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

(11) **EP 3 321 593 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.05.2018 Bulletin 2018/20

(51) Int Cl.:
F24C 15/20 *(2006.01)*

(21) Application number: **17199099.7**

(22) Date of filing: **30.10.2017**

(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

(30) Priority: **11.11.2016 IT 201600113965**

(71) Applicant: **ELICA S.p.A.**
60044 Fabriano (AN) (IT)

(72) Inventors:
- **AGOSTINELLI, Agostino**
  60044 Fabriano AN (IT)
- **CIMINO, Marco**
  60044 Fabriano AN (IT)

(74) Representative: **Perani & Partners S.p.A.**
Piazza Armando Diaz, 7
20123 Milano (IT)

(54) **KIT AND METHOD FOR THE ASSEMBLY OF ANTI-ODOUR FILTER IN A DOMESTIC HOOD AND DOMESTIC HOOD**

(57) A kit for installing an anti-odour filter (100) in a hood (20) comprising an anti-odour filter (100) comprising a predetermined number of modular elements (1), each modular element (1) comprises a box-shaped body (2) defining a containment compartment (3) for a filter element; the box-shaped body (2) has a first (4) and a second breathable surface (5) opposite to each other and permeable to air; the box-shaped body (2) comprises a first (6) and a second edge (7) substantially parallel to each other; engagement means configured to adhere the first edge (6) to a second edge (7) of another modular element (1) and/or the second edge (7) to a first edge (6) of another modular element (1); the kit also comprises a filter holder (21) having a seat (22) configured to house the anti-odour filter (100).

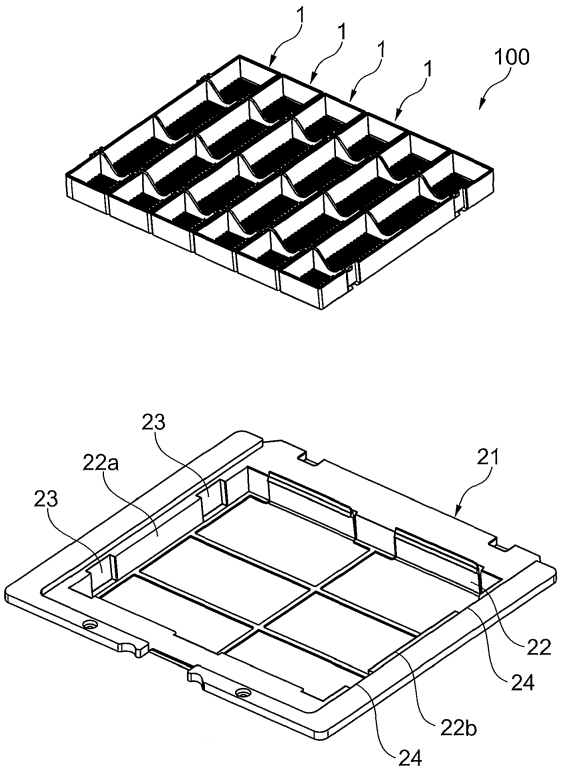


Fig. 4

EP 3 321 593 A1

Description

Technical field

[0001] The present invention relates to a kit for installing an anti-odour filter in a hood and to a domestic hood according to the preamble to claim 1, and also to a method for installing an anti-odour filter in a domestic hood according to the preamble of claim 12.

Background art

[0002] It is known to use both capturing and filtering hoods in kitchens of private homes, restaurants, canteens or in any other environment in which there is a need to cook food and then to evacuate the cooking fumes.

[0003] The anti-odour filter for such hoods is also known in the background art. For example, an anti-odour filter of known type comprises a box-shaped body, generally parallelepiped-shaped. The box-shaped body has a pair of opposite breathable surfaces, between which there is defined a containment compartment for filtering material such as for example, activated carbons or other elements capable of filtering the organic compounds (VOC) responsible for spreading bad odours.

[0004] Disadvantageously, there is a large variety of hood models on the market.

[0005] For each model, there is a corresponding type of filter and in most cases, a filter designed for a specific hood model cannot be used for another model. This generates significant problems both for the consumer, who has difficulty finding the spare parts, and for the distributors who need to stock up with a large number of types of filters.

[0006] In an attempt to mitigate this problem, solutions have been conceived in which the filter is defined by a plurality of modular elements. In particular, document EP 1 527 806 A1 to Pellegrini shows a modular filter of this type.

[0007] Disadvantageously, the modular filters already known provide making corresponding hoods, which are to have a housing for the filter having sizes that are compatible with the modules, that is to say having as a size a whole multiple of the corresponding sizes of the modules. This is the case of the Pellegrini document which, in paragraph 36, teaches to shape a wall of the housing for the filter so as to be able to engage with the modular elements defining the filter itself.

[0008] Alternatively, it is possible to use modules having different sizes for different models of hoods already on the market. Thereby however, the advantage of the modularity is at least partly lost.

[0009] To date, it is not possible to make a universal modular system, that is to say applicable both to hoods already on the market and to the new models.

Object of the invention

[0010] In this context, the technical task at the basis of the present invention is to propose a kit for installing an anti-odour filter in a domestic capturing hood which overcomes the above-mentioned drawbacks of the known technique.

[0011] In particular, it is an object of the present invention to make available a kit for installing an anti-odour filter in a domestic capturing hood capable of being used with any type of hoods, including those already on the market.

[0012] The technical task identified and objects specified are substantially achieved by a kit for installing an anti-odour filter in a domestic capturing hood comprising the technical features explained in one or more of the appended claims.

Advantages of the invention

[0013] In particular, a first embodiment of the present invention relates to a hood comprising a filter holder. Such filter holder has a seat configured to house a predetermined number of modular elements.

[0014] Each modular element comprises a box-shaped body, which defines a containment compartment for an absorbing element. The box-shaped body has a first and a second breathable surface opposite to each other and permeable to air.

[0015] The box-shaped body comprises a first and a second edge substantially parallel to each other. The first edge is configured to adhere to a second edge of another modular element. Said second edge is configured to adhere to a first edge of another modular element.

[0016] Optionally, the first edge has at least one male connector configured to be inserted into a female connector of another modular element. The second edge has at least one female connector configured to receive a male connector of another modular element.

[0017] Optionally, the seat of the filter holder has a first inner wall having at least one female connector for receiving a male connector of a modular element. The seat also has a second inner wall opposite to the first inner wall. The second inner wall has at least one male connector to be inserted into the female connector of a modular element.

[0018] A second embodiment of the invention relates to a kit for installing an anti-odour filter in a hood. Such kit comprises an anti-odour filter comprising a predetermined number of modular elements. The kit also comprises a filter holder having a seat configured to house the anti-odour filter made starting from the modular elements.

[0019] A third embodiment of the invention relates to a method for installing an anti-odour filter in a domestic hood. Such method comprises the steps of providing a predetermined number of modular elements and of providing a domestic hood.

[0020] A filter holder is also provided, having a seat configured to house the anti-odour filter.

[0021] Then, the predetermined number of modular elements is juxtaposed in such a manner that a first edge of at least one modular element is adjacent to and in contact with a second edge of another modular element and that a second edge is adjacent to and in contact with a first edge of another modular element.

[0022] The first edge is therefore constrained to the second edge of another modular element, while the second edge is constrained to the first edge of another modular element by means of engagement means so as to make the predetermined number of modular elements integral with one other and to assemble the anti-odour filter.

[0023] The anti-odour filter is then inserted into the seat of the filter holder and then into the capturing hood. The devices and the method according to the invention resolve the technical problem because they make possible a universal modular system adaptable to any model of hood. Indeed, the user may autonomously assemble filters of different sizes using an appropriate number of modular elements. To insert such filters into existing hoods, it is sufficient to provide a filter holder having outer sizes compatible with the hood model desired. The seat of the filter holder instead has sizes compatible with the modular system.

[0024] Moreover, advantageously the use of male and female connectors allows holding the edges of the modular elements in contact between one another, thus avoiding the creation of a passageway for the air which, in addition to not being filtered, would increase the noisiness of the hood.

LIST OF DRAWINGS

[0025] Further features and advantages of the present invention shall be more apparent from the indicative, and therefore non-limiting, description of a preferred, but not exclusive, embodiment of a kit for installing anti-odour filters for domestic hoods, as illustrated in the accompanying drawings, in which:

- Figure 1 is a perspective exploded view of a modular element for assembling anti-odour filters for domestic hoods;
- Figure 2 is a top view of the modular element of Figure 1;
- Figure 3 is a front view of the modular element of Figures 1 and 2;
- Figure 4 is a perspective view of an anti-odour filter assembled starting from a plurality of modular elements of Figures 1 and 2; and
- Figure 5 is a perspective exploded view of a domestic hood according to the present invention, provided to receive an anti-odour filter.

DETAILED DESCRIPTION

[0026] Even when not expressly indicated, the individual characteristics described in reference to the specific embodiments shall be intended as accessories and/or interchangeable with other characteristics described in reference to other embodiments.

[0027] With reference to the accompanying drawings, 1 indicates a modular element for assembling anti-odour filters 100 (Figure 4) for domestic hoods, both capturing or filtering hoods.

[0028] The element 1 comprises a box-shaped body 2, which defines a containment compartment 3. Activated carbons (not shown) or any other absorbing/filtering element may be inserted into the containment compartment 3 to perform a filtering action.

[0029] In particular, the box-shaped body 2 has a first 4 and a second breathable surface 5 opposite to each other and permeable to air. The box-shaped body 2 comprises a first 6 and a second edge 7 substantially parallel to each other. Further parallel edges 10 join the first 6 and the second edge 7. In particular, the further edges 10 are perpendicular to the first 6 and to the second edge 7.

[0030] It is worth noting that the box-shaped body 2 preferably has the shape of an elongated parallelepiped.

[0031] The prevailing size, or length, is defined along the development direction of the first 6 and of the second edge 7. The depth, which is less than the length, is defined along the development direction of the further edges 10. The height, which is less than the depth, is defined along the direction perpendicular to the breathable surfaces 4, 5.

[0032] Therefore, in a preferred embodiment, the further edges 1 have a linear length which is less than the linear length of the first 6 and of the second edge 7 so that the box-shaped body 2 takes on a parallelepiped configuration with a rectangular base.

[0033] In further detail, it is worth noting that the first breathable surface 4 is defined by a grid 11 made integral with the edges 6, 7 and preferably with the further edges 10.

[0034] Preferably, the second breathable surface 5 is defined by a breathable cloth 12. Such cloth 12 is for example, associated with the edges 6, 7 by means of heat-sealing and preferably with the further edges 10.

[0035] The first edge 6 is configured to adhere to a second edge 7 of another modular element 1. Similarly, the second edge 7 is configured to adhere to a first edge 6 of another modular element 1.

[0036] In particular, the aforesaid edges 6, 7 of the respective modular elements 1 are juxtaposed with respect to one another so that they are in surface contact with one another.

[0037] Such surface contact is closed so as to avoid gaps between the respective edges 6 and 7, which are harmful for the filtering performance and for the noise caused by the sucked air passing through such gaps.

[0038] Advantageously, this allows anti-odour filters 100 having different sizes to be formed by assembling a predetermined number of modular elements 1 with one another.

[0039] The modular element 1 comprises constraining means which in a preferred embodiment, are made integral with the respective edges 6, 7.

[0040] In the preferred embodiment, such constraining means comprise at least one male connector 8 and one female connector 9.

[0041] In detail, the male connector 8 is arranged on the first edge 6, while the female connector 9 is arranged on the second edge 7.

[0042] The male connector 8 is configured to be inserted into the female connector 9 of another modular element 1.

[0043] Similarly, the female connector 9 is configured to receive the male connector 8 of another modular element 1. Such constraining means allow making a plurality of modular elements 1 integral with one another.

[0044] According to the embodiment shown in Figures 1 and 2, the modular element 1 comprises two male connectors 8 and therefore, two female connectors 9.

[0045] In alternative embodiments (not shown), there may be any number of connectors 8, 9, so long as the coupling is possible between the edges 6, 7 of different modular elements 1.

[0046] Preferably, the number of male connectors 8 is equal to the number of female connectors 9. Preferably, the mutual spacing between the male connectors 8 and the distribution thereof along the first edge 6 is equal to the mutual spacing between the female connectors 9 and the distribution of the female connectors along the second edge 7.

[0047] In further detail, each female connector 9 comprises a recess 13 made in the second edge 7. The recess 13 has a bottom wall 14 parallel to the development direction of the second edge 7. The recess 13 also has a pair of side walls 15 perpendicular to the development direction of the second edge 7. The recess 13 also has an abutment surface 16 which substantially lies on the same plane as the first breathable surface 4.

[0048] Similarly, each male connector 8 comprises a pair of fins 17 which protrude from the first edge 6. Such fins 17 are configured to interfere with the side walls 15 of the recess 13. In particular, the fins 17 slightly diverge from one another so that the insertion thereof into the recess 13 requires a slight forcing capable of elastically deforming them. Once they are inserted into the recess 13, the fins 17 exert a pressure against the side walls 15.

[0049] Each male connector 8 also has a projection 18 which protrudes externally from the first edge 6. Such projection 18 is arranged between the fins 17. Both the projection 18 and the fins 17 substantially develop along the whole height of the first edge 6. It is also worth noting that the projection 18 and the fins 17 are provided to abut against the abutment surface 16 of the recess 13.

[0050] In an alternative embodiment (not shown in the drawings), the constraining means materialize in mechanical joining members which are distinct and separate from the respective edges 6 and 7. Such mechanical joining members are for example, shaped like holding clips which engage the edges 6 and 7 of the respective modular elements 1 to make them integral with one another.

[0051] The modular element 1 comprises at least one reinforcing rib 19 placed in the containment compartment 3.

[0052] Such rib 19 is connected to the first 6 and to the second edge 7.

[0053] In particular, such rib 19 is perpendicular to the edges 6, 7 and consequently, parallel to the further edges 10.

[0054] In greater detail, the rib 19 is made integral with the edges 6, 7 and with the first breathable surface 4.

[0055] Preferably, the modular element 1 comprises a plurality of parallel ribs 19 and even more preferably, spaced at a same distance from one another.

[0056] A domestic hood 20 is also part of the present invention. In addition to having the usual components required for the operation thereof and known to an expert in the field, such hood 20 comprises a filter holder 21 which has a seat 22 configured to house a predetermined number of modular elements 1 as described above.

[0057] In particular, the seat 22 is sized in such a manner as to house a predetermined number of modular elements 1.

[0058] Figure 4 for example, shows that the seat 22 of the filter holder 21 may house six modular elements 1 made integral with one another.

[0059] In greater detail, in the preferred embodiment, the seat 22 has a first inner wall 22a having at least one female connector 23 to be coupled with a shape coupling with the male connector 8 of a modular element 1.

[0060] The seat 22 also has a second inner wall 22b, opposite to the first inner wall 22a, and having at least one male connector 24 to be coupled with a shape coupling with the female connector 9 of a modular element 1.

[0061] The connectors 23, 24 of the seat 22 are made in a similar manner to the connectors 8, 9 of the modular element 1.

[0062] It is worth noting that in order to facilitate the maintenance or replacement operations of the filter elements, the filter holder 21 may be removed from the hood 20, taking with it the modular elements 1.

[0063] In use, the air that flows inside the hood 20 passes through the modular elements 1 inserted in the filter holder 21 since there are no gaps between the various modular elements, in particular the sucked air passes through the first 4 and the second 5 breathable surfaces.

[0064] The air is then purified by a filter element, generally activated carbon, placed inside the containment compartment 3.

[0065] To proceed with the installation of the anti-odour filter, that is with a predetermined number of modular elements 1 made integral with one other, it is worth pointing out that the containment compartment 3 of each mod-

ule of the aforesaid modules 1 in the hood 20 was already filled with the activated carbons by the manufacturer, just as the manufacturer already executed the heat-sealing process of the cloth 12 to the edges 6, 7 of the second breathable surface 5.

[0066] Therefore, the user who wants to install an anti-odour filter 100 in a domestic hood 20 is required to perform a step of juxtaposing the predetermined number of modular elements 1 such that the first edge 6 is adjacent to and in surface contact with the second edge 7 of another modular element 1 and such that said second edge 7 is adjacent to and in contact with a first edge 6 of another modular element 1.

[0067] Such step is to be repeated as many times as there are modular elements 1 requiring coupling with one another.

[0068] The user then must perform a step of constraining the first edge 6 to the second edge 7 of another modular element 1 and the second edge 7 to the first edge 6 of another modular element 1 by means of engagement means so as to make the predetermined number of modular elements integral with one other.

[0069] Finally, the user is to perform a step of inserting the predetermined number of modular elements made integral with one another into the seat 22 of the filter holder 21, and a step of inserting the filter holder 21, bringing with it the predetermined number of modular elements made integral with one another, into the hood 20.

[0070] Should it be necessary to perform an operation of replacing the filter element, there is provided a step of accessing inside the hood 20 by means for example, of removing the grease filter grids (not shown in the drawings), and therefore removing the filter holder 21 from which to remove the modular elements therein installed.

[0071] Clearly, in order to meet contingent and specific needs, those skilled in the art may make several modifications and variants to the configurations described above. Such variants and modifications moreover are all contained within the scope of protection of the invention as defined by the following claims.

Claims

1. Hood for domestic use (20) comprising an anti-odour filter (100) comprising a predetermined number of modular elements (1), each modular element (1) comprising a box-shaped body (2) defining a containment compartment (3) for a filter element, said box-shaped body (2) having a first (4) and a second breathable surface (5) opposite to each other and permeable to air, said box-shaped body (2) comprising a first (6) and a second edge (7) substantially parallel to each other; engagement means configured to adhere said first edge (6) to a second edge (7) of another modular element (1) and/or said second edge (7) to a first edge (6) of another modular element (1), said hood (1) being **characterised in that** it comprises a filter holder (21) having a seat (22) configured to house said anti-odour filter (100).

2. Hood (20) according to the preceding claim, wherein said seat (22) has a first inner wall (22a) having at least one female connector (23) for receiving a male connector (8) of one of said modular elements (1), said seat having a second inner wall (22b) opposite to said first inner wall (22a) and having at least one male connector (24) to be inserted into a female connector (9) of one of said modular elements (1).

3. Hood (20) according to any one of the preceding claims, wherein said engagement means are made integral with said first edge (6) and/or with said second edge (7), said first edge (6) having at least one male connector (8) configured to be inserted into a female connector (9) of another modular element (1), said second edge (7) having at least one female connector (9) configured to receive a male connector (8) of another modular element (1).

4. Hood (20) according to claim 1 or 2, wherein said engagement means are mechanical coupling members separated and different from said first edge (6) and/or from said second edge (7) of said modular element.

5. Hood (20) according to any one of the preceding claims, wherein said first breathable surface (4) is defined by a grid (11) made integral with said edges (6, 7).

6. Hood (20) according to any one of the preceding claims, wherein said second breathable surface (5) is defined by a breathable cloth (12) heat-sealed to said edges (6, 7).

7. Hood (20) according to any one of the preceding claims, **characterised in that** it comprises at least one reinforcing rib (19) placed in said containment compartment (3) and connected to said first (6) and to said second edge (7).

8. Hood (20) according to the preceding claim, wherein said rib (19) is perpendicular to said edges (6, 7).

9. Hood (20) according to claim 7 or 8, **characterised in that** said rib (19) is made integral with said edges (6, 7) and with said first breathable surface (4).

10. Hood (20) according to any one of the preceding claims, **characterised in that** it comprises activated carbons placed inside of said containment compartment (3).

11. Kit for installing an anti-odour filter (100) in a hood (20) comprising an anti-odour filter (100), said anti-

odour filter (100) comprising a predetermined number of modular elements (1), each modular element (1) comprising a box-shaped body (2) defining a containment compartment (3) for a filter element, said box-shaped body (2) having a first (4) and a second breathable surface (5) opposite to each other and permeable to air, said box-shaped body (2) comprising a first (6) and a second edge (7) substantially parallel to each other; engagement means configured to adhere said first edge (6) to a second edge (7) of another modular element (1) and/or said second edge (7) to a first edge (6) of another modular element (1), **characterised in that** it comprises a filter holder (21) having a seat (22) configured to house said anti-odour filter (100).

12. Method for installing an anti-odour filter (100) in a domestic hood (20), said method comprising the steps of:

- providing a predetermined number of modular elements (1);
- providing a domestic hood (20) according to any one of claims 1 to 10;

said method comprising the steps of:

- juxtaposing said predetermined number of modular elements (1) such that the first edge (6) is adjacent to and in contact with a second edge (7) of another modular element (1) and such that said second edge (7) is adjacent to and in contact with a first edge (6) of another modular element (1);
- constraining said first edge (6) to said second edge (7) of another modular element (1) and said second edge (7) to said first edge (6) of another modular element (1) by means of engagement means so as to make said predetermined number of modular elements integral with each other to assemble said anti-odour filter (100);
- inserting said anti-odour filter (100) into said capturing hood for domestic use (20); **characterised in that** it comprises the further steps of
- providing a filter holder (21) having a seat (22) configured to house said anti-odour filter (100);
- following the assembly of said anti-odour filter (100) and prior to inserting said anti-odour filter (100) into said hood (20), inserting said anti-odour filter (100) into the seat (22) of said filter holder (21).

13. Method according to the preceding claim, **characterised in that** the step of inserting said anti-odour filter (100) into said hood (20) is achieved by inserting said filter holder (21) into said hood (20).

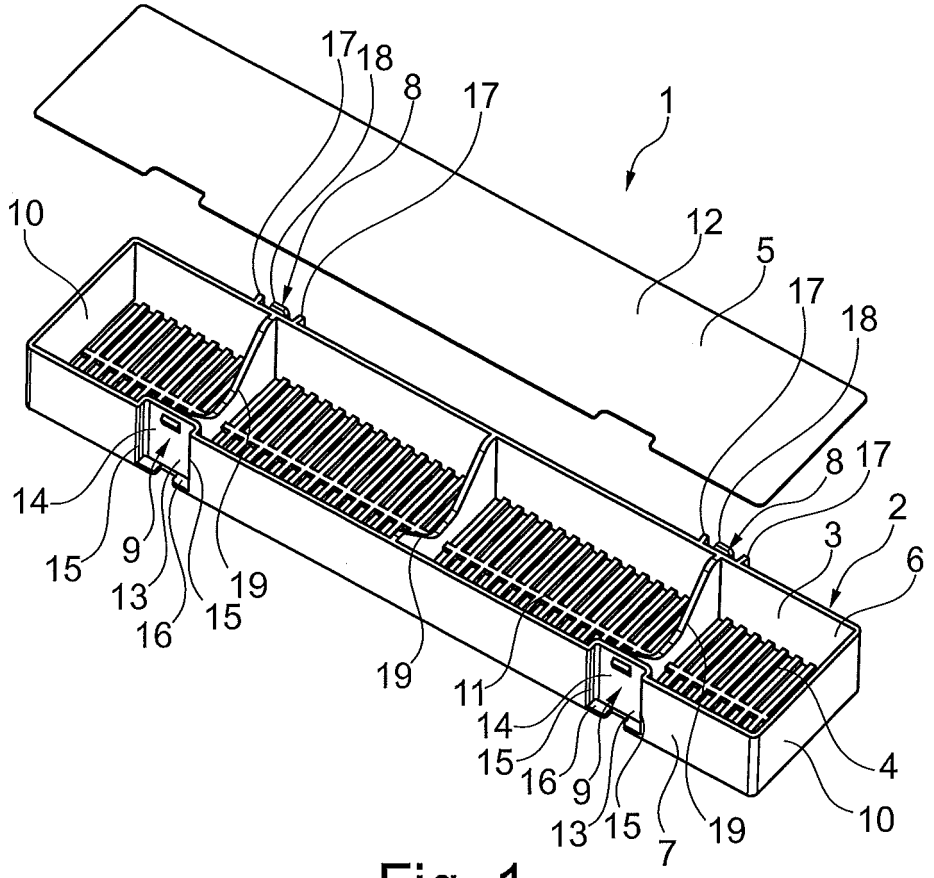

17
18
8
17
1
10
12
5
17
18
8
17
2
3
6
14
15
9
13
16
15
19
19
11
14
15
16
9
13
15
7
19
4
10

Fig. 1

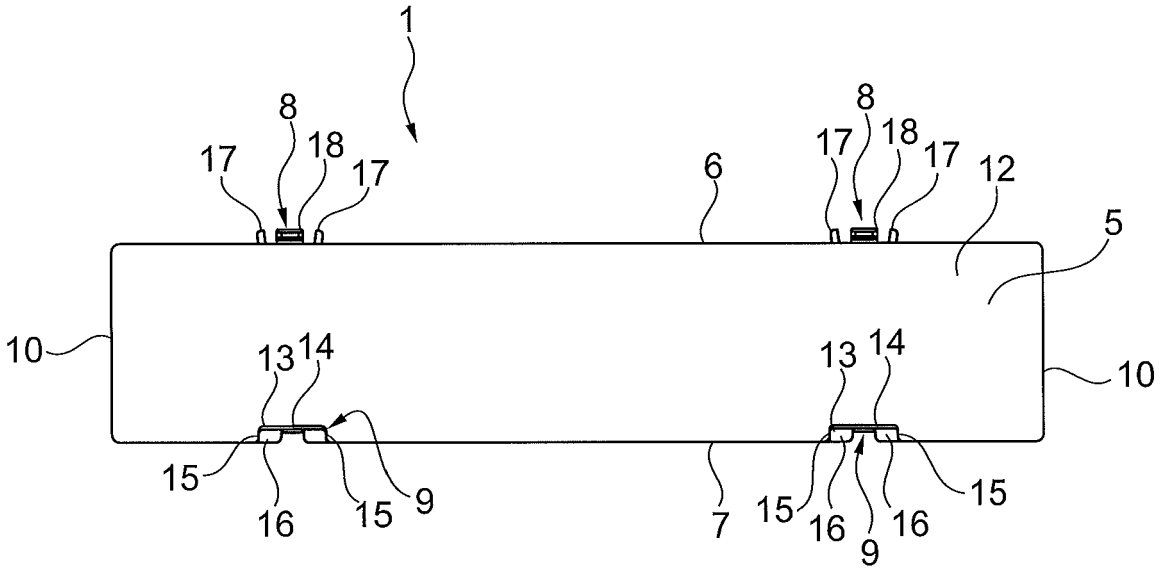

1
8
17
18
17
6
8
17
18
17
12
5
10
13
14
13
14
10
15
16
15
9
7
15
16
9
16
15

Fig. 2

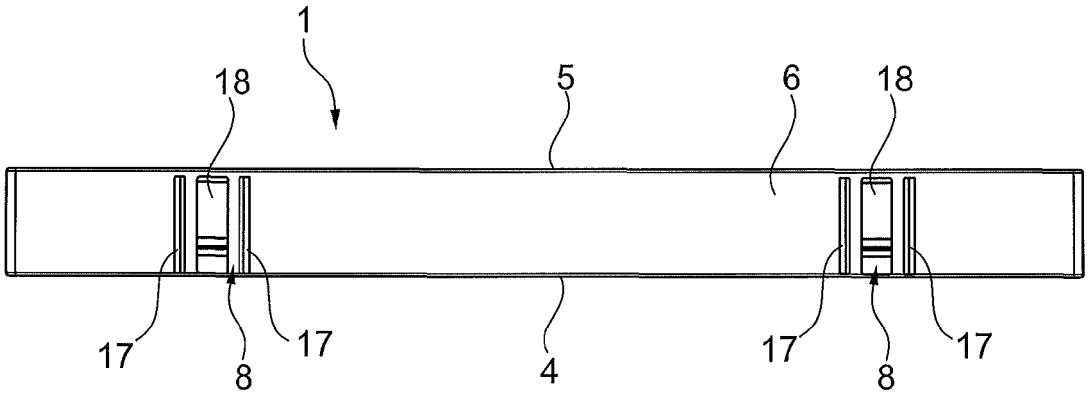
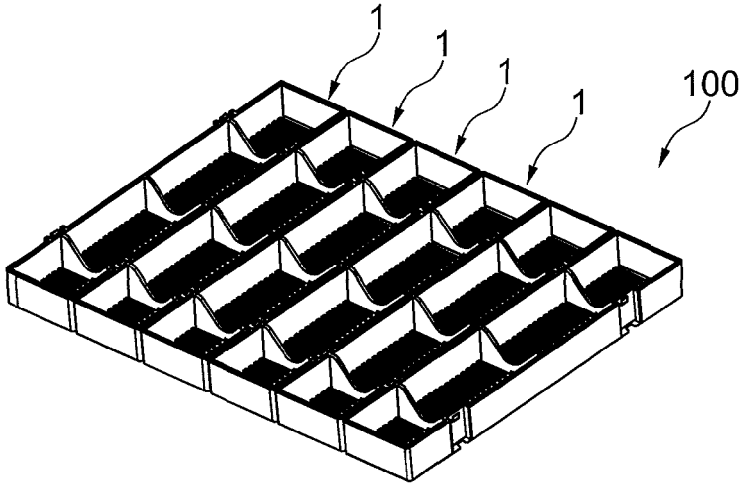


Fig. 3



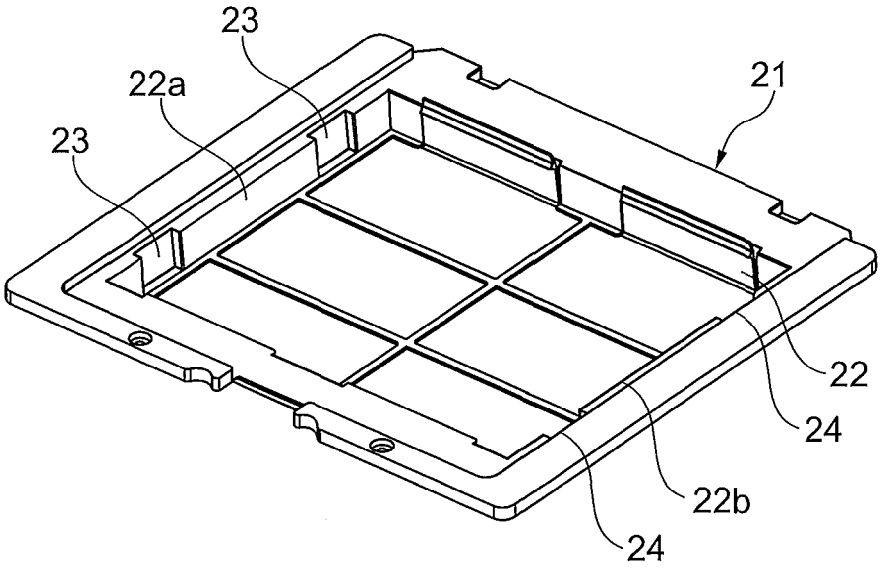


Fig. 4

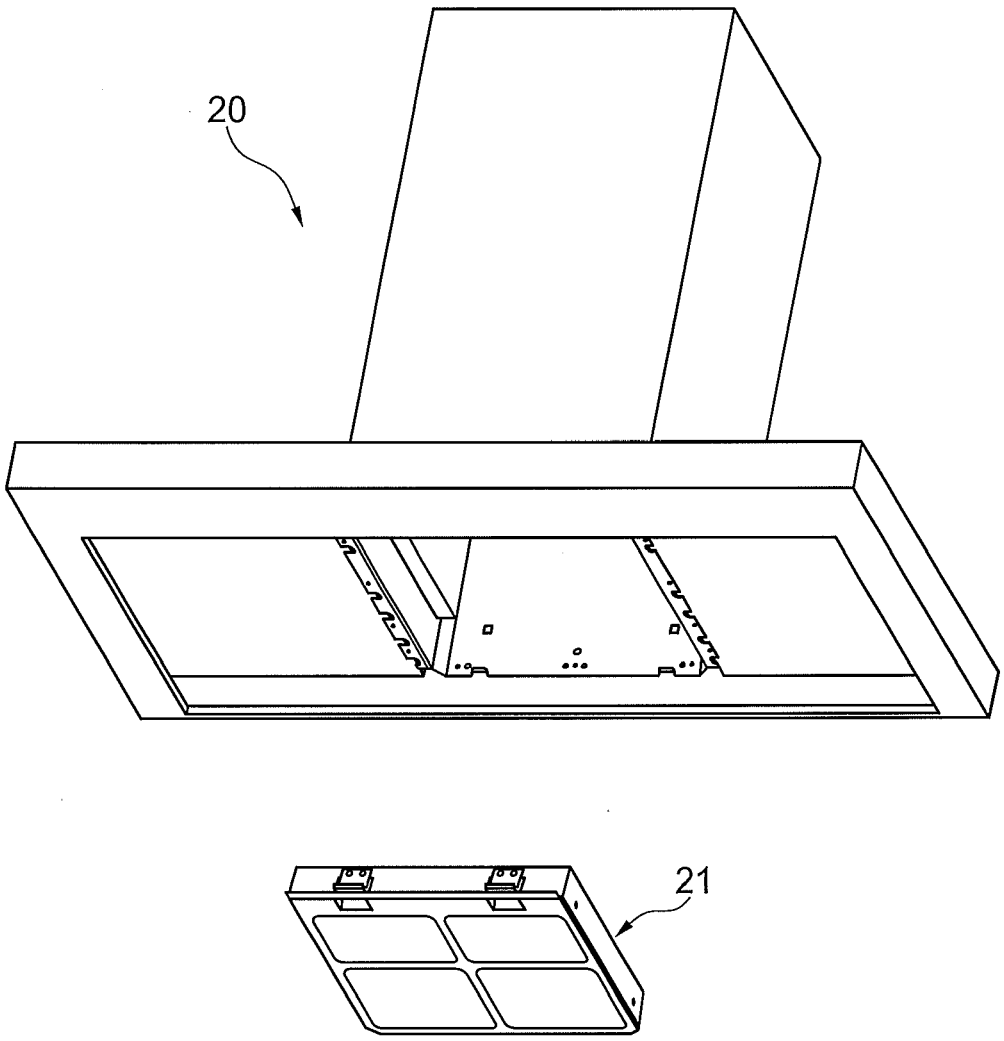


Fig. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 19 9099

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 Y	EP 1 527 806 A1 (ZIZI S R L [IT]) 4 May 2005 (2005-05-04) * paragraphs [0013], [0020], [0033], [0036]; claims 1,8, 19; figures 1,7,9 * -----	1,3-13 2	INV. F24C15/20
Y	DE 298 01 086 U1 (CAMFIL GMBH [DE]) 20 May 1999 (1999-05-20) * claim 20; figure 1 * -----	2	

TECHNICAL FIELDS SEARCHED (IPC)

F24C
B01D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 March 2018	Meyers, Jerry

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 17 19 9099

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.

23-03-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1527806 A1	04-05-2005	NONE	
DE 29801086 U1	20-05-1999	AT 229367 T	15-12-2002
		AU 2618399 A	09-08-1999
		DE 29801086 U1	20-05-1999
		EP 1062016 A1	27-12-2000
		HK 1035680 A1	16-05-2003
		US 6451079 B1	17-09-2002
		WO 9937384 A1	29-07-1999

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1527806 A1, Pellegrini **[0006]**