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(54) **FASTENING MEANS FOR FASTENING THE FRONT PLATE OF A VENTILATION TERMINAL DEVICE, SUCH AS A CEILING DIFFUSER, TO THE FRAME**

(57) Fastening means (3) for fastening the front plate (6) of a ventilation terminal device, such as a ceiling diffuser, to the frame of the terminal device, which fastening means (3) comprises a magnet for the fastening. The invention is implemented in such a way that at that end of the fastening means (3) attached to the front plate (6) are guide means (7) suited to the shape of the front plate (6) for positioning the front plate (6) precisely into position.

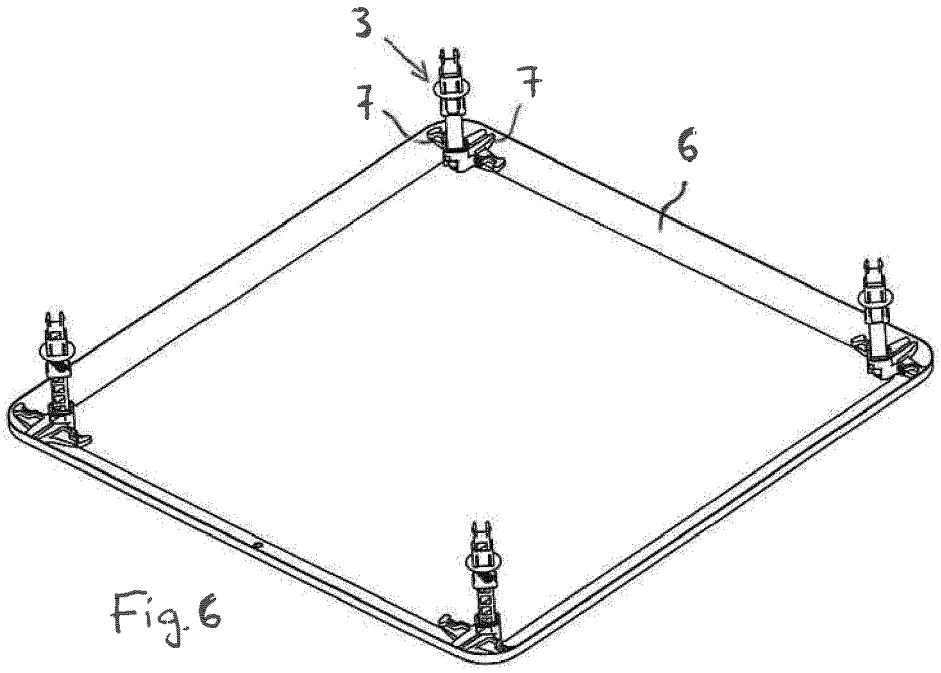

Fig. 6

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Description

[0001] The object of the present invention is a fastening means for fastening the front plate of a ventilation terminal device, such as a ceiling diffuser, to the frame of the terminal device, which fastening means comprises a magnet for the fastening. The object of the invention is also a terminal device for ventilation, such as a ceiling diffuser, which comprises a frame and a front plate fastened to it, for which fastening two or more fastening means provided with a magnet are installed between the frame and the front plate.

[0002] The invention thus relates to the structure of a ventilation terminal device, such as a ceiling diffuser, provided with a front plate. Hereinafter, reference is mainly made to a ceiling diffuser, but also other types of terminal means can be meant. A ceiling diffuser is typically fastened to a ceiling, but it could also be fastened e.g. to a wall. At issue could be a supply air device or an exhaust air device. There are typically both angular and round ceiling diffusers, as also in the case of other terminal devices. The invention applies to both.

[0003] By means of a ceiling diffuser, the desired quantity of air is brought into the room space without draughts in such a way that the desired mixing of the air is brought about. A ceiling diffuser is formed from a frame and a front plate fastened to it. The front plate is solid or perforated. If the front plate is solid, air flows only through the gap between the frame and the front plate. In such a case the flow can be adjusted by changing the distance of the front plate in relation to the frame.

[0004] The front plate is typically fastened to the frame in many different ways. Known in the art, for example, are various fastening means for this purpose, such as metal springs. What most fastening methods have in common is that detachment of the front plate is awkward. It is advantageous to have the front plate removed, e.g. for cleaning.

[0005] Also known in the art is the fastening of a front plate with magnets. In this case, on the end of the fastening means that comes against the front plate is a magnet. A problem in magnet fastenings known in the art, however, is that the front plate is difficult to align into the fully correct position. It can remain askew or slightly to the side with respect to the frame, *et cetera.* Although the front plate might be correctly aligned, it might move out of position in use.

[0006] The aim of the present invention is to provide fastening means with which the front plate of a ventilation terminal device, such as a ceiling diffuser, can easily be detachably fastened to the frame in exactly the correct position by means of magnets and, if necessary, adjustably. The fastening means according to the invention is characterized in that at the end of the fastening means that is attached to the front plate are guide means suited to the shape of the front plate for positioning the front plate precisely into position.

[0007] One preferred embodiment of the fastening means according to the invention is characterized in that the guide means of the fastening means are formed from two or more wings that settle against the edge of the front plate.

[0008] A second preferred embodiment of the fastening means according to the invention is characterized in that the fastening means is formed from a fastening part fastened to the frame of the terminal device and from a retainer, to which the front plate is attached.

[0009] Yet another preferred embodiment of the invention is characterized in that the fastening part is fastened to the retainer adjustably in the longitudinal direction of the fastening part.

[0010] The aim of the invention is also to provide a ventilation terminal device with which the aforementioned problems can be eliminated. The terminal apparatus according to the invention is characterized in that on each fastening means are guide means settling against the edge of the front plate for aligning the front plate precisely into position.

[0011] One preferred embodiment of the terminal apparatus according to the invention is characterized in that each fastening means is formed from two parts adjustable in relation to each other, by means of which parts the distance of the front plate from the frame is adjustable.

[0012] Some of the advantages of the invention that can be mentioned are that the front plate can be precisely fastened into position and also easily detachably. The fastening according to the invention also ensures that the front plate stays in position. The fastening means enables fastening of the front plate adjustably in relation to the frame.

[0013] In the following, the invention will be described in more detail by the aid of some preferred embodiments with reference to the attached drawings, wherein

Fig. 1 presents the frame of a ceiling diffuser as viewed from the side.

Fig. 2 presents the frame of a ceiling diffuser as viewed from above.

Fig. 3 presents a B-B section from Fig. 2.

Fig. 4 presents a C-C section from Fig. 2.

Fig. 5 presents a D-D section from Fig. 2.

Fig. 6 presents the front plate of the ceiling diffuser as viewed from the side that will face the frame.

Fig. 7 presents a cross-section of a corner of the front plate, to which the fastening means according to the invention is fastened.

[0014] Fig. 1 thus presents the frame 1 of a ceiling diffuser according to the invention as viewed from the side. The frame is fastened to the ceiling and connected either

to a ventilation duct or to a regulating box, in a manner that is *per se* known in the art, by means of a collar 2. Fastening means 3 according to the invention are also fastened to the frame, with which fastening means the front plate of the ceiling diffuser is fastened to the frame. Fig. 1 does not show the front plate, but it would come below the frame when viewing Fig. 1.

[0015] In Fig. 2 the same frame 1 is presented, as viewed from above. It can be seen in the figure that the frame 1 is in this case essentially square shaped. The shape can, however, vary and it can also be e.g. round.

[0016] It can also be seen from Fig. 2 that there are four units of fastening means 3 according to the invention, one in each corner of the frame 1. Of course, the number of fastening means is not limited to four, but instead other numbers are possible. The number depends on the shape of the frame and front plate and on the need at any given time of the fastening means in order for the front plate to remain firmly in position and correctly aligned.

[0017] Fig. 3 presents a B-B section from Fig. 2. It can be seen in the figure that the fastening means 3 is fastened to the frame 1. The fastening means 3 comprises two parts movable in relation to each other; a fastening part 3' and a retainer 3" of the front plate. Of these, therefore, the fastening part 3' is fastened to the frame 1 and the elongated retainer 3", in turn, is movable, either in steps or steplessly, in relation to the fastening part 3'. In the situation of Fig. 3, the fastening part 3" is in a position in which the front plate is as close as possible to the frame 1.

[0018] Fig. 4 presents a C-C section from Fig. 2. It can be seen from the figure that on the fastening part 3' is a lever 4, by means of which the locking between the fastening part and the retainer 3" is openable. From Fig. 3 it can be seen that in this embodiment there are two adjustment positions, which are implemented by means of the two notches in the retainer and the corresponding protrusion on the fastening part, the protrusion locking into the notch. In the inner adjustment position, the front plate is near the frame 1 and in the outer adjustment position at a distance from the frame 1. By means of the tongue 4, therefore, the protrusion can be turned out of the notch, in which case the retainer 3" moves in its longitudinal direction in relation to the fastening part 3'. When the correct adjustment position has been achieved, the lever 4 is released, in which case the protrusion goes into the corresponding notch. The number of notches is not, of course, limited to the stated two and in principle the adjustment can also be stepless.

[0019] Fastening of the front plate takes place with magnets 5. A magnet is installed in each fastening means 3, more precisely in each fastening part 3", at the point indicated by Fig. 3, i.e. on the outermost point of the fastening part in such a way that it is able to attach to the metallic front plate 6 (Fig. 6).

[0020] Fig. 5 presents a fastening means 3 as viewed obliquely from below. It can be seen in the figure that wings 7 functioning as guide means are formed on the fastening means 3, more precisely on the fastening part 3', by means of which wings the fastening means is intended to meet the front plate 6 (Fig. 6) in precisely the correct position. The fastening of the fastening means 3 to the front plate 6 is best illustrated in Fig. 6. In the figure it can be seen that the fastening means are situated in the corner of the front plate 6. In this case the front plate is essentially square-shaped, therefore there is one fastening means 3 in each corner. The shape of the front plate could, of course, be something else, e.g. some other polygon or round. The fastening means presented in the drawings is shaped in such a way that it is possible by means of it to fasten both an angular and a round front plate precisely into position.

[0021] It is seen from Fig. 6 that the wings 7 settle into the corner of the front plate 6 in such a way that the two wings are in contact with the walls on both sides of the corner. The wings 7 are therefore dimensioned in such a way that the front plate can settle precisely into position.

[0022] Instead of wings 7, there could be some other kind of shaping in the fastening means 3 that corresponds to the shaping of the front plate, e.g. an unbroken shape precisely following the shape of the corner.

[0023] Fig. 7 further presents how the bottom surface of a wing 7 of a fastening means 3 settles against the corresponding surface of the front plate 6. The shapes of the slopes match each other.

[0024] It is obvious to the person skilled in the art that the invention is not limited to the embodiments presented above, but that it can be varied within the scope of the claims presented below. The terminal device can be other than a ceiling diffuser, e.g. a supply valve or an exhaust valve. The terminal device can be fastened to elsewhere than to a ceiling, e.g. to a wall.

[0025] The characteristic features possibly presented in the description in conjunction with other characteristic features can also, if necessary, be used separately to each other.

Claims

1. Fastening means (3) for fastening the front plate (6) of a ventilation terminal device, such as a ceiling diffuser, to the frame (1) of the terminal device, which fastening means (3) comprises a magnet (5) for the fastening, and at the end of which fastening means (3) that is attached to the front plate (6) are guide means (7) suited to the shape of the front plate (6) for positioning the front plate (6) precisely into position, **characterized in that** the fastening means (3) is formed from a fastening part (3') fastened to the frame (1) of the terminal device and from a retainer (3"), to which the front plate (6) is attached, and **in that** the fastening part (3') is fastened to the retainer (3") adjustably in the longitudinal direction of the fastening part (3').

2. Fastening means according to claim 1, **characterized in that** the guide means (7) of the fastening means (3) are formed from two or more wings that settle against the edge of the front plate (6).

3. Fastening means according to claim 1 or 2, **characterized in that** the adjustment between the fastening part (3') and the retainer (3") is stepless.

4. Fastening means according to claim 1 or 2, **characterized in that** the adjustment between the fastening part (3') and the retainer (3") is stepped, and **in that** for this purpose two or more notches are made in the retainer (3"), the protrusion on the retainer locking into the notches.

5. Fastening means according to claim 4, **characterized in that** for opening and locking the protrusion on the retainer (3"), a lever (4) is formed on the retainer (3").

6. A ventilation terminal device, such as a ceiling diffuser, which comprises a frame (1) and a front plate (6) fastened to it, for which fastening two or more fastening means (3) provided with a magnet (5) are installed between the frame (1) and the front plate (6), and on each fastening means (3) are guide means (7) settling against the edge of the front plate (6) for aligning the front plate (6) precisely into position, **characterized in that** each fastening means (3) is formed from two parts (3', 3") adjustable in relation to each other, by means of which parts the distance of the front plate (6) from the frame (1) is adjustable.

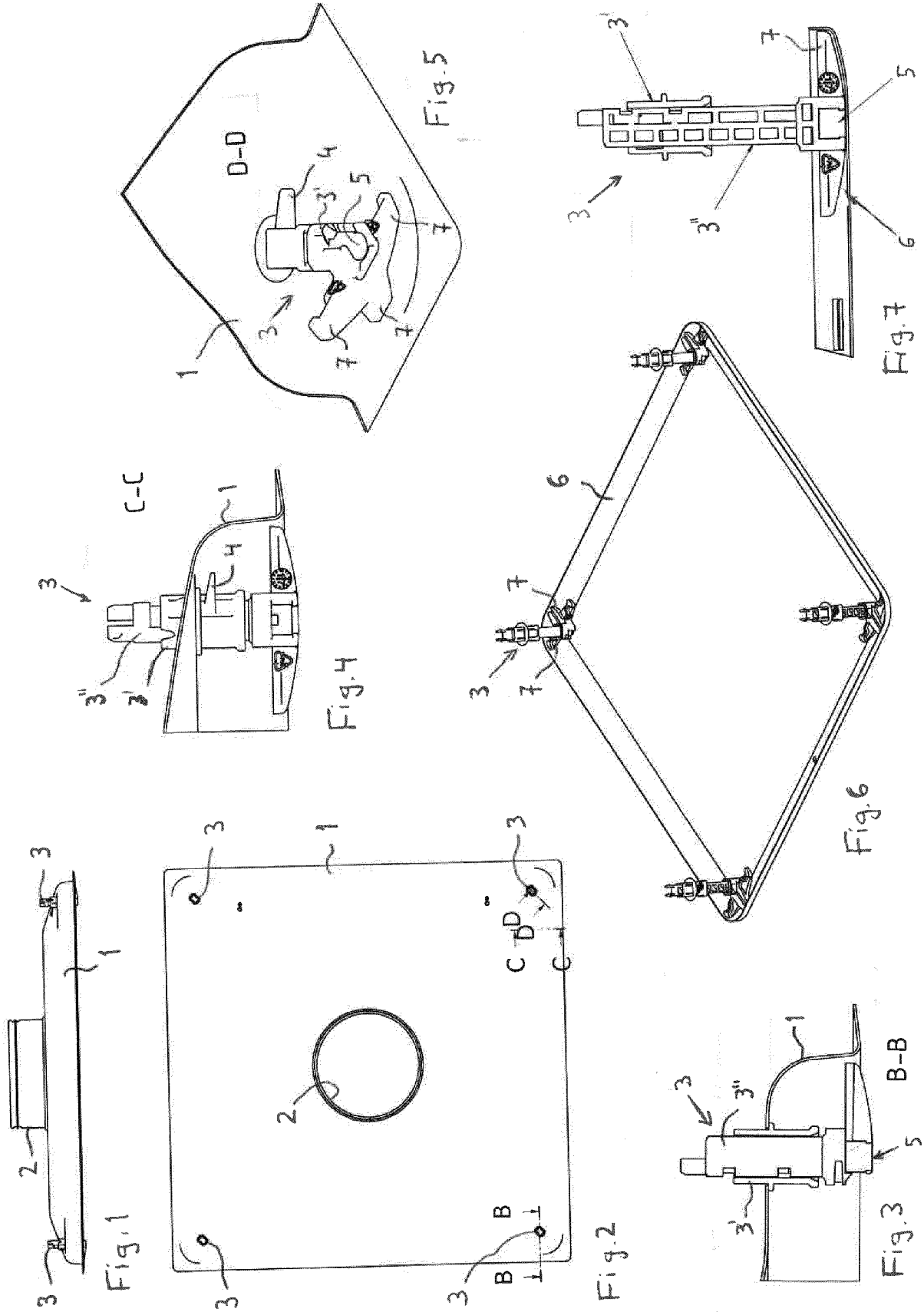
Fig.1
Fig.2
Fig.3
B-B
Fig.4
C-C
Fig.5
D-D
Fig.6
Fig.7

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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 4779

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 October 2018	Anconetani, Mirco

CATEGORY OF CITED DOCUMENTS

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