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(84) Designated Contracting States: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR Designated Extension States: AL BA MK RS (71) Applicant: Electrolux Home Products Corporation N.V. 1930 Zaventem (BE)	(72) Inventors: • Del Pos, Maurizio 33170 Pordenone (IT) • Pezzuto, Alberto 31045 Motta di Livenza (IT) (74) Representative: Baumgartl, Gerhard Willi et al AEG Hausgeräte GmbH Group Intellectual Property 90327 Nürnberg (DE)
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(54)

Electrical appliance with an improved door mechanism

(57) An electrical appliance (1) having: a casing (2); a work environment (3) housed inside the casing (2) and having a loading/unloading opening (4); a door (5) fitted to the casing (2) to close the loading/unloading opening (4) of the work environment (3); and connecting means (6) for connecting the door (5) to the casing (2) so that the door (5) can be moved between a closed position and an open position, and having at least one first guide

(9) formed on the door (5), at least one trolley (10) sliding along the first guide (9), and at least one hinge (11) connecting the trolley (10) to the casing (2) to permit rotation about a horizontal axis of rotation (14) between the trolley (10) and the casing (2); the hinge (11) has at least one spring (16), which pulls the hinge (11) into each of its two limit positions and so tends to keep the hinge (11) in each of its two limit positions.

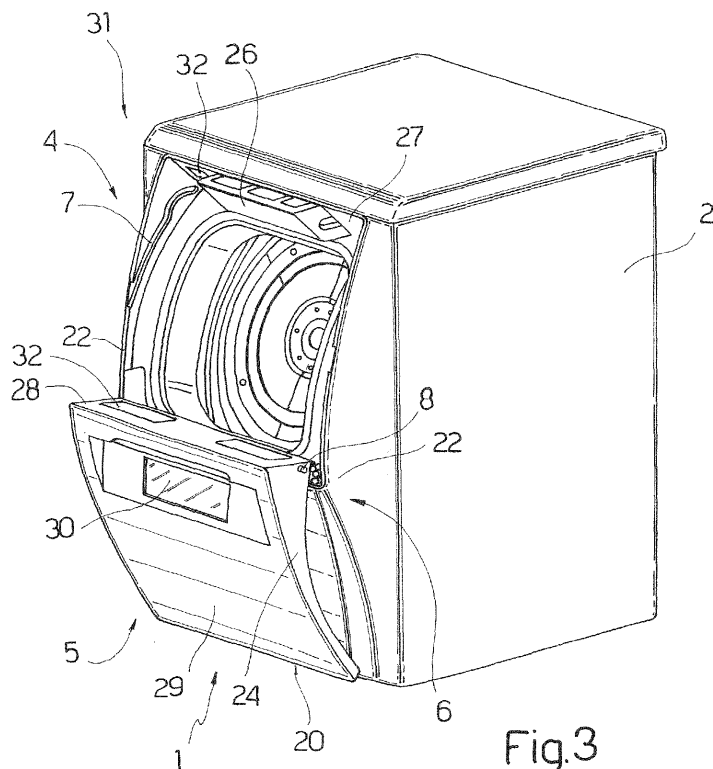


Fig.3

Description

TECHNICAL FIELD

[0001] The present invention relates to an electrical appliance with an improved door mechanism.

[0002] The present invention may be used to particular advantage in a washing machine, to which the following description refers purely by way of example.

BACKGROUND ART

[0003] Household and professional appliances have a common structure: a work environment in which the material to be processed (e.g. fabrics to be washed, food to be cooked, dishes to be washed, etc.) is loaded by the user through a loading/unloading opening; work components for the appliance to function (e.g. washing means or a heater to heat the environment); a cabinet housing both the work environment and the work components; and a door, which is fitted to the cabinet and closes the loading/unloading opening of the work environment to allow access to the work environment (door open) and to isolate the work environment from the external environment (door closed).

[0004] At present almost all door mechanisms comprise a hinge, which is located either on the side of the door (as in washing machines) or on the bottom of the door (as in dishwashers or ovens) and allows the door to rotate about a fixed axis of rotation. Although convenient in terms of simplicity and cost, these door mechanisms can be troublesome when the space around the machine is tiny (e.g. small apartments, kitchens or bathrooms), as the whole door is rotated about a fixed axis of rotation, regardless of the location of the machine or door. In other words, a door hinged to rotate about a fixed axis of rotation requires a large amount of space in front of the appliance when the door is open (as in an oven) or being opened (as in a washing machine or tumble drier).

[0005] Patent application EP1333118A1 discloses a front-loading electrical household appliance comprising a supporting and containing structure with a front wall having a loading opening closed by a door. The door is connected to the front wall by two closing links located near two opposite sides of the door and connected rotatably, by a first end, to the door and, by a second end, to the front wall to cause the door to move from the closed position to a sliding position; two tracks formed in the door and in sliding connection with said first ends of the closing links cause the door to slide parallel to the front wall from the sliding position to the open position.

[0006] Patent application EP2007103015.9 discloses an electrical appliance having: a casing; a work environment supported inside the casing and having a loading/unloading opening; a door supported by the casing to close the loading/unloading opening of the work environment; and connecting means for connecting the door to

the casing so that the door can be moved between a closed position and an open position, and having at least one first guide formed on the casing, at least one first trolley sliding along the first guide and connected to the door, at least one second guide formed on the door and the same shape as the first guide, and at least one second trolley sliding along the second guide and connected to the casing; each guide has a curved first portion, along which the respective trolley slides when the door nears the closed position, and a second portion, which is longer than the first portion and is tangent to the first portion at a point of connection to the first portion.

[0007] Patent US6029649 discloses an oven including a body portion and a door that engages the body portion. The body portion is cylindrical in shape and has two lateral sides, each of which has a circular groove and two vertical slots extending upwardly from the circular groove. The door has two flanges at two ends, each provided, at an inner side, with two projections that slide inside the circular groove and the vertical slots.

DISCLOSURE OF INVENTION

[0008] It is an object of the present invention to provide an electrical appliance with an improved door mechanism, designed to eliminate the aforementioned drawbacks, and which is cheap and easy to implement.

[0009] According to the present invention, there is provided an electrical appliance with an improved door mechanism, as claimed in the accompanying Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic perspective view of a washing machine in accordance with the present invention and with a door in a closed position;

Figure 2 shows a schematic perspective view of the Figure 1 washing machine with the door in a partially open position;

Figure 3 shows a schematic perspective view of the Figure 1 washing machine with the door in a fully open position and with a detergent dispenser in an extracted position;

Figure 4 shows a schematic perspective view of a portion of the door of the Figure 1 washing machine; Figures 5 and 6 show two schematic perspective views of a hinge of the door of the Figure 1 washing machine in two different positions;

Figures 7 and 8 show two different enlarged schematic perspective views of the hinge of the door of the Figure 1 washing machine;

Figure 9 shows a schematic side view of a portion of a casing of the Figure 1 washing machine supporting a guide of door connecting means; and

Figure 10 shows a schematic perspective view of the Figure 1 washing machine highlighting the position of an inner wash tub defining a work environment.

PREFERRED EMBODIMENTS OF THE INVENTION

[0011] Number 1 in Figure 1 indicates as a whole a washing machine comprising a casing 2 resting on a floor on a number of feet (not shown). Casing 2 supports a work environment 3 (in particular, a cylindrical wash tub) in which the material to be processed (i.e. fabrics to be washed) is loaded/unloaded by the user through a loading/unloading opening 4 of casing 2. Access to loading/unloading opening 4 of casing 2 is closed by a door 5 supported by casing 2.

[0012] As shown in Figures 4-9, connecting means 6 are provided to connect door 5 to casing 2, so that door 5 can be moved between a closed position (shown in Figure 1) and an open position (shown in Figure 3).

[0013] Connecting means 6 comprise two guides 7 (only one shown in Figure 9) formed on casing 2, both the same shape, and located on two opposite sides of door 5; and two followers 8 (only one shown in Figure 4), each of which slides along a respective guide 7 and projects from door 5. Connecting means 6 also comprise two guides 9 (only one shown in Figure 5) formed on door 5, both the same shape, and located on two opposite sides of door 5; and two trolleys 10 (only one shown in Figures 4-8), each of which slides along a respective guide 9 and is connected to casing 2 by means of a hinge 11.

[0014] As shown more clearly in Figures 5 and 6, each hinge 11 has a fixed end portion 12 connected rigidly to casing 2; and a movable end portion 13 opposite fixed end portion 12 and connected rigidly to trolley 10. In each hinge 11, movable end portion 13 rotates with respect to fixed end portion 12, about a horizontal axis of rotation 14 substantially parallel to door 5 and perpendicular to relative guide 9, between an inside position (shown in Figure 5) and an outside position (shown in Figure 6). In a preferred embodiment shown in the attached Figures, each hinge 11 comprises three arms 15, each of which is hinged to both fixed end portion 12 and movable end portion 13 to connect the two portions 12 and 13 to each other. By comprising three arms 15, each hinge 11 prevents any undesired movement of door 5; i.e. door 5 can only rotate about axis of rotation 14.

[0015] Each hinge 11 also comprises at least one spiral spring 16, which has a first end connected to fixed end portion 12, and a second end opposite the first end and connected to a central portion of an inner arm 15, so that each spring 16 is of minimum length when hinge 11 is in one of its two limit positions (inside position and outside position shown in Figures 5 and 6) defined by its stops, and is of maximum length when hinge 11 is in an intermediate position between its two limit positions. In other words, each spring 16 has to be extended to move hinge

11 out of each of its two limit positions; thus, spring 16 pulls hinge 11 into each of its two limit positions and so tends to keep hinge 11 in each of its two limit positions. As shown more clearly in Figure 7, fixed end portion 12 and the inner arm 15 of each hinge 11 have respective eyelets 17 for receiving the ends of spring 16.

[0016] When hinges 11 are in the inside position (shown in Figures 1 and 5), i.e. when hinges 11 are in the inside limit position, door 5 is in the closed position and vice versa; on the contrary, when hinges 11 are in the outside position (shown in Figures 2, 3 and 6), i.e. when hinges 11 are in the outside limit position, door 5 can slide towards the fully open position of Figure 3 and thus door 5 can be in any position comprised between the partially open position of Figure 2 and the fully open position of Figure 3.

[0017] As shown in Figure 4, each guide 9 is curved with a fixed radius, but, in a different embodiment, may vary in radius. As shown in Figure 9, each guide 7 has a curved top portion 18 with a fixed radius substantially equal to the radius of rotation of hinges 11; and a curved bottom portion 19, which is longer than curved top portion 18, has a fixed radius, and is the same shape (i.e. has the same radius) as guides 9. In other words, curved bottom portions 19 of the two guides 7 are the same shape as guides 7. Curved bottom portions 19 of the two guides 9 may, of course, differ in shape from the two guides 7, but only to a minor extent, since guides 7 and 9 all guide the movement of the same rigid object: door 5.

[0018] As shown in the opening sequence in Figures 1-3, door 5 is guided by guides 7 and 9 and by hinges 11, which allow two combined movements: door 5 moves (rotates) initially out of its closed position (from the closed position in Figure 1 to the partially open position in Figure 2), and then slides down (from the partially open position in Figure 2 to the open position in Figure 3) to allow access to work environment 3. The first part of the movement of door 5 is a rotation and is guided by top portions 19 of guides 7 and by hinges 11; over the first part of the movement of door 5, each follower 8 slides along top portion 19 of the relative guide 7, while hinge 11 rotates about the respective axis of rotation 14. The second part of the movement of door 5 is guided by bottom portions 19 of guides 7 and by guides 9; over the second part of the movement of door 5, each follower 8 slides along bottom portion 19 of relative guide 7, while each trolley 10 slides along relative guide 9.

[0019] In other words, over the first part of the movement of door 5, door 5 moves substantially away from casing 2, at least up to a point at which the space requirements for door 5 to move parallel to casing 2 no longer interfere with casing 2; whereas, over the second part of the movement of door 5, door 5 moves substantially parallel to casing 2.

[0020] As stated, springs 16 pull hinges 11 into each of their limit positions and so tend to keep hinges 11 in each of their limit positions. Springs 16 therefore have two functions: keeping door 5 pulled against a door gas-

ket fitted about loading/unloading opening 4 to prevent water leakage during the wash cycle; and moving door 5 smoothly into the open and closed position. This second function in particular is very important, in that springs 16 keep hinges 11 in the outside position (shown in Figure 6) as trolleys 10 slide along guides 9, thus preventing hinges 11 from rotating into the inside position (shown in Figure 5) as trolleys 10 slide along guides 9. It is important to note that rotation of hinges 11 into the inside position (shown in Figure 5) as trolleys 10 slide along guides 9 results in undesired stoppage of trolleys 10 along guides 9.

[0021] The bottom parts of guides 9 slope towards casing 2 so that, over the last portion of its opening movement, door 5 moves towards casing 2, and, in its lowest (open) position shown in Figure 3, the bottom edge 20 of door 5 is right next to the bottom portion of casing 2, safely out of range of the user's feet.

[0022] As shown in Figures 7 and 8, one arm 15 of at least one hinge 11 supports a stop 21, which limits downward slide of trolley 10 along guide 9, i.e. defines the lowest (open) position of door 5 shown in Figure 3.

[0023] In a preferred embodiment shown in the attached Figures, casing 2 comprises two vertical appendices 22, which are located on opposite sides of loading/unloading opening 4, have respective vertical walls 23 facing relative vertical walls 24 of door 5, and completely surround door 5 when door 5 is in the closed position (shown in Figure 1). Guides 7 are defined on vertical walls 23 of appendices 22, and followers 8 project from vertical walls 24 of door 5.

[0024] In the embodiment shown in the attached Figures, bottom portions 19 of guides 7 are shorter than guides 9, so that followers 8 disengage guides 9 at the end of the opening movement of door 5, and engage guides 9 at the start of the closing movement of door 5. Each guide 9 obviously has an opening, through which the respective follower 8 disengages or engages guide 9. In a different embodiment not shown, bottom portions 19 of guides 7 are the same length as guides 9, so followers 8 never disengage guides 7.

[0025] In a different embodiment not shown, connecting means 6 only comprise one guide 7 formed on casing 2, one follower 8 sliding along guide 7, one guide 9 formed on door 5, and one trolley 10 sliding along guide 9.

[0026] In another different embodiment not shown, connecting means 6 only comprise guides 9 and trolleys 10, and so comprise no guides 7 and no followers 8.

[0027] Washing machine 1 may comprise locking means for locking door 5 in the closed position; and braking and/or damping means for attenuating the sliding movement of door 5 between the closed position and the open position.

[0028] In the embodiment shown in the attached Figures, guides 7 and 9 are located on both casing 2 and door 5 (guides 7 on casing 2, and guides 9 on door 5). In a different embodiment not shown, guides 7 and 9 are located either on door 5 only, or on casing 2 only.

[0029] In each trolley 10, the sliding part 25 which engages relative guide 9 (i.e. slides inside guide 9) may be covered with antifriction material (for example, Teflon or similar) to reduce the force necessary to move trolley 10 along guide 9.

[0030] As shown in Figure 3, washing machine 1 comprises a detergent dispenser 26 mounted in casing 2 to slide between a stowed position (not shown), in which detergent dispenser 26 is fully inserted inside casing 2, and an extracted position (shown in Figure 3), in which detergent dispenser 26 is partially extracted from casing 2. Preferably, detergent dispenser 26 is located through a front panel 27 of casing 2, which is closed by a top panel 28 of door 5 when door 5 is in the closed position (shown in Figure 1).

[0031] Preferably, a front panel 29 of door 5 supports a user interface 30 having a display and a number of buttons. User interface 30 communicates with an electronic control unit (not shown) of washing machine 1, housed inside casing 2, by means of a wireless communication device 31 (e.g. employing infrared or radio signals) having two communication means 32 (shown in Figure 3), one of which is located inside door 5, and the other inside casing 2. For example, one communication means 32 may be located on top panel 28 of door 5, and the other communication means 32 may be located on front panel 27 of casing 2, so that the two communication means 32 face each other when door 5 is in the closed position (shown in Figure 1). The fact that the two communication means 32 face each other is important when the two communication means 32 communicate using infrared signals.

[0032] As shown in Figure 10, work environment 3 is a cylindrical wash tub having a central axis 33 parallel to loading/unloading opening 4 of casing 2, and encloses a revolving perforated drum 34 having two access doors 35 to the inside of perforated drum 34. Access doors 35 are hinged to perforated drum 34 and can be fixed to one another by means of hooks and slots (not shown). One of access doors 35 is equipped with a safety lock to prevent undesired opening of access doors 35. Central axis 33 of wash tub 3 being parallel to loading/unloading opening 4 provides for more efficient use of the space inside casing 2, thus greatly increasing the rated capacity of washing machine 1, i.e. the maximum amount of laundry (normally measured in kg) that perforated drum 34 can hold, even with a relatively small casing 2. In a different embodiment not shown, central axis 33 of the cylindrical wash tub (and thus of perforated drum 34) is perpendicular to loading/unloading opening 4 of casing 2.

[0033] In the embodiment shown in the attached Figures, door 5 has a curved cross section and varies in thickness, which is maximum at top panel 28 and minimum at a bottom edge 36. In other words, door 5 tapers gradually in thickness from top panel 28 to bottom edge 36.

[0034] Washing machine 1 as described above has numerous advantages, by being easy to implement, by

allowing door 5 to open without too much space needed, and so being suitable for use in confined spaces. It is important to note that in its lowest (open) position shown in Figure 3, bottom edge 20 of door 5 is right next to the bottom portion of casing 2, and so safely out of range of the user's feet.

[0035] Though particularly advantageous for a washing machine, the above connecting means 6 of door 5 also apply to any other kind of electrical appliance, such as a drier, washer-drier, refrigerator, conventional oven, microwave oven, or dishwasher.

Claims

1. An electrical appliance (1) comprising:

a casing (2);
a work environment (3) housed inside the casing (2) and having a loading/unloading opening (4); a door (5) fitted to the casing (2) to close the loading/unloading opening (4) of the work environment (3); and
connecting means (6) for connecting the door (5) to the casing (2) so that the door (5) can be moved between a closed position and an open position, and comprising at least one first guide (9) formed on the door (5), at least one trolley (10) sliding along the first guide (9), and at least one hinge (11) connecting the trolley (10) to the casing (2) to permit rotation about a horizontal axis of rotation (14) between the trolley (10) and the casing (2);
the electrical appliance (1) being **characterized in that** the hinge (11) comprises at least one spring (16), which pulls the hinge (11) into each of its two limit positions and so tends to keep the hinge (11) in each of its two limit positions.

2. An electrical appliance (1) as claimed in Claim 1, wherein the spring (16) is of minimum length when the hinge (11) is in one of its two limit positions, and is of maximum length when the hinge (11) is in an intermediate position between its two limit positions.

3. An electrical appliance (1) as claimed in Claim 1 or 2, wherein the hinge (11) has a fixed end portion (12) connected rigidly to the casing (2), and a movable end portion (13) opposite the fixed end portion (12), connected rigidly to the trolley (10), and rotating with respect to the fixed end portion (12) about the axis of rotation (14); and the hinge (11) comprises at least one arm (15) hinged to both the fixed end portion (12) and the movable end portion (13) to connect the two end portions (12, 13) to each other.

4. An electrical appliance (1) as claimed in Claim 3, wherein the hinge (11) comprises three arms (15).

5. An electrical appliance (1) as claimed in Claim 3 or 4, wherein one arm (15) of at least one hinge (11) supports a stop (21), which limits downward slide of the trolley (10) along the first guide (9) to define the open position of the door (5).

6. An electrical appliance (1) as claimed in Claim 3, 4 or 5, wherein the fixed end portion (12) and the inner arm (15) of the hinge (11) have respective eyelets (17) for receiving the ends of the spring (16).

7. An electrical appliance (1) as claimed in any of Claims 1 to 6, wherein the first guide (9) is curved.

8. An electrical appliance (1) as claimed in any of Claims 1 to 7, wherein the connecting means (6) comprise at least a second guide (7) formed on the casing (2); and at least one follower (8), which slides along the second guide (7) and is connected to the door (5).

9. An electrical appliance (1) as claimed in Claim 8, wherein the follower (8) projects from door (5).

10. An electrical appliance (1) as claimed in Claim 8 or 9, wherein the second guide (7) has a curved top portion (18) with a fixed radius substantially equal to the radius of rotation of the hinge (11); and a curved bottom portion (19), which is longer than the curved top portion (18) and is the same shape as first guide (9).

11. An electrical appliance (1) as claimed in Claim 10, wherein the bottom portion (19) of the second guide (7) is shorter than the first guide (9), and has an opening, through which the follower (8) disengages or engages the second guide (7); the follower (8) disengages the second guide (7) at the end of the opening movement of the door (5), and the follower (8) engages the second guide (7) at the start of the closing movement of the door (5).

12. An electrical appliance (1) as claimed in Claim 10, wherein the bottom portion (19) of the second guide (7) is the same length as the first guide (9); and the follower (8) never disengages the second guide (7).

13. An electrical appliance (1) as claimed in any of Claims 8 to 12, wherein the connecting means (6) comprise two second guides (7) formed on opposite sides of the loading/unloading opening (4); and two followers (8), each of which slides along the second guide (7) and is connected to the door (5).

14. An electrical appliance (1) as claimed in any of Claims 1 to 13, wherein the casing (2) comprises two vertical appendices (22), which are located on opposite sides of the loading/unloading opening (4),

have respective vertical walls (23) facing relative vertical walls (24) of the door (5), and completely surround the door (5) when the door (5) is in the closed position.

15. An electrical appliance (1) as claimed in Claim 14, wherein the connecting means (6) comprise two second guides (7) formed on the vertical walls (23) of the appendixes (22) of the casing (2); and two followers (8), each of which slides along a respective second guide (7) and is connected to a vertical wall (24) of the door (5).

16. An electrical appliance (1) as claimed in any of Claims 1 to 15, wherein the sliding part (25) of the trolley (10) engaging the first guide (9) is covered with antifriction material.

17. An electrical appliance (1) as claimed in any of Claims 1 to 16 and comprising a detergent dispenser (26), which is mounted in the casing (2) to slide between a stowed position, in which the detergent dispenser (26) is fully inserted inside the casing (2), and an extracted position, in which the detergent dispenser (26) is partially extracted from the casing (2); the detergent dispenser (26) is located through a front panel (27) of the casing (2), which is closed by a top panel (28) of the door (5) when the door (5) is in the closed position.

18. An electrical appliance (1) as claimed in any of Claims 1 to 17 and comprising:

a user interface (30) fitted to a front panel (29) of the door (5);
an electronic control unit housed inside the casing (2); and
a wireless communication device (31) having a first communication means (32) located inside door (5) and connected to the user interface (30); and a second communication means (32) located inside the casing (2) and connected to the electronic control unit.

19. An electrical appliance (1) as claimed in Claim 18, wherein the first communication means (32) is located on a top panel (28) of the door (5), and the second communication means (32) is located on a front panel (27) of the casing (2), so that the two communication means (32) face each other when the door (5) is in the closed position.

20. An electrical appliance (1) as claimed in any of Claims 1 to 19, wherein the electrical appliance (1) is a washing machine, and the work environment (3) is a cylindrical wash tub having a central axis (33) parallel to the loading/unloading opening (4) of the casing (2).

21. An electrical appliance (1) as claimed in Claim 20, wherein the work environment (3) houses a revolving perforated drum (34) having two access doors (35) to the inside of the perforated drum (34).

22. An electrical appliance (1) as claimed in Claim 21, wherein the access doors (35) are hinged to the perforated drum (34), and can be fixed to one another by means of hooks and slots; and one of the access doors (35) is equipped with a safety lock to prevent undesired opening of the access doors (35).

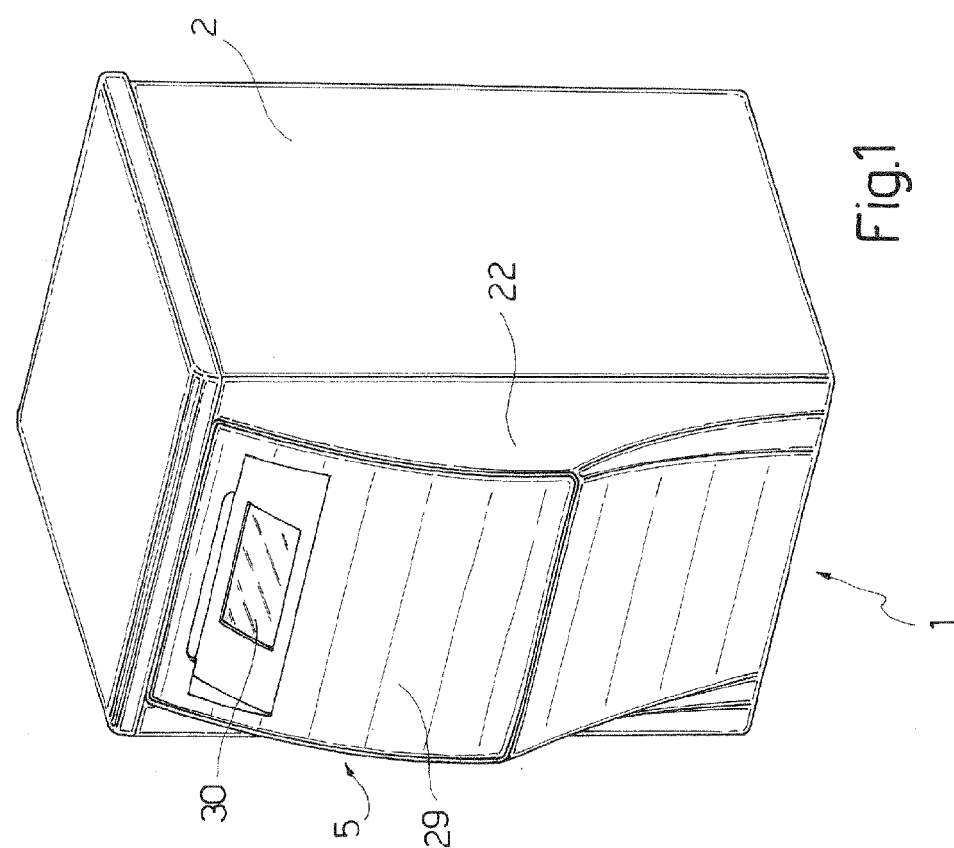
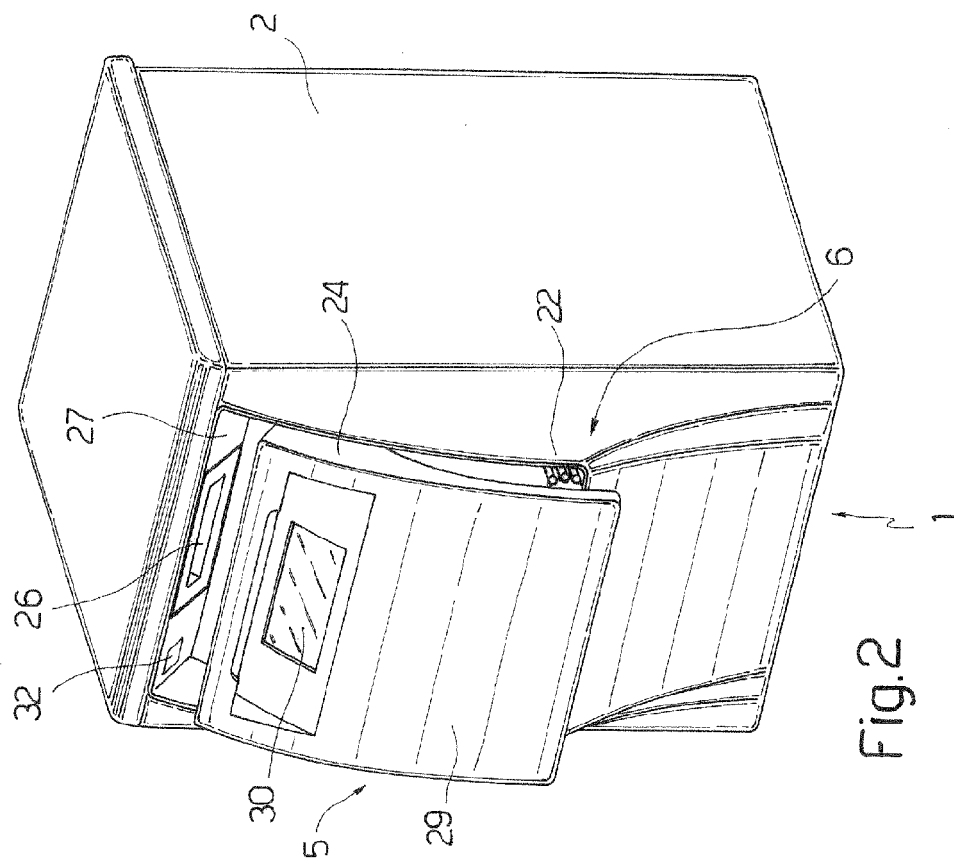
23. An electrical appliance (1) as claimed in any of Claims 1 to 22, wherein the door (5) has a curved cross section and varies in thickness, which is maximum at a top panel (28) and minimum at a bottom edge (36).

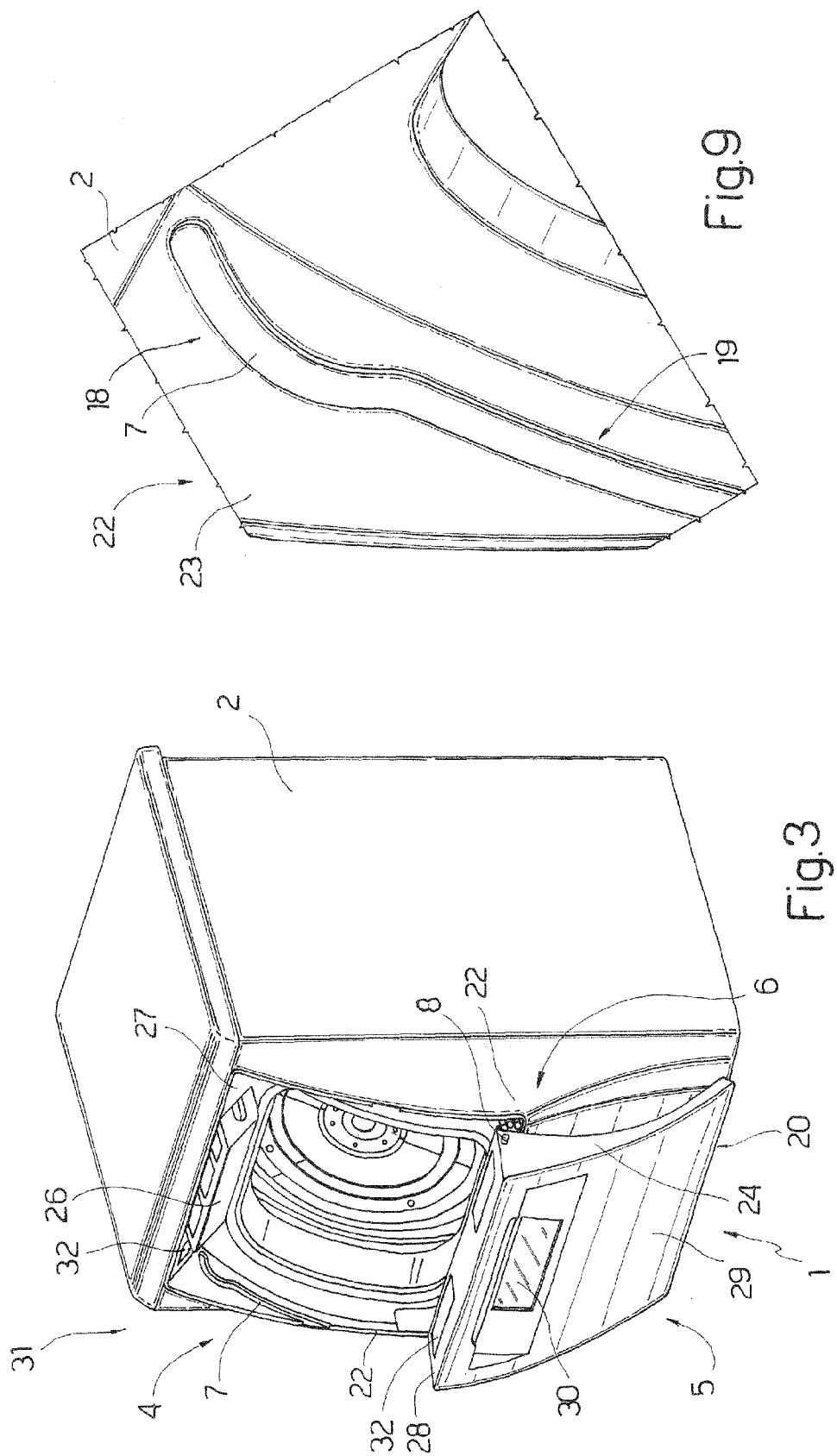
24. An electrical appliance (1) as claimed in any of Claims 1 to 23, wherein the connecting means (6) comprise two first guides (9) located on two opposite sides of the door (5); and two trolleys (10) sliding along the second guides (7).

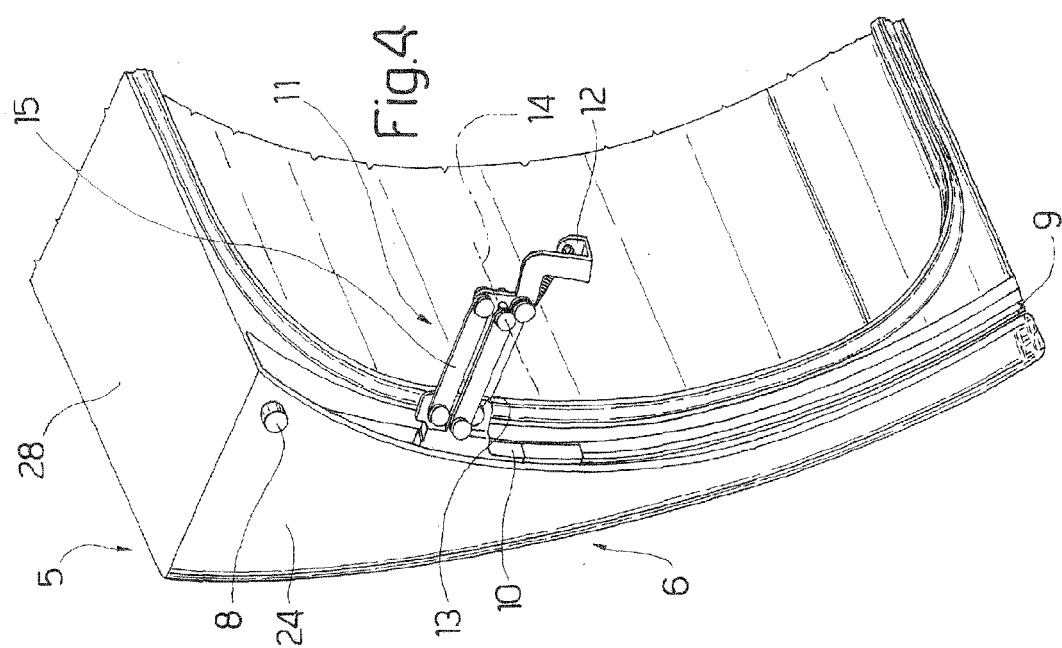
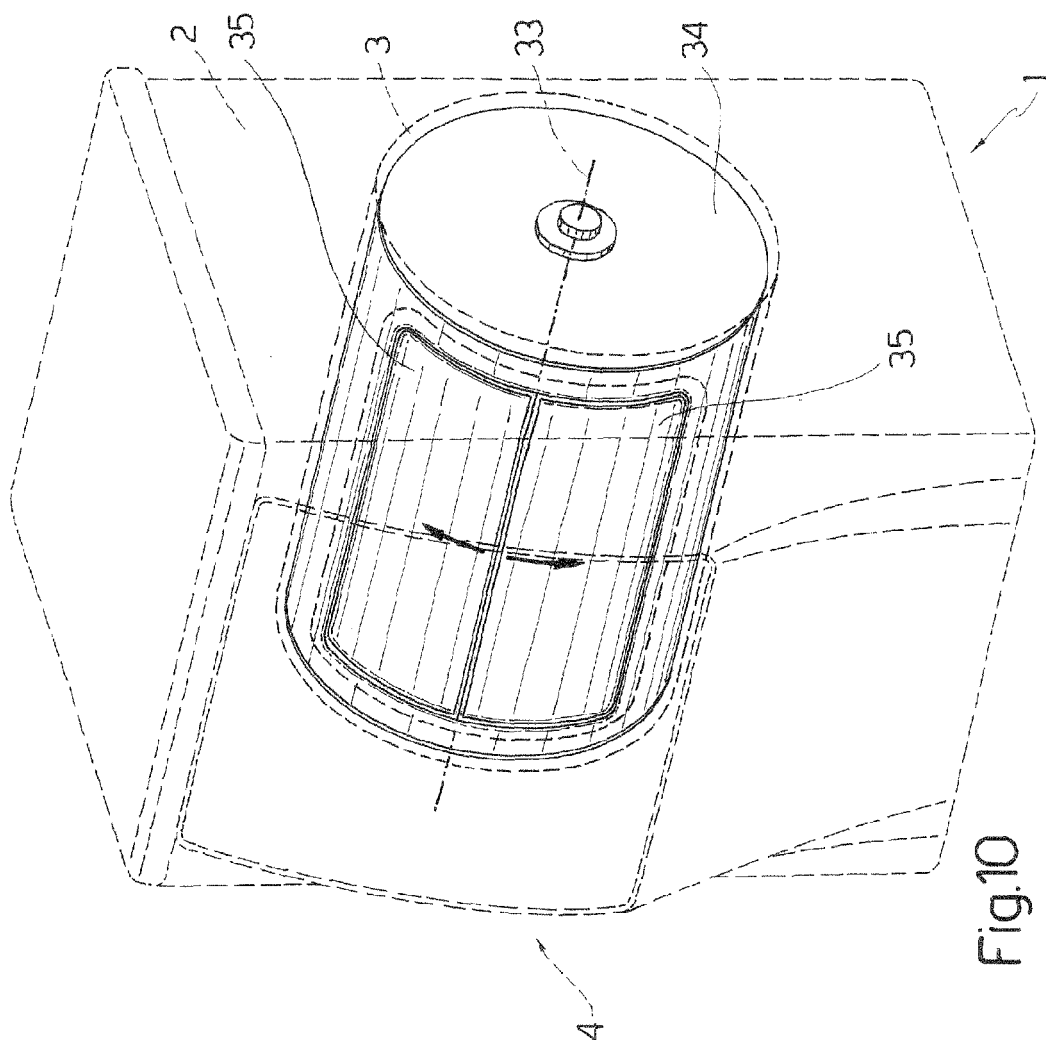
25. An electrical appliance (1) as claimed in any of Claims 1 to 24, wherein respective bottom parts of the first guides (9) slope towards the casing (2), so that, over the last portion of its opening movement, the door (5) moves towards the casing (2).

26. An electrical appliance (1) comprising:

a casing (2);
a work environment (3) housed inside the casing (2) and having a loading/unloading opening (4);
a door (5) fitted to the casing (2) to close the loading/unloading opening (4) of the work environment (3); and
connecting means (6) for connecting the door (5) to the casing (2) so that the door (5) can be moved between a closed position and an open position, and comprising at least one first guide (9) formed on the door (5), at least one trolley (10) sliding along the first guide (9), and at least one hinge (11) connecting the trolley (10) to the casing (2) to permit rotation about a horizontal axis of rotation (14);
the electrical appliance (1) being **characterized in that** respective bottom parts of the first guides (9) slope towards the casing (2), so that, over the last portion of its opening movement, the door (5) moves towards the casing (2).







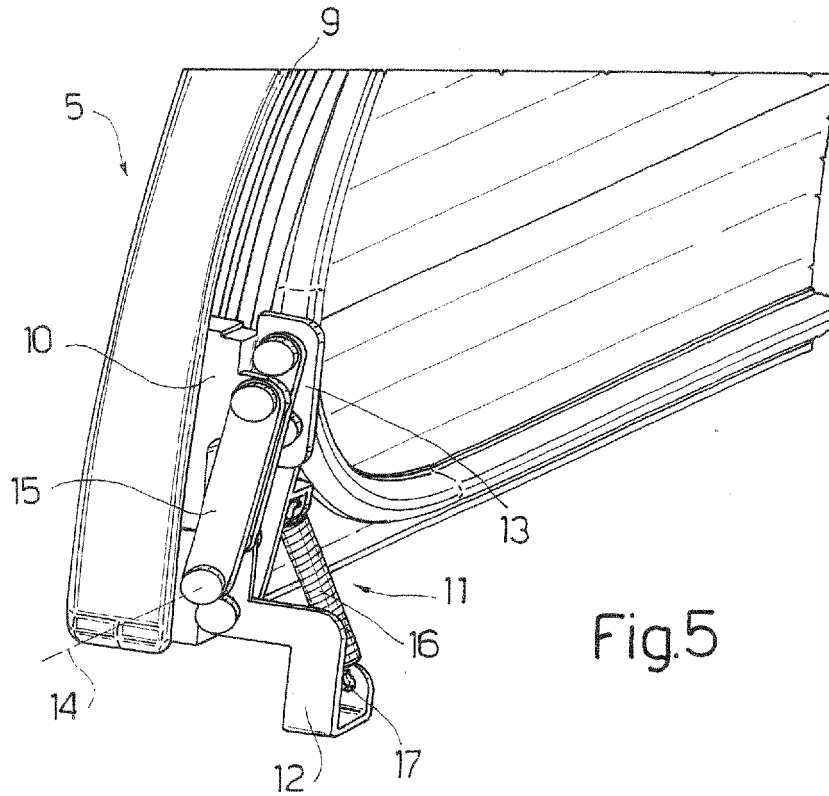


Fig.5

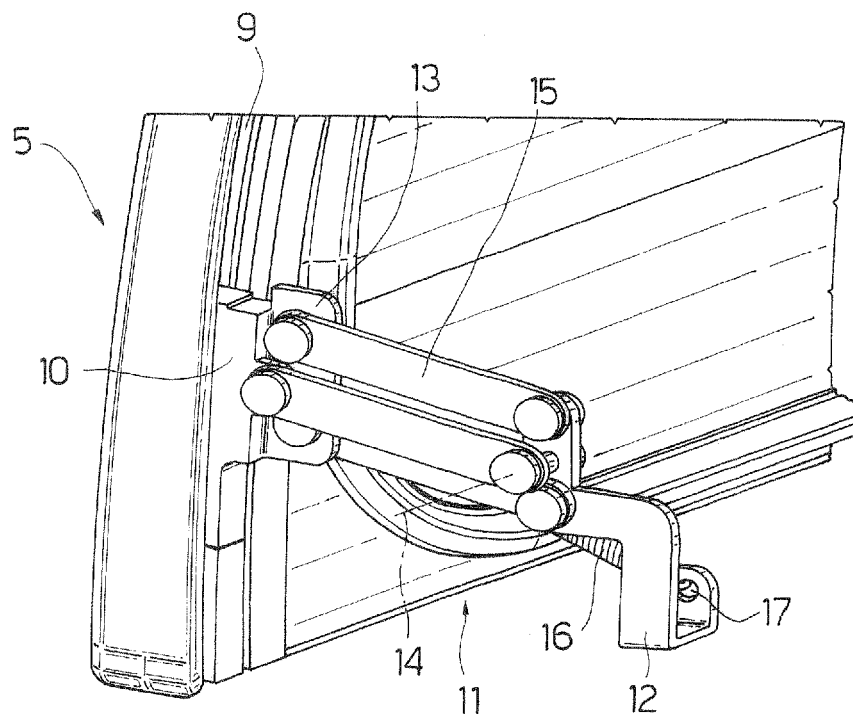
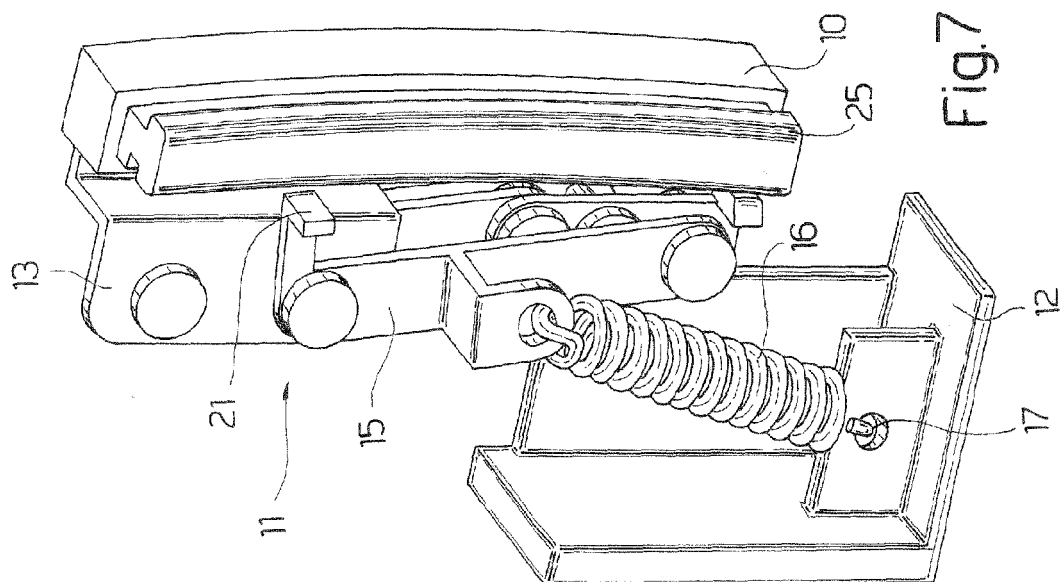
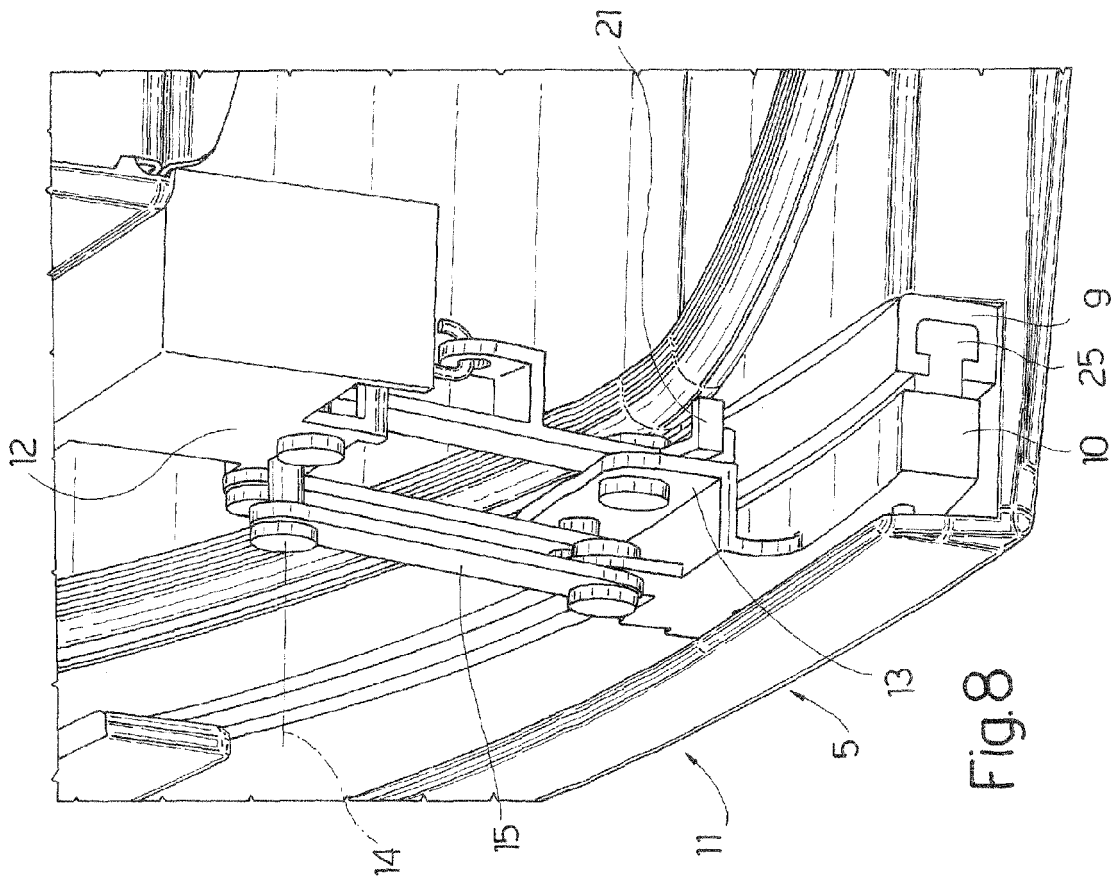


Fig.6





EUROPEAN SEARCH REPORT

Application Number
EP 08 15 3795

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,A	EP 1 333 118 A (CANDY SPA [IT]) 6 August 2003 (2003-08-06) * paragraphs [0055] - [0057]; claim 1; figures 11-13 *	1-26	INV. D06F37/28 D06F39/14 F24C15/02 A47L15/42
D,A	US 6 029 649 A (SU YUNG SEN [TW]) 29 February 2000 (2000-02-29) * figures *	1-26	
A	EP 1 417 923 A (MATSUSHITA ELECTRIC IND CO LTD [JP]) 12 May 2004 (2004-05-12) * the whole document *	1	
E	EP 1 961 856 A (ELECTROLUX HOME PROD CORP [BE]) 27 August 2008 (2008-08-27) * paragraphs [0017] - [0020]; figures *	26	
			TECHNICAL FIELDS SEARCHED (IPC)
			D06F F24C A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 January 2009	Examiner Stroppa, Giovanni
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			

8
EPO FORM 1503 03.82 (P04C01)



Application Number

EP 08 15 3795

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 08 15 3795

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-25

An electrical appliance (1) having connecting means for connecting the door to the casing including a hinge connecting the trolley to the casing to permit rotation about a horizontal axis of rotation whereby the hinge comprises at least one spring which pulls the hinge into each of its two limit positions and so tends to keep the hinge in each of its two limit positions.

2. claim: 26

An electrical appliance having a door capable to move towards the casing during opening

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 15 3795

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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12-01-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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