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

(11) **EP 3 222 928 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
28.04.2021 Bulletin 2021/17

(21) Application number: **16162162.8**

(22) Date of filing: **24.03.2016**

(51) Int Cl.:
F24H 9/00 *(2006.01)* ***F24F 13/24*** *(2006.01)*
F24F 13/28 *(2006.01)* ***F24F 13/02*** *(2006.01)*
F24F 13/08 *(2006.01)* ***F24F 13/06*** *(2006.01)*

(54) **VENTILATION UNIT**

LÜFTUNGSVORRICHTUNG

DISPOSITIF DE VENTILATION

(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

(43) Date of publication of application:
27.09.2017 Bulletin 2017/39

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EP 3 222 928 B1

Description

TECHNICAL FIELD

[0001] The present invention relates to a device in a ventilation unit, comprising an air intake, a duct, and a filter, arranged after the duct as seen in a direction of an airflow from the inlet.

BACKGROUND ART

[0002] Ventilation units in connection with radiators are well known, e. g. from WO0031474A1. Air is drawn from an air intake, and is intended to pass via a radiator into a room, the device comprising a supply air filter, in order to keep dust and pollution from entering into the room with the outside air.

[0003] In order to provide an efficient ventilation and particularly easy intake of supply air in a mechanical air extraction system, without causing chilly draughts in cold seasons, it is evidently necessary to heat the incoming air.

[0004] The required heating is provided by the above-mentioned radiator, and the supply air is hence conducted into the radiator. When the supply air has been heated by the radiator, it will rise by convection, and it will mix with the rest of the air present in the room. A typical flow of air through an intake could amount to 8-10 litres per second.

[0005] The air filter will generally not give rise to a great drop in pressure in the airflow. In order to provide a large filter area for contact with the air supply, while the filter still fits into a fairly compact housing in or close to the radiator, the filter is often pleated, with a large number of valleys and ridges.

[0006] Another solution is presented in DE3632268A1, which discloses a ventilation unit arranged behind a radiator 6, which comprises a hatch 18 disposed adjacent to, but after a filter 21 seen in the flow direction of the air. The hatch has no air distribution function but a closing and opening function for the air intake.

[0007] WO2015/122832A1 discloses an air intake unit arranged for lowering the noise level from a ventilation plant. An air permeable porous material 29 (similar to a filter) is used for noise reduction. The air flowing through the air intake duct does not necessarily flow through the permeable porous material 29, given that a divider 31 is located like a lid over the greater part of the filter material 29. This solution is also arranged such as if the air should pass the filter and not pass around it, the divider 31 is more or less arranged inside a duct part of the air intake.

[0008] In JP2010249368A a filter is arranged for filtering of dust in a valve/air intake. An anvil 6 for an outer lid 4 is disposed in a hole 7a in the center of the filter 7. The anvil does not have an air distributing effect for a better use of the filter but is instead interfering the effective filter area.

[0009] In GB2464746A a construction designed for noise reduction is disclosed. Air flows through a duct 10 against a porous particulate material 12. The air is spread by means of baffles 16 before the filter. The document shows the technique for lowering speed of the air flowing through a filter, by widening the duct and by incorporating a greater filter area, and/or using air dividers for distributing air.

[0010] In DE1215527B a filter housing 11 is arranged with a protecting plate 18. The plate 18 is arranged perpendicular to the filters 30 of the filter housing and has the function of protecting the filters from direct hit from a water jet or the like.

[0011] A problem with the present ventilation units is that the air passes through only a limited part of the filter directly in front of a duct leading the air to the filter. Dust, pollen and other pollution particles will be concentrated to that part of the filter, and the filter is not used in an optimal way. In many cases the filter will have to be cleaned or exchanged more often, in order to maintain a high quality of the filtered air, than if all of the filter had been used for filtering the air.

[0012] A general concern in ventilation units is also a desire to reduce noise, both external noise, such as traffic noise, and noise arising from the units itself, e. g. from the air flow. Another concern is the desire to maintain a high sense of comfort to the inhabitants of the room, by avoiding a sense of draft from the ventilation.

PROBLEM STRUCTURE

[0013] It is hence an object of the present invention to provide a ventilation unit where the filter is utilized in a more efficient way, while the noise and draft are kept at a minimum level.

SOLUTION

[0014] The object of the invention is attained with a ventilation unit comprising the features of independent claim 1. Preferred embodiments are defined in the dependent claims.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0015] The present invention will now be described in greater detail hereinbelow, with reference to the accompanying drawings. In the accompanying drawings:

- Fig. 1 is a schematic view showing the principle of a ventilation system for a room;
- Fig. 2 is a section through the the ventilation unit with a device according to the invention;
- Fig. 3 is a front view of the filter according to the invention; and
- Fig. 4 is a sectional view of the duct and a plate included in the invention.

DESCRIPTION OF PREFERRED EMBODIMENT

[0016] In Fig. 1 a room 1 with a mechanical ventilation system is shown in principle. The ventilation system includes an exhaust fan 2, which draws air from the room 1. The exhaust fan 2 may include a device for recovery of heat, although that is not an object of the present invention.

[0017] The exhaust fan 2 reduces the air pressure inside the room 1, thus causing fresh air to enter from the outside through the air intake 3 in a wall 4. The air intake 3 may include one or more ducts 5, in various configurations, directing an air flow towards a filter 6 in a ventilation unit 7. From the filter 6, the air flow is led through a radiator, which has been omitted from the drawings, for the sake of clarity. The air will be heated in the radiator and will enter the room at a comfortable temperature.

[0018] Fig. 2 discloses the ventilation unit 7 in greater detail, with a series of interconnected ducts 5 directing the airflow towards the filter 6. The ducts 5 are embedded in an insulation material 8, e. g. mineral wool or glass wool. The insulation material 8 serves not only to reduce an undesired heat transfer through the wall 4, but it will also reduce the noise from the air flow and noise from the outside.

[0019] At the end of the series of ducts 5, there is a socket 9, to which a plate 10 is attached. The plate 10 is formed from any airtight material, which is durable and easy to clean. In a preferred embodiment, the plate 10 is made of metal, but other materials such as plastics, glass, or rubber are possible alternatives.

[0020] The plate 10 is positioned adjacent to the filter 6, either in direct contact with the filter 6 or at a short distance therefrom. In a preferred embodiment the distance between the plate 10 and the filter 6 is approximately 2.5 mm. The distance may be greater, but is limited by the internal dimensions of the ventilation unit 7.

[0021] The airflow from the duct 5 exits from the socket 9 reaches the surface of the plate 10. The airflow will then be deflected and spread out approximately radially towards the edges of the plate 10. The airflow will be directed along the surface of the filter 6, and will gradually move through the filter 6. The motion of the airflow along the filter 6 will result in that the airflow is spread out over a larger area, and the filter 6 will be better utilized. Dust, pollution, and other particles will be filtered by a larger filter area, resulting in a lower contamination per area unit of the filter 6.

[0022] Fig 3. shows a front view of the filter 6 in the ventilation unit 7. The approximate positions of the socket 9 and of the plate 10 have been indicated, although their respective positions are on the farther side of the filter 6. The diameter of the plate 10 is larger than the diameter of the socket 9 in the preferred embodiment, in order to ensure a sufficient spreading of the airflow over the filter area.

[0023] As the filter 6 is pleated in a preferred embodiment, the filter 6 will not be completely blocked by the plate 10. The plate 10 will at most only come in contact with the outer ends of the ridges of the filter 6, thereby allowing a part of the airflow to enter into the valleys between the ridges where the filter is more or less covered by the plate 10. Hence air will pass through the filter 6 even in the area behind the plate 10.

[0024] The section from the side of the socket 9 and the plate 10 in Fig. 4, shows the fastening clips 11 for fastening the plate 10 at the outer end of the socket 9. The fastening clips 11 are metal bands that are attached to one side of the plate, preferably by welding. The ends of the metal bands are crimped in order to mesh with corresponding indentations or grooves 12. The plate 10 is slightly angled in relation to the socket 9 in order to be approximately parallel with the filter 6, which is also arranged with an angle to a vertical plane. As the clips 11 are slightly resilient, the plate 10 may be removed for cleaning and then remounted again.

[0025] Apart from the better utilization of the filter 6, another advantage of the deflection of the airflow is that the speed of the filtered airflow will be lowered. Since the volume of the airflow is constant, but the filter area which is actively filtering the airflow is significantly larger than without the plate 10, the air will move into the radiator and further into the room at a lower speed than without the plate 10. The sense of a draft from the ventilation unit will be greatly reduced. Also the lower speed of the airflow through the radiator will allow for a better heating of the air. An improved heating of the air will result in a supply air temperature which will be more pleasant.

[0026] Further advantages are that the plate 10 limits the airflow in case of sudden gusts of wind into the intake. This reduces both the risk of sudden drafts in the room as well as noise from the wind. The need for a separate flow limiting equipment is hence eliminated. Also, there is a general noise reduction by up to 3 dB by the provision of the plate 10.

ALTERNATIVE EMBODIMENTS

[0027] The above described device for a ventilation unit may be varied concerning the materials used or the dimensions and proportions shown in the drawings, as long as the resulting ventilation unit is covered by the subject-matter as defined in the appended claims.

[0028] The fastening of the plate on the socket could be varied with a number of different releasable fastening means that are already known in the art.

Claims

1. Ventilation unit (7), comprising an air intake (3), a duct (5), and a filter (6), arranged after the duct (5) as seen in a direction of an airflow from the intake (3), **characterized in that** a plate (10) formed from any airtight material is arranged between the duct (5) and the filter (6) approximately transversal to the

direction of the airflow, wherein the plate (10) is attached to a socket (9) at the open end of the duct (5), allowing the airflow to pass over the surface of the plate (10) so that the airflow is deflected and spread out approximately radially towards and past its edges towards the filter (6), and that the plate (10) is larger than the cross-section of the duct (5).

2. Ventilation unit (7) according to claim 1, **characterized in that** the plate (10) is releasably attached to the socket (9).

3. Ventilation unit (7) according to any of claims 1 to 2, **characterized in that** the filter (6) is pleated.

4. Ventilation unit (7) according to claim 3, **characterized in that** the plate (10) is arranged in contact with the filter (6).

Patentansprüche

1. Lüftungseinheit (7), die einen Lufteinlass (3), einen Kanal (5) und einen Filter (6), der bei Betrachtung in der Richtung eines Luftstroms von dem Einlass (3) nach dem Kanal (5) angeordnet ist, umfasst, **dadurch gekennzeichnet, dass** eine Platte (10), die aus einem luftdichten Material gebildet ist, zwischen dem Kanal (5) und dem Filter (6) ungefähr quer zur Richtung des Luftstroms angeordnet ist, wobei die Platte (10) an einer Fassung (9) an dem offenen Ende des Kanals (5) angebracht ist, wodurch gestattet wird, dass der Luftstrom über die Fläche der Platte (10) hinweg strömt, so dass der Luftstrom abgelenkt und ungefähr radial zu und an ihren Enden vorbei zu dem Filter (6) verteilt wird, und dass die Platte (10) größer als der Querschnitt des Kanals (5) ist.

2. Lüftungseinheit (7) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Platte (10) lösbar an der Fassung (9) angebracht ist.

3. Lüftungseinheit (7) nach einem der Ansprüche 1 bis 2, **dadurch gekennzeichnet, dass** der Filter (6) gefaltet ist.

4. Lüftungseinheit (7) nach Anspruch 3, **dadurch gekennzeichnet, dass** die Platte (10) in Kontakt mit dem Filter (6) angeordnet ist.

Revendications

1. Unité de ventilation (7), comprenant une admission d'air (3), un conduit (5) et un filtre (6) disposé après le conduit (5), dans la direction d'un flux d'air provenant de l'admission (3), **caractérisée en ce qu'**une plaque (10) formée en un matériau étanche à l'air quelconque est disposée entre le conduit (5) et le filtre (6) approximativement transversalement à la direction du flux d'air, la plaque (10) étant attachée à une douille (9) au niveau de l'extrémité ouverte du conduit (5), permettant au flux d'air de passer sur la surface de la plaque (10) de telle sorte que le flux d'air soit dévié et s'étale approximativement radialement vers et au-delà de ses bords vers le filtre (6), et **en ce que** la plaque (10) est plus grande que la section transversale du conduit (5).

2. Unité de ventilation (7) selon la revendication 1, **caractérisée en ce que** la plaque (10) est attachée de manière amovible à la douille (9).

3. Unité de ventilation (7) selon l'une quelconque des revendications 1 et 2, **caractérisée en ce que** le filtre (6) est plissé.

4. Unité de ventilation (7) selon la revendication 3, **caractérisée en ce que** la plaque (10) est agencée en contact avec le filtre (6).

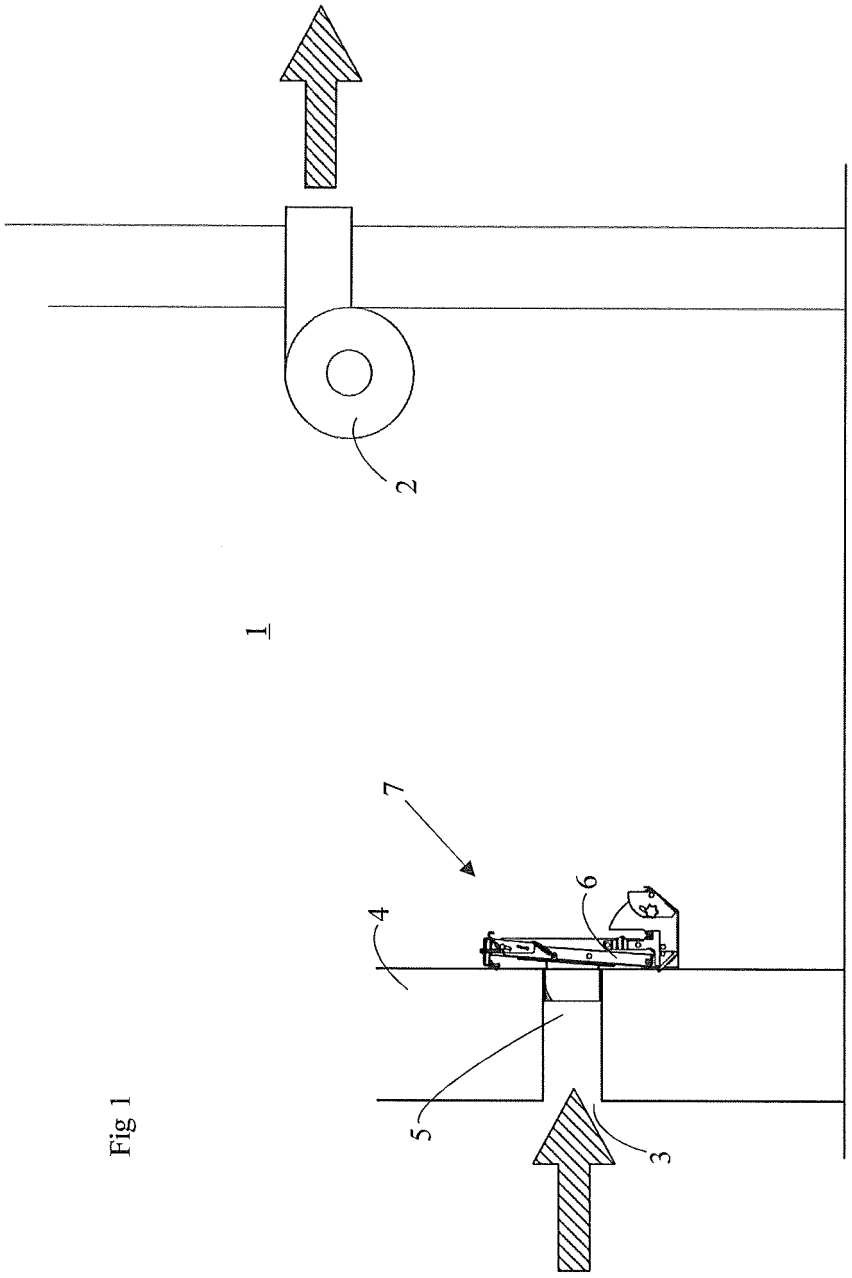


Fig 1

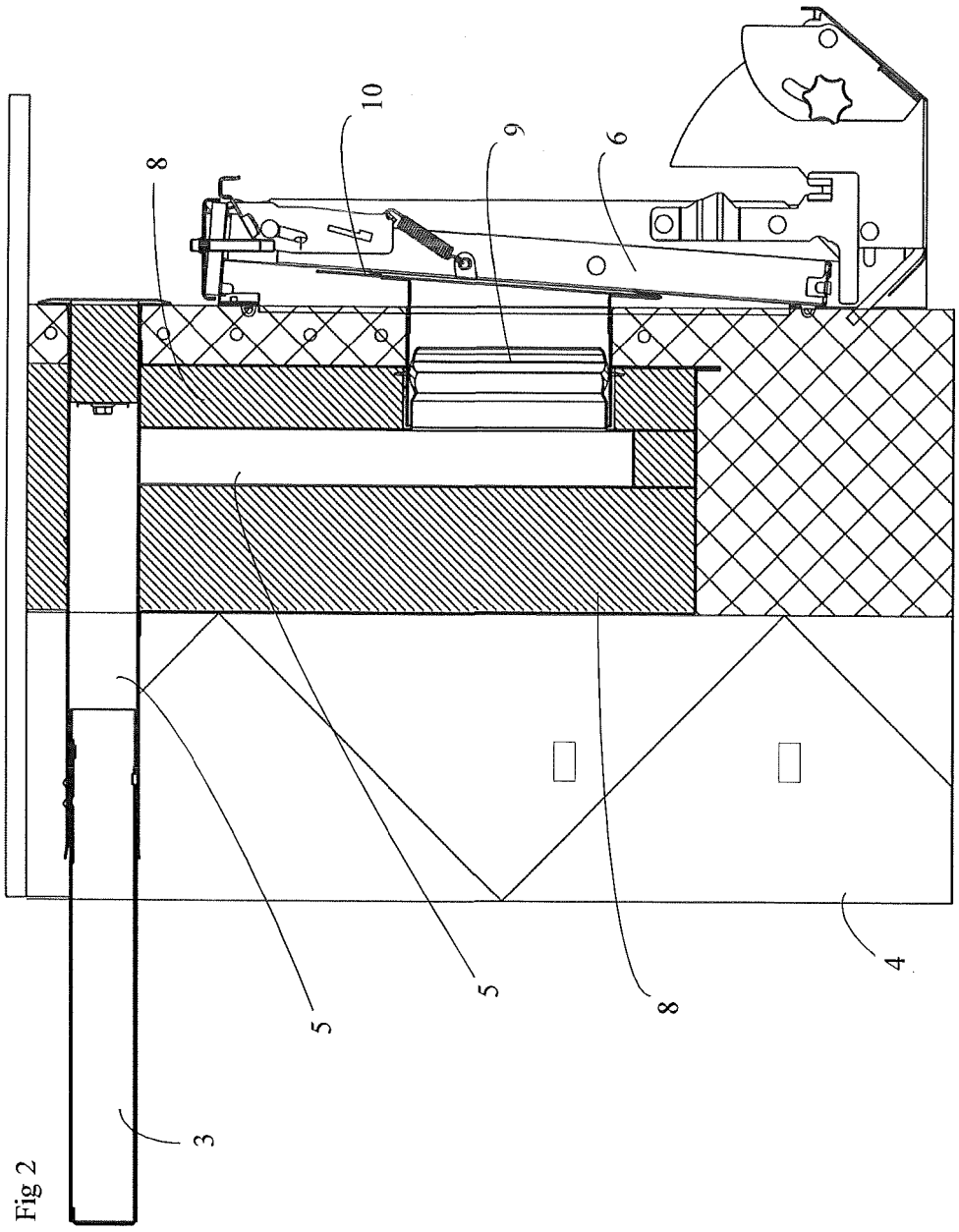


Fig 2

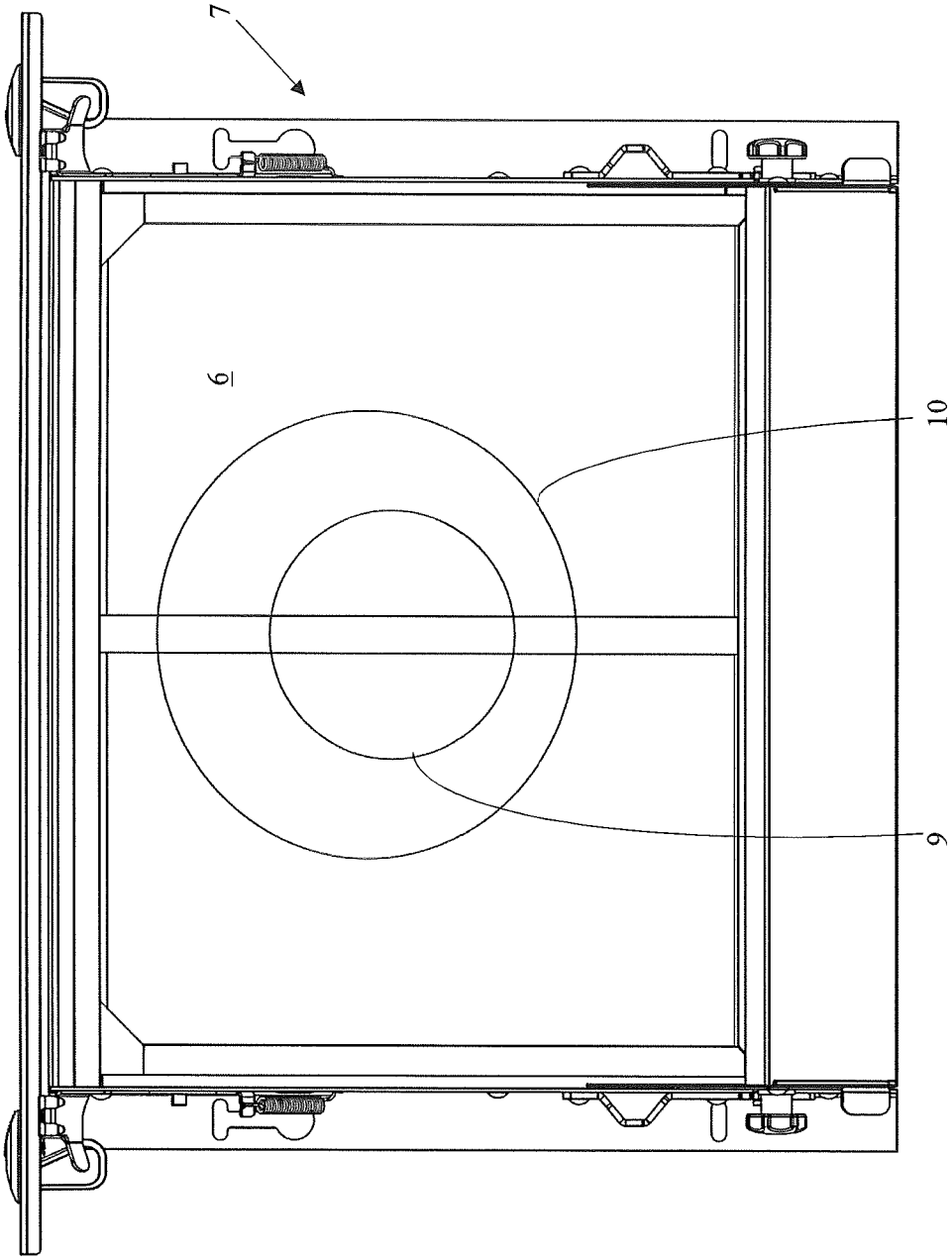
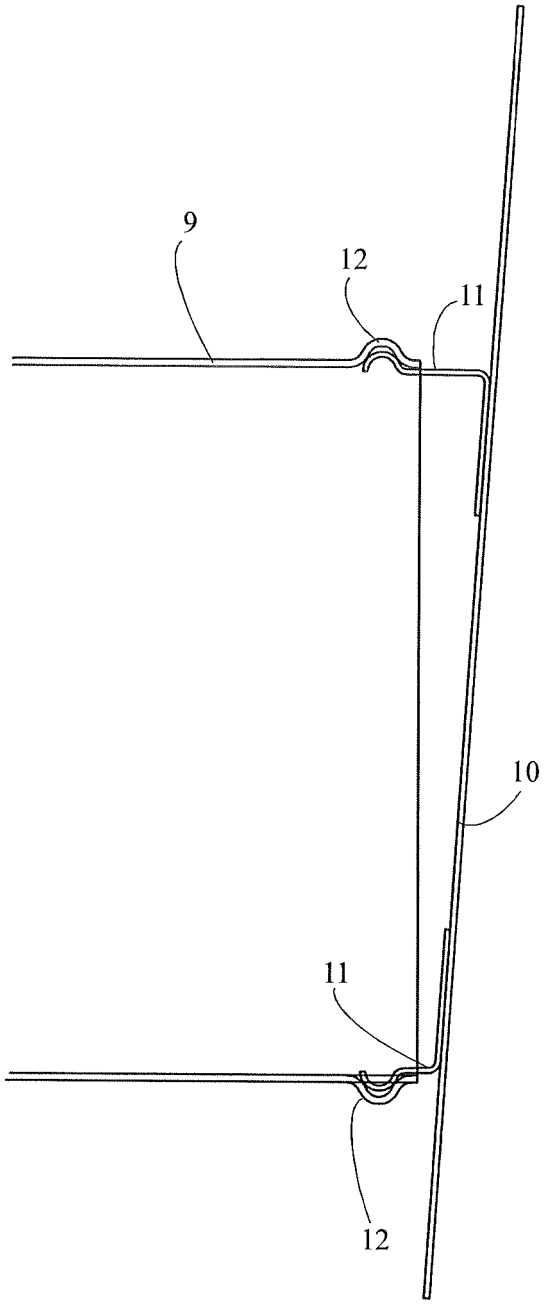


Fig 3

Fig 4



REFERENCES CITED IN THE DESCRIPTION

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