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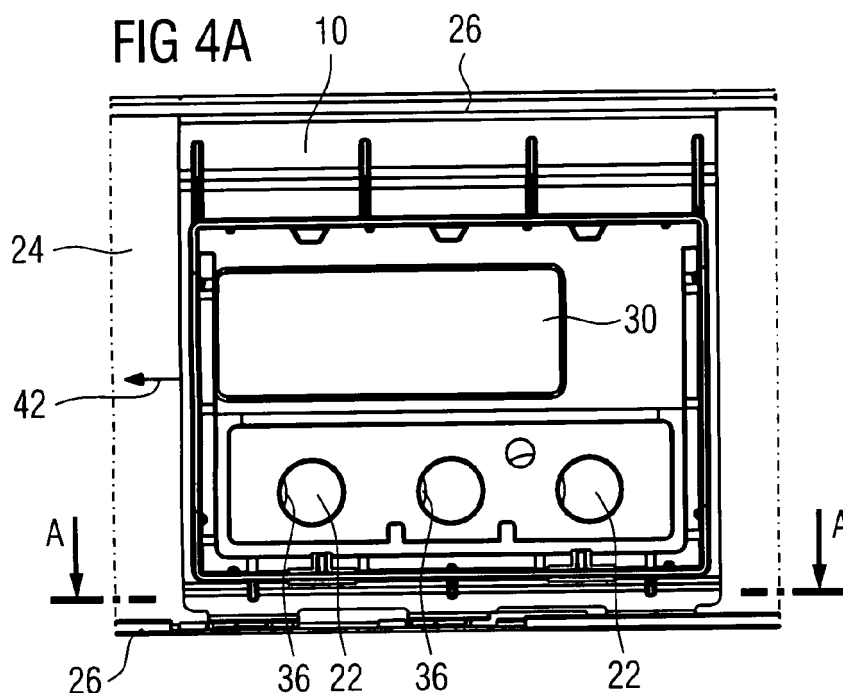
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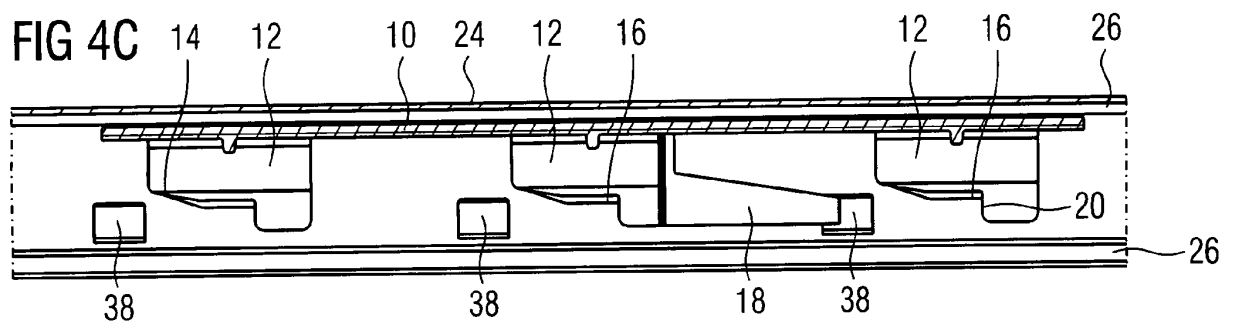
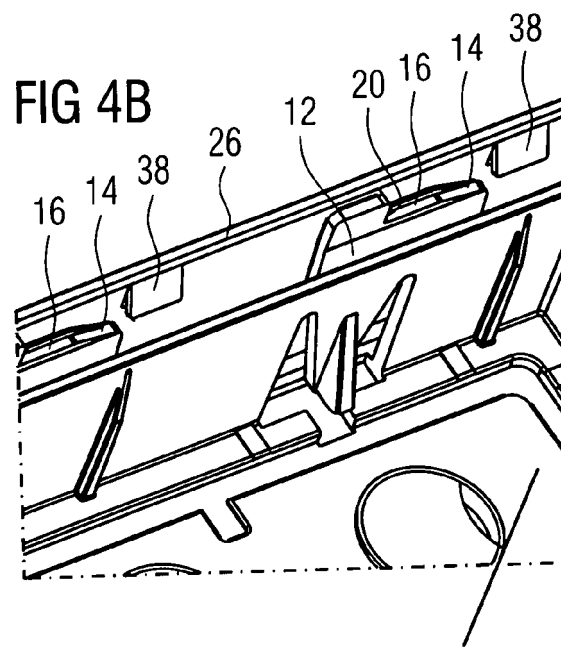
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(54) **A control panel for a household appliance**

(57) The present invention relates to a control panel for a household appliance comprising an outer part (24) and at least one inner part (10; 44; 46). The outer part (24) includes a substantially closed front side and an open rear side. The inner part (10; 44; 46) is inserted in or insertable into the outer part (24) through the open rear side. The inner part (10; 44; 46) is moveable for a distance within the outer part (24) along a predetermined

direction extending parallel to the front side of the outer part (24). The inner part (10; 44; 46) includes a number of holding elements (12) arranged on at least one side of the inner part (10; 44; 46). The holding elements (12) are engaged or engageable with corresponding elements (38) of the outer part (24) by a motion of the inner part (10; 44; 46) along the predetermined direction, so that the inner part (10; 44; 46) is pressed against the front side of the outer part (24).





Description

[0001] The present invention relates to a control panel with an outer part and at least one inner part for a household appliance. Further, the present invention relates to a household appliance with at least one control panel according to the preamble of claim 15.

[0002] The control panel for a household appliance is usually arranged at a front side of the household appliance. The control panel comprises actuating and indicator elements. The control panel comprises an inner holding frame for supporting the actuating and indicator elements. Further, the control panel comprises an outer faceplate for decorative and protective purposes. The holding frame and the faceplate are typically connected by fixing elements.

[0003] DE 20 2007 006 099 U1 discloses a cooling and/or freezing device. A frame with a recess is provided for receiving a component, wherein the recess is bigger than the component. When the component is inserted in the recess, a part of the recess remains free. The recess and/or the component comprise fixing elements for fastening the component within the recess. The fixation is obtained by a motion of the component along a direction extending parallel to the plane of the recess.

[0004] DE 197 57 809 A1 discloses a household appliance with a holding frame and a faceplate. The holding frame can be inserted into the faceplate through an open rear side of said faceplate. The holding frame may be fixed at the faceplate by screws.

[0005] DE 199 50 829 B4 discloses a fastening device in a household appliance. The fastening device is provided for the fixation of a component at the backside of a faceplate. The fastening device is formed as a frame and supports the component. The fastening device is connected to the faceplate by several fixing elements. It is an object of the present invention to provide an improved control panel for a household appliance, which allows the fastening of one or more holding frames and compatible devices in a faceplate without any additional fixing elements.

[0006] The object of the present invention is achieved by the control panel according to claim 1.

[0007] According to the present invention the control panel for a household appliance comprises an outer part and at least one inner part, wherein:

- the outer part includes a substantially closed front side and an open rear side,
- the inner part is inserted in or insertable into the outer part through the open rear side,
- the inner part is moveable for a distance within the outer part along a predetermined direction extending parallel to the front side of the outer part,
- the inner part includes a number of holding elements arranged on at least one side of the inner part, and
- the holding elements are engaged or engageable with corresponding elements of the outer part by a

motion of the inner part along the predetermined direction, so that the inner part is pressed against the front side of the outer part.

[0008] The main idea of the present invention is that the inner part is insertable through the open rear side of the outer part on the one hand and moveable within the outer part along the predetermined direction until the holding elements are engaged with the corresponding elements of the outer part on the other hand. The engagement of the holding elements with the corresponding elements of the outer part allows a quick fastening of the inner part at the outer part without any additional fixing elements.

[0009] According to a preferred embodiment of the present invention the outer part is a faceplate provided for a front side of the household appliance.

[0010] For example, the inner part is a holding frame provided for supporting at least one actuating element and/or indicator element.

[0011] Alternatively or additionally, the inner part is a toggle box provided for receiving and/or supporting at least one toggle.

[0012] Preferably, the inner part and at least a part of the holding elements form a single-piece part. This contributes to an easy production and assembling by low costs.

[0013] Further, at least one of the holding elements may have the form of a hook.

[0014] For example, at least a part of the holding elements may be arranged in at least one row. The row or rows of the holding elements may be arranged on one or both sidewalls of the inner part, wherein the sidewalls extend along the predetermined direction. Thereby the holding elements can be equally spaced within said row.

[0015] According to the preferred embodiment of the present invention, the holding element may comprise at least one bevel for guiding the corresponding element into an engagement with the holding element during the motion of the inner part.

[0016] Preferably, the corresponding elements of the outer part may be lugs. This contributes to a low complexity and low costs. Alternatively, as corresponding elements of the outer part may be used holes, recesses, rim holes and the upper and/or lower border of the outer part. If the holding element comprises a mushroom-shaped portion, then the corresponding elements of the outer part may be keyholes.

[0017] At least two surface sections of the holding element may be at least partially complementary to the corresponding element of the outer part. This contributes to a safe engagement between the holding element and the corresponding element.

[0018] Further, at least one of the holding elements may comprise at least one snap-fit. The snap-fit secures the engagement between the holding element and the corresponding element.

[0019] Preferably, at least one sidewall of the inner

part, which side wall extends along the predetermined direction, comprises at least one spring arm. The spring arm allows that the inner part can be clamped into the outer part along a direction perpendicular to the predetermined direction. For example, one side wall extending along the predetermined direction comprises the spring arm and the holding elements are arranged on another sidewall on the opposite side.

[0020] Further, at least one sidewall of the inner part, which sidewall extends along the predetermined direction, may comprise at least one fold back extending along the predetermined direction and along the rear side of said sidewall. Preferably, both sidewalls extending along the predetermined direction comprise at least one fold back along their rear side. The fold backs guarantee that the inner part is moveable only along the predetermined direction. The fold back may be used as corresponding elements of the outer part.

[0021] The present invention relates further to a household appliance with at least one control panel as described above.

[0022] Novel and inventive features of the present invention are set forth in the appended claims.

[0023] The present invention will be described in further detail with reference to the drawings, in which

- FIG 1 illustrates a perspective view of a holding frame for a control panel according to a first embodiment of the present invention,
- FIG 2 illustrates a sectional side view of the control panel according to the first embodiment of the present invention,
- FIG 3 illustrates a perspective view of the rear side of the control panel according to the first embodiment of the present invention,
- FIG 4 illustrates three views of the control panel according to the first embodiment of the present invention before the holding frame is completely inserted,
- FIG 5 illustrates three views of the control panel according to the first embodiment of the present invention after the holding frame has been completely inserted,
- FIG 6 illustrates a perspective view of a toggle box for a control panel according to a second embodiment of the present invention,
- FIG 7 illustrates three views of the control panel according to the second embodiment of the present invention before the toggle box is completely inserted,
- FIG 8 illustrates three views of the control panel ac-

cording to the second embodiment of the present invention after the toggle box has been completely inserted,

- FIG 9 illustrates a perspective view of the holding frame for the control panel according to a third embodiment of the present invention,
- FIG 10 illustrates a sectional side view of the control panel according to the third embodiment of the present invention, and
- FIG 11 illustrates a perspective view of the rear side of the control panel according to the third embodiment of the present invention.

[0024] FIG 1 illustrates a perspective view of a holding frame 10 for a control panel according to a first embodiment of the present invention. The control panel with the holding frame 10 is provided for a front side of a household appliance. The holding frame 10 forms an inner part of the control panel. The control panel may comprise one or more inner parts.

[0025] In FIG 1 the front side of the holding frame 10 is positioned at the bottom of the perspective view. The front side of the holding frame 10 comprises three recesses 22 provided for buttons. The top side of the holding frame 10 is formed as a spring arm 40.

[0026] A number of holding elements 12 is arranged serially at the bottom side of the holding frame 10. In this example the holding frame 10 comprises three holding elements 12 at its bottom side. The holding elements 12 are formed as hooks with substantially L-shaped sheet elements. Each holding element 12 includes a bevel 14, a contact surface 16 and a stop unit 20. The holding elements 12 are engageable with at least partially complementary elements. In this example the central holding element 12 includes a snap-fit 18.

[0027] The holding frame 10 may be assembled in an outer part of the control panel. Thereby, at first the holding frame 10 is inserted from the rear side of said outer part. Then, the holding frame 10 is engaged with the outer part by a sideways motion of said holding frame 10 relative to the outer part.

[0028] FIG 2 illustrates a sectional side view of the control panel according to the first embodiment of the present invention. The control panel comprises the holding frame 10, a faceplate 24 and a central part 32. The faceplate 24 forms the outer part of the control panel.

[0029] The holding frame 10 is clamped between a top wall and a bottom wall of the faceplate 24. The top and bottom walls of the faceplate 24 include a fold back 26 at their rear end in each case. The elastic spring arm 40 at the top of the holding frame 10 allows an overcoming of the fold backs 26 during inserting the holding frame 10 into the faceplate 24. In the jammed state of the holding frame 10 the inner height of the faceplate 24 is marginally bigger than the outer height of the holding frame

10.

[0030] Further, a central part 32 is inserted in the holding frame 10. Said central part 32 is provided as a carrier for elements of the control panel, e.g. buttons, switches, relays and/or displays. The faceplate 24 includes a recess 36 for a button 28 and a window 30 for a display device.

[0031] FIG 3 illustrates a perspective view of the rear side of the control panel according to the first embodiment of the present invention. The faceplate 24 is equipped with one holding frame 10, wherein the central part 32 is inserted in said holding frame 10. The portions besides the holding frame 10 are vacant and provided for further holding frames 10 or similar compatible devices. In this example the faceplate 24 includes two recesses 34 for toggles.

[0032] FIG 4 illustrates three views of the control panel according to the first embodiment of the present invention before the holding frame 10 is completely inserted into the faceplate 24. FIG 4A shows a rear view of a portion of the faceplate 24 with the holding frame 10. FIG 4B shows a detailed perspective view of a portion of the bottom walls of the holding frame 10 and the faceplate 24. FIG 4C shows a sectional top view along the line A-A in FIG 4A.

[0033] FIG 4A shows a situation, in which the holding frame 10 is to the right of its intended position, in which the holding frame 10 will be completely inserted. An arrow 42 shows the motion required to obtain said intended position. The faceplate 24 includes recesses 36 for buttons, which corresponds with the recesses 22 of the holding frame 10. In this situation the holding frame 10 is clamped between the top wall and bottom wall of the faceplate 24, wherein the holding frame 10 is secured by the fold backs 26 at said top wall and bottom wall.

[0034] FIG 4B shows in detail a part of the bottom walls of the holding frame 10 and the faceplate 24. The bottom wall of the faceplate 24 comprises lugs 38. Each lug 38 is provided for engaging with one holding element 12 after the sideways motion of said holding frame 10. In the situation of FIG 4A the holding frame 10 is not yet in its final position.

[0035] Preferably, the holding element 12 comprises a small step between the bevel 14 and the contact surface 16, so that the contact surface 16, the stop unit 20 and said small step form a recess for receiving the lug 38. Thus, the small step between the bevel 14 and the contact surface 16 acts as an undercut. The small step pinches the lug 38 during the sideways motion of the holding frame 10. In the mounted state the small step interlocks the lug 38 between the contact surface 16, the stop unit 20 and said small step.

[0036] FIG 4C clarifies the positions of the holding elements 12 in relation to their corresponding lugs 38. The contact surface 16 and the stop unit 20 of each holding element 12 are provided for engaging with one corresponding lug 38. The bevels 14 of the holding elements are provided for guiding the lugs 38 to the corresponding

contact surfaces 16 and stop units 20.

[0037] FIG 5 illustrates three views of the control panel according to the first embodiment of the present invention after the holding frame 10 has been completely inserted into the faceplate 24. FIG 5A shows a rear view of the portion of the faceplate 24 with the holding frame 10. FIG 5B shows a detailed perspective view of the portion of the bottom walls of the holding frame 10 and faceplate 24. FIG 5C shows a sectional top view along the line A-A in FIG 5A. Thus, FIG 5 shows similar views as FIG 4, wherein according to FIG 5 the holding frame 10 has been completely inserted in the faceplate 24.

[0038] FIG 5A clarifies that the recesses 22 of the holding frame 10 are congruent with the recesses of the faceplate 24. FIG 5B shows that the lugs 38 of the faceplate 24 are engaged with the holding elements 12 of the holding frame 10. Also FIG 5C shows clearly the engagement of the lugs 38 and the holding elements 12. Thereby the lugs 38 are in contact with the contact surface 16 and the stop unit 20 of the holding frame 10.

[0039] FIG 5C clarifies the small step between the bevel 14 and the contact surface 16. The contact surface 16, the stop unit 20 and the small step enclose partially the lug 38 in each case.

[0040] FIG 6 illustrates a perspective view of a toggle box 44 for a control panel according to a second embodiment of the present invention. The toggle box 44 has similar outer dimensions as the holding frame 10, so that the toggle box 44 is compatible with the holding frame 10 and can also be inserted into the faceplate 24.

[0041] The toggle box 44 comprises holding elements 12 at its bottom side and the spring arm 40 at its top side. Each of the holding elements 12 includes a bevel 14, a contact surface 16 and a stop unit 20. The holding elements 12 are engageable with at least partially complementary elements. Unlike the holding frame 10 the toggle box 44 has no snap-fit but can be held by the undercut. The toggle box 44 is provided for receiving a toggle.

[0042] FIG 7 illustrates three views of the control panel according to the second embodiment of the present invention before the toggle box 44 is completely inserted. FIG 7A shows a rear view of a portion of the faceplate 24 with the toggle box 44. FIG 7B shows a detailed perspective view of a portion of the bottom walls of the toggle box 44 and the faceplate 24. FIG 7C shows a sectional top view along the line A-A in FIG 7A.

[0043] FIG 7A shows the situation, in which the toggle box 44 is to the right of its intended position. In said intended position the toggle box 44 will be completely inserted. An arrow 42 shows the motion of the toggle box 44, which is required to obtain said intended position. In this situation the toggle box 44 is clamped between the top wall and bottom wall of the faceplate 24, wherein the toggle box 44 is secured by the fold backs 26 at said top wall and bottom wall.

[0044] FIG 7B shows in detail a part of the bottom walls of the toggle box 44 and the faceplate 24. Each holding element 12 of the toggle box 44 is provided for engaging

with one lug 38 of the faceplate 24 after the sideways motion of the toggle box 44. In the situation of FIG 7A the toggle box 44 is not yet in its final position.

[0045] FIG 7C clarifies the positions of the holding elements 12 of the toggle box 44 in relation to their corresponding lugs 38 of the faceplate 24. The contact surface 16 and the stop unit 20 of each holding element 12 are provided for engaging with one corresponding lug 38. The bevels 14 of the holding elements are provided for guiding the lugs 38 to the corresponding contact surfaces 16 and stop units 20.

[0046] FIG 8 illustrates three views of the control panel according to the second embodiment of the present invention after the toggle box 44 has been completely inserted. FIG 8A shows a rear view of the portion of the faceplate 24 with the toggle box 44. FIG 8B shows a detailed perspective view of the portion of the bottom walls of the toggle box 44 and the faceplate 24. FIG 8C shows a sectional top view along the line A-A in FIG 8A. Thus, FIG 8 shows similar views as FIG 7, wherein according to FIG 8 the toggle box 44 has been completely inserted in the faceplate 24.

[0047] FIG 8A clarifies that the recesses 22 of the toggle box 44 are congruent with the recesses of the faceplate 24. FIG 8B shows that the lugs 38 of the faceplate 24 are engaged with the holding elements 12 of the toggle box 44. FIG 8C clarifies the engagement of the lugs 38 and the holding elements 12. Thereby the lugs 38 are in contact with the contact surface 16 and the stop unit 20 of the holding frame 10.

[0048] FIG 9 illustrates a perspective view of the holding frame 46 for the control panel according to a third embodiment of the present invention. The holding frame 46 is similar to the holding frame 10 of FIG 1.

[0049] The holding frame 46 comprises a number of holding elements 12. The holding elements 12 have the same structure as the holding elements 12 as described before. In this example the holding frame 46 comprises five holding elements 12.

[0050] Further, the holding frame 46 comprises a window 48. The window 48 is relative big and may be provided for a display. The holding frame 46 has such dimensions, that the holding frame 46 can be inserted into the faceplate 24 together with a glass panel 50.

[0051] FIG 10 illustrates a sectional side view of the control panel according to the third embodiment of the present invention. The control panel includes the faceplate 24, the holding frame 46 and the glass panel 50. The holding frame 46 is fastened within the faceplate 24 in a similar way as the holding frame 10 in FIG 2. Additionally the glass panel 50 is arranged between the faceplate 24 and the holding frame 46.

[0052] FIG 11 illustrates a perspective view of the rear side of the control panel according to the third embodiment of the present invention. FIG 11 clarifies that the holding elements 12 and the lugs 38 of the faceplate 24 are engaged in the same way as in the first and second embodiments of the present invention.

[0053] The control panel according to the present invention allows a fastening of the holding frames 10 and 46 or the toggle box 44, respectively, at the faceplate 24 without any fixing elements. Since the holding frames 10 and 46 or the toggle box 44, respectively, are not glued at the faceplate 24, it is not necessary that the faceplate 24 has to be cleaned. The holding frames 10 and 46, the toggle box 44 and the faceplate 24 can be easily exchanged, if a repairing occurs.

[0054] Since the holding frames 10 and 46 and the toggle box 44, respectively, are pressed against the faceplate 24, the control panel is very robust.

[0055] The holding elements 12 may be arranged at upper portion and/or at the lower portion of the holding frame 10 and 46 and the toggle box 44, respectively.

[0056] Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to those precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

List of reference numerals

[0057]

- 10 holding frame
- 12 holding element
- 14 bevel
- 16 contact surface
- 18 snap-fit
- 20 stop unit
- 22 recess for button in the holding frame
- 24 faceplate
- 26 fold back
- 28 button
- 30 window
- 32 central part
- 34 recess for toggle
- 36 recess for button in the faceplate

- 38 lug
- 40 spring arm
- 42 arrow
- 44 toggle box
- 46 holding frame
- 48 window
- 50 glass panel

Claims

1. A control panel for a household appliance comprising an outer part (24) and at least one inner part (10; 44; 46), wherein:
 - the outer part (24) includes a substantially closed front side and an open rear side,
 - the inner part (10; 44; 46) is inserted in or insertable into the outer part (24) through the open rear side,
 - the inner part (10; 44; 46) is moveable for a distance within the outer part (24) along a predetermined direction extending parallel to the front side of the outer part (24),
 - the inner part (10; 44; 46) includes a number of holding elements (12) arranged on at least one side of the inner part (10; 44; 46), and
 - the holding elements (12) are engaged or engageable with corresponding elements (38) of the outer part (24) by a motion of the inner part (10; 44; 46) along the predetermined direction, so that the inner part (10; 44; 46) is pressed against the front side of the outer part (24).
2. The control panel according to claim 1, **characterized in, that** the outer part is a faceplate (24) provided for a front side of the household appliance.
3. The control panel according to claim 1 or 2, **characterized in, that** the inner part is a holding frame (10; 46) provided for supporting at least one actuating element (28) and/or indicator element.
4. The control panel according to any one of the preceding claims, **characterized in, that** the inner part is a toggle box (44) provided for receiving and/or supporting at least one toggle.
5. The control panel according to any one of the pre-

ceding claims,
characterized in, that
 the inner part (10; 44; 46) and at least a part of the holding elements (12) form a single-piece part.

6. The control panel according to any one of the preceding claims, **characterized in, that** at least one of the holding elements (12) has the form of a hook.
7. The control panel according to any one of the preceding claims, **characterized in, that** at least a part of the holding elements (12) are arranged in at least one row.
8. The control panel according to claim 7, **characterized in, that** the holding elements (12) are equally spaced within one row.
9. The control panel according to any one of the preceding claims, **characterized in, that** the holding element (12) comprises at least one bevel (14) for guiding the corresponding element (38) into the engagement with said holding element (12) during the motion of the inner part (10; 44; 46) along the predetermined direction.
10. The control panel according to any one of the preceding claims, **characterized in, that** the corresponding elements of the outer part (24) are lugs (38).
11. The control panel according to any one of the preceding claims, **characterized in, that** at least two surface sections (16, 20) of the holding element (12) are complementary to the corresponding element (38) of the outer part (24).
12. The control panel according to any one of the preceding claims, **characterized in, that** at least one of the holding elements (12) comprises at least one snap-fit (18).
13. The control panel according to any one of the preceding claims, **characterized in, that** at least one sidewall of the inner part (10; 44; 46), which sidewall extends along the predetermined direction, comprises at least one spring arm (40).
14. The control panel according to any one of the pre-

ceding claims,

characterized in, that

at least one sidewall of the inner part (10; 44; 46),
which sidewall extends along the predetermined di- 5
rection, comprises at least one fold back (26) extend-
ing along the predetermined direction and along the
rear side of said side wall.

15. A household appliance with at least one control pan- 10
el, **characterized in, that**
the household appliance comprises at least one con-
trol panel according to any one of the claims 1 to 14.

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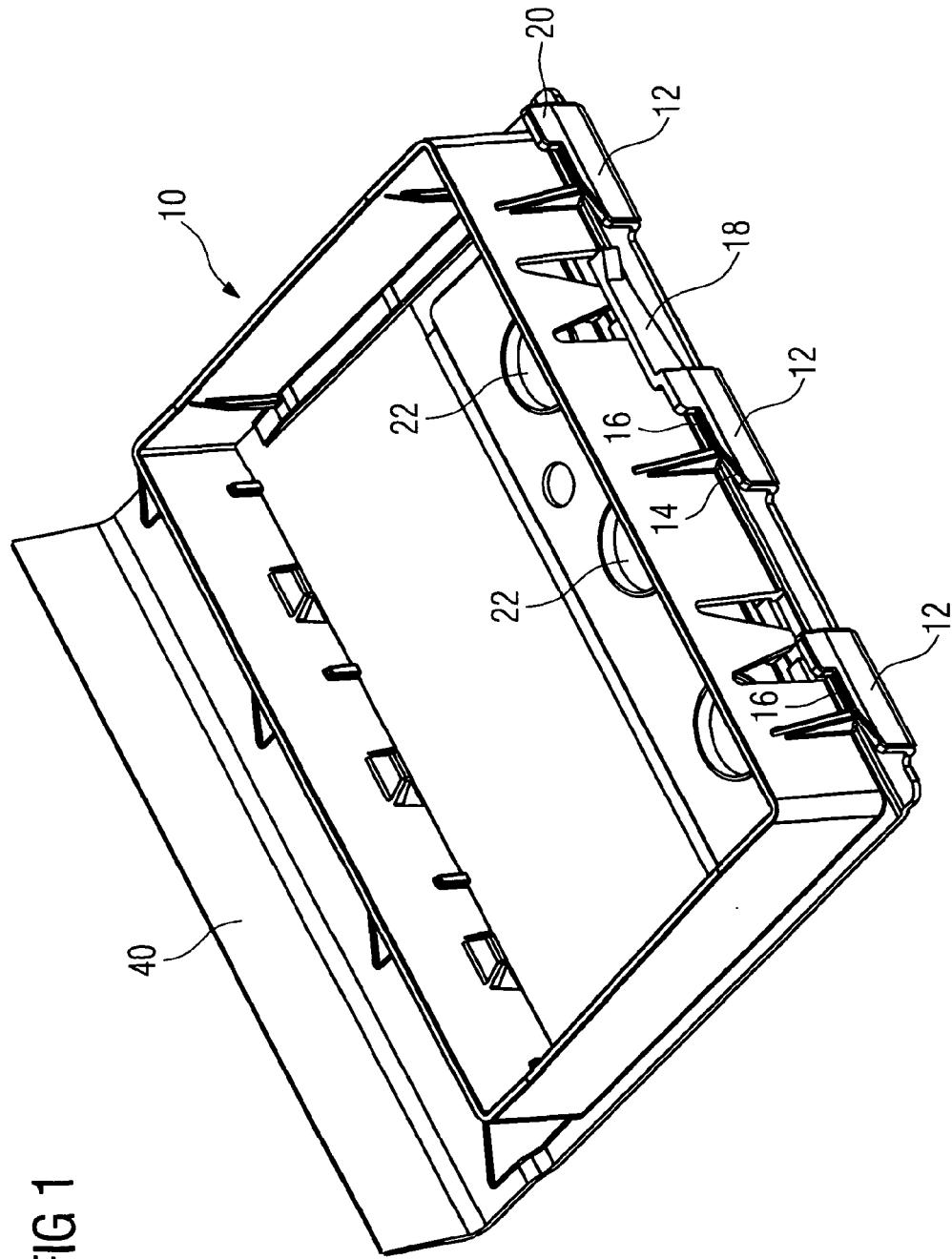


FIG 1

FIG 2

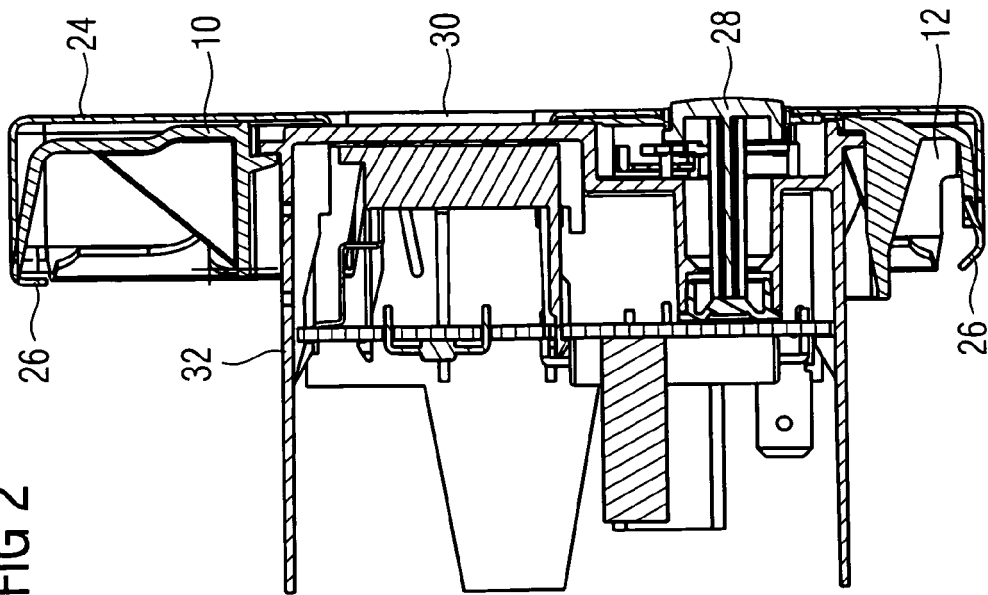
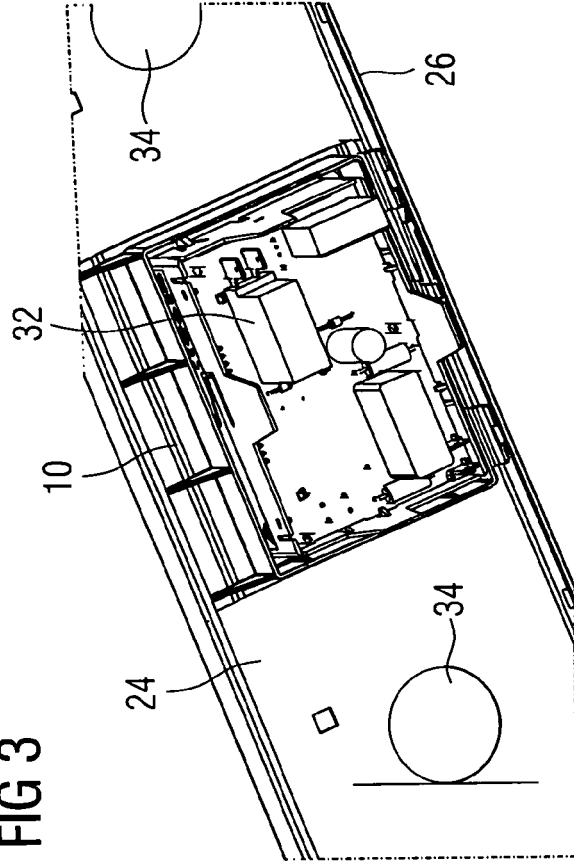
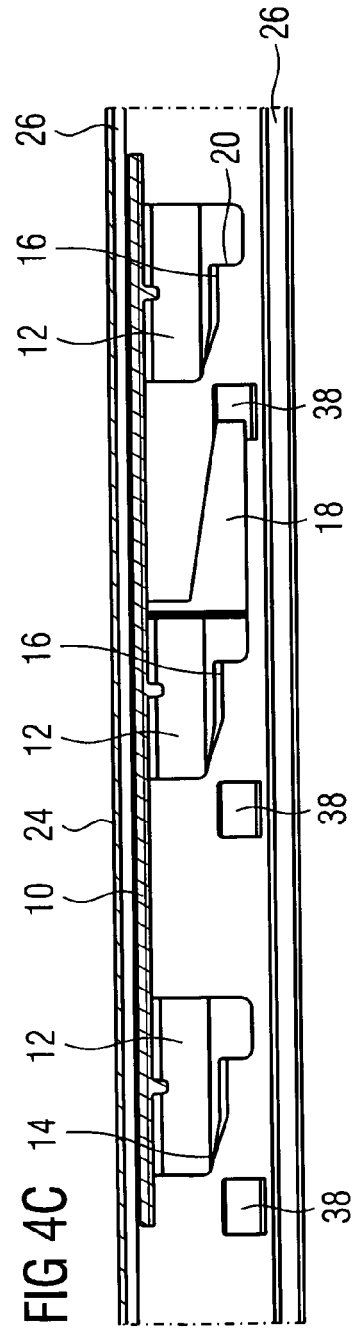
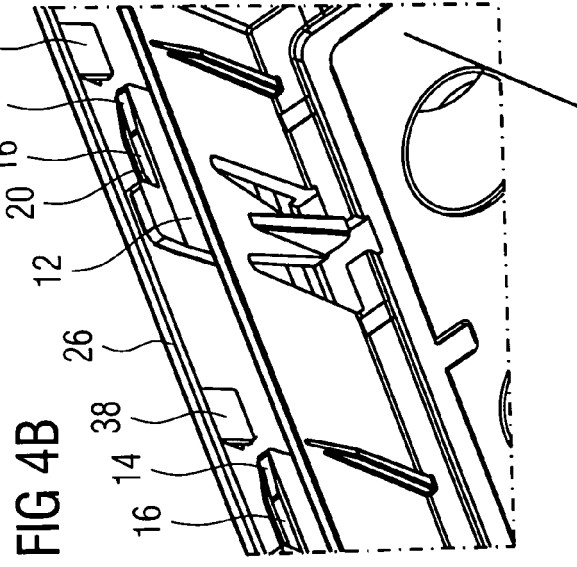
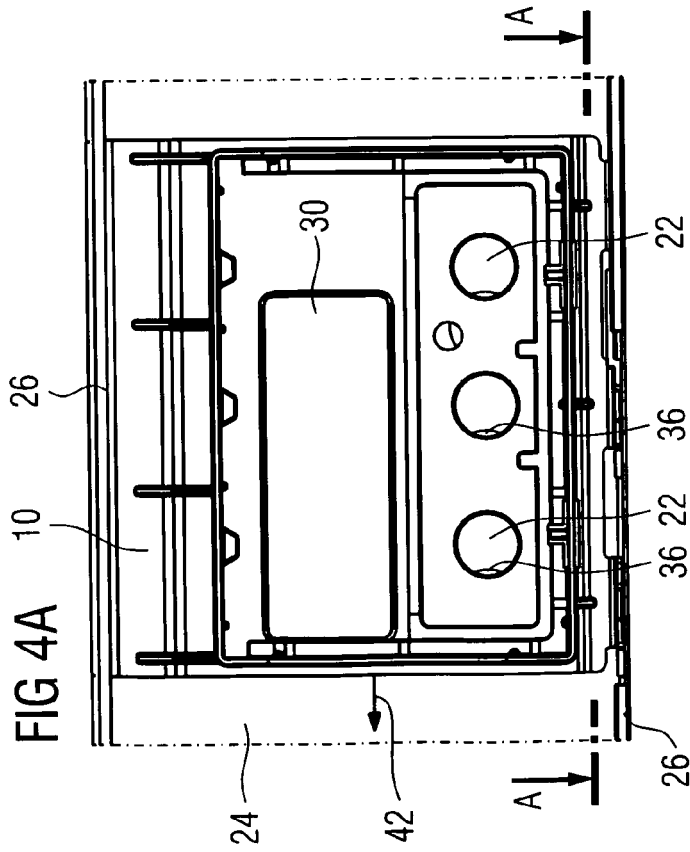


FIG 3





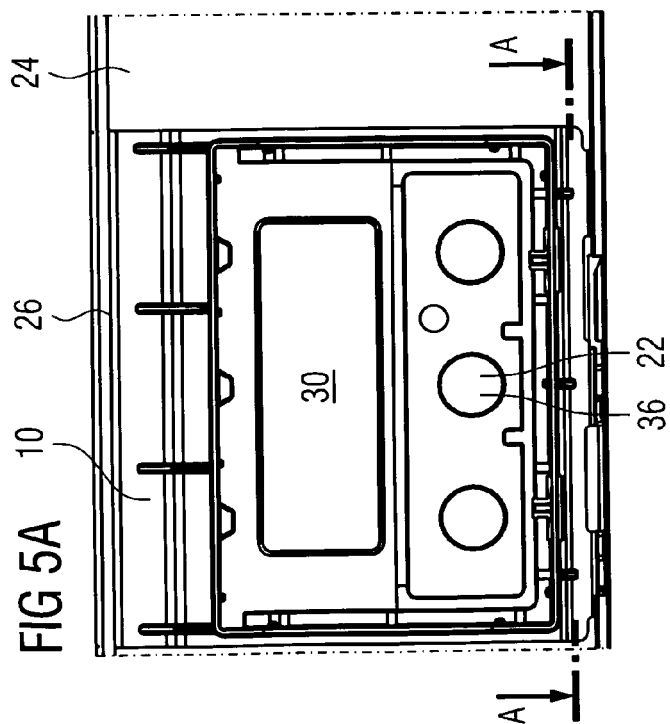
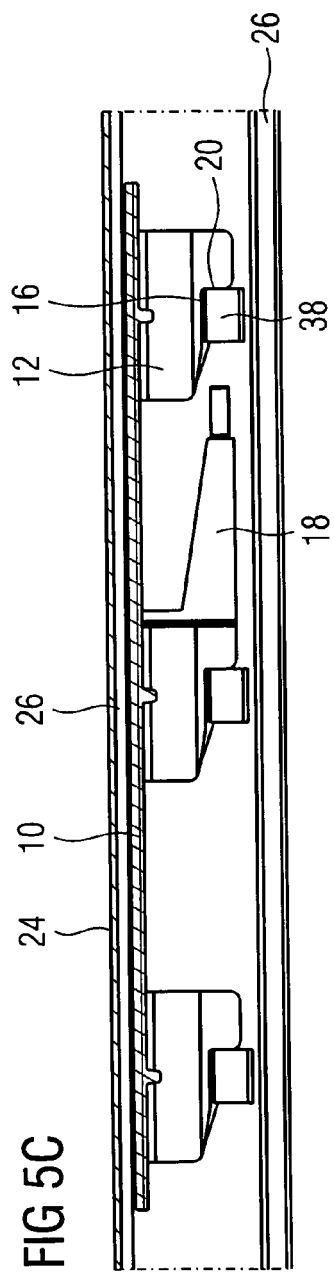
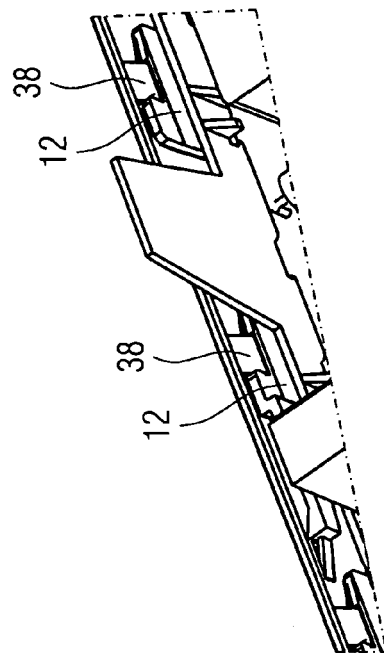
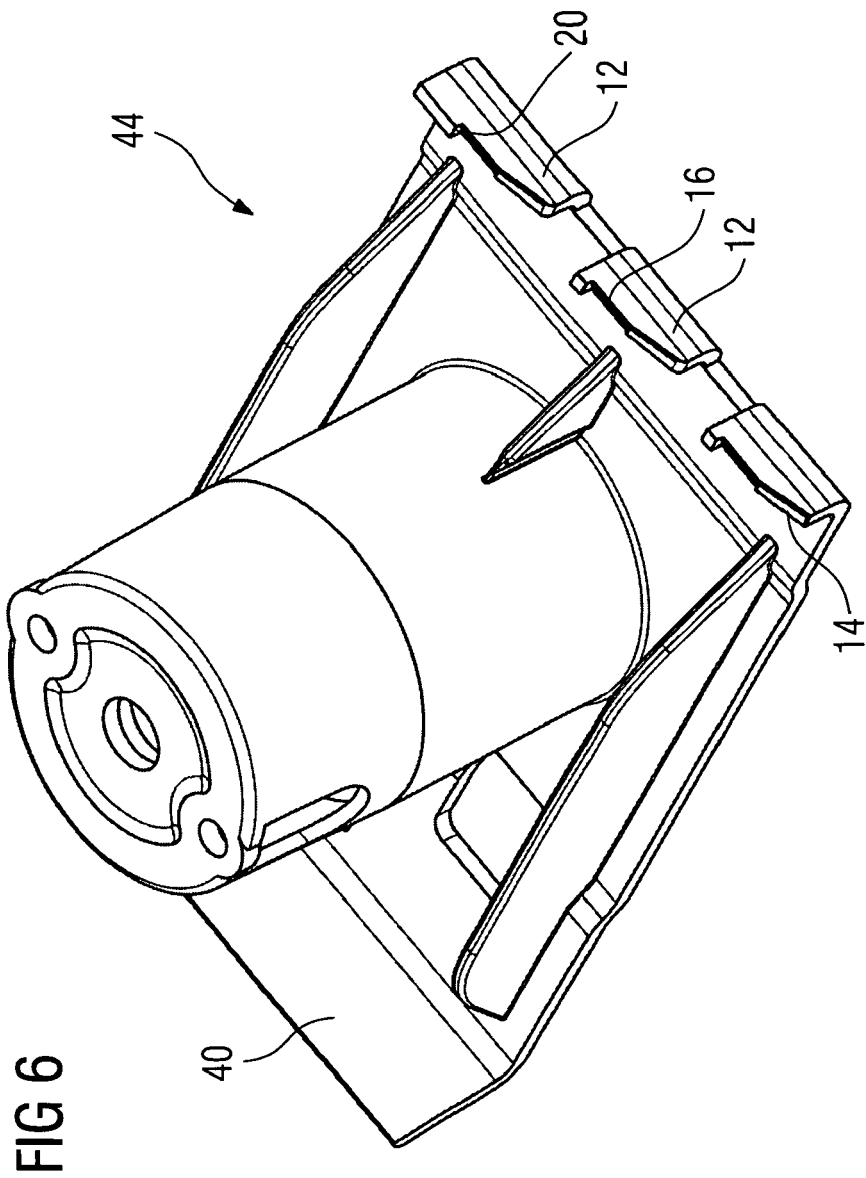


FIG 5B





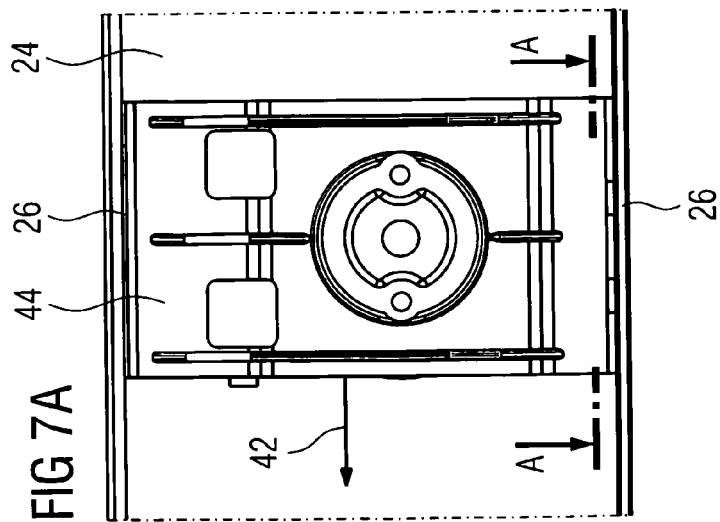
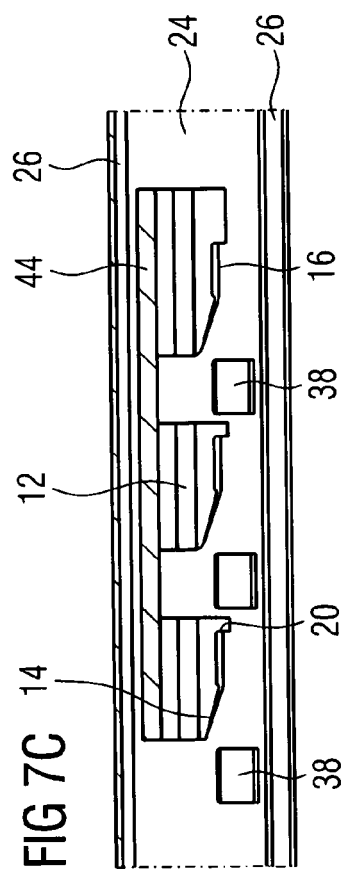
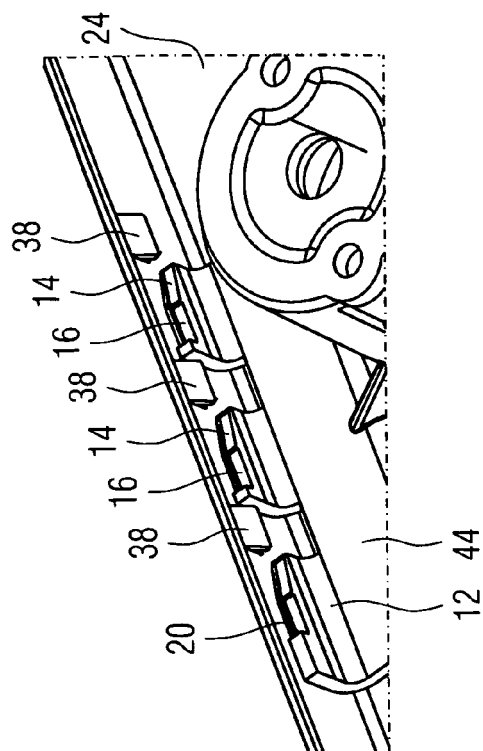


FIG 7B



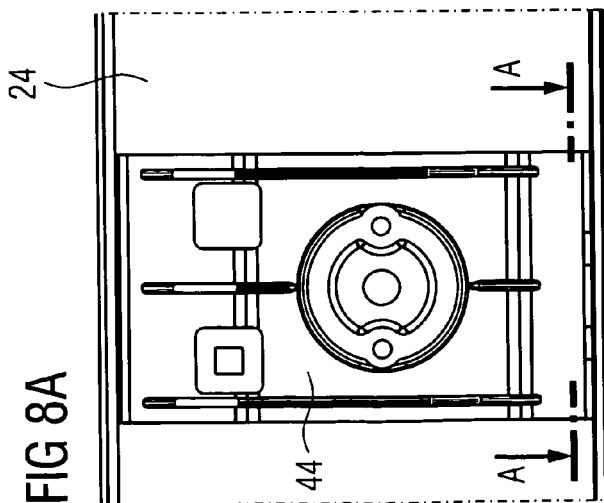
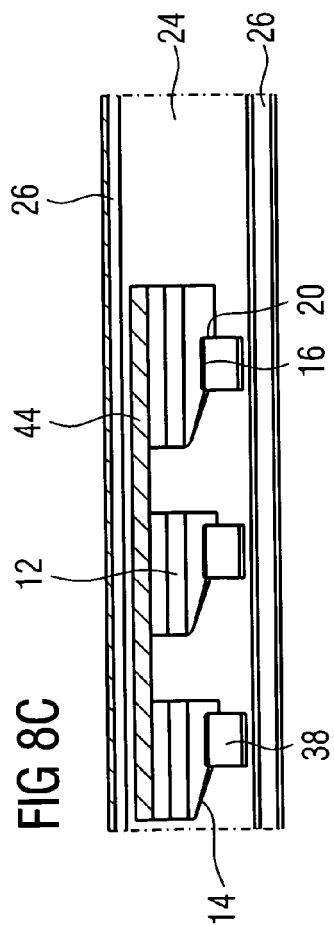
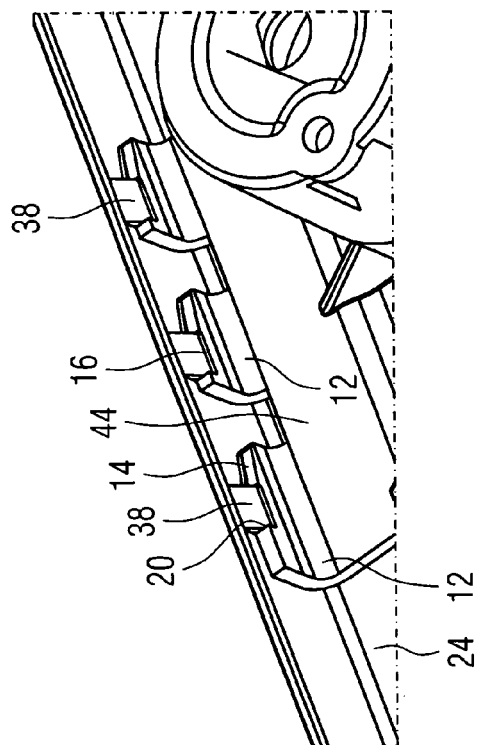
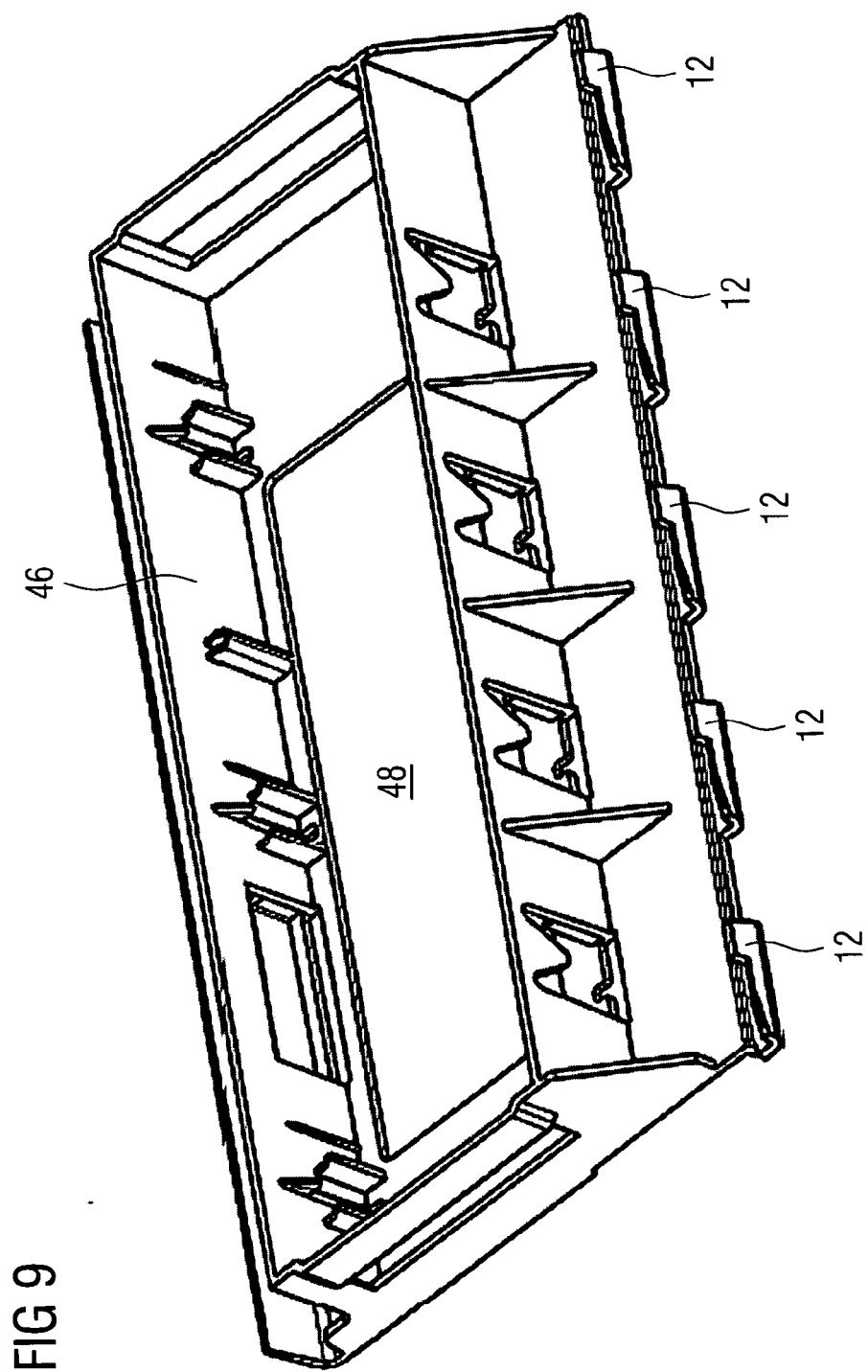
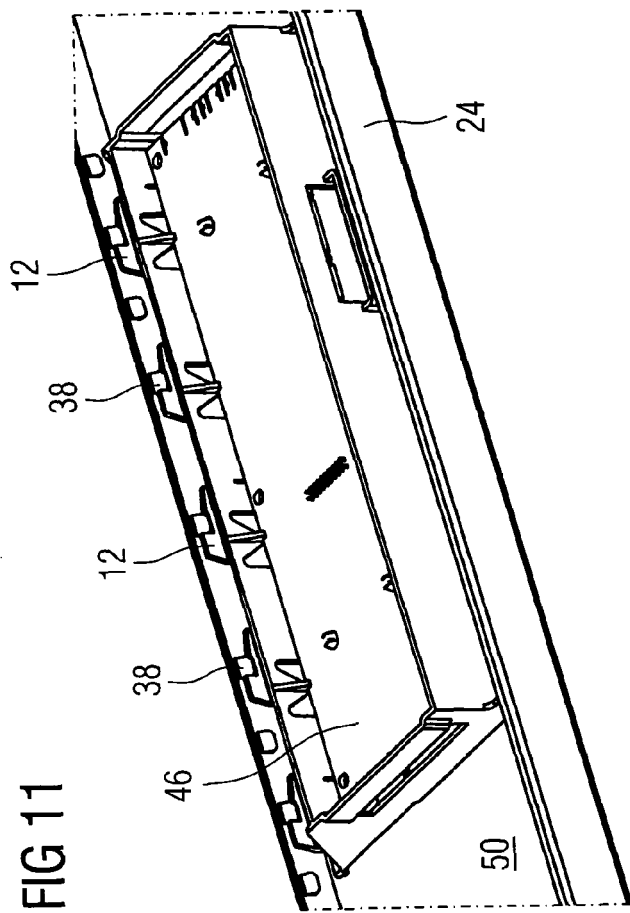
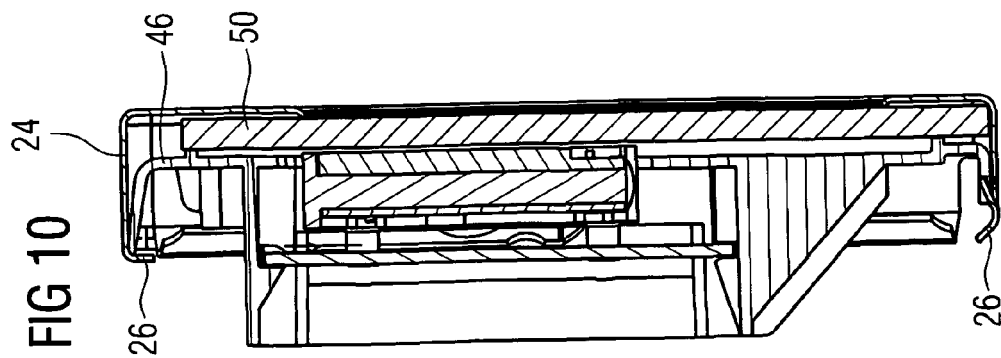


FIG 8B









EUROPEAN SEARCH REPORT

Application Number
EP 10 00 1444

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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