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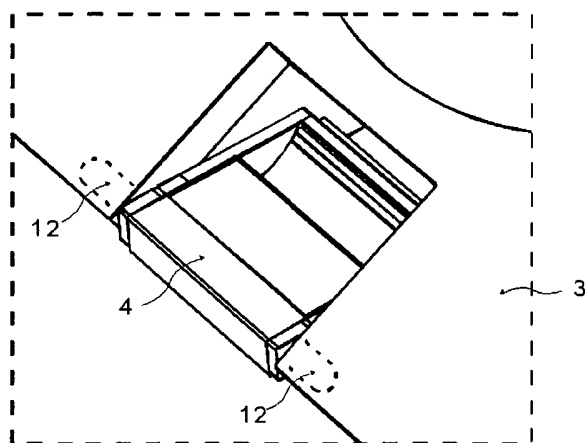
(43) International Publication Date
12 May 2005 (12.05.2005)

PCT

(10) International Publication Number
WO 2005/042891 A1

- (51) International Patent Classification⁷: **E05D 15/50**
- (21) International Application Number:
PCT/IB2004/052152
- (22) International Filing Date: 20 October 2004 (20.10.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
2003/01877 31 October 2003 (31.10.2003) TR
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DOMESTIC APPLIANCE WITH TWO DIRECTIONAL HINGE



(57) Abstract: In domestic appliances (1) preferably in front load type washing machines, when the door (3) is opened by releasing any one of the door opening mechanisms (4) which are situated at both sides of the appliance in order to ensure opening the door (3) from both sides, the door opening mechanism (4) situated on the other side becomes a stationary axis which is installed to one of the sides of the door (3).

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Description

DOMESTIC APPLIANCE WITH TWO DIRECTIONAL HINGE

- [001] This invention is related to a domestic appliance which has a door that is preferably used in washer/dryers and which opens from both sides.
- [002] The opening and closing direction of the doors of domestic appliances such as washing machines, refrigerators is generally designed for people who use their right hand. In the known door opening systems, the door of the appliance moves around an axis situated on the right hand side of the user and it is opened and closed by means of a handle that is much easier to grip. Thus, a difficulty in usage arises for left handed users. Moreover, a door of an appliance which opens and closes from both sides is preferred and implemented due to the constraints rising from, for instance, the position of the appliance and other objects present in the same place. In the known embodiments of doors which open and close from both sides, both a hinge and a handle is present at the right and left sides of the door. When the door is opened by pulling the handle on the right hand side the hinge axis on the left is stationary and when the door is opened by pulling the handle on the left hand side the hinge on the right is stationary. When the door is opened both from the right and left side, the axis on the opposite side must be fully stationary for safety purposes. In the embodiments of doors which open from both sides, safety precautions are taken by means of additional mechanisms in order to prevent the door from opening from both sides at the same time or to carry out processes of opening and freeing/fixing of any sides of the door individually.
- [003] In the United States Patent Document No US3048899, a process of opening a door from both sides by activating or deactivating the door hinge system which is present on the right and the left side of the door by pushing and pulling the buttons located at the right and left side of the door is disclosed.
- [004] In the United States Patent Document No US4811518, a process of opening a door from both sides by means of a method wherein vertical hinge pins, which take action at the moment when the door opens, locks one side of the door by interacting with the movement transmission element that extends across the door and with the hinge pins which are located at the other side of the door is disclosed.
- [005] In the European Patent Application No EP0844354, double-sided opening system which enables opening a washing machine door from both sides by freeing one side of the front door while locking the other is disclosed.
- [006] The object of the invention is to realize a domestic appliance comprising a door which can be opened from both sides, which does not require an additional safety mechanism and which enables fixing the rotating axis in a simple and in a secure way when one of the sides is opened or closed.
- [007] The domestic appliance realized in order to attain the object of this invention has

been illustrated in the attached drawings, wherein;

- [008] Figure 1 – is a schematic view of a domestic appliance.
- [009] Figure 2 – is a perspective view of a door opening mechanism.
- [010] Figure 3 – is an exploded perspective view of a door opening mechanism.
- [011] Figure 4 – is a schematic view of a door opening mechanism.
- [012] Figure 5 – is a schematic view of a domestic appliance door which is shut comprising two door opening mechanisms.
- [013] Figure 6 – is a schematic view of a domestic appliance door which is opened from one side comprising two door opening mechanisms.
- [014] Figure 7 – is a detailed schematic view of an installation of a door opening mechanism, which is fixed to the body of a domestic appliance, to a stationary side of an opened door.
- [015] Figure 8 – is a schematic view of a door opening mechanism which is fixed to the body of a domestic appliance and which is compressed by means of a repellent.
- [016] Figure 9 – is a schematic view of a door opening mechanism which is fixed to the body of a domestic appliance and which is released by means of a repellent.
- [017] Figure 10 – is a schematic view of a door opening mechanism which is fixed to the body of a domestic appliance and which is released by pulling a handle.
- [018] Figure 11 – is a schematic view of the separation of the released door opening mechanism from the body of the domestic appliance.
- [019] Figure 12 – is a schematic view of a door which is closed and which is fixed by means of door opening mechanisms that are present on both sides of the door.
- [020] Figure 13 – is a schematic view of a door which is opened from the left side while the right side is stationary.
- [021] Figure 13 – is a schematic view of a door which is opened from the left side while the right side is stationary.
- [022] The components in the figures have each been numbered corresponding the following:
1. Domestic appliance
 2. Main Body
 3. Door
 4. Door opening mechanism
 5. Mechanism body
 6. Handle
 7. Lock latch
 8. Lock socket
 9. Handle spring
 10. Handle pin
 11. Hinge pin
 12. Hinge pin recess

13. Hinge spring
1. Contact surface
2. Lock latch extension
3. Protector recess
4. Lock protector
5. Projection
6. Buffer
7. Lock latch window
8. Repellent
9. Repellent window

[023] Domestic appliances (1), in particular washing machines comprise a main body (2), a door (3) which enables access into it and loading and unloading objects and at least two door opening mechanisms (4) which are fixed on the door (3), which enable the door (3) to open from both sides, preferably from the right and from the left side, which are released from the main body (2), at the opened side of the door (3), by departing together with the door (3) and which have no longer a contact with the main body (2) and which move, at the closed side of the door, around the rotating axis (C) that functions as a stationary axis.

[024] Door opening mechanism (4) comprises a mechanism body (5) which ensures the connection between the main body (2) and the door (3), a handle (6) which enables opening the door manually, one or more lock latches (7) which are actuated with the handle (6) and which ensures fixing the door opening mechanism (4) and the door (3) to the main body (2) and which enables opening the door (3) by releasing the door opening mechanism (4), a handle spring (9) which pushes the lock latch (7) and which enables the handle (6) to take its original position when it is released, a handle pin (10) which functions as an axis that rotates around the handle (6) and the lock latch (7), a hinge pin (11) located at the rotating axis (C) which can make a rotating movement during the opening and closing movement of the door (3) and a hinge spring (13) which prevents idle turning of the door opening mechanism (4) when it is released.

[025] The main body (2) comprises more than one lock recesses (8) which fix the door opening mechanism (4) when the lock latch extension (16) is inserted when the door (3) is closed and a mechanic or an electrically controlled repellent (22) wherein the door opening mechanism (4) is fitted which prevents the door (3) from opening from one side when the other side is already opened and which compresses one or more protector recesses (17) and the lock latch (7).

[026] The door (3) comprises one or more hinge recesses (12) which enable the installation by means of the hinge pin (11).

[027] The lock latch (7) comprises a contact surface (15) which has a special shape, which contacts the handle (6) directly and which transmits the movement of the handle (6) without any loss and a lock latch extension (16) which fits inside the lock recess (8)

at the position when the door opening mechanism (3) is fixed on the main body (2).

[028] The mechanism body (5) comprises one or more lock protectors (18) which fit inside the protector recess (17) and which guide the lock latch (7), one or more projections (19) which enable fitting inside the main body (2) at the right position and one or more buffers (20) which enable the mechanism body (5) to fit inside the main body (5) without any gaps by producing an initial tension.

[029] Lock protector (18) comprises a lock latch window (21) which enables the insertion of the lock latch extension (16) inside the lock recess (8) on one side and a repellant window (23) which enables the insertion of the repellant (22) on the other side and the compression of the lock latch (7).

[030] A door opening mechanism (4) is situated on the right and left side of preferably a washing machine door (3). When the washing machine is in operating condition, the repellants (22) compress the lock latches (7) by going through the repellant window (22) and opening of the door opening mechanism (4) during operation is prevented even if the user forces to open it. The repellants (22) retreat back when the operation of the machine is complete, in which case, the lock latch extension (16) stays inside the lock recess (8) with the force of the handle spring (9) and when the user pulls the handle with a force surpassing that of the handle spring (9) the lock latch extension (16) exits the lock recess (8) which in turn releases the door opening mechanism (4) and, thus, the door (3) is opened.

[031] In order to open the door (3) from the right side, the user pulls the handle (6) of the door opening mechanism (4) situated on the right. The movement of the handle (6) is transmitted to the lock latch (7) with the aid of the contact surface (15) and the lock latch extension (16) exits the lock recess (8), thereby the door opening mechanism (4) is released from the main body (2). The door opening mechanism (4) moves together with the door (3) as it is fixed to the door (3) in all cases by means of hinge pins (11) that fit inside the hinge pin recesses (12). At this moment, the lock latch (7) situated at the left side of the door (3) fixes the mechanism body (5) to the main body (2) with the propelling force of the handle spring (9) and at the same time the special curvilinear shape of the lock latch (7) prevents it from coming out of the lock protector (18) and from being released from the door opening mechanism (4) that is situated at the left. As the door opening mechanism (4) on the left and consequently the mechanism body (5) remains locked, the hinge pin (11) which is installed on the mechanism body (5) and which is situated on the rotating axis (C) functions as a stationary axis that rotates around the stationary side of the door (3).

[032] In order to open the door (3) from the left side, the door opening mechanism (4) situated on the left is released by pulling the handle (6) and as the rotating axis (C) is stationary, the door opening mechanism (4) situated at the right functions as a stationary axis that rotates around the door (3).

[033] In another embodiment of the invention, repellants (22) which are activated during

the operation cycle of the washing machine and deactivated when the operation cycle of the washing machine is complete are utilized to prevent the door from opening from one side while the other side is already opened even if the user forces to open it and to bring the rotating axis (C) to a firmer position by means of a handle spring (9) and a lock latch (7) situated at the side which cannot be opened. In this embodiment, when the door opening mechanism (4) at any side is actuated, the door opening mechanism (4) situated at the other side is locked by the repellant (22) after a predetermined period of time. Thus, opening the door from one side while the other side is already opened is prevented and the stability of the stationary rotating axis (C) situated at the side which cannot be opened is increased.

[034] With the principle of releasing one of the two opposite rotating axis (C) entirely while the other functions as a stationary axis, it is possible to open the door (3) from the right or the left side or in another embodiment, from the top or the bottom side, by means of door opening mechanisms (4) which are situated on the right and the left side of the horizontal axis which pass by the center of the door (3) or on the top and bottom side of the vertical axis which pass by the center of the door (3) or on opposing sides of the inclined axis which pass by the center of the door (3).

Claims

- [001] A domestic appliance (1) comprising a main body (2) and a door (3) which enables access into it and loading and unloading objects, and characterized by at least two door opening mechanisms (4) which are fixed on the door (3), which enable the door (3) to open from both sides, preferably from the right and from the left, which are released from the main body (2), at the opened side of the door (3), by departing together with the door (3) and which have no longer a contact with the main body (2) and which move, at the closed side of the door, around the rotating axis (C) that function as a stationary axis.
- [002] A domestic appliance (1) as defined in claim 1 characterized by a main body (2) comprising one or more protector recesses (17) wherein the door opening mechanism (4) is fitted which prevents the door (3) from opening from one side when the other side is already opened.
- [003] A domestic appliance (1) as defined in claim 2 characterized by a main body (2) comprising more than one lock recesses (8) which enable locking of the door (3) by fixing the door opening mechanism (4) when the door (3) is closed.
- [004] A domestic appliance (1) as defined in claims 1 to 3 characterized by a door opening mechanism (4) comprising a mechanism body (5), a handle (6) which enables opening the door manually, one or more lock latches (7) which are actuated with the handle (6) and which ensures fixing the door opening mechanism (4) and the door (3) with the main body (2) and which enables opening the door (3) by releasing the door opening mechanism (4), a handle spring (9) which pushes the lock latch (7) and which enables the handle (6) to take its original position when it is released, a handle pin (10) which functions as an axis that rotates around the handle (6) and the lock latch (7), a hinge pin (11) located at the rotating axis (C) which can make a rotating movement during the opening and closing movement of the door (3).
- [005] A domestic appliance (1) as defined in claim 4 characterized by a door (3) comprising one or more hinge pin recesses (12) which enable the installation by means of the hinge pin (11).
- [006] A domestic appliance (1) as defined in claims 4 and 5 characterized by a door opening mechanism (4) comprising a contact surface (15) which has a special shape, which contacts the handle (6) directly and which transmits the movement of the handle (6) without any loss and a lock latch extension (16) which fits inside the lock recess (8) at the position when the door opening mechanism (3) is fixed on the main body (2).
- [007] A domestic appliance (1) as defined in claims 4 to 6 characterized by a door opening mechanism (4) comprising a mechanism body (5) which has one or more locking protectors (18) which fit inside the protector recess (17), which has a lock latch window (21) on one side that enables the insertion of the lock latch

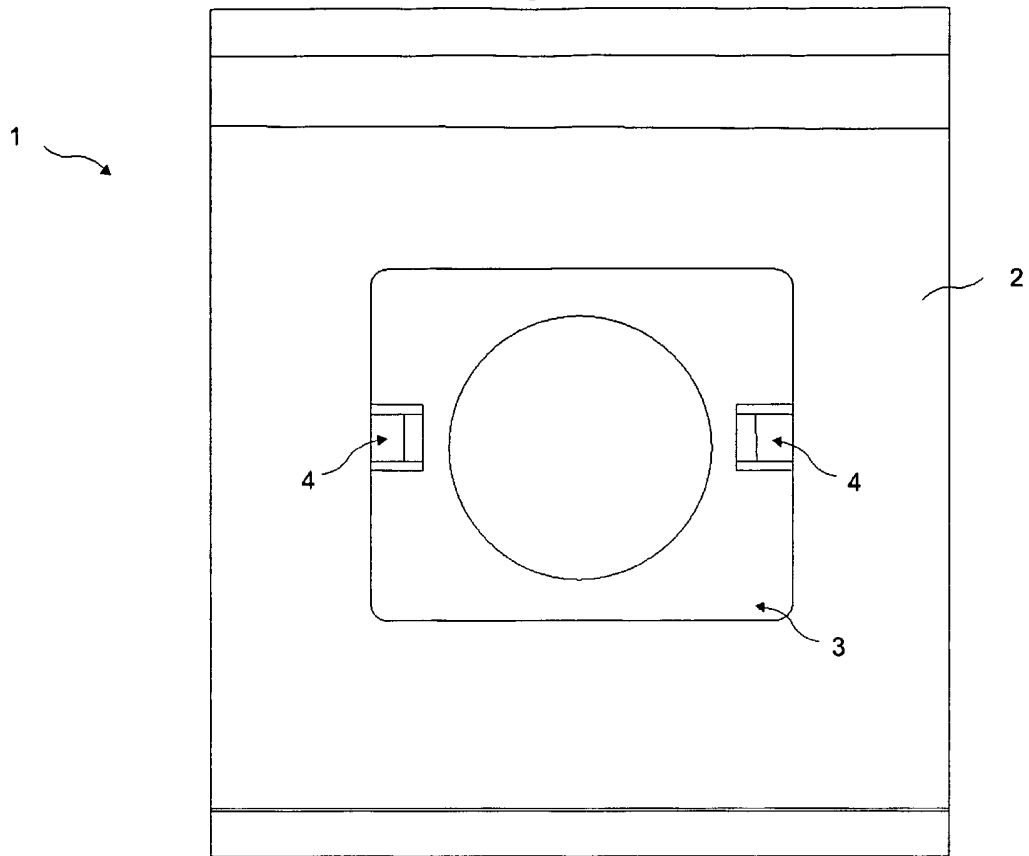
extension (16) inside the lock recess (8) and a repellant window (23) on the other side which enables the insertion of the repellant (22) and the compression of the lock latch (7).

[008] A domestic appliance (1) as defined in claims 4 to 7 characterized by a door opening mechanism (4) comprising a mechanism body (5) having one or more projections (19) which enable to fit inside the main body (2) at the right position, one or more buffers (20) which enable the mechanism body (5) to fit inside the main body (5) without any gaps by producing an initial tension.

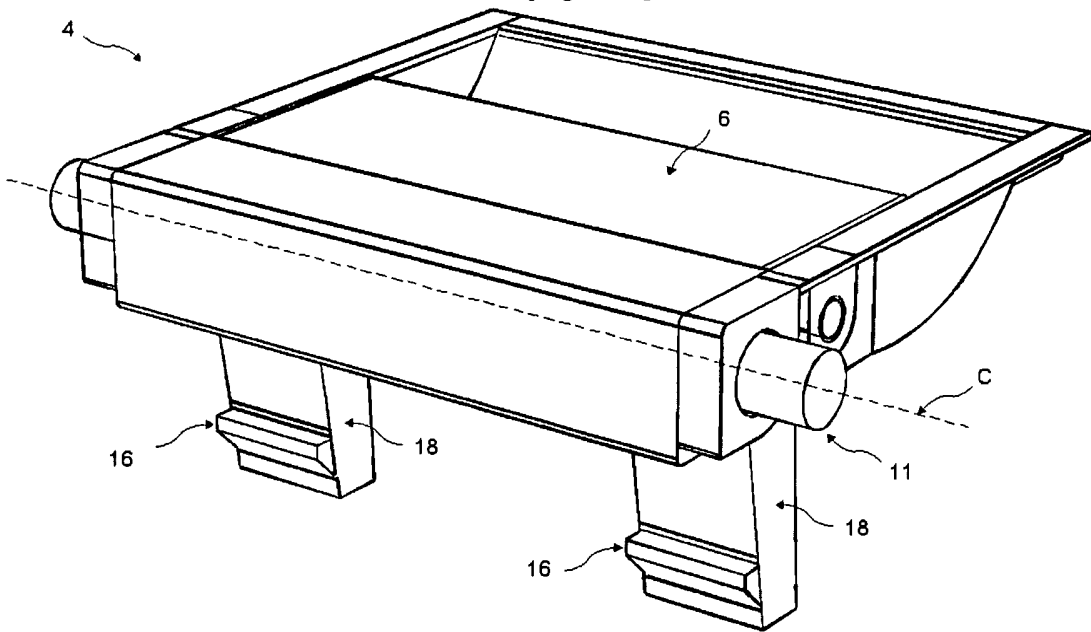
[009] A domestic appliance (1) as defined in claim 6 characterized by a door opening mechanism (4) comprising a lock latch (7) which has a curvilinear shape that prevents the door opening mechanism (4), that functions as a stationary axis when the door (3) is opened, from coming out of its place.

[010] A domestic appliance (1) as defined in any of the above claims characterized by a door opening mechanism (4) comprising a hinge spring (13) which prevents idle turning of the door (3) when it is opened.

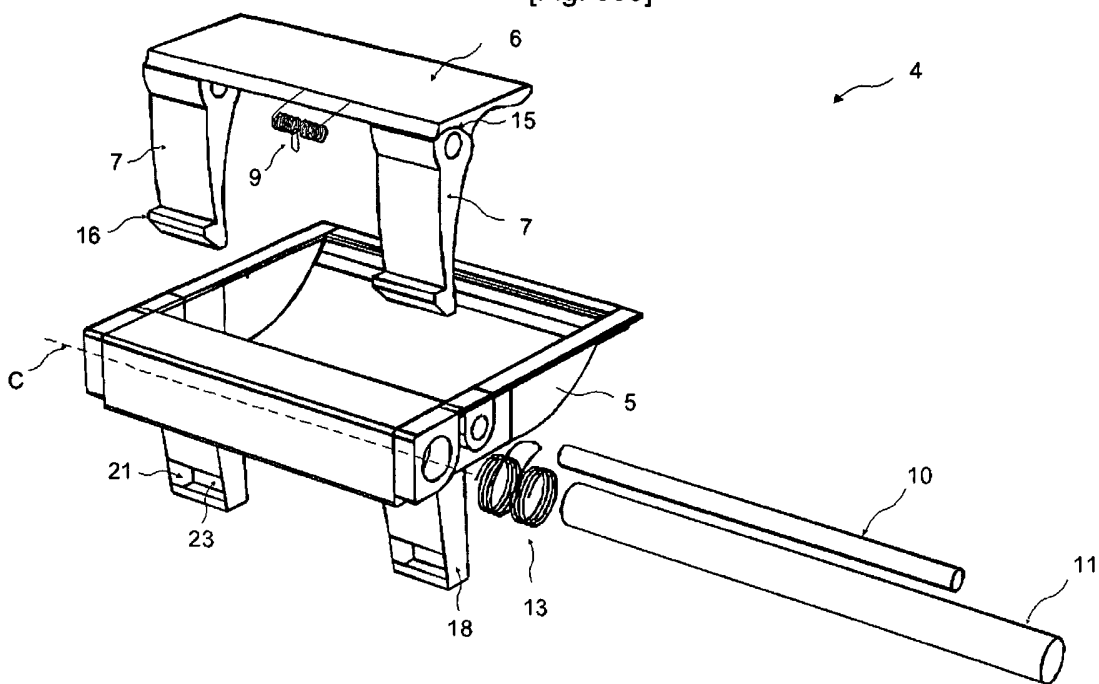
[Fig. 001]



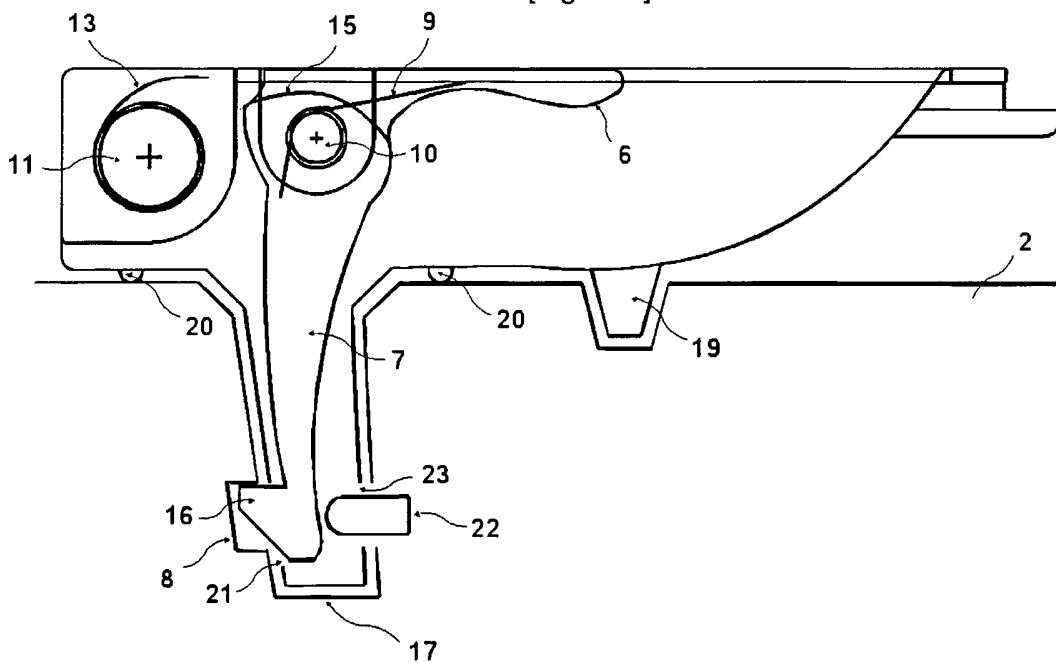
[Fig. 002]



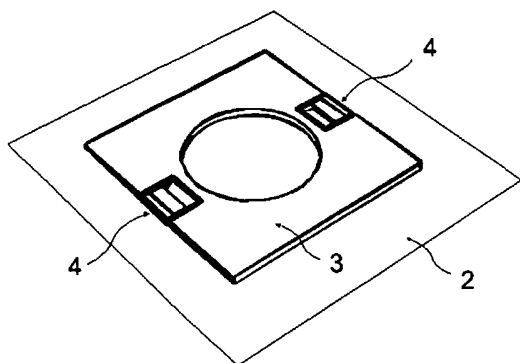
[Fig. 003]



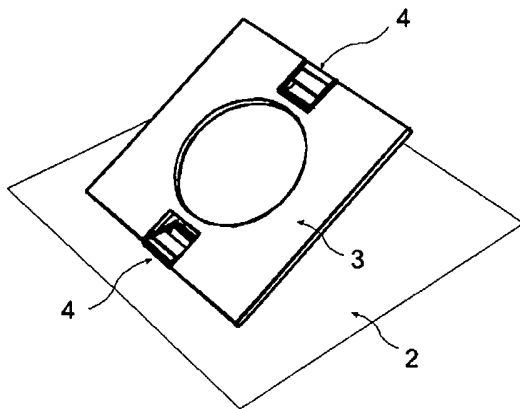
[Fig. 004]



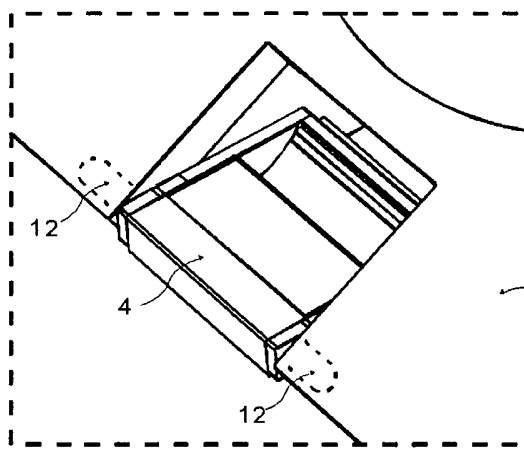
[Fig. 005]



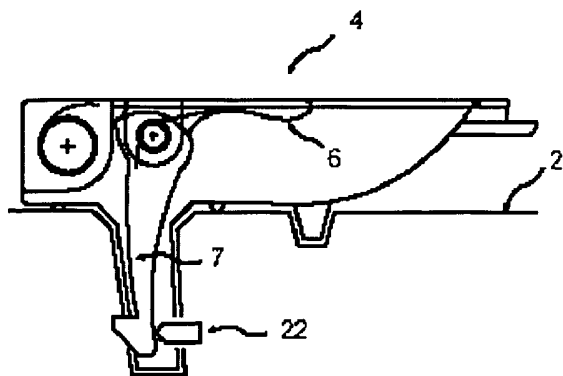
[Fig. 006]



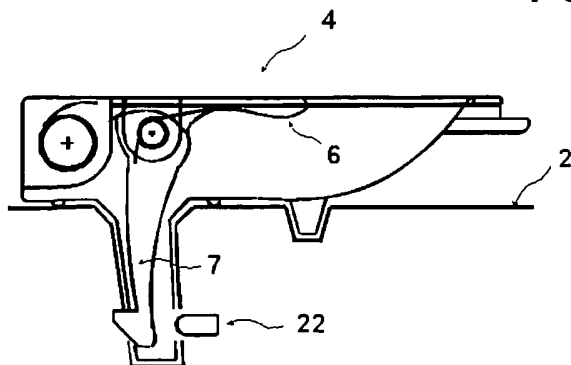
[Fig. 007]



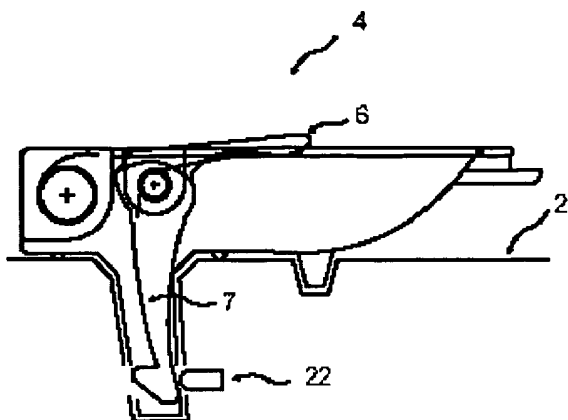
[Fig. 008]



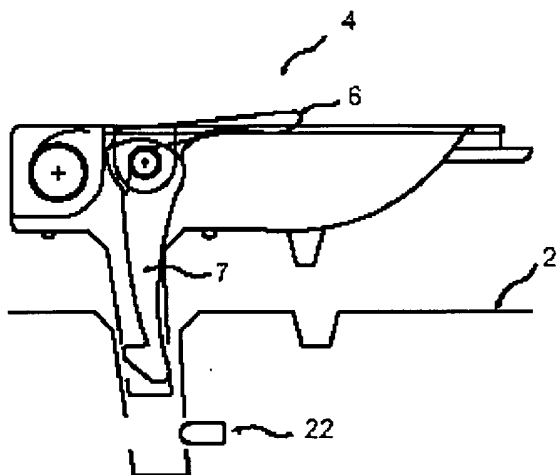
[Fig. 009]



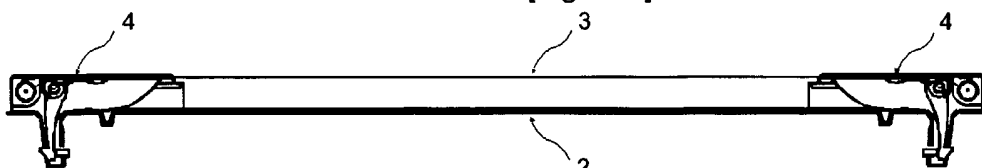
[Fig. 010]



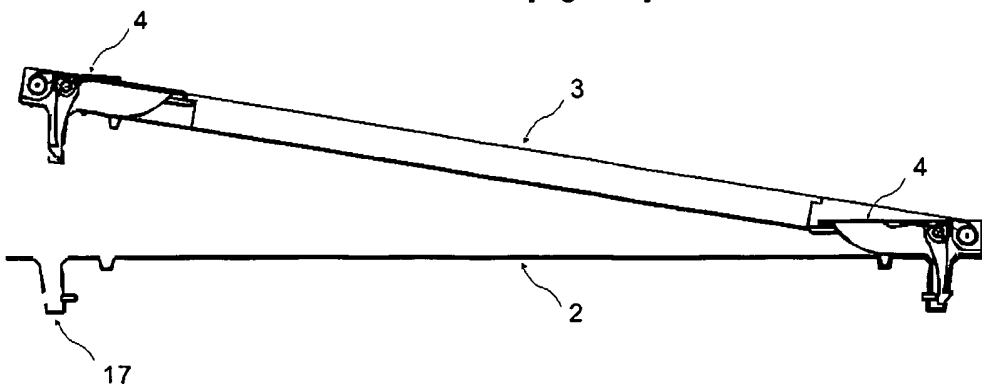
[Fig. 011]



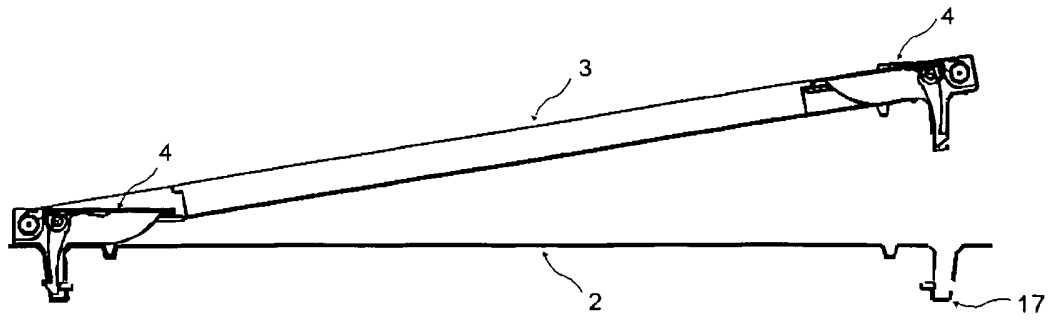
[Fig. 012]



[Fig. 013]



[Fig. 014]



INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/052152

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E05D15/50

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)
IPC 7 E05D D06F E06B

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 899 717 A (WHIRLPOOL CORPORATION) 18 August 1959 (1959-08-18)	1-3
A	column 2, line 3 - column 4, line 56; claims 1-3; figures 1-5	4-10
X	US 4 503 583 A (FROHBIETER EDWIN H) 12 March 1985 (1985-03-12)	1-3
A	column 2, line 60 - column 5, line 44; claim 1; figures 1-5	4-10
X	EP 0 844 354 A (BALAY SA) 27 May 1998 (1998-05-27)	1-3
A	cited in the application column 2, line 34 - column 4, line 43; claims 1-6; figures 1,2	4-10
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

14 January 2005

Date of mailing of the international search report

25/01/2005

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/052152

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 811 518 A (LADISA NICHOLAS F) 14 March 1989 (1989-03-14) cited in the application	1-3
A	column 5, line 43 - column 8, line 5; claim 1; figures 1-7 -----	4-10
X	US 3 048 899 A (DEVELOPMENT FUNDATION ET AL) 14 August 1962 (1962-08-14) cited in the application the whole document -----	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No PCT/IB2004/052152

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US 4503583	A	12-03-1985	NONE			
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US 4811518	A	14-03-1989	NONE			
US 3048899	A	14-08-1962	NONE			