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(54) CLEANING DEVICE FOR A REFRIGERATED DISPLAY COUNTER

(57) A refrigerated display counter (1) comprises:
- a display structure (2) for positioning and containing products to be displayed and refrigerated,
- a containment structure (5) positioned below with respect to said display structure (2), said containment structure (5) comprising at least a first side wall (21),
- a steam compression refrigerant circuit (6), wherein the condenser (11) and the compressor (12) of said circuit are housed within said containment structure (5),
- a cleaning device (10) comprising a cleaning element (31) movable along a surface to be cleaned (16) of said refrigerant circuit (6), a handle (32) graspable by an operator for moving said cleaning element (31) and a connecting support (33) for connecting said cleaning element (31) and said handle (32).

The first side wall (21) is interposed between said cleaning element (31) and said handle (32) and is provided with a hole (35), said connecting support (33) being through said hole (35).

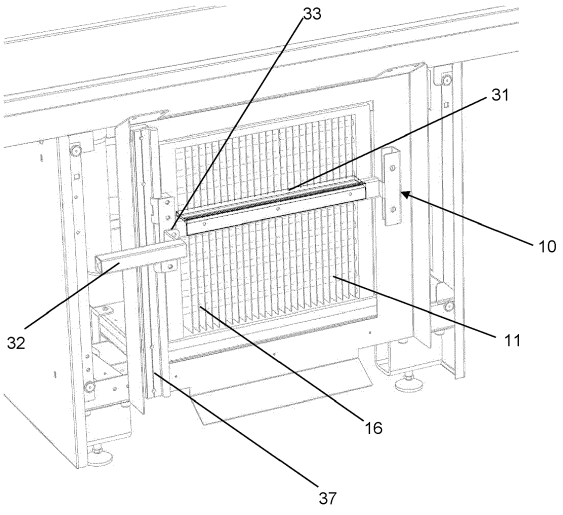

Fig. 3

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Description

[0001] The present invention relates to a cleaning device for a refrigerated display counter. The aforesaid cleaning device is conveniently used for cleaning components of the refrigerant circuit for cooling said refrigerated display counter. Particularly, although not exclusively, the aforesaid cleaning device can be conveniently employed for cleaning a condenser of the refrigerant circuit.

[0002] Refrigerated counters are known for the display of food products.

[0003] Generally, these counters comprise a display structure formed by a base for containing food products and, possibly, by a plurality of shelves on which to position the food products. A refrigerant circuit for cooling the refrigerated display counter is suitably positioned below the display structure. In particular, the refrigerant circuit comprises a laminating member, an evaporator, a compressor and a condenser. Generally, the evaporator is positioned immediately below the base, within a bottom portion of the display structure, while the condenser and the compressor are housed within a special containment structure, placed below the bottom portion. The containment structure is substantially box-shaped with side walls which have protection grilles with holes for the passage of air. In particular, the grilles allow the entry of an air flow from the external environment towards the inside of the box-like structure and the exit of the air flow from the latter towards the external environment. The condenser can be positioned within the box-like structure in a position adjacent to a first protection grille, generally the protection grille of a front side wall, which allows the entry of the air flow from the external environment, so that such an air flow is directed on the condenser itself. Suitably, the air is sucked inside the box-like structure by means of a fan placed immediately behind the condenser.

[0004] Always inside the box-like structure, in a position further back with respect to the condenser, the compressor of the refrigerant circuit and a condensate collection tray are provided. Further grilles are provided on the other walls of the box-like structure for the exit of the air towards the external environment which, inside said box-like structure, is heated by absorbing the heat released by the condenser and generated by the operation of the compressor.

[0005] However, the traditional refrigerated counters described above have some drawbacks.

[0006] In particular, being near the floor, dirt or dust accumulates extremely easily and quickly on the condenser which, undesirably, reduces the ability of the condenser itself to dissipate heat. More in detail, this reduces the effectiveness of the refrigerant circuit and further causes an overload of the compressor, an overload which undesirably causes an increase in the electrical consumption required for the operation of the compressor itself and/or its breakage.

[0007] To avoid this inconvenience, therefore, frequent cleaning and maintenance operations are necessary, which are particularly laborious, delicate and long, as well as expensive since they require the use of dedicated staff.

[0008] The object of the innovation is to propose a refrigerated display counter which overcomes the aforesaid drawbacks present in the traditional solutions.

[0009] Another object of the innovation is to propose a refrigerated display counter which requires less cleaning and maintenance interventions of the components of the refrigerant circuit, and in particular of the condenser.

[0010] Another object of the innovation is to propose a refrigerated display counter in which the cleaning and maintenance interventions of the components of the refrigerant circuit, and in particular of the condenser, are simpler and faster to perform.

[0011] Another object of the innovation is to propose a refrigerated display counter in which the cleaning and maintenance interventions of the components of the refrigerant circuit, and in particular of the condenser, can be carried out by any unspecialised operator.

[0012] Another object of the innovation is to propose a refrigerated display counter which allows to reduce the risk of overheating or breakage of the components of the refrigerant circuit, and in particular of the compressor.

[0013] Another object of the innovation is to propose a refrigerated display counter which allows to reduce the risk of obstruction, even partial and temporary, of the air flow entering the containment structure of the refrigerant circuit.

[0014] Another object of the innovation is to propose a refrigerated display counter which is highly efficient from the point of view of energy consumption.

[0015] All these objects, whether considered alone or in any combination thereof, and others which will result from the following description are achieved, according to the innovation, with the refrigerated display counter having the features indicated in claim 1.

[0016] The present innovation is hereinafter further clarified in a preferred embodiment thereof, reported for purely exemplary and non-limiting purposes with reference to the attached drawing tables, in which:

figure 1 shows a perspective view of a refrigerated display counter;
figure 2 shows an enlarged detail of the counter of fig. 1,
figure 3 shows the detail of fig. 1 with a side wall removed
figure 4 shows an exploded front view of the counter of fig. 1,
figure 5 shows an exploded partial view of the counter of fig. 1,
figure 6 shows a rear exploded view of the counter of fig. 1.

Suitably, hereinafter, the term "refrigerated counter" refers to average-temperature counters, i.e., counters adapted to ensure conservation temperatures of prod-

ucts close to zero. In particular, with reference to standard UNI EN 23953, the counters to which the present innovation refer belong to climate class M0 with temperatures comprised between - 1°C and +4°C, to class M1 with temperatures between -1°C and +5°C, or to class M2 with temperatures between -1°C and 7°C.

[0017] In particular, the refrigerated display counter 1 according to the present innovation is of the type provided for the display of food products, and can be used for assisted or free sales.

[0018] In particular, the refrigerated display counter 1 according to the present innovation is of the autonomous type (also called "plug-in"), as all the components of the refrigerant circuit are entirely housed therein and, therefore, exclusively requires the power supply connection to the electrical grid.

[0019] As depicted in figure 1, the refrigerated display counter 1 comprises a display structure 2 for containing food products to be displayed and refrigerated. Preferably, the display structure 2 has a tub shape inside which a compartment is defined for positioning and containing the food products to be displayed and refrigerated.

[0020] Suitably, the refrigerated display counter 1 according to the present invention comprises a traditional compression refrigerant circuit 6 of a refrigerant fluid. Suitably, the refrigerant circuit 6 for cooling the display structure 2 is positioned below the latter. In particular, the evaporator (not depicted) of the refrigerant circuit 6 is positioned immediately below the display structure 2 and inside the bottom portion 3 of the display structure 2. The refrigerant circuit 6 comprises a condenser 11 and a compressor 12 housed inside a containment structure 5.

[0021] Suitably, the counter 1 comprises a command and control unit (e.g., a processor) connected to the components of the refrigerant circuit for its management and control.

[0022] Suitably, the containment structure 5 is substantially box-shaped and delimits an inner chamber 17 in which the condenser 11, the compressor 12 and, preferably, a condensate collection tank (not depicted) are housed.

[0023] In particular, the containment structure 5 is defined by several (preferably four) side walls 21, 22, 23, 24 arranged vertically. Suitably, the containment structure 5 is configured so that its side walls 21, 22, 23, 24 are associated with each other by removable mechanical fixing means, so as to allow easy and quick access to the inner chamber 17 of the containment structure 5. The side walls 21, 22, 23, 24 comprise a first side wall 21 and a second side wall 22 opposite the first side wall 21. The condenser 11 is housed within the containment structure 5 at or near the first side wall 21. The compressor 12 is housed within the containment structure 5 at or near the second side wall 22. Advantageously, the first side wall 21 and the second side wall 22 comprise respective perforated grilles 36, 46. Suitably, an air flow enters inside the containment structure 5 from the perforated grille 36 of the first side wall 21 to substantially horizontally cross the inner chamber 17. The air flow exits the containment structure 5 from the perforated grille 37 of the second side wall 22 and/or from an open bottom of the containment structure 5. Suitably, the condenser 11 is associated with a fan 41 which sucks the entering air flow so that it crosses the condenser 11 and so that it circulates inside the inner chamber 17 and thus cools the compressor 12, thereby reducing the risk of its overheating. Preferably, the fan 41 is associated with the condenser 11 at the innermost face of the latter, i.e., the face facing the inner chamber 17.

[0024] The condenser 11 comprises a plurality of metal slats defining the main heat exchange surface and which are arranged substantially vertically so as to be superficially lapped by the air flow which, crossing the condenser 11, sliding substantially parallel with respect to said slats. The front edge of the slats closest to the first side wall 21 defines a surface to be cleaned 16 of the condenser 11.

[0025] According to the present innovation, to clean the surface to be cleaned 16, the refrigerated display counter 1 comprises a cleaning device 10.

[0026] The cleaning device 10 comprises a cleaning element 31 movable along the surface to be cleaned 16, a handle 32 graspable by an operator for moving the cleaning element 31 and a connecting support 33 for connecting the cleaning element 31 and the handle 32 together. The cleaning element 31 is shaped like a brush or similar device adapted to clean a surface. The connecting support 33 is through a hole 35 provided in the first side wall 21, which is interposed between the cleaning element 31 and the handle 32. The hole 35 as shown in the appended drawings is shaped like an elongated slot according to a sliding direction of said cleaning device 10. The slotted hole 35 is straight and vertically oriented. According to the present innovation, an operator can use the cleaning device 10 by grasping the handle 32 and sliding the cleaning device 10 along the slotted hole 35 without the need to remove the first side wall 21. By operating the handle 32, the operator slides the cleaning element 31 along the surface to be cleaned 16, thereby promoting the removal of dust and/or other dirt from the surface to be cleaned 16. According to other embodiments (not depicted), the hole 35 could be shaped differently from a straight slot. For example, the hole 35 could be curved or circular to allow a rotation or rototranslation of the cleaning element 31 on the surface to be cleaned 16.

[0027] The cleaning device 10 further comprises a sliding guide 37 for guiding the connecting support 33 and the cleaning element 31 therewith, along the surface to be cleaned 16. The sliding guide 37 is fixed to a frame 42 provided in the containment structure 5 so as to also be covered by the first side wall 21. The sliding guide 37 is fixed to one or more supports 39 provided in the frame 42, for example by means of screws or other similar connection. The frame 42 is shaped like a quadrangular

frame with a central hole to allow air to pass towards the condenser 11. The cleaning device 10 further comprises at least one sliding bearing 38 (two sliding bearings 38 in the embodiment of the appended drawings) sliding along the sliding guide 37. The sliding bearings 38 are fixed to the connecting support 33, so as to allow the integral sliding of the connecting support 33 and the sliding bearings 38 along the sliding guide 37.

[0028] According to other embodiments (not shown) of the present invention, the refrigerated display counter 1 could also comprise at least a second cleaning device 10 associated with one or more of the other side walls 22, 23, 23 of the containment structure 5. For example, a second cleaning device 10 could be associated with the second side wall 22 for cleaning a surface to be cleaned placed on the compressor 12.

[0029] It is clear from the above that the refrigerated display counter according to the innovation is particularly advantageous, as the cleaning device of the present innovation can be operated externally by an operator without removing any structure of the refrigerated display counter. This allows to prevent malfunctions due to the accumulation of dirt without the intervention of specialised staff. Intervening manually on a handle accessible from the outside,even the unspecialised operator can clean the condenser easily and safely, without using tools and without removing the cover panel which also has the function of protecting from direct access to live parts or sharp parts such as the fins of the exchanger.

[0030] Furthermore, the system is inexpensive enough to be
applied to any refrigerated display counter, even already existing.

[0031] The present invention has been illustrated and described in a preferred embodiment thereof, but it is understood that executive variants can be made thereto in practice, without however departing from the scope of protection of the present invention.

Claims

1. Refrigerated display counter (1) comprising:

- a display structure (2) for positioning and containing products to be displayed and refrigerated,
- a containment structure (5) positioned below with respect to said display structure (2), said containment structure (5) comprising at least a first side wall (21),
- a steam compression refrigerant circuit (6), wherein a condenser (11) of said refrigerant circuit (6) is housed inside said containment structure (5),
- a cleaning device (10) comprising a cleaning element (31) movable along a surface to be cleaned (16) of said refrigerant circuit (6), a handle (32) graspable by an operator for moving said cleaning element (31) and a connecting support (33) for connecting said cleaning element (31) and said handle (32),

wherein said first side wall (21) is interposed between said cleaning element (31) and said handle (32) and said first side wall (21) is provided with a hole (35), said connecting support (33) being through said hole (35).

2. Refrigerated display counter (1) according to claim 1, wherein
said hole (35) is slot-shaped, said slot being elongated according to a sliding direction of said cleaning device (10).

3. Refrigerated display counter (1) according to claim 3, wherein
said slotted hole (35) is vertically oriented.

4. Refrigerated display counter (1) according to one of the preceding claims,
wherein said condenser (11) comprises said surface to be cleaned (16).

5. Refrigerated display counter (1) according to one of the preceding claims,
wherein said cleaning element (31) is brush-shaped.

6. Refrigerated display counter (1) according to one of the preceding claims,
wherein said first side wall (21) comprises a perforated grille (36) for the entry of a cooling air flow in said containment structure (5).

7. Refrigerated display counter (1) according to one of the preceding claims,
wherein said cleaning device (10) comprises a sliding guide (37) to guide for said connecting support (33).

8. Refrigerated display counter (1) according to one of the preceding claims,
wherein said cleaning device (10) comprises at least one sliding bearing (38) slidable along said sliding guide (37), said sliding bearing (38) being fixed to said connecting support (33).

9. Refrigerated display counter (1) according to claim 7 or 8, wherein
said containment structure (5) comprises a frame (42), said sliding guide (37) being fixed to said frame (42).

10. Refrigerated display counter (1) according to one of the preceding claims, wherein said refrigerated display counter (1) comprises at least a second cleaning

device (10) associated with a second side wall (22) of said containment structure (5).

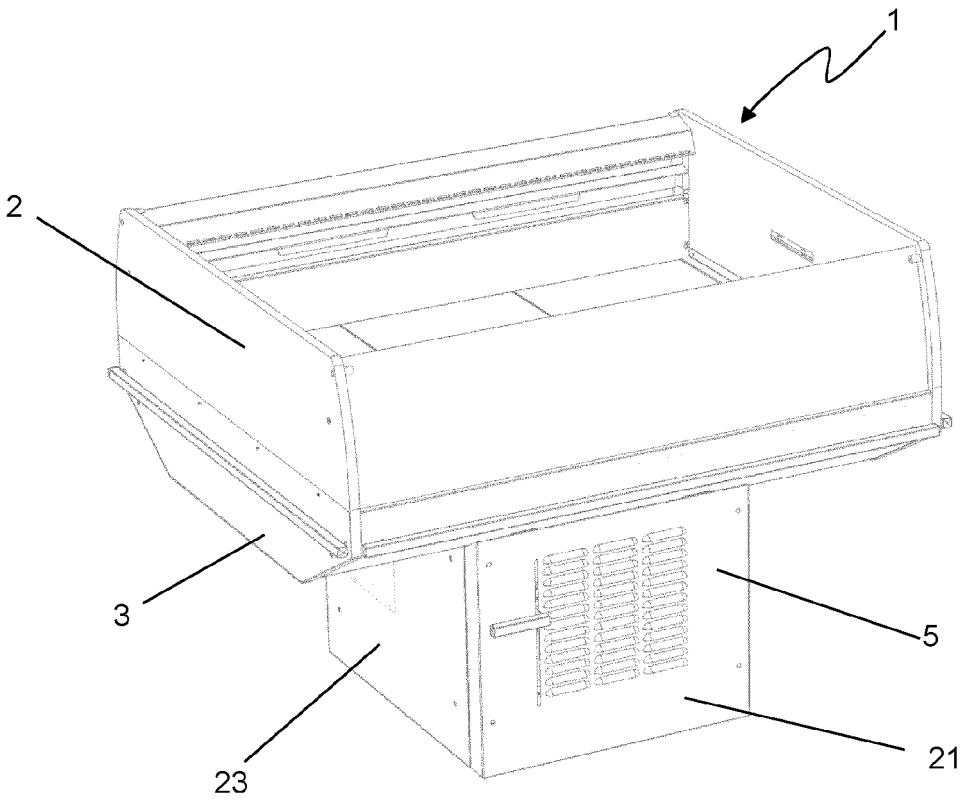

Fig. 1

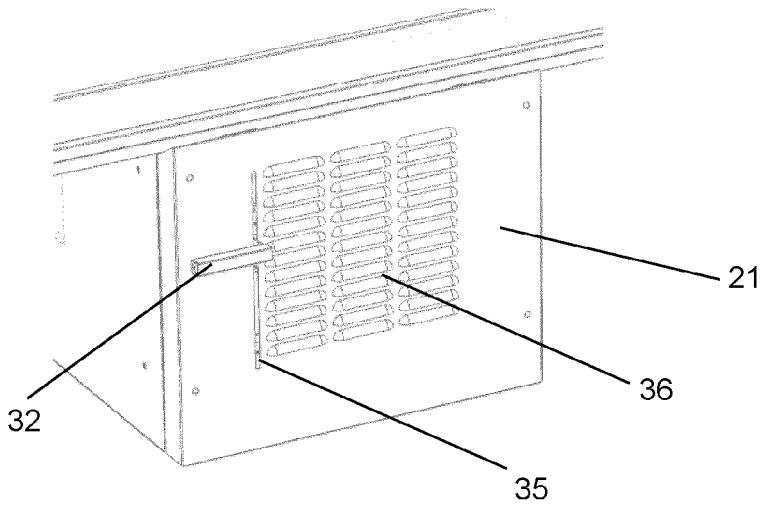

Fig. 2

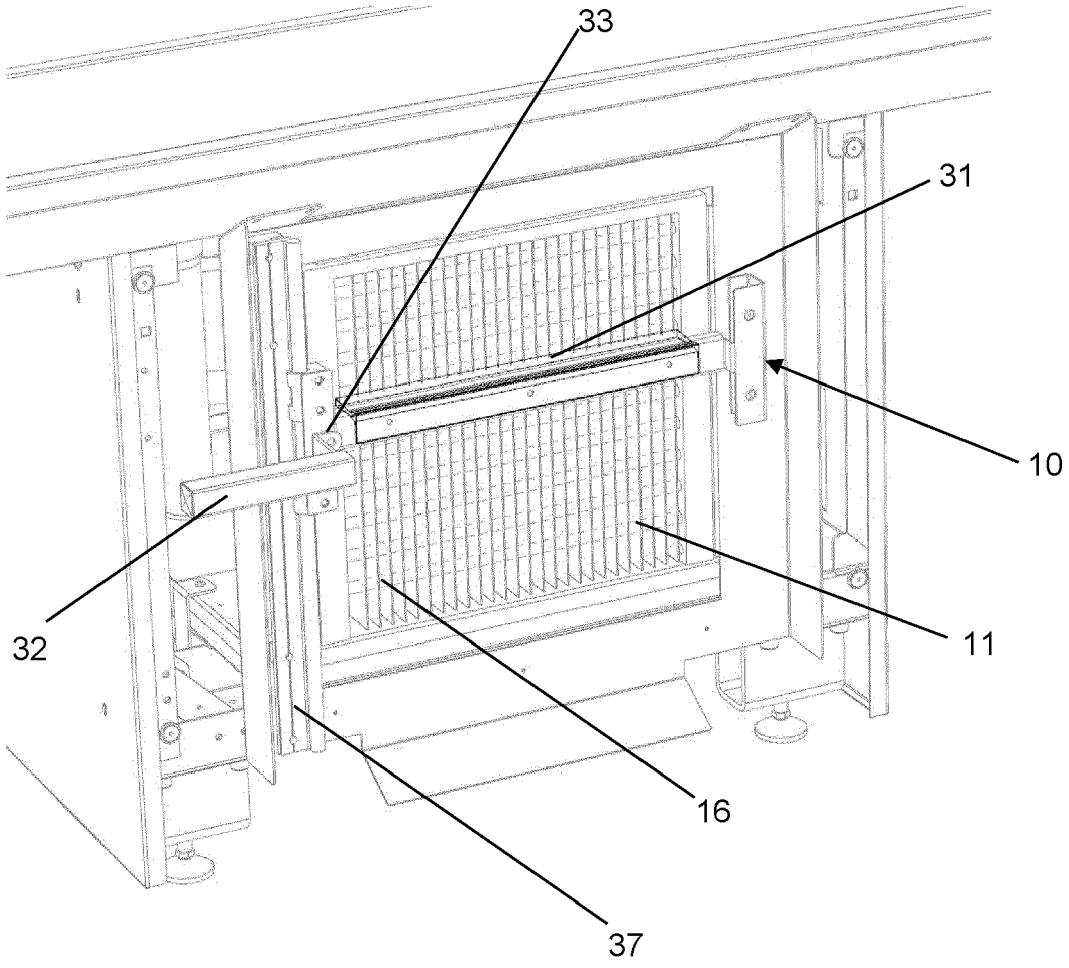

Fig. 3

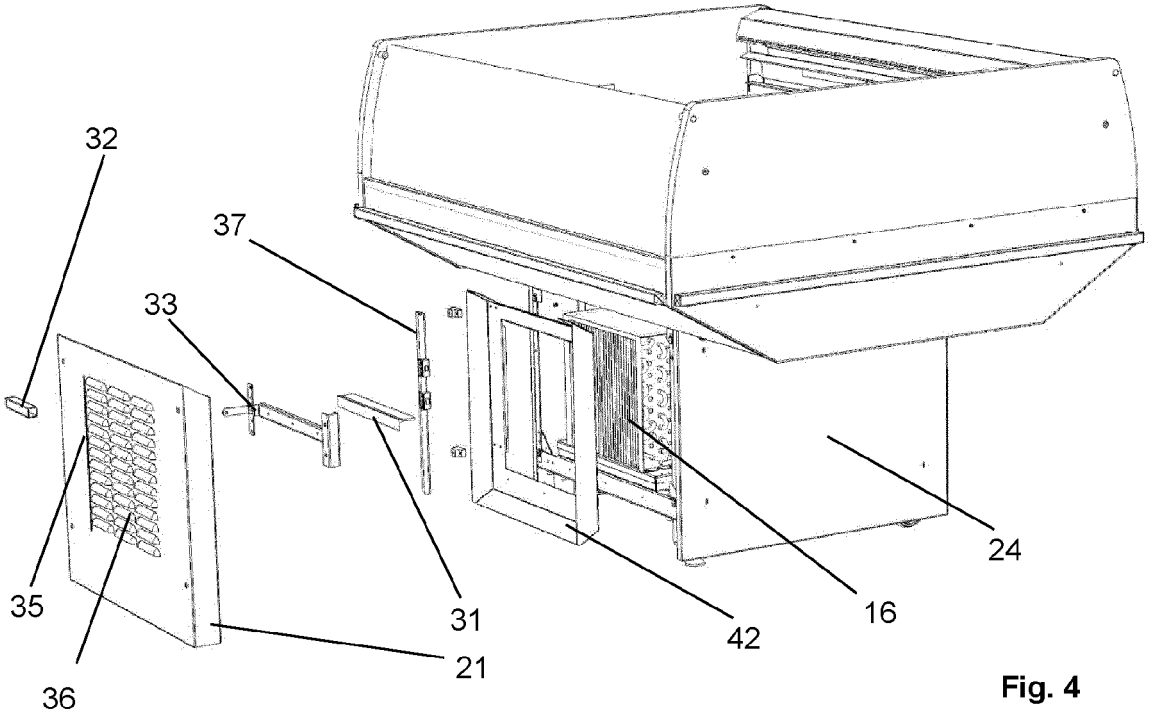

Fig. 4

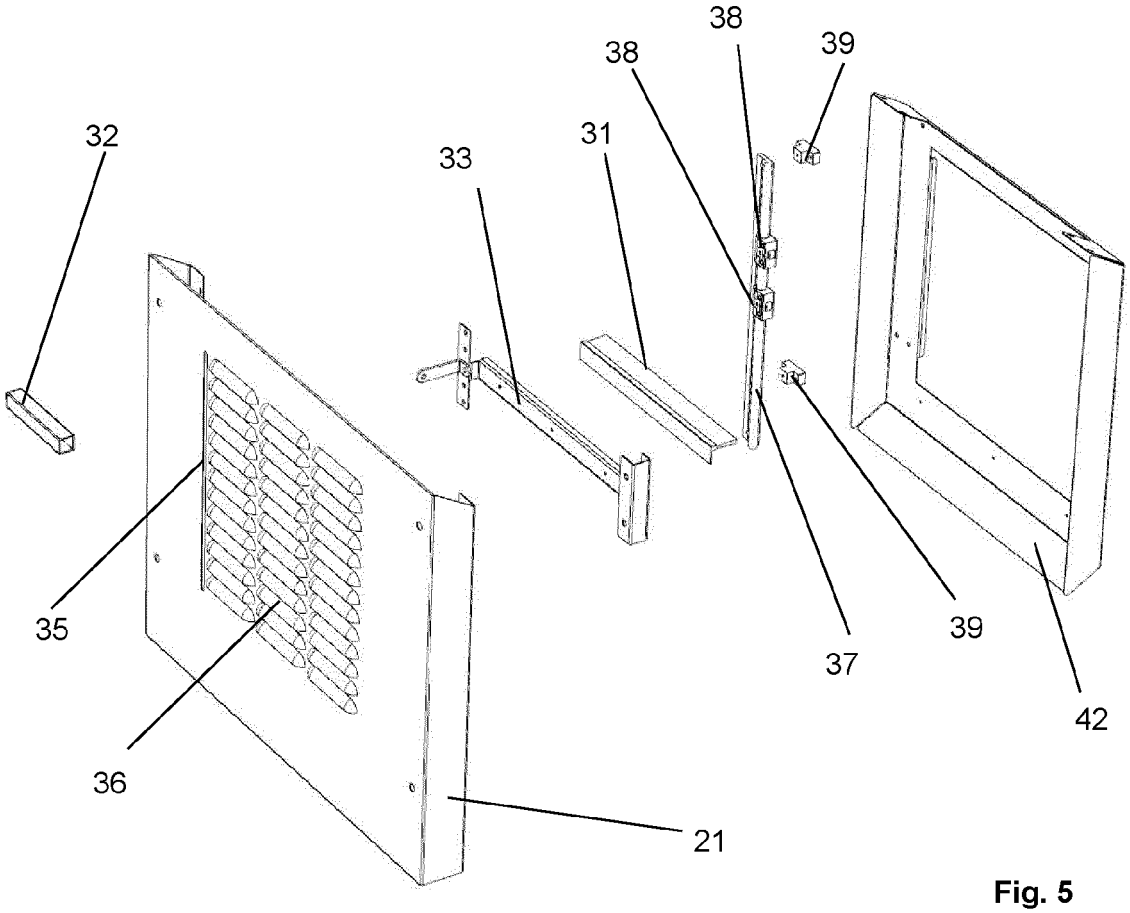

Fig. 5

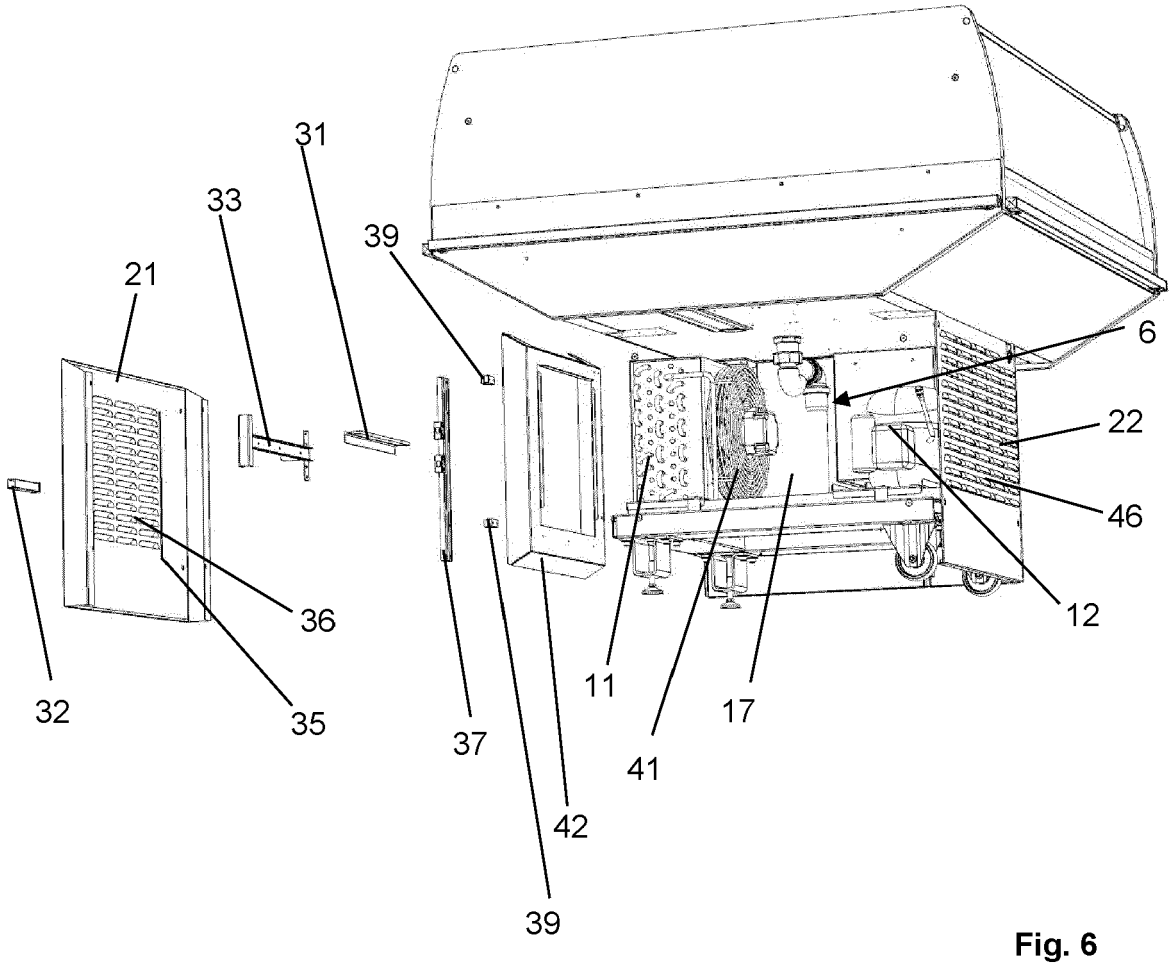

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 9089

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	CN 109 682 153 B (NINGBO ROTOR ELECTRICAL APPLIANCES CO LTD) 5 January 2021 (2021-01-05)	1,2,4-10	INV. F25B47/00 F25D23/00
A	* abstract; figures 1-6 *	3	A47F3/04
A	CN 213 066 671 U (GUANGDONG BASET ELECTRIC APPLIANCE CO LTD) 27 April 2021 (2021-04-27) * abstract; figures 1-5 *	1-10	

TECHNICAL FIELDS SEARCHED (IPC)

F25B
F25D
A47F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 August 2023	Kohler, Pierre

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 16 9089

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
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30-08-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 109682153 B	05-01-2021	NONE	
CN 213066671 U	27-04-2021	NONE	

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