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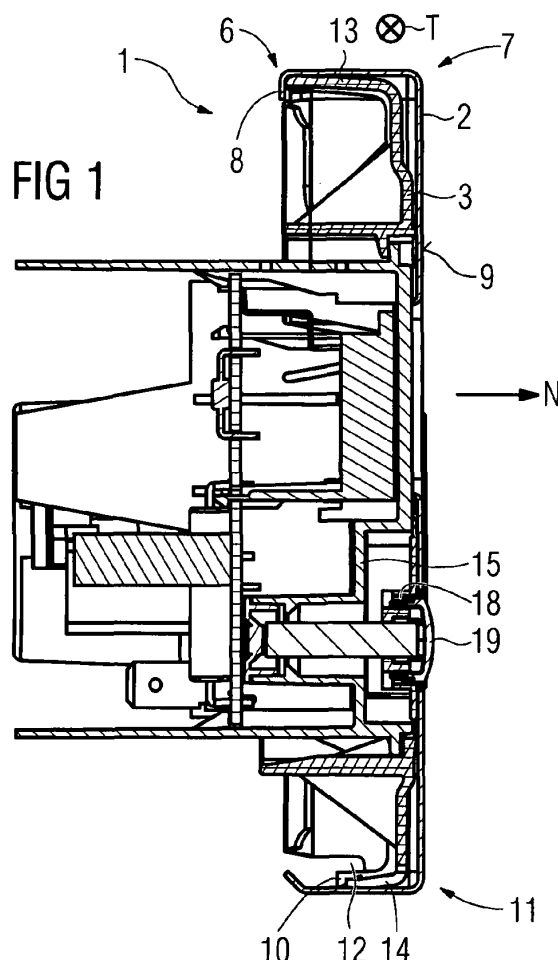
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(54) **Switching and/or adjusting panel for an appliance, especially for a domestic appliance**

(57) The invention relates to a switching and/or adjusting panel (1) for an appliance, especially for a domestic appliance, for switching and/or adjusting of an operation parameter of the appliance, wherein the panel (1) has a panel cover element (2) which extends in a transverse direction (T) and wherein the panel (1) has at least two functional elements (3, 4, 5). To facilitate the assembly of such a panel and to allow an easy substitution of functional elements, the invention is characterized in that the panel cover element (2) has a hook element (6) in a top region (7) forming an undercut (8) in a direction (N) perpendicular to a front surface (9) of the panel cover element (2) and that the panel cover element (2) has a plurality of snap elements (10) in a bottom region (11) forming an undercut (12) in a direction (N) perpendicular to the front surface (8) of the panel cover element (2), wherein the functional elements (3, 4, 5) have a first section (13) extending in the direction (N) perpendicular to the front surface (9) of the panel cover element (2) when being in the mounted state, which abut against the undercut (8) of the hook element (6) and wherein the functional elements (3, 4, 5) have a second section (14) extending in the direction (N) perpendicular to the front surface (9) of the panel cover element (2) when being in the mounted state, which abut against the undercut (12) of the snap elements (10).



Description

[0001] The invention relates to a switching and/or adjusting panel for an appliance, especially for a domestic appliance, for switching and/or adjusting of an operation parameter of the appliance, wherein the panel has a panel cover element which extends in a transverse direction and wherein the panel has at least one functional element.

[0002] Switching or adjusting panels of this kind are well known in the art, especially for domestic ovens. The assembly process for such panels is quite laborious and thus expensive. Often, parts of the panel are glued together during assembly. By this, a firm connection can be obtained. The disadvantage of this process is that it is complicated to substitute a broken part of the panel construction. Also, to ensure a stable connection the parts to be glued must be prepared properly, i. e. they must be degreased.

[0003] Thus, it is an object of the present invention to suggest a panel design which allows an easy and cost-efficient assembly. Furthermore, the substitution of broken parts of the panel should be possible in an easy manner. It should also be possible to connect additional parts - if they are necessary - in a stable but simple way to the panel construction.

[0004] The solution of this object according to the invention is characterized in that the panel cover element has a hook element in a top region (or alternatively in a bottom region) forming an undercut in a direction perpendicular to a front surface of the panel cover element and that the panel cover element has a plurality of snap elements in a bottom region (or alternatively in a top region) forming an undercut in a direction perpendicular to the front surface of the panel cover element, wherein the at least one functional element has a first section extending in the direction perpendicular to the front surface of the panel cover element when being in the mounted state, which abut against the undercut of the hook element and wherein the at least one functional element has a second section extending in the direction perpendicular to the front surface of the panel cover element when being in the mounted state, which abut against the undercut of the snap elements.

[0005] The panel has preferably at least two functional elements, wherein the at least two functional elements are preferably arranged side by side along the transverse direction of the panel cover element. Thus, a modular concept becomes possible in designing the panel and the necessary functional elements which have to be connected to the panel cover element.

[0006] The hook element extends preferably along the entire width (in transverse direction, specifically in a horizontal direction) of the panel cover element and holds all of the functional elements in their position.

[0007] The panel cover element consists preferably of sheet metal. In this case the hook element can be formed by a bended portion of the panel cover element. Further-

more, the snap elements can be formed from the material of the panel cover element; a preferred solution suggests that the snap elements are produced by a punching or by a plastic deformation process of the panel cover element.

[0008] At least one of the functional elements can be a carrier frame which can carry a component. The component can be e. g. a switch. Also, the component can be a lamp.

[0009] At least one of the functional elements can be a housing element for an adjusting knob.

[0010] The panel cover element can have at least one opening for the passage of a switching or adjusting element.

[0011] The panel cover element can also have at least one opening for showing a display element. In this case a transparent element can be located between the panel cover element and the display element; the transparent element is preferably a glass panel or pane.

[0012] By the suggested design it becomes possible to obtain different advantages in producing, assembling and servicing switching and/or adjusting panels for a domestic appliance.

[0013] No additional carrier element is necessary to fix the necessary elements to the panel; also no additional parts for fixation are necessary. This applies especially in the case that parts like lights are to be fixed on the panel construction. The guidance of the switching elements, especially of pushbuttons, is precise and no further actions have to be taken to ensure a proper guidance of those element.

[0014] The assembly process becomes very easy and thus economic as the whole panel construction can be put together with all of the necessary parts by the suggested clip connections. For assembly no specific mounting devices are necessary.

[0015] There are no additions measures to be taken in preparation of the assembly; especially a degreasing of parts is redundant.

[0016] A substitution of parts is very convenient as those parts are fixed on the panel construction by means of clip or snap connections.

[0017] Especially, the fixation of parts or elements on a sheet metal panel element becomes very stable and easy.

[0018] A specific beneficial function is thus a good guidance of the adjusting elements and adjustment knobs of the panel. The different components can easily be mounted and dismantled what is of specific advantage in the case of substitution of broken parts during service work. E. g. a clock can be dismantled without dismantling of the carrier frame element for the clock.

[0019] The design and the appearance respectively are not influenced by any unnecessary openings at the front surface of the panel cover element.

[0020] It is also possible that the functional element is designed as a guidance for an adjusting element or switch. In this case the functional element is basically a

plate having a respective opening for penetration by the adjusting element or switch. A functional element with a plane front surface can also be employed as a protection element.

[0021] A further advantage is that any necessary push button can be inserted after the functional element is mounted, i. e. snapped in. Then, the timer can be snapped in. This is not possible in the case of holders which are mounted on the timer from the rear side. This is an advantage for assembly and servicing of the appliance.

[0022] The proposed concept allows that no flaps or embossments must be machined from the visible front section of the panel cover element. This allows a higher degree of freedom in designing the appliance. No covering by other elements is necessary.

[0023] In the drawings embodiments of the invention are depicted.

FIG 1 shows a cross sectional view through a switching and/or adjusting panel of a domestic oven at a first location along the transverse extension of the panel,

FIG 2 shows a cross sectional view according to FIG 1 at another location along the transverse extension of the panel,

FIG 3 shows a further cross sectional view according to FIG 1 at another location along the transverse extension of the panel,

FIG 4 shows in perspective view the reverse side of a panel cover element,

FIG 5 shows in perspective view a first functional element to be mounted on the panel cover element according to FIG 4,

FIG 6 shows in perspective view a second functional element to be mounted on the panel cover element according to FIG 4,

FIG 7 shows in perspective view a third functional element to be mounted on the panel cover element according to FIG 4, and

FIG 8 shows the front view of a part of the panel cover element.

[0024] In FIG 1 a cross sectional view can be seen of a switching and/or adjusting panel 1 which is part of a domestic oven. The panel 1 has a panel cover element 2 made from sheet metal. In a top region 7 the sheet metal of the panel cover element 2 is bended to form a hook element 6, i. e. a part extending substantially in a direction N perpendicular to a front surface 9 of the panel cover element 2. At the end of this part a hook section is

formed extending a certain amount to the bottom to form an undercut 8 seen in direction N.

[0025] In a similar way, the panel cover element 2 has a section in the bottom region 11 which extends substantially in the direction N perpendicular to the front surface 9. In this section snap element 10 are formed which form an undercut 12 seen in direction N.

[0026] The whole panel cover element 2 extends horizontally and in a transverse direction T which is perpendicular on the drawing plane in FIG 1.

[0027] The panel cover element 2 is designed to allow functional elements 3, 4, 5 (see FIG 1, 2, and 3) to be firmly engaged with the panel cover element 2 by means of a snap connection / clip connection.

[0028] The functional element 3 in FIG 1 is a standard carrier frame which is connected to the panel cover element 2 in the following way: The functional element 3 has a first section 13 in an upper area and a second section 14 in a bottom area. Both sections 12, 13 extend substantially in the direction N perpendicular to the front surface 9 (when being arranged in the mounted position).

[0029] For mounting of the functional element 3 with the panel cover element 2, at first the first section 13 is hanged under the hook element 6 in the top region 7 of the panel cover element 2. The end of the first section 13 abuts against the undercut 8 of the hook element 6. Then, the functional element 3 is pivoted in the position shown in FIG 1. By doing this, the second section 14 slides along the inner side of the section with the snap element 10 in the bottom region 11 of the panel cover element 2 until the end of the second section 14 snaps behind the undercut 12. Now, the functional element 3 is snap-fitted to the panel cover element 2.

[0030] The panel cover element 2 has openings at the front surface 9 as can be seen in FIG 8. Openings 18 of circular shape are machined (punched) in the panel cover element 2 for switches which are mounted in the functional elements 3, 4, 5. Also an opening 20 is machined into the panel cover element 2 for a display element 21 (see FIG 2). By mounting the functional elements 3, 4, 5 in the described way the respective elements are brought into position to reach through the openings. As can be seen in FIG 1, an adjusting element 19 is mounted in the functional element 3 which comes into the right alignment when the functional element 3 is mounted in the panel cover element 2.

[0031] The mounting of the other functional elements 4, 5 takes place in the same way as the assembly of the functional element 3 and the panel cover element 2. The functional element 4 is a carrier frame for a component 15 which is a circuit board in the embodiment according to FIG 2. Also the display element 21 is part of the functional element 4 according to FIG 2. Before the functional element 4 is mounted a transparent element (glass pane) 22 is inserted in a respective opening near the surface 9 of the panel cover element 2.

[0032] In FIG 3 the functional element 5 is a knob for adjusting of a parameter of the domestic appliance. A

controlling element 23 is part of the functional element 5. The adjustment is carried out by actuating (turning and/or pressing) an adjusting knob 16 which is connected with the controlling element 23. For the adjusting knob 16 a respective opening 17 is machined in the panel cover element 2.

[0033] In the case of the functional element 3 (carrier frame element) at first the adjusting elements 19 (which are pushbuttons) are inserted and/or snapped into the functional element 3 before it is mounted on the panel cover element 2. The functional element 3 can be e. g. a clock. It is also possible to mount the functional element 3 at first and then the other components. This is advantageous for changing elements.

[0034] In the same way adjustment elements 19 (push-buttons) are inserted or snapped in at first in the functional element 4 before the component 15 (circuit board) is also connected by means of a snap-fit connection. Then, the functional element 4 is mounted on the panel cover element 2.

[0035] In FIG 4 the panel cover element 2 can be seen in its extension in transverse direction T and with different openings 17, 18, 20 for adjusting elements and knobs as well as for a display element. In the top region 7 the hook element 6 can be seen under which the respective first sections 13 of the functional elements 3, 4, 5 are brought. In the bottom region 11 the plurality of snap elements 10 can be seen for fixing the different functional elements 3, 4, 5 with the panel cover element 2.

[0036] In FIG 5, FIG 6 and FIG 7 functional elements 3, 4 and 5 are shown.

[0037] In the case of the knob for adjusting of a parameter of the domestic appliance at first the controlling element 23 is fixed to the functional element 5 and to the adjusting knob 16 (fixed by means of screws or by a snap-fit connection). Then, the whole functional element 5 is mounted to the panel cover element 2 in the described way.

[0038] Additional parts like lamps can be mounted preferably also by a snap-fit connection to the functional elements 3, 4, 5. In FIG 3 a component 15 being a lamp is shown which is connected to the functional part in the mentioned way. Here it is also possible to mount the functional element 3 at first.

[0039] The functional element 4 with the circuit board can be made from transparent material especially in the region of the opening 20 so that no glass pane is necessary.

[0040] The adjusting knob 16 and the adjusting element 19 are fed through the respective openings in the panel cover element 2 and are thus protected by the panel cover element 2. The travel of the adjusting elements is always equal, i. e. no tolerances are added. No screws or additional parts are necessary for the fixation of the elements with the functional elements.

[0041] The panel needs not to be degreased in difference to the preknown process of gluing. By the snap-fit connection which is used widely for connecting the re-

spective parts and elements is becomes very easy to substitute elements when carrying out service work.

[0042] The arrangement of the hook element and the snap elements can also be the other way around, i. e. the hook element can be arranged in the bottom region and the snap elements can be arranged in the top region of the panel cover element. Consequently, the assembly process is then carried out in a modified corresponding way, i. e. the functional element is hooked in in the bottom region and snapped in in the top region.

[0043] Reference Numerals

1 Switching and/or adjusting panel

2 Panel cover element

3 Functional element

4 Functional element

5 Functional element

6 Hook element

7 Top region

8 Undercut

9 Front surface

10 Snap element

11 Bottom region

12 Undercut

13 First section

14 Second section

15 Component

16 Adjusting knob

17 Opening

18 Opening

19 Adjusting element

20 Opening

21 Display element

22 Transparent element

23 Controlling element

T Transverse direction

N Direction perpendicular to the front surface

Claims

1. Switching and/or adjusting panel (1) for an appliance, especially for a domestic appliance, for switching and/or adjusting of an operation parameter of the appliance, wherein the panel (1) has a panel cover element (2) which extends in a transverse direction (T) and wherein the panel (1) has at least one functional element (3, 4, 5),
characterized in that the panel cover element (2) has a hook element (6) in a top or bottom region (7) forming an undercut (8) in a direction (N) perpendicular to a front surface (9) of the panel cover element (2) and
that the panel cover element (2) has a plurality of snap elements (10) in a bottom or top region (11) forming an undercut (12) in a direction (N) perpendicular to the front surface (9) of the panel cover element (2),
 wherein the at least one functional element (3, 4, 5) has a first section (13) extending in the direction (N) perpendicular to the front surface (9) of the panel cover element (2) when being in the mounted state, which abut against the undercut (8) of the hook element (6) and
 wherein the at least one functional element (3, 4, 5) has a second section (14) extending in the direction (N) perpendicular to the front surface (9) of the panel cover element (2) when being in the mounted state, which abut against the undercut (12) of the snap elements (10).
2. Switching and/or adjusting element according to claim 1, **characterized in that** the panel (1) has at least two functional elements (3, 4, 5), wherein the at least two functional elements (3, 4, 5) are preferably arranged side by side along the transverse direction (T) of the panel cover element (2).
3. Switching and/or adjusting element according to claim 1 or 2, **characterized in that** the hook element (6) extends along the entire width of the panel cover element (2) and holds all of the functional elements (3, 4, 5) in their position.
4. Switching and/or adjusting element according to one of claims 1 to 3, **characterized in that** the panel cover element (2) consists of sheet metal.
5. Switching and/or adjusting element according to claim 4, **characterized in that** the hook element (6) is formed by a bended portion of the panel cover element (2).
6. Switching and/or adjusting element according to claim 4 or 5, **characterized in that** the snap elements (10) are formed from the material of the panel cover element (2).
7. Switching and/or adjusting element according to claim 6, **characterized in that** the snap elements (10) are produced by a punching or by a plastic deformation process of the panel cover element (2).
8. Switching and/or adjusting element according to one of claims 1 to 7, **characterized in that** at least one of the functional elements (3, 4, 5) is a carrier frame (3) which can carry a component (15).
9. Switching and/or adjusting element according to claim 8, **characterized in that** the component (15) is a switch.
10. Switching and/or adjusting element according to claim 8, **characterized in that** the component (15) is a lamp.
11. Switching and/or adjusting element according to one of claims 1 to 7, **characterized in that** at least one of the functional elements (3, 4, 5) is a housing element (5) for an adjusting knob (16).
12. Switching and/or adjusting element according to one of claims 1 to 11, **characterized in that** the panel cover element (2) has at least one opening (17, 18) for the passage of a switching or adjusting element (16, 19).
13. Switching and/or adjusting element according to one of claims 1 to 11, **characterized in that** the panel cover element (2) has at least one opening (20) for showing a display element (21).
14. Switching and/or adjusting element according to claim 13, **characterized in that** a transparent element (22) is located between the panel cover element (2) and the display element (21).
15. Switching and/or adjusting element according to claim 14, **characterized in that** the transparent element (22) is a glass panel.

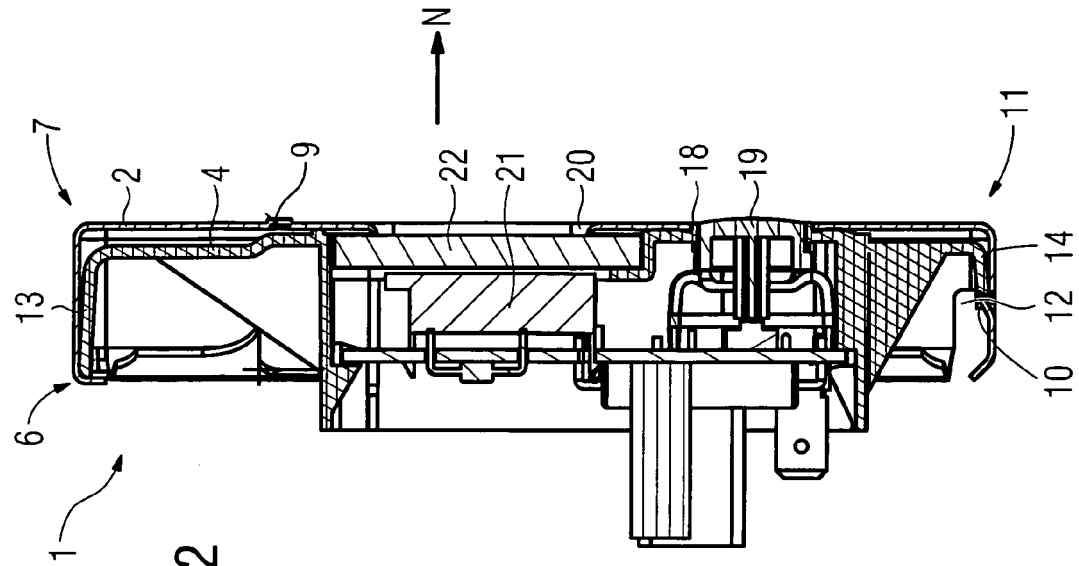


FIG 2

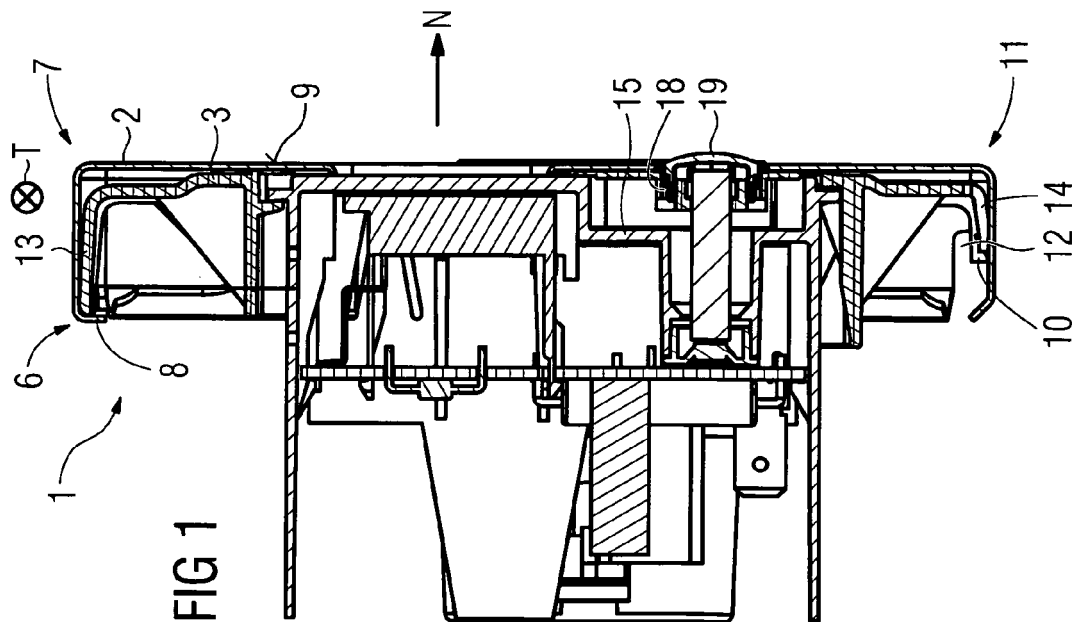


FIG 1

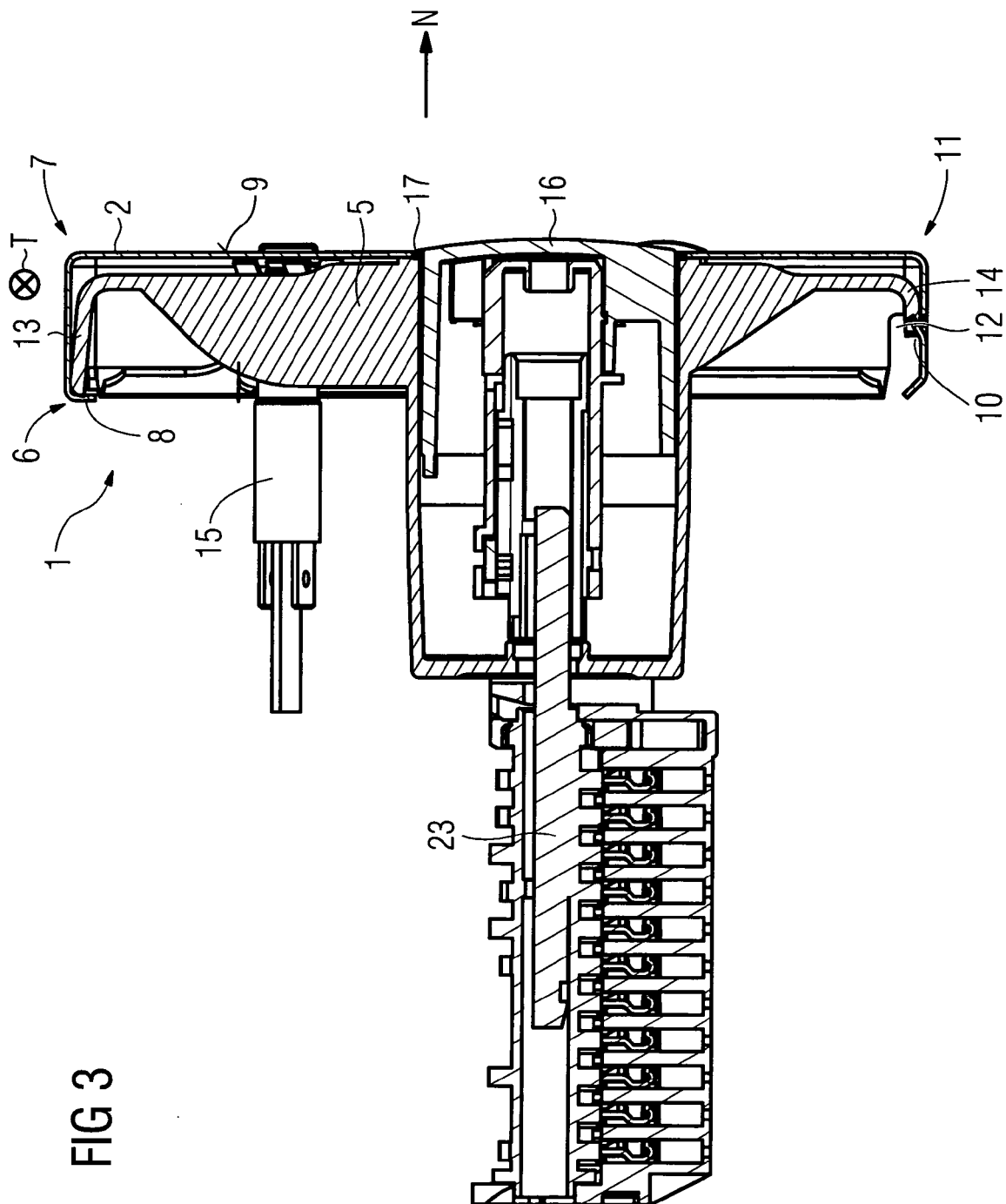


FIG 5

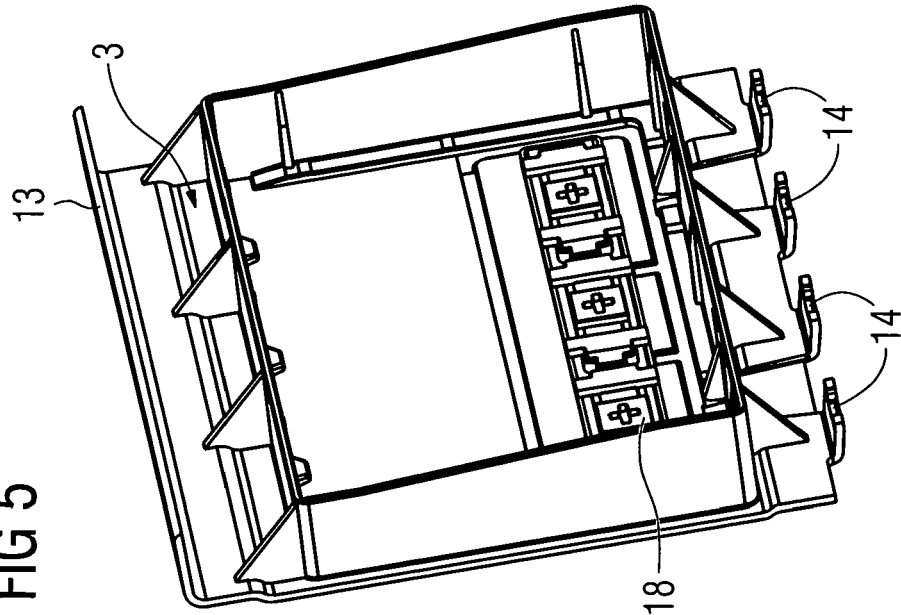


FIG 4

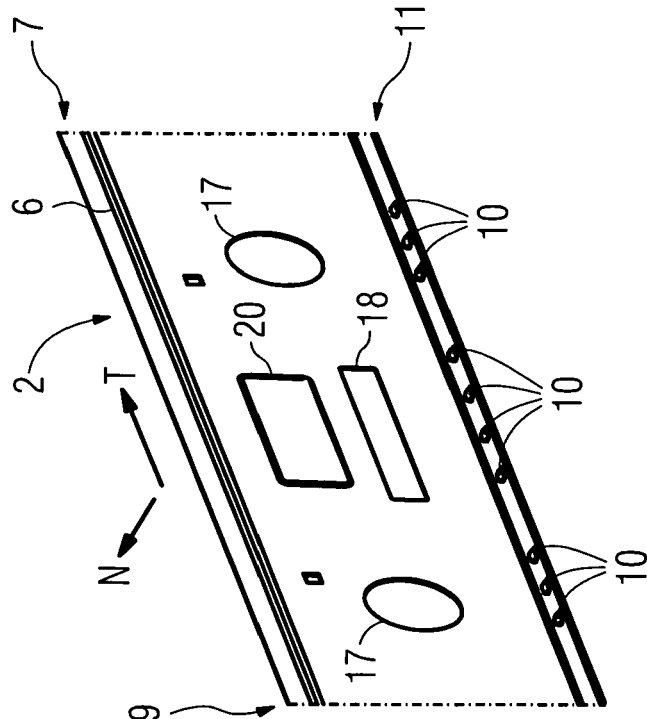


FIG 7

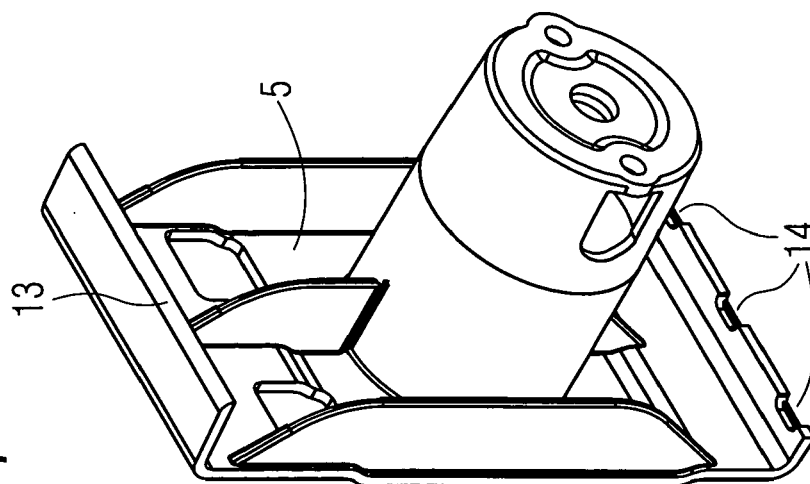


FIG 6

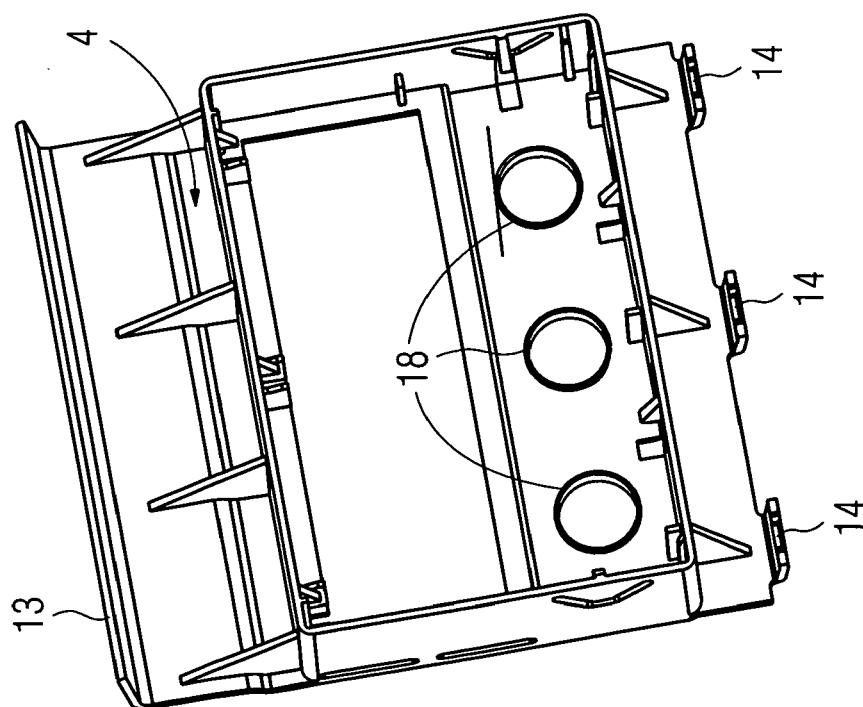
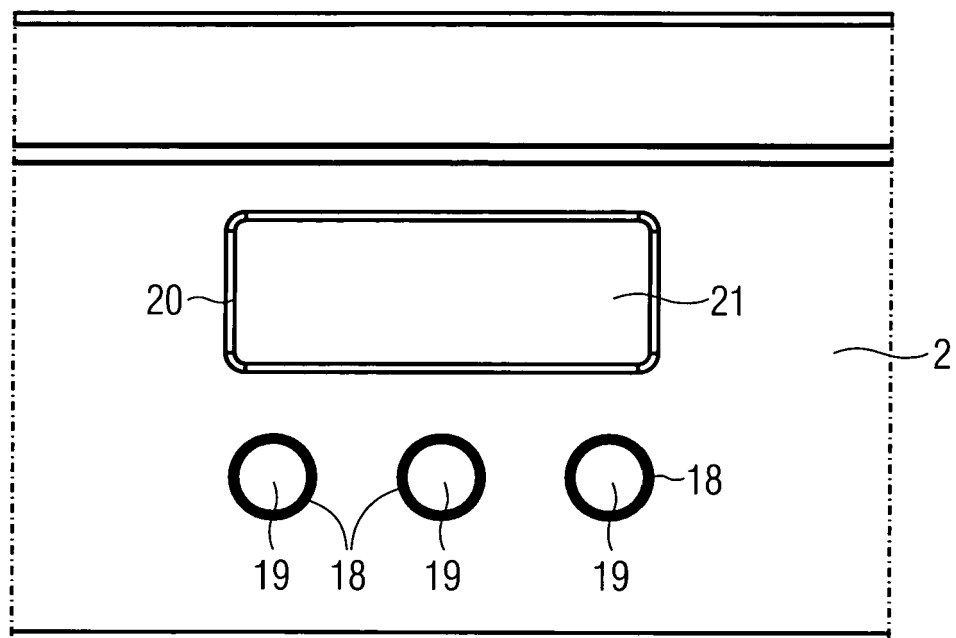


FIG 8





EUROPEAN SEARCH REPORT

Application Number
EP 09 01 4981

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 5 653 221 A (LUKEN PATRICK CHARLES [US] ET AL) 5 August 1997 (1997-08-05) * the whole document *	1-15	INV. F24C7/08
A	US 2 866 450 A (REEVES HERBERT M) 30 December 1958 (1958-12-30) * the whole document *	1	
			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 1 June 2010	Examiner Vanheusden, Jos
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 09 01 4981

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The members are as contained in the European Patent Office EDP file on
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01-06-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5653221 A	05-08-1997	NONE	

US 2866450 A	30-12-1958	NONE	

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