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

(11) **EP 4 273 460 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
08.11.2023 Bulletin 2023/45

(21) Application number: **23166483.0**

(22) Date of filing: **04.04.2023**

(51) International Patent Classification (IPC):
F24F 1/58 *(2011.01)*

(52) Cooperative Patent Classification (CPC):
F24F 1/58

(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 ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **02.05.2022 NL 2031756**

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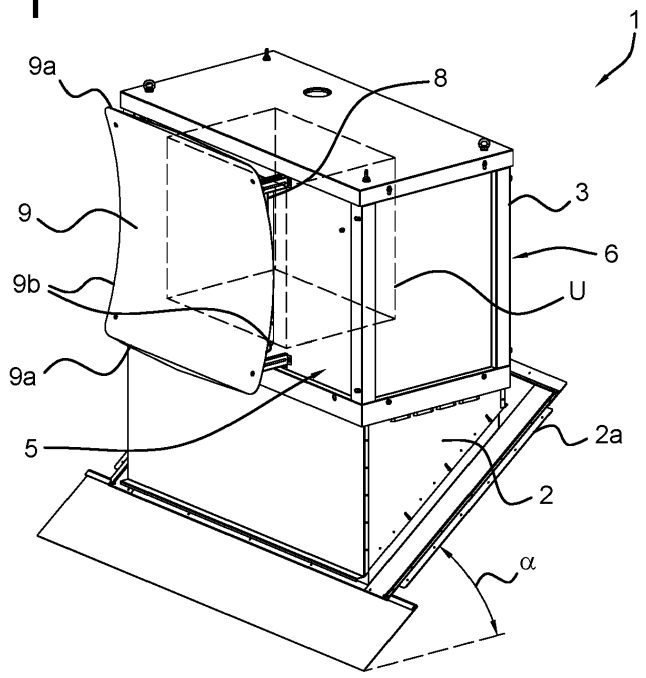
(54) **COVER FOR AN OUTDOOR UNIT**

(57) A cover (1) for an outdoor unit (U) of a third party supplier, comprising a base (2) configured to be mounted on a roof, and a housing (3) arranged on the base (2), wherein the housing (3) comprises an interior space (4) for enclosing and mounting the outdoor unit (U) of the third party supplier. A deflector panel (9) is mounted to the housing (3) in front of an air exhaust opening (8) of the front panel (5) and spaced apart therefrom, wherein an air gap (10) is provided between the deflector panel (9) and the front panel (5), and wherein the air gap (10) continuously extends between the deflector panel (9) and the front panel (5) at least across a height (Ho) and at least across a width (Wo) of the air exhaust opening (8).

Fig. 1



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Description

Field of the invention

[0001] The present invention relates to a cover for an outdoor unit, in particular a cover for an outdoor unit of a third party supplier for placement on a roof.

Background art

[0002] European patent application EP 2 767 768 A1 discloses a cover for household appliances mounted outside a building, comprising a body adapted to cover the household appliance and provided with at least one window closed by a micro-perforated mesh in such manner to allow for an air flow from the inside of the cover towards the outside and prevent the penetration of dust from the outside of the cover towards the inside.

[0003] Covers such as those described above provide a protective enclosure for the household appliance, such an outdoor unit, to prevent ingress of water and dust. However, performance of the outdoor unit can be reduced significantly when the cover and outdoor unit are arranged on a roof and subjected to harsh wind conditions.

Summary of the invention

[0004] The present invention relates to a cover, i.e. a protective cover, for an outdoor unit for placement on a roof, wherein the outdoor unit is supplied by a third party and may be part of a heat pump system for heating a home for example. The cover of the present invention not only provides protection against rain, but also ensures that operational performance and efficiency of the outdoor unit is maintained by optimizing air flow through the cover and thus providing improved air flow through the outdoor unit even when the cover is subjected to harsh wind conditions that are often present on roofs.

[0005] According to the present invention, a cover for an outdoor unit as mentioned in the preamble above is provided, comprising a base configured to be mounted on a roof, and a housing arranged on the base, wherein the housing comprises an interior space for enclosing and mounting the outdoor unit of the third party supplier,

wherein the housing comprises a front panel and an opposing back panel, wherein the back panel comprises an air intake opening and wherein the front panel comprises an air exhaust opening having a height in a vertical z-direction and a width in a horizontal y-direction perpendicular to the z-direction, wherein the cover further comprises

a deflector panel mounted to the housing in front of the air exhaust opening and spaced apart therefrom, wherein an air gap is provided between the deflector panel and the front panel, thus between the deflector panel and the air exhaust opening, and wherein the air gap continuously extends between the deflector panel and the front panel at least across the height and at least across the width of the air exhaust opening.

[0006] The deflector panel mounted in front of the air exhaust opening and spaced apart therefrom significantly increases the coefficient of performance, or "COP" for short, of an outdoor unit placed inside the housing when there is frontal wind striking the front panel. Without the deflector panel such frontal wind causes excessive back pressure on the air exhaust opening, thereby impeding optimal air flow through the housing from the air intake opening to the air exhaust opening as needed by the outdoor unit to function optimally. This, in turn, degrades performance of the outdoor unit and as such the entire heat pump system in which the outdoor unit may be used.

[0007] The deflector panel of the present invention prevents excessive back pressure on the air exhaust opening when the housing is subjected to frontal wind as the deflector panel provides wind deflection around the housing. The abovementioned continuously extending air gap between the deflector panel and the front panel allows for an optimal and stable flow of air from the air intake opening to the air exhaust opening with a minimum of pressure build-up at the air exhaust opening. As the deflector panel prevents back pressure on the air exhaust opening allows an outdoor unit inside the housing to utilize a required air flow for achieving optimal operating conditions with a minimum of power usage.

Short description of drawings

[0008] The present invention will be discussed in more detail below, with reference to the attached drawings of embodiments, in which

Figure 1 shows a three dimensional front view of a cover according to a first embodiment of the present invention;

Figure 2 shows a three dimensional front view of a housing of a cover according to a second embodiment of the present invention;

Figure 3 shows a three dimensional rear view of a cover according to an embodiment of the present invention;

Figure 4 shows a side view of a cover according to an embodiment of the present invention;

Figure 5 shows a schematic cross section of a cover according to an embodiment of the present invention;

Figure 6 shows a top view of a cover according to an embodiment of the present invention;

Figure 7 to 11 each show a schematic top view of a cover according to embodiments of the present invention; and

Figure 12 and 13 each show a schematic side view of a cover according to embodiments of the present

invention.

Description of embodiments

[0009] Each of the Figures 1 to 6 show a particular view as mentioned above of a cover 1 for an outdoor unit U. The cover 1 comprises a base 2 which is configured to be mounted on a roof, which is not depicted. The cover 1 further comprises a housing 3 which is arranged on the base 2. The housing 3 comprises an interior space 4 for enclosing the outdoor unit U. That is, the housing 3 is arranged to receive an outdoor unit U of a particular supplier, so that the housing 3 is not to be construed as an outdoor unit itself but wherein the housing 3 provides a hollow compartment, see interior space 4, in which an outdoor unit U of a particular supplier can be placed and mounted.

[0010] From e.g. Figure 1 it can be seen that in an embodiment the base 2 may comprise a base flashing 2a for achieving sealed attachment of the cover 1 to a roof surface (not shown). Note that in an embodiment the base 2 may be configured for placement on an inclined or a flat roof as indicated by the angle α, which may vary between 0° to e.g. 60° degrees or even higher if that is feasible for the base 2. As will be clear, the Figures 1 to 4 show an embodiment of the base 2 that is configured for placement on an inclined roof.

[0011] Referring to e.g. Figure 1, 2, 4 and 6, the housing 3 further comprises a front panel 5 and an opposing back panel 6, wherein the back panel 6 comprises an air intake opening 7 and wherein the front panel 5 comprises an air exhaust opening 8, wherein the air exhaust opening 8 has a height Ho in a vertical z-direction, see Figure 4, and a width Wo in a horizontal y-direction perpendicular to the z-direction, see Figure 6. From Figure 3 it can be inferred that an embodiment may be envisaged wherein the air intake opening 7 comprises a plurality of slits or wherein the air intake opening 7 may be embodiment as a grill or mesh.

[0012] In Figure 1 and 4 it is further shown that the cover 1 of the present invention also comprises a deflector/deflection panel 9 mounted to the housing 3 in front of the air exhaust opening 8 and spaced apart therefrom, wherein an air gap 10 is provided between the deflector panel 9 and the front panel 5. In particular, the air gap 10 continuously extends between the deflector panel 9 and the front panel 5 at least across the height Ho and at least across the width Wo of the air exhaust opening 8.

[0013] It should be noted that Figure 2 shows an embodiment of the housing 3 in more detail, without the deflector panel 9 mounted in front of the air exhaust opening 8, thereby showing the air exhaust opening 8 in more detail. In particular, Figure 2 clarifies that the abovementioned vertical z-direction as depicted may be viewed as a vertical z-axis. The horizontal y-direction as depicted may be seen as a horizontal y-axis, which is perpendicular to the z-axis. As will be clear later, there is defined a horizontal x-direction as depicted, wherein the horizontal x-axis is perpendicular to both the z-axis/direction and y-axis/direction. For ease of reference, the y-axis and z-axis may be considered to extend in a plane of the air exhaust opening 8.

[0014] Advantageously, the deflector panel 9 mounted in front of the air exhaust opening 8 and spaced apart therefrom significantly increases the coefficient of performance, or "COP" for short, of an outdoor unit U placed inside the internal space 4 of the housing 3 when there is frontal wind "FW", see Figures 4, 5 and 6. That is, where wind blows toward the deflector panel 9 in a direction opposite to intake air "IA" that flows into the housing 3 through the air intake opening 7 when the outdoor unit U is in operation.

[0015] Figure 2 shows that in an exemplary embodiment a plurality of mounting brackets 8a may be arranged around the air exhaust opening 8 for mounting the deflector panel 9 in front of the air exhaust opening 8 spaced apart therefrom. For example, in case the air exhaust opening 8 is rectangular as depicted, then a mounting bracket 8a may be provided at each corner of the air exhaust opening 8. In another example, should the air exhaust opening 8 be circular, then the plurality of mounting brackets 8a may be evenly spaced around the air exhaust opening 8.

[0016] From Figure 6 it is further understood that frontal wind FW need not have a direction precisely perpendicular to the housing 3, in particular the front panel 5, more particular the deflector panel 9, along the horizontal x-direction (axis). So frontal wind FW may impinge or strike the deflector panel 9 at an angle between e.g. 0° and +60°/-60° degrees with respect to the x-direction/axis. Performance improvements of the outdoor unit U are particularly noticeable when the angle of the frontal wind FW with respect to the x-direction/axis is between 0° and +30°/-30°.

[0017] From Figure 2 it will be clear that, without the deflector panel 9, frontal wind FW will cause excessive back pressure on the air exhaust opening 8, thereby impeding optimal flow of intake air IA through the housing 3 from the air intake opening 7 to the air exhaust opening 8 as needed by the outdoor unit U to function optimally. This, in turn, degrades performance of the outdoor unit U and as such an entire heat pump system in which the outdoor unit U may be utilised.

[0018] The deflector panel 9 as depicted in Figures 1, 3-6, on the other hand, prevents excessive back pressure on the air exhaust opening 8 when the housing 3 is subjected to frontal wind FW, which strikes the deflector panel 9 not the air exhaust opening 8.

[0019] In light of Figure 4 and 5 it is important to note that the abovementioned continuous air gap 10 between the deflector panel 9 and the front panel 5 allows for optimal and stable flow of intake air IA from the air intake opening 7 to the air exhaust opening 8. The air gap 10 prevents pressure build-up at the air exhaust opening 8 when exhaust air E from the outdoor unit U is to be expelled for the performance required. Therefore, accord-

ing to the present invention, the deflector panel 9 prevents excessive back pressure on the air exhaust opening 8 caused by frontal wind FW, and wherein the continuous air gap 10 between the deflector panel 9 and the front panel at least across the height Ho and at least across the width Wo of the air exhaust opening 8, allows a required air flow through the outdoor unit U to be achieved without pressure build-up at the air exhaust opening 8 when the outdoor unit U expels an amount of exhaust air E as required to achieve a particular performance. Put differently, the continuous air gap 10 allows an outdoor unit U inside the housing 3 to receive a required flow of intake air IA for achieving optimal operating conditions.

[0020] It is emphasized that frontal wind FW on the housing 3 without deflector panel 9, see e.g. Figure 2, leads to a direct performance loss, i.e. loss of COP, which in turn leads to an additional use of electricity as the outdoor unit U will need to work harder to maintain a particular output. This is exemplified in e.g. Figure 5, wherein an outdoor unit U is depicted comprising a fan F to induce a flow of intake air IA along its internal heat exchanger (not shown). Without the deflector panel 9, frontal wind FW would lead to excessive back pressure on the air exhaust opening 8 and as such the fan F would experience more resistance, thus consume more electrical power for maintaining a required flow of intake air IA.

[0021] Going into further detail as to the advantages of the deflector panel 9, in Figure 5 the deflector panel 9 of the present invention induces an area of lower or reduced pressure P- in the air gap 10 when frontal wind FW strikes the deflector panel 9. On an opposing side of the deflector panel 9 there is an area of higher or increased pressure P+ as the frontal wind FW striking the deflector panel 9 on that opposing side. The area of lower pressure P- in the continuous air gap 10 allows exhaust air E originating from the outdoor unit U to be expelled from the air exhaust opening 8 more easily and as such facilitate a significantly higher COP of the outdoor unit U.

[0022] In light of Figure 4 and 6, the air gap 10 is provided between the deflector panel 9 and the front panel 5, thus between the deflector panel 9 and the air exhaust opening 8, wherein the air gap 10 continuously extends between the deflector panel 9 and the front panel 5 at least across the height Ho and at least across the width Wo of the air exhaust opening 8. Here, the air gap 10 must be understood as continuously extending, i.e. without obstruction, along the deflector panel 9 in the vertical z-direction and horizontal y-direction and at least across the height Ho and at least across the width Wo of the air exhaust opening 8. So the air intake opening 8 may be seen as being free from any obstruction other than the deflector plate 9 which is spaced apart from the air exhaust opening 8 by virtue of the continuous air gap 10.

[0023] As depicted in Figure 5 and 6, the area of lower pressure P- in the air gap 10 during use continuously extends both in the vertical z-direction as shown in Figure 5 but also in the horizontal y-direction as shown in Figure 6. This area of lower pressure P- thus fully extends along the width Wo and height Ho of the air exhaust opening 8, thereby allowing the outdoor unit U to expel exhaust air E with lower resistance and thus achieve optimal operating conditions with less energy consumption.

[0024] The deflector panel 9 may be embodied in various advantageous ways, see the Figures 7 to 13, schematically showing various embodiments of the deflector panel 9 mounted to the housing 3 in front of the air exhaust opening 8. The direction of frontal wind FW is indicated.

[0025] For example, Figure 11 shows an exemplary embodiment of a deflector panel 9 as a flat panel. This embodiment allows good protection against frontal wind FW striking on the deflector panel 9 and ensures that minimal back pressure on the air exhaust opening 8 exists so that the outdoor unit U is able to expel air with less resistance by virtue of the air gap 10. The flat deflector panel 9 will also simplify manufacturing and lower the cost of the cover 1.

[0026] As depicted in the exemplary embodiment of e. g. Figure 4 and 5, the deflector panel 9 may comprise a concave side view profile, e.g. cross section, extending in the z-direction and arching inward toward the air exhaust opening 8. In this embodiment, the inward arching concave deflector panel 9 provides for an air gap 10 having a variable gap width D along the z-direction, wherein the gap width D is at a minimum in a centre portion the deflector panel 9, e.g. where the x-axis and z-axis cross as shown in Figure 4 and 5.

[0027] Note that concavity is defined from the frontal wind FW direction, so that the deflector panel 9 is convex as seen from the air exhaust opening 8. The concavity of the deflector panel 9 in the vertical z-direction allows an improved area of lower pressure P- extending in the air gap 10, so that the outdoor unit U may increase its performance when frontal wind FW strikes on the deflector panel 9. In particular, see Figure 5, the concave side view profile of the deflector panel 9 facilitates smoother arched guidance of exhaust air E, in the z-direction, from the outdoor unit U. It should be noted that the deflector panel 9 in this embodiment has a straight top view profile as seen in Figure 6, so wherein the air gap 10 has a gap width D that remains constant in the y-direction as depicted.

[0028] As an extension of the embodiment shown in Figure 4-6, it is conceivable that an embodiment may be contemplated wherein the deflector panel 9 has a concave top view profile, e.g. cross section, extending in the y-direction and arching inward toward the air exhaust opening 8 as schematically depicted in Figure 8. In this embodiment the concave top view profile of the deflector panel 9 also allows for smooth arched guidance of exhaust air from the outer unit U, thereby lowering flow resistance as experienced by the outdoor unit U for increasing performance thereof.

[0029] It is worth noting that an embodiment may be considered, though not shown, wherein the deflector

panel 9 comprises both a concave side view profile extending in the z-direction as depicted in e.g. Figure 5 as well as a concave top view profile extending in the y-direction as schematically depicted in Figure 8. This embodiment also provides for smooth arched guidance of exhaust air from the outdoor unit U through the air exhaust opening 8.

[0030] Instead of concavity of the deflector panel 9 as mentioned above, so wherein the deflector panel 9 arches inward to the air exhaust opening 8, a convex shaped deflector panel 9 is possible, so where the deflector panel 9 arches away from the air exhaust opening 8.

[0031] In particular, as schematically depicted in the side view of Figure 12, an embodiment may be provided wherein the deflector panel 9 has a convex side view profile extending in the vertical z-direction and arching away from the exhaust opening 8. This allows for smooth deflector of frontal wind FW around the deflector panel 9 in the z-direction but also provides for an area of lower pressure in the air gap 10 to allow exhaust air from the outdoor unit U to exit the air exhaust opening 8 with less resistance. Another advantage of such a convex side view profile is that increased protection is provided for side wind on the housing 3, i.e. wind in the y-direction or z-direction.

[0032] In alternative fashion, a convex top view profile may be provided to the deflector panel 9 as schematically depicted in the top view of Figure 7, wherein the deflector panel 9 has a convex top view profile extending in the horizontal y-direction and arching away from the air exhaust opening 8. This embodiment also allows for smooth deflection of frontal wind FW around the deflector panel 9 in the y-direction and provides for an area of lower pressure in the air gap 10 such that exhaust air from the outdoor unit U can be expelled through the air exhaust opening 8 with less resistance, hence providing improved performance of the outdoor unit U. This embodiment also provides additional protection against side wind on the housing 3, i.e. wind in the y-direction or z-direction.

[0033] As further shown in the top view of Figure 9, an embodiment may be provided wherein the cover 1 further comprises a secondary deflector panel 12 spaced apart from a side panel 13 of the housing 3 and extending in the horizontal x-direction, wherein the x-direction is perpendicular to the y-direction and the z-direction, and wherein the secondary deflector panel 12 extends beyond the front panel 5. In this embodiment, the secondary deflector panel 12 allows for further protection of the air exhaust opening 8 against excessive back pressure by blocking wind to enter the air gap 10 in the y-direction, e.g. between the deflector panel 9 and an edge between the side panel 13 and front panel 5. In an embodiment, the secondary deflector panel 12 has a concave top view profile arching inward toward the side panel 13, thereby allowing for a venturi effect when frontal wind flows in the x-direction between the secondary deflector panel 12 and the side panel 13. This venturi effect amplifies the lower pressure in the air gap 10, i.e. causing "air pull" from the air exhaust opening 8. As stated earlier, the area of lower pressure in the air gap 10 greatly reduces flow resistance out of the air exhaust opening 8 so that the outdoor unit U is able to perform optimally as it is able to receive a required flow of intake air IA with minimal power usage.

[0034] In the schematic side view of Figure 13, an alternative embodiment is depicted wherein the cover 1 may further comprise a secondary deflector panel 12 arranged along an upper edge of the deflector panel 9 at an angle ß between 0° and 90° with respect to the vertical z-direction. In this embodiment, the secondary deflector panel 12 is advantageous for blocking frontal wind from entering the air gap 10 from above and reduce back pressure in the air gap 10. Even though a flat deflector panel 9 is utilized in the embodiment of Figure 13, in further embodiments (not shown) the secondary deflector panel 12 may be used with a deflector panel 9 having a concave or convex side view profile and/or with a deflector panel 9 having a concave or convex top view profile as mentioned earlier.

[0035] In a further embodiment as shown Figure 13, the secondary deflector panel 12 has a convex side view profile arching away from the housing 3. In this embodiment the secondary deflector panel 12 acts as an arched "spoiler" and improves blockage and smooth deflection of wind entering the air gap 10 at the upper edge of the deflector panel 9.

[0036] Further advantageous embodiments are conceivable to prevent frontal wind FV from inducing excessive back pressure at the air exhaust opening 8. For example, referring to the schematic top view of Figure 10, an embodiment may be considered wherein the deflector panel 9 covers the entire front panel 5. In this embodiment, the deflector panel 9 extends along the entire front panel 5 in the vertical z-direction and horizontal y-direction. This embodiment not only reduces back pressure at the air exhaust opening 8 when frontal wind FW strikes the deflector panel 9, but the entire front panel 5 is also shielded from wind pressure imposed by frontal wind FW, so that side wind along the front panel 5 is reduces as frontal wind is deflected and guided around the housing 3.

[0037] As can be seen from e.g. Figure 1, 5, 6, in an embodiment the deflector panel 9 may be rectangular and comprises a pair of opposing horizontal edges 9a and a pair of opposing vertical edges 9b. Then, in light of Figure 10, an embodiment can be considered wherein the pair of horizontal edges 9a and/or the pair of vertical edges 9b bend inward, i.e. toward the housing 3, extending around a plurality of edges 5a of the front panel 5. In this embodiment the deflector panel 9 not only covers the entire front panel 5 as shown in Figure 10, but wherein the pair of horizontal edges 9a and/or the pair of vertical edges 9b also wrap around or enclose the plurality of edges 5a of the front panel 5. In this way the entire housing 3 is shielded from frontal wind FW and the pair of horizontal edges 9a and/or the pair of vertical edges 9b greatly reduce side wind entering the air gap 10.

[0038] As further shown in the schematic top views of

Figures 7 to 10, in an embodiment the deflector panel 9 comprises a flat surface portion 11. That is, in this embodiment the deflector panel 9 may have a concave or convex top view profile or concave or convex side view profile as described earlier, but wherein a flat surface portion 11, e.g. a centre surface portion 11, allows the gap with D of the air gap 10 to remain constant at the air exhaust opening 8 if so required but wherein e.g. the pair of horizontal edges 9a and/or the pair of vertical edges 9b may still be formed to provide sufficient concavity or convexity to the deflector panel 9.

[0039] It is worth noting that the air gap 10 may have a minimum gap width D. For example, referring to Figure 5, in an exemplary embodiment, the air gap 10 has a gap width D of at least 10 cm in the horizontal x-direction, wherein the x-direction is perpendicular to the y-direction and the z-direction. In real applications 10 cm gap width provides for sufficient reduction of pressure build-up when the outdoor unit U expels exhaust air E through the air exhaust opening 8. As mentioned above, the deflector panel 9 may comprise a concave side view profile extending in the z-direction and arching inward toward the air exhaust opening 8. This is depicted in Figure 5. In light of this depicted embodiment, the minimum gap width D may then be understood as applying to the gap width D in a centre portion the deflector panel 9, e.g. where the x-axis and z-axis cross as shown and where the gap width D is at a minimum, e.g. at least 10 cm.

[0040] From Figure 5 it is also seen that an embodiment may be contemplated wherein the front panel 5 comprises a recessed panel portion 14, and wherein the air exhaust opening 8 is arranged in the recessed panel portion 14. In this embodiment the gap width D may be taken as a distance from the recessed panel portion 14 to the deflector panel 9.

[0041] According to the present invention, the cover 1, in particular the housing 3, is configured to receive an outdoor unit U from a third party supplier. Since outdoor units U may have different external dimensions the housing 3 must be able to receive outdoor units U with variable dimensions. To that end there is provided an embodiment, wherein the front panel 5 comprises an edge sealing member 15 at least in part circumferentially arranged around the air exhaust opening 8 for connection to the outdoor unit U. For cases where dimensions of the air exhaust opening 8 are substantially different with respect to outer dimensions of the outdoor unit U, then the edge sealing member 15 prevents exhaust air E expelled by the outdoor unit U from being drawn back into the housing 3 along edges of the outdoor unit U. The most optimal sealing is achieved for embodiments wherein the edge sealing member 15 is arranged along the entire circumference of the air exhaust opening 8 and circumferentially connects to outer edges of the outdoor unit U.

[0042] In view of the above, the present invention can now be summarised by the following embodiments:

Embodiment 1. A cover (1) for an outdoor unit (U), comprising a base (2) configured to be mounted on a roof, and a housing (3) arranged on the base (2), wherein the housing (3) comprises an interior space (4) for enclosing the outdoor unit (U),

wherein the housing (3) comprises a front panel (5) and an opposing back panel (6), wherein the back panel (6) comprises an air intake opening (7) and wherein the front panel (5) comprises an air exhaust opening (8) having a height (Ho) in a vertical z-direction and a width (Wo) in a horizontal y-direction perpendicular to the z-direction, wherein the cover (1) further comprises a deflector panel (9) mounted to the housing (3) in front of the air exhaust opening (8) and spaced apart therefrom, wherein an air gap (10) is provided between the deflector panel (9) and the front panel (5), and wherein the air gap (10) continuously extends between the deflector panel (9) and the front panel (5) at least across the height (Ho) and at least across the width (Wo) of the air exhaust opening (8).

Embodiment 2. The cover (1) according to embodiment 1, wherein the deflector panel (9) is a flat panel.

Embodiment 3. The cover (1) according to embodiment 1, wherein the deflector panel (9) has a concave side view profile extending in the vertical z-direction and arching inward toward the air exhaust opening (8).

Embodiment 4. The cover (1) according to embodiment 1 or 3, wherein the deflector panel (9) has a concave top view profile extending in the horizontal y-direction and arching inward toward the air exhaust opening (8).

Embodiment 5. The cover (1) according to embodiment 1, wherein the deflector panel (9) has a convex side view profile extending in the vertical z-direction and arching away from the air exhaust opening (8).

Embodiment 6. The cover (1) according to embodiment 1 or 5, wherein the deflector panel (9) has a convex top view profile extending in the horizontal y-direction and arching away from the air exhaust opening (8).

Embodiment 7. The cover (1) according to any one of embodiments 1-6, further comprising a secondary deflector panel (12) spaced apart from a side panel (13) of the housing (3) and extending in a horizontal x-direction, wherein the x-direction is perpendicular to the y-direction and the z-direction, and wherein the secondary deflector panel (12) extends beyond the front panel (5).

Embodiment 8. The cover (1) according to embodiment 7, wherein the secondary deflector panel (12) has a concave top view profile arching inward toward the side panel (13).

Embodiment 9. The cover (1) according to any one of embodiments 1-6, further comprising a secondary deflector panel (12) arranged along an upper edge of the deflector panel (9) at an angle (ß) between 0° and 90° with respect to the vertical z-direction.

Embodiment 10. The cover (1) according to embodiment 9, wherein the secondary deflector panel (12) has a convex side view profile arching away from the housing (3).

Embodiment 11. The cover (1) according to any one of embodiments 1-10, wherein the deflector panel (9) covers the entire front panel (5).

Embodiment 12. The cover (1) according to embodiment 11, wherein the deflector panel (9) is rectangular and comprises a pair of opposing horizontal edges (9a) and/or a pair of opposing vertical edges (9b), and wherein the pair of horizontal edges (9a) and/or the pair of vertical edges (9b) bend inward extending around a plurality of edges (5a) of the front panel (5).

Embodiment 13. The cover (1) according to any one of embodiments 1-12, wherein the deflector panel (9) comprises a flat surface portion (11).

Embodiment 14. The cover (1) according to any one of embodiments 1-13, wherein the air gap (10) has a gap width (D) of at least 10 cm in a horizontal x-direction, wherein the x-direction is perpendicular to the y-direction and the z-direction.

Embodiment 15. The cover (1) according to any one of embodiments 1-14, wherein front panel (5) comprises an edge sealing member (15) at least in part circumferentially arranged around the air exhaust opening (8) for connection to the outdoor unit (U).

[0043] The present invention has been described above with reference to a number of exemplary embodiments as shown in the drawings. Modifications and alternative implementations of some parts or elements are possible, and are included in the scope of protection as defined in the appended claims.

Claims

1. A cover (1) for an outdoor unit (U) of a third party supplier, comprising a base (2) configured to be mounted on a roof, and a housing (3) arranged on the base (2), wherein the housing (3) comprises an interior space (4) for enclosing and mounting the outdoor unit (U) of the third party supplier,

wherein the housing (3) comprises a front panel (5) and an opposing back panel (6), wherein the back panel (6) comprises an air intake opening (7) and wherein the front panel (5) comprises an air exhaust opening (8) having a height (Ho) in a vertical z-direction and a width (Wo) in a horizontal y-direction perpendicular to the z-direction, wherein the cover (1) further comprises a deflector panel (9) mounted to the housing (3) in front of the air exhaust opening (8) and spaced apart therefrom, wherein an air gap (10) is provided between the deflector panel (9) and the front panel (5), and wherein the air gap (10) continuously extends between the deflector panel (9) and the front panel (5) at least across the height (Ho) and at least across the width (Wo) of the air exhaust opening (8).

2. The cover (1) according to embodiment 1, wherein the deflector panel (9) is a flat panel.

3. The cover (1) according to embodiment 1, wherein the deflector panel (9) has a concave side view profile extending in the vertical z-direction and arching inward toward the air exhaust opening (8).

4. The cover (1) according to embodiment 1 or 3, wherein the deflector panel (9) has a concave top view profile extending in the horizontal y-direction and arching inward toward the air exhaust opening (8).

5. The cover (1) according to embodiment 1, wherein the deflector panel (9) has a convex side view profile extending in the vertical z-direction and arching away from the air exhaust opening (8).

6. The cover (1) according to embodiment 1 or 5, wherein the deflector panel (9) has a convex top view profile extending in the horizontal y-direction and arching away from the air exhaust opening (8).

7. The cover (1) according to any one of embodiments 1-6, further comprising a secondary deflector panel (12) spaced apart from a side panel (13) of the housing (3) and extending in a horizontal x-direction, wherein the x-direction is perpendicular to the y-direction and the z-direction, and wherein the secondary deflector panel (12) extends beyond the front panel (5).

8. The cover (1) according to embodiment 7, wherein the secondary deflector panel (12) has a concave top view profile arching inward toward the side panel

(13).

9. The cover (1) according to any one of embodiments 1-6, further comprising a secondary deflector panel (12) arranged along an upper edge of the deflector panel (9) at an angle (ß) between 0° and 90° with respect to the vertical z-direction.

10. The cover (1) according to embodiment 9, wherein the secondary deflector panel (12) has a convex side view profile arching away from the housing (3).

11. The cover (1) according to any one of embodiments 1-10, wherein the deflector panel (9) covers the entire front panel (5).

12. The cover (1) according to embodiment 11, wherein the deflector panel (9) is rectangular and comprises a pair of opposing horizontal edges (9a) and/or a pair of opposing vertical edges (9b), and wherein the pair of horizontal edges (9a) and/or the pair of vertical edges (9b) bend inward extending around a plurality of edges (5a) of the front panel (5).

13. The cover (1) according to any one of embodiments 1-12, wherein the deflector panel (9) comprises a flat surface portion (11).

14. The cover (1) according to any one of embodiments 1-13, wherein the air gap (10) has a gap width (D) of at least 10 cm in a horizontal x-direction, wherein the x-direction is perpendicular to the y-direction and the z-direction.

15. The cover (1) according to any one of embodiments 1-14, wherein front panel (5) comprises an edge sealing member (15) at least in part circumferentially arranged around the air exhaust opening (8) for connection to the outdoor unit (U).

Fig. 1

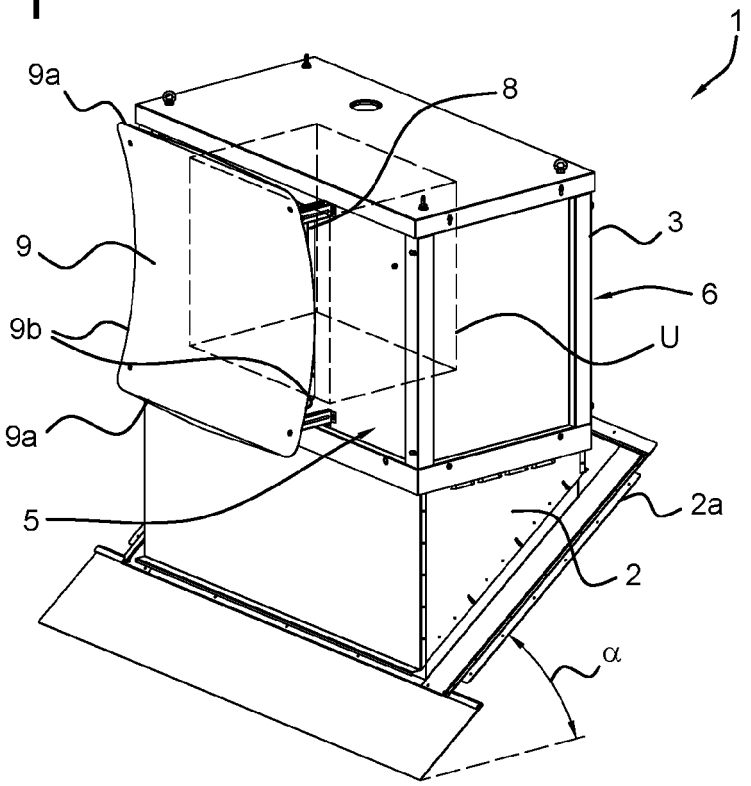


Fig. 2

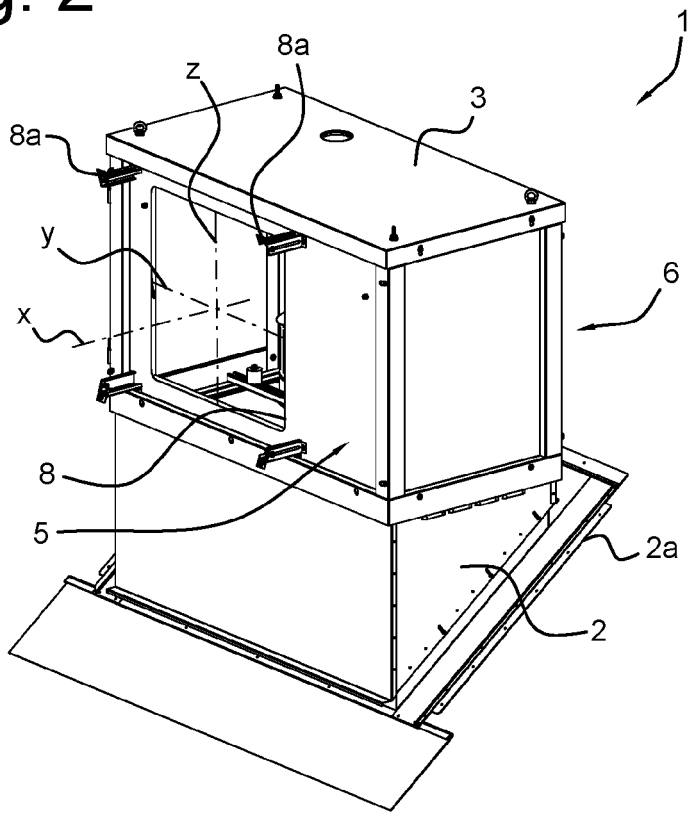


Fig. 3

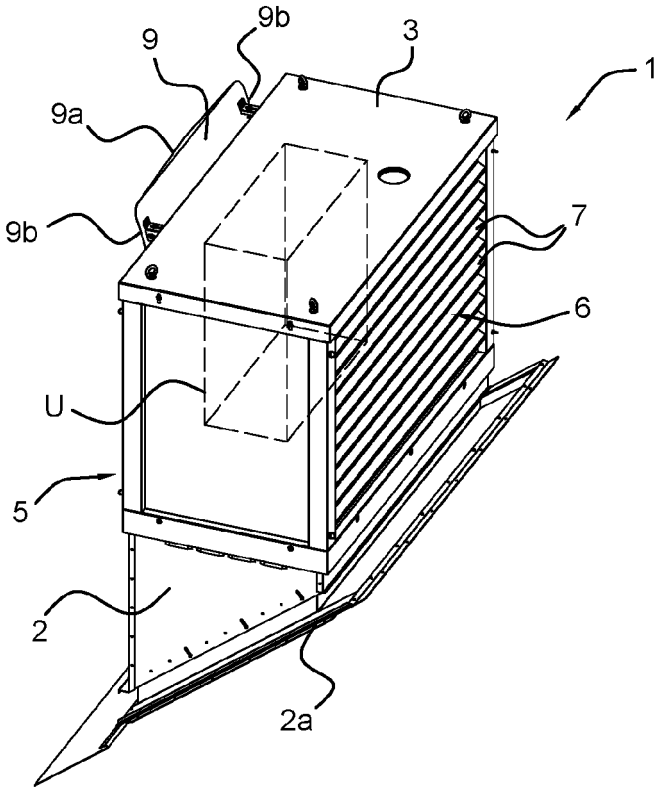


Fig. 4

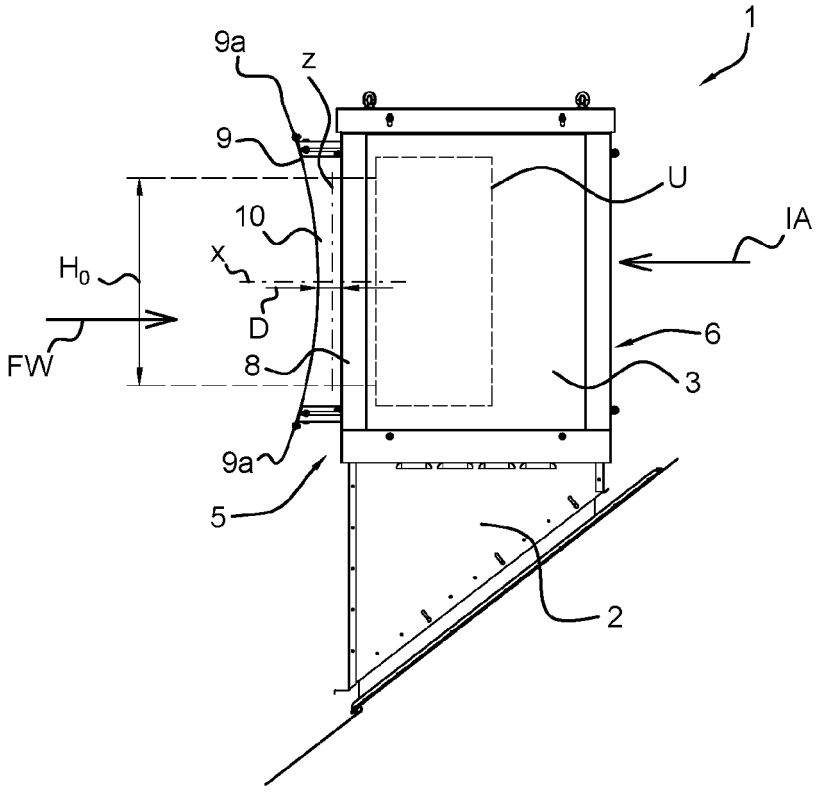
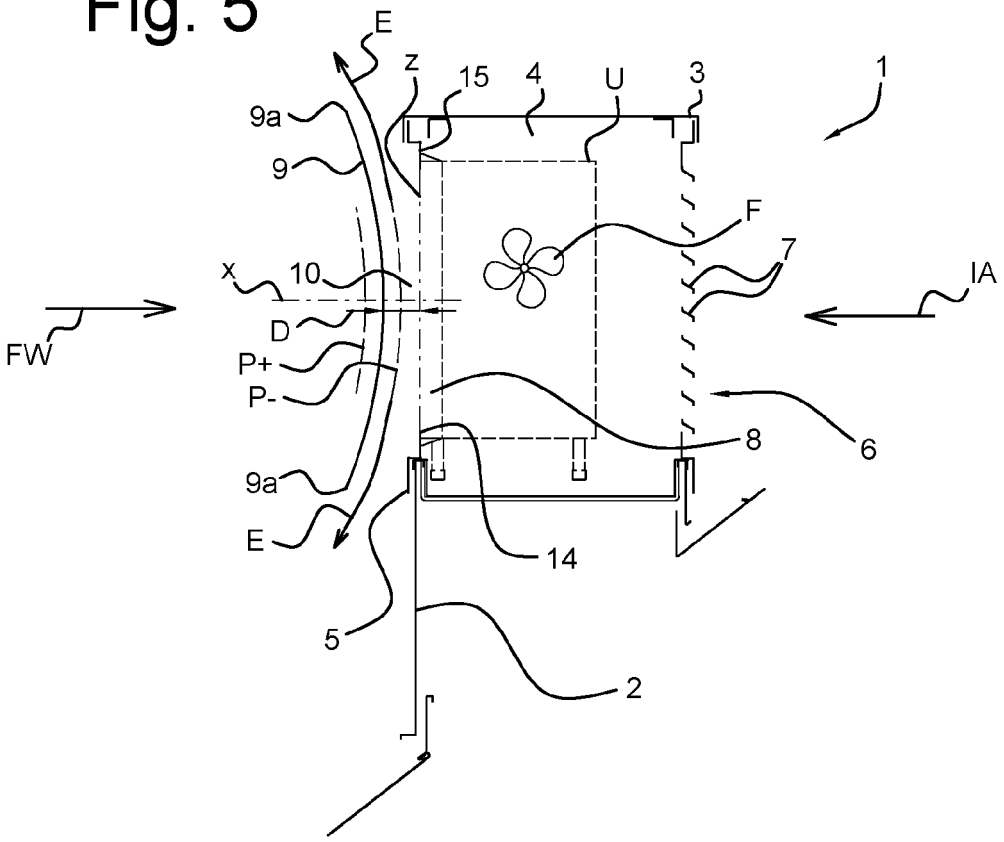


Fig. 5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4
U
3
1
9a
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10
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D
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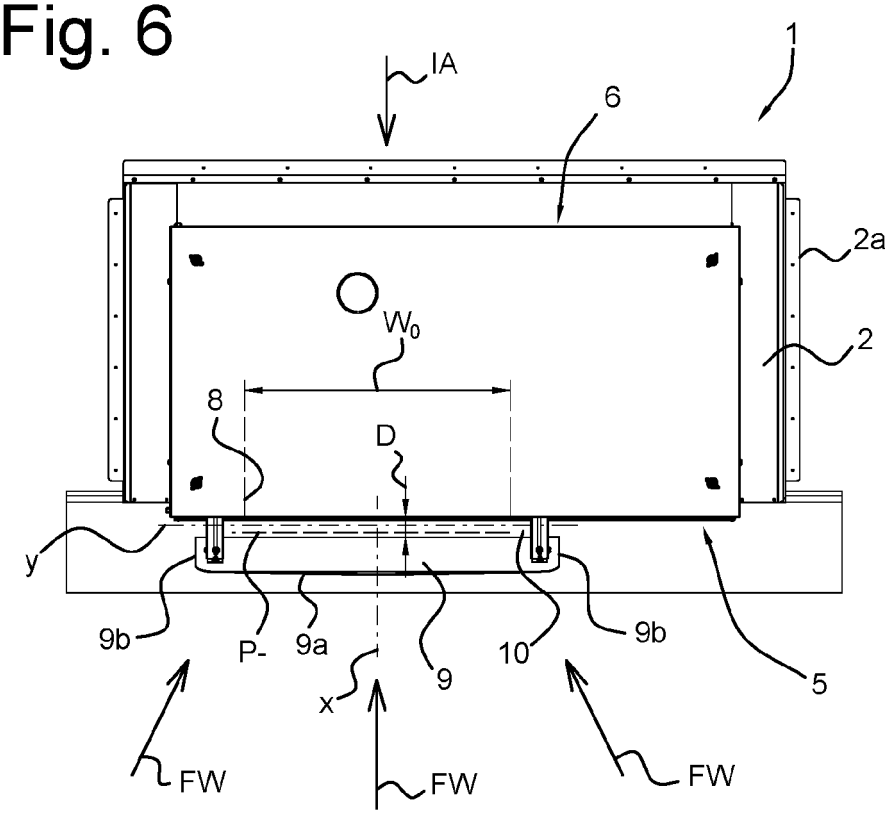
14
5
2

Fig. 6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FW
FW
FW

Fig. 7

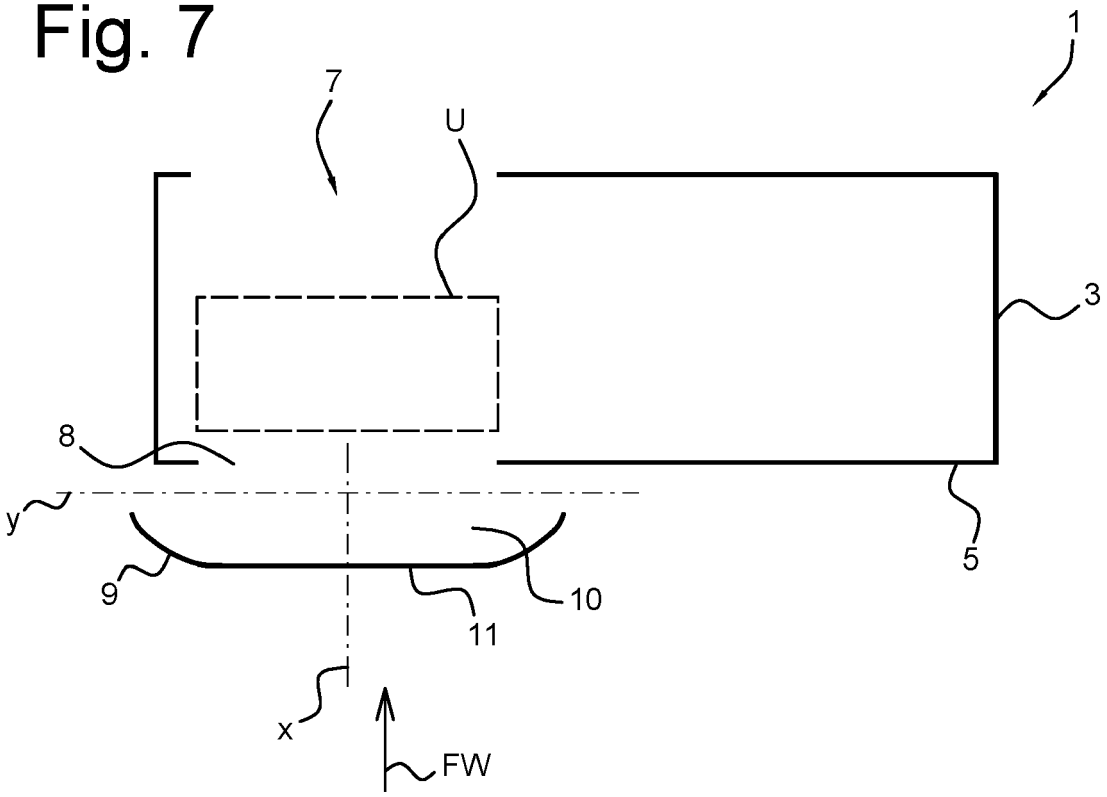


Fig. 8

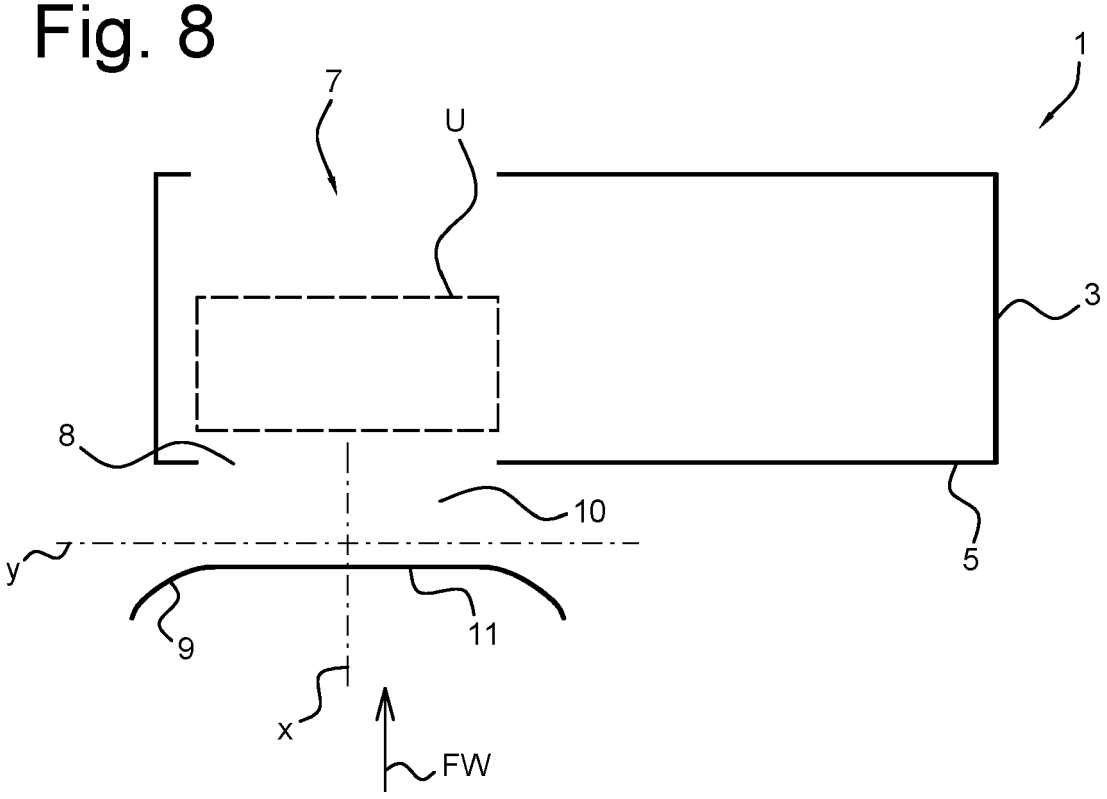


Fig. 9

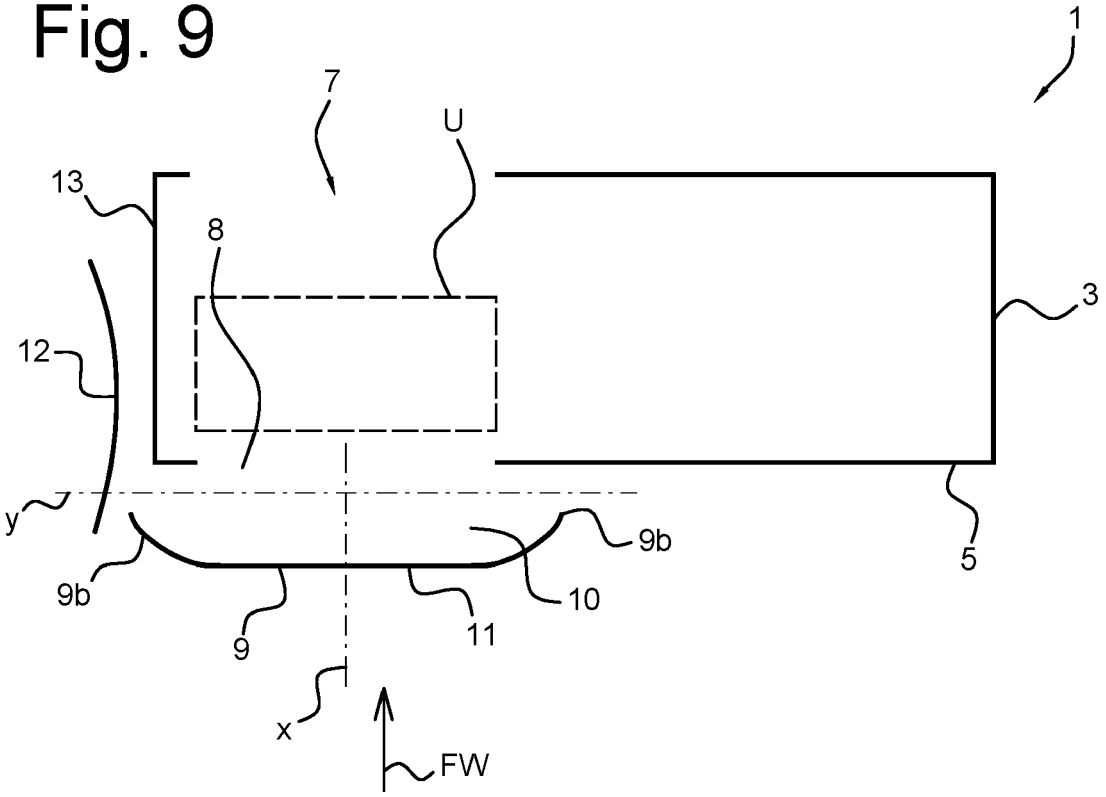


Fig. 10

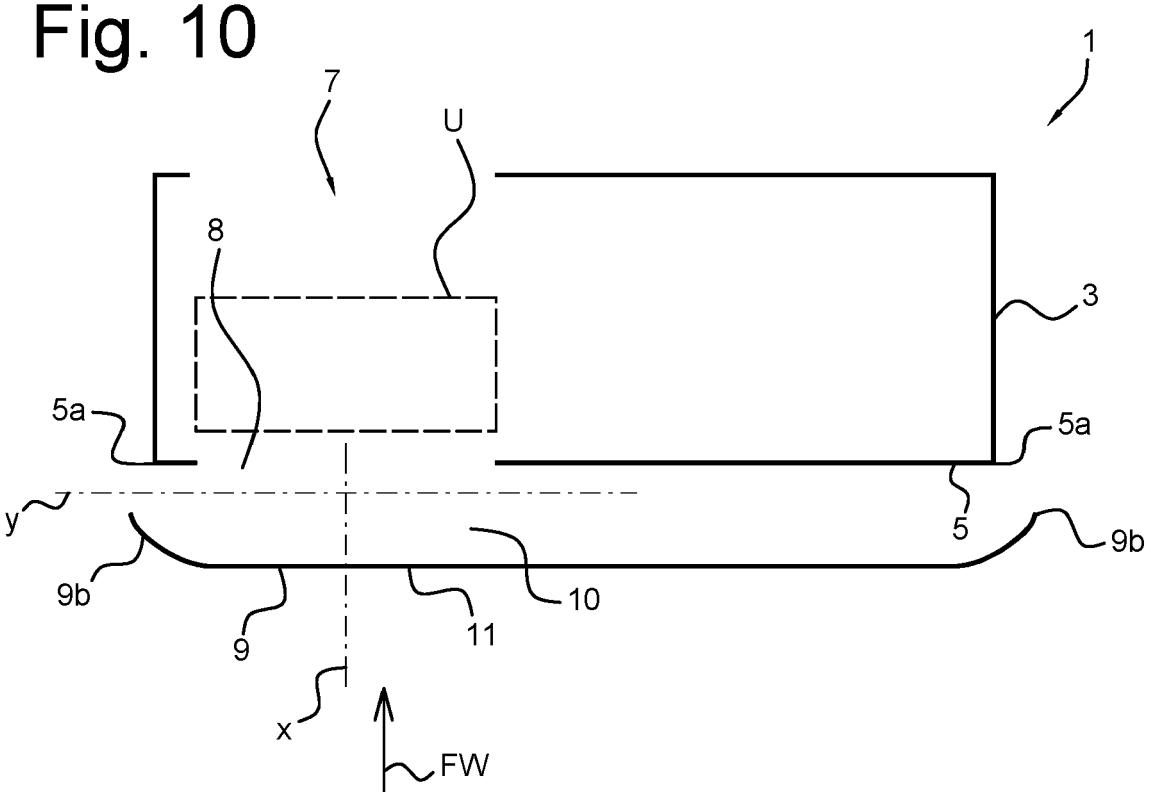


Fig. 11

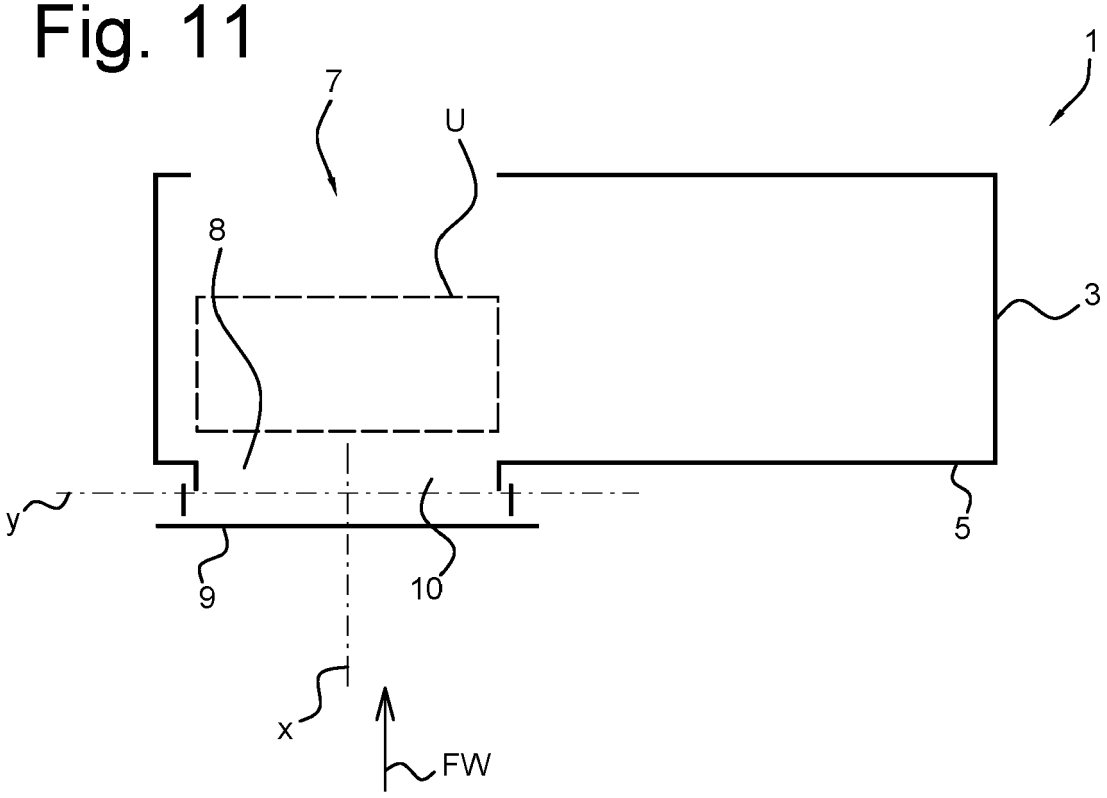


Fig. 12

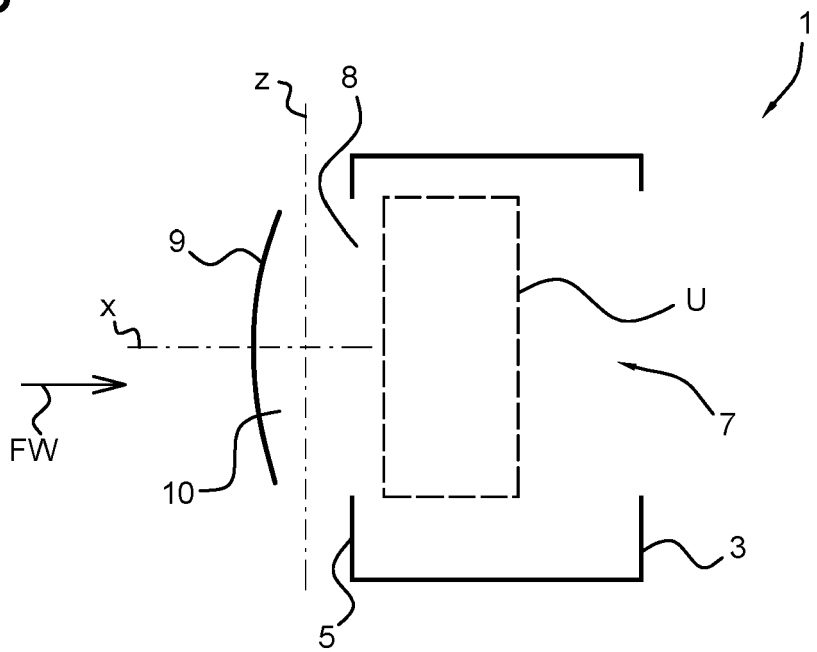
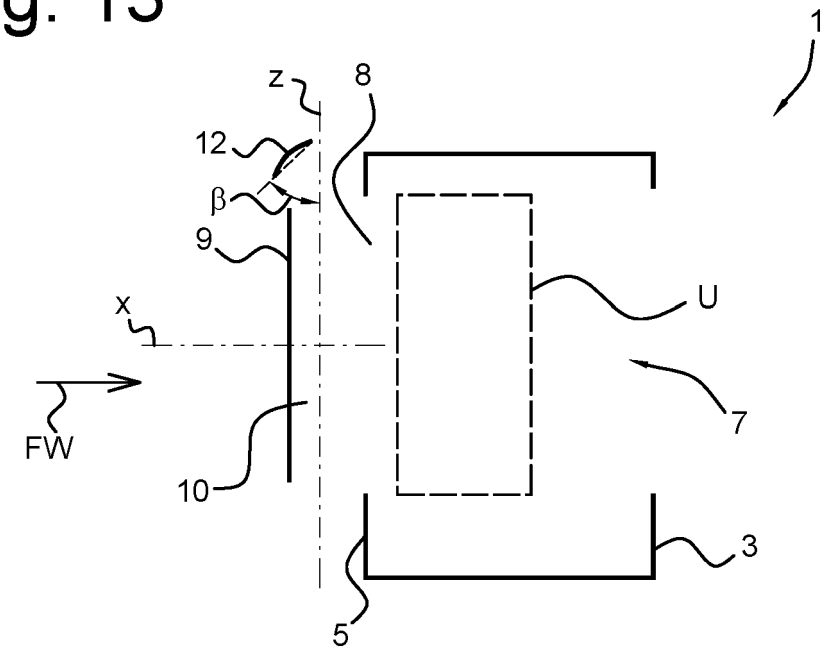


Fig. 13



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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 6483

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Place of search	Date of completion of the search	Examiner
Munich	18 April 2023	Mattias Grenbäck

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