(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 299 724 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.03.2018 Bulletin 2018/13

(51) Int Cl.:
F24C 15/10 *(2006.01)*

(21) Application number: **16190512.0**

(22) Date of filing: **23.09.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Electrolux Appliances Aktiebolag**
105 45 Stockholm (SE)

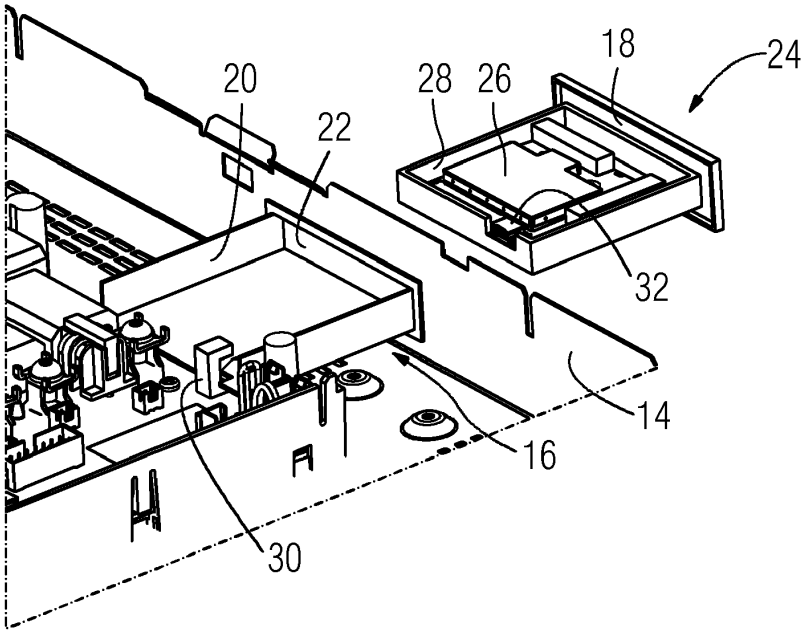
(72) Inventors:
- **NEUKAMM, Alwin**
  91541 Rothenburg ob der Tauber (DE)
- **HÄUTLE, Ulrich**
  91541 Rothenburg ob der Tauber (DE)
- **LEIKAM, Juergen**
  91541 Rothenburg ob der Tauber (DE)

(74) Representative: **Electrolux Group Patents**
AB Electrolux
Group Patents
105 45 Stockholm (SE)

(54) DOMESTIC APPLIANCE WITH CONTROL PLUG-IN MODULE

(57) The present invention relates to a domestic appliance (10), in particular a cooking hob (10). The domestic appliance (10) comprises at least reception device (16) configured for receiving a plug-in module (22) into the interior of said reception device (16). The reception device (16) includes a recess (22) configured to be penetrated by the plug-in module (22) during inserting said plug-in module (22) into the reception device (16). The reception device (16) includes connecting means (30) arranged in the interior of the casing (14). The reception device (16) is configured for connecting the plug-in module (22) to a control unit of the domestic appliance (10).

FIG 4



EP 3 299 724 A1

Description

[0001] The present invention relates to a domestic appliance, in particular a cooking hob. Further, the present invention relates to a reception device for the domestic appliance. Moreover, the present invention relates to a system comprising the domestic appliance with the reception device and a plug-in module. At last, the present invention relates to a method for upgrading said system.

[0002] Usually, a conventional cooking hob comprises a panel and a casing. The panel forms the top side of the cooking hob, while the casing forms the substructure of the cooking hob and supports said panel. The casing includes a bottom plate, side walls and an open top side. Said open top side is covered by the panel. One or more heating elements and electric and/or electronic circuits are arranged inside the casing.

[0003] The conventional cooking hob forms a compact unit. In the conventional cooking hob the heating elements and the electric and/or electronic circuits are fixed at predetermined positions. Any modifications of the cooking hob and its components are not provided. It is not possible to add any further conventional cooking components to the conventional cooking hob.

[0004] It is an object of the present invention to provide a domestic appliance, wherein an additional electric and/or electronic circuit may be added or a present electric and/or electronic circuit may be exchanged by low complexity.

[0005] The object is achieved by the domestic appliance according to claim 1.

[0006] According to the present invention a domestic appliance, in particular a cooking hob is provided, wherein:

- the domestic appliance comprises at least one reception device for receiving or inserting a plug-in module into the interior of said reception device,
- the reception device includes a recess configured to be penetrated by the plug-in module during inserting said plug-in module into the reception device,
- the reception device includes connecting means arranged in the interior of said reception device, and
- the reception device is configured for connecting the plug-in module to a control unit of the domestic appliance.

[0007] The reception device allows that an additional electric and/or electronic component may be added to the cooking hob without effort. Alternatively, an electric and/or electronic circuit already present in the reception device may be exchanged by low effort. In particular, the reception device allows an upgrade of the domestic appliance. Usually, the domestic appliance is used over several years, during which time further developments of domestic appliances and their components occur. The domestic appliance may be modernised by adding the additional electric or electronic component or by exchanging the present electric and/or electronic circuit. Further, the reception device allows a modular construction system for the domestic appliance, wherein some components of said domestic appliance may be either added or omitted.

[0008] In particular, the domestic appliance comprises at least one casing or housing, in which the reception device is formed. Preferably, the reception device is formed in a wall of said housing or casing.

[0009] Further, the reception device may include a support frame extending from the recess into the interior of the housing or casing, wherein preferably said support frame includes a bottom part and two lateral parts.

[0010] Moreover, the reception device may be provided for receiving the plug-in module with or without a printed circuit board and with or without a mobile connector.

[0011] Preferably, the reception device includes a stationary connector arranged in the interior of the reception device and connectable or connected to a mobile connector of the plug-in module. Alternatively, a cable connector may be provided instead of the stationary connector. Said cable connector may be flexibly positioned.

[0012] Further, the recess is formed in a side wall of the housing or casing and/or of the domestic appliance, wherein preferably the recess is formed as a cut-out within said side wall.

[0013] For example, the recess is rectangular, wherein preferably the bottom part of the support frame extends inwardly from a lower edge of the recess, while the lateral parts of the support frame extend inwardly from lateral edges of the recess.

[0014] In particular, the reception device is formed that the plug-in module is moveable into and out of said reception device like a drawer.

[0015] Moreover, the domestic appliance may comprise at least one cover element for closing the recess when no plug-in module is received by or inserted in the reception device.

[0016] Preferably, the stationary connector is a standardised connector.

[0017] Furthermore, the stationary connector may be connected to a control unit of the domestic appliance.

[0018] Additionally, the domestic appliance may comprise at least one plug-in module without the printed circuit board and/or without the mobile connector, wherein said plug-in module is provided as a placeholder in the reception device. This empty plug-in module may be used instead of the cover element in order to close the recess.

[0019] For example, the domestic appliance is a cooking hob comprising at least one heating element, wherein preferably the at least one heating element is an induction coil, a radiant heating element and/or a gas burner assembly.

[0020] Further, the present invention relates to the reception device for the domestic appliance mentioned above, wherein said reception device is either an integrated part of the domestic appliance or formed as a sep-

arate component connectable or connected to the domestic appliance.

[0021] Moreover, the present invention relates to a system comprising the domestic appliance and the reception device mentioned above, wherein said system comprises at least one plug-in module with the printed circuit board and/or the mobile connector. Preferably, the plug-in module includes a carrier portion and a front element, wherein the carrier portion supports the printed circuit board and/or the mobile connector.

[0022] In particular, the mobile connector of the plug-in module is connectable to the stationary connector of the reception device by pushing said plug-in module into said reception device. Alternatively, a cable may be manually interconnected between the mobile connector and the stationary connector.

[0023] Further, the plug-in module may include thermal insulation, wherein preferably said thermal insulation encloses the printed circuit board and/or the mobile connector.

[0024] Moreover, the plug-in module in the reception device may be fixable by at least one latching mechanism and/or snap-in lock. No special tools are required for fixing the plug-in module to the reception device.

[0025] At last, the present invention relates to a method for upgrading the system mentioned above, wherein the method comprises the step of inserting the plug-in module into the reception device.

[0026] Novel and inventive features of the present invention are set forth in the appended claims.

[0027] The present invention will be described in further detail with reference to the drawing, in which

FIG 1 illustrates a schematic perspective view of a cooking hob according to a preferred embodiment of the present invention,

FIG 2 illustrates a schematic detailed perspective view of the cooking hob according to the preferred embodiment of the present invention,

FIG 3 illustrates a schematic detailed perspective view of a casing of the cooking hob according to the preferred embodiment of the present invention, wherein a plug-in module is inserted in a reception device,

FIG 4 illustrates a schematic detailed perspective view of the casing of the cooking hob according to the preferred embodiment of the present invention, wherein the plug-in module is outside the reception device,

FIG 5 illustrates a schematic detailed sectional side view of the casing of the cooking hob according to the preferred embodiment of the present invention, wherein the plug-in module is inserted in the reception device, and

FIG 6 illustrates a schematic detailed sectional side view of the casing of the cooking hob according to the preferred embodiment of the present invention, wherein the plug-in module is partially inserted in the reception device.

[0028] FIG 1 illustrates a schematic perspective view of a cooking hob 10 according to a preferred embodiment of the present invention. In general, the present invention relates to an arbitrary domestic appliance.

[0029] The cooking hob 10 comprises a panel 12 and a casing 14. The panel 12 forms the top side of the cooking hob 10. The casing 14 forms the substructure of the cooking hob 10 and supports the panel 12. For example, the panel 12 is a glass ceramic panel. The casing 14 includes a bottom plate, side walls and an open top side. Said open top side is covered by the panel 12. In this example, the casing includes four side walls. One or more heating elements are arranged inside the casing 14. Further, electric and/or electronic circuits are arranged inside the casing 14. The terms "top", "bottom" and other positional terms relate to the usual orientation of the cooking hob 10, when said cooking hob 10 is in use.

[0030] The cooking hob 10 comprises at least one reception device 16. Said reception device 16 is provided for receiving a plug-in module 24. The reception device 16 includes a support frame 20 and a recess 22. The support frame 20 is arranged inside the casing 14. The recess 22 is formed in the side wall of said casing 14. In general, the reception device 16 may be arranged in an arbitrary position of the cooking hob 10. In this example, the reception device 16 is arranged behind or besides the side wall of the casing 14, wherein said side wall may be the front side wall, the rear side wall or the lateral side wall.

[0031] The recess 22 is covered either by a front element 18 or by a cover element 18. If the plug-in module 24 is absent, then the recess 22 is covered and/or closed by the cover element 18. If the plug-in module 24 is received by the reception device 16, then the recess 22 is covered and/or closed by the front element 18, which is a part of the plug-in module 24.

[0032] FIG 2 illustrates a schematic detailed perspective view of the cooking hob 10 according to the preferred embodiment of the present invention. Said detailed perspective view shows the front element 18 or cover element 18 closing the recess 22 in the side wall of the casing 14. The cover element 18 closes the recess 22, if the plug-in module 24 is absent. However, the front element 18 of the plug-in module 24 closes the recess 22, if said plug-in module 24 is received bv the reception device 16.

[0033] FIG 3 illustrates a schematic detailed perspective view of the casing 14 of the cooking hob 10 according to the preferred embodiment of the present invention, wherein the plug-in module 24 is inserted in the reception device 16. For clarity, the panel 12 is not shown in FIG 3.

[0034] The reception device 16 includes a support frame 20 and the recess 22. For example, the recess 22

is formed as a cut-out in the side wall of the casing 14. The support frame 20 is arranged inside the casing 14. The support frame 20 extends inwardly from the recess 22. Further, the reception device 16 includes a stationary connector 30.

[0035] In FIG 3 the plug-in module 24 is received by the reception device 16. The plug-in module 24 includes a printed circuit board 26, a carrier portion 28 and the front element 18. The printed circuit board 26 is supported by the carrier portion 28. For example, the carrier portion 28 and the front element 18 form a single-piece part. Further, the plug-in module 24 includes a mobile connector 32. In FIG 3, said mobile connector 32 of the plug-in module 24 is connected to the stationary connector 30 of the reception device 16. The mobile connector 32 of the plug-in module 24 and the stationary connector 30 of the reception device 16 are complementary to each other. The mobile connector 32 and the stationary connector 30 provide an electric connection between the plug-in module 24 on the one hand and the reception device 16 and the cooking hob 10 on the other hand.

[0036] FIG 4 illustrates a schematic detailed perspective view of the casing 14 of the cooking hob 10 according to the preferred embodiment of the present invention, wherein the plug-in module 24 is outside the reception device 16. In particular, FIG 4 shows the details of the reception device 16 and the plug-in module 24.

[0037] The reception device 16 includes the support frame 20, the recess 22 and the stationary connector 30. In this example, the recess 22 is formed as a rectangular cut-out in the side wall of the casing 14. Preferably, the support frame 20 includes a bottom part and two lateral parts. The bottom part of the support frame 20 extends inwardly from a lower edge of the recess 22 in the side wall of the casing 14. The lateral parts of the support frame 20 extend inwardly from lateral edges of the recess 22 in the side wall of the casing 14. In this example, the bottom part and the lateral parts of the support frame 20 are formed as sheet elements.

[0038] The plug-in module 24 includes the printed circuit board 26, the carrier portion 28, the front element 18 and the mobile connector 32. The printed circuit board 26 is supported by the carrier portion 28. For example, the carrier portion 28 and the front element 18 are formed as a single-piece part. The mobile connector 32 may be attached on the printed circuit board 26 and/or on the carrier portion 28.

[0039] FIG 5 illustrates a schematic detailed sectional side view of the casing 14 of the cooking hob 10 according to the preferred embodiment of the present invention, wherein the plug-in module 24 is inserted in the reception device 16.

[0040] The reception device 16 includes the support frame 20 and the stationary connector 30. The support frame 20 is arranged inside the casing 14 and extends inwardly from the side wall of the casing 14. In FIG 5 the plug-in module 24 is received by the reception device 16. The plug-in module 24 includes the printed circuit board 26 supported bv the carrier portion 28. The front element 18 of the plug-in module 24 is aligned at the side wall of the casing 14. The carrier portion 28 and the front element 18 may form a single-piece part. Further, the plug-in module 24 includes the mobile connector 32. In FIG 3 said mobile connector 32 of the plug-in module 24 is connected to the stationary connector 30 of the reception device 16.

[0041] FIG 6 illustrates a schematic detailed sectional side view of the casing 14 of the cooking hob 10 according to the preferred embodiment of the present invention, wherein the plug-in module 24 is partially inserted in the reception device 16.

[0042] The reception device 16 includes the support frame 20, the recess 22 and the stationary connector 30. The support frame 20 includes the bottom part and the both lateral parts. The plug-in module 24 is moveable into and out of the reception device 16 like a drawer. By pushing the plug-in module 24 into the reception device 16 the mobile connector 32 of the plug-in module 24 and the stationary connector 30 of the reception device 16 are connectable with each other.

[0043] If the cooking hob 10 does not include the printed circuit board 26, then the recess 22 in the side wall of the casing 14 is closed and covered by the cover element 18. Said cover element 18 is similar as the front element 18 of the plug-in module 24. Alternatively, the recess 22 may be closed and covered by an empty plug-in module 24, wherein said empty plug-in module 24 includes the carrier portion 28 and the front element 18, but not the printed circuit board 26 and the mobile connector 32.

[0044] The printed circuit board 26 of the plug-in module 24 is an electric and/or electronic device, which is not a standard component of the cooking hob 10. The reception device 16 allows that the cooking hob 10 may be later modified or extended without any effort. The cooking hob 10 may by upgraded by adding or exchanging the printed circuit board 26. In particular, the printed circuit board 26 may be developed after the production of the cooking hob 10 and is used in order to upgrade said cooking hob 10. The reception device 16 allows that the cooking hob 10 may be modernised during the whole lifetime of said cooking hob 10. For example, the printed circuit board 26 of the plug-in module 24 is a LAN module, a WLAN module or a WIFI module.

[0045] The insertion of the plug-in module 24 with the printed circuit board 26 may provide additional functions for the control unit of the cooking hob 10, so that an upgrade of the cooking hob 10 is performed. Alternatively, the plug-in module 24 may be already factory-provided in the reception device 16 and the printed circuit board 26 forms a standard control unit of the cooking hob 10, wherein an exchange of the plug-in module 24 implies the exchange of the complete control unit. In the latter case, the exchange of the complete or substantially complete control unit performs the upgrade of the cooking hob 10.

[0046] The plug-in module 24 in the reception device

16 may be fixable by at least one latching mechanism and/or snap-in lock, so that no special tools are required for fixing the plug-in module 24 to the reception device 16.

[0047] Although an illustrative embodiment of the present invention has been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to that precise embodiment, 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

[0048]

10	domestic appliance, cooking hob
12	panel
14	casing
16	reception device
18	cover element, front element
20	support frame
22	recess
24	plug-in module
26	printed circuit board
28	carrier portion
30	stationary connector
32	mobile connector

Claims

1. A domestic appliance (10), in particular a cooking hob (10), wherein:

- the domestic appliance (10) comprises at least one reception device (16) for receiving or inserting a plug-in module (22) into the interior of said reception device (16),
- the reception device (16) includes a recess (22) configured to be penetrated by the plug-in module (22) during inserting said plug-in module (22) into the reception device (16),
- the reception device (16) includes connecting means (30) arranged in the interior of said reception device (16), and
- the reception device (16) is configured for connecting the plug-in module (22) to a control unit of the domestic appliance (10).

2. The domestic appliance according to claim 1, **characterised in that** the domestic appliance (10) comprises at least one housing or casing (14), in which the reception device (16) is formed, wherein preferably the reception device (16) is formed in a wall of said housing or casing (14).

3. The domestic appliance according to claim 1 or 2, **characterised in that** the reception device (16) includes a support frame (20) extending from the recess (22) into the interior of the housing or casing (14), wherein preferably the support frame (20) includes a bottom part and two lateral parts.

4. The domestic appliance according to any one of the preceding claims, **characterised in that** the reception device (16) is provided for receiving the plug-in module (22) with or without a printed circuit board (26) and with or without a mobile connector (32).

5. The domestic appliance according to any one of the preceding claims, **characterised in that** the reception device (16) includes a stationary connector (30) arranged in the interior of the reception device (16) and connectable or connected to a mobile connector (32) of the plug-in module (22).

6. The domestic appliance according to any one of the preceding claims, **characterised in that** the recess (22) is formed in a side wall of the housing or casing (14) and/or of the domestic appliance (10), wherein preferably the recess (22) is formed as a cut-out within said side wall.

7. The domestic appliance according to any one of the preceding claims, **characterised in that** the recess (22) is rectangular, wherein preferably the bottom part of the support frame (20) extends inwardly from a lower edge of the recess (22), while the lateral parts of the support frame (20) extend inwardly from lateral edges of the recess (22).

8. The domestic appliance according to any one of the preceding claims, **characterised in that** the reception device (16) is formed that the plug-in module (24) is moveable into and out of said reception device (16) like a drawer.

9. The domestic appliance according to any one of the preceding claims, **characterised in that** the domestic appliance (10) comprises at least one cover element (18) for closing the recess (22) when no plug-in module (22) is received by or inserted in the reception device (16).

10. The domestic appliance according to any one of the preceding claims,
characterised in that
the stationary connector (30) is a standardised connector.

11. The domestic appliance according to any one of the preceding claims,
characterised in that
the domestic appliance (10) comprises at least one plug-in module (22) without the printed circuit board (26) and/or without the mobile connector (32), wherein said plug-in module (22) is provided as a placeholder in the reception device (16).

12. The domestic appliance according to any one of the preceding claims,
characterised in that
the domestic appliance is a cooking hob (10) comprising at least one heating element, wherein preferably at least one heating element is an induction coil, a radiant heating element and/or a gas burner assembly.

13. A reception device (16) for the domestic appliance (10) according to any one of the preceding claims,
characterised in that
the reception device (16) is either an integrated part of the domestic appliance (10) or formed as a separate component connectable or connected to the domestic appliance (10).

14. A system comprising at least one domestic appliance (10) according to any one of the claims 1 to 12 and a reception device (16) according to claims 13,
characterised in that
the system comprises at least one plug-in module (22) with the printed circuit board (26) and/or the mobile connector (32), wherein preferably the plug-in module (22) includes a carrier portion (28) and a front element (18), and wherein the carrier portion (28) supports the printed circuit board (26) and/or the mobile connector (32).

15. The system according to claim 14,
characterised in that
the mobile connector (32) of the plug-in module (22) is connectable to the stationary connector (30) of the reception device (16) by pushing said plug-in module (22) into said reception device (16).

16. The system according to claim 14 or 15,
characterised in that
the plug-in module (22) includes thermal insulation, wherein preferably said thermal insulation encloses the printed circuit board (26) and/or the mobile connector (32).

17. The system according to any one of the claims 14 to 16, **characterised in that**
the plug-in module (22) in the reception device (16) is fixable by at least one latching mechanism and/or snap-in lock.

18. A method for upgrading a system according to any one of the claims 14 to 17,
characterised in that
the method comprises the step of inserting the plug-in module (22) into the reception device (16).

FIG 1

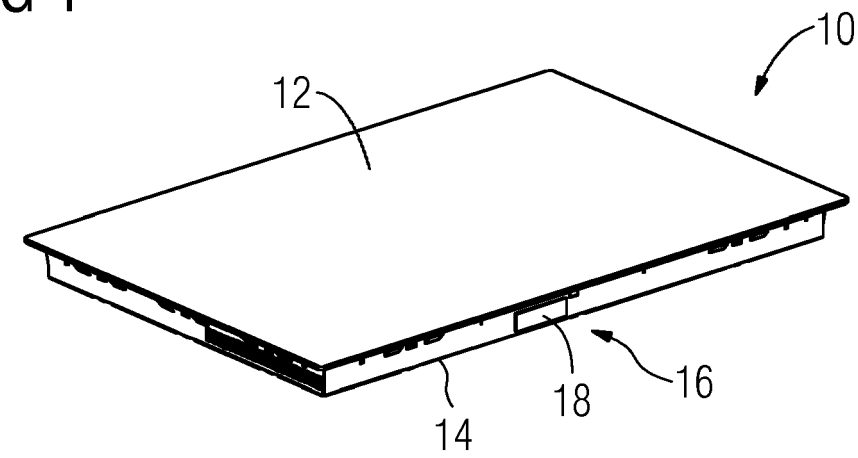


FIG 2

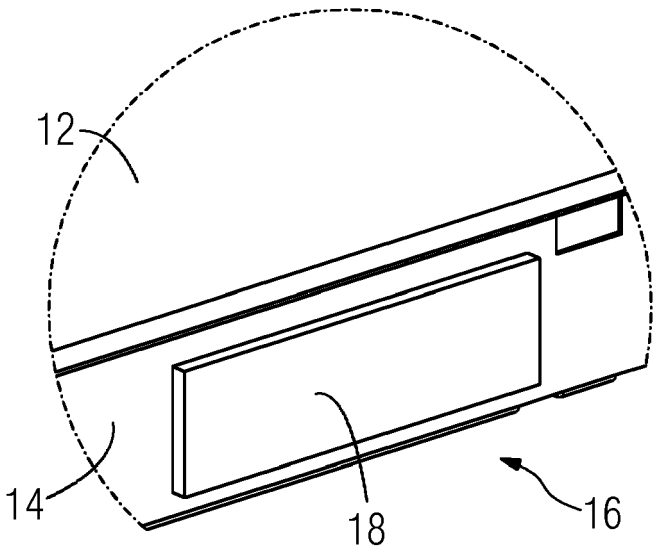


FIG 3

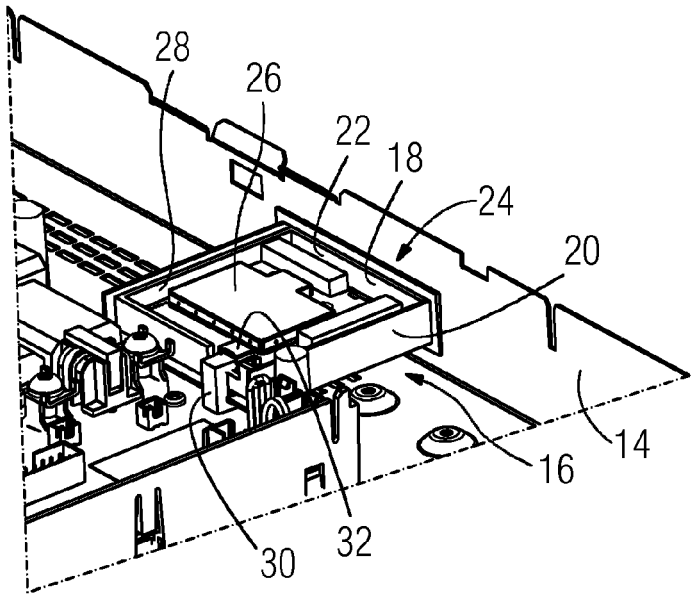


FIG 4

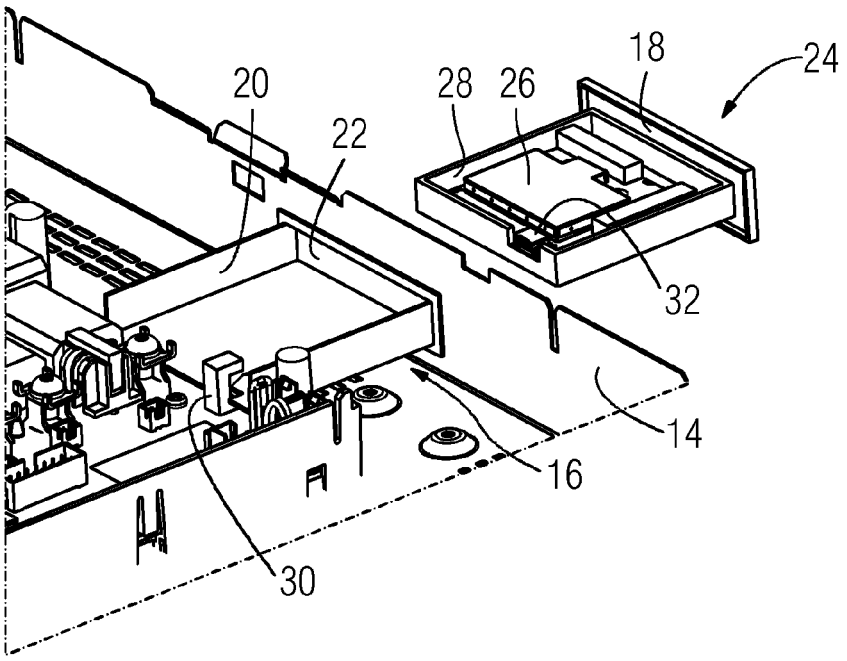


FIG 5

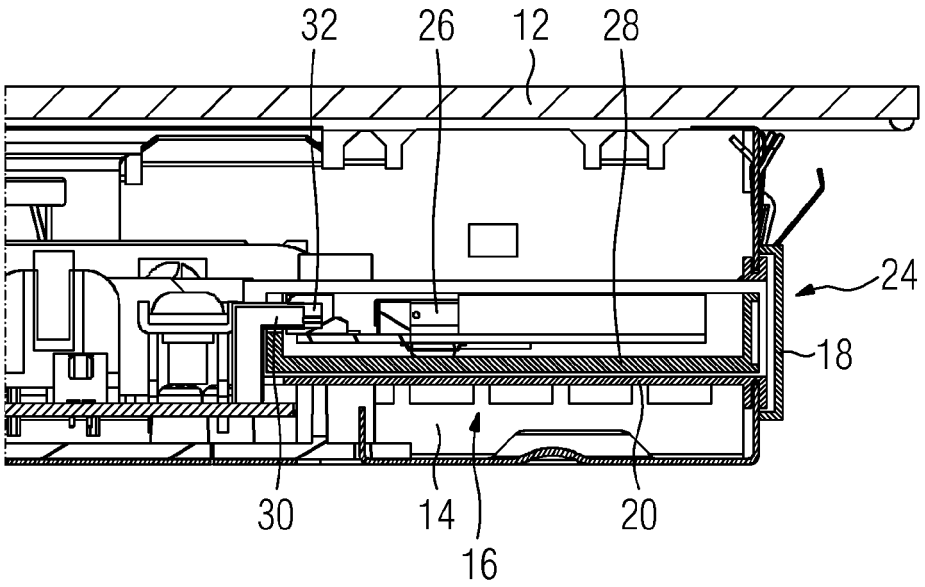
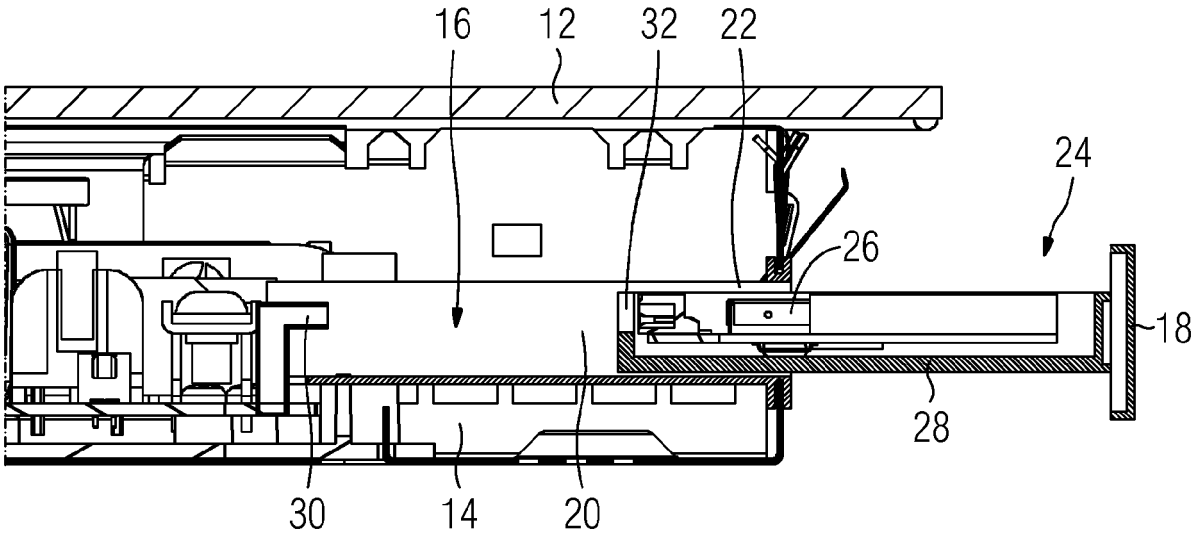


FIG 6



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 16 19 0512

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	DE 20 2010 014337 U1 (STEFFEN RENE [DE]) 27 February 2013 (2013-02-27) * paragraphs [0001], [0021] * * figure 7 * * figure 3 *	1-8, 10-18	INV. F24C15/10
X A	EP 0 413 208 A2 (DIEHL GMBH & CO [DE]) 20 February 1991 (1991-02-20) * column 3, line 56 - column 4, line 7 * * column 4, line 17 - column 4, line 22 * * figures 1, 5 * * column 1, line 1 - column 1, line 2 * * column 5, line 20 - column 5, line 23 * * column 4, line 45 - column 4, line 50 *	1-8,10, 12-16 11	
X A	GB 2 255 397 A (SAMSUNG ELECTRONICS CO LTD [KR]) 4 November 1992 (1992-11-04) * page 1, line 3 - page 1, line 5 * * page 1, line 26 - page 2, line 1 * * page 5, line 24 - page 5, line 26 * * page 7, line 4 - page 7, line 5 * * page 7, line 12 - page 7, line 14 * * page 8, line 5 - page 8, line 9 * * page 8, line 14 - page 8, line 18 *	1-8,10, 13-15 11	TECHNICAL FIELDS SEARCHED (IPC) F24C
X A	EP 2 302 474 A1 (ELECTROLUX HOME PROD CORP [BE]) 30 March 2011 (2011-03-30) * paragraphs [0001], [0046] - [0048] * * figure 6 *	1-8,10, 13,14,17 11	
X	EP 2 584 270 A1 (NEUBAUER KURT MKN MASCHF [DE]) 24 April 2013 (2013-04-24) * paragraphs [0001], [0002], [0005], [0007], [0008], [0040], [0042], [0044], [0045], [0046], [0047], [0050], [0054], [0062] * * figure 3 *	1-17	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 December 2016	Jalal, Rashwan

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 19 0512

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-12-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202010014337 U1	27-02-2013	NONE	
EP 0413208 A2	20-02-1991	DD 297224 A5	02-01-1992
		DE 3927247 A1	21-02-1991
		EP 0413208 A2	20-02-1991
GB 2255397 A	04-11-1992	GB 2255397 A	04-11-1992
		JP H05126344 A	21-05-1993
EP 2302474 A1	30-03-2011	NONE	
EP 2584270 A1	24-04-2013	NONE	

EPO FORM P0459

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