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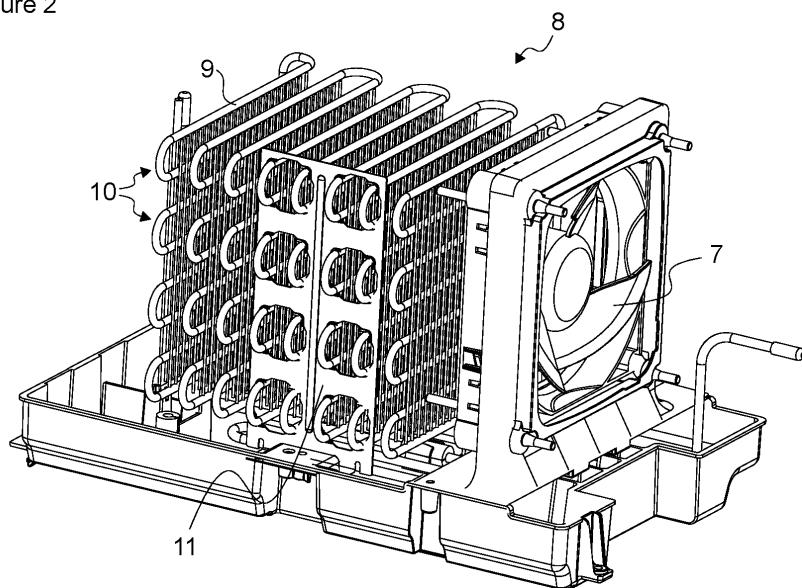
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(54) A COOLING DEVICE COMPRISING A PIPE HOLDER

(57) Cooling device (1) comprising at least one cabinet (2) wherein foodstuffs to be cooled are placed; a compressor (6) which compresses a refrigerant fluid; at least one evaporator (5) which provides the heat transfer between the refrigerant fluid and the cabinet (2) being cooled; a condenser (8) which condenses the refrigerant fluid, which has at least one pipe (9) bent in the form of a serpentine with a plurality of bent parts (10) extending in the horizontal and/or vertical axis through which the

refrigerant fluid flows; a room (3) which is provided in the cabinet (2) and which has a base (4) whereon the condenser (8) is fixed; and a holder (11) which is fixed to the base (4), which has a plurality of housings (12) wherein the bent parts (10) are snap-fitted and which enables the condenser (8) to be fixed in the room (3), wherein each of the plurality of housings (12) receives two bent parts (10).

Figure 2



Description

[0001] The present invention relates to a cooling device comprising a holder which enables the serpentine bent pipes on the condenser to be attached to a base.

[0002] In cooling devices, for example in refrigerators, compressors, condensers and evaporators are used in the refrigeration cycle. In cooling devices, the compressor and the condenser are usually disposed in a room positioned at the bottom of the cooling body. The serpentine bent pipes on the condenser enable the refrigerant fluid to lose heat more easily. The condenser is fixed to a base by means of holders fitted on the bent parts of the pipes. The state of the art holders comprises a plurality of slots so as to receive only one bent part of the pipe. The slots on the holder are generally arranged in one direction and are designed to receive only one bent part. However, due to the condenser design, serpentine pipes may extend horizontally or vertically. In this case, a separate holder is required to be designed for each different arrangement. This increases cost of components and molds and brings various disadvantages such as assembly and labor.

[0003] In the state of the art United States Patent Application No. US2010288477A1, a condenser structure comprising a holder is disclosed.

[0004] In the state of the art PCT Patent Application No. WO2008077762A2, a condenser structure comprising a holder is disclosed.

[0005] The aim of the present invention is the realization of a cooling device comprising a holder which allows the fixing of condensers with different arrangements.

[0006] The cooling device realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises at least one cabinet wherein foodstuffs to be cooled are placed; a compressor which compresses a refrigerant fluid; at least one evaporator which provides the heat transfer between the refrigerant fluid and the cabinet being cooled; a condenser which condenses the refrigerant fluid, which has at least one pipe bent in the form of a serpentine with a plurality of bent parts extending in the horizontal and/or vertical axis through which the refrigerant fluid flows; a room which is provided in the cabinet and which has a base whereon the condenser is fixed; and a holder which is fixed to the base, which has a plurality of housings each receiving two bent parts and which enables the condenser to be fixed in the room. Thus, the holder can grasp the bent parts of the serpentine pipes extending both in the horizontal and vertical axes. Consequently, it is provided that the same holder can be used for different types of condensers.

[0007] In another embodiment of the present invention, the holder comprises a plurality of housings having a symmetrical form with respect to both horizontal and vertical axes. Thus, the bent parts extending horizontally or vertically can be more easily fitted into the housings, providing ease of assembly.

[0008] In another embodiment of the present invention, on the housing, there are a plurality of holding parts with a curved form so as to at least partially enclose the pipe which bears against the same. Thus, the pipes are better gripped and a more robust structure is obtained.

[0009] In another embodiment of the present invention, on the holding part, there is at least one flange in the form of an extension formed by bending the holding part from one edge towards the bent part. Thus, the pipes are gripped better by a larger surface area.

[0010] In another embodiment of the present invention, the flange extends at an angle towards the bent part so as to gradually compress the bent part. Thus, as being pushed in the mounting direction, the holder holds the pipes more tightly, thus providing a more robust structure.

[0011] In another embodiment of the present invention, on the flange, there is at least one damping pad which prevents the vibrations coming from the pipe from being transmitted to the holder. Thus, the transfer of vibrations from the pipe to the holder is prevented and the generation of sound caused by vibration is avoided.

[0012] In another embodiment of the present invention, the housing has at least one cut-out which extends as a recess between the holding parts. Thus, the bending of the flange during production is facilitated, avoiding mold and labor costs.

[0013] In another embodiment of the present invention, on the holder, there is at least one abutment which enables the holder to be bent from the side where the same is joined with the base so as to enable the holder to be attached to the base. Thus, the user's access to the holder is facilitated and the assembly process is enabled to be performed faster and more accurately.

[0014] By means of the present invention, the condenser is enabled to be held with the same holder by holding the two bent parts of the serpentine pipes which have bent parts extending in the horizontal or vertical direction.

[0015] The cooling device realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the rear perspective view of the cooling device related to an embodiment of the present invention.

Figure 2 - is the perspective view of the condenser and the fan when the holder is attached to the vertical pipes related to another embodiment of the present invention.

Figure 3 - is the perspective view of the condenser and the fan when the holder is attached to the horizontal pipes related to another embodiment of the present invention.

Figure 4 - is the perspective view of the holder related to another embodiment of the present invention.

Figure 5 - is the front view of the holder related to another embodiment of the present invention.

[0016] The elements illustrated in the figures are numbered as follows:

1. Cooling device
2. Cabinet
3. Chamber
4. Base
5. Evaporator
6. Compressor
7. Fan
8. Condenser
9. Pipe
10. Bent part
11. Holder
12. Housing
13. Holding part
14. Flange
15. Damping pad
16. Cut-out
17. Abutment

[0017] The cooling device (1) comprises at least one cabinet (2) wherein foodstuffs to be cooled are placed; a compressor (6) which compresses a refrigerant fluid; at least one evaporator (5) which provides the heat transfer between the refrigerant fluid and the cabinet (2) being cooled; a condenser (8) which condenses the refrigerant fluid, which has at least one pipe (9) bent in the form of a serpentine with a plurality of bent parts (10) extending in the horizontal and/or vertical axis through which the refrigerant fluid flows; a room (3) which is provided in the cabinet (2) and which has a base (4) whereon the condenser (8) is fixed; and a holder (11) which is fixed to the base (4), which has a plurality of housings (12) wherein the bent parts (10) are snap-fitted and which enables the condenser (8) to be fixed in the room (3). The condenser (8) can be provided in different forms and sizes according to the cooling need of the cooling device (1). A fan (7) is generally used to remove the water accumulated on the

5 pipes (9) of the condenser (8). The dimensions of the condenser (8) placed in a room generally located at the rear side the cooling device (1) are important in terms of mounting. Therefore, the serpentine bent pipes (9) provided on the condenser (8) can extend horizontally or vertically. The condenser (8) is attached to the base (4) by means of the holders (11) having housings (12) suitable for receiving the bent parts (10) of the pipe (9). The holder (11) is preferably manufactured from sheet metal.

10 **[0018]** The holder (11) of the present invention comprises a plurality of housings (12) each receiving two bent parts (10). The housing (12) has the width to receive two bent parts (10). The housing (12) can be mounted on two horizontal bent parts (10) parallel to each other or two vertical bent parts (10) parallel to each other (Figure 2, Figure 3)

15 **[0019]** In another embodiment of the present invention, the holder (11) comprises a plurality of housings (12) having a symmetrical form with respect to both horizontal 20 axis and vertical axis. The housing (12) being in a symmetrical form with respect to both horizontal and vertical axes provides convenience in terms of production and use. The symmetrical housing (12) provides ease of mounting on the condenser (8) during assembly, reducing 25 mold and labor costs during the production phase.

20 **[0020]** In another embodiment of the present invention, on the housing (1), there are a plurality of holding parts (13) with a curved form so as to at least partially enclose the pipe (9) which bears against the same. The holding 30 parts (13) are almost in the form of a quadrant and grip at least a quarter of the pipe (9). Thus, the pipes (9) are fitted better into the housing (12) by means of the holding parts (13) (Figure 4).

35 **[0021]** In another embodiment of the present invention, on the holding part (13), there is at least one flange (14) in the form of an extension formed by bending the holding part (13) from one edge towards the bent part (10). The flange (14) extends outwards from the holding part (13). By contacting the surface of the pipe (9), the flange (14) 40 grips the pipe (9) tightly. Thus, the condenser (8) is fixed to the base (4) more securely (Figure 4).

45 **[0022]** In another embodiment of the present invention, the flange (14) extends at an angle towards the bent part (10) so as to gradually compress the bent part (10). The flange (14) gradually gets closer to the bent part (10). Thus, the holder (11) holds the pipe (9) more tightly while moving from the bent part (10) towards the inner part of the condenser (8).

50 **[0023]** In another embodiment of the present invention, on the flange (14), there is at least one damping pad (15) which prevents the vibrations coming from the pipe (9) from being transmitted to the holder (11). The damping pad (15) is manufactured from a material with vibration damping capability, preferably from rubber. The damping pad (15) is attached to the flange (14) preferably by means of an adhesive (Figure 5).

55 **[0024]** In another embodiment of the present invention, the housing (12) has at least one cut-out (16) which is in

the form of a recess remaining between the holding parts (13). The cut-out (16) is formed by cutting the part between the holding parts (13). The cut-out (16) enables the flange (14) to be bent more easily during production. Thus, the sheet metal tearing problem is prevented while the flange (14) is being formed.

[0025] In another embodiment of the present invention, on the holder (11), there is at least one abutment (17) which enables the holder (11) to be bent from the side where the same is joined with the base (4) so as to enable the holder (11) to be attached to the base (4). The holder (11), together with the abutment (17), is almost in the form of an L and presses the base (4) from a flat surface. Thus, the holder (11) is more firmly attached to the base (4). Since the abutment (17) is bent towards the outside of the condenser (8), the operator's access to the abutment (17) is facilitated and the holder (11) is enabled to be easily mounted to the base (4).

[0026] By means of the present invention, the condenser (8) is enabled to be held with the same holder (11) by holding the two bent parts (10) of the serpentine pipes (9) which have bent parts (10) extending in the horizontal or vertical direction.

Claims

1. A cooling device (1) **comprising** at least one cabinet (2) wherein foodstuffs to be cooled are placed; a compressor (6) which compresses a refrigerant fluid; at least one evaporator (5) which provides the heat transfer between the refrigerant fluid and the cabinet (2) being cooled; a condenser (8) which condenses the refrigerant fluid, which has at least one pipe (9) bent in the form of a serpentine with a plurality of bent parts (10) extending in the horizontal and/or vertical axis through which the refrigerant fluid flows; a room (3) which is provided in the cabinet (2) and which has a base (4) whereon the condenser (8) is fixed; and a holder (11) which is fixed to the base (4), which has a plurality of housings (12) wherein the bent parts (10) are snap-fitted and which enables the condenser (8) to be fixed in the room (3), **characterized by** a plurality of housings (12) each receiving two bent parts (10).
2. A cooling device (1) as in Claim 1, **characterized by** a plurality of housings (12) having a symmetrical form with respect to both horizontal axis and vertical axis.
3. A cooling device (1) as in Claim 1 or Claim 2, **characterized by** a plurality of holding parts (13) which are provided on the housing (1) and which have a curved form so as to at least partially enclose the pipe (9) which bears against the same.
4. A cooling device (1) as in Claim 3, **characterized**

by at least one flange (14) which is provided on the holding part (13) and which is in the form of an extension formed by bending the holding part (13) from one edge towards the bent part (10).

5. A cooling device (1) as in Claim 4, **characterized by** the flange (14) which extends at an angle towards the bent part (10) so as to gradually compress the bent part (10).
6. A cooling device (1) as in Claim 5, **characterized by** at least one damping pad (15) which is provided on the flange (14) and which prevents the vibrations coming from the pipe (9) from being transmitted to the holder (11).
7. A cooling device (1) as in any one of Claims 3 to 6, **characterized by** the housing (12) which has at least one cut-out (16) which is in the form of a recess remaining between the holding parts (13).
8. A cooling device (1) as in any one of the above claims, **characterized by** at least one abutment (17) which is provided on the holder (11) and which enables the holder (11) to be bent from the side where the same is joined with the base (4) so as to enable the holder (11) to be attached to the base (4).

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Figure 1

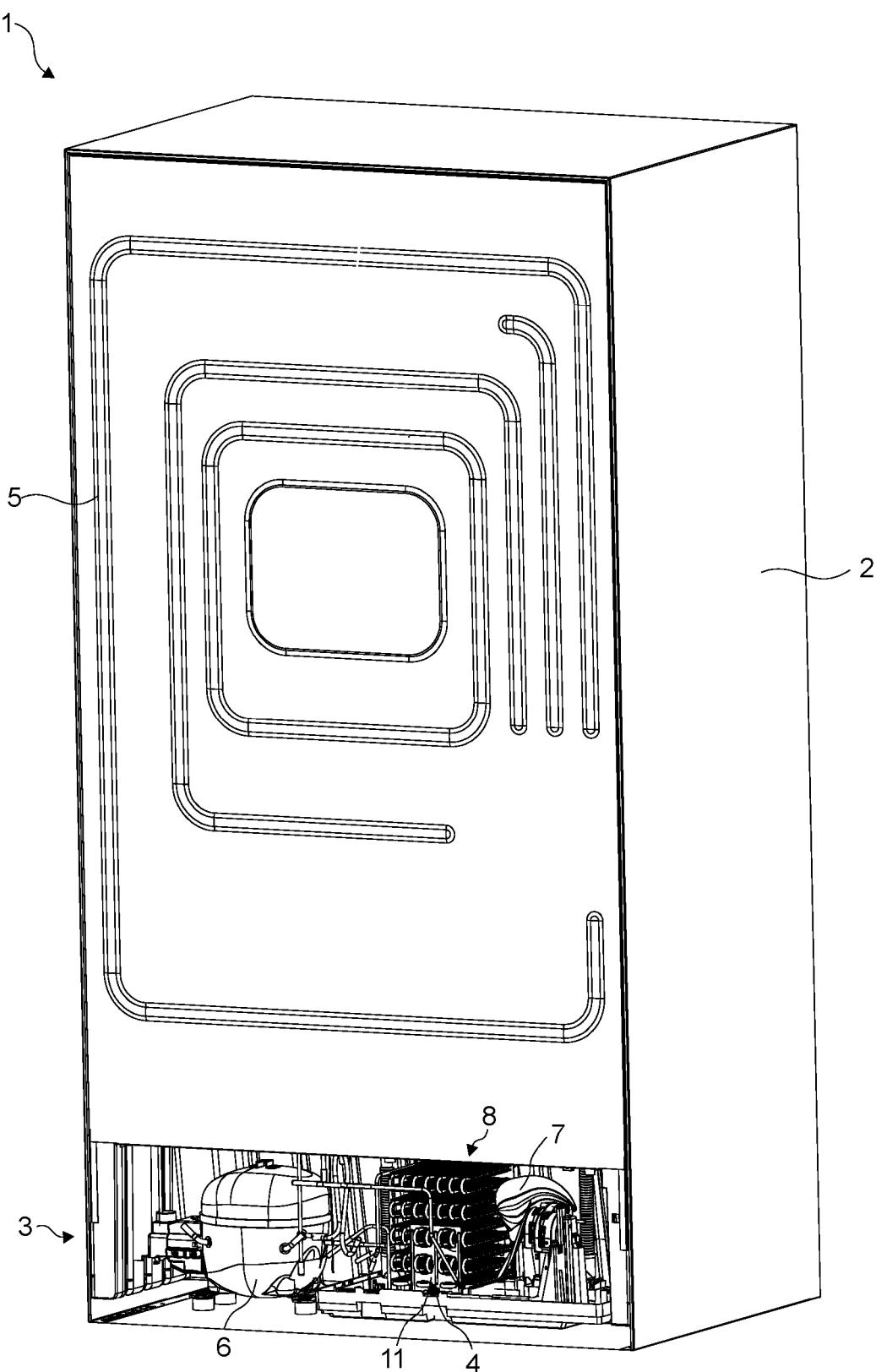


Figure 2

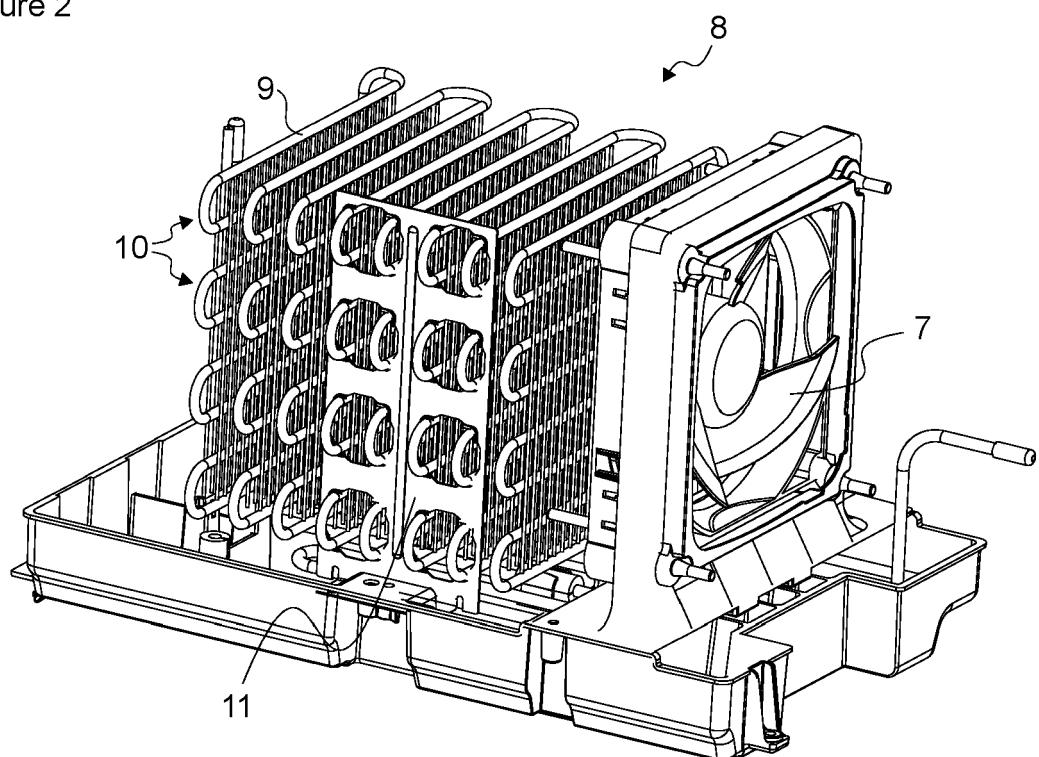


Figure 3

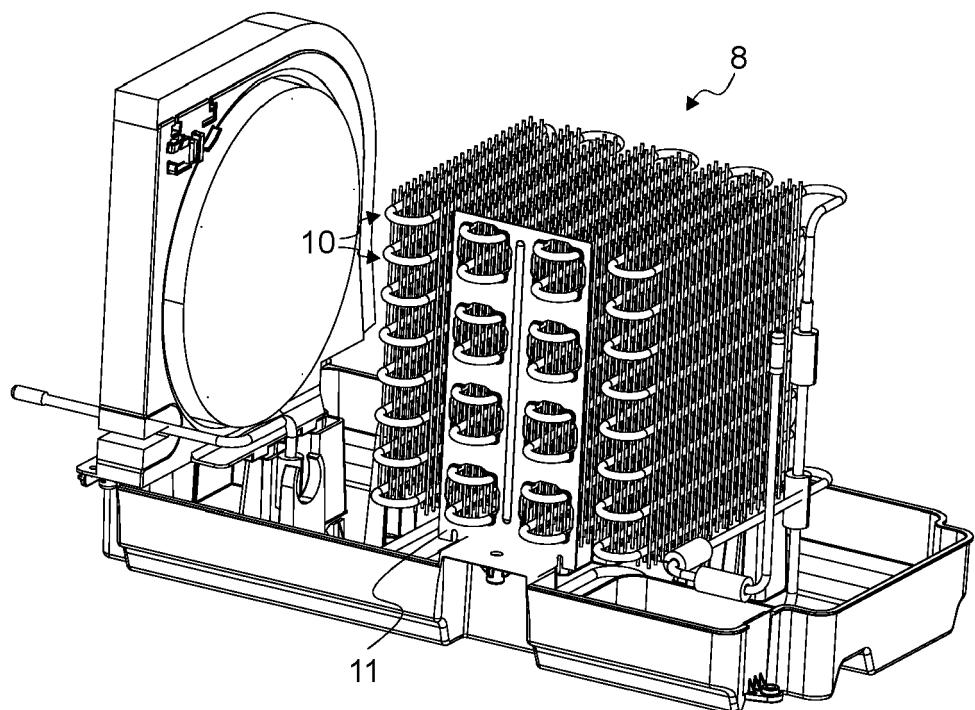


Figure 4

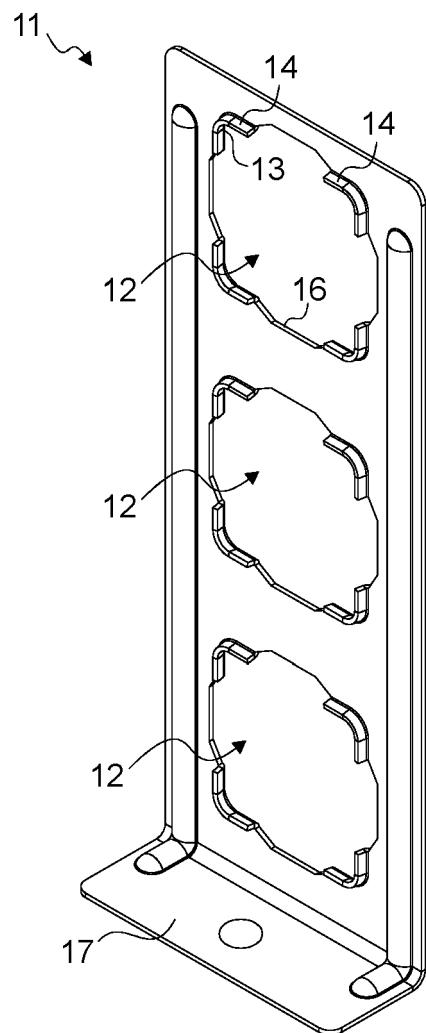
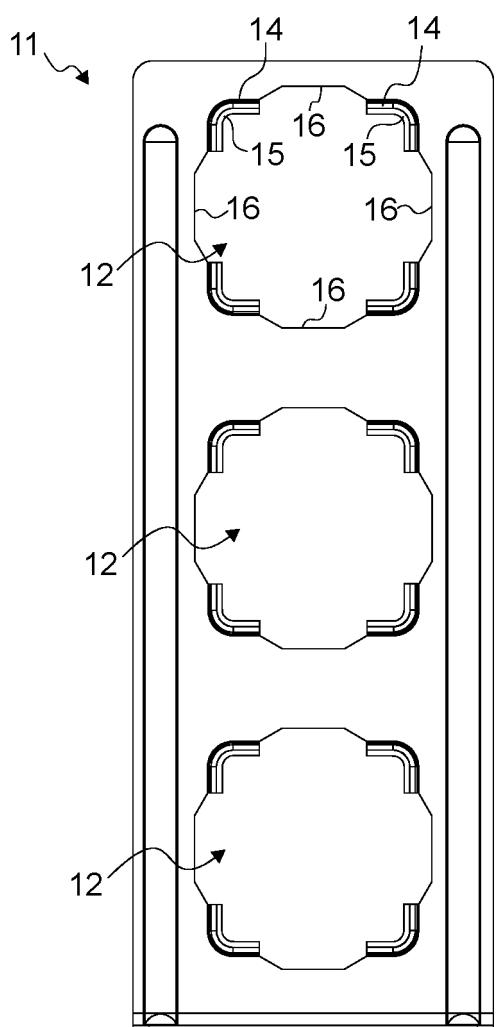


Figure 5





EUROPEAN SEARCH REPORT

Application Number

EP 23 20 0537

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25			F25D F25B F28F F28D F16L
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50	2 The present search report has been drawn up for all claims		
55	Place of search The Hague	Date of completion of the search 15 March 2024	Examiner Correia dos Reis, I
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