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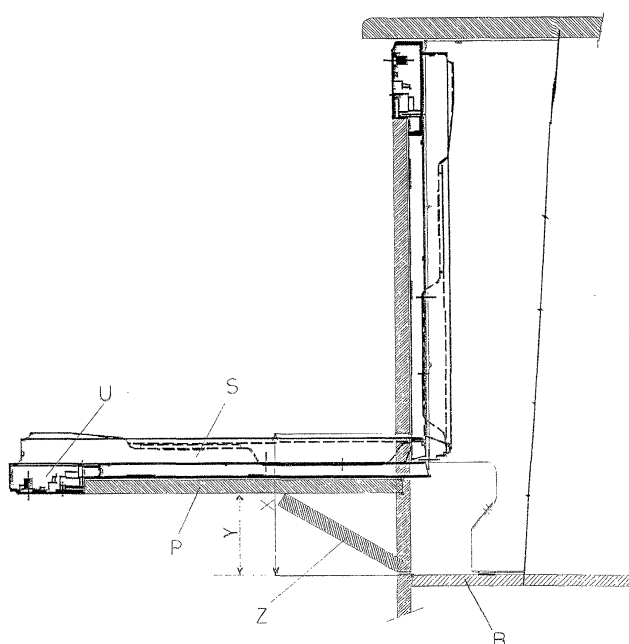
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(54) **Built in domestic appliance with front decorative panels**

(57) In a built-in domestic appliance with a door (S) hinged along its bottom side and provided with a top front decorative panel (P) applied to the door (S) and with a bottom front decorative panel acting as a plinth (Z) and arranged flush with the top panel (P), the plinth (Z) is applied to the appliance through a mounting system including a parallelogram hinge connecting the plinth (Z) to a support which is in turn carried by a bracket secured to the appliance base, as well as means for driv-

ing the hinge so as to incline the plinth (Z) forward upon opening of the door (S). In this way it is possible to use any mounting system for the top panel (P) applied to the door (S), which can even be of the type where the control panel (U) is permanently visible, so that no difficulty results in the installation inside the furniture nor in the lowering of the top panel with the door closed even if the plinth (Z) is flush with the panel (P), which can even be shorter than the door (S) so as to be able to use as plinth (Z) a bottom panel of standard height.



**Fig. 1**

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## Description

**[0001]** The present invention relates to built-in domestic appliances lined with decorative panels, and in particular to domestic appliances installed in kitchen furniture which completely encloses them (so-called "fully integrated"). Reference will be made hereafter to a dishwasher while it is clear that what is said applies to any other domestic appliance with similar decorative panels, e.g. a washing machine.

**[0002]** This type of decorative panels is known to be used to camouflage a built-in appliance so that it blends with the kitchen furniture. This is achieved by applying to the door of said appliance, by various means, a top panel having the same appearance of the other doors. In this way there is no visible element allowing to distinguish the appliance from the other members which make up the kitchen, its controls being accessible only when the door is open.

**[0003]** Moreover, below the panel applied to the door there is a plinth which acts as complementary bottom panel to maintain the continuity of the lining while allowing the opening of the door.

**[0004]** However, the presence of these panels poses particular problems in the case of installation inside a piece of furniture, i.e. when the dishwasher rests on the bottom of the furniture and is placed flush with the side walls thereof. In fact in this case the top panel must also cover the front edge of said side walls, same as normally occurs with the other doors. But in this way it would interfere with the walls when the dishwasher door is opened and the panel moves back into the space behind the plinth.

**[0005]** The solutions presently available to prevent such an interference are only those of forming a recess in the side walls or of hinging the panel directly to the piece of furniture which contains the dishwasher. In the first case it is required to carry out a significant work of furniture adaptation to form in the sides the space for receiving the panel when the door is opened. In the second case it is necessary to mount a spacer on the bottom of the furniture and to find the exact hinging level for a smooth operation of the panel. Moreover, the plinth cannot be applied and must be replaced by an underlying element, such as the front face of a bottom drawer, to cover the spacer and the hinges mounted thereon.

**[0006]** In both cases these additional workings make the installation long and costly, and moreover the direct mounting on the furniture causes a further drawback. In fact the presence of the spacer on the furniture bottom makes complicated to pull the dishwasher out of the furniture if need arises for a maintenance intervention, since it is necessary to take away and then put back in place the spacer on the furniture as well as the panel on the dishwasher door.

**[0007]** In order to overcome these drawbacks the applicant has already devised a mounting system with upward sliding of the top panel with respect to the door

upon opening (European application n.02425296.7). However also this solution is not completely satisfying since it is not applicable to doors where the control panel is permanently visible, and therefore projects over the panel, neither allows the lowering of the panel with the door closed because the panel is secured to the machine base at its bottom.

**[0008]** The problem of lowering the panel is dealt with by the applicant also in the European application n. 02425353.6 with specific reference to the presence of the plinth flush with the top panel. In this case the mounting system of the top panel is carried only by the door and allows the lowering even with the door closed. The drawback still remains however that the panel must be of greater height than the door to allow the complete opening at 90° of the latter, which otherwise would interfere with the underlying plinth, whereby the plinth must have a limited height and it is not possible to use for it a bottom panel of standard height.

**[0009]** Therefore the object of the present invention is to provide a domestic appliance provided with a mounting system of the bottom panel or plinth which overcomes the aforementioned drawbacks.

**[0010]** This object is achieved by means of a domestic appliance in which the plinth is mounted through a parallelogram hinge secured to the base of the machine itself, preferably through a height-adjustable support, and controlled through a bar integral with the door so as to incline the plinth forward upon opening of the door.

**[0011]** The main advantage of the domestic appliance with the plinth mounting system according to the present invention is the possibility of using any mounting system for the top panel applied to the door, so that no difficulty results in the installation inside the furniture, nor in the lowering of the top panel with the door closed to check the cycle phase and/or to discharge air through a suitable top grid during the drying phase.

**[0012]** A further advantage of this solution is that of being able to use as plinth also panels of standard height, typically 18 cm, since it is no longer necessary that the top panel is higher than the door.

**[0013]** Still another advantage of the present system stems from its extreme structural simplicity which makes it cheap and reliable.

**[0014]** These and other advantages and features of the domestic appliance according to the present invention will be evident to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the attached drawings, wherein:

Fig. 1 is a partial diagrammatic sectional side view showing a dishwasher according to the invention of the type with permanently visible control panel;

Fig. 2 is an enlarged view similar to the preceding one showing in detail the mounting and moving system of the plinth omitted in fig. 1;

Fig. 3 is a view similar to the preceding one showing an intermediate phase of the door opening, at an

angle of about 40°; and

Fig. 4 is a view similar to the preceding one with the door fully open.

[0015] Starting from fig. 1, there is first shown that a dishwasher introduced inside a piece of furniture includes a decorative panel P applied to the door S, the distance X between the bottom edge of panel P and the furniture bottom B being covered by a plinth Z. This plinth Z has a height greater than the distance Y between the bottom B and the level reached by panel P when the door is opened, but the latter can nonetheless open to 90° thanks to the moving system of the plinth Z which controls the forward inclination thereof upon opening of door S.

[0016] It should be noted that in this case panel P is applied to the door in a conventional way, since the dishwasher is of the type where the control panel U is permanently visible, but nothing changes when the system is applied to a dishwasher with panel P vertically sliding upward or downward along door S as those described in the above-mentioned European applications n. 02425296.7 and n.02425353.6.

[0017] Referring now to fig.2, there is illustrated the mounting and moving system of plinth Z which clearly results arranged flush between panel P of door S and a panel V of the underlying piece of furniture (e.g. the front face of a drawer).

[0018] Plinth Z carries at its bottom end a bracket H connected through pins C to rods J, K of a parallelogram hinge. These rods are in turn connected at their opposite ends through pins D to an L-shaped support G, which is in turn inserted onto a bracket F secured to the dishwasher base M. The vertical position of support G is defined by means of screws and may be adjusted within adjustment slots A formed in bracket F.

[0019] From the upper rod K a lever L extends vertically, a roller R carried by a bar T integral with door S abutting on the front side thereof. The position of lever L, and therefore of the parallelogram hinge integral therewith, is maintained by a spring E arranged and restrained between bracket F and lever L.

[0020] The simple and effective operation of the present mounting and moving system for plinth Z is readily understood from the description above with the help of figs.3 and 4.

[0021] Upon opening of door S, bar T pushes lever L through roller R and causes the rotation thereof around the fixed pin D of rod K, overcoming the resistance of spring E. This causes rods J, K to rotate upward around pins D, thus resulting in a rototranslational movement of bracket H through pins C. This calculated movement of bracket H allows the forward inclination of plinth Z without interference either with the overlying panel P or the underlying panel V.

[0022] Upon complete opening at 90°, lever L is inclined backward at about 40° with roller R at the end thereof, whereas plinth Z is inclined forward at about 60°

due to the effect of the parallelogram hinge.

[0023] It is obvious that in the reverse movement, when door S is closed, spring E returns lever L to the vertical position and consequently also plinth Z through the hinge.

[0024] From the above figures it is clear that in no phase of the movement panel P or plinth Z move closer to the dishwasher or mutually interfere, or interfere with the underlying panel V, whereby there is no problem of interference with the furniture sides. Furthermore, since the whole mounting system is secured to the dishwasher, the latter can be easily pulled out of the furniture for maintenance, if any, without requiring the removal of any member of the furniture.

[0025] Also the adaptation to panels of different heights is simple and readily understood from Fig.2. In fact it is sufficient to adjust the position of support G on bracket F, by lowering it along slots A through a distance equal to the exceeding height of panel P and/or plinth Z, possibly providing extension members for bar T and/or lever L.

[0026] It is clear that the above-described and illustrated embodiment of the domestic appliance according to the invention is just an example susceptible of various modifications. In particular, the driving of the parallelogram hinge to incline plinth Z forward can be performed in other ways, for example by replacing roller R with a friction slide of suitable material since the relative movement between bar T and lever L takes place at low speed and with a reduced load.

## Claims

1. A built-in domestic appliance with a door (S) hinged along its bottom side, provided with a top front decorative panel (P) applied to said door (S) and with a bottom front decorative panel acting as a plinth (Z) and arranged flush with said top panel (P), **characterized in that** said plinth (Z) is applied to the appliance through a mounting system including a parallelogram hinge connecting the plinth (Z) to a support (G) which is in turn carried by a bracket (F) secured to the appliance base (M), as well as means for driving said parallelogram hinge so as to incline the plinth (Z) forward upon opening of the door (S).
2. A built-in domestic appliance according to claim 1, **characterized in that** the plinth (Z) carries at its bottom end a bracket (H) connected through pins (C) to rods (J, K) which are in turn connected through pins (D) at their opposite ends to an L-shaped support (G).
3. A built-in domestic appliance according to claim 2, **characterized in that** the means for driving the parallelogram hinge consist of a lever (L) extending vertically from the upper rod (K), a roller (R) carried

by a bar (T) integral with the door (S) abutting on the front side thereof, the position of said lever (L) being maintained by a spring (E) arranged and restrained between the bracket (F) for the mounting on the dishwasher and the lever (L).

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4. A built-in domestic appliance according to one or more of the preceding claims, **characterized in that** the position in height of the support (G) on the bracket (F) is adjustable.

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5. A built-in domestic appliance according to claim 4, **characterized in that** the support (G) is mounted onto the bracket (F) by means of screws whose vertical position can be adjusted within adjustment slots (A) formed in the bracket (F).

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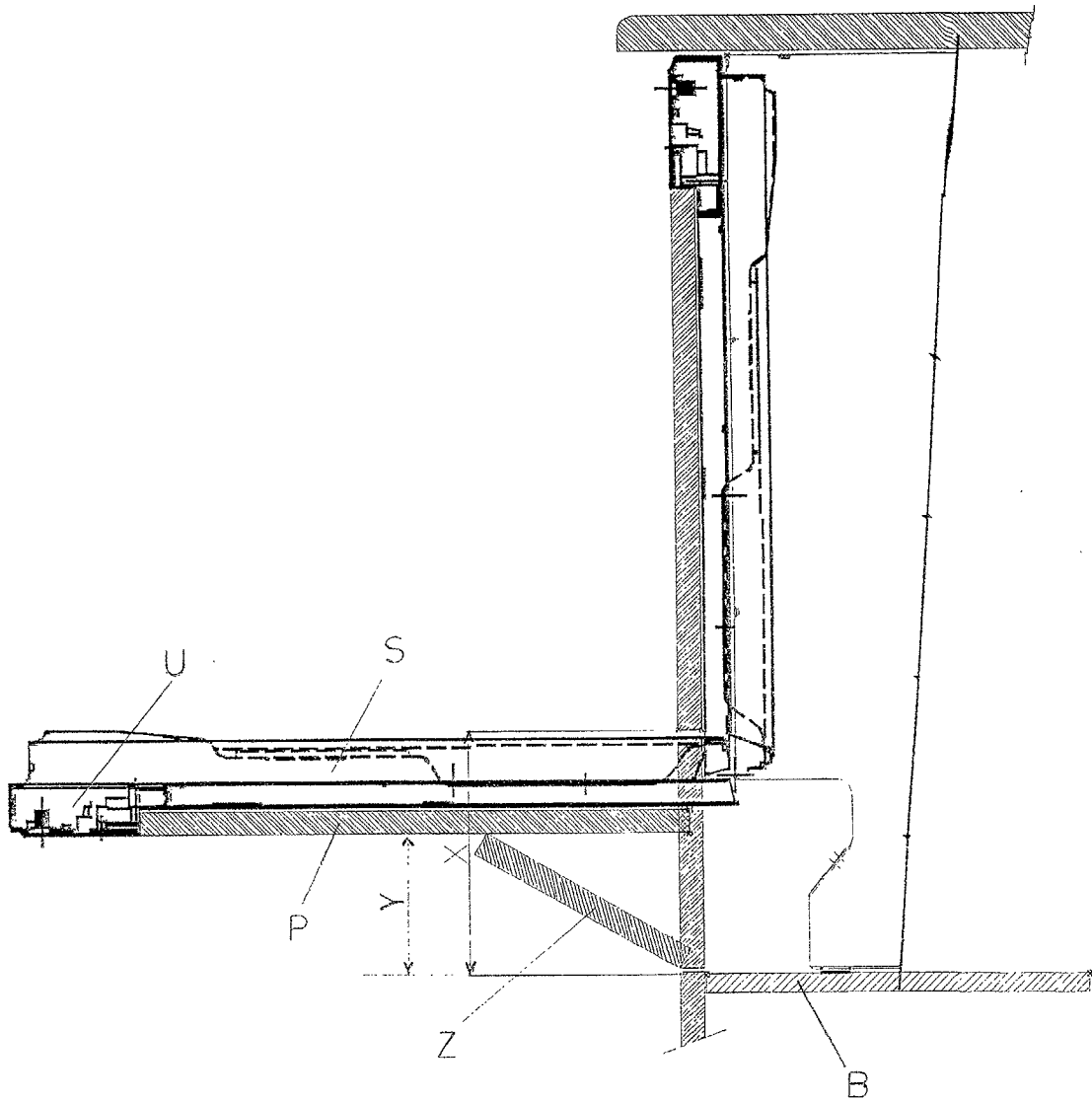
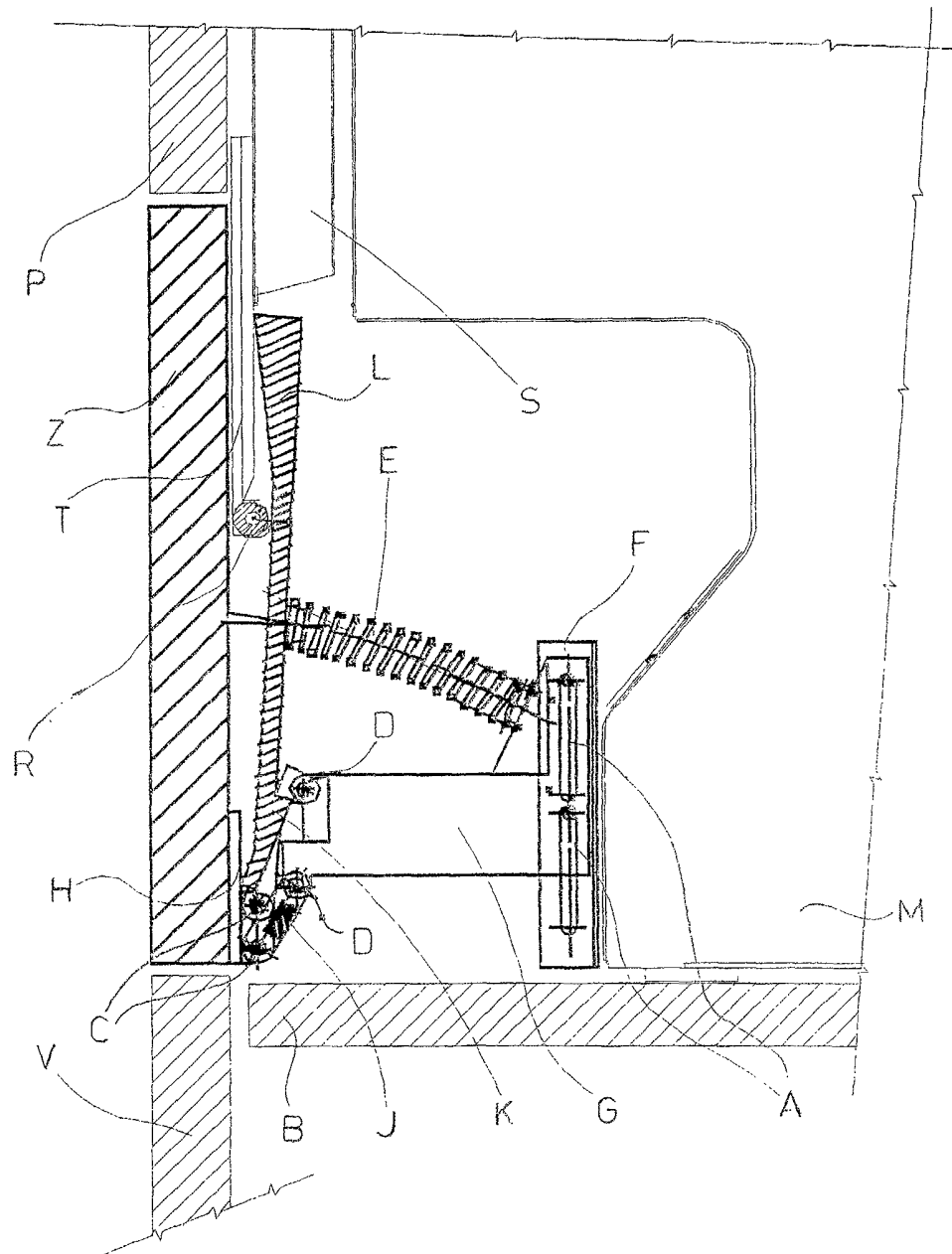


Fig. 1



***Fig. 2***

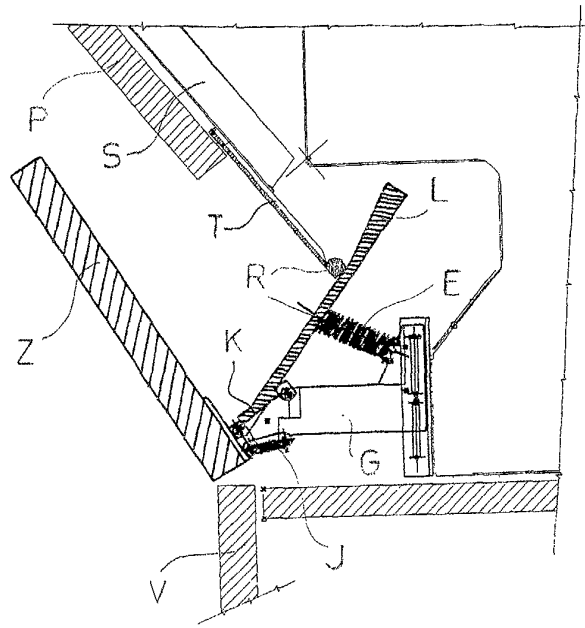


Fig. 3

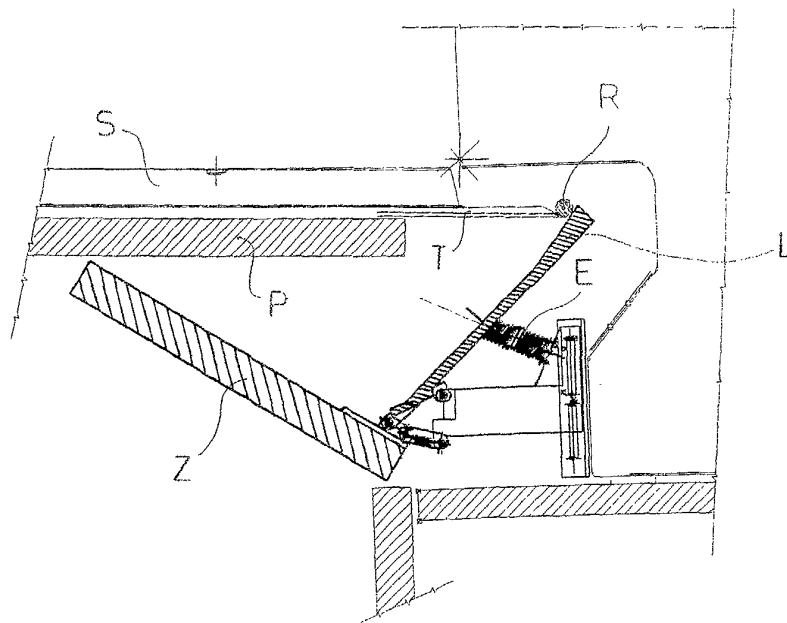


Fig. 4



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# EUROPEAN SEARCH REPORT

Application Number  
EP 02 42 5448

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 1 216 643 A (BSH BOSCH SIEMENS HAUSGERAETE) 26 June 2002 (2002-06-26) * the whole document *	1, 2	A47L15/42
X	EP 1 169 963 A (BLUTHAUP GMBH & CO KG KUECHENS) 9 January 2002 (2002-01-09) * the whole document *	1	
A	US 4 756 054 A (MITTS RICHARD K ET AL) 12 July 1988 (1988-07-12) * the whole document *	1, 4, 5	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47L
Place of search THE HAGUE		Date of completion of the search 13 January 2003	Examiner Norman, P
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  
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EP 02 42 5448

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13-01-2003

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