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(54) **Method for fastening a functional component to a carrier element of a domestic appliance**

Verfahren zur Befestigung einer funktionellen Komponente an ein Trägerelement eines Haushaltsgerätes

Procédé pour la fixation d'un composant fonctionnel sur un élément de support d'un appareil domestique

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(56) References cited:  
**DE-A1- 10 051 075 DE-A1- 10 157 221**  
**GB-A- 2 255 397 US-A1- 2006 117 813**

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**Description**

**[0001]** The invention relates to a method for fastening a functional component to a carrier element of a domestic appliance.

**[0002]** During the assembly process of a domestic appliance, like e. g. a kitchen oven, a washing machine and a dryer, a carrier element of the appliance like e. g. a panel has to be equipped with a functional element which has to be fixed at the carrier element.

**[0003]** The functional element can be e. g. an electronic part of the domestic appliance, an operational device of the appliance or a fastening element.

**[0004]** For fixing the functional element at the carrier element different solutions are known in the art. DE 85 35 431 U1 shows the fixation of a functional component at a carrier element by a specific design by using journals and bushings. With this the functional component can be detachably connected with the carrier element.

**[0005]** Another mechanical solution to fix a functional component to a carrier element is known from DE 86 23 803 U1. Here an elastic element is employed which is connected with the functional element and which snaps into an undercut in the carrier element.

**[0006]** Other solutions to connect a functional component with a carrier element are shown and described in DE 103 09 516 B3, in DE 103 49 592 A1, in DE 199 17 191 C2, in DE 195 04 471 B4.

**[0007]** Furthermore, it is known to fix a functional element of a domestic appliance at a carrier element by glueing. Examples are shown in DE 100 51 075 A1, in GB 2 255 397 A and in US 2006/0117813 A1. Here a functional element is glued to a front element on a visible side of the domestic appliance.

**[0008]** In some cases the use of an adhesive film is suggested to fix parts to one another, like EP 1 639 935 A2 discloses. A similar solution shows EP 1 045 300 B1.

**[0009]** Special techniques for allocating a functional element at a carrier element are shown in DE 103 37 441 A1, in DE 101 57 221 A1, in DE 103 07 536 A1 and in DE 196 45 678 C2.

**[0010]** The use of a mechanical connection between the functional element and the carrier element is quite complex and thus costly.

**[0011]** The use of an adhesive is suggested in connection with an adhesive film. This solution demands a quite huge demand concerning the handling; it is thus very problematic to automate the mounting procedure.

**[0012]** Therefore, it is an object of the invention to improve the pre-known possibilities to fix a functional component to a carrier element. Specifically, it should become possible that the fixation can be established with low costs but in a very precise way. Furthermore, it should be possible to automate the assembly process without big investments.

**[0013]** The solution of this object according to the invention is with respect to the method for fastening a functional component to a carrier element characterized in

that the method comprises the steps of:

a) Applying a defined amount of adhesive on a fixation area of the functional component or the carrier element;

b) Positioning of the functional component relatively to the carrier element in a defined position by means of an actuator of a mounting device;

c) Pressing the fixation area of the functional component against the carrier element by means of the actuator of the mounting device, so that the fixation area of the functional component or of the carrier element presses against a counter area of the other part,

wherein the functional component is positioned according to step b) at a reverse side of the carrier element being turned away from a front wall of the carrier element and wherein the carrier element has a vertical orientation during its intentional use.

**[0014]** The adhesive can thus be applied in an economical way and only in those parts of the fixation area where it is really needed. The process can be automated in an easy way.

**[0015]** Preferably, before above step a) a cleaning process of the fixation area and/or of the counter area is carried out. Also, it is possible that before above step a) a primer is applied to the fixation area and/or to the counter area.

**[0016]** The functional component can be a retainer or carrier for an electronic part of the domestic appliance. It can also be an operation device of the domestic appliance. Furthermore, an example for a carrier element is a fastening element of the domestic appliance.

**[0017]** The carrier element can be a panel of the domestic appliance.

**[0018]** The domestic appliance is preferably a kitchen oven, a washing machine or a dryer. Of course it can also be any other kind of domestic appliances.

**[0019]** By this method a perfect positioning of the functional component relatively to the carrier element becomes possible. Preferably, the actuator is designed to position a tip or grip portion of it at a defined point of a cartesian coordinate system.

**[0020]** By the suggested method it becomes possible to fix the functional element and the carrier element in a very economical way. A suitable adhesive is used which is known in the art as such.

**[0021]** In the drawings an embodiment of the invention is depicted.

FIG 1 shows a schematically side view - partially broken - of a domestic appliance in the form of a domestic kitchen oven,

FIG 2 shows a perspective view of a part of a mounting device, i. e. of means for applying adhesive

- and a functional component,  
 FIG 3 shows schematically a side view of the mounting device with an actuator,  
 FIG 4 shows a perspective view of a part of a carrier element, where the front wall is shown and  
 FIG 5 shows a perspective view of a part of the carrier element according to FIG 4, where the opposite side, i. e. the reverse side is shown.

**[0022]** FIG 1 shows a domestic appliance 3 which is a domestic oven for a kitchen. The domestic appliance 3 has - as can be seen in the depicted partly broken view - a carrier element 2 with a front wall 10. The carrier element 2 has an aperture 13 through which a part of a functional component 1 protrudes. The functional component 1 is fixed at the reverse side 9 of the carrier element 2. Therefore, the functional component 1 has a holding section 14 with a fixation area 5. The fixation area 5 contacts in the mounted state of the domestic appliance a counter area 8 of the carrier element 2.

**[0023]** To fix the functional component 1 to the carrier element 2 a method is employed as described below.

**[0024]** A first method step is depicted in FIG 2. Here the functional component 1 is shown which is held in position by not depicted means. An adhesive 4 is applied to the fixation areas 5 of the functional component 1. In the embodiment of FIG 2 this is done by means 11 for applying adhesive which are part of a-mounting device 7.

**[0025]** As shown in FIG 2 in a schematically way only those means 11 have a nozzle 15 by which a defined amount of adhesive can be expelled. The nozzle 15 is arranged at a - not depicted - actuator which moves the nozzle 15 precisely within a cartesian coordinate system with the coordinates x and y to exactly apply a desired amount of adhesive on the fixation area 5. Of course, a motion can be executed in the third direction in space, if necessary.

**[0026]** After the adhesive 4 is applied the functional component 1 is gripped by a tip or grip portion 12 of the mounting device 7 as shown in FIG 3. The functional component 1 is thus precisely brought into the correct position relatively to the carrier element 2 which is stationary. The grip portion 12 is moved within cartesian coordinates x, y (and of course also in z-direction which is perpendicular to the plane of FIG 3) by an actuator 6.

**[0027]** So, the functional component 1 can be positioned exactly to the carrier element 2.

**[0028]** After this is done the functional component 1 is pressed in the direction of the arrow in FIG 3 onto the carrier element 2, i. e. the fixation area 5 - which is supplied with the adhesive 4 - is pressed on the counter area 8 of the carrier element 2.

**[0029]** The mounted state of the functional component-1 with the carrier element 2 is shown in FIG 4 and FIG 5 from two different lines of vision. In FIG 4 the front wall 10 is depicted. A knob 16 of the functional component 1 is shown which protrudes through the aperture 13 in the carrier element 2. In FIG 5 the carrier element 2 with

the functional component 1 is shown, seen from the reverse side 9 of the carrier element 2.

**[0030]** The functional element can be any possible part which is necessary in a domestic appliance.

5 **[0031]** The automatization of the assembly process is possible in a very easy way as the actuator for moving the nozzle 15 as well as the actuator 6 can have NC-axes by which any-position can be reached with high precision.

10 **[0032]** It is possible to combine the described process with further activities. E. g. a cleaning process can be carried out before the adhesive 4 is applied.

**[0033]** Also a primer can be applied before the adhesive is brought on the fixation area 5.

15 **[0034]** The carrier element 2 can be of any suitable material. It can be made from sheet metal, stainless steel, light metal, glass or plastic. It can be enamelled or painted.

20 **[0035]** The carrier element in the form of a panel can have a printing.

**[0036]** With the suggested solution and the proposed method and device it becomes possible that a technique of connection can be employed which was not possible before. Specifically, the required space for the connection is less compared with a mechanical solution. Consequently, solutions become possible which demand less space.

#### Reference Numerals

30

#### [0037]

- |    |                             |
|----|-----------------------------|
| 1  | Functional component        |
| 2  | Carrier element             |
| 35 | 3 Domestic appliance        |
| 4  | Adhesive                    |
| 5  | Fixation area               |
| 6  | Actuator                    |
| 7  | Mounting device             |
| 40 | 8 Counter area              |
| 9  | Reverse side                |
| 10 | Front wall                  |
| 11 | Means for applying adhesive |
| 12 | Tip / Grip portion          |
| 45 | 13 Aperture                 |
| 14 | Holding section             |
| 15 | Nozzle                      |
| 16 | Knob                        |
| 50 | x x-axis                    |
| 51 | y y-axis                    |

#### Claims

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1. Method for fastening a functional component (1) to a carrier element (2) of a domestic appliance (3), characterized in that

the method comprises the steps of:

- a) Applying a defined amount of adhesive (4) on a fixation area (5) of the functional component (1) or the carrier element (2);
- b) Positioning of the functional component (1) relatively to the carrier element (2) in a defined position by means of an actuator (6) of a mounting device (7);
- c) Pressing the fixation area (5) of the functional component (1) against the carrier element (2) by means of the actuator (6) of the mounting device (7), so that the fixation area (5) of the functional component (1) or of the carrier element (2) presses against a counter area (8) of the other part (2, 1), **characterised in that** the functional component (1) is positioned according to step b) at a reverse side (9) of the carrier element (2) being turned away from a front wall (10) of the carrier element (2) and wherein the carrier element (2) has a vertical orientation during its intended use.
2. Method according to claim 1, **characterized in that** before step a) according to claim 1 a cleaning process of the fixation area (5) and/or of the counter area (8) is carried out.
3. Method according to claim 1, **characterized in that** before step a) according to claim 1 a primer is applied to the fixation area (5) and/or to the counter area (8).
4. Method according to at least one of claims 1 to 3, **characterized in that** the functional component (1) is a retainer or carrier for an electronic part of the domestic appliance (3).
5. Method according to at least one of claims 1 to 3, **characterized in that** the functional component (1) is an operation device of the domestic appliance (3).
6. Method according to at least one of claims 1 to 3, **characterized in that** the functional component (1) is a fastening element of the domestic appliance (3).
7. Method according to at least one of claims 1 to 6, **characterized in that** the carrier element (2) is a panel of the domestic appliance (3).
8. Method according to at least one of claims 1 to 7, **characterized in that** the domestic appliance (3) is a kitchen oven.
9. Method according to at least one of claims 1 to 7, **characterized in that** the domestic appliance (3), is a washing machine.
10. Method according to at least one of claims 1 to 7,

**characterized in that** the domestic appliance (3) is a dryer.

## 5 Patentansprüche

1. Verfahren zur Befestigung einer funktionellen Komponente (1) an einem Trägerelement (2) eines Haushaltsgerätes (3),  
**dadurch gekennzeichnet, dass**  
 das Verfahren die folgenden Schritte umfasst:

- a) Anbringen einer definierten Menge an Klebstoff (4) an einem Befestigungsbereich (5) der funktionellen Komponente (1) oder des Trägerelements (2);
- b) Positionieren der funktionellen Komponente (1) relativ zum Trägerelement (2) in einer definierten Position mit Hilfe einer Betätigungsvorrichtung (6) einer Montagevorrichtung (7);
- c) Pressen des Befestigungsbereichs (5) der funktionellen Komponente (1) gegen das Trägerelement (2) mit Hilfe der Betätigungsvorrichtung (6) der Montagevorrichtung (7), so dass der Befestigungsbereich (5) der funktionellen Komponente (1) oder des Trägerelements (2) gegen einen Gegenbereich (8) des anderen Teils (2, 1) drückt, **dadurch gekennzeichnet, dass**

die funktionelle Komponente (1) gemäß Schritt b) an einer Rückseite (9) des Trägerelements (2) positioniert wird, die von einer Vorderwand (10) des Trägerelements (2) abgewandt ist, und wobei das Trägerelement (2) während seiner bestimmungsgemäßen Verwendung eine vertikale Ausrichtung aufweist.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** vor dem Schritt a) nach Anspruch 1 ein Vorgang der Reinigung des Befestigungsbereichs (5) und/oder des Gegenbereichs (8) durchgeführt wird.
3. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** vor dem Schritt a) nach Anspruch 1 eine Grundierung am Befestigungsbereich (5) und/oder am Gegenbereich (8) angebracht wird.
4. Verfahren nach mindestens einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die funktionelle Komponente (1) ein Halter oder Träger für einen Elektronikteil des Haushaltsgerätes (3) ist.
5. Verfahren nach mindestens einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die funktionelle Komponente (1) eine Betriebsvorrichtung des Haushaltsgerätes (3) ist.

6. Verfahren nach mindestens einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die funktionelle Komponente (1) ein Befestigungselement des Haushaltsgerätes (3) ist.
7. Verfahren nach mindestens einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** das Trägerelement (2) ein Bedienfeld des Haushaltsgerätes (3) ist.
8. Verfahren nach mindestens einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** das Haushaltsgerät (3) ein Küchenofen ist.
9. Verfahren nach mindestens einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** das Haushaltsgerät (3) eine Waschmaschine ist.
10. Verfahren nach mindestens einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** das Haushaltsgerät (3) ein Trockner ist.

#### Revendications

1. Procédé pour la fixation d'un composant fonctionnel (1) sur un élément de support (2) d'un appareil domestique (3), **caractérisé en ce que** le procédé comprend les étapes de:
- a) appliquer une quantité définie d'adhésif (4) sur une zone de fixation (5) du composant fonctionnel (1) ou de l'élément de support (2);
- b) positionner le composant fonctionnel (1) relativement à l'élément de support (2) dans une position définie au moyen d'un actionneur (6) d'un dispositif de montage (7);
- c) presser la zone de fixation (5) du composant fonctionnel (1) contre l'élément de support (2) au moyen de l'actionneur (6) du dispositif de montage (7) de sorte que la zone de fixation (5) du composant fonctionnel (1) ou de l'élément de support (2) exerce une pression sur une contrezone (8) de l'autre partie (2, 1), **caractérisé en ce que**
- le composant fonctionnel (1) est positionné en accord avec l'étape (b) à un côté inverse (9) de l'élément de support (2) tourné au loin d'une paroi frontale (10) de l'élément de support (2), et où l'élément de support (2) présente une orientation verticale durant son utilisation prévue.
2. Procédé selon la revendication 1, **caractérisé en ce qu'**avant l'étape (a) selon la revendication 1, un processus de nettoyage de la zone de fixation (5) et/ou de la contre-zone (8) est exécuté.

3. Procédé selon la revendication 1, **caractérisé en ce qu'**avant l'étape (a) selon la revendication 1, une amorce est appliquée à la zone de fixation (5) et/ou à la contre-zone (8).
4. Procédé selon au moins l'une des revendications 1 à 3, **caractérisé en ce que** le composant fonctionnel (1) est un élément de retenue ou de support d'une pièce électronique de l'appareil domestique (3).
5. Procédé selon au moins l'une des revendications 1 à 3, **caractérisé en ce que** le composant fonctionnel (1) est un dispositif de fonctionnement de l'appareil domestique (3).
6. Procédé selon au moins l'une des revendications 1 à 3, **caractérisé en ce que** le composant fonctionnel (1) est un élément de fixation de l'appareil domestique (3).
7. Procédé selon au moins l'une des revendications 1 à 6, **caractérisé en ce que** l'élément de support (2) est un panneau de l'appareil domestique (3).
8. Procédé selon au moins l'une des revendications 1 à 7, **caractérisé en ce que** l'appareil domestique (3) est un four de cuisine.
9. Procédé selon au moins l'une des revendications 1 à 7, **caractérisé en ce que** l'appareil domestique (3) est une machine à laver.
10. Procédé selon au moins l'une des revendications 1 à 7, **caractérisé en ce que** l'appareil domestique (3) est un séchoir.

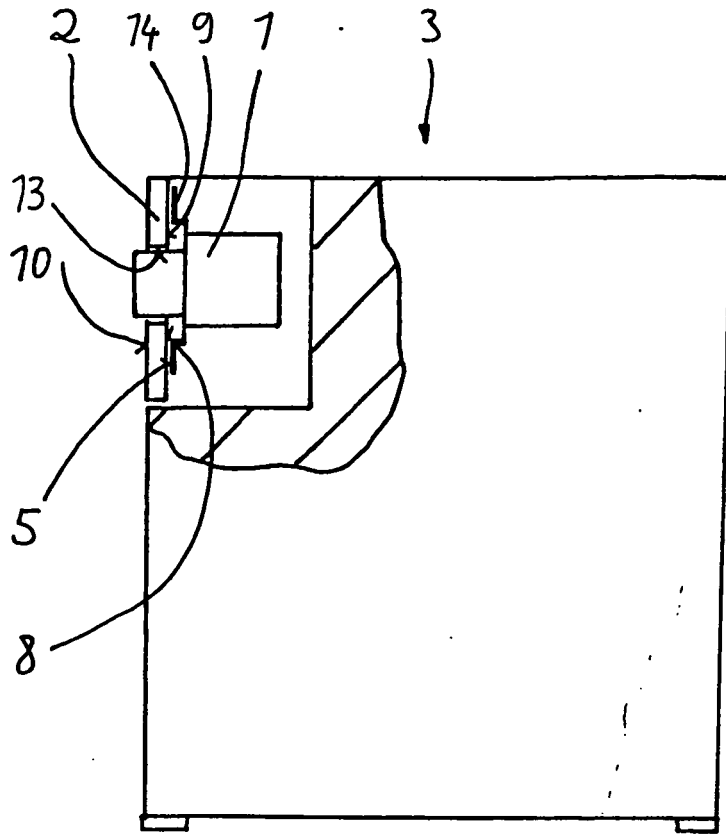


FIG 1

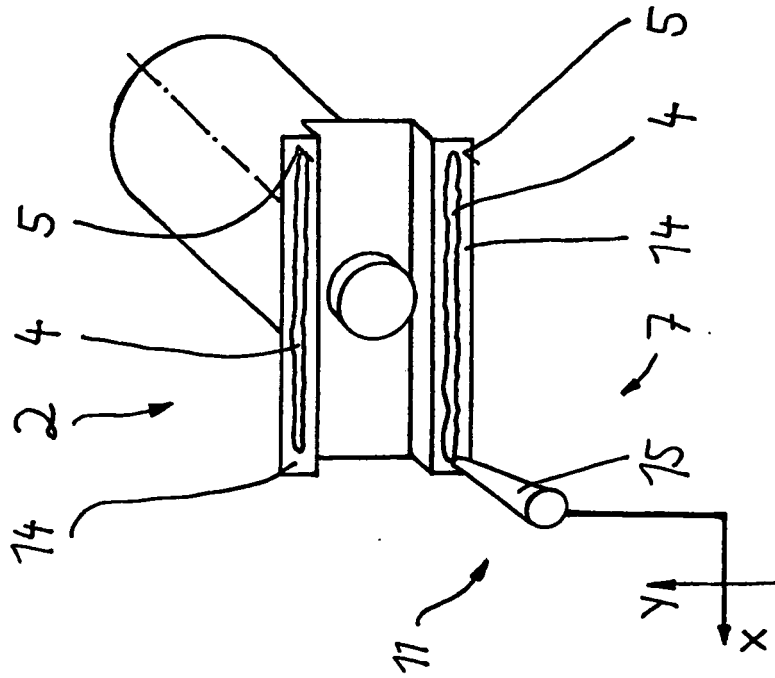


FIG 2

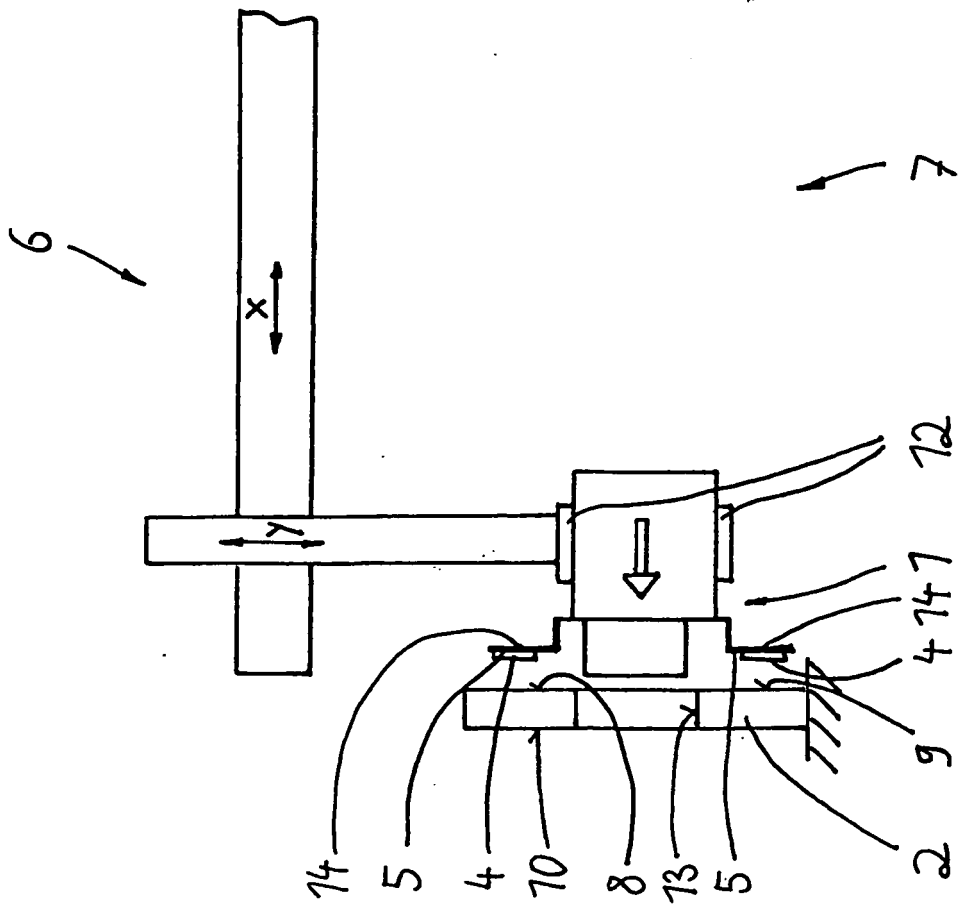


FIG 3

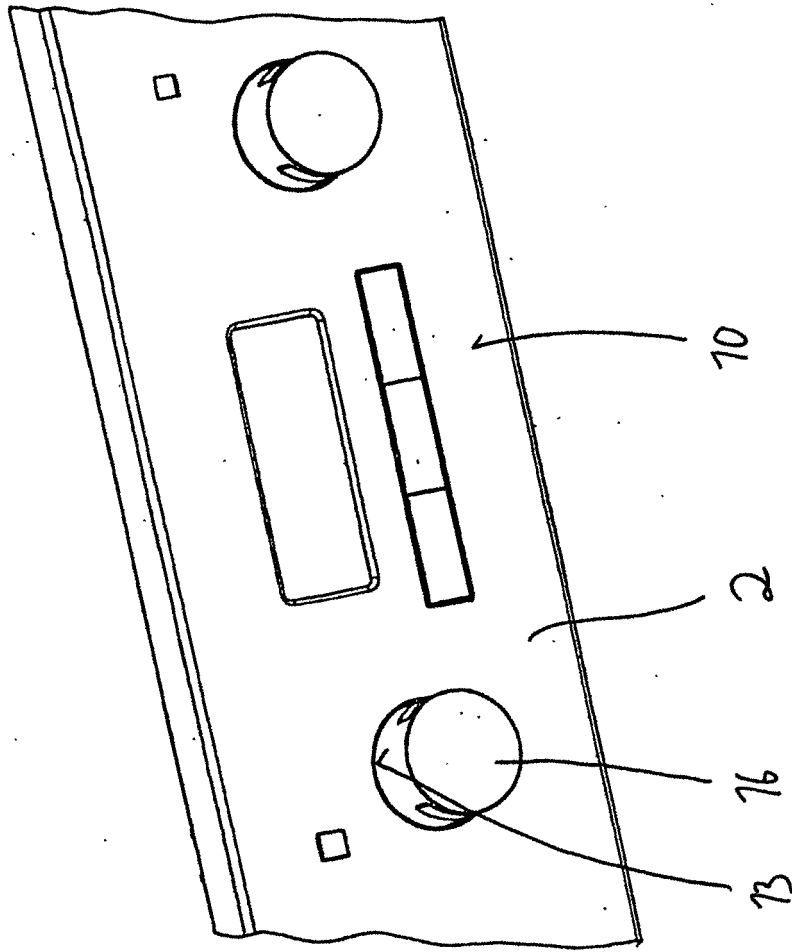


FIG 4

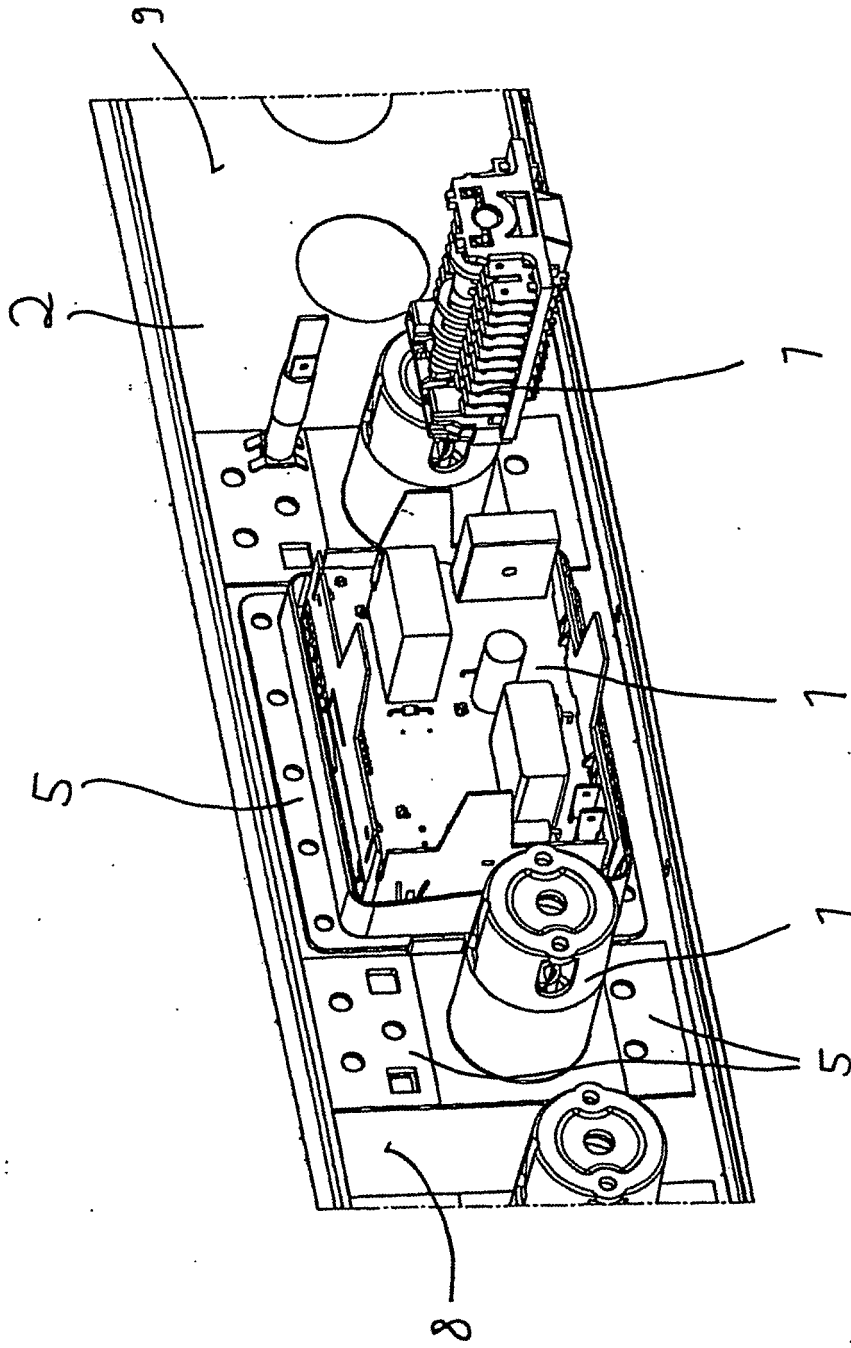


FIG 5

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- DE 8535431 U1 [0004]
- DE 8623803 U1 [0005]
- DE 10309516 B3 [0006]
- DE 10349592 A1 [0006]
- DE 19917191 C2 [0006]
- DE 19504471 B4 [0006]
- DE 10051075 A1 [0007]
- GB 2255397 A [0007]
- US 20060117813 A1 [0007]
- EP 1639935 A2 [0008]
- EP 1045300 B1 [0008]
- DE 10337441 A1 [0009]
- DE 10157221 A1 [0009]
- DE 10307536 A1 [0009]
- DE 19645678 C2 [0009]