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(54) **Ceiling diffuser for air conditioning installations**

(57) The present invention relates to a built-in ceiling diffuser for air conditioning installations of the type fitted into a false ceiling (2), only the outlet slit (3) being externally visible, and comprising a hollow longitudinal main body (1) and securing bridges (9) therein, further comprising a longitudinal laminar part (10) secured to the securing bridges (9) by removable securing means, which allow changing the position of the part (10), where said laminar part (10) comprises transverse movement guides (21), this laminar part (10) being symmetrical and having bent longitudinal sides, forming respective flaps (11) inclined towards the lower face thereof, and the width of the laminar part (10) between bends (12.1, 12.2) being less than the width of the securing bridge (9) at that point.

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Description

Technical Field of the Invention

[0001] The present invention corresponds to the technical field of air conditioning diffusers, specifically the type placed and built into a false ceiling, such that the only visible portion of the diffuser is the outlet slit for the exit of air from the diffuser.

Background of the Invention

[0002] Today air conditioning diffusers are usually assembled in false plaster ceilings or suspended false ceiling panels, such that gratings with a built-in frame and a window made for that purpose in the corresponding false ceiling or panel can be seen, which leads to a rather unpleasant aesthetic appearance clashing with the characteristics of the ceiling itself. Likewise, such diffusers require assembling the grating and thereby the corresponding frame for the grating, regardless of the installation system required for the diffuser assembly.

[0003] To solve said aesthetic problem, diffusers such as those described in ES1070582-U which are built into a false ceiling, keeping the entire assembly concealed from users' view except for the outlet slit for the exit of air from the diffuser, which is the only portion that is externally visible, emerged on the market. This involved a significant improvement in terms of aesthetics with respect to the other air conditioning diffusers which hang from the outside of walls and ceilings or which, even when they are built into a false ceiling, project to a large extent from the ceiling.

[0004] Nevertheless, said diffusers have the drawback that the mechanism regulating the air outlet direction is fixed and non-removable, so apparatuses must be chosen depending on where they will be placed, i.e., with the airflow oriented to the left or right depending on if the diffuser is to be placed in a portion of the ceiling close to a wall. Therefore, if the diffuser has a wall on its right side, for example, the airflow must be oriented towards the left and vice versa.

[0005] Given that the location of diffusers must often be changed, or due to the compartmentalization of a room, diffusers are adhered to a wall which was not previously there, said diffusers become rather impractical since in order to be reused they must be disassembled, generally in a factory since they are fixed or non-removable air outlet regulating mechanisms. Likewise, during the installation step, such diffusers to be used must be carefully chosen in the project phase since those diffusers having air outlet oriented towards a specific location are rarely usable or do not perform their function well for a distribution different from the intended distribution.

[0006] Likewise, such diffusers do not have the possibility of directing air vertically either, whereby it is a drawback since placing some of the diffusers in a central area of the ceiling in a large space may be of interest.

[0007] Another drawback of such diffusers and of diffusers in general is that they are made with sheet metals, so sometimes they are too heavy to be assembled in certain types of false ceilings.

Description of the Invention

[0008] The ceiling diffuser for air conditioning installations of the present invention solves the problems of the state of the art mentioned above since it comprises removable regulating means for regulating the direction of airflow, thus making it a versatile and practical diffuser.

[0009] More specifically, the diffuser of the invention is of the type fitted into a false ceiling, only the outlet slit for the exit of air being externally visible and basically comprising a hollow longitudinal main body, and the removable regulating means for regulating the direction of airflow being a laminar part located on securing bridges of the main body through removable securing means such that changing the position of said laminar part with respect to said securing bridges and therefore to the main body is allowed for regulating the direction of airflow.

[0010] Said laminar part is structured such that its sides are bent forming respective flaps inclined towards the lower face thereof such that airflow is directed, where the maximum distance between said bends is less than the width of the securing bridges at that point, i.e., less than the width of the main body such that air passage is allowed.

[0011] Therefore, as a result of the possibility of transverse movement of the laminar part with respect to the main body, depending on if the position of this laminar part is at one end, at the opposite end or in the center, the air will exit the diffuser in a direction inclined towards the side opposite that in which the laminar part is located or in a vertical direction, respectively.

[0012] Therefore, versatility is achieved which allows locating the diffuser in any position of the room in which it is installed by simply changing the position of the inner laminar part, this change being very quick and easy to perform.

Brief Description of the Drawings

[0013] For the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description in which the following has been depicted with an illustrative and non-limiting character:

Figures 1.1 and 1.2 respectively show respective top and bottom perspective views of a built-in ceiling diffuser for a preferred embodiment of the invention.

Figures 2.1, 2.2 and 2.3 show the respective section views of the built-in ceiling diffuser located inside the false ceiling and with the laminar part located to the left of the securing bridges, to the right or in the cent-

er, depending on the location of the diffuser in the room.

Figure 3 shows a perspective view of an in-line connection of several diffusers like the diffuser of this preferred embodiment of the invention, as well as the exploded view of one of the connections.

Figure 4 shows detail A of Figure 3 corresponding to the exploded view of the in-line connection between two adjacent diffusers.

Figures 5.1, 5.2 and 5.3 show schematic plan, elevational and profile views of the laminar part, respectively.

Detailed Description of a Preferred Embodiment of the Invention

[0014] In view of the attached drawings, the ceiling diffuser for air conditioning installations of the type fitted into a false ceiling (2), only the outlet slit (3) for the exit of air from the diffuser being externally visible, and comprising a hollow longitudinal main body (1), securing bridges (9) transverse to said main body (1) and, as removable regulating means for regulating the direction of airflow, a longitudinal laminar part (10) located on the lower face of said securing bridges (9) and secured to the bridges by removable securing means which allow changing the position of the part (10) with respect to said securing bridges (9), can be seen in a preferred embodiment of the invention. In this preferred embodiment of the invention, these removable securing means are formed by screwed elements.

[0015] As shown in Figures 1.1, 1.2 and 2.1 to 2.3, in this preferred embodiment of the invention, the hollow longitudinal main body (1) has two sides, each formed by an aluminum extrusion profile and attached to one another at their front and rear ends by a front cover (5) and a rear cover (6), respectively. The upper face (7) of the main body (1) is open, like the lower face (8), forming the outlet slit (3) of the diffuser.

[0016] In said drawings it can be seen that the extrusion profiles forming the sides of the main body (1) of this diffuser are formed by a first vertical section (4.1) and a second section (4.2) inclined towards the inside of the main body (1), the latter being located after and below the first section (4.1).

[0017] As shown in Figures 2.1 to 2.3, the securing bridges (9) of the diffuser are located at an intermediate height of the first section (4.1) of the sides of the main body (1).

[0018] As can be seen in Figures 5.1, 5.2 and 5.3, in this preferred embodiment of the invention, the laminar part (10) is symmetrical and comprises equidistant transverse movement guides (21). The laminar part (10) in turn comprises bends on the longitudinal sides, such that they form respective flaps (11) inclined towards the lower face, such that the maximum distance between bends (12.1, 12.2) is less than the width of the securing bridges (9) at that point, i.e., less than the width of the main body (1). Therefore, since the position of the laminar part (10) can be changed, the difference in width of the laminar part (10) with respect to the main body (1) forms a free hole (13) for air passage.

[0019] In other words, by changing the position of the laminar part (10) the position of the free hole (13) for passage is changed, whereby the location where the air exits the diffuser is being changed.

[0020] Figure 2.1 shows a first position of the laminar part (10) in which said part is moved towards the left of the securing bridges (9), with the left bend (12.2) of said laminar part (10) in contact with the inside of the first section (4.1) of the left side of the main body (1) of the diffuser. Any possibility of air exiting through this side is thus blocked, directing the air to the free hole (13) generated on the right side of the securing bridge (9). Therefore, the air is expelled with an inclination towards the left due to the inclined flap (11) of the right, marking its path. This position of the laminar part (10) is used in diffusers located with a wall located nearby on the right side.

[0021] Figure 2.2 shows the case of the opposite position of the laminar part (10), i.e., this part is moved towards the right with the right bend (12.1) in contact with the inside of the first section (4.1) of the right side and the air exits through the free hole (13) generated in the left portion of the securing bridges (9). In this case the air exits with an inclination towards the right and is suitable for diffusers located with a wall located nearby on its left side.

[0022] Figure 2.3 depicts a third possibility in which the laminar part (10) is located in the center with respect to the securing bridges (9), whereby two free holes (13) are generated on both sides of the part (10), where the air which the flaps (11) converge in the central area exits vertically. This position is suitable when the diffuser is not located close to any wall.

[0023] According to a possible embodiment of the invention, to prevent possible air leakage through the contact area of the bend (12.1, 12.2) with the inside of the first section (4.1) of the side of the main body (1), the diffuser comprises sealing means (14), such as a sealing strip or joint, for example, both when the laminar part (10) is located as in the case depicted in Figure 2.1, and when it is located as in Figure 2.2.

[0024] Furthermore, as shown in Figures 1.1, 1.2 and 2.1 to 2.3, the diffuser in this preferred embodiment of the invention comprises securing means for securing to the false ceiling (2) which in this case are formed by L-shaped side profiles (15), which are fixed on the outer face of the first section (4.1) of the sides of the main body (1) and to the inner face of the false ceiling (2), thus acting as a fixed support for supporting the diffuser on the false ceiling (2). Screwed elements (16) are used for fixing these L-shaped profiles (15) to the first section (4.1) of the sides of the main body (1) and to the false ceiling (2).

[0025] All the elements of the diffuser mentioned above will be made from a strong, light-weight material, such as aluminum for example, so a significant reduction of

weight exerted on the false ceiling is achieved.

[0026] On the other hand, the diffuser of the present invention can be a single element in the manner shown until now or an in-line connection between several adjacent built-in diffusers. To that end and as shown in Figures 3 and 4, the diffuser has in-line connection means which are formed by connecting elements (19) secured in securing flanges (20) distributed throughout the inner face of the extrusion profiles forming the first section (4.1) and the second section (4.2) of the sides of both main bodies (1) in each attachment.

[0027] It can be seen in said Figures 3 and 4 that in an in-line connection between adjacent diffusers, the first diffuser has a front attachment cover (5) at the front end of the in-line connection, the last diffuser comprises a rear attachment cover (6) at the rear end of the connection, whereas each connection between two adjacent diffusers comprises an intermediate cover (17) in the section attaching both diffusers.

[0028] Finally and as can be seen in said drawings, the connection between adjacent diffusers has reinforcements (18) consisting of respective L-shaped reinforcement profiles located on both sides of the intermediate attachment cover (17).

Claims

1. Ceiling diffuser for air conditioning installations suitable for being built into a false ceiling (2) such that only the outlet slit (3) for the exit of air to the outside is visible, comprising a hollow main body (1), **characterized in that** it further comprises removable regulating means for regulating the direction of airflow through the outlet slit (3).

2. Ceiling diffuser for air conditioning installations according to claim 1, **characterized in that** the regulating means for regulating the direction of airflow comprise a laminar part (10) secured by removable securing means to at least one securing bridge (9) of the main body (1) and which allow changing the position of said laminar part (10) with respect to said securing bridge (9).

3. Ceiling diffuser for air conditioning installations according to claim 2, **characterized in that** the sides of the laminar part (10) are bent forming respective flaps (11) inclined towards the lower face thereof, such that the maximum distance between bends (12.1, 12.2) is less than the width of the securing bridge (9) at that point.

4. Ceiling diffuser for air conditioning installations according to claim 2 or 3, **characterized in that** the removable securing means comprise movement guides (21) along the laminar part (10).

5. Ceiling diffuser for air conditioning installations according to any of the preceding claims, **characterized in that** it comprises sealing means (14) in the contact areas of the bend (12.1, 12.2) of the laminar part (10) with the sides of the main body (1).

6. Ceiling diffuser for air conditioning installations according to claim 5, **characterized in that** the sealing means (14) are formed by a sealing strip.

7. Ceiling diffuser for air conditioning installations according to claim 1, **characterized in that** it comprises in-line connection means between adjacent diffusers formed by connecting elements (19) secured to the main body (1) in securing flanges (20) distributed throughout the inner face of a first section (4.1) and a second section (4.2) of the sides of both bodies (1), as well as reinforcement profiles (18) on both sides of an intermediate cover (17) attaching the adjacent diffusers.

8. Ceiling diffuser for air conditioning installations according to any of the preceding claims, **characterized in that** the main body (1) of the diffuser is made of aluminum.

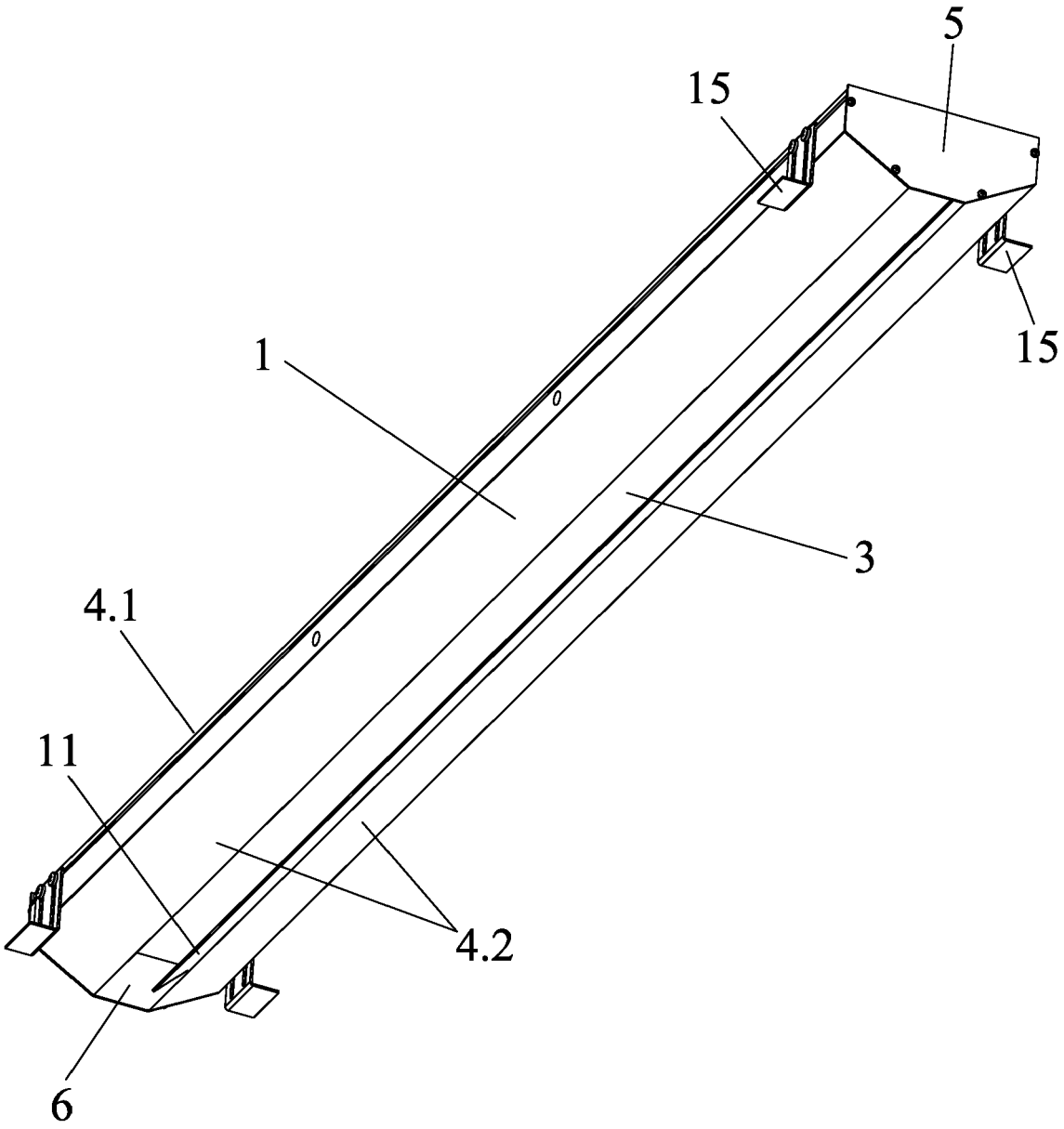

FIG. 1.1

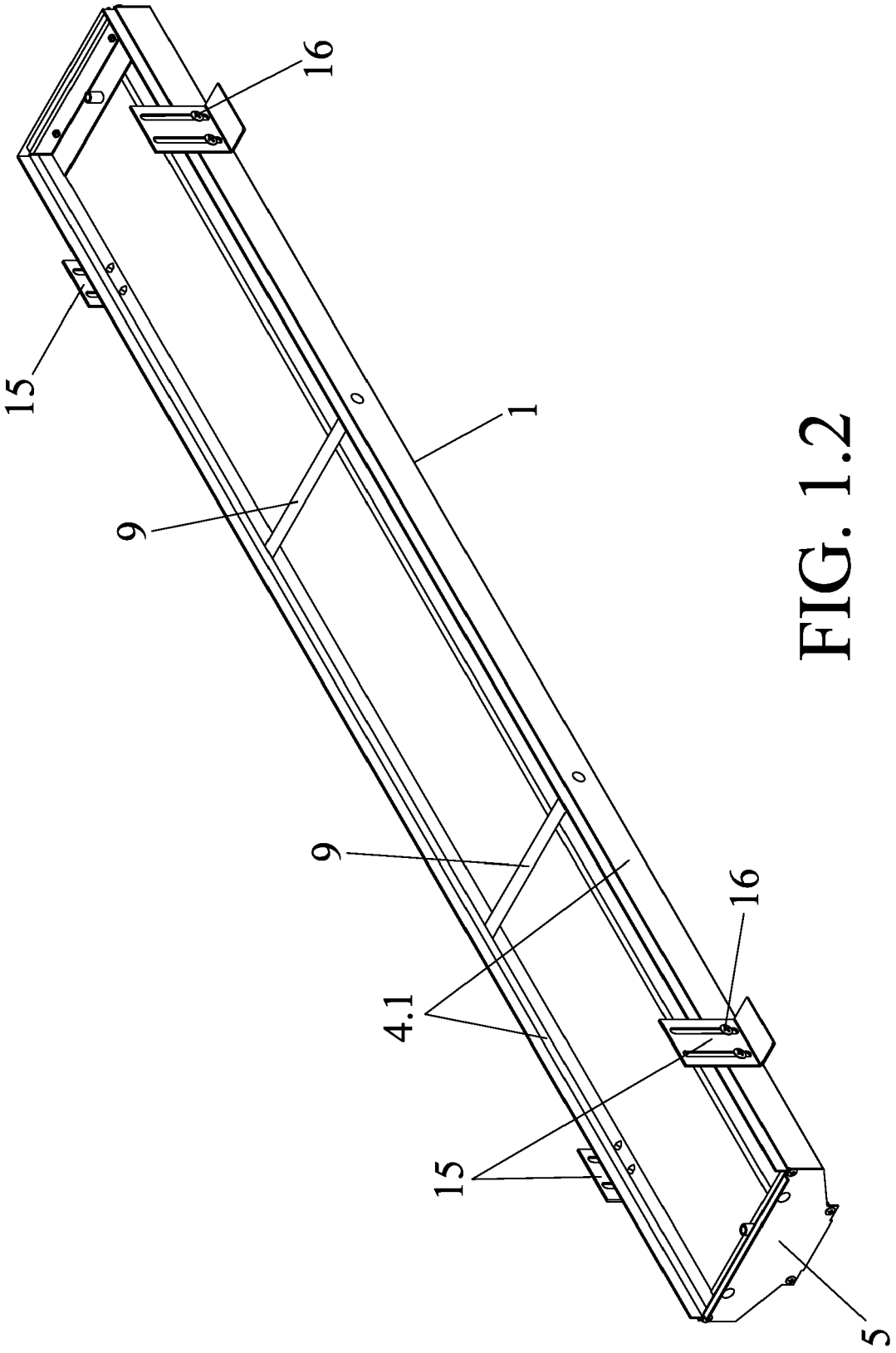

FIG. 1.2

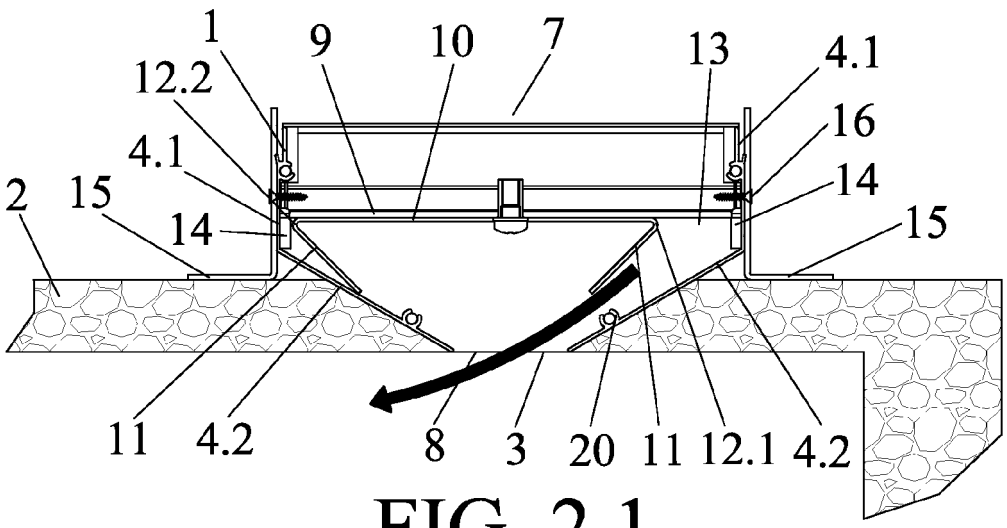

FIG. 2.1

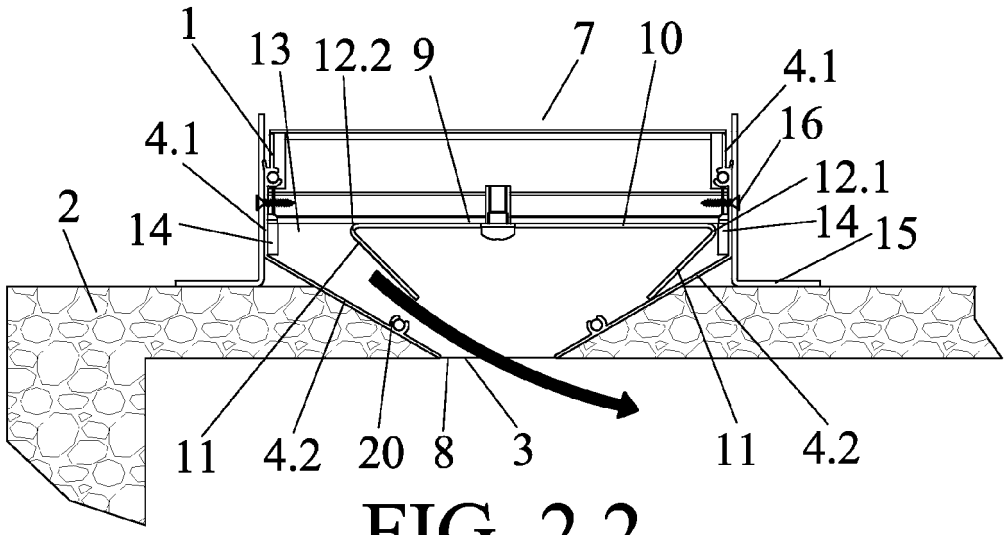

FIG. 2.2

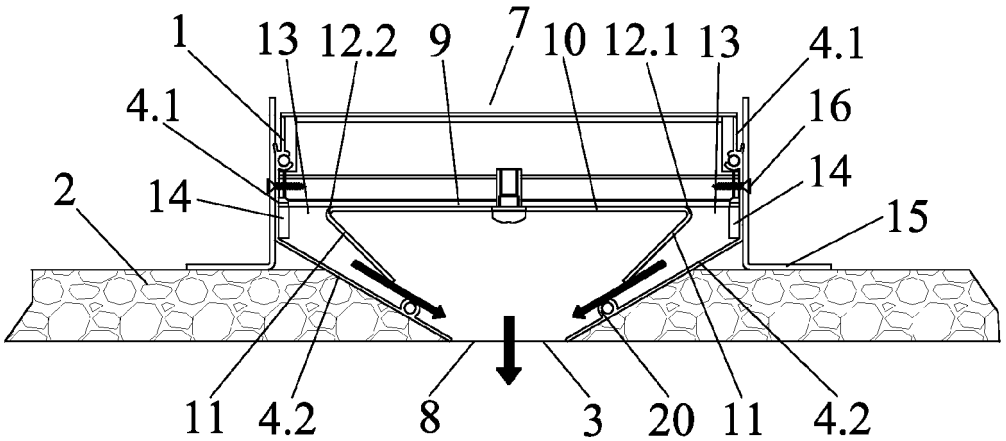

FIG. 2.3

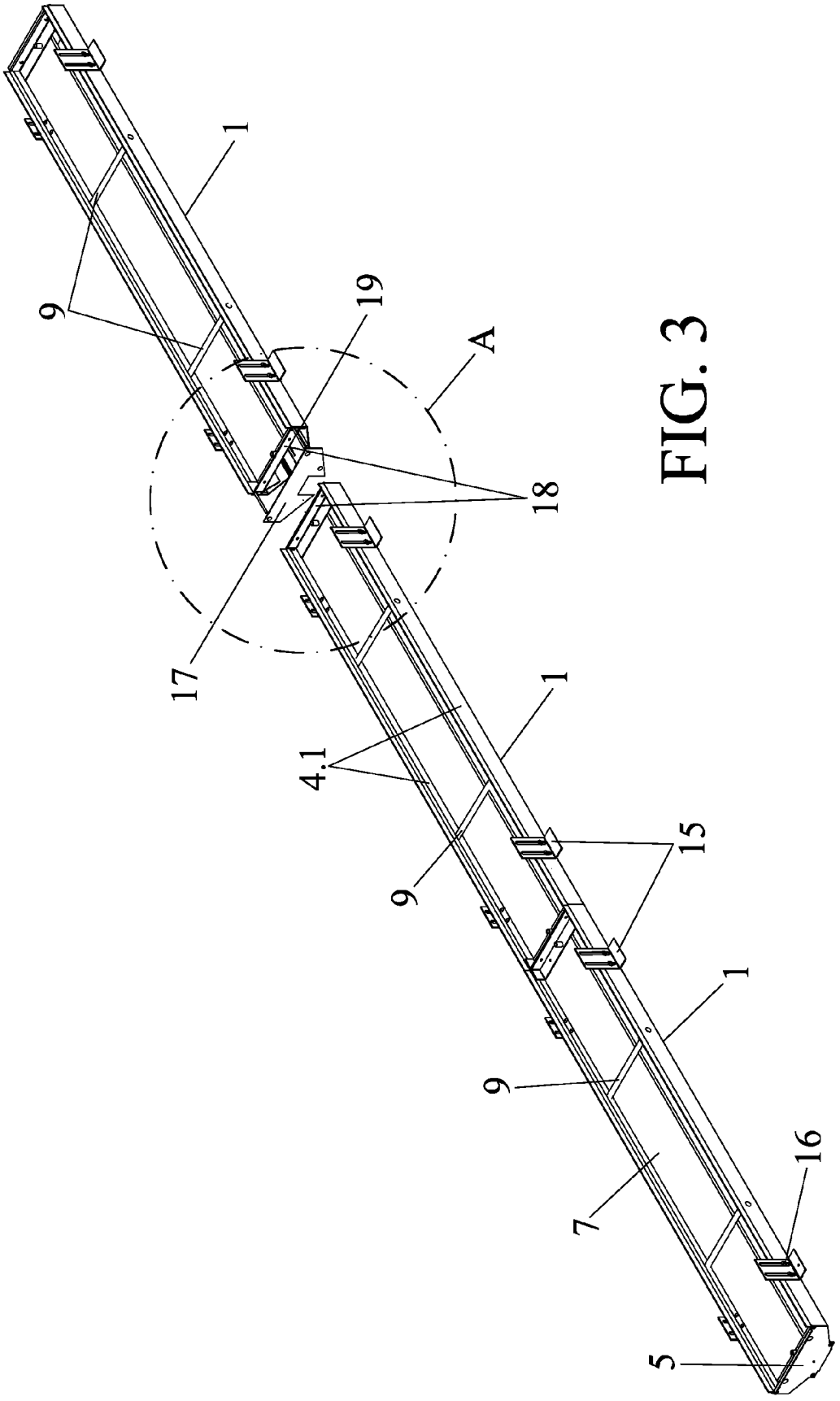

FIG. 3

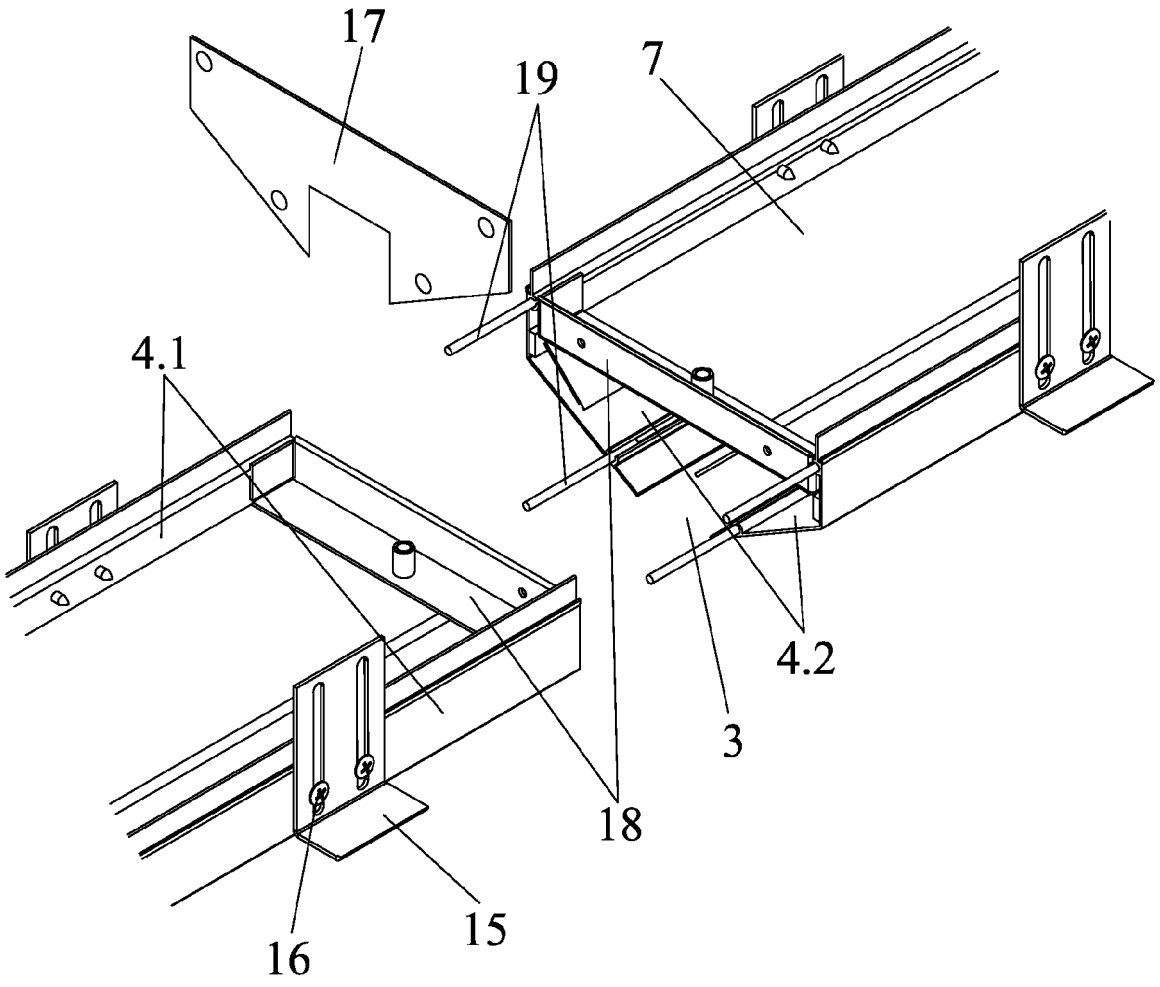

FIG. 4

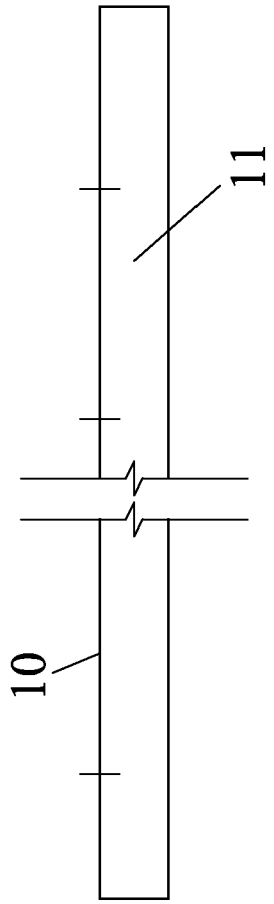

FIG. 5.3

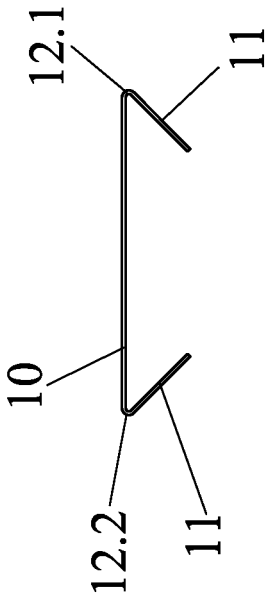

FIG. 5.2

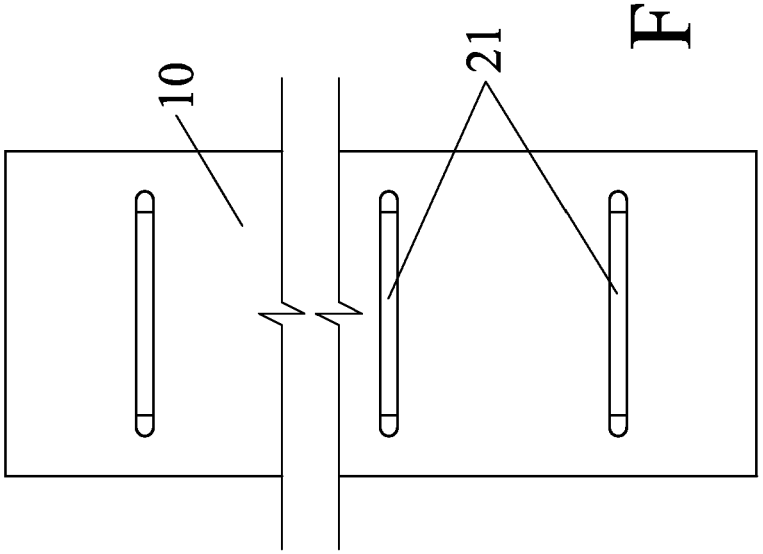

FIG. 5.1

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EUROPEAN SEARCH REPORT

Application Number
EP 13 38 2365

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	BE 897 735 A2 (ETAP NV) 2 January 1984 (1984-01-02) * the whole document *	1-6,8	INV. F24F13/072
X	US 4 352 323 A (BURKARTH JACK L) 5 October 1982 (1982-10-05) * column 3, line 21 - column 5, line 25 * * figures *	1,3,4,8	
X	DE 71 36 475 U (GEBR TROX GMBH) 5 January 1972 (1972-01-05) * page 4, paragraph 5 - page 6, paragraph 2 * * figures *	1	
A	US 4 399 739 A (DEAN RAYMOND H [US]) 23 August 1983 (1983-08-23) * abstract; figures *	1	

TECHNICAL FIELDS SEARCHED (IPC)

F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 February 2014	Mattias Grenbäck

CATEGORY OF CITED DOCUMENTS

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24-02-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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