



(11)

EP 2 108 729 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.10.2009 Bulletin 2009/42

(51) Int Cl.:
D06F 37/28 (2006.01) A47L 15/42 (2006.01)

(21) Application number: **08154283.9**

(22) Date of filing: **09.04.2008**

(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) Inventor: **Favaro, Daniele
30020 Pramaggiore (IT)**

(74) Representative: **Baumgartl, Gerhard Willi et al
AEG Hausgeräte GmbH
Group Intellectual Property
90327 Nürnberg (DE)**

(54) **Electric household appliance featuring a device for fixing an outer panel to the appliance casing**

(57) An electric household appliance (20)(40) having a casing (21), an outer panel (23), and a fastening device (22)(41) for fixing the panel (23) to a wall (24) of the casing (21) to conceal the wall (24); the fastening device (22)(41) being designed to permit rotation of the panel (23), with respect to the wall (24), about a predetermined hinge axis (A), and at the same time providing for adjusting the position of the panel (23), with respect to the wall (24), in an adjusting direction (D) substantially parallel to the hinge axis (A).

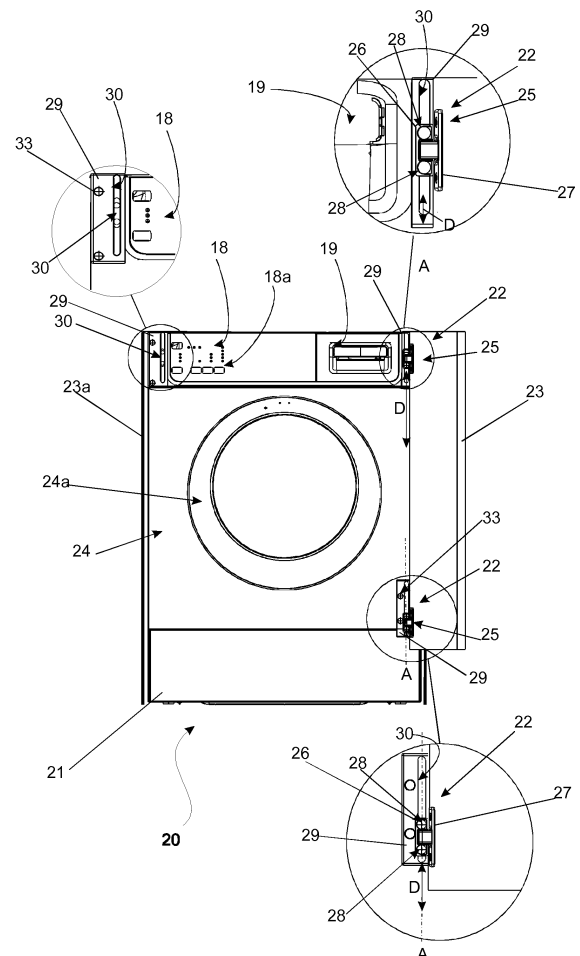


Fig. 2

EP 2 108 729 A1

Description

[0001] The present invention relates to an electric household appliance featuring a device for fixing an outer panel to the appliance casing.

[0002] More specifically, the present invention relates to an electric household appliance, such as a washing machine and/or drier, featuring a device for hinging a panel, e.g. a cabinet door, to a wall of the appliance; to which the following description refers purely by way of example.

[0003] As is known, some cabinets comprise a compartment in which to house a "recessed" electric household appliance; and an outer panel, e.g. a door, which fixes onto the front wall of the appliance to conceal it.

[0004] For this purpose, some types of appliances, in particular last-generation washing machines, are designed to simplify assembly of the outer panel to the front wall of the machine.

[0005] The Figure 1 example shows a washing machine 1 housed inside a compartment of a kitchen cabinet 2, beneath the worktop 3 of cabinet 2, and resting on the floor on feet 4.

[0006] Washing machine 1 comprises a fastening device 5 for fixing an outer panel 6 to the front wall 7 of the casing 8 of machine 1. Fastening device 5 substantially comprises two hinges 9, each comprising two plates or brackets 10 hinged to each other to rotate about a vertical axis, and fixed to outer panel 6 and to the side of front wall 7 respectively; and front wall 7 of machine 1 has two pairs of through holes 12 for screws 14, by which to fix brackets 10 to casing 8 of machine 1.

[0007] In the example shown, one pair of holes 12 is formed in the bottom corner of front wall 7 of casing 8, and the other pair of holes 12 in an intermediate part of the front wall, beneath the control panel 15 of machine 1.

[0008] Albeit efficient, the fastening device 5 described above has several drawbacks.

[0009] Firstly, "standard" outer panels 6, i.e. commonly used household cabinet doors, have preassembled hinges 9 fixed to the top and bottom corners of the inner face of panel 6.

[0010] This location of hinges 9 is designed to permit fast assembly of the door to any standard-type cabinet, but is totally unsuitable for assembling the door to a front wall of a washing machine, in which case, the through holes in the machine are out of line with the top hinge. To fix a "standard" door to the front wall of a washing machine using the fastening device described above, the top hinge 9 must therefore be lowered to align it with the top holes 12 in machine 1. Apart from the inconvenience involved, this also increases the time taken to fit panel 6 to machine 1, and therefore the cost of installing the machine.

[0011] Moreover, lowering hinge 9 from the standard position in the top corner of the inner face of the panel obviously impairs the rigidity/stability with which panel 6 is secured to machine 1.

[0012] The fastening device described above also adapts poorly to adjustments to the vertical position of the outer panel with respect to the front wall of the machine, as required, for example, when the top wall of machine 1 falls short of and forms an unsightly gap with the underside surface of the worktop. At present, the gap is closed by increasing the height of the feet of the machine. So doing, however, increases the height of the machine's gravity centre with respect to the supporting surface of the machine, thus aggravating walking and/or the noise level of the machine when it is running.

[0013] It is an object of the present invention to provide an electric household appliance featuring a device for fixing an outer panel to a wall of the appliance, and designed to eliminate the aforementioned drawbacks.

[0014] According to the present invention, there is provided an electric household appliance featuring a device for fixing an outer panel to a wall of the appliance, and as claimed in Claim 1 and preferably, though not necessarily, in any one of the Claims depending directly or indirectly on Claim 1.

[0015] 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 front view, with enlarged details and with parts removed for clarity, of a washing machine featuring a known fastening device;

Figure 2 shows a schematic front view, with enlarged details and with parts removed for clarity, of a washing machine featuring a fastening device in accordance with the present invention;

Figure 3 shows an exploded view of the Figure 2 fastening device;

Figure 4 shows a view in perspective of a washing machine featuring a fastening device in accordance with a variation of the present invention.

[0016] Number 20 in Figure 2 indicates as a whole an electric household appliance comprising a casing 21; and a fastening device 22 for hinging an outer panel 23, e.g. a door of a cabinet 23a, to an outer wall 24 of casing 21, so as to permit rotation of panel 23 about a hinge axis A, and, at the same time, adjustment, in a direction D parallel to hinge axis A, to the fastening position of panel 23 to wall 24.

[0017] In the Figure 2 example, electric household appliance 20 is a home washing machine or combination washing machine-drier, which comprises a wash assembly (not shown) connected to casing 21 and in turn comprising a laundry drum (not shown) mounted to rotate freely inside casing 21, and directly facing a laundry loading/unloading opening 24a formed in front wall 24 of casing 21.

[0018] Appliance 20 also comprises a substantially rectangular control panel 18 having a number of control buttons 18a, and located, in the Figure 2 example, on the exposed top portion, i.e. along the top edge, of front

wall 24 of appliance 20.

[0019] Appliance 20 also comprises a pull-out detergent dispenser 19, which pulls out of casing 21 and is located in the exposed top portion of front wall 24, alongside control panel 18. Control panel 18 and dispenser 19 are known and therefore not described in detail.

[0020] Fastening device 22 comprises at least two hinges 25, each of which comprises two fastening plates 27, 26 hinged to each other to rotate about hinge axis A, and fixed by screws 28 to panel 23 and wall 24 respectively.

[0021] For each hinge 25, fastening device 22 also comprises an adjusting plate 29, which may be fixed to or integrated in one side of casing 21, and is connected to fastening plate 26 of hinge 25 to permit axial adjustment of hinge 25, and therefore of the position of panel 23, in direction D parallel to hinge axis A.

[0022] More specifically, each adjusting plate 29 has a slot 30 elongated parallel to hinge axis A to receive the shanks of screws 28 of fastening plate 26; and fastening device 22 comprises a plate 31, which is mounted to slide on an inner guide (not shown) facing slot 30 and the inner face of adjusting plate 29, on the opposite side to fastening plate 26, and engages screws 28 to grip adjusting plate 29, by means of screws 28 and together with fastening plate 26, and so axially lock hinge 25.

[0023] In the Figure 2 example, adjusting plate 29 of top hinge 25 is fixed firmly by screw fasteners 33 to a top corner of wall 24, alongside control panel 18 and/or dispenser 19, and adjusting plate 29 of bottom hinge 25 is fixed firmly by screw fasteners 33, or any other similar fastener, to a bottom corner of wall 24.

[0024] In one embodiment, slot 30 may conveniently be formed in wall 24 of machine 20 to receive screws 28 connecting fastening plate 26 to sliding plate 31.

[0025] In actual use, fastening plates 27 and 26 of each hinge 25 are fixed to panel 23 and to plate 31 of fastening device 22 respectively. Before tightening down fastening plate 26 and plate 31, the vertical position of panel 23 can be adjusted by the fitter sliding hinges 25 and respective plates 31 along slots 30 in adjusting direction D. Once the panel is positioned correctly, the fitter tightens down fastening plates 26 of hinges 25 using screws 28.

[0026] Besides being cheap and easy to produce, fastening device 22 as described also has the advantage of requiring no realignment of preassembled standard-panel hinges, and at the same time permitting vertical adjustment of the panel.

[0027] Clearly, changes may be made to the fastening device as described herein without, however, departing from the scope of the present invention as defined in the accompanying Claims.

[0028] The Figure 4 embodiment relates to an electric household appliance 40 similar to appliance 20, and the component parts of which are indicated, where possible, using the same reference numbers as for the corresponding parts of appliance 20.

[0029] Appliance 40 corresponds to a home washing machine or combination washing machine-drier featuring a fastening device 41 for fixing an outer panel 23, e.g. a door, to an outer wall 24 of the casing 21, so as to permit rotation of panel 23 about a hinge axis A, and, at the same time, adjustment, in a direction D parallel to hinge axis A, to the fastening position of panel 23 to wall 24.

[0030] For which purpose, the top hinge 25 of fastening device 41 is fixed to the top wall 42 of machine 40 by a spacer 43, the thickness S of which corresponds to the required vertical displacement of panel 23 with respect to a predetermined work position, in which the top edge of panel 23 is substantially aligned with and parallel to the plane of the top wall 42 of machine 40.

[0031] In the Figure 4 example, spacer 43 is substantially parallelepiped-shaped, is substantially as long as the width of machine 40, and is fixed firmly to top wall 42 by fastening members such as screws 44.

[0032] In the example shown, spacer 43 is fixed firmly and substantially horizontally to the front side of top wall 42, with the exposed lateral face of the spacer substantially coplanar with front wall 24 of machine 40.

[0033] In the Figure 4 example, the top hinge 25 of fastening device 41 connects a top lateral portion of panel 23 to spacer 43, and the bottom hinge 25 connects a bottom lateral portion of panel 23 to front wall 24 of machine 40.

[0034] More specifically, top hinge 25 substantially comprises two fastening plates 27 and 26 hinged to each other to rotate with respect to each other about hinge axis A, and fixed to the inner face of panel 23 and to the top face of spacer 43 respectively.

[0035] More specifically, in the Figure 4 example, fastening plate 26 is substantially rectangular, is fixed firmly to the top face of spacer 43 by screws (not shown), and has, on its free end, a pin (not shown) extending downwards coaxially with axis A, and engaging a seat (not shown) formed in the top end of fastening plate 27.

[0036] The bottom hinge 25 comprises two brackets 35 and 36 hinged to each other to rotate with respect to each other about a hinge axis A, and fixed to the inner face of panel 23 and to front wall 24 of machine 40 respectively.

[0037] More specifically, in the Figure 4 example, bracket 35 comprises a preferably, though not necessarily, substantially L-shaped metal plate, and has a major portion fixed firmly by screws (not shown) to the inner face of panel 23, and, at the free end of the minor portion, a seat (not shown) for receiving a connecting pin (not shown) on the free end of bracket 36.

[0038] More specifically, bracket 36 comprises a preferably, though not necessarily, substantially L-shaped metal plate having a major portion fixed firmly to front wall 24 by screws 50, and a minor portion having the connecting pin (not shown) on the end.

[0039] In the example shown, screws 50 screw inside respective holes (not shown) formed in front wall 24, and the respective shanks fit through slots 52 formed in the

major portion of bracket 36.

[0040] In actual use, the vertical position of panel 23 is adjusted by fitting the top wall of machine 40 with a spacer 43 of a thickness S equal to the required vertical displacement of panel 23, and connecting top hinge 25 to spacer 43, and bottom hinge 25 to front wall 24. At this stage, slots 52 in bracket 36 permit vertical movement of bracket 36 with respect to the holes in wall 24, before screws 50 are tightened down.

[0041] In a different embodiment not shown, the bottom hinge 25 of fastening device 41 may be fixed to front wall 24 of the machine using adjusting plate 29 and plate 31, as in the Figure 1-3 embodiment described above.

[0042] In connection with the above, it should be pointed out that fastening devices 22 and 41 described may also be used to fix a panel 23 to electric household appliances other than washing machine 20 or 40, i.e. refrigerators, ovens, or other similar "recessed" appliances.

Claims

1. An electric household appliance (20) (40) comprising a casing (21), an outer panel (23), and fastening means (22)(41) for fixing said panel (23) to a wall (24) of said casing (21) to conceal the wall (24); said electric household appliance (20)(40) being **characterized in that** said fastening means (22) (41) are designed to permit rotation of said panel (23), with respect to said wall (24), about a predetermined hinge axis (A), and at the same time provide for adjusting the position of said panel (23), with respect to said wall (24), in an direction (D) substantially parallel to said hinge axis (A).
2. An electric household appliance as claimed in Claim 1, wherein said fastening means (22) comprise at least one hinge (25) having a first portion (27) fixed firmly to said panel (23), and a second portion (26) hinged to the first portion (27) to rotate about said hinge axis (A), and fitted to said wall (24) of said electric household appliance to slide in said direction (D); said fastening means (22) also comprising tightening means (28) for locking said second portion (26) to said wall (24) of said electric household appliance (20).
3. An electric household appliance as claimed in Claim 2, wherein said tightening means (28) for tightening said second portion (26) of said hinge (25) engage an elongated through opening (30) extending parallel to said hinge axis (A); said tightening means (28) sliding in said adjusting direction (D) inside said elongated through opening (30).
4. An electric household appliance as claimed in Claim 3, wherein said elongated through opening (30) is formed in said wall (24) of the electric household

appliance (20).

5. An electric household appliance as claimed in Claim 3, wherein said elongated through opening (30) is formed in an adjusting plate (29) fixed firmly to said wall (24) of the electric household appliance (20).
6. An electric household appliance as claimed in Claim 4 or 5, wherein said fastening means (22) comprise a plate (31) mounted to slide in a direction parallel to said hinge axis (A), and in a position facing said elongated through opening (30); said tightening means (28) being connected to said plate (31) so as to slide inside said elongated through opening (30).
7. An electric household appliance (40) as claimed in Claim 1, and comprising at least one substantially parallelepiped-shaped spacer (43) of a predetermined thickness (S) and fixed firmly to the top wall (42) of said electric household appliance (40); said fastening means (41) comprising at least a first hinge (25) having a first portion (27) fixed firmly to said panel (23), and a second portion (26) hinged to the first portion (27) to rotate about said hinge axis (A), and fixed firmly to said spacer (43).
8. An electric household appliance (40) as claimed in Claim 7, wherein said fastening means (41) comprise at least one hinge (25) comprising a first portion (27) fixed firmly to said panel (23), and a second portion (26) hinged to the first portion (27) to rotate about said hinge axis (A), and fixed firmly to said wall (24).
9. An electric household appliance (40) as claimed in Claim 8, wherein the second portion (26) of said hinge (25) is fixed firmly to said wall (24) by a plate (36) having at least one slot (52) for receiving tightening means (28) engaging corresponding holes formed in said wall (24).
10. An electric household appliance (40) as claimed in Claim 8, wherein said second portion (26) of said hinge (25) is formed as claimed in any one of Claims 2 to 6.
11. An electric household appliance (20)(40) as claimed in any one of the foregoing Claims, and corresponding to a washing machine or combination washing machine-drier, wherein said wall (24) corresponds to the front wall of said washing machine, and said panel (23) corresponds to a door.
12. An electric household appliance (20)(40) as claimed in any one of Claims 3 to 11, and comprising a control panel (18) and/or a detergent dispenser (19); said control panel (18) and/or detergent dispenser (19) being located on the top portion of said wall (24) and

aligned with the top edge of the wall; and said elongated through opening (30) of said fastening device being located alongside said control panel (18) and/or said detergent dispenser (19).

5

10

15

20

25

30

35

40

45

50

55

Prior Art

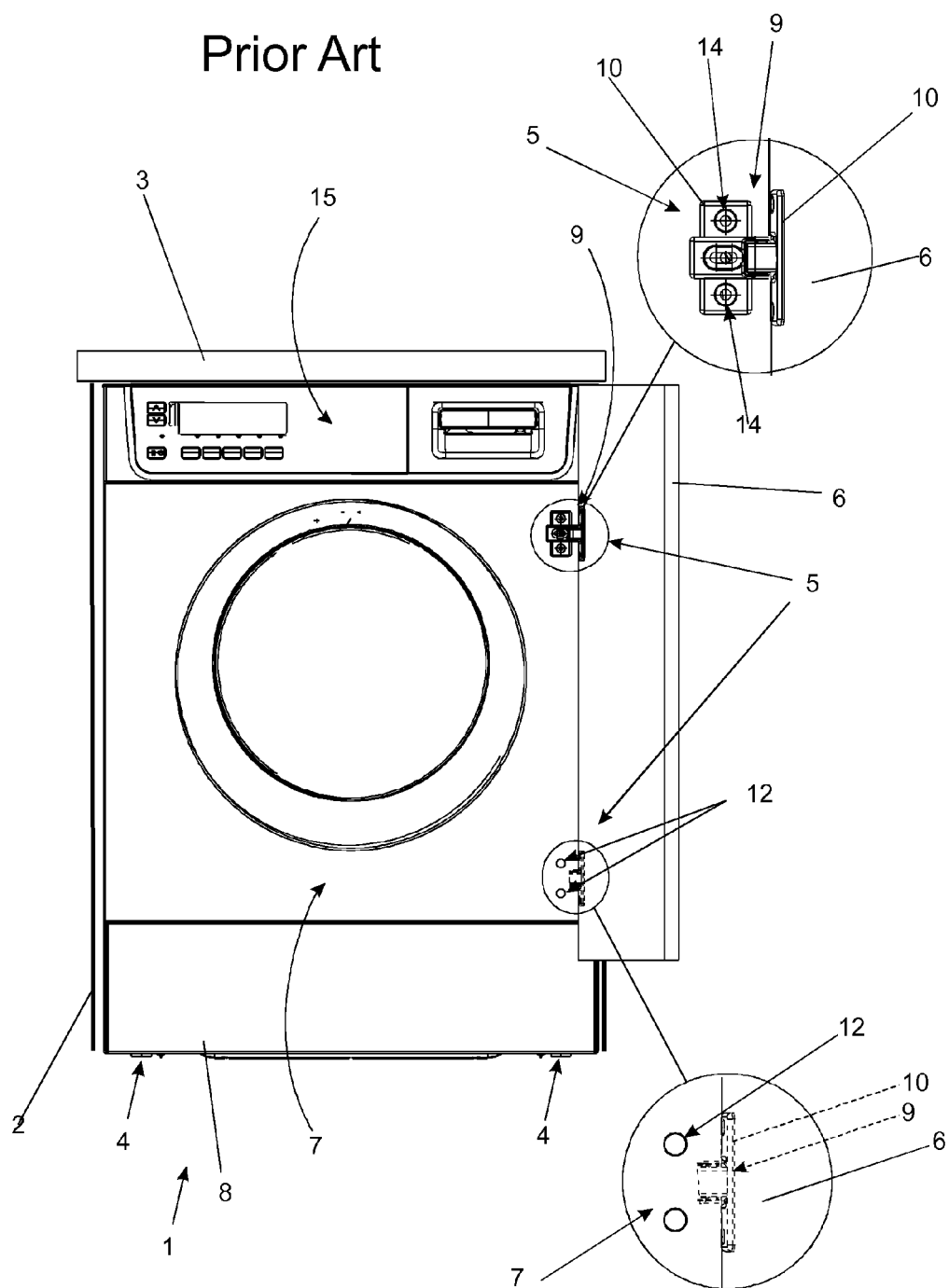


Fig. 1

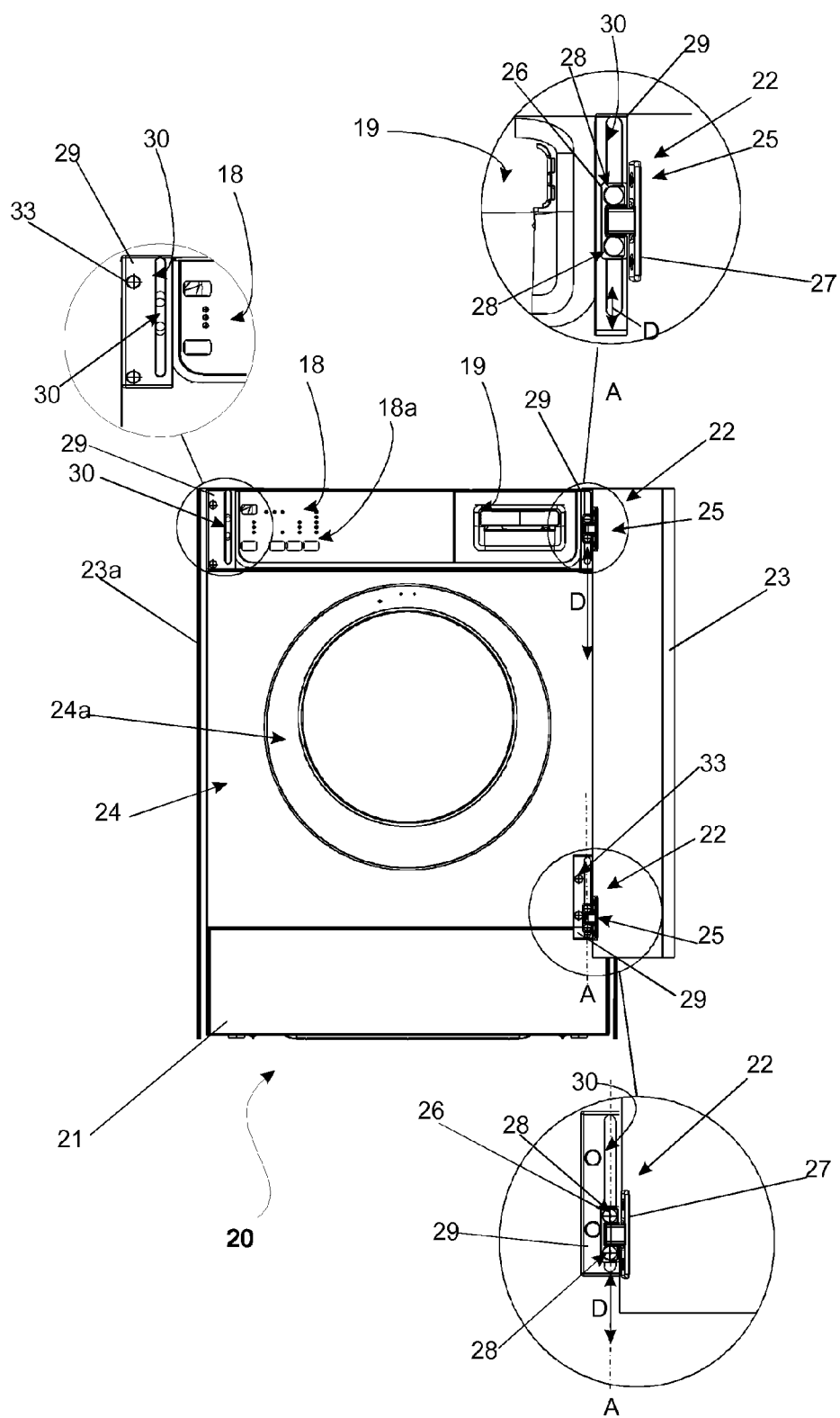


Fig. 2

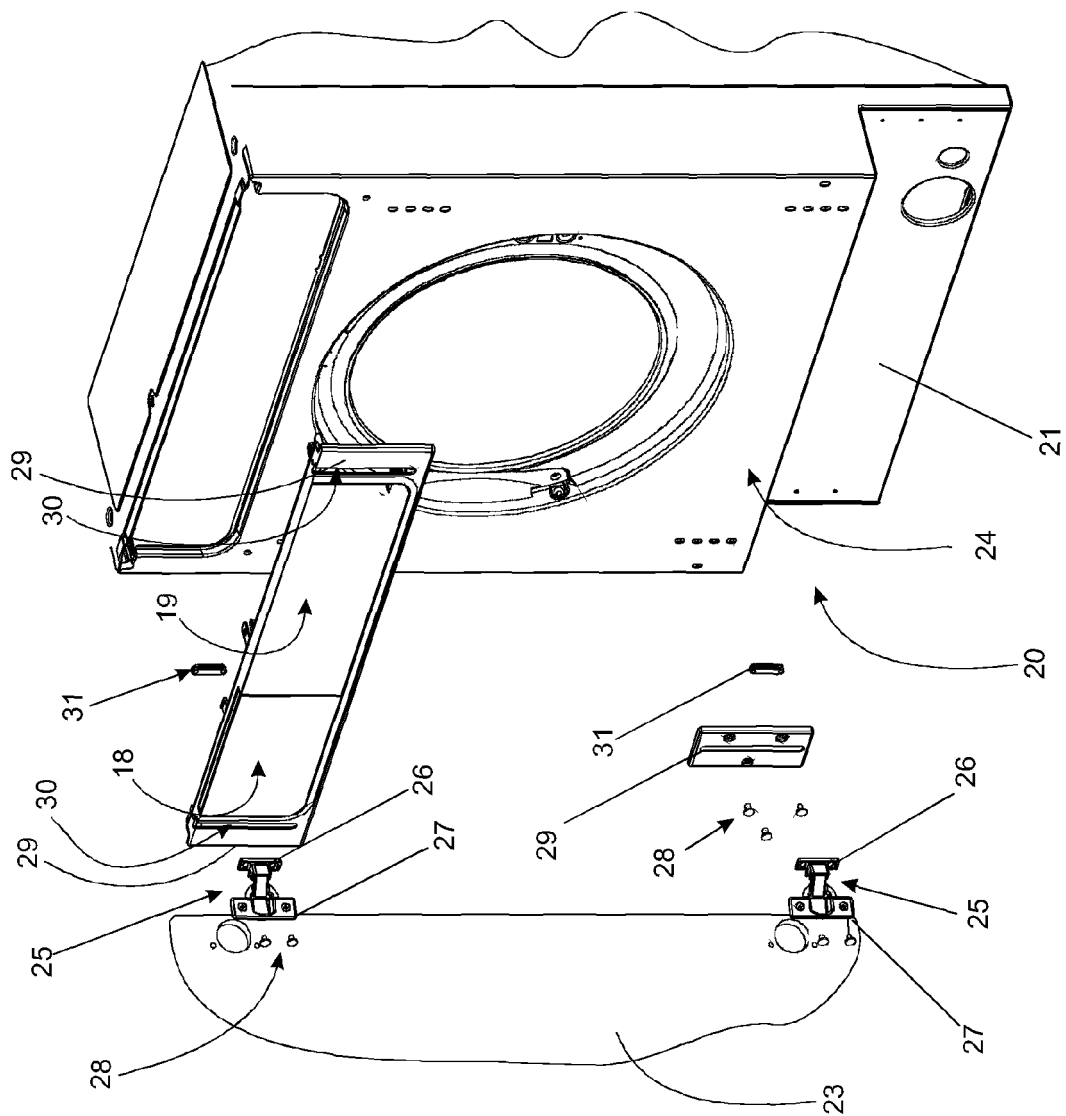
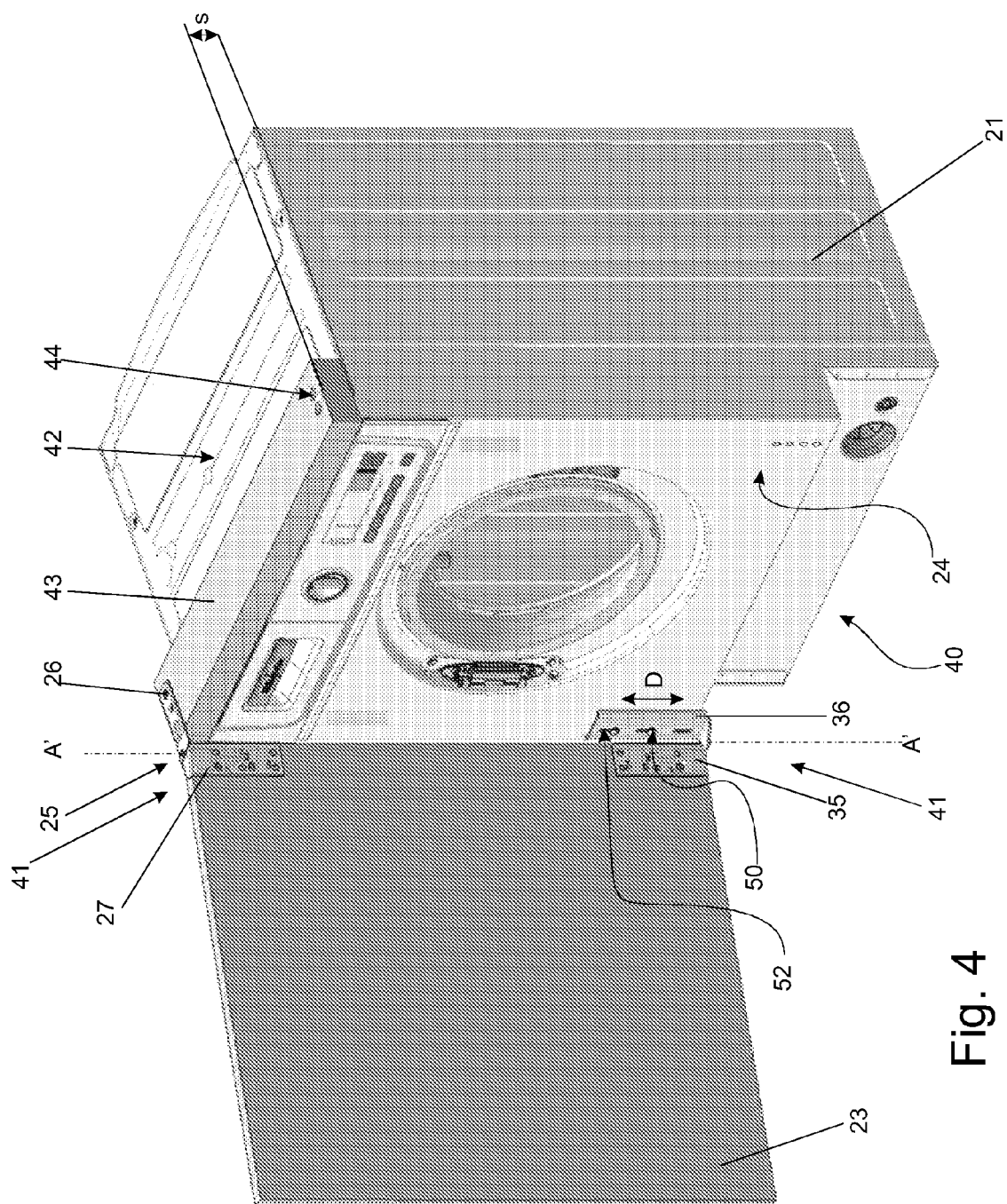


Fig.3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 4283

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 788 351 A (PRUNTY JEFFREY L [US] ET AL) 4 August 1998 (1998-08-04) * column 3, line 11 - line 28 * * column 4, line 53 - line 56; figure 3 *	1-3,5,6,11	INV. D06F37/28 A47L15/42
A	US 5 265 954 A (KEIL JOHN P [US]) 30 November 1993 (1993-11-30) * abstract; figure 2 *	1-12	
A	DE 299 21 641 U1 (MERLONI ELETTRODOMESTICI SPA [IT]) 17 August 2000 (2000-08-17) * abstract; figure 2 *	1-12	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			D06F A47L F25D E05D A47B
Place of search		Date of completion of the search	Examiner
Munich		9 September 2008	Westermayer, Wilhelm
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			

1
EPO FORM 1503 03.82 (P04C01)

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

EP 08 15 4283

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-09-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5788351 A	04-08-1998	NONE	
US 5265954 A	30-11-1993	NONE	
DE 29921641 U1	17-08-2000	DE 10012631 A1	13-06-2001

EPO FORM P0459

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