to the problems, it is necessary to further optimize the design of the structure of the detergent box.

In view of the problems, an objective of the present invention is to solve the technical defects in the prior art and provide a detergent box having a fastening device, so that the detergent box in use does not wear and it is ensured that the detergent box is fastened once inserted and does not escape outwards automatically.

In view of the objective, the present invention adopts technical solution as defined by the independent claim attached to solve the technical problem. Preferred embodiments and developments of the invention are defined by the dependent claims attached.

Accordingly, a detergent box of a washing machine includes a box body for receiving detergent, a front plate formed at a front end of the box body, an opening disposed on the front plate and for insertion of a hand therein, and a movable cover plate for opening and closing the opening. A fastening device linked to the movable cover plate is disposed on

an inner side wall of the front plate or of the movable cover plate, and the fastening device is capable of being fastened to a housing of the washing machine when the detergent box is inserted into the washing machine; and the movable cover plate is used to release the fastening device when driving the fastening device.

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The detergent box provided with the fastening device does not need to be provided with the escape-preventing structure in the prior art anymore, so that the problem of wearing does not occur during use when the detergent box is inserted into or pulled out of the washing machine. Further, when the detergent box is inserted into the washing machine, the fastening device fastens the detergent box to the washing machine, so as to solve the problem of automatic escape of the detergent box. To pull the detergent box out, the movable cover plate is used to release the fastening device, and a light force can draw the detergent box out, so as to solve the problem of difficulty in controlling the force and poor hand feeling incurred by forced pulling-out of the detergent box in the prior art.

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As a preferred embodiment of the present invention, the movable cover plate is a flip cover plate or a vertically slidable cover plate.

As another preferred embodiment of the present invention, the fastening device disposed on the inner side wall of the front plate includes a movable fastener for being fastened to the housing of the washing machine and a reset spring connected to the movable fastener and used to reset the movable fastener to an initial position.

With the configuration, when the detergent box is inserted into the washing machine, the fastening device is automatically fastened to the washing machine through the movable fastener and the reset spring.

As a further preferred embodiment of the present invention, the flip cover plate is hinged to the front plate and is capable of free rotation, and a transmission member for driving the fastening device disposed on the inner side wall of the front plate in a linked manner is disposed on the inner side wall of the flip cover plate.

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As yet another preferred embodiment of the present invention, the fastening device further includes a fastening pin, the reset spring and the movable fastener are sleeved on the fastening pin, and the movable fastener rotates about the fastening pin.

5 As yet a further preferred embodiment of the present invention, one end portion of the movable fastener is hook-shaped, a groove is disposed on the housing of the washing machine, and when the detergent box is inserted into the washing machine, the hook-shaped end portion of the movable fastener is hooked in the groove to achieve fastening.

10 As still another preferred embodiment of the present invention, the hook-shaped end portion of the movable fastener has a slope on a surface thereof in contact with the housing of the washing machine. With the configuration, during insertion of the detergent box, the movable fastener does not interfere with the housing of the washing machine.

15 As still a further preferred embodiment of the present invention, the vertically slidable cover plate is disposed on an inner side of the opening of the front plate, a vertical slide way is disposed on a left side and a right side of the opening, the vertically slidable cover plate is slidably disposed in the slide way, a pushing member is disposed on an outer side of the vertically slidable cover plate, and the fastening device is disposed on the inner side
20 wall of the vertically slidable cover plate.

As again another preferred embodiment of the present invention, the fastening device includes a fastener, a groove is disposed on the housing of the washing machine, and after the detergent box is inserted into the washing machine, the vertically slidable cover
25 plate slides downwards to close the opening, and the fastener is fastened into the groove to achieve fastening.

Particularly preferred embodiments of the invention are now explained in further detail with reference to the attached drawing. In the drawing,
30

FIG. 1 is a structural view of a detergent box and a housing of a washing machine according to a first embodiment;

FIG. 2 is an exploded view of FIG. 1;

FIG. 3 is a partially enlarged view of FIG. 2;

FIG. 4 is a fastened state view that a detergent box is inserted into a washing
5 machine according to a first embodiment;

FIG. 5 is a structural exploded view of a detergent box and a housing of a washing
machine according to a second embodiment; and

FIG. 6 is a fastened state view that a detergent box is inserted into a washing
10 machine according to the second embodiment.

In view of the problems in the prior art, the detergent box as disclosed herein and
generally shown in each of the Figures is greatly improved structurally, and thereby is
15 provided a detergent box 100 having a fastening device and having a front plate provided
with an opening capable of being opened and closed. This detergent box 100 includes a
box body 10 for receiving detergent, a front plate 11 formed at a front end of the box body
10, an opening 13 disposed on the front plate 11 and for insertion of a hand therein, and a
movable cover plate 12 for opening and closing the opening 13. A fastening device 30
20 linked to the movable cover plate 12 is disposed on an inner side wall of the front plate 11
or of the movable cover plate 12, and the fastening device 30 is capable of being fastened
to a housing 20 of the washing machine when the detergent box 100 is inserted into the
washing machine; and the movable cover plate 12 is used to release the fastening device
30 when driving the fastening device 30.

Embodiment 1:

FIG. 1 is a structural view of the detergent box 100 and the housing 20 of the washing
machine. FIG. 2 is a structural exploded view of FIG. 1. As shown in FIG. 1 and FIG. 2,
30 the detergent box 100 includes the box body 10 for receiving detergent. The front plate 11
is formed at the front end of the box body 10. The opening 13 for insertion of a hand
therein is disposed on the front plate 11. The flip cover plate 12 for opening and closing
the opening 13 is hinged to the inner side wall of the front plate 11 through a hinge 15. A
rotary pin 16 is disposed in the hinge 15. The flip cover plate 12 achieves flipping through

the hinge 15 and the rotary pin 16, so as to achieve the effect of opening and closing the opening 13 of the front plate. The fastening device 30 is disposed on the inner side wall of the front plate 11. When the detergent box is inserted into the washing machine, the fastening device 30 can be fastened to the housing 20 of the washing machine to achieve the effect of fastening the detergent box 100. A transmission member 14 is disposed on the inner side wall of the flip cover plate 12. The flip cover plate 12 is linked to the fastening device 30 through the transmission member 14, so as to achieve the effect of releasing the fastening device 30.

FIG. 3 is a partially enlarged view of FIG. 2. As shown in FIG. 3, the fastening device 30 disposed on the inner side wall of the front plate 11 includes a movable fastener 31 for being fastened to the housing 20 of the washing machine, a reset spring 32 connected to the movable fastener 31 and used to reset the movable fastener to an initial position, and a fastening pin 33. The reset spring 32 and the movable fastener 31 are sleeved on the fastening pin 33, and the movable fastener 31 rotates about the fastening pin 33. One end portion of the movable fastener 31 is hook-shaped. A groove 21 is disposed on the housing 20, fitting the movable fastener 31, of the washing machine. When the detergent box 100 is inserted into the washing machine, the hook-shaped end portion of the movable fastener 31 is hooked in the groove 21 to achieve fastening. The hook-shaped end portion of the movable fastener 31 has a slope on a surface thereof in contact with the housing 20 of the washing machine. During insertion of the detergent box 100 into the washing machine, the hook-shaped end portion of the movable fastener 31 contacts the housing 20 of the washing machine. The front surface of the hook-shaped end portion has the slope, so that the movable fastener 31 is upturned when interacting with the housing 20 of the washing machine, and does not interfere with the housing 20 of the washing machine, so as to enable the detergent box 100 to be inserted into the washing machine smoothly.

As shown in FIG. 4, when the detergent box 100 is inserted into the washing machine, the movable fastener 31 is fastened into the groove 21 on the housing 20 of the washing machine, so as to achieve a fastening effect of the fastening device 30, so that the detergent box is unlikely to automatically escape outwards. In order to draw the detergent box 100 out, a hand pushes the flip cover plate 12 open and is inserted into the opening 13 of the front plate. At the moment, the flip cover plate 12 is flipped inwards, and meanwhile the transmission member 14 moves downwards and strikes the movable fas-

tener 31 to make the movable fastener 31 rotate about the fastening pin 33. The reset spring 32 under the action of the movable fastener 31 is in an elastically deformed state. The hook-shaped end portion of the movable fastener 31 rotates upwards to escape from the groove 21 on the housing 20 of the washing machine, so as to release the fastening device 30. Then, the hand grips the front plate 11 and pulls the front plate 11 outwards, so as to draw the detergent box 100 out easily, saving the need of forceful drawing. When the hand leaves the flip cover plate 12, the reset spring 32 correspondingly changes from the elastically deformed state back to an initial state, and acts on the movable fastener 31, so that one end, interacting with the transmission member 14, of the movable fastener 31 rotates upwards and strikes the transmission member 14, so as to push the flip cover plate 12 to be flipped outwards and close the opening of the front plate. When the detergent box 100 is inserted into the washing machine, direct push of the detergent box into the washing machine can achieve automatic fastening.

Embodiment 2:

FIG. 5 is a structural exploded view of a second embodiment of the novel detergent box 100. Different from the aforementioned embodiment, in this embodiment, the movable cover plate 12 is vertically slidable. The vertically slidable cover plate 12 is disposed on an inner side of the opening 13 of the front plate, a vertical slide way 17 is disposed on a left side and a right side of the opening 13, the vertically slidable cover plate 12 is slidably disposed in the slide way 17, a pushing member (not shown) is disposed on an outer side of the vertically slidable cover plate 12, and the fastening device 30 is disposed on the inner side wall of the vertically slidable cover plate 12.

FIG. 6 is a state view illustrating that the detergent box 100 is inserted into the washing machine and fastened. As shown in FIG. 6, the fastening device 30 may be a fixed fastener disposed on the inner side wall of the vertically slidable cover plate 12, and move vertically together with the vertically slidable cover plate 12. After the detergent box 100 is inserted into the washing machine, the vertically slidable cover plate 12 is made to slide downwards to close the opening 13, and the fixed fastener is fastened into the groove 21 fitting the fixed fastener to achieve fastening. In order to draw the detergent box 100 out, the vertically slidable cover plate 12 is made to slide upwards to open the opening 13, and

the fixed fastener moves upwards together with the vertically slidable cover plate 12 to escape from the groove 21, so as to achieve releasing. It is only required that the hand is inserted into the opening 13 and grips the front plate 11 to pull the front plate 11 out easily.

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Various specific embodiments described in the foregoing and shown in accompanying drawings are only used for illustrating the present invention, and may not be regarded as the entirety of the present invention. Within the scope of the basic technical thought of the present invention, any types of modifications to the present invention made by persons

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ordinarily skilled in the art fall within the protection scope of the present invention.

CLAIMS

1. A detergent box (100) of a washing machine, comprising a box body (10) for
5 receiving detergent, a front plate (11) formed at a front end of the box body (10), an
opening (13) disposed on the front plate (11) and for insertion of a hand therein, and a
movable cover plate (12) for opening and closing the opening (13), **characterized in that**
a fastening device (30) linked to the movable cover plate (12) is disposed on an inner side
wall of the front plate (11) or of the movable cover plate (12), and the fastening device
10 (30) is capable of being fastened to a housing (20) of the washing machine when the
detergent box (100) is inserted into the housing (20); and the movable cover plate (12) is
used to release the fastening device (30) when driving the fastening device (30).

2. The detergent box (100) according to claim 1, characterized in that the movable
15 cover plate (12) is a flip cover plate or a vertically slidable cover plate.

3. The detergent box (100) according to one of claims 1 and 2, characterized in that
the fastening device (30) disposed on the inner side wall of the front plate (11) comprises
a movable fastener (31) for being fastened to the housing (20) of the washing machine
20 and a reset spring (32) connected to the movable fastener (31) and used to reset the
movable fastener (31) to an initial position.

4. The detergent box (100) according to claim 2, characterized in that the movable
cover plate (12) is a flip cover plate (12), and is hinged to the front plate (11) and is capa-
25 ble of free rotation, and a transmission member (14) for driving the fastening device (30)
disposed on the inner side wall of the front plate (11) in a linked manner is disposed on
the inner side wall of the flip cover plate (12).

5. The detergent box (100) according to claim 3, characterized in that the fastening
30 device (30) further comprises a fastening pin (33), the reset spring (32) and the movable
fastener (31) are sleeved on the fastening pin (33), and the movable fastener (31) rotates
about the fastening pin (33).

6. The detergent box (100) according to claim 3, characterized in that one end portion of the movable fastener (31) is hook-shaped, a groove (21) is disposed on the housing (20), and when the detergent box is inserted into the housing (20), the hook-shaped end portion of the movable fastener (31) is hooked in the groove (21) to achieve fastening.

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7. The detergent box (100) according to claim 6, characterized in that the hook-shaped end portion of the movable fastener (31) has a slope on a surface thereof in contact with the housing (20).

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8. The detergent box (100) according to claim 3, characterized in that when the movable fastener (31) is reset to the initial position by the reset spring (32), the movable fastener (31) correspondingly acts on the movable cover plate (12) so that the movable cover plate (12) is flipped to close the opening (13).

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9. The detergent box (100) according to claim 2, characterized in that the vertically slidable cover plate (12) is disposed on an inner side of the opening (13) of the front plate, a vertical slide way (16) is disposed on a left side and a right side of the opening (13), the vertically slidable cover plate (12) is slidably disposed in the slide way (16), a pushing member is disposed on an outer side of the vertically slidable cover plate (12), and the fastening device (30) is disposed on the inner side wall of the vertically slidable cover plate (12).

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10. The detergent box (100) according to claim 9, characterized in that the fastening device (30) comprises a fastener, a groove (21) is disposed on the housing of the washing machine, and after the detergent box is inserted into the washing machine, the vertically slidable cover plate (12) slides downwards to close the opening (13), and the fastener is fastened into the groove (21) to achieve fastening.

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1/6

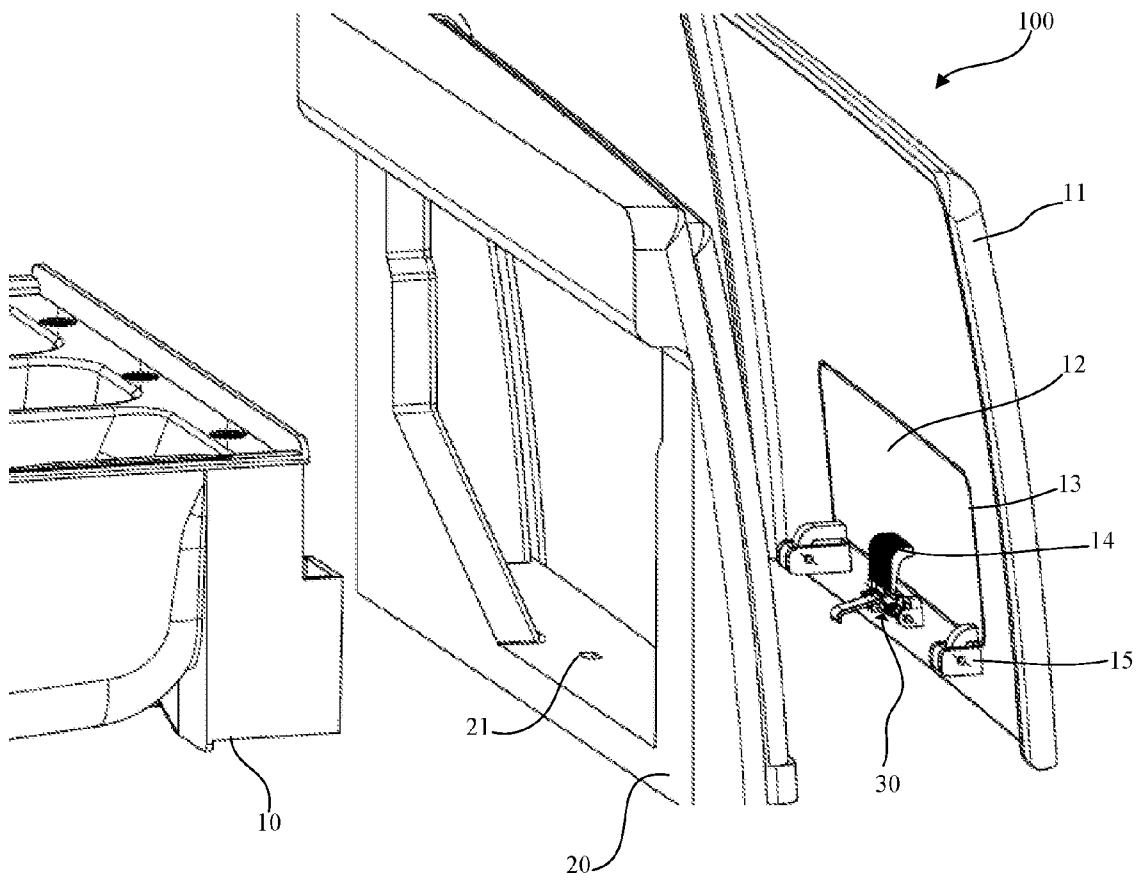


FIG. 1

2/6

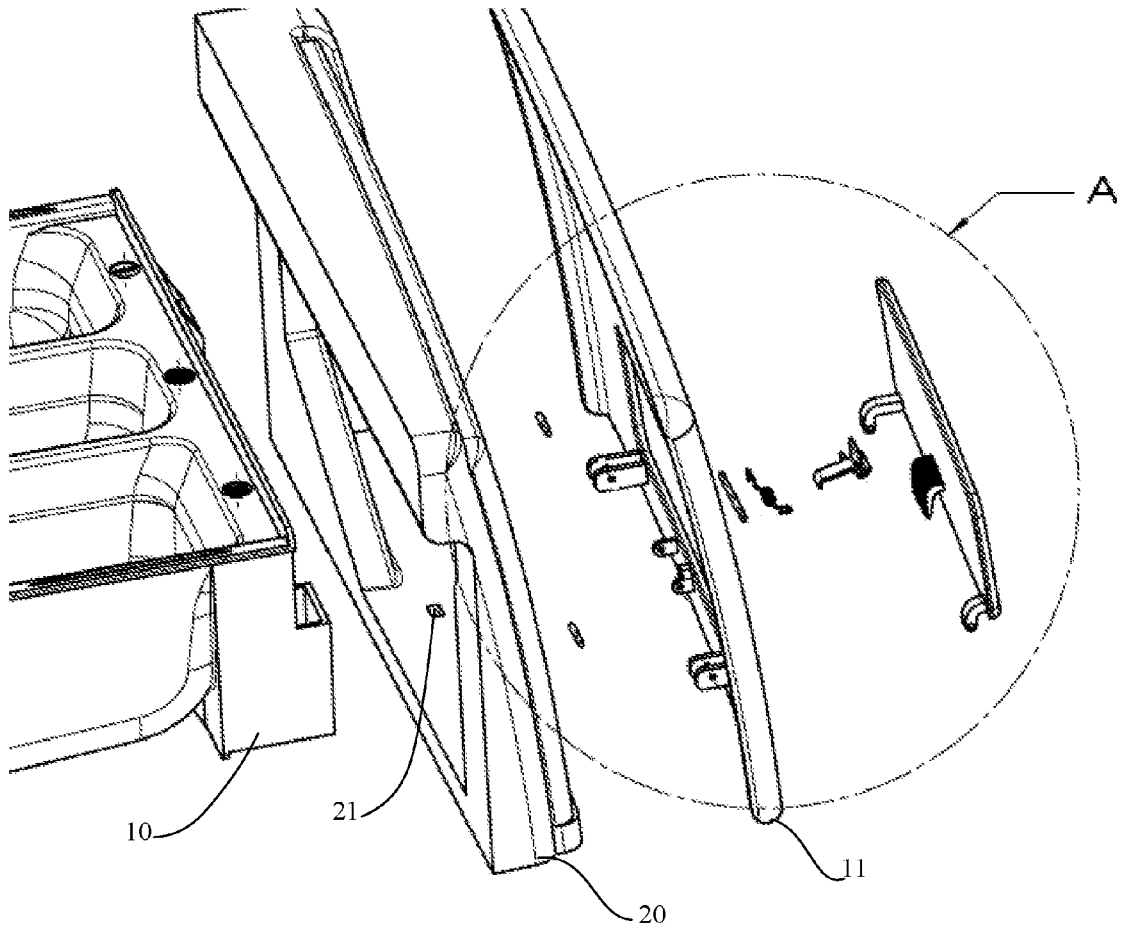


FIG. 2

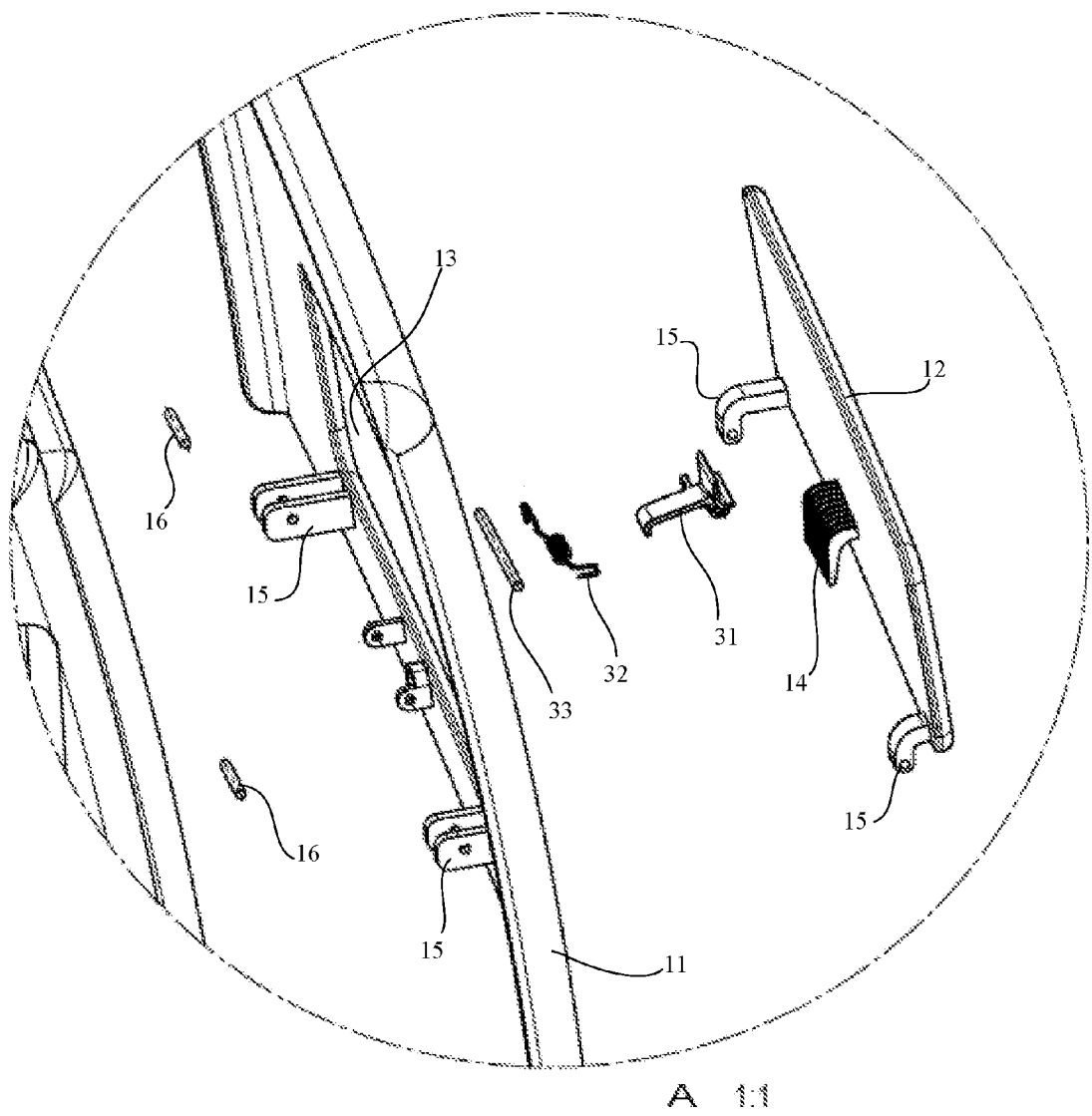


FIG. 3

4/6

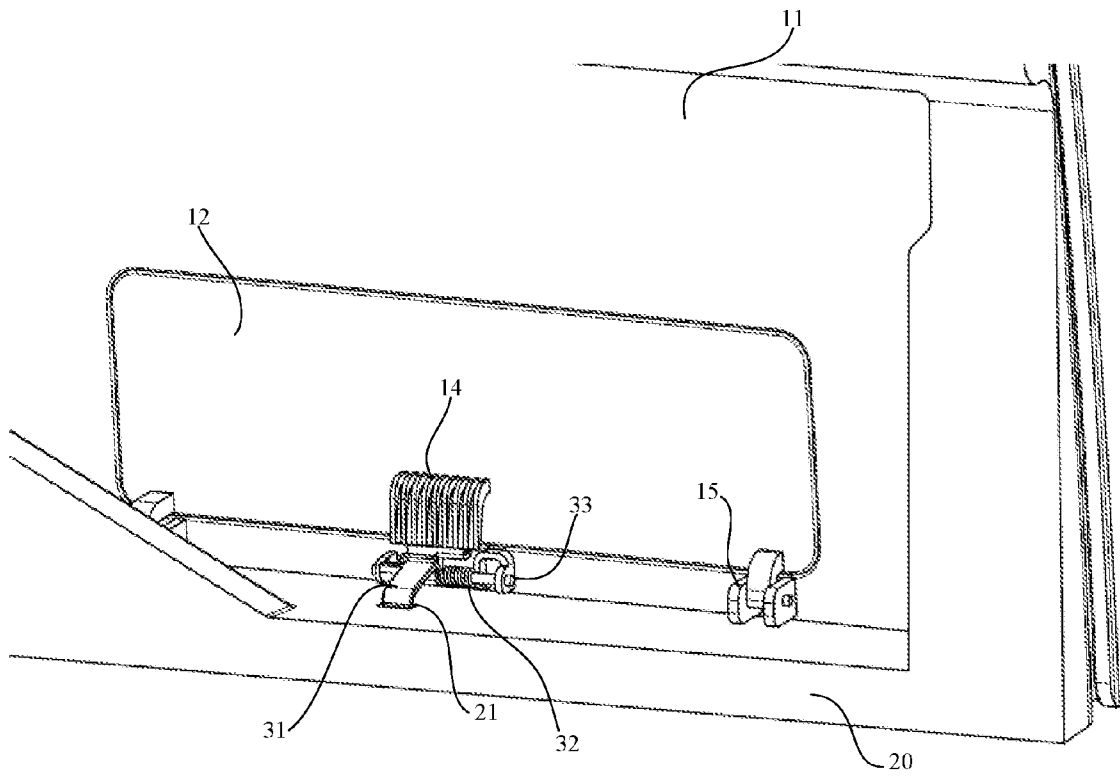


FIG. 4

5/6

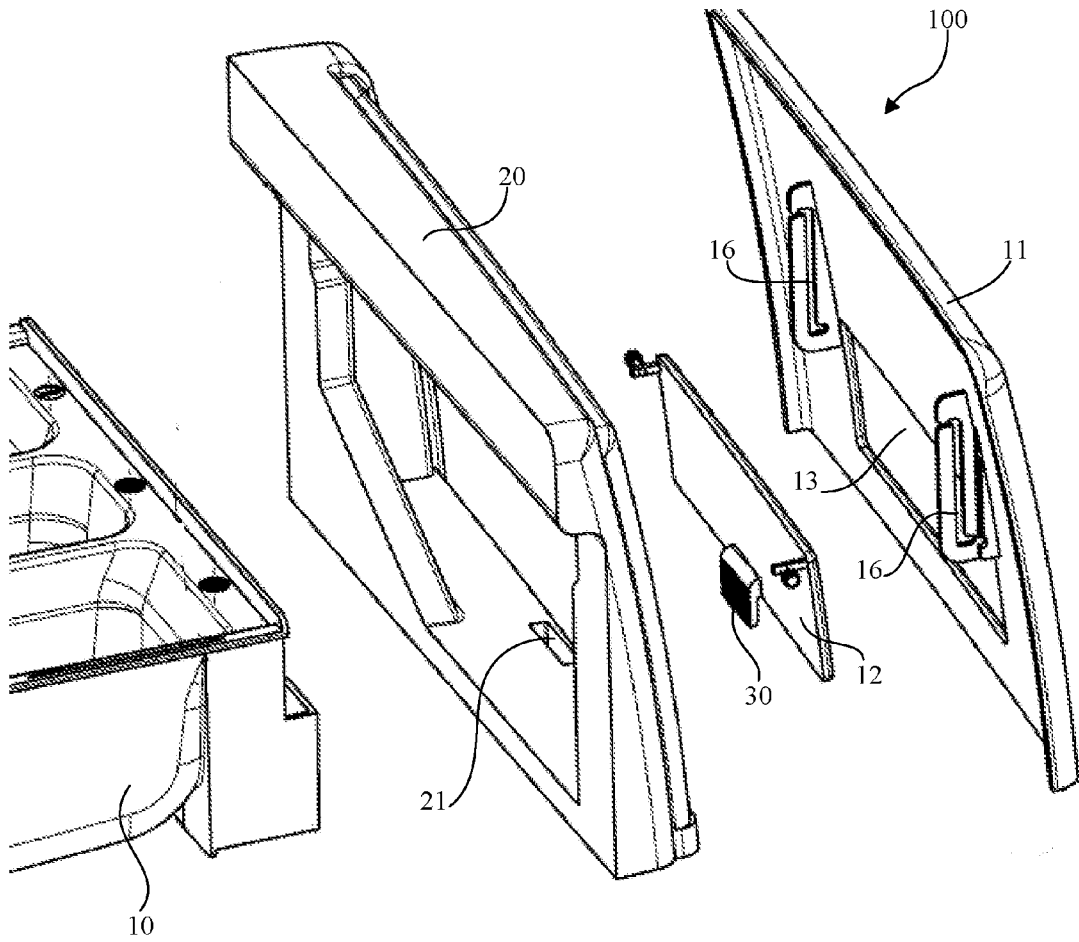


FIG. 5

6/6

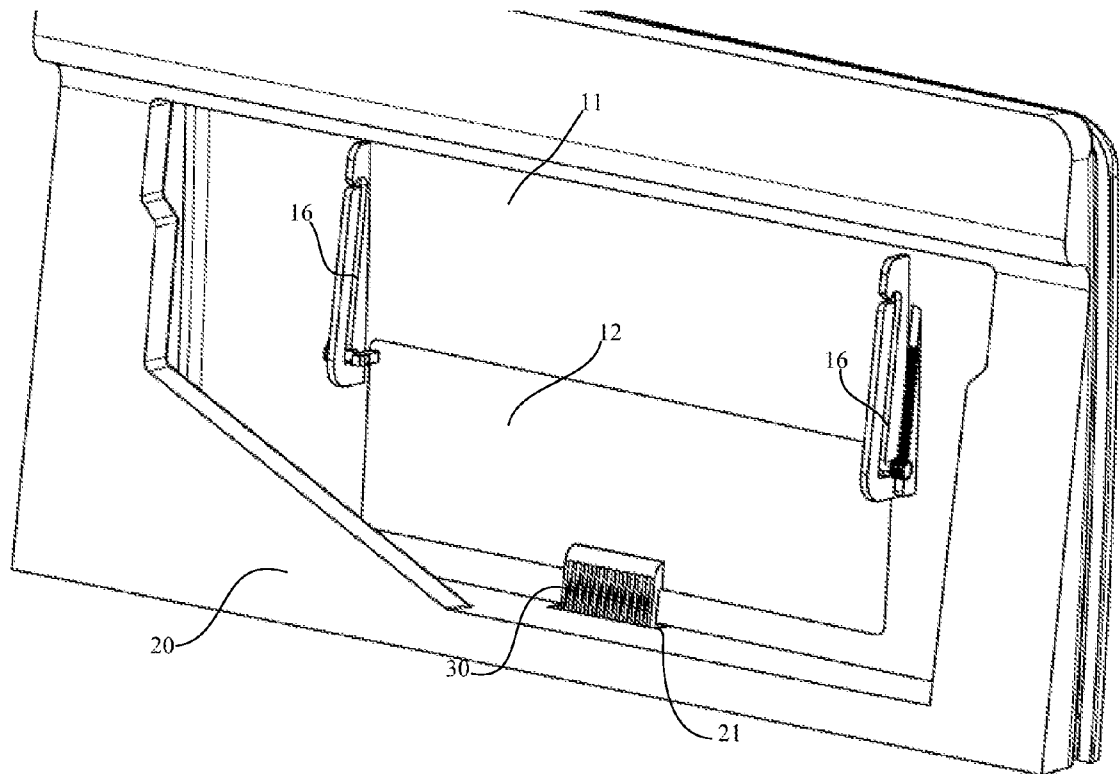


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/051854

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F39/02
ADD.

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 865 911 B2 (BOLDUAN EDWIN [DE] ET AL) 15 March 2005 (2005-03-15) column 4, line 5 - column 6; figures 3-4 -----	1-10
A	DE 31 01 745 A1 (MIELE & CIE [DE]) 26 August 1982 (1982-08-26) page 4 - page 5; figures 1-2 -----	1-10
A	DE 10 2005 011046 B3 (MIELE & CIE [DE]) 4 May 2006 (2006-05-04) figures -----	1-10
A	EP 2 281 938 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 9 February 2011 (2011-02-09) the whole document -----	1-10



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Date of the actual completion of the international search

1 July 2013

Date of mailing of the international search report

09/07/2013

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/051854

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