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Remarks:

Amended claims in accordance with Rule 86 (2) EPC.

(54) Device for applying a decorative panel to a structure

(57) A device for applying and adjusting in height a decorative panel (P) applied to a structure (A) to be lined, such as the door of a built-in dishwasher, includes a bracket (B) secured on the rear of the panel (P) and provided with a peg (C) that engages a corresponding member arranged on the dishwasher door, said peg (C) resting on an eccentric portion (E) of a horizontal shaft (S) received in a seat (K). In order to adjust the height of the panel (P) it is sufficient to rotate the shaft (S) so as to move the eccentric portion (E) upward or downward and therefore also the peg (C) resting thereon, whereby the position in height of the panel (P) is adjusted with extreme precision and great rapidity without removing it from the door and without having to loosen and re-tighten the screws of the bracket (B).

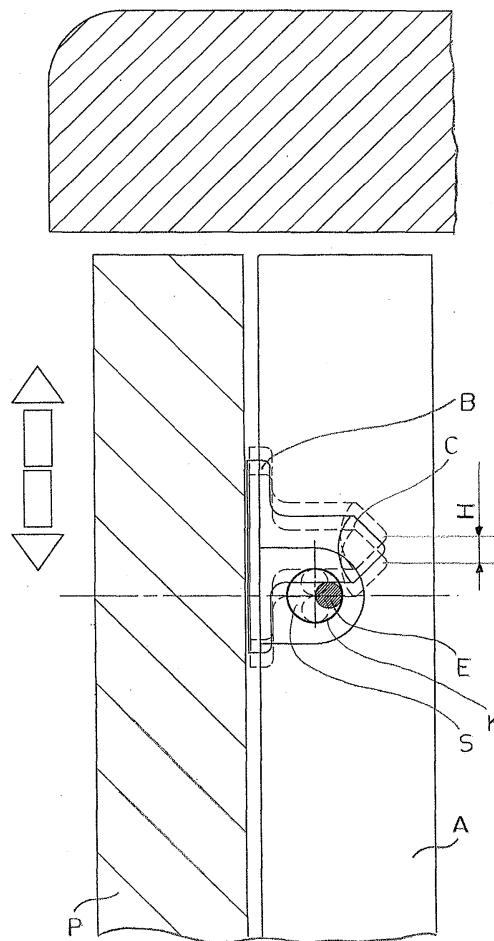


Fig. 3

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Description

[0001] The present invention relates to built-in domestic appliances lined with decorative panels, and in particular to a device suitable to provide the application and a quick and easy adjustment in height of such a panel. 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, as well as to other similar applications that provide the precise positioning of a decorative panel on a structure to be lined.

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

[0003] The panel is applied to the domestic appliance through mounting devices that usually include one or more brackets secured on the rear of the panel and provided with coupling members suitable to engage corresponding members provided on the domestic appliance, such as seats formed in the door or plinth-supporting arms. The brackets are secured on the panel by means of screws, the screwing position being defined by reference holes obtained through a drilling template.

[0004] A drawback of this mounting device is that after having applied the panel to the domestic appliance it often occurs that the panel is not precisely aligned with the other kitchen doors. This is due to the fact that the mounting brackets are not exactly positioned in the intended location, whereby it is necessary to remove the panel and re-position the brackets.

[0005] This operation requires precise measurements for the relative shifting of the brackets with respect to the screws by exploiting the adjustment slots usually provided on the brackets. Moreover it is not infrequent that the panel must be drilled again to re-position the screws due to the deterioration of the holes, since the panels are often made from chipboard.

[0006] It is therefore clear that such an operation implies a substantial waste of time to: measure the required correction, remove the panel, loosen the bracket screws, move the brackets through the measured distance, tighten the screws again (with the risk of damaging the holes) and put back the panel to check the outcome of the adjustment.

[0007] The problem is still more important when not only one but even two panels are applied to the domestic appliance one on top of the other, as in the above-mentioned case of a built-in dishwasher with a panel applied

to the door and a bottom panel acting as plinth (e.g. see EP-1380250 of the same applicant). In this case the adjustment work is doubled and made more difficult by the mutual influence of the adjustment of one panel with respect to the other.

[0008] Therefore the object of the present invention is to provide a device for mounting and adjusting in height a decorative panel applied to a domestic appliance which overcomes the aforementioned drawbacks.

[0009] This object is achieved by means of a device that in addition to providing the known coupling members on the panel and on the appliance is provided with a horizontal shaft whose longitudinal profile includes a portion that is eccentric with respect to the rotation axis, on which eccentric portion rests the bracket secured on the panel.

[0010] The main advantage of the device according to the present invention is the possibility of adjusting with extreme precision and great rapidity the position in height of the panel without removing it from the domestic appliance and without having to loosen the bracket screws.

[0011] A further advantage of this device is that of being easily made in various embodiments depending on the type of required mounting (on a door, as a plinth, etc.) and always with a simple, cheap and reliable structure.

[0012] These and other advantages and features of the device according to the present invention will be evident to those skilled in the art from the following detailed description of two embodiments thereof, with reference to the attached drawings, wherein:

Fig.1 is a diagrammatic front view of a decorative panel applied to a built-in dishwasher through two devices according to a first embodiment the invention;

Fig.2 is a partial sectional enlarged view along the line II-II of fig.1;

Fig.3 is a diagrammatic partial sectional enlarged view along the line III-III of fig.1;

Fig.4 is a diagrammatic vertical sectional view of a dishwasher provided with two decorative panels applied through devices according to the invention;

Fig.5 is a perspective exploded view of a second embodiment of the present device for mounting a panel as a plinth on the dishwasher of fig.4; and

Fig.6 is a perspective view of the device of fig.4 in the assembled state and with the indication of the adjustment capacity.

[0013] With reference to figures 1 to 3, there is seen that a built-in domestic appliance A is provided with a decorative panel P that has to be mounted aligned with the adjacent kitchen doors as well as properly spaced from the kitchen top. The mounting of panel P is preferably achieved, to obtain a balanced movement, through a pair of devices D symmetrically arranged close to the side edges of the panel at the top portion thereof.

[0014] Each device D includes a bracket B secured on

the rear of panel P and provided with a coupling member C suitable to engage a corresponding member provided on the dishwasher door. In particular, in the illustrated example the coupling member C consists of a peg having an ogive-shaped tip extending rearwardly into a cylindrical body whose cross-section is reduced by a recess along a plane parallel to a vertical mid-plane, thus forming a vertical tooth on the rear of the tip. Said peg C is introduced into a seat formed in the door, and a horizontal cylindrical bolt (omitted for the sake of clarity of the drawing) whose inner end has a vertical abutment projects inside the seat. The coupling of peg C takes place through the axial sliding of the bolt in its own seat against the action of a spring, which prevents the subsequent uncoupling only made possible by using a specific tool.

[0015] Bracket B, through peg C, rests on a horizontal shaft H at an eccentric portion E of the latter. Shaft S is rotatably received in a seat K formed in the appliance A, and it is retained therein by a circlip (not shown) arranged in a groove G formed close to the inner end of shaft S.

[0016] The rotation of shaft S within seat K is not free in that there is provided a small interference therebetween, so that the weight of panel P is not sufficient to cause the rotation of shaft S but rather it is necessary to apply a torque by engaging the outer end thereof which is accessible from the door side (fig.2).

[0017] The simple and effective operation of the present mounting and adjustment device for panel P is readily understood from the description above, in particular with reference to fig.3 where peg C is depicted abutting on the eccentric portion E (hatched circle) of shaft S when said portion E is horizontally aligned with the rotation axis of shaft S.

[0018] In order to adjust the height of panel P it is sufficient to rotate shaft S so as to move the eccentric portion E upward or downward (circles in broken lines) and therefore also peg C resting thereon (pegs in broken lines). The maximum adjustment travel H is obviously given by the distance between the rest points of peg C on the eccentric portion E when the latter is vertically aligned with the rotation axis.

[0019] It should be noted that although in the illustrated example it is peg C that rests on the eccentric portion E, the adjustment can be performed also if any other part of bracket B rests on said portion E or even if any member integral with panel P, though not making part of bracket B, rests on portion E.

[0020] Moreover, in order to prevent the repeated movement of the door to which panel P is applied from causing a loss of adjustment, it is preferable that upon setting the exact position of panel P the latter is locked with respect to the door by means of a specific locking member such as a screw.

[0021] The same shaft S can be used also in the second embodiment of the device illustrated in figs.4-6 that refer to a dishwasher with two decorative panels arranged one on top of the other.

[0022] In this case the top panel P is applied and ad-

justed through a device as described above and then locked on door A by a locking screw L, whereas the bottom panel P' acting as a plinth is applied and adjusted on the support structure A' through a device as illustrated hereunder and then locked by a relevant screw L'.

[0023] In the second embodiment the bracket B' secured on panel P' has a coupling member C' different from the above-illustrated peg C, since the coupling takes place through a vertical sliding, yet also in this embodiment it is said member C' that rests on the eccentric portion E of shaft S having an interference fitting in a seat K' as described above.

[0024] Also the locking by screw L' is carried out in a different way, since said screw engages a hole Q in bracket B' by passing through a vertical slot R in the support structure A', so that it can slide with respect to said structure A' in case of adjustment of the position of panel P'.

[0025] This adjustment is achieved very easily, as shown in fig.6, by using a Phillips screwdriver to rotate shaft S whose outer end is provided with a cross-shaped slot X. Obviously, the rotation might be obtained through other similar tools, e.g. an Allen wrench if shaft S has an hexagonal socket head.

[0026] Therefore it is evident that the device according to the present invention allows to perform a precise and quick adjustment of the decorative panel without requiring any removal and re-mounting operation of the latter, neither loosening and re-tightening of the screws of brackets B, B'.

[0027] It is clear that the above-described and illustrated embodiments of the device according to the invention are just examples susceptible of various modifications. In particular, the shape of shaft S may be freely changed according to the specific mounting needs; for example, the eccentric portion E rather than being obtained as a cylindrical portion of reduced diameter that does not radially project with respect to the other portions of shaft S could be made as a projecting portion of increased diameter, a cam or merely a portion of the same diameter but eccentric with respect to the rotation axis of shaft S.

[0028] Similarly, the means to block shaft S in its seat and to prevent its free rotation may be other means mechanically equivalent to the above-mentioned groove G and interference fitting, e.g. threadings, nuts, spring lock washers, etc.

[0029] Finally, it should be noted that also the position of shaft S could be reversed with respect to the above-illustrated examples, i.e. seat K, K' could be formed on bracket B, B' and portion E could interact with a fixed abutment on structure A, A'.

Claims

1. A device for applying a decorative panel (P; P') to a structure (A; A'), said device including at least one bracket (B; B') provided with holes for the mounting

on the rear of said panel (P; P') by means of screws and provided with at least one coupling member (C; C') suitable to engage a corresponding member arranged on said structure (A; A'), **characterized in that** it further includes a horizontal shaft (S) provided with an eccentric portion (E) and rotatably received in a seat (K; K') formed in said structure (A; A') or in said bracket (B; B'), said eccentric portion (E) interacting with a member integral with the panel (P; P') or with the structure (A; A') respectively, and **in that** rotation-preventing means are provided such that the weight of the panel (P) is not sufficient to cause the rotation of said shaft (S), as well as a shaping of an accessible end of the shaft (S) suitable to allow the application of a rotation torque by an operator.

2. A device according to claim 1, **characterized in that** the seat (K; K') is formed in the structure (A; A') and the eccentric portion (E) interacts with the coupling member (C; C').
3. A device according to claim 1 or 2, **characterized in that** the rotation-preventing means consist of an interference between the shaft (S) and its seat (K; K').
4. A device according to one of the preceding claims, **characterized in that** the shaft (S) is provided with a groove (G) for a circlip suitable to prevent the shaft (S) from coming out of its seat (K; K').
5. A device according to one of the preceding claims, **characterized in that** it further includes a member for locking the panel (P; P') with respect to the structure (A; A').
6. A device according to claim 5, **characterized in that** the locking member consists of a screw (L) passing through a hole formed in the structure (A) and screwed into the panel (P).
7. A device according to claim 5, **characterized in that** the locking member consists of a screw (L') passing through a vertical slot (R) formed in the structure (A') and screwed into a hole (Q) of the bracket (B') secured on the panel (P').
8. A device according to one of the preceding claims, **characterized in that** the shaping of the end of the shaft (S) for applying a rotation torque consists of a cross-shaped slot (X) on the head of the shaft (S).
9. A device according to one of the preceding claims, **characterized in that** the eccentric portion (E) is obtained as a cylindrical portion of reduced diameter that does not radially project with respect to the other portions of the shaft (S).

Amended claims in accordance with Rule 86(2) EPC.

1. A combination of a device and a structure (A; A') for applying in a height-adjustable manner a decorative panel (P; P') to said structure (A; A'), said device including at least one bracket (B; B') provided with holes for the mounting on the rear of said panel (P; P') by means of screws, said bracket (B; B') being further provided with at least one coupling member (C; C') suitable to engage a corresponding member arranged on the structure (A; A'), **characterized in that** said device further includes a horizontal shaft (S) provided with an eccentric portion (E) and rotatably received in a seat (K; K'), said seat (K; K') being formed in the structure (A; A') so that said eccentric portion (E) interacts with a member integral with the panel (P; P'), or said seat (K; K') being formed in the bracket (B; B') so that said eccentric portion (E) interacts with a member integral with the structure (A; A'), and also **in that** rotation-preventing means are provided such that the weight of the panel (P) is not sufficient to cause the rotation of said shaft (S), an accessible end of the latter being shaped so as to allow the application of a rotation torque by an operator.

2. A combination according to claim 1, **characterized in that** the seat (K; K') is formed in the structure (A; A') and the eccentric portion (E) interacts with the coupling member (C; C').

3. A combination according to claim 1 or 2, **characterized in that** the rotation-preventing means consist of an interference between the shaft (S) and its seat (K; K').

4. A combination according to one of the preceding claims, **characterized in that** the shaft (S) is provided with a groove (G) for a circlip suitable to prevent the shaft (S) from coming out of its seat (K; K').

5. A combination according to one of the preceding claims, **characterized in that** it further includes a member for locking the panel (P; P') with respect to the structure (A; A').

6. A combination according to claim 5, **characterized in that** the locking member consists of a screw (L) passing through a hole formed in the structure (A) and screwed into the panel (P).

7. A combination according to claim 5, **characterized in that** the locking member consists of a screw (L') passing through a vertical slot (R) formed in the structure (A') and screwed into a hole (Q) of the bracket (B') secured on the panel (P').

8. A combination according to one of the preceding

claims, **characterized in that** the shaping of the end of the shaft (S) for applying a rotation torque consists of a cross-shaped slot (X) on the head of the shaft (S).

9. A combination according to one of the preceding claims, **characterized in that** the eccentric portion (E) is obtained as a cylindrical portion of reduced diameter that does not radially project with respect to the other portions of the shaft (S).

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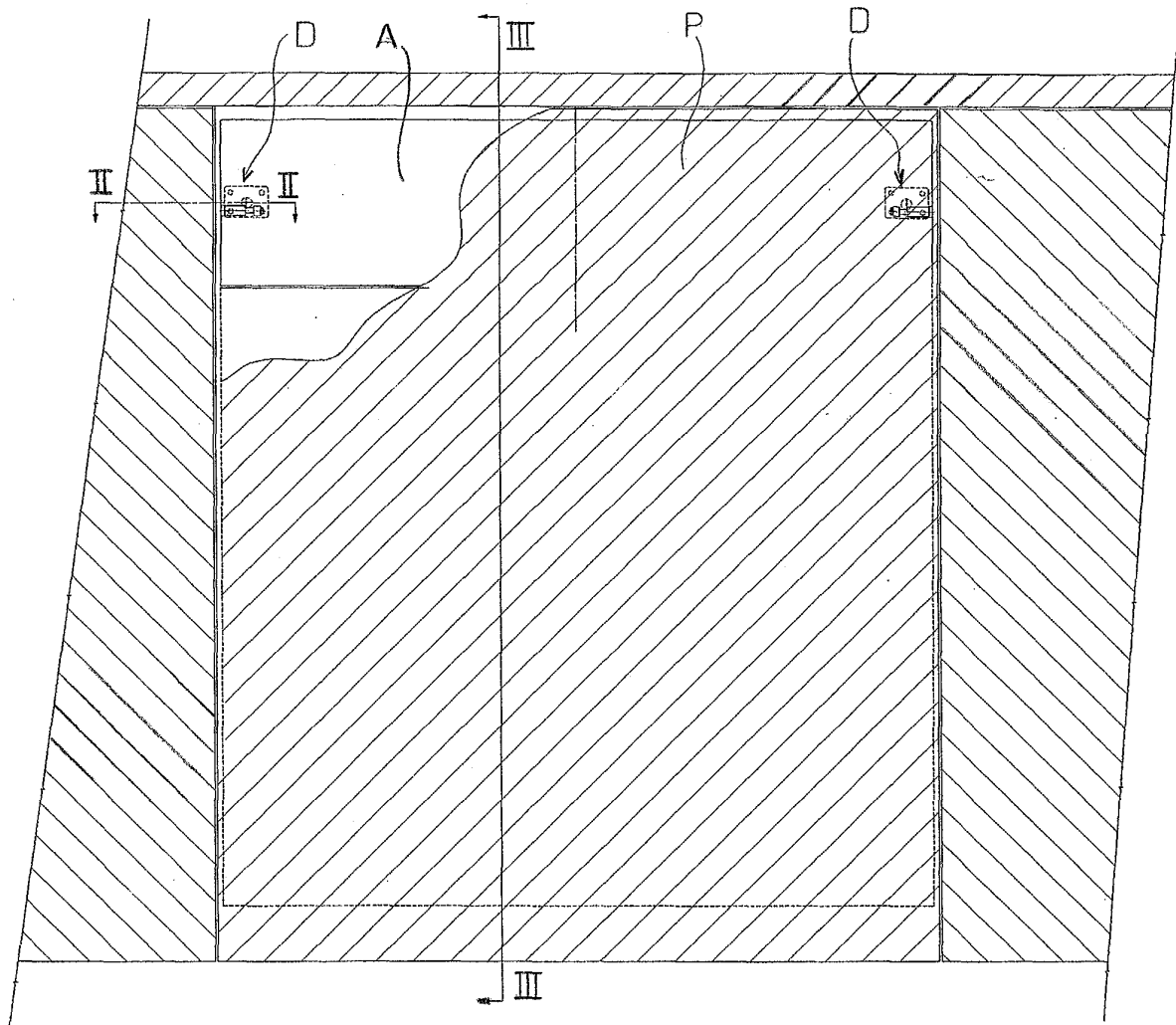


Fig. 1

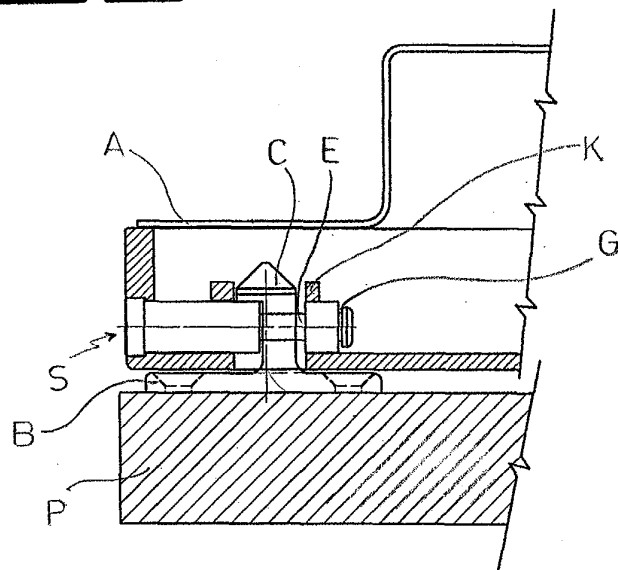


Fig. 2

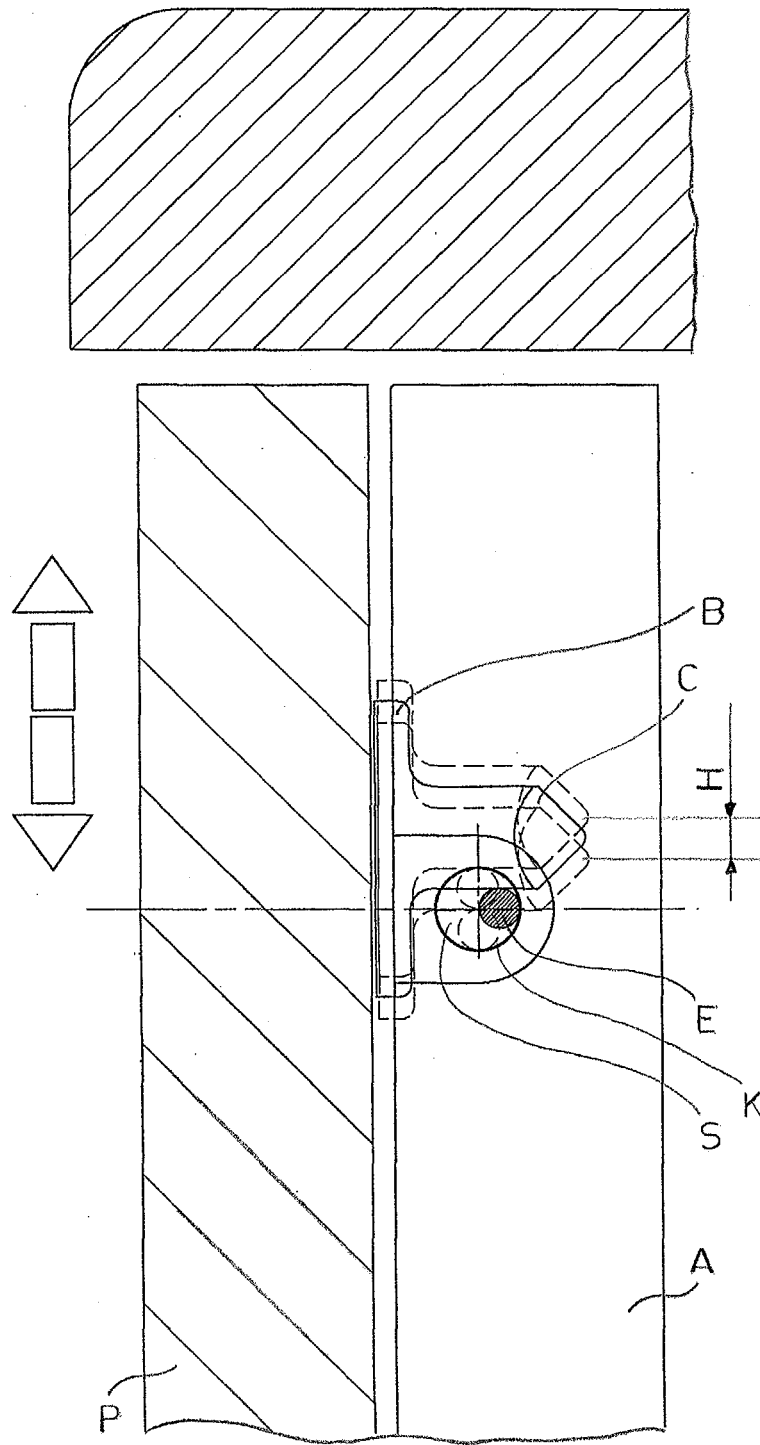


Fig. 3

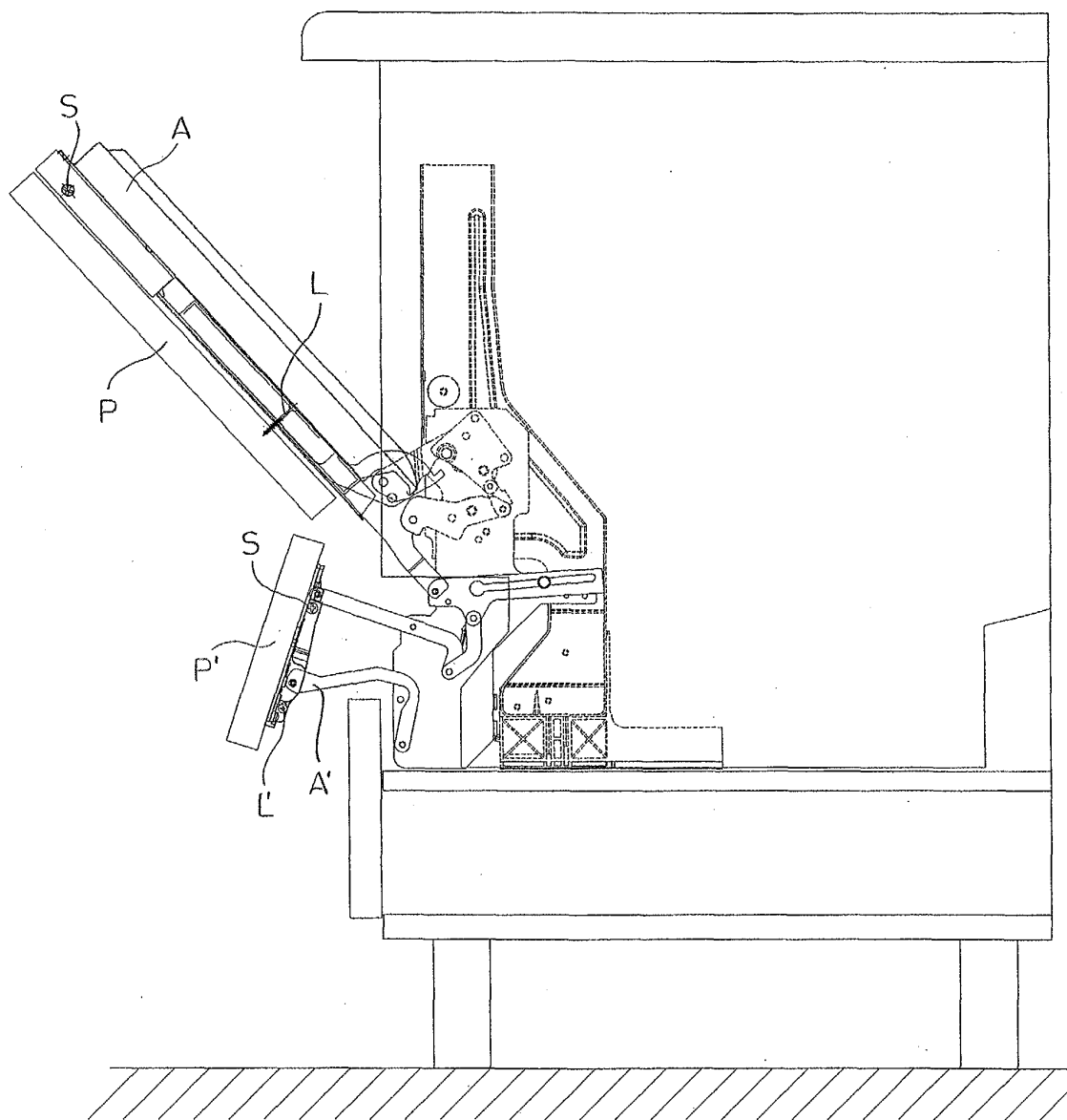


Fig. 4

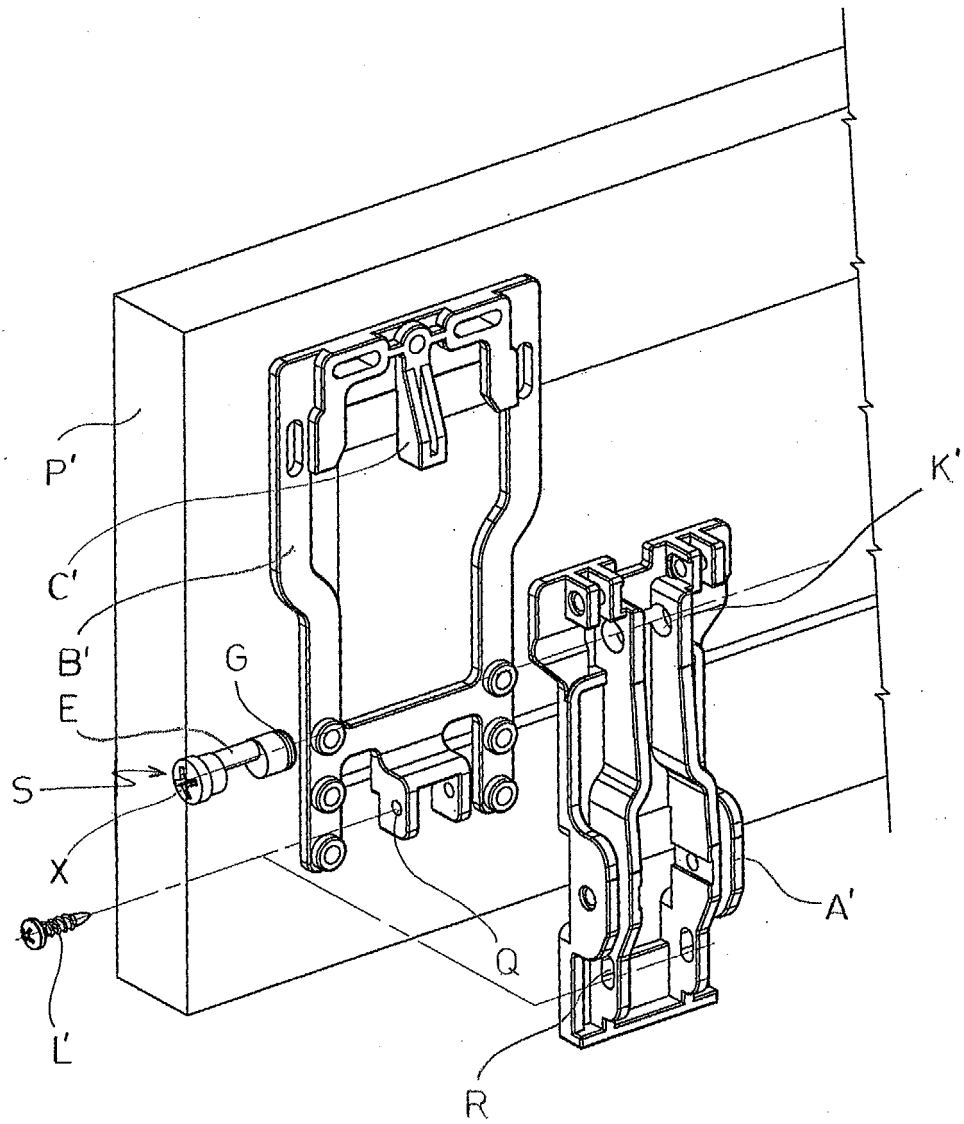


Fig. 5

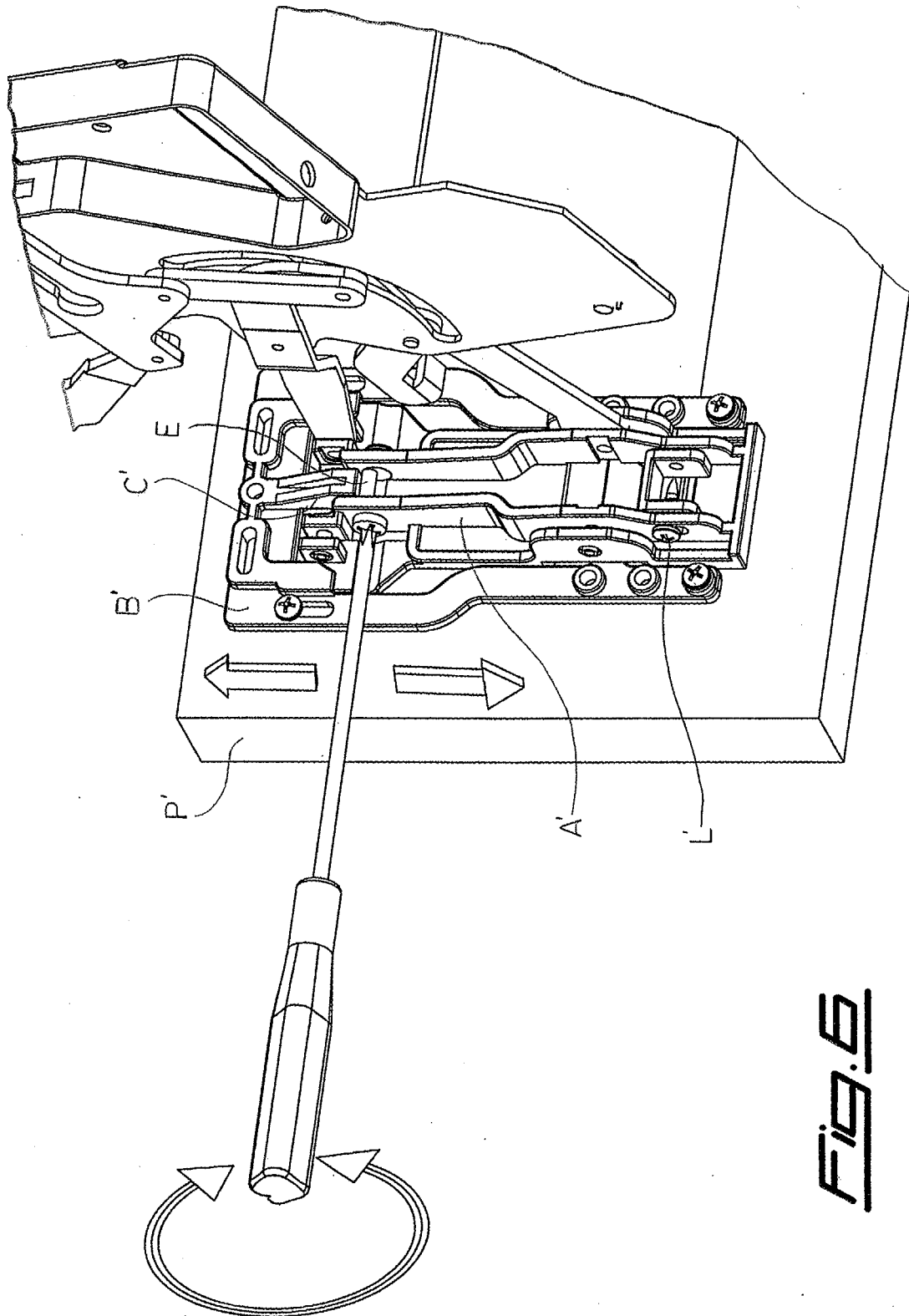


Fig. 6



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Application Number
EP 04 42 5489

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Place of search The Hague		Date of completion of the search 22 December 2004	Examiner Norman, P
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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