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(54) **AIR EXCHANGER DEVICE**

(57) Disclosed herein is an air exchanger device (1) for exchanging air between two rooms of a building, the air exchanger device (1) comprising: a body housing (2) defining a housing chamber (3) and which comprises an inlet wall portion (4) and an oppositely arranged outlet wall portion (5), wherein the inlet wall portion (4) defines an air inlet (6) and the outlet wall portion (5) defines an air outlet (7), wherein the air inlet (6) and the air outlet (7) are offset to each other; a fan unit (8) comprising a fan (9), the fan (9) being arranged inside the housing chamber (3), wherein the air inlet (6), the air outlet (7) and the housing chamber (3) define a bent airflow path (10) through the body housing (2) from the air inlet (6) via the fan (9) to the air outlet (7).

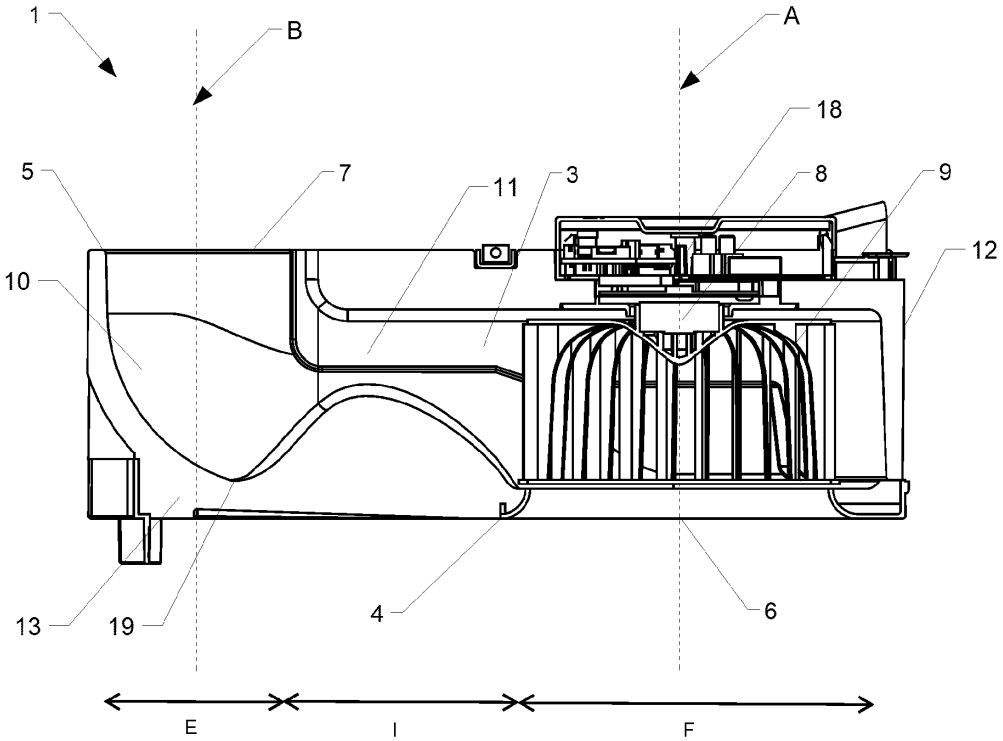

Fig. 2

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Description

Field of disclosure

[0001] The present invention lies in the field of building ventilation and relates in particular to an air exchanger device for exchanging air between two rooms of a building, the use of such an air exchanger device and a building comprising such an air exchanger device.

Background, prior art

[0002] For exchanging air between rooms of a building, for example between an office room and a better ventilated hallway, air exchanger devices may be used. These devices are inserted into a through-hole in the wall separating the two rooms from each other, thereby providing a fluid connection between the two rooms via the air exchanger device. Airflow may typically be supported by a fan being accommodated inside the air exchanger devices.

[0003] A common problem in prior art devices is however noise transmission, in particular telephonic noise. Noise generated in the hallway may readily be transmitted into the room, such as the office, being in fluidic communication with the hallway via the air exchanger device. Such noise transmission is however undesired for the habitants of a building. Furthermore, the fans of air exchanger devices are additional common noise sources. It is often observed that users at least temporarily switch off the ventilation system, respectively the air exchanger device, because they are disturbed by the fan noise. Additionally, many prior art devices require considerable space on the wall of a room, which is undesirable as it may, depending on the architectural conditions, impede or even prevent installation of such a device. Furthermore, many devices are in generally relatively large and/or comprise specific shapes which makes post-construction installation cumbersome.

Summary of disclosure

[0004] It is therefore the general object of the present invention to advance the state of the art in the field of air exchanger devices and preferably to overcome the disadvantages of the prior art fully or partly. In advantageous embodiments, an air exchanger device is provided, which requires less space in the rooms in which it is installed. In further advantageous embodiments, an air exchanger device is provided, which can be installed in a more efficient manner, in particular for post-construction, i.e. retroactive, installations. In further advantageous embodiments, an air exchanger device is provided, which prevents or at least decreases noise transmissions, in particular telephonic noise, between the rooms it may fluidic connect. In further advantageous embodiments, an air exchanger device is provided, which has no or at least significantly decreased fan noise emissions.

[0005] The general object is achieved by the subject-matter of the independent claims. Further advantageous embodiments follow from the dependent claims and the overall disclosure.

[0006] A first aspect of the invention relates to an air exchanger device, being configured for exchanging air between two rooms of a building, in particular between two directly adjacent rooms being for example separated by a wall. The air exchanger device comprises a body housing and a fan unit. The body housing defines, respectively delimits, a housing chamber. The body housing comprises two oppositely arranged wall portions, namely an inlet wall portion and an outlet wall portion. The inlet wall portion defines, respectively delimits, an air inlet and the outlet wall portion defines, respectively delimits, an air outlet. The air inlet and the air outlet are offset to each other, in particular completely offset to each other, e.g. without overlap. The fan unit comprises a fan which is arranged inside the housing chamber. Furthermore, the air inlet, the air outlet and the housing chamber, and optionally the body housing, define a bent airflow path through the body housing from the air inlet via the fan to the air outlet. A bent airflow path allows to reduce noise transmission between the rooms being fluidic connected by the air exchanger. Furthermore, arranging the air inlet and the air outlet offset to each other and at oppositely arranged wall portions of the body housing being in the mounted state completely arranged inside a building wall, allows to directly expel or draw the air to/from the room without in principle requiring additional deflection elements, in particular space-demanding deflection elements, which have to be arranged at the walls of the rooms and allows further to install the air exchanger device in a space-saving manner.

[0007] The inlet wall portion and the outlet wall portion may in some embodiments each have an outer surface, i.e. a surface facing away from the housing chamber, which may in particular essentially extend in parallel to each other.

[0008] In some embodiments, the body housing has the shape of a general cylinder, such as for example a round, particularly circular or elliptic, cylinder, a prismatic cylinder (e.g. a cuboid) or and other suitable cylinder. Particularly, the air inlet and the air outlet may be arranged at the two opposing cylinder bases. Furthermore, the inlet wall portion and the outlet wall portion may be arranged at the opposing cylinder bases.

[0009] In some embodiments, the air exchanger device only comprises a single air inlet and a single air outlet.

[0010] In some embodiments, the bent airflow path is configured such, respectively designed such that telephonic sound waves cannot pass the housing chamber directly from the air inlet to the air outlet. Thus, telephonic sound waves will be reflected at inner portions of the body housing, where they are at least partially absorbed.

[0011] In some embodiments, the body housing comprises, and particularly consists of, a sound absorbing

material. A sound absorbing material may be a sound-insulating material, such as foams, in particular polymer foams. A preferred sound absorbing material as it may be used in the invention at hand may be expanded polymer foams, particularly expanded synthetic polymer foams, such as expanded polypropylene or expanded polystyrene. Preferably at least the inner portions of the body housing, i.e. the portions facing the body housing chamber or also the complete body housing, may comprise, particularly consist of, such sound absorbing material. In certain embodiments, the polymer foam is a closed cell polymer foam.

[0012] In some embodiments, the airflow path is configured such that there is no straight line within the airflow path connecting the air inlet and the air outlet. This ensures that sound waves cannot directly pass the air exchanger device but contact parts of the body housing upon which they are at least partially absorbed.

[0013] In some embodiments, the air inlet is perpendicularly arranged to an air inlet axis which extends through the center of the air inlet. As the skilled person understands, the center of the air inlet is the position of the air inlet at which the distance to the inlet wall portion defining the air inlet is the largest in all 2-dimensional, i.e. with respect to the air inlet axis radial, directions. The air inlet and also the air outlet may in this or any other embodiment described herein be considered as planar, i.e. they lie within a two dimensional even plane, which may particularly extend in parallel to the outer surface of the inlet wall portion, respectively the outlet wall portion. In some embodiments, the air outlet is perpendicularly arranged to an air outlet axis, which extends through the center of the air outlet. As the skilled person understands, the center of the air outlet is the position of the air outlet at which the distance to the inlet wall portion defining the air inlet is the largest in all 2-dimensional, i.e. with respect to the air outlet axis radial, directions.

[0014] Preferably, the air inlet axis and the air outlet axis are offset to each other and/or parallel to each other.

[0015] In some embodiments, the fan unit further comprises a drive unit, such as a motor. In some embodiments, the fan unit may also comprise a control unit, such as a circuit or a microprocessor, being configured for controlling the drive unit.

[0016] In some embodiments, the fan is directly arranged adjacent to the air inlet. Airflow entering the housing chamber via the air inlet may therefore be directly exposed to the fan.

[0017] In some embodiments, the bent airflow path comprises a constriction. The constriction may be arranged between the air inlet and the air outlet. Particularly, the constriction may be arranged between the fan and the air outlet. The cross-sectional area of the bent airflow path reaches at the constriction its minimum, particularly its global minimum. Such a constriction prevents that sound waves, in particular telephonic sound waves, can pass through the bent airflow path without being reflected, respectively contacted, by the body housing, in particular the inner portions of the body housing, and therefore reduces noise transmission through the air exchanger device. In certain embodiments, the bent airflow path has at the constriction a cross-sectional area which is smaller than the cross sectional area at any other position of the bent airflow path.

[0018] In some embodiments, the bent airflow path has at the constriction a total surface area of 20 cm^2 to 100 cm^2, in particular 25 cm^2 to 50 cm^2, in particular 35 cm^2 to 50 cm^2.

[0019] In some embodiments, the cross-sectional area of the bent airflow path upstream and downstream of the constriction is larger than at the constriction.

[0020] In some embodiments, the cross-sectional area of the bent airflow path at the constriction is at least 20%, in particular at least 35%, in particular at least 40%, in particular at least 45% smaller than the open area of the air outlet. Preferably, the cross-sectional area of the bent airflow path at the constriction is 20% to 80%, in particular 35% to 70%, smaller than the open area of the air outlet.

[0021] In some embodiments, the cross-sectional area of the bent airflow path at the constriction is at least 20%, in particular at least 35%, in particular at least 40%, in particular at least 45% smaller than the open area of the air inlet. Preferably, the cross-sectional area of the bent airflow path at the constriction is 20% to 80%, in particular 35% to 70%, smaller than the open area of the air inlet.

[0022] In some embodiments, the height of the air exchanger device, which may be the distance of the two even planes in which the air inlet and the air outlet are arranged, is between 5 cm to 50 cm, in particular 5 cm to 30 cm.

[0023] In some embodiments, the offset, e.g. the minimum offset between the air inlet and the air outlet is between 5 cm and 15 cm, in particular between 5 cm and 10 cm. The offset is the lateral smallest distance between the air inlet and the air outlet, respectively their rims. The lateral distance is typically perpendicular to the height.

[0024] In some embodiments, the body housing, in particular an inner portion of the body housing, has in cross-section, in particular in cross-section through the air inlet and the air outlet, a wave shape, such as a sinusoidal wave shape, or a S-shape. This wave shape or S-shape may at least partially form the constriction. In certain embodiments, the body housing has only a single portion with such shapes, i.e. only a single wave shape, such as a sinusoidal wave shape, or a S shape. Such shapes avoid edges which evoke noise emissions.

[0025] In some embodiments, the body housing, in particular a bottom base part of the body housing, comprises a bell-shape curved cross-section forming the constriction.

[0026] In some embodiments, the fan is a radial fan. A radial fan may typically comprise a cylindrical main body with radially arranged fan blades. Furthermore, the radial fan may have a fan inlet which faces the air inlet of the air exchanger device. The fan blades may particularly be circumferentially arranged around the fan inlet. The radial

fan may particularly be configured such that air can be drawn through the air inlet of the inlet wall portion into, particularly directly into, the fan and then be radially expelled from the fan, particularly towards the constriction.

[0027] In some embodiments, the fan comprises a fan chamber being delimited by the fan blades and the fan inlet. The fan blades are circumferentially arranged around the fan chamber. In the operating mode, the fan blades rotate, in particularly around the fan chamber, thereby air is drawn through the air inlet of the inlet wall portion via the fan inlet into the fan chamber. From there, the air is then expelled radially, in particular through the gaps between individual fan blades. Then, the expelled air is transported to the constriction and from there to the air outlet through which it exits the air exchanger device.

[0028] In typical embodiments, the fan may not be separately encased within the housing chamber.

[0029] In some embodiments, the radial fan comprises a rotational axis. For example, the rotational axis of the fan may be coaxial or identical with the air inlet axis. The rotational axis of the fan may in some embodiments be essentially perpendicular to the air inlet and extend through the center of the air inlet. A rotational axis of the fan being coaxial or identical to the air inlet axis allows to reduce the space required for the air exchanger device and thus allows to decrease the space required for the air exchanger device. Furthermore, the air stream through the exchanger device does not need to be bent when entering the fan from the inlet which reduces noise emissions.

[0030] In some embodiments, the bent airflow path comprises an intermediate section and an exhaust section. The exhaust section may preferably be adjacent to the intermediate section. Therefore, the intermediate section may merge into the exhaust section. The intermediate section is arranged upstream of the fan and downstream of the exhaust section. That is, the intermediate section is arranged between the fan and the exhaust section. In preferred embodiments, the constriction is part of the intermediate section. It is understood that the terms "upstream" and "downstream" refer to the airflow direction in the operative state through the bent airflow path from the air inlet to the air outlet. Such embodiments have the advantage that air can directly and efficiently enter the fan from the air inlet and the noise reduction occurs after the fan via the constriction. Thus, also noise emissions caused by the fan operation can be decreased.

[0031] In some embodiments, the bent airflow path further comprises a fan section. The fan is typically arranged in the fan section. Thus, the intermediate section is arranged upstream of the fan section and downstream of the exhaust section, i.e. between the fan section and the exhaust section. In certain embodiments, the bent airflow path consists of these three sections.

[0032] In some embodiments, the volume of the intermediate section is smaller than the volume of the exhaust section and/or the volume of the fan section.

[0033] In some embodiments, the intermediate section extends at least partially radially away from the fan, respectively the fan section, towards the exhaust section. Therefore, the intermediate section is configured such that air flows in the intermediate section transverse, in particular at least partially perpendicular, to the air inlet axis and/or the rotational axis of the fan. Typically, the cross-sectional open area defined by the constriction lies in a plane being in parallel to the air inlet axis and/or the air outlet axis and/or the rotational axis of the fan.

[0034] In some embodiments, the exhaust section of the bent airflow path is dome shaped, and/or the exhaust section has a cross-section equal to a cross-section of a dome. As the skilled person understands, a dome is a shape with base surface, which may be round, in particular circular, and from which the dome mantle tapers to the pole of the dome. The mantle may in particular be at least partially curved, e.g. concavely or convexly curved. Such an exhaust portion further reduces the noise transmission, because sound waves contact the dome shaped surfaces and are thereby absorbed. In some embodiments, the exhaust section may also be cone shaped.

[0035] In preferred embodiments, the intermediate portion merges into the exhaust section at a position between the dome pole, respectively the cone pole, and the air outlet. The air outlet may in this or any other embodiment be arranged adjacent the base surface of the dome or cone shaped exhaust portion and/or may be aligned with the base surface of the dome or cone shaped exhaust portion. Preferably, the intermediate portion may therefore merge with the dome or cone shaped exhaust portion at the dome mantle. In these embodiments, sound waves being expelled from the intermediate portion into the exhaust portion are at least partially guided towards the dome or cone pole, where they are adsorbed and reflected before they are guided towards the air outlet. This therefore further reduces noise transmission.

[0036] In some embodiments, the body housing consists of two base parts, namely a top base part and a bottom base part. The two base parts may particularly be two injection-molded parts. Particularly, the two base parts may be connected with each other, in particular at least partially along the airflow path.

[0037] In some embodiments, the air exchanger device further comprises a casing, in particular a metal casing, which encases the body housing. Preferably, the casing may be tubular. Thus, the casing may circumferentially surround the body housing along its periphery. In preferred embodiments, the air inlet and the air outlet are however not covered by the casing. In some embodiments the casing may have an essentially cylindrical shape, in particular a shape of a general cylinder, such as a rounded cylinder, particularly a circular or elliptic cylinder, or a prismatic cylinder (e.g. a cuboid).

[0038] In some embodiments, the body housing, in particular the two base parts of the body housing, are directly injection molded into the casing. Thus, the body housing, respectively the two base parts form a material bonding

connection with the casing. Such embodiments provide for a fluid tight sealing connection of the body housing with the casing.

[0039] In some embodiments, the air exchanger device comprises two mounting plates. Such mounting plates may be connected to the body housing, in particular at the inlet wall portion and the outlet wall portion. The mounting plates are configured such that in the mounted, i.e. installed, state, the mounting plates protrude into the two rooms between which air is exchanged and preferably such that the mounting plates rest against the wall separating the two rooms. In certain embodiments, the mounting plates laterally protrude from the casing. The mounting plates may typically define an opening corresponding to the size of the body housing, in particular the two cylinder bases if the body housing has a cylinder shape. The openings may for example be configured such that at least the air inlet and the air outlet are not covered by the mounting plates, i.e. that they are accessible. The mounting plates may have a thickness of less than 2 cm, in particular less than 1 cm, in particular less than 0.5 cm, in particular less than 0.2 cm.

[0040] In certain embodiments, a slotted and/or perforated cover grill may be arranged in front of each of the mounting plates. The slotted and/or perforated cover grill may have a thickness of less than 2 cm, in particular less than 1 cm, in particular less than 0.5 cm, in particular less than 0.2 cm.

[0041] A second aspect of the invention relates to the use of an air exchanger device according to any of the embodiments as described herein, in particular with respect to the first aspect of the invention. Preferably, the air exchanger device may be used for exchanging air between two directly adjacent rooms, which may particularly be separated by a building wall. In certain embodiments, the air exchanger device may be used such that it does not protrude from the building wall or only protrude from the building wall into the room by at most 2 cm, in particular at most 1 cm, in particular at most 0.5 cm. Preferably, the air inlet axis and the air outlet axis extend essentially perpendicularly from the building wall. The air inlet and the air outlet may also each be covered by a perforated and/or slotted cover grill.

[0042] A third aspect of the invention relates to a building comprising a building wall separating two rooms from each other, which defines a wall opening penetrating the wall and fluidic connection the two rooms. The building further comprises an air exchanger device according to any of the embodiments as described herein, in particular with respect to the first aspect of the invention which is inserted into the wall opening. In certain embodiments, the air exchanger device may not protrude from the building wall or only protrude from the building wall into the corresponding rooms by at most 2 cm, in particular at most 1 cm, in particular at most 0.5 cm. Preferably the air inlet axis and the air outlet axis extend essentially perpendicularly from the building wall. The building may further comprise two perforated and/or slotted cover grills which cover the air inlet and the air outlet of the air exchanger device.

Brief description of the figures

[0043] The herein described invention will be more fully understood from the detailed description given herein below and the accompanying drawings which should not be considered limiting to the invention described in the appended claims. The drawings are showing:

Fig. 1 an exploded view of an air exchanger device according to an embodiment of the invention;

Fig. 2 a sectional view of an air exchanger device according to another embodiment of the invention;

Fig. 3 an exploded view of an air exchanger device according to another embodiment of the invention;

Fig. 4 a perspective view of an air exchanger device according to another embodiment of the invention.

Exemplary embodiments

[0044] Fig. 1 shows an exploded view of air exchanger device 1, which comprises body housing 2 and a fan unit (not referenced, see Fig. 2). Body housing 2 defines a housing chamber (not referenced, see Fig. 2), and further comprises inlet wall portion 4 which defines, respectively delimits air inlet 6. It can be seen that fan 9 is arranged directly adjacent to air inlet 6. Air exchanger device 1 further comprises cylindrical and tubular casing 14, which circumferentially surrounds body housing 2. Body housing 2 is further arranged between the two mounting plates 17 and 18, which laterally protrude from casing 14 and thus have a larger width than casing 14. At both end portions, the air exchanger device further comprises two perforated cover grills 16 and 17. In the mounted state, casing 14 and body housing 2 are arranged inside the wall separating the two rooms between which air is exchanged by the air exchanger device, while mounting plate 17 and perforated cover grill 15 protrude into one of the rooms and mounting plate 18 and perforated grill 16 protrude into the other of the rooms.

[0045] Fig. 2 shows a sectional view of air exchanger device 1 according to another embodiment of the invention. Air exchanger device 1 comprises body housing 2 which consists of two base parts 12 and 13. Body housing 2 comprises inlet wall portion 4 and outlet wall portion 5 which is oppositely arranged of inlet wall portion 4. Inlet wall portion 4 defines air inlet 6 and outlet wall portion 5 defines air outlet 7. As can be seen in the sectional view, air outlet 7 and air inlet 6 are offset to each other. In particular, inlet axis A extending through the center of air inlet 6 and being arranged perpendicular to air inlet 6

extends in parallel and is offset to outlet axis B extending through the center of air outlet 7 and being arranged perpendicular to air outlet 7. The height of the air inlet device is defined as the extension along any of axes A or B. Air exchanger device 1 further comprises fan unit 8 which comprises fan 9, being a radial fan rotating around rotational axis A, and drive unit 18. Body housing 2 defines housing chamber 3 in which fan 9 is arranged. The air inlet 6, air outlet 7 and housing chamber 3 are configured such that they define bent airflow path 10 extending through the body housing 2 from air inlet 6 via fan 9 to air outlet 7. When a telephonic sound wave enters air exchanger device 1 via air inlet 6, there is no straight line within the airflow path connecting the air inlet 6 and the air outlet 7. Bent airflow path 10 further comprises constriction 11. As can be seen, the cross-sectional area at the constriction is smaller than the cross sectional area at any other position of the airflow path 10. This further increases sound wave absorption and thus reduces noise transmission. The cross-sectional area of the constriction, is parallel to inlet axis A and also to outlet axis B. Additionally, body housing 2, in particular bottom base part 13, comprises in the shown cross-section a sinusoidal wave shape, respectively a S shape, thereby forming the constriction. In this or any other embodiment as described herein, top base part 12 may be devoid of such a wave shape. The bulge which forms the constriction is part of bottom base portion 13. Bottom base portion 13 may comprise a bell shaped curved cross-section which forms constriction 11.

[0046] Bent airflow path 10 essentially consists of three different sections, namely exhaust section E, intermediate section I and fan section F. As can be seen intermediate section I is arranged between exhaust section E and fan section F, i.e. downstream of exhaust section E and upstream of fan section F. These sections are adjacent to each other and merge into each other. Constriction 11 of airflow path 10 is arranged in intermediate section I and fan 9 is arranged in fan section F. Intermediate section I may in this or any other embodiment described herein at least partially extend radially away from radial fan 9 towards exhaust section E. It merges into exhaust section E directly downstream of constriction 11. Exhaust section E is configured as a diffusor. This has the advantage that the velocity of the airflow drops in exhaust section E, which avoids that high velocity air flows are expelled from air outlet 7 and particular that these high velocity air flows are guided onto a perforated cover grill 16 (see Fig. 1), which prevents noise emissions. Exhaust section E has in the shown cross-section essentially a dome shape. Intermediate section I of airflow path 10 merges into exhaust section E at the dome mantle, i.e. between air outlet 7 and dome pole 19. This allows that sound waves may at least partially be guided, for example by top base part 12, from intermediate portion I towards dome pole 19 before they exit air exchanger device 1 via air outlet 7. Thereby, the sound waves are at least partially absorbed and noise emissions are reduced. This is particularly true for embodiments in which at least the inner portions of the body housing are made of sound adsorbing material, such as a polymer foam.

[0047] Fig. 3 shows an exploded view of air exchanger device 1 according to another embodiment of the invention. In this view it can be seen that the body housing consists of two base parts, namely top base part 12 and bottom base part 13. Body base part 13 further forms in this or optionally in any other embodiment described herein, a bulge 20, which forms constriction 11 (see Fig. 2).

[0048] Fig. 4 shows a perspective view on an air exchanger device 1 according to another embodiment of the invention. It can be seen that cylindrical and tubular casing 14 surrounds, respectively encases, body housing 2 (see Fig. 1), while the air inlet and air outlet 7 are not surrounded, but accessible. Furthermore, it can be seen that the mounting plates 17 and 18 have a larger width than casing 14 and thus laterally protrude therefrom.

List of designations

[0049]

1	air exchanger device
2	body housing
3	housing chamber
4	inlet wall portion
5	outlet wall portion
6	air inlet
7	air outlet
8	fan unit
9	fan
10	airflow path
11	constriction
12	top base part
13	bottom base part
14	casing
15, 16	perforated cover grill
17, 18	mounting plates
19	dome pole
20	bulge

Claims

1. Air exchanger device (1) for exchanging air between two rooms of a building, the air exchanger device (1) comprising:

a. a body housing (2) defining a housing chamber (3) and which comprises an inlet wall portion (4) and an oppositely arranged outlet wall portion (5), wherein the inlet wall portion (4) defines an air inlet (6) and the outlet wall portion (5) defines an air outlet (7), wherein the air inlet (6) and the air outlet (7) are offset to each other;

b. a fan unit (8) comprising a fan (9), the fan (9) being arranged inside the housing chamber (3);

wherein the air inlet (6), the air outlet (7) and the housing chamber (3) define a bent airflow path (10) through the body housing (2) from the air inlet (6) via the fan (9) to the air outlet (7).

2. The air exchanger device (1) according to claim 1, wherein the bent airflow path (10) is configured such that telephonic sound waves cannot pass the housing chamber (3) directly from the air inlet (6) to the air outlet (7).

3. The air exchanger device (1) according to claim 1 or 2, wherein the body housing (2) comprises a sound absorbing material, in particular an expanded polymer foam, preferably a closed cell expanded polymer foam.

4. The air exchanger device (1) according to any of the previous claims, wherein the airflow path (10) is configured such that there is no straight line within the airflow path connecting the air inlet (6) and the air outlet (7).

5. The air exchanger device (1) according to any of the previous claims, wherein the air inlet (6) is perpendicularly arranged to an air inlet axis (A) extending through a center of the air inlet (6) and the air outlet (7) is perpendicularly arranged to an air outlet axis (B) extending through a center of the air outlet (7), wherein the air inlet axis (A) and the air outlet axis (B) are parallel and offset to each other.

6. The air exchanger device (1) according to any of the previous claims, wherein the bent airflow path (10) comprises a constriction (11) being arranged between the air inlet (6) and the air outlet (7), in particular between the fan (9) and the air outlet (7), wherein the cross-sectional area of the bent airflow path reaches at the constriction (11) its minimum, wherein preferably the cross-sectional area of the bent airflow path (10) upstream and downstream of the constriction (11) is larger than at the constriction (11).

7. The air exchanger device (1) according to claim 6, wherein the cross-sectional area of the bent airflow (10) path at the constriction at least 20%, in particular at least 35%, in particular at least 40%, in particular at least 45% smaller, than the open area of the air outlet (7); and/or wherein the cross-sectional area of the bent airflow path (10) at the constriction is at least 20%, in particular at least 35%, in particular at least 40%, in particular at least 45% smaller than the open area of the air inlet (6).

8. The air exchanger device (1) according to claim 6 or 7, wherein the body housing (2) comprises in cross-section a sinusoidal wave shape or a S-shape which forms the constriction (11).

9. The air exchanger device (1) according to any of claims 6 to 8, wherein the body housing, in particular a bottom base part (13) of the body housing (2), comprises a bell-shape curved cross-section forming the constriction (11).

10. The air exchanger device (1) according to any of the previous claims, wherein the fan (9) is a radial fan, wherein preferably the radial fan comprises a rotational axis which is coaxial to the air inlet axis (A).

11. The air exchanger device (1) according to any of the previous claims, wherein the bent airflow path (10) comprises an intermediate section and an exhaust section, wherein the intermediate section is arranged upstream of the fan and downstream of the exhaust section, wherein preferably the constriction (11) is part of the intermediate section, wherein preferably the intermediate section extends radially away from the radial fan towards the exhaust section.

12. The air exchanger device (1) according to claim 11, wherein the exhaust section is configured as a diffusor.

13. The air exchanger device (1) according to claim 11 or 12, wherein the exhaust section of the bent airflow path (10) is dome shaped, wherein preferably the intermediate portion merges into the exhaust section at a position between the dome pole and the air outlet (7).

14. The air exchanger device (1) according to any of the previous claims, wherein the body housing (2) consists of two base parts (12, 13), in particular two injection-molded parts.

15. The air exchanger device (1) according to any of the previous claims, further comprising a casing (14), in particular a metal casing, which encases the body housing (2), wherein preferably the body housing (2) is injection molded into the casing (14).

16. Use of an air exchanger device (1) according to any of the previous claims, in particular for exchanging air between two directly adjacent rooms through a building wall separating the rooms.

17. Building comprising a building wall separating two rooms from each other, wherein the building wall defines a wall opening penetrating the wall, the building further comprising an air exchanger device (1) according to any of claims 1 to 15, which is inserted through the wall opening.

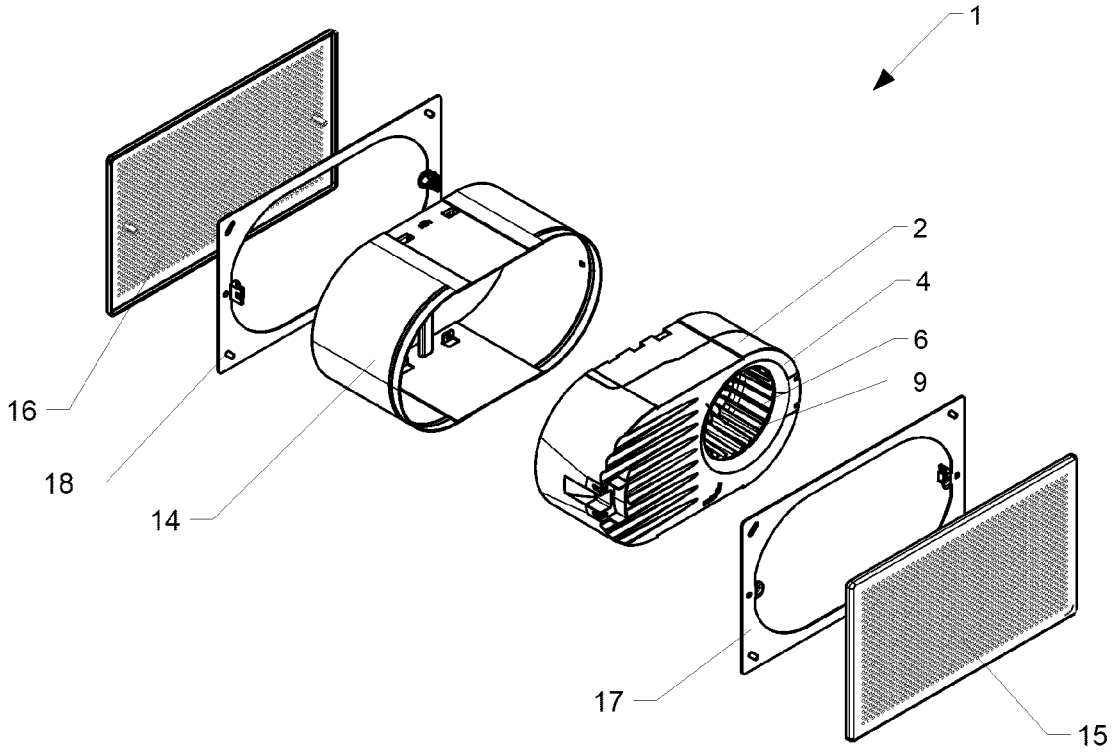

Fig. 1

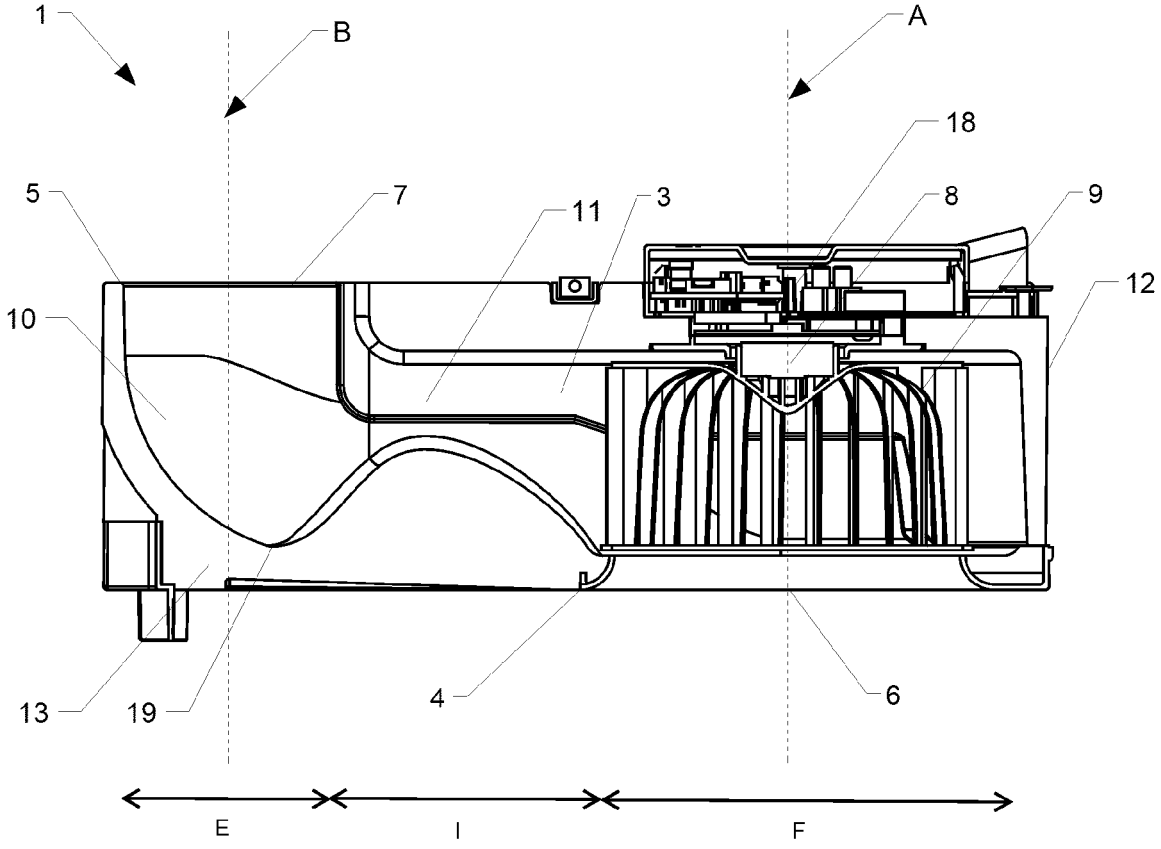

Fig. 2

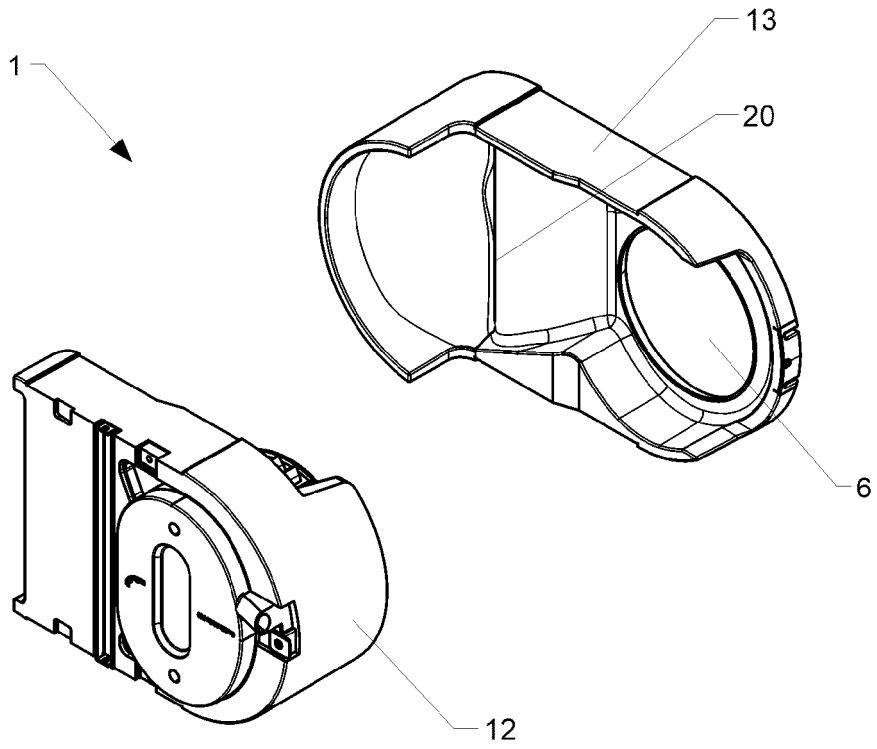

Fig. 3

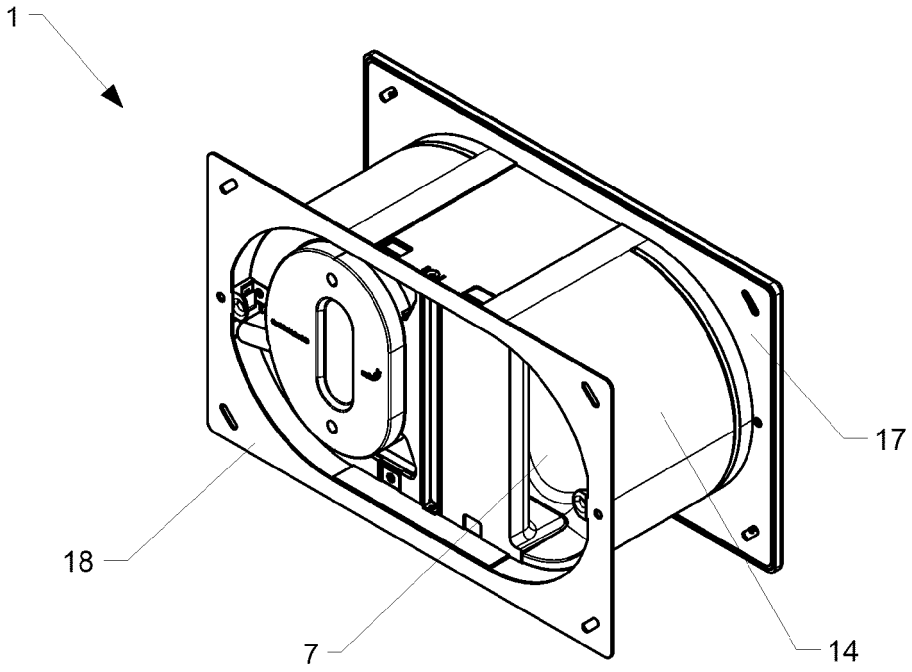

Fig. 4

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Application Number
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Place of search	Date of completion of the search	Examiner
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