

(19)



(11)

EP 3 182 019 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.06.2017 Bulletin 2017/25

(51) Int Cl.:
F24C 15/08 (2006.01)

(21) Application number: **16201161.3**

(22) Date of filing: **29.11.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

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(30) Priority: **18.12.2015 TR 201516383**

(54) **A HOME APPLIANCE HAVING A COUPLING ELEMENT**

(57) The present invention relates to a home appliance (1) comprising a body (10), at least one flange (20) provided on said body (10), a connection piece (50) for providing the connection between the flange (20) and at least one panel (30), and having at least one connection channel (56) wherein the flange (20) is partially placed and an upper channel (52) wherein at least one engagement tab (34) of the panel (30) is placed, and a support

piece (60) which at least partially fills the gap provided between the flange (20) and a front wall (31) of the panel (30), **characterized** by comprising an engagement opening (39) provided at the engagement tab (34), and an engagement protrusion (57) provided at the upper channel (52) of the connection piece (50) in a manner corresponding to the engagement opening (39).

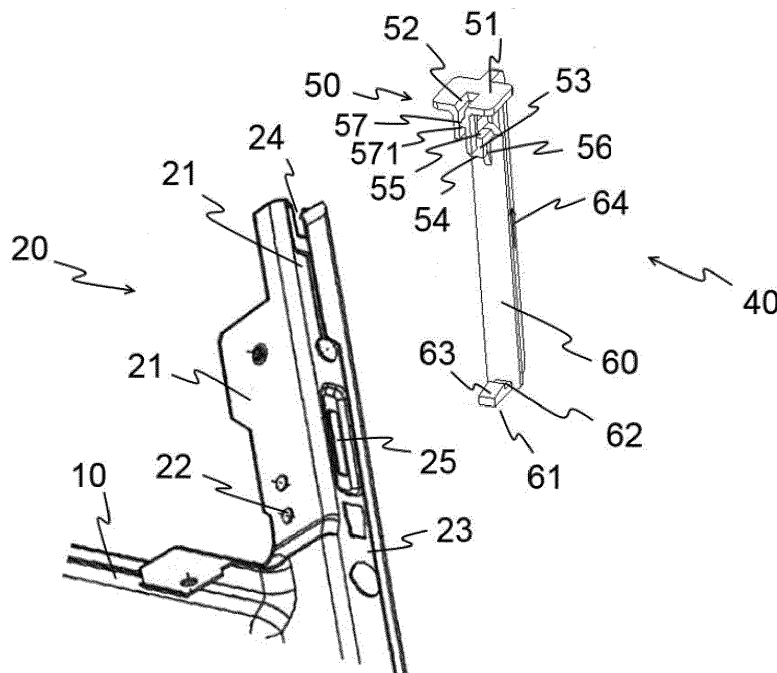


Figure 2

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Description

[0001] The present invention relates to a home appliance having a coupling element provided between the panel and the body of the home appliance.

[0002] The front panels of cooking appliances such as ovens are connected to the flange piece in the body by providing a support element in between. In order to provide connection of the front panel to the flange, a tab, provided on the front panel, engages to an engagement tip provided on the flange. For realizing said connection, an additional piece, placed to the housing, is required. Therefore, the number of assembly process steps and thus the cost increase. Moreover, since the front panel is not fixed, the panel lifts upwardly, and therefore, the assembly of the other pieces becomes difficult.

[0003] In the application DE102009000650, an appliance i.e. baking oven is disclosed, having a front part including an appliance door and adjacent parts provided for accommodating control and display bodies. The appliance door and the front part are detachably and separately fastened at the appliance housing. A locking element is arranged between the front part and the housing, and an engaging element is locked in the locking element and arranged for adjusting the front part opposite to a front surface.

[0004] The object of the present invention is to provide a home appliance where the assembly of the panel to the body is facilitated such that the panel is fixed in the vertical direction.

[0005] Another object of the present invention is to provide a home appliance where the production and mounting costs are reduced.

[0006] The present invention is a home appliance comprising a body, at least one flange provided on said body, a connection piece for providing the connection between the flange and at least one panel, and having at least one connection channel wherein the flange is partially placed and an upper channel wherein at least one engagement tab of the panel is placed, and a support piece which at least partially fills the gap provided between the flange and a front wall of the panel. The subject matter home appliance comprises an engagement opening provided at the engagement tab, and an engagement protrusion provided at the upper channel of the connection piece in a manner corresponding to the engagement opening. Thus, after the assembly of the panel and the body flange, the panel is fixed and the vertical movement of the panel is prevented. By means of this, the difficulties and visual faults faced in the assembly of the panel are prevented.

[0007] In a possible embodiment of the present invention, the engagement opening at least partially surrounds the engagement protrusion by means of placement of the engagement tab into the upper channel. Thus, by means of placement of the engagement tab of the panel into the upper channel of the connection piece, the engagement protrusion is placed to the engagement opening.

[0008] In a possible embodiment of the present invention, the engagement tab has a lower edge which prevents vertical movement of the panel. Thus, the vertical movement of the panel is prevented.

5 **[0009]** In a possible embodiment of the present invention, the engagement protrusion has a stop surface which stops onto the lower edge of the engagement tab. Thus, as the stop surface stops onto the lower edge of the engagement tab, the vertical movement of the panel is prevented.

10 **[0010]** In a possible embodiment of the present invention, at least one coupling element, comprising the connection piece and the support piece in a one-piece manner, is provided. Thus, while the coupling element is being produced, the connection piece and the support piece are produced simultaneously. During fixation of the coupling element to the flange, the assembly of the connection piece and of the support piece is realized simultaneously. By means of this, the production and assembly costs are reduced. Moreover, by means of the new form created, the risk of the erroneous fixation of the support piece is eliminated, and the assembly faults are prevented.

15 **[0011]** In a preferred embodiment of the present invention, an upper tab, whereon the connection channel is provided, is placed into a slit provided on the flange. Thus, when the upper tab is fixed on the flange, it is prevented from moving left and right.

20 **[0012]** In a preferred embodiment of the present invention, the upper channel is provided on a seating surface of the connection piece. Thus, when the engagement tab of the panel is placed into the upper channel, an upper wall of the panel where the engagement tab is provided presses onto the seating surface. By means of this, the connection piece is secured between the flange and the panel, and thus, the coupling element is fixed.

25 **[0013]** In a preferred embodiment of the present invention, the coupling element comprises at least one lower tab provided in the vicinity of one end of the support piece and placed to at least one housing provided on the flange. Thus, after the upper tab is fixed into the slit, the coupling element is pressed towards the flange, and the lower tab is fixed to the housing and the coupling element is fixed.

30 **[0014]** In a preferred embodiment of the present invention, at least one inclined surface is provided on the side of the lower tab facing the upper tab. Thus, when the support piece is pressed towards the flange, the lower tab is rested onto an edge of the housing, and it is bent in a manner moving away from the upper tab.

35 **[0015]** In a preferred embodiment of the present invention, at least one locking protrusion is provided at the end of the inclined surface. Thus, after the lower tab bends and it is inserted into the housing, the locking protrusion passes through the housing, and it provides the lower tab to be fixed to the housing. By means of this, the coupling element stays fixed on the flange.

40 **[0016]** In a preferred embodiment of the present invention, the support piece extends in the direction of the

height of the panel. Thus, the panel is supported along at least one section of its height.

[0017] In a preferred embodiment of the present invention, said upper channel extends in the same direction as the engagement tab, and it has a width in a manner receiving the engagement tab with substantial tightness. Thus, the engagement tab can be fixed to the upper channel without deformation, and the panel is fixed with substantial tightness.

[0018] In a preferred embodiment of the present invention, said coupling element is made of plastic. Thus, the coupling element can be produced in a one-piece manner with low costs.

[0019] In a preferred embodiment of the present invention, said home appliance is a cooking appliance, particularly an oven.

Figure 1 is a representative view of the subject matter home appliance.

Figure 2 is a representative exploded view of the connection of the panel to the body of the subject matter home appliance.

[0020] With reference to Figure 1; a home appliance (1), particularly an oven realizing the cooking process, has a body (10), and a panel (30) connected to said body (10). With reference to Figure 2; the panel (30) comprises a front wall (31), an upper wall (33) and a lower wall (35) extending towards the body (10) from two mutual edges of the front wall (31). The side of the front wall (31) facing the body (10) is defined as a rear face (32). A vertically provided engagement tab (34) is formed by means of partially bending one end of the upper wall (33) towards the lower wall (35). On the engagement tab (34), an engagement opening (39) is provided which is similar to "U" shape. Thus, a lower edge (341) is provided on the engagement tab (34). The edge of the lower wall (35), where the engagement tab (34) is provided, is partially bent towards the upper wall (33), and thereby a coupling protrusion (36) is formed. At least one opening (37) is provided on the coupling protrusion (36). On the panel (30), there are control knobs which control the functions of the home appliance (1), and there are sequential valve openings (38) providing connection of the control knobs to the shaft.

[0021] A flange (20) is provided on the body (10) of the home appliance (1). Said flange (20) is provided in a manner staying behind the panel (30) provided on the front face of the home appliance (1). The flange (20) extends upwardly from the upper ends of the body (10) on two sides of the body (10). The flange (20) has a support edge (23) and a coupling edge (21) provided essentially vertically with respect to each other. While said support edge (23) extends in an essentially parallel manner with respect to each other, the coupling edge (21) extends in an essentially orthogonal manner with respect to the panel (30) and with respect to the support edge (23). At least

one coupling opening (22) is provided on the coupling edge (21). There is a slit (24) embodied in recess form at the upper end of the support edge (23). At least one housing (25) is provided on the support edge (23). Said housing (25) is provided in opening form. Moreover, the housing (25) is in the form of a channel extending in the extension direction of the flange (20). The engagement tab (34) is provided in the alignment of the upper wall (33) of the panel (30), and the housing (25) is preferably provided in the vicinity of the lower wall (35) of the panel (30).

[0022] There is a coupling element (40) provided between the panel (30) and the support edge (23). The coupling element (40) has a connection piece (50) and a support piece (60). The coupling element (40) comprises the connection piece (50) and the support piece (60) in a one-piece manner. The connection piece (50) is provided in a one-piece manner on the support piece (60). The connection piece (50) is embodied in a T-like form.

There is a seating surface (51) provided horizontally at the upper section of the connection piece (50). At the same time, the seating surface (51) defines the upper face of the coupling element (40). There is an upper channel (52) provided in recess form extending from the seating surface (51) towards the support piece (60). An engagement protrusion (57), corresponding to the engagement opening (39), is embodied at the upper channel (52). The engagement protrusion (57) has a stop surface (571). An upper tab (53), extending outwardly, is embodied at the lower section of the upper channel (52). The upper tab (53) is provided in the vicinity of the section where the connection piece (50) and the support piece (60) are joined. A connection channel (56) is embodied on the upper tab (53). The connection channel (56) is embodied in recess form from the base (54) of the upper tab (53) towards the ceiling (55) thereof. The support piece (60) extends in the direction of the height of the panel (30). The support piece (60) has a form which is similar to a rectangular prism. At least one lower tab (61) is provided in the vicinity of an end of the support piece (60). In the preferred application, the lower tab (61) is positioned in the vicinity of the lower end of the support piece (60). The lower tab (61) has an inclined surface (63) provided on the side thereof facing the upper tab (53). At least one locking protrusion (62) is provided at the end of the inclined surface (63). At least one indicator (64), which indicates direction, is provided on the support piece (60).

[0023] The coupling element (40) is placed between the flange (20) and the panel (30). First of all, the coupling element (40) is connected to the flange (20) and afterwards, the panel (30) is fixed to the flange (20) and thus it is fixed to the body (10). The connection of the coupling element (40) to the flange (20) is as follows. The indicator (64), provided on the support piece (60), indicates the direction of connection of the coupling element (40) to the flange (20). The upper tab (53), provided on the connection piece (50), is placed into the slit (24) provided on

the support edge (23) of the flange (20). The support edge (23) and thus the flange (20) are partially placed into the connection channel (56). Thus, the rightward-leftward movement of the coupling element (40) is prevented. Afterwards, the coupling element (40) is pressed onto the flange (20), and the lower tab (61), provided at one end of the support piece (60), is inserted into the housing (25) provided on the support edge (23). By means of the inclined surface (63), when the coupling element (40) is pressed towards the flange (20), the lower tab (61) is rested to an edge of the housing (25), and it is bent in a manner moving away from the upper tab (53). When the lower tab (61) is bent and when it is inserted into the housing (25), the locking protrusion (62) passes through the housing (25), and it provides the lower tab (61) to be fixed to the housing (25). Thus, the coupling element (40) is fixed onto the flange (20), and the rotation or accidental movement of the coupling element (40) is prevented. Moreover, by means of the lower tab (61), the erroneous fixation of the coupling element (40) to the flange (20) is prevented. In case the coupling element (40) is fixed in an erroneous manner, the support edge (23) pushes the coupling element (40), and it indicates that the coupling element (40) is tried to be placed in an erroneous manner. Alternatively, the lower tab (61) can be positioned on the support edge (23), and the housing (25) can be positioned on the coupling element (40).

[0024] After the coupling element (40) is fixed to the flange (20), the panel (30) is fixed onto the body (10) of the home appliance (1). The engagement tab (34) embodied on the upper wall (33) engages to the upper channel (52) provided on the connection piece (50). The upper channel (52) extends in the same direction as the engagement tab (34). Moreover, the upper channel (52) has a width in a manner receiving the engagement tab (34) with substantial tightness. Thus, the engagement tab (34) can be fixed to the upper channel (52) without deformation, and the panel (30) can be fixed with substantial tightness. The engagement protrusion (57), embodied at the upper channel (52), is placed to the engagement opening (39) provided on the engagement tab (34). Thus, the engagement opening (39) at least partially surrounds the engagement protrusion (57), and the engagement opening (39) has a width in a manner surrounding the engagement protrusion (57) with substantial tightness. As the stop surface (571) of the engagement protrusion (57) stops onto the lower edge (341) of the engagement tab (34), the vertical movement of the panel (30) is prevented. Since the upper channel (52) is provided on the seating surface (51) of the connection piece (50), the upper wall (33) of the panel (30) presses on the seating surface (51) when the engagement tab (34) is placed in the upper channel (52). By means of this, the connection piece (50) is tightened between the flange (20) and the panel (30), and thus, the coupling element (40) is fixed. Meanwhile, the coupling edge (21) and the coupling protrusion (36) provided on the lower wall (35) are aligned. A connection element is passed

through the opening (37) provided at the coupling protrusion (36) and through the coupling opening (22) provided at the coupling edge (21). By means of this, the assembly of the panel (30) to the body (10) of the home appliance (1) is completed.

[0025] When the coupling element and the body (10) are connected to each other, since the coupling element (40) is fixed to the flange (20), the panel (30) is rested onto the support edge (23) from one side, and it is stopped onto the rear face (32) of the front wall (31) of the panel (30) from one side. Since the support piece (60) and thus the coupling element (40) extend in the direction of the height of the panel (30), the panel (30) is at least partially supported along the height thereof. In the preferred application, the coupling element (40) is made of a plastic based material, and the lower tab (61) can be obtained without the need for an additional process during the production. Moreover, the coupling element (40) can be produced in a one-piece manner with low costs; and during the production of the coupling element (40), the production of the connection piece (50) and of the support piece (60) is simultaneously realized. During fixation of the coupling element (40) to the flange (20), the assembly of the connection piece (50) and the support piece (60) is simultaneously completed. By means of this, the production and assembly costs are reduced, and moreover, the assembly duration is also reduced. Moreover, since the connection piece (50) is provided on the support piece (60) in a one-piece manner, the erroneous fixation of the coupling element (40) on the flange (20) is prevented.

REFERENCE NUMBERS

[0026]

1. Home appliance
10. Body
20. Flange
21. Coupling edge
22. Coupling opening
23. Support edge
24. Slit
25. Housing
30. Panel
31. Front wall
32. Rear face
33. Upper wall
34. Engagement tab
341. Lower edge
35. Lower wall
36. Coupling protrusion
37. Opening
38. Valve opening
39. Engagement opening
40. Coupling element

50. Connection piece
 51. Seating surface
 52. Upper channel
 53. Upper tab
 54. Base
 55. Ceiling
 56. Connection channel
 57. Engagement protrusion
 571. Stop surface

60. Support piece
 61. Lower tab
 62. Locking protrusion
 63. Inclined surface
 64. Indicator

Claims

1. A home appliance (1) comprising a body (10), at least one flange (20) provided on said body (10), a connection piece (50) for providing the connection between the flange (20) and at least one panel (30), and having at least one connection channel (56) wherein the flange (20) is partially placed and an upper channel (52) wherein at least one engagement tab (34) of the panel (30) is placed, and a support piece (60) which at least partially fills the gap provided between the flange (20) and a front wall (31) of the panel (30), **characterized by** comprising an engagement opening (39) provided at the engagement tab (34), and an engagement protrusion (57) provided at the upper channel (52) of the connection piece (50) in a manner corresponding to the engagement opening (39). 20
2. A home appliance (1) according to Claim 1, wherein the engagement opening (39) at least partially surrounds the engagement protrusion (57) by means of placement of the engagement tab (34) into the upper channel (52). 25
3. A home appliance (1) according to Claim 1 and 2, wherein the engagement tab (34) has a lower edge (341) which prevents vertical movement of the panel (30). 30
4. A home appliance (1) according to Claim 3, wherein the engagement protrusion (57) has a stop surface (571) which stops onto the lower edge (341) of the engagement tab (34). 35
5. A home appliance (1) according to any one of the preceding claims, wherein at least one coupling element (40), comprising the connection piece (50) and the support piece (60) in a one-piece manner, is provided. 40

6. A home appliance (1) according to any one of the preceding claims, wherein the upper channel (52) is provided on a seating surface (51) of the connection piece (50). 45

7. A home appliance (1) according to any one of the preceding claims, wherein the coupling element (40) comprises at least one lower tab (61) provided in the vicinity of one end of the support piece (60) and placed to at least one housing (25) provided on the flange (20). 50

8. A home appliance (1) according to Claim 7, wherein at least one inclined surface (63) is provided on the side of the lower tab (61) facing the upper tab (53). 55

9. A home appliance (1) according to Claim 8, wherein at least one locking protrusion (62) is provided at the end of the inclined surface (63). 60

10. A home appliance (1) according to any one of the preceding claims, wherein the support piece (60) extends in the direction of the height of the panel (30). 65

11. A home appliance (1) according to any one of the preceding claims, wherein said upper channel (52) extends in the same direction as the engagement tab (34), and it has a width in a manner receiving the engagement tab (34) with substantial tightness. 70

12. A home appliance (1) according to any one of the preceding claims, wherein said coupling element (40) is made of plastic. 75

13. A home appliance (1) according to any one of the preceding claims, wherein said home appliance (1) is a cooking appliance, particularly an oven. 80

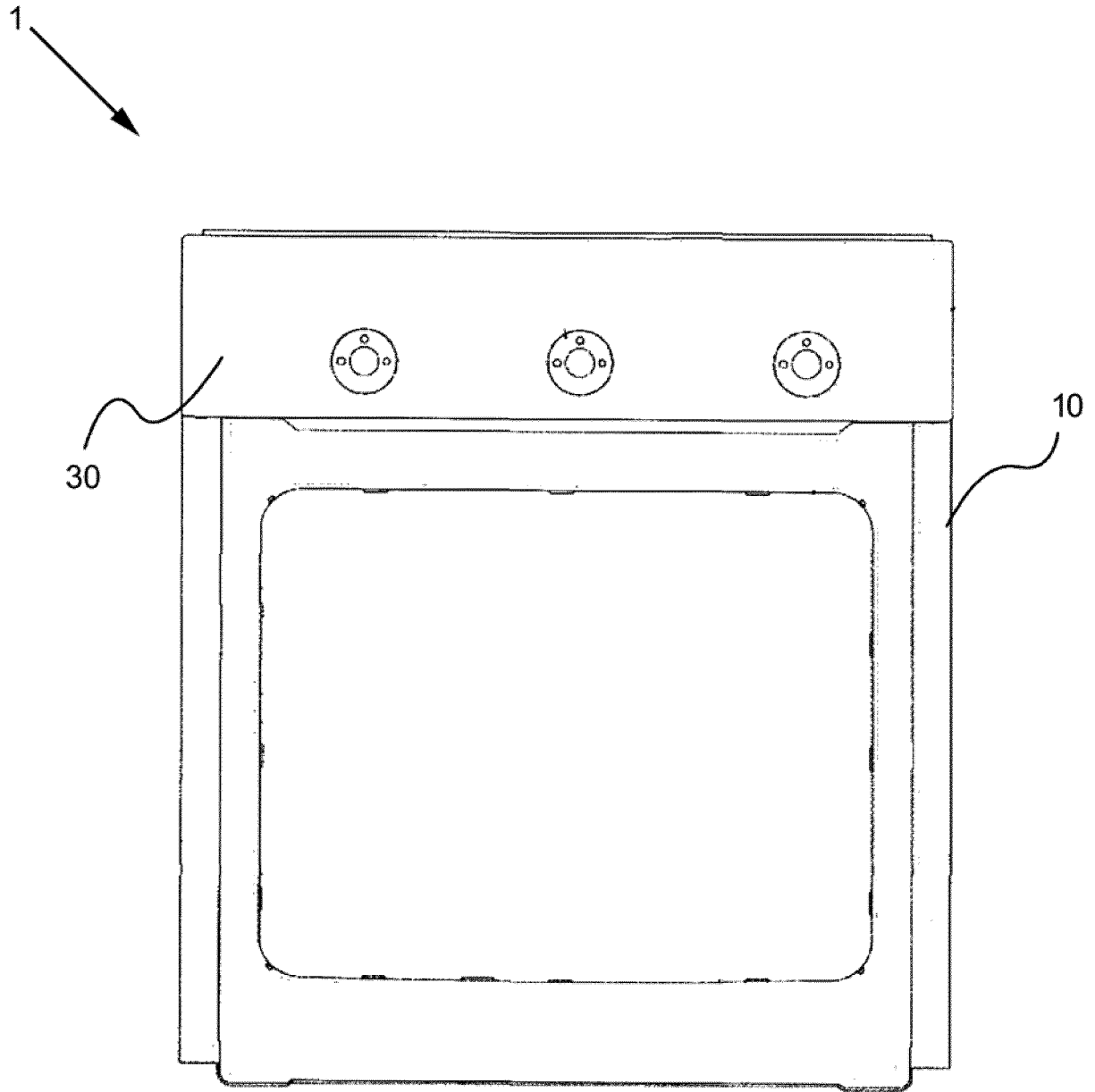


Figure 1

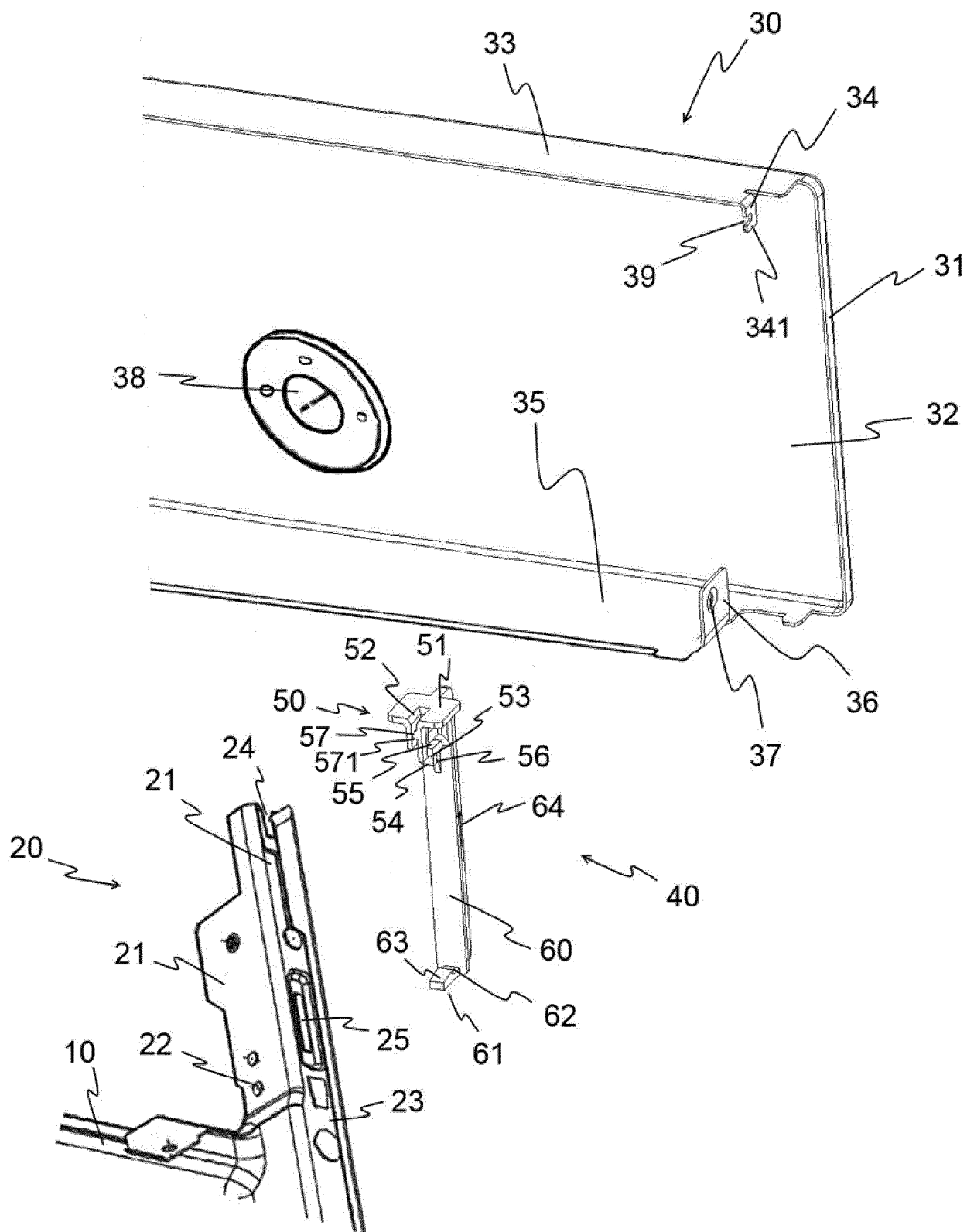


Figure 2



EUROPEAN SEARCH REPORT

Application Number
EP 16 20 1161

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	DE 10 2009 001547 A1 (BSH BOSCH SIEMENS HAUSGERÄTE [DE]) 16 September 2010 (2010-09-16) * figures 1-3 *	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 11 May 2017	Examiner Moreno Rey, Marcos
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			

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

EP 16 20 1161

5 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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11-05-2017

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REFERENCES CITED IN THE DESCRIPTION

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