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(71) Applicant: **Nederlandse Organisatie voor Toegepast -Natuurwetenschappelijk Onderzoek TNO**
2628 VK Delft (NL)

(72) Inventor: **The designation of the inventor has not yet been filed**

(74) Representative: **Hatzmann, Martin**
Vereenigde
Johan de Wittlaan 7
2517 JR Den Haag (NL)

(54) Ceiling system with framework and panels and including means for creating ventilation gaps.

(57) Ceiling system comprising a plurality of ceiling panels (1) and a ceiling framework for supporting those panels, the framework including panel support profiles (2) each including a vertical portion (3) and a horizontal portion (4), the ceiling system, moreover, comprising spacing means (6) arranged to create, per panel concerned, a vertical gap between relevant vertical portions of the profiles and at least one of the side edges of the panel, as well as a horizontal gap between relevant horizontal portions of the profiles and the horizontal lower surface of the panel. The spacing means may comprise an elongated part (7), in use extending mainly parallel to the vertical gap and horizontal gap and interconnecting a series of spacing elements (8) extending in the vertical gap and horizontal gap. The ceiling system may be arranged to be used in a ventilation system wherein an overpressure is provided at the top side relative to the lower side of the ceiling system, causing a ventilation stream (13-15) to flow from the top side to the lower side of the ceiling system via the vertical and horizontal gaps. The elongated part (7) may be arranged to deflect the ventilation stream, after having passed the horizontal gap, into a downward direction (15).

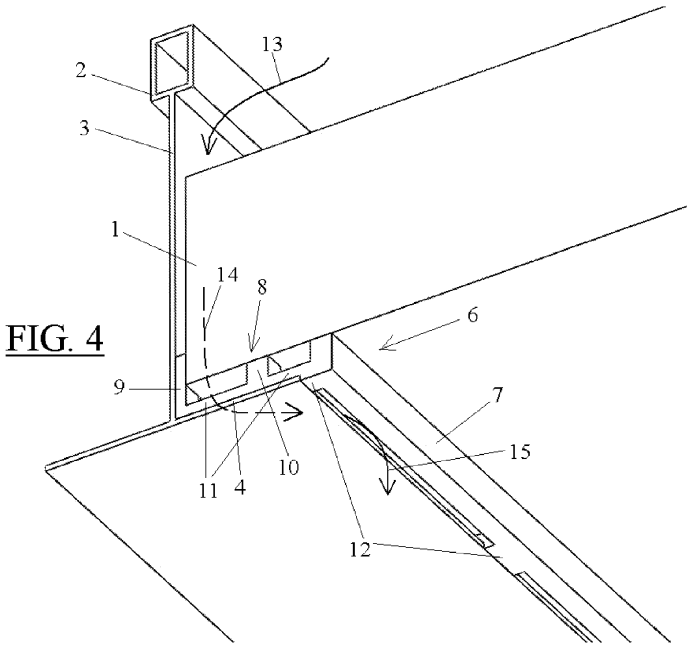

FIG. 4

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Description

[0001] The present invention refers to a ceiling system comprising a plurality of ceiling panels and a ceiling framework for supporting those panels.

[0002] In particular, however not exclusively, the invention refers to a so-called dropped ceiling system, i.e. a lowered (secondary) ceiling, hung below mainly parallel to the main (structural) ceiling. They may also be referred to as a drop ceiling, false ceiling, or suspended ceiling. The area above the dropped ceiling is called the plenum space, as it is sometimes used for HVAC air return. The plenum space is also very commonly used to conceal piping, wiring, and/or ductwork.

[0003] A typical dropped ceiling consists of a grid-work of metal channels in the shape of an upside-down "T", suspended on wires from the overhead structure. These channels snap together in a regularly spaced pattern - typically a 2x2 or 2x4 foot grid in the US, or 600x600 mm grid in Europe. Each cell is filled with lightweight "tiles" or "panels" which simply drop into the grid. Tiles can be selected with a variety of materials, including wood, metal, plastic, or mineral fibers, and can come in almost any color. Light fixtures, HVAC air grilles, and other fixtures are available which can fit the same space as a tile for easy installation. Most tile material is easily cut to allow fixtures in other shapes, such as incandescent lights, speakers, and fire sprinkler heads.

[0004] An earlier patent application WO2009005344 of applicant discloses a ventilation method and system respectively for ventilating rooms like classrooms and the like, comprising a surface structure mainly extending parallel to the ceiling, and means for forced air inlet from the outside air into the room between said surface structure and the ceiling. Air outlet openings are provided, which are mainly evenly spaced over the whole surface of the surface structure. Preferably, the hydraulic diameter of the outlet openings is between 0.1 and 6 cm. The means for forced air inlet from the outside air into the room (or plenum space) between the surface structure and said wall, ceiling or floor are formed by an electrical ventilator.

[0005] In the embodiments shown in WO2009005344 the panels concerned are provided with holes which can be made during the manufacturing process of the panels or -e.g. when already installed panels are used- by drilling. Disadvantageous is that

- the holes have to be made, either during production or afterwards;
- panels with and without holes should be held in stock separately;
- the (plurality of) holes in the ceiling panels are considered to be not aesthetical.

[0006] One aim of the present invention is to provide a system which e.g. is arranged to perform a method as presented in W02009005344, however without the obligation to provide -during or after their manufacture- the relevant panels with holes.

[0007] Another aim of the present invention is to provide means by which standard panels can be used, even if already installed in an existing ceiling system.

[0008] According to the invention a ceiling system is provided comprising a plurality of ceiling panels and a ceiling framework for supporting those panels, said framework including panel support profiles each including a vertical portion and a horizontal portion, which ceiling system, preferably, comprises spacing means arranged to create, per panel concerned, a vertical gap between relevant vertical portions of the profiles and at least one of the side edges of the panel, as well as a horizontal gap between relevant horizontal portions of the profiles and the horizontal lower surface of the panel.

[0009] By using spacing means for creating a vertical gap between the vertical portions of the profiles and the side edges of the panel, as well as a horizontal gap the horizontal portions of the profiles and the horizontal lower surface of the panel the panels don't need to be provided with ventilation holes. Moreover, standard panels can be used, even if already installed in an existing ceiling system. The ventilation gaps can be obtained by insertion of the spacing means between the panels concerned and the surrounding portions of the support frame.

[0010] Preferably, the spacing means comprise an elongated part, extending, in use, mainly parallel to said vertical gap and horizontal gap and interconnecting a series of spacing elements extending in said vertical gap and horizontal gap.

[0011] The ceiling system, preferably, is arranged to be used in a ventilation system wherein an overpressure is provided at the top side relative to the lower side of the ceiling, causing a ventilation stream to flow from the top side to the lower side of the ceiling via said vertical and horizontal gaps. To cause that the ventilation air mixes well with the below air mass in the room to be ventilated, the elongated part is, preferably, arranged to deflect said ventilation stream, after having passed said horizontal gap, into a downward direction. Preferably, the elongated part includes a mainly vertical wall, located opposite to the location of the vertical gap.

[0012] Hereinafter the invention will be elucidated with reference to some figures.

Figure 1 shows a prior art ceiling system including ceiling panels and a ceiling framework including support profiles with vertical and horizontal portions.

Figure 2 shows the ceiling system of figure 1, however, including spacing means arranged to create a vertical gap and a horizontal gap between the profiles and the panel.

Figure 3 shows an elongated part interconnecting a series of spacing elements intended to ex-

tend in a vertical gap and horizontal gap between the profiles and the panel.

Figure 4 shows the elongated part shown in figure 3 wherein the spacing elements have been installed between parts of the profile and panel, wherein the elongated part includes a vertical wall arranged to deflect a ventilation stream into downward direction.

[0013] Figure 1 shows a prior art ceiling system including ceiling panels 1 and a ceiling framework including support profiles 2 with vertical portions 3 and horizontal portions 4. The framework is hung below mainly parallel to the main (structural) ceiling by means of hooks 5.

[0014] Figure 2 shows the ceiling system of figure 1 including spacing means 6 arranged to create a vertical gap and a horizontal gap between the profiles 2 and the panel 1, forming a continuous gap between the upper side and the lower side of the panel, having a vertical and a horizontal part.

[0015] Figure 3 shows, as a preferred embodiment of the spacing means 6, an elongated part 7 interconnecting a series of spacing elements 8 which are intended to be mounted between the profiles 2 and the panel 1. Normally, four of such elongated part 7, having a length equal to about the length or width of the panel, will be mounted per panel, thus creating a mainly continuous gap surrounding that panel. The spacing elements 8 each consist of a vertical spacer 9 for spacing the side edge of the panel from the vertical profile surface, as well as a horizontal spacer 10 for spacing the lower surface of the panel from the upper surface of the horizontal portion of the support profile. The spacers 9 and 10 are interconnected by an interconnection part 11 which extends further to a side protrusion 12 provided on the elongated part 7. The elongated part 7 has the shape of a vertical wall which is arranged to deflect a ventilation stream, caused by overpressure at the upper side of the panels, passing the vertical and horizontal gaps between the panel and the vertical and horizontal profile portions, into downward direction, away from the lower horizontal) surface of the panel. The protrusion 12 functions as a (redundant) vertical spacer between the edge of the horizontal portion of the support profile and the deflection surface 13 of the elongated part 7.

[0016] Figure 4 shows the elongated part 7 of the spacing means 6, shown in figure 3, wherein the spacing elements 8 have been installed between the (right) surface of the vertical part 3 and the upper surface of the horizontal part 4 of the support profile 2 and the (left) vertical side surface and the lower surface of the panel 1, wherein the elongated part 7 includes a vertical wall which is arranged to deflect the last part of a ventilation stream, originating from the plenum space above the panels and indicated by the arrows 13, 14 and 15, into downward direction, via a gap between said deflection wall/elongated part 7 and the side edge of the horizontal part 4 of the support profile 2.

Claims

1. Ceiling system comprising a plurality of ceiling panels (1) and a ceiling framework for supporting those panels, said framework including panel support profiles (2) each including a vertical portion (3) and a horizontal portion (4), the ceiling system, moreover, comprising spacing means (6) arranged to create, per panel concerned, a vertical gap between relevant vertical portions of the profiles and at least one of the side edges of the panel, as well as a horizontal gap between relevant horizontal portions of the profiles and the horizontal lower surface of the panel.

2. Ceiling system according to claim 1, said spacing means comprising an elongated part (7), in use extending mainly parallel to said vertical gap and horizontal gap and interconnecting a series of spacing elements (8) extending in said vertical gap and horizontal gap.

3. Ceiling system according to claim 1 or 2, arranged to be used in a ventilation system wherein an overpressure is provided at the top side relative to the lower side of the ceiling system, causing a ventilation stream (13-15) to flow from the top side to the lower side of the ceiling system via said vertical and horizontal gaps.

4. Ceiling system according to claim 2 and 3, wherein said elongated part (7) is arranged to deflect said ventilation stream, after having passed said horizontal gap, into a downward direction (15).

5. Ceiling system according to claim 4, wherein said elongated part includes a mainly vertical wall (7) located opposite to the location of said vertical gap.

FIG. 1

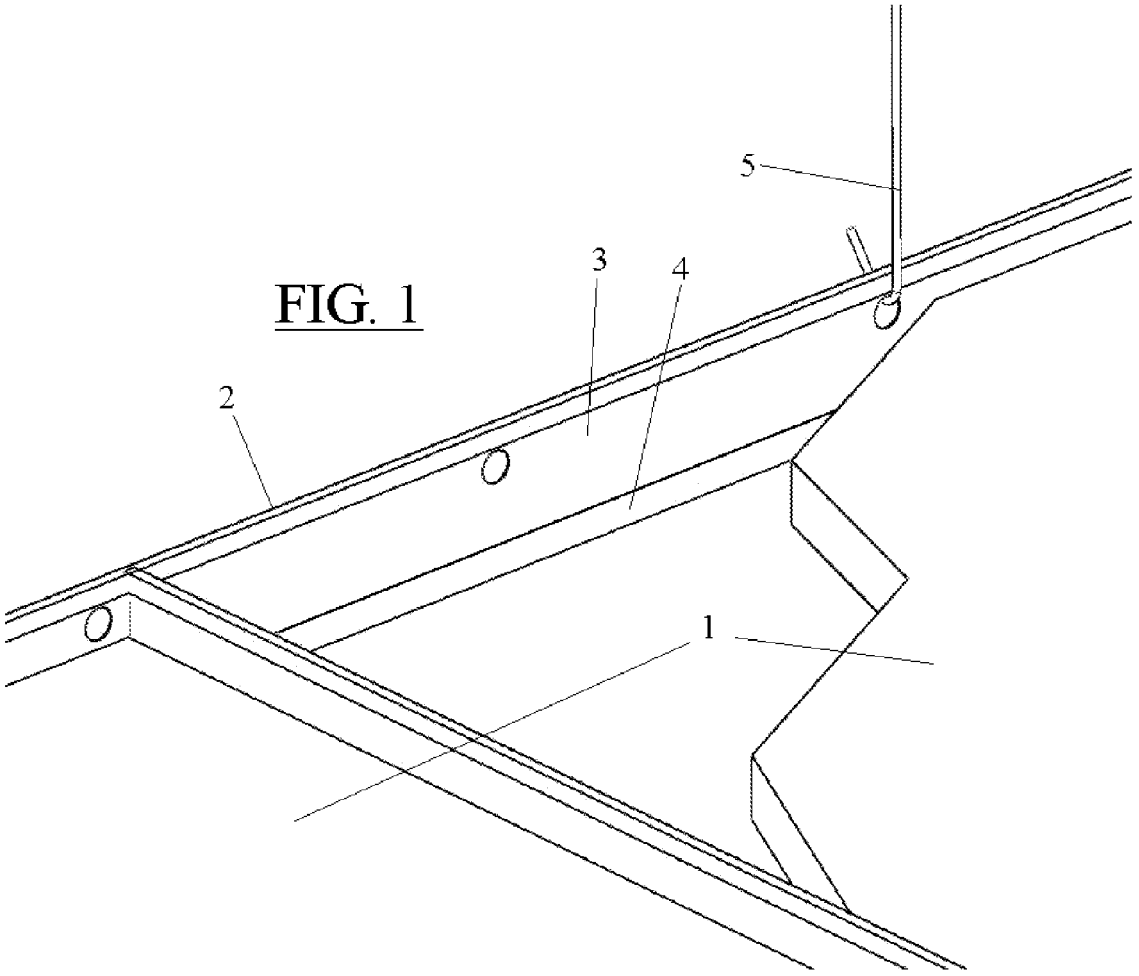


FIG. 2

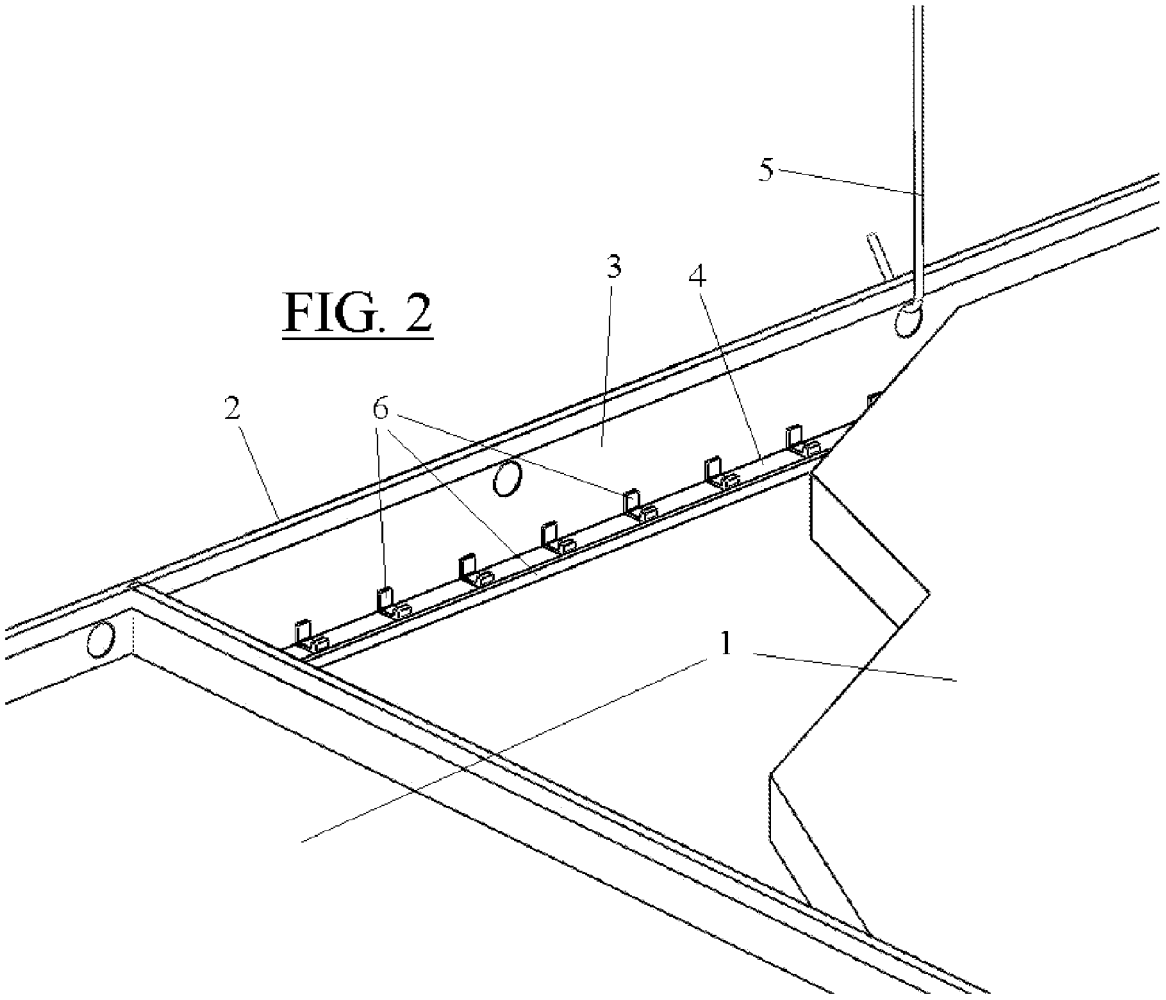
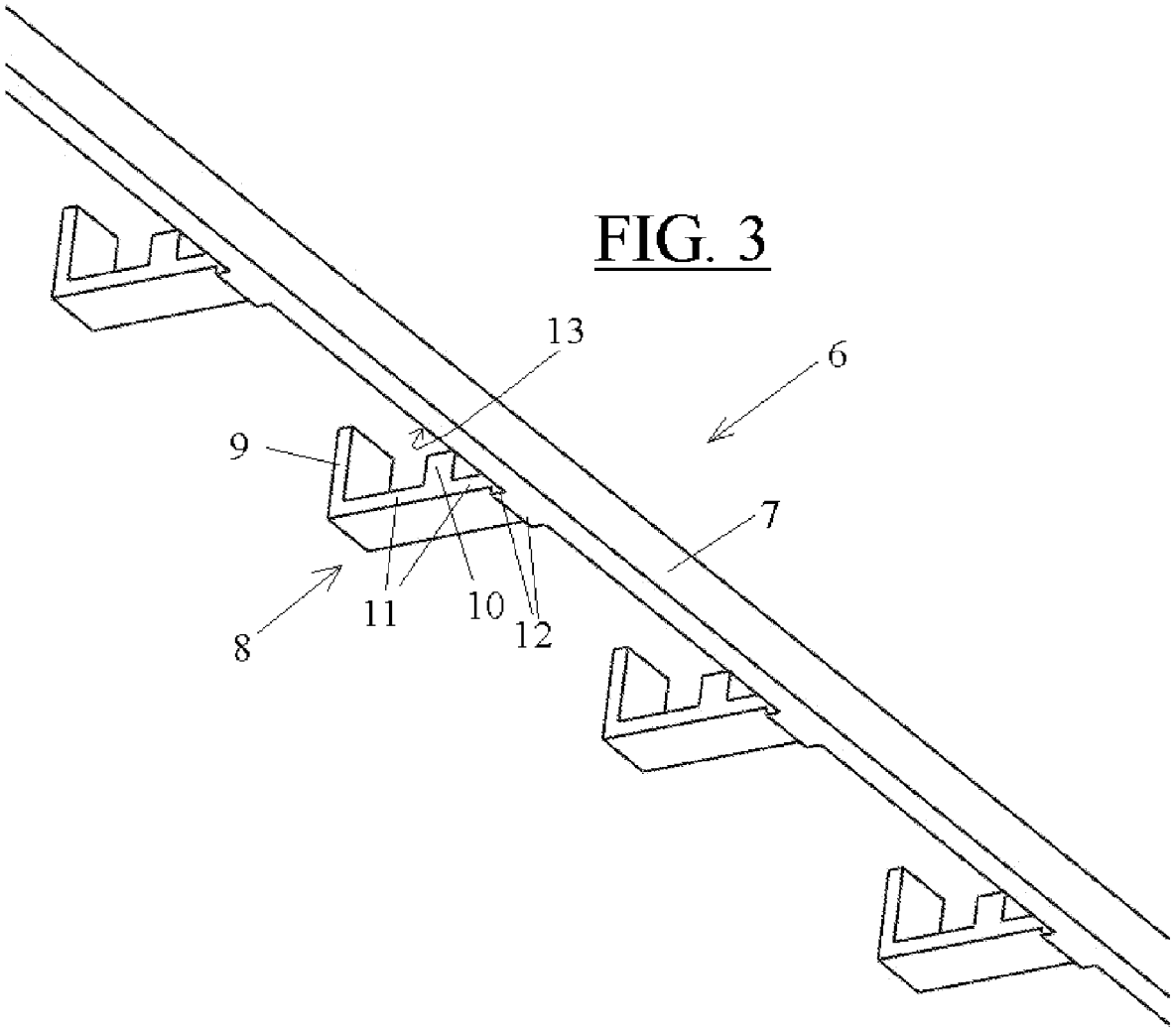


FIG. 3



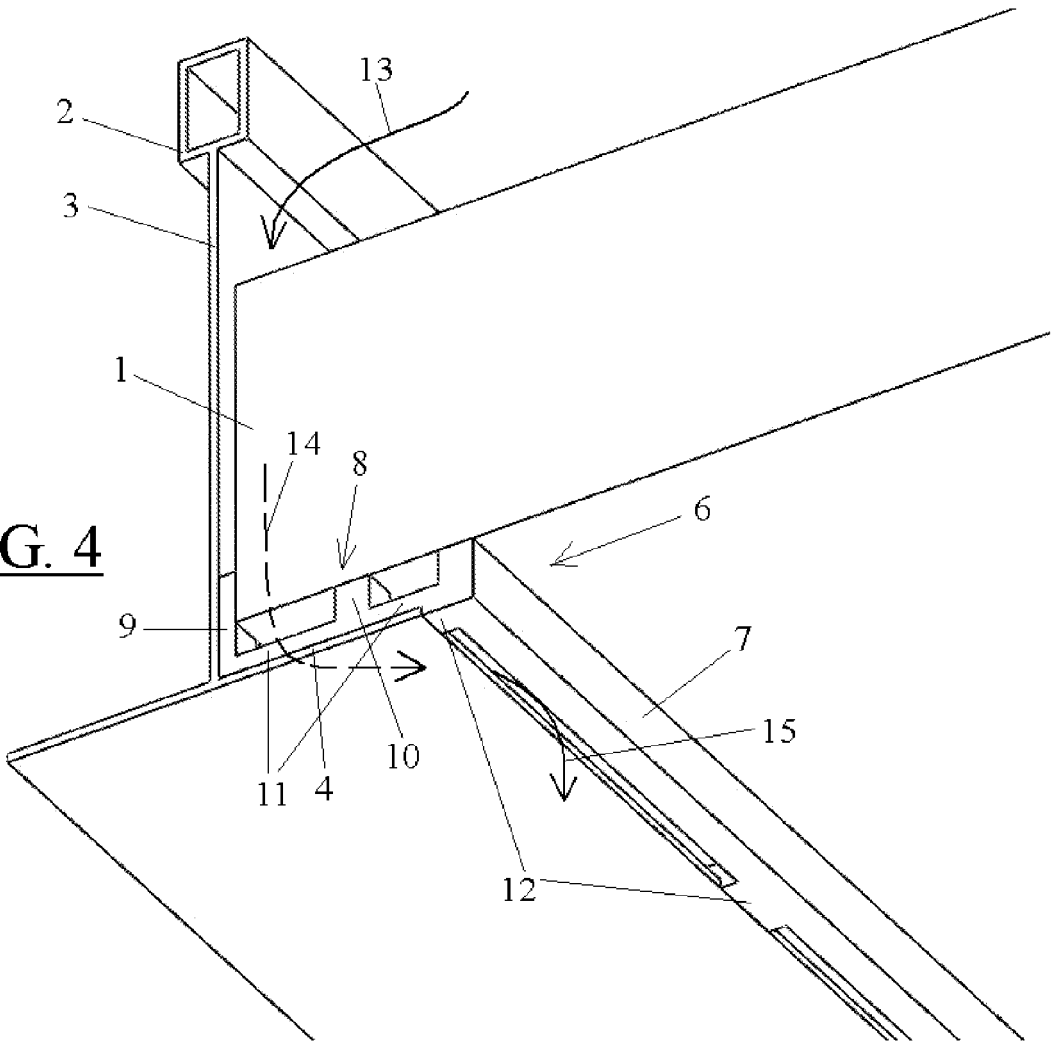


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 10 15 5585

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 A	US 3 207 057 A (BROWN DONALD A ET AL) 21 September 1965 (1965-09-21) * figure 3 * -----	1-3 4,5	INV. E04B9/02 E04B9/06 E04F13/08
X	US 3 475 869 A (JAHN REINHARDT H) 4 November 1969 (1969-11-04) * column 3, line 66 - column 4, line 10; figures 1-6 * -----	1-5	F24F13/072
X	US 4 611 444 A (NASSOF MARTIN [US]) 16 September 1986 (1986-09-16) * column 2, line 64 - column 3, line 14; figure 6 * -----	1-4	
X	US 3 429 250 A (KODARAS MICHAEL J) 25 February 1969 (1969-02-25) * figure 4 * -----	1-5	

TECHNICAL FIELDS SEARCHED (IPC)

E04B
E04F
F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 August 2010	Yates, John

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 15 5585

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19-08-2010

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EPO FORM P0459

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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