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

(11) **EP 3 399 242 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.11.2018 Bulletin 2018/45

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

(21) Application number: **18166114.1**

(22) Date of filing: **06.04.2018**

(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:
KH MA MD TN

(30) Priority: **04.05.2017 IT 201700048340**

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(54) **Intergrated range hood with safety device**

(57) The present disclosure relates to a downdraft range hood, i.e. a downward fume exhausting hood integrated in the cooktop. The hood is characterized in that the hood moving frame comprises a pair of columns (6, 7) which vertically extend in a box-like housing (1), with their respective free ends (26) facing its bottom (4). The free end (28) of each column is equipped with a respective elastic member (26), forming an axial extension of each column (6, 7), said elastic member (26) being adapted to react between said free end (28) of each column and the bottom (4) of said box-like housing (1). The hood frame will be thus biased out of the housing, with a bias equal to about 20% of the overall weight of the hood.

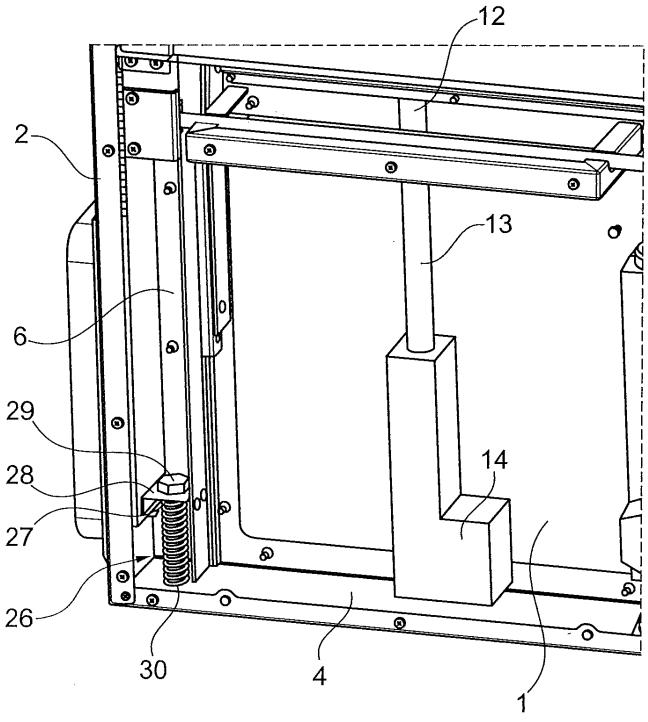

Fig. 7

EP 3 399 242 A1

Description

Field of the invention

[0001] The present disclosure relates to an integrated range hood with a safety device, as defined in the preamble of claim 1.

[0002] Namely, the hood is a downdraft exhaust hood, i.e. a downward fume exhausting hood integrated in the cooktop.

Discussion of the related art

[0003] Downdraft exhaust range hoods, i.e. downward fume exhausting hoods integrated in the cooktop comprise a box-like housing oriented parallel to a vertical wall of the range base, with its opening located at the cooktop, through which the hood can be fitted in and pulled out.

[0004] The fume intake is conventionally located on the upper cross member of a frame, which is adapted to be displaced from a first position in which said intake is entirely within the housing and below the cooktop, and a second position in which it is located outside said housing and above the cooktop, in an operating fume exhaust position.

[0005] The fume intake conventionally communicates with the interior of said box-like housing, which also contains means for evacuating and eliminating the fumes.

[0006] Furthermore, motor means are provided for displacement of said frame within the housing, these means comprising, for instance, a mechanical or hydraulic jack whose stem is fixed to one point of a cross member of the frame and is actuated by an electric motor in either displacement direction.

Prior art problem

[0007] With this type of hoods, as the hood is lowered into the box-like housing, a portion of the operator's hand, e.g. during maintenance of the filter compartment, may be trapped in the intake.

[0008] In this circumstance, the downward displacement of the hood continues at least until the conventional energy absorption sensor, associated with the electric motor, is triggered as it detects a stress exceeding a predetermined maximum value, cuts off power to the motor, and reverses the direction of rotation to cause the hood to move upwards.

[0009] The motor is stopped and its direction is reversed, thereby releasing the trapped finger upon reaching an energy absorption level that is necessarily higher, through slightly, than the energy absorption associated with a regular up and down motion of the hood imposed by the overall weight of the frame and the elements connected thereto.

[0010] Since the weight of an integrated hood typically ranges from 8 to 10kg, the potential damage to the finger trapped below the worktop, or the hand inserted in the intake, although the torque sensor of the motor is triggered, is not negligible and constitutes a drawback.

SUMMARY OF THE INVENTION

[0011] The invention has the object of providing a downdraft range hood that can solve the problems of the above discussed prior art.

[0012] Its purposes are achieved by the provision of a downdraft range hood as defined in claim 1 herein below.

Advantages of the invention

[0013] In one embodiment, a downdraft range hood can be provided that can limit the possible injury caused when a finger or hand of a user is accidentally pinched as the hood fits into the housing.

[0014] In one embodiment, a downdraft range hood can be provided that affords the same safety level as prior art arrangements, but is more reliable and less expensive.

BRIEF DESCRIPTION OF THE DRA WINGS

[0015] The characteristics and advantages of the present disclosure will appear from the following detailed description of a possible practical embodiment, illustrated as a non-limiting example in the set of drawings, in which:

- Figure 1 shows a schematic front view of the interior of the housing in which the frame of the integrated hood of the invention is moved;
- Figure 2 is a schematic perspective view of the upper portion of the hood with a worktop, lifted out of the housing;
- Figure 3 is a schematic perspective view of the upper portion of the hood with a worktop, as taken from a point of view other than that of Figure 2;
- Figure 4 is a schematic sectional view as taken along line IV - IV of Figure 2;
- Figure 5 is a schematic view of the interior of the housing in which the frame of the integrated hood is moved, with the latter in a first position lifted from the bottom of the housing;
- Figure 6 is a schematic view of the interior of the housing in which the frame of the integrated hood is moved, with the latter in a second position, in which the elastic members of the ends of the columns contact the bottom of the housing;
- Figure 7 is a schematic view of the interior of the housing in which the frame of the integrated hood is moved, with the latter in a third position, in which the elastic members of the ends of the columns are axially deformed to such an extent as to impart a lifting thrust to the frame that is at least 20% the weight of the latter.

DETAILED DESCRIPTION

[0016] Even when this is not expressly stated, the individual features as described with reference to the particular embodiments shall be intended as auxiliary to and/or interchangeable with other features described with reference to other exemplary embodiments.

[0017] Referring to the aforementioned figures and particularly to Figure 1, numeral 1 designates the housing for moving a frame 1A of a downdraft domestic hood 1B, which may be either a filter or an extractor hood, i.e. a downward fume exhausting hoods integrated in the cooktop.

[0018] This housing 1 is defined by the side walls 2 and 3, the bottom 4 and a top opening 5.

[0019] The housing is conventionally oriented parallel to a vertical wall of the base of a range, the latter being of conventional type and not shown, and having a cooktop that may coincide with the plane of the opening 5 of the housing 1 although, in one alternative, such opening may be located higher than the conventional plane of the cooktop with the burners.

[0020] Preferably, the housing 1 is oriented parallel to the rear of the base of the range.

[0021] The frame 1A of the integrated hood 1B comprises the vertical columns 6 and 7, resting upon the walls 2 and 3 of the housing 1, which also act as guides for the columns, as well as an upper cross member 8 with a mainly longitudinally extending fume intake 9.

[0022] The opening 9 communicates with the interior of the housing 1 from which fumes are evacuated and eliminated from the range, using conventional suction means, generally referenced 10.

[0023] In addition to the cross member 8, the frame 1B of the hood also comprises an intermediate beam 11 having the end 12 of a hydraulic or mechanical jack 13, actuated by an electric motor 14, connected thereto. Such jack is equipped, as is known in the art, by a torque sensor or an implement for measuring the absorbed power, such that its operation may be stopped and its direction of rotation may be possibly reversed as a predetermined absorption value is exceeded.

[0024] Referring now to Figures 5, 6 and 7, it shall be noted that the integrated hood of the invention comprises elastic members 26, e.g. a spring, located at the end of each column 6 and 7 of the hood frame, as an extension thereof toward the bottom 4 of the housing 1.

[0025] Each spring 26 is fixed by its end 27 to its respective column by means of a cantilever support 28, which is rigidly joined to the column, and a screw 29.

[0026] The physical and elastic properties of the springs 26 are selected in view of balancing at least 20% the overall weight of the hood frame when, once it has fitted into the housing 1, the free end 30 of the springs 26 carried by each column of the frame rests against the bottom 4 of the housing, the motor 14 is stopped and at least part of the whole weight of the frame is borne by the springs 26 and deforms them.

[0027] The connection between the motor 14 and the hood frame, when the motor is not powered, is deemed to be reversible, to thereby allow the frame to move by gravity and the springs 26 to be deformed.

[0028] Alternatively, the compressive deformation of the springs 26 and their elastic load may be obtained by allowing the motor 14 to run an additional number of revolutions after those required and calculated to only move the ends 30 of the springs 26 to contact with the bottom 4 of the housing 1.

[0029] With the additional revolutions of the motor, the springs 26 undergo an axial deformation, as shown for instance in Figure 7, to impart a thrust to the columns 6 and 7 which is equal to at least 20% the overall weight of the frame and the members connected thereto, i.e. the overall weight of the hood.

[0030] Once the predetermined deformation is reached in the springs 26, the motor 14 is stopped and the hood frame is still in the position it has reached, with the springs 26 in the deformed state.

[0031] Of course, this position of the hood frame shall correspond to an exact position of the cross member 8 within the opening 5.

[0032] When the hood has to be pulled out, as the frame is lifted, the start of the motor 14 is facilitated by the initial thrust imparted by the elastic energy stored in the springs 26 and released as they are restored to their initial length.

[0033] In one embodiment of the hood, i.e. the one as shown with reference to Figures 2, 3 and 4, it may be noted that a worktop, referenced 15, is associated with the cross member 8, and may be either at the same level as the cooktop or at a higher level.

[0034] Shelves 16 and 17 may be provided in the hood of the invention, at the sides of the worktop 15, and be attached outside the vertical walls 2 and 3 of the housing 1 respectively, at the same level as the top 15 when the hood is in its lowered position, with the frame retracted in the housing 1.

[0035] In one aspect, the worktop 15 is connected to the cross member 8 with the interposition of disconnection means 19, 24, which are configured to provide separation to a predetermined extent between the worktop 15 and the cross member 8.

[0036] This separation between the worktop 15 and the cross member 8 will ensure safety of the user, as it will prevent pinching of an obstacle, e.g. a finger of a user, below the top 15. This, when the hood 1B moves under the action of the means 14 to fit into the housing 1, the obstacle shall only bear the weight of the worktop 15 and not the entire frame 1A and the hence the hood 1B.

[0037] Particularly, according to a preferred embodiment, the disconnection means 19, 24 comprise:

- a rod-like element 19, which projects transverse, preferably perpendicular, to the surface 18 of the top 15 that faces said cross member 8 of the frame,
- an abutment 22, which is rigidly joined to the free

end 21 of the rod-like element 19,

- an elastic member 24 which reacts between the abutment 22 and the surface of the cross member 8.

[0038] In one embodiment, the worktop 15 comprises at least one hole 20 formed in the cross member 8 and aligned with the element 19 that extends there through in axially sliding fashion.

[0039] It shall be noted that the rod-like element 19 is removably connected to the surface 18 of the top 15, e. g. with the interposition of a glue and/or another mechanical connecting arrangement.

[0040] In one embodiment, the top 15 is embodied by a rectangular element whose thickness is smaller than the width and length dimensions.

[0041] A material that may constitute this worktop 15 is, for instance, glass, steel or other materials.

[0042] In other words, a rod-like element 19 is attached to the bottom surface 18 of the top 15, and extends perpendicular to said surface toward the opening 5 of the housing 1, and extends through the hole 20 formed in the cross member 8 of the hood frame.

[0043] The free end 21 of the rod-like element 19 is equipped with the abutment 22 in the form of a plate, against which the end 23 of the elastic member 24 coaxially located on the rod-like element 19 engages.

[0044] The other end 25 of the elastic member 24 reacts against the cross member 8 around the hole 20.

[0045] The length of the elastic member 25 and its elastic properties are selected in view of ensuring an elastic separation, to a predetermined extent, of the top 15 from the cross member 8, if an obstacle, e.g. a finger of a user, is placed below the top 15, in its contour portion 15A that projects out of the contour of the cross member 8 and beyond the edge 5A of the opening 5 of the housing 1, as the hood is lowered.

[0046] In one embodiment, the elastic member 24 consists of a spring.

[0047] Namely, according to the invention, the extent to which the worktop 15 is elastically separated from the cross member 8, as set by the dimensions of the spring 24 and those of the rod-like element 19 during displacement of the hood frame, will generate an elastic reaction in the spring that is equal to a predetermined fraction of the overall weight on the jack 13 and the motor 14 which ensure the displacement of said frame in the housing.

[0048] For example, this fraction is smaller than 5%, preferably smaller than 3%, more preferably smaller than 1% the weight of the frame 1B.

[0049] Although the spring 24 and the rod-like element 19 have been only shown in the drawings of Figures 2 and 3 at the end of the worktop 15 that faces the column 6 of the hood frame, these structural members shall be intended to be also provided at the end of the worktop 15 that faces the column 7 of the same hood frame, thereby providing a pair of balancing members for balancing the horizontal position of the top 15.

[0050] In one aspect, the pair of such rod-like elements 19 and elastic members 24, i.e. the springs, are located proximate to a respective end of the worktop 15 in aligned and parallel relationship.

[0051] Those skilled in the art will obviously appreciate that a number of changes and variants as described above may be made to fulfill particular requirements, without departure from the scope of the invention, as defined in the following claims.

Claims

1. A downdraft range hood, i.e. a downward fume exhausting hood integrated in the cooktop, comprising:

   - a box-like housing (1) oriented parallel to a vertical wall of the range base, with an opening (5) located at the cooktop,
   - a frame (1B) that can be displaced through said opening (5) between a first position in which it is entirely accommodated within said housing (1) and a second position in which it is at least partially outside said housing (1),
   - a fume intake (9) communicating with the interior of said box-like housing (1),
   - motor means (13, 14) for ensuring the displacement of said frame (1B),
   - suction means (10) for extracting and evacuating said fumes from said housing (1),

   characterized in that said frame (1B) comprises a pair of columns (6, 7) and vertically extending in said box-like housing (1) with their free ends (28) facing the bottom (4) thereof, the free end (28) of each column being equipped with a respective elastic member (26), forming an axial extension of each column (6, 7), said elastic member (26) being adapted to react between said free end (28) of each column (6, 7) and the bottom (4) of said box-like housing (1), as said frame moves in the housing (1).

2. A hood as claimed in claim 1, wherein said elastic members (26) of each column (6, 7) of said frame have an elastic deformation ability that can impart a thrust to said frame, that is equal to a fraction of the overall weight of the frame and the members connected thereto.

3. A hood as claimed in claim 1 or 2, wherein said fume intake (9) is formed in a cross member (8) of said frame, said pair of columns (6, 7) being situated at the sides of said cross member (8).

4. A hood as claimed in claim 3, comprising a worktop (15) associated with said cross member (8) of said frame, above said intake (9) with a contour (15A) that extends beyond the contour that delimits the cross member (8), said worktop (15) is connected to

said cross member (8) with the interposition of disconnection means (19, 24), which are configured to provide separation to a predetermined extent between said worktop (15) and said cross member (8).

5. A hood as claimed in claim 4, wherein said disconnection means (19, 24) comprise:

- a rod-like element (19) which project out of the surface (18) of said top that faces said cross member (8) of the frame,
- an abutment (22), which is rigidly joined to the free end (21) of said rod-like element (19),
- an elastic member (24) reacting between said abutment (22) and the surface of said cross member (8).

6. A hood as claimed in claim 5, comprising a pair of said rod-like elements (19) and said elastic members (24), which are placed proximate to respective ends of said worktop (15) in aligned and parallel relationship.

7. A hood as claimed in claim 5, wherein said worktop (15) comprises at least one hole (20) formed in said cross member (8) and aligned with said rod-like element (19) which extends there through in axially sliding fashion.

8. A hood as claimed in any of claims 1 to 7, wherein said elastic members (24) are adapted to exert on said worktop (15) an elastic reaction that is equal to a predetermined fraction of the overall weight borne by said motor means (14) that ensure the displacement of said frame in the housing (1).

9. A hood as claimed in claims 1 and 3, wherein the deformation of said elastic members (24, 26) is adapted to generate a bias that is equal to at least 20% said overall weight of the frame (1B).

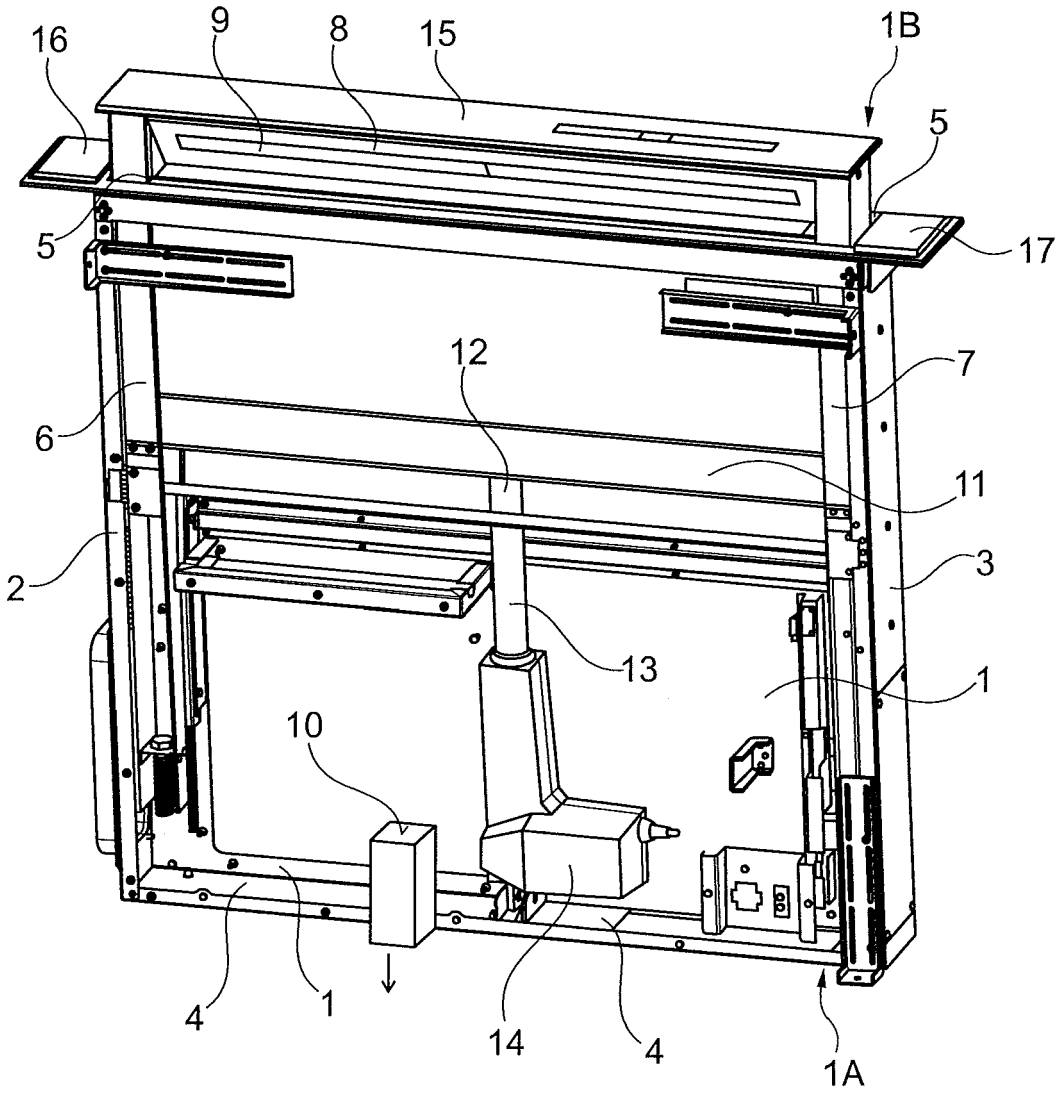

Fig. 1

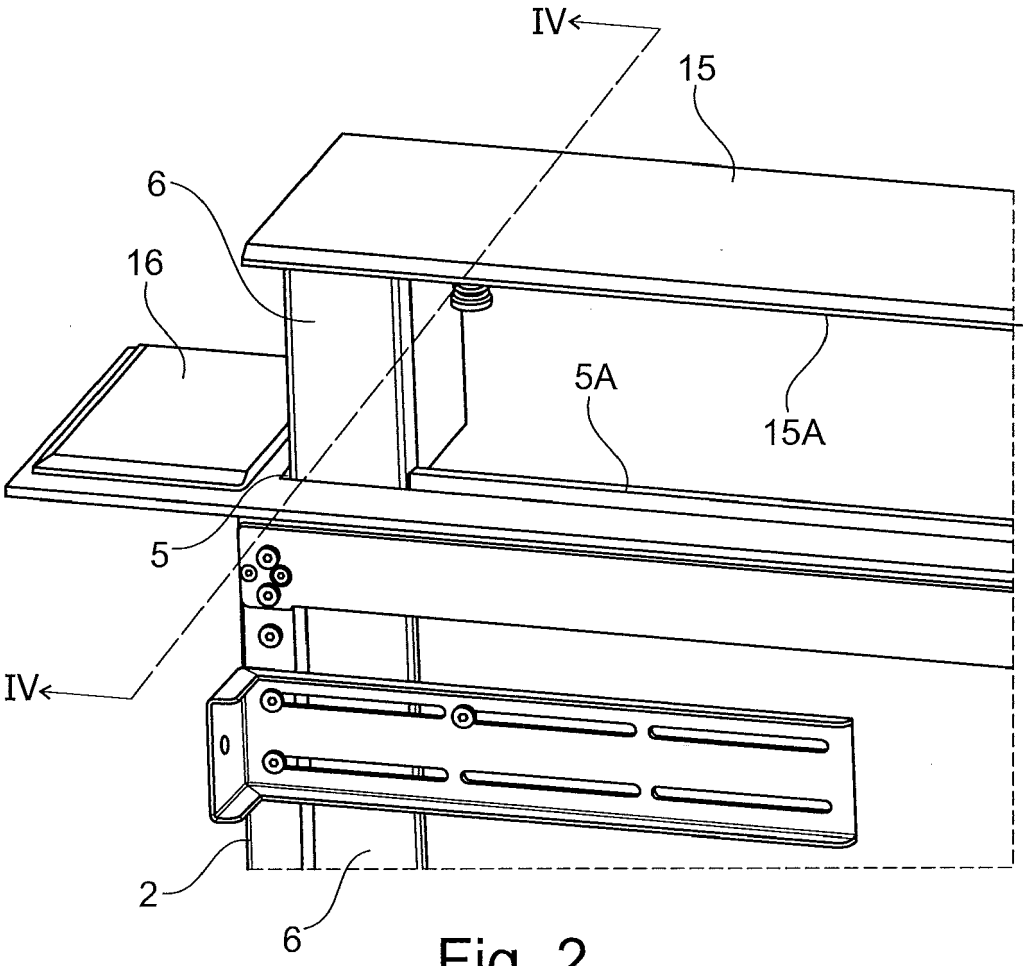

Fig. 2

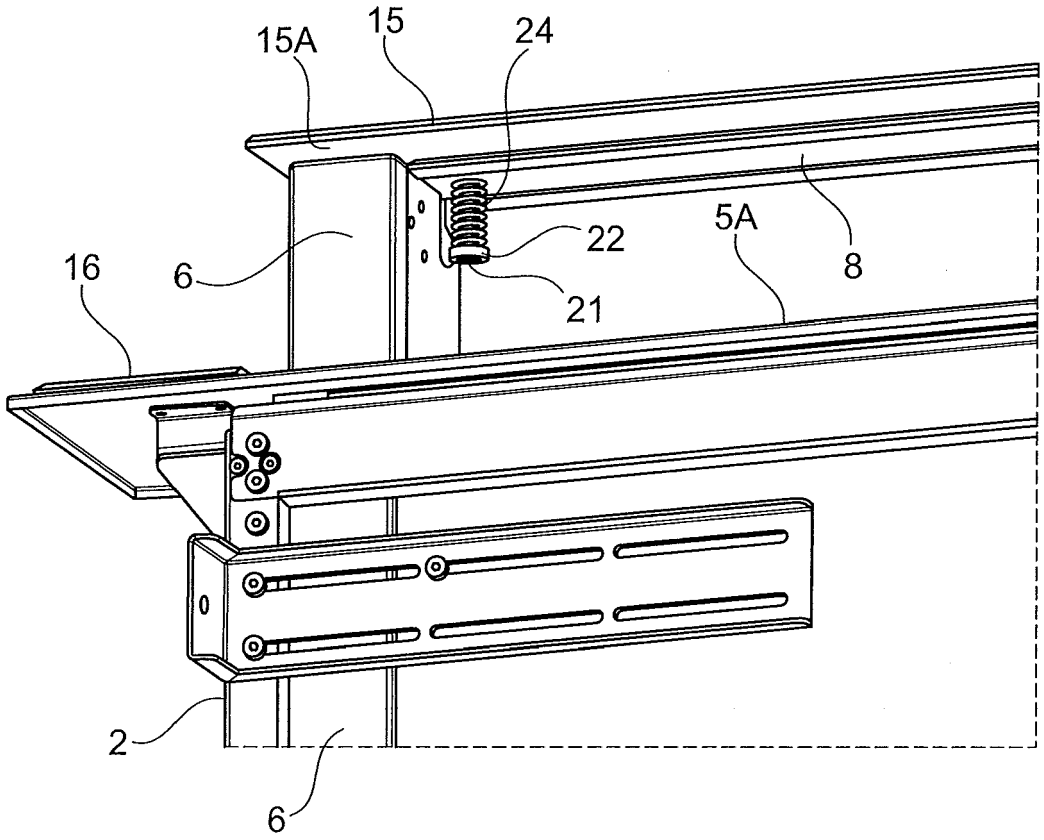

Fig. 3

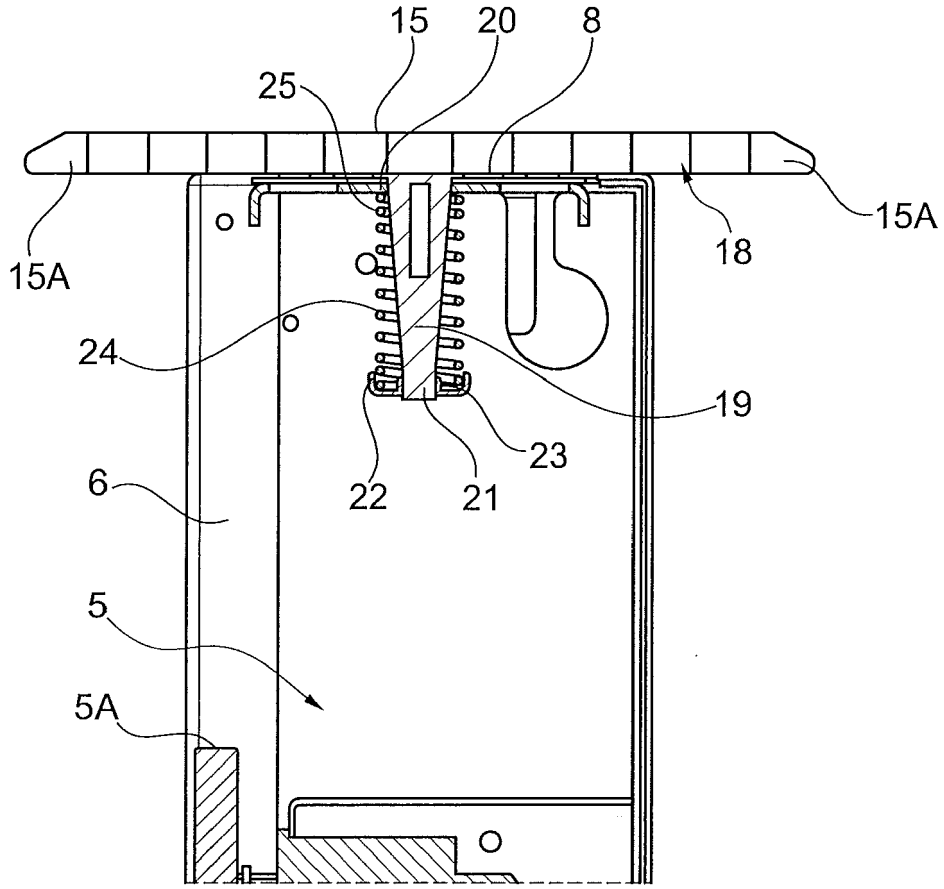

Fig. 4

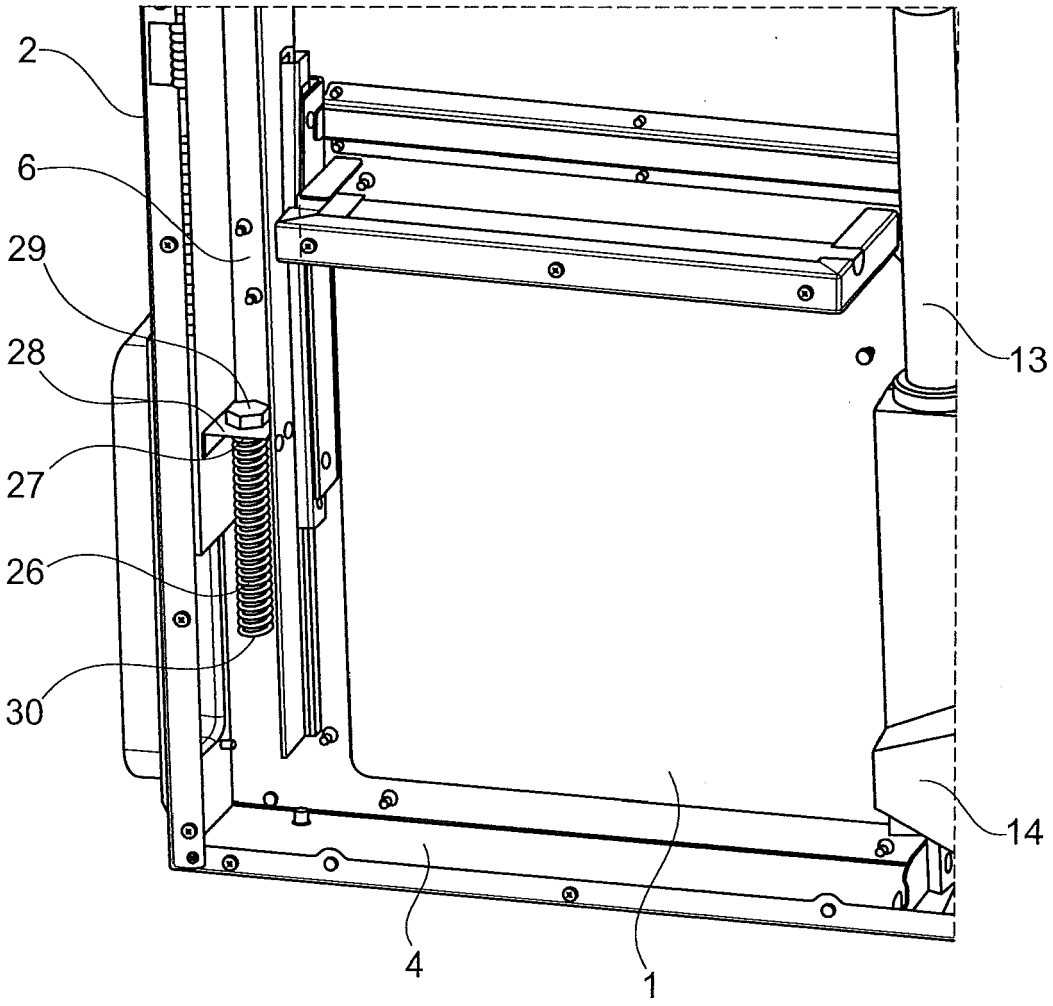

Fig. 5

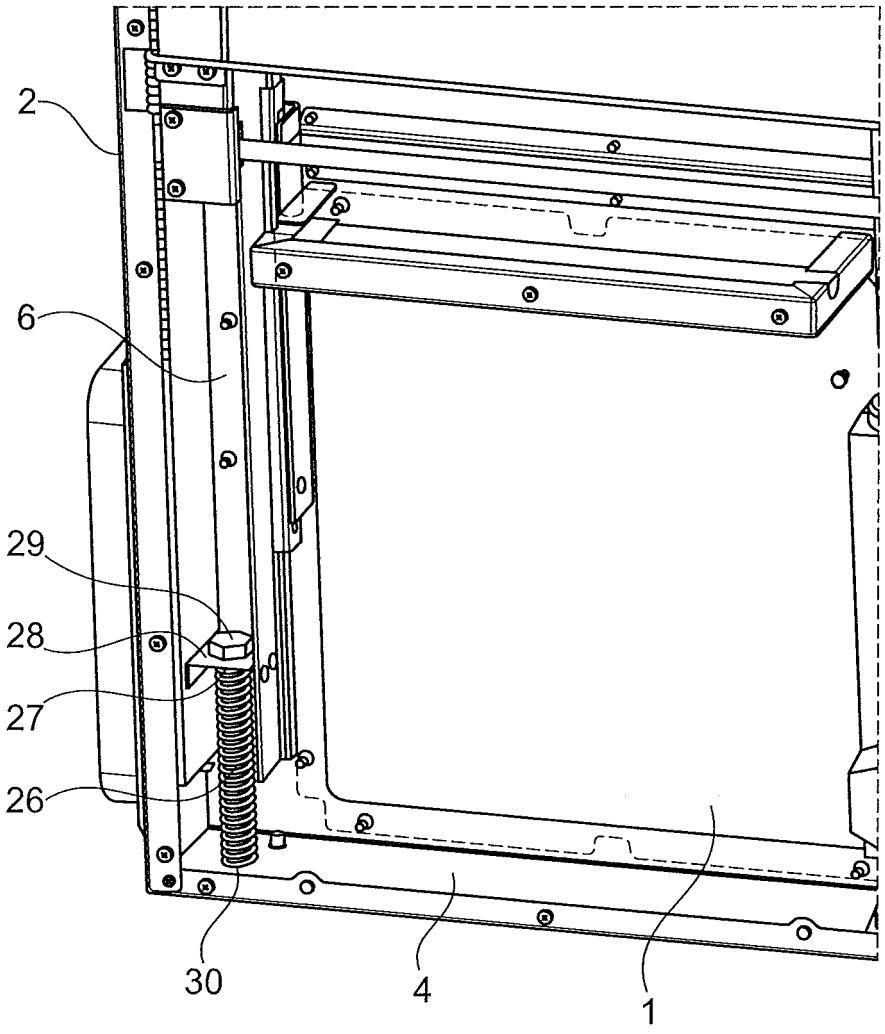

Fig. 6

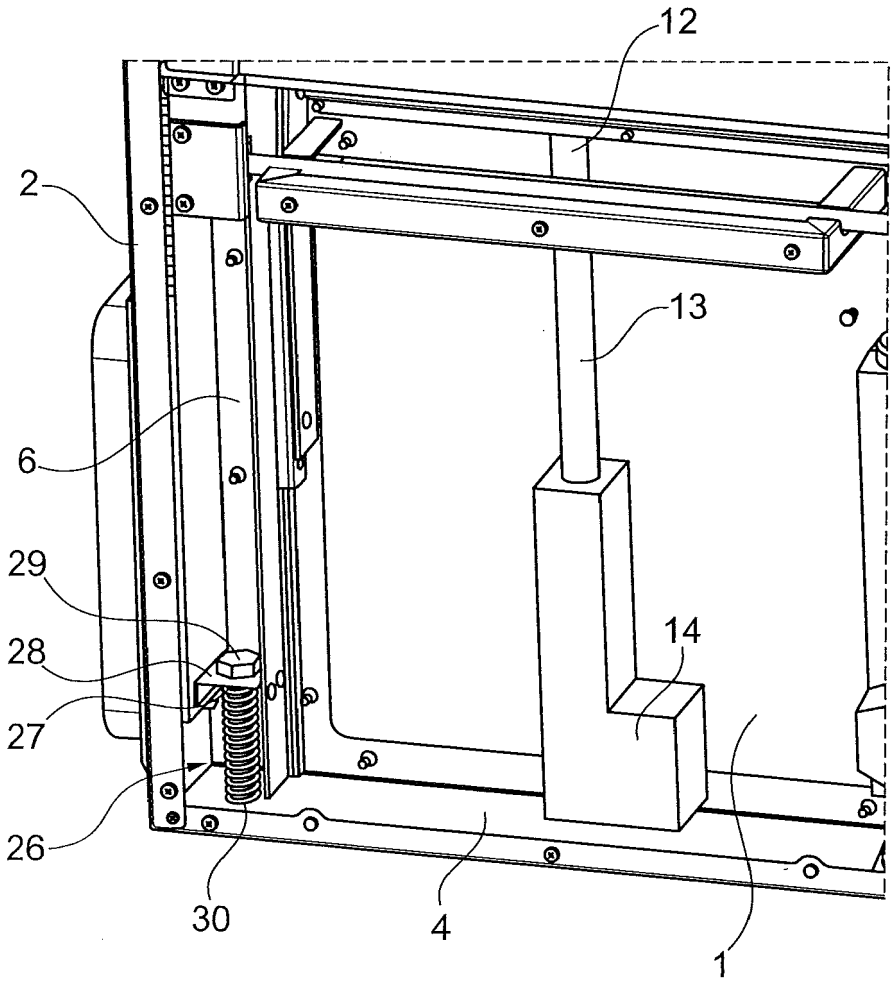

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 18 16 6114

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 June 2018	Jalal, Rashwan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EUROPEAN SEARCH REPORT

Application Number
EP 18 16 6114

DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims

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