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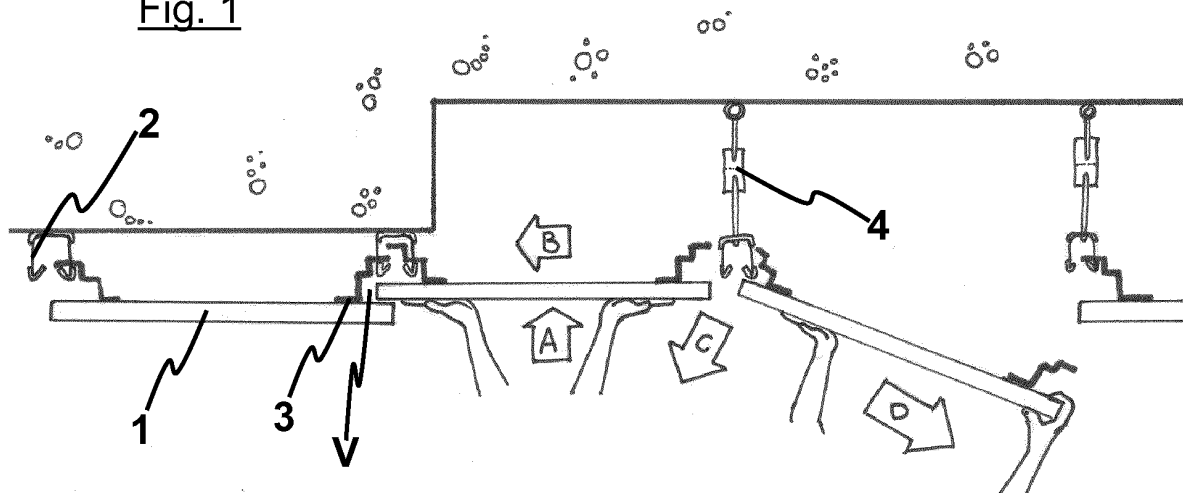
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(54) **False ceiling structure**

(57) The invention relates to a false ceiling structure, comprising false ceiling plates 1, profiles 2 for supporting said plates 1 for supporting two adjacent plates 1, parts 3 for supporting the plates 1 joined thereto and provided with a supporting flange 31, in which said parts 3 comprise at least a positioning element of the supporting flange 31 in respect to the profile 2, and the part 3 being

configured to allow the simultaneous displacement of said flange 31 over the bearing region on the profile 2 and of the plate 1 in the space V lying between the adjacent plate 1' and the supporting profile 2 when the part 3 and the plate 1 are moved upwards, such that it is possible to disengage the supporting part 3' of the supporting profile 2' in the side opposite the plate 1 and then rotate the plate 1 for removing it.

Fig. 1



Description

[0001] The present invention relates to a false ceiling structure having a high structural simplicity, which allows for a simple installation and removal and high-quality aesthetics, since the supporting profiles remain completely hidden. It also relates to a false ceiling structure, convenient to install and in which the supporting flanges remain hidden, without resorting to specific profiles.

Background of the invention

[0002] Different systems are known for hanging false ceilings composed of plates or trays suspended with hidden, visible and semi hidden profiles. Different forms of profiles support each of the three systems.

[0003] In the system with semi hidden or hidden profiles, plates or trays are supported on the posterior or front profile and are inserted into the opposite one thus completely or partially covering the profile. For the extraction of the plate, the supported part is raised until it can be disengaged from the opposite profile, at which time the plate invades the interior zone between the profile and the ceiling, in case of meeting any obstacle like the tensioners of the hanging system of the profiles or the passage of supply or service facilities, it is necessary to remove the plate or plates adjacent to displace it (them) laterally and remove the plate in this new position.

[0004] The use of standard systems limits the size of the plates in the direction perpendicular to the profiles to the same distance between said support profiles of the plates.

[0005] There are complex mechanisms, provided with cam systems, latches, screws or magnets, to allow disengage the plate without raising it.

[0006] Ceiling structures of the type comprising a false ceiling plates, profiles provided with a bottom flange and a web so as to define two tabs for the support of two adjacent plates, the plates being provided with a supporting and positioning tabs on the sides of support plates being disengageable by a rotation which implies the vertical displacement of one side followed by a translational displacement of the plate to the disengaged from the side on which the rotation has been made, are also known.

[0007] These structures are for example disclosed in the document US5311719.

[0008] However, this solution has the drawback that the support structure must have a special configuration or its supporting length has to be limited to half the width of the beam flange wing, thus originating stability limitations.

[0009] In US5024034 a similar structure is disclosed too, but whose attachment is based on a retractable part to be manipulated by a tool, to proceed to disengage the plate. This solution fits standard profiles, but has the disadvantage that the manipulation of the retractable part is quite complicated and requires an added tool.

Description of the invention

[0010] To overcome the abovementioned limitations, the invention provides for a false ceiling structure, comprising false ceiling plates, profiles for supporting said plates for supporting two adjacent plates, parts for supporting the plates joined thereto and provided with a supporting flange, and wherein said parts comprise at least a positioning element of the supporting flange in respect to the profile, and the parts are configured to allow the simultaneous displacement:

- of said flange over the bearing region on the profile and;
- of the plate in the space lying between the adjacent plate and the supporting profile;

when the part and the plate are moved upwards, such that it is possible to disengage the part from the supporting profile in the opposite side of the plate and then rotate the plate for removing it.

[0011] Advantageously, the supporting profile is provided with at least two portions with a vertical section provided with openings over which said supporting flanges are supported.

[0012] Preferably, these parts are small plates provided with five portions perpendicular with each other and in a stepped form, the first of these portions corresponding to the supporting flange, the second to an abutting and positioning portion that leans against a portion of the profile with a vertical section, two third and fourth portions which define a space between the part and the plate and a fixation portion of the part to the plate, the height of the fourth portion being greater than the height of the vertical portion of the profile arranged under the opening and the height of the opening being greater than the height of the second portion, such that it is possible to move the plate between two positions, one wherein the supporting flange leans on the opening and the second portion abuts with the profile thereby positioning the plate and another one wherein the plate is raised until said space lies in front of the vertical portion of the profile arranged under the opening and the second portion in front of the opening in which it is possible to move laterally the plate.

[0013] More preferably, the distance between the projection of the second portion of the part over the plate and the edge of the plate corresponds to half the horizontal width of the supporting profile.

[0014] Advantageously, the supporting profiles are U-inverted profiles.

[0015] More advantageously, the structure comprises bridles for hanging it on the supporting profiles.

[0016] Finally, the fixation portion is attached to the plate by a staple or an equivalent fixation element.

[0017] The invention also relates to a false ceiling structure, comprising false ceiling plates, profiles provided with a lower flange and a web such that two flanges are defined for supporting two adjacent plates, the plates

being provided with supporting and positioning flanges in the supporting sides, the plates being disengageable by a rotation involving the vertical displacement of one of the sides then followed by a translation displacement of the plate for disengagement of the side on which the rotation has been done, which is **characterised in that** the supporting and positioning flanges of one of the sides are fixed in respect to the plate, and the flanges of the opposite side are retractable, retracting the retractable flanges in the movement of translation displacement.

[0018] Therefore, the present invention combines the teachings of the two state of the art documents for obtaining a dismountable system by a simple displacement of the plate and which is compatible with commercial profiles.

[0019] According to a first variant of the invention, the supporting retractable flanges comprise a resilient plastic member, such that these flanges are retracted when pressing the web of the profile. Therefore, the stability of the plate is ensured by the retractable member which remains continuously pressed by the spring.

[0020] According to a second variant of the invention, the plates comprise a retractable member in the engagement region in the side opposite the plate, the retractable member of the engagement region being mechanically linked with the retractable flange such that the sliding of the retractable member end in the plate causes a sliding of the same length of the retractable flange.

[0021] In this second variant, it is the engagement by the opposite side which ensures that the flange protrudes for a correct support.

[0022] Preferably, according to this embodiment, the retractable member is a rod which is attached to the retractable flange.

[0023] The invention can be applied to wood, plaster or metallic plates.

[0024] Finally, the inferior portion of the plates has a width in the separation direction of the supporting profiles which is the same to the distance between consecutive profiles.

Brief description of the drawings

[0025] For a better understanding of what has been disclosed some drawings are attached in which, schematically and solely by way of non-limiting example, practical cases of embodiment are shown.

Figure 1 is a schematic section showing the process of dismounting a plate of a structure according to the invention.

Figure 2 is a perspective view in which the main components of the structure are shown.

Figure 3 is a detail of the supporting plate according to a preferred embodiment provided with a sixth fixation portion on the edge of the plate.

Figure 4 is a perspective view illustrating a detail of the supporting part, illustrating its attachment to the

plate by a staple and the profile provided with openings for the part.

Figure 5 shows schematically an alternative supporting part 3 in which the positioning element comprises two protrusions between which the bottom edge of the profile opening is fitted.

Figure 6 is a section showing an embodiment in which the plate has a width greater than the distance between two supporting profiles, and which is provided with supporting parts on the intermediate profiles.

Figure 7 shows an embodiment which employs a square profile and on top of which the supporting parts rests.

Figure 8 is a schematic section which shows the main components of the invention according to another embodiment, in which the plate is placed.

Figure 9 is a schematic section similar to figure 8 in which the plate has been disengaged.

Figure 10 is a detail of the supporting part of the plate in the retractable flange side.

Figure 11 is similar to Figure 10 but in which the flange is retracted.

Figures 12 to 14 show three steps of placement of a metal plate provided with internal rods.

Figure 15 shows the arrangement of the rods in the metal plate.

Figures 16 to 18 show three steps of placing a plaster plate provided with inner rods.

Figure 19 shows the arrangement of the rods in the plaster plate.

Description of preferred embodiments

[0026] The invention relates to a false ceiling structure, comprising false ceiling plates 1, profiles 2 for supporting said plates 1 for supporting two adjacent plates 1, parts 3 for supporting the plates 1 joined thereto and provided with a supporting flange 31.

[0027] The invention is **characterised in that** said parts 3 comprise at least a positioning element of the supporting flange 31 in respect to the profile 2, and the part 3 being configured to allow the simultaneous displacement:

- of said flange 31 over the bearing region on the profile 2 and;
- of the plate 1 in the space V lying between the adjacent plate 1' and the supporting profile 2;

when the part 3 and the plate 1 are moved upwards, such that it is possible to disengage the supporting part 3' of the supporting profile 2' in the side opposite of the plate 1 and then rotate the plate 1 for removing it.

[0028] The supporting profile 2 is provided with at least two portions 11, 12 with a vertical section provided with openings 13 over which said supporting flanges 31 are supported.

[0029] A structure as described can be done in many ways, although an embodiment in which these parts 3 are plates provided with five portions 31, 32, 33, 34, 35 perpendicular with each other and in a stepped form, as shown in figures 3 and 4, is preferred.

[0030] The first portion 31 corresponds to the supporting flange. The second one 32 corresponds to an abutting and positioning portion that leans against a portion 11 with a vertical section of the profile 2. The two portions third and fourth 33, 34 define a space between the part 3 and the plate 1. Finally the fifth one 35 is a fixation portion of the part 3 to the plate 1.

[0031] In this embodiment, for the invention to have an effect it is necessary that the height of the fourth portion 34 is greater than the height of the vertical portion of the profile arranged under the opening 13 and the height of the opening greater than the height of the second portion, such that it is possible to move the plate between two positions, one wherein the supporting flange leans on the opening and the second portion abuts with the profile thereby positioning the plate and another one wherein the plate is raised until said space lies in front of the vertical portion of the profile arranged under the opening 13 and the second portion in front of the opening 13 in which it is possible to move laterally the plate 1, displacement shown by the arrow B of figure 1.

[0032] The distance between the projection of the second portion 32 of the part 3 over the plate 1 and the edge of the plate 1 corresponds to half the horizontal width of the supporting profile 2, such that by the opposite side of the profile a plate identical will lie adjacent to the first plate.

[0033] For this purpose, the supporting profiles 2 are preferably U-inverted profiles.

[0034] As in other known structures, bridles 4 are provided for hanging it on the supporting profiles 2. If necessary, it is possible to directly fix the supporting profiles 2 to the ceiling as shown in figure 1.

[0035] There are several ways of attaching the parts to the plate, two of which are illustrated in Figures 3 y 4. In the first case the attachment is carried out in the edge of the plate 1 and in the second by means of a staple 5. It is possible to use screws, rivets, nuts recessed, welding, adhesives etc, as well.

[0036] In the embodiment described with reference to the drawings a supporting part 3 provided with five or six bent portions is described. This is an economical and reliable solution.

[0037] However, it will be apparent to one skilled in the art that other solutions are possible without departing from the scope of the first appended claim.

[0038] Specifically, the supporting portion in the profile 2 could be provided with a central engagement portion in the edge of the opening of the profile, for example by means of an inlaying. In this case the supporting part 3 could require to be made of only three portions, though with dimensions selected to allow the claimed displacement abilities, for example as schematically shown in figure 5.

ure 5.

[0039] Another solution might be, as seen in Figure 7, to use a square profile on which the supporting part rests, solution also encompassed by the present invention.

[0040] On the other hand, the skilled person will appreciate that in this preferred embodiment it is required that the supporting profiles are disposed with the openings for supporting the flanges facing each other, and therefore positioning profiles are provided for fixing with each other adjacent supporting profiles 2, which can be arranged diagonally as struts.

[0041] Figure 6 shows an embodiment in which the plate has dimensions greater than the distance between two adjacent supporting profiles 2, but in which supporting parts in the intermediate profiles are provided. In this case, it is also possible to remove the plate according to the present invention.

[0042] As can be seen in Figures 8 to 10, the invention also relates to a false ceiling structure, comprising plates 1' of a false ceiling, profiles 2' provided with a lower flange 3' and a web 4' such that two flanges are defined 41', 42' for supporting two adjacent plates 1', the plates being 1' provided with supporting and positioning flanges 5', 6' in the supporting sides, the plates being 1' disengageable by a rotation involving the vertical displacement of one of the sides then followed by a translation displacement of the plate 1' for disengagement of the side on which the rotation has been done.

[0043] These features being known, the invention is **characterized in that** the supporting and positioning flanges 5' of one of the sides are fixed in respect to the plate, and the flanges 6' of the opposite side are retractable, retracting the retractable flanges 6' in the movement of translation displacement.

[0044] Therefore, as can be seen in any of the two variants illustrated in the figures, for example in Figures 12 to 14, it is possible to disengage the plates without having to access the flange, simply by a means of a vertical movement of the left side of the plate, a permitted translation, since the flange is retractable, this translation allowing to release the engaged right end, after which the plate may be removed. The mounting would be to perform these actions in reverse order. Figures 16 to 18 describe the same process, but in the case of a plaster plate.

[0045] As illustrated in Figures 8 to 11, a first alternative would be that the supporting retractable flanges 6' comprise a resilient plastic member 7', such that these flanges 6' are retracted when pressing the web of the profile 4'.

[0046] According to another embodiment, the plates 1' comprise a retractable element 8' in the engagement region in the side opposite the plate 1', the retractable member being mechanically linked 8' of the engagement region with the retractable flange 6' such that the sliding of the retractable member end 8' in the plate 1' causes a sliding of the same length of the retractable flange 6'. Therefore, this embodiment omits the use of a spring, but uses a mechanical link between both sides of the

plate.

[0047] In this second variant, the retractable element 8 'is a rod 9' attached to the retractable flange 6', as illustrated in the plan views of the 8' and 12 '.

[0048] Finally, as illustrated for example in Figures 14 and 18, the inferior portion of the plates 1' has a width in the separation direction of the supporting profiles which is the same to the distance between consecutive profiles. As illustrated in Figures 1 'and 2', it is also possible that said width is a multiple of the distance between the profiles, so that a single plate 1 'can cover large areas.

[0049] Although reference has been made to specific embodiments of the invention, it is apparent to one skilled in the art that the false ceiling structure as described is susceptible to numerous variations and modifications, and that all the details mentioned can be replaced by other technically equivalent, without departing from the scope of protection defined by the appended claims.

[0050] Therefore the inventive structure solutions overcomes the prior art because it eliminates mechanisms, facilitates the extraction of the plates from the profiles, and in this system, all the plates are accessible in all the assemblies, which in turn, allows the mounting of plates which distance is greater than the distance between the profiles in any direction.

Claims

1. False ceiling structure, comprising false ceiling plates (1), profiles (2) for supporting said plates (1) for supporting two adjacent plates (1), parts (3) for supporting the plates (1) joined thereto and provided with a supporting flange (31), **characterized in that** said parts (3) comprise at least a positioning element of the supporting flange (31) in respect to the profile (2), and the part (3) being configured to allow the simultaneous displacement:

- of said flange (31) over the bearing region on the profile (2) and;
 - of the plate (1) in the space (V) lying between the adjacent plate (1') and the supporting profile (2);
- when the part (3) and the plate (1) are moved upwards, such that it is possible to disengage the supporting part (3') of the supporting profile (2') in the side opposite the plate (1) and then rotate the plate (1) for removing it.

2. Structure according to the previous claim, wherein the supporting profile (2) is provided with at least two portions (11, 12) with a vertical section provided with openings (13) over which said supporting flanges (31) are supported.
3. Structure according to the previous claim, wherein said parts (3) are plates provided with five portions

(31, 32, 33, 34, 35) perpendicular with each other and in a stepped form, the first of these portions (31) corresponding to the supporting flange, the second (32) to an abutting and positioning portion that leans against a portion (11) with a vertical section of the profile (2), two portions third and fourth (33, 34) which define a space between the part (3) and the plate (1) and a fixation portion (35) of the part (3) to the plate (1), the height of the fourth portion being (34) greater than the height of the vertical portion of the profile arranged under the opening (13) and the height of the opening greater than the height of the second portion, such that it is possible to move the plate between two positions, one wherein the supporting flange leans on the opening and the second portion abuts with the profile thereby positioning the plate and another one wherein the plate is raised until said space lies in front of the vertical portion of the profile arranged under the opening (13) and the second portion in front of the opening (13) in which it is possible to move laterally the plate (1).

4. Structure according to the previous claim, wherein the distance between the projection of the second portion (32) of the part (3) over the plate (1) and the edge of the plate (1) corresponds to half the horizontal width of the supporting profile (2).
5. Structure according to any of the previous claims, in which the supporting profiles (2) are U-inverted profiles.
6. Structure according to any of the previous claims, comprising bridles (4) for hanging it on the supporting profiles (2).
7. Structure according to any of the previous claims, wherein the fixation portion is attached to the plate by a staple (5).
8. Structure according to any of the previous claims, wherein the length of the plate is a multiple of the distance between adjacent supporting profiles, the plate being provided with intermediate supporting parts.
9. False ceiling structure, comprising plates (1') of a false ceiling, profiles (2') provided with a lower flange (3') and a web (4') such that two flanges are defined (41', 42') for supporting two adjacent plates (1'), the plates being (1') provided with supporting and positioning flanges (5', 6') in the supporting sides, the plates being (1') disengageable by a rotation involving the vertical displacement of one of the sides then followed by a translation displacement of the plate (1') for disengagement of the side on which the rotation has been done, **characterized in that** the supporting and positioning flanges (5') of one of the sides

are fixed in respect to the plate, and the flanges (6') of the opposite side are retractable, retracting the retractable flanges (6') in the movement of translation displacement.

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10. Structure according to claim 9, in which the supporting retractable flanges (6') comprise a resilient plastic member (7'), such that these flanges (6') are retracted when pressing the web of the profile (4').

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11. Structure according to claim 9, in which the plates (1') comprise a retractable member (8') in the engagement region in the side opposite the plate (1'), the retractable member being mechanically linked (8') of the engagement region with the retractable flange (6') such that the sliding of the retractable member end (8') in the plate (1') causes a sliding of the same length of the retractable flange (6').

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12. Structure according to claim 11, in which the retractable member (8') is a rod (9') which is attached to the retractable flange (6').

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13. Structure according to any of the previous claims 11 or 12, in which the plates (1') are made of wood, plaster or metal.

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14. Structure according to any of the previous claims 9 to 13, in which the inferior portion of the plates (1') has a width in the separation direction of the supporting profiles which is the same to the distance between consecutive profiles.

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Fig. 1

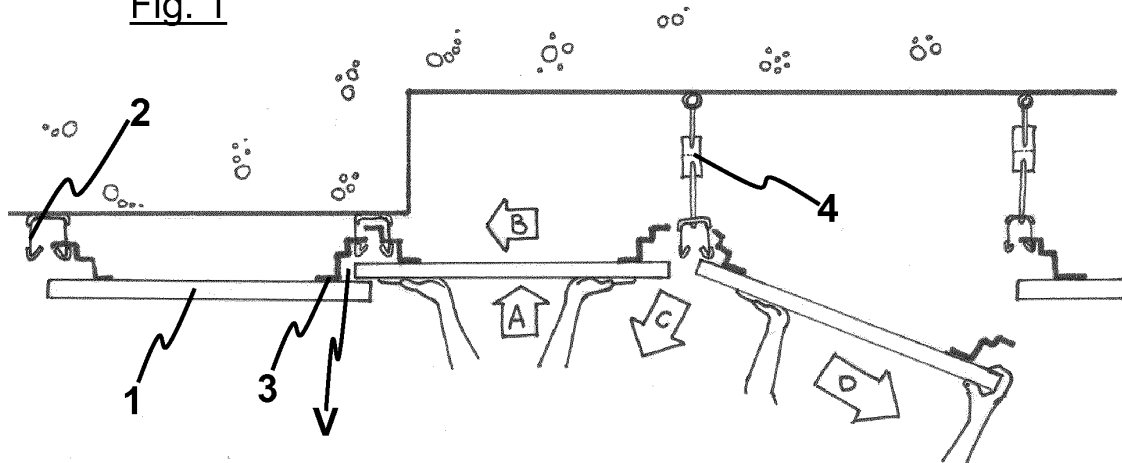


Fig. 2

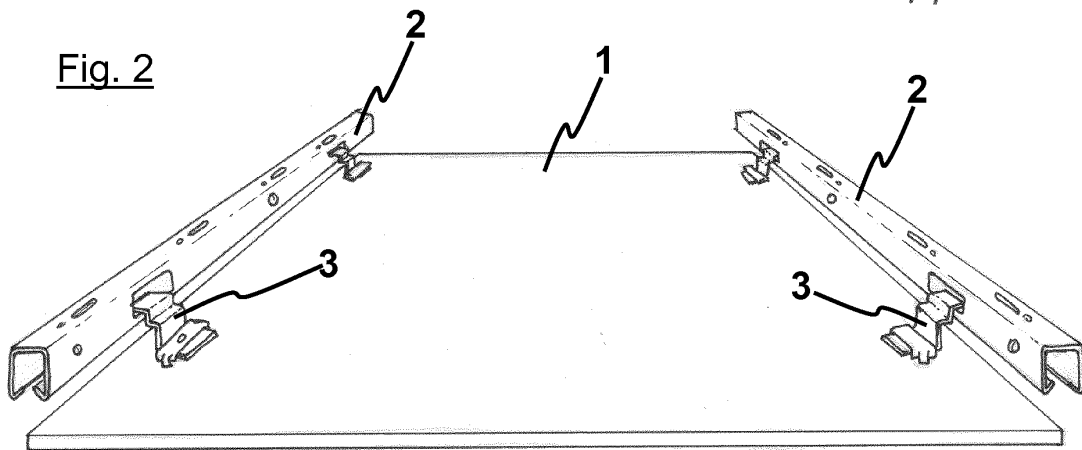


Fig. 6

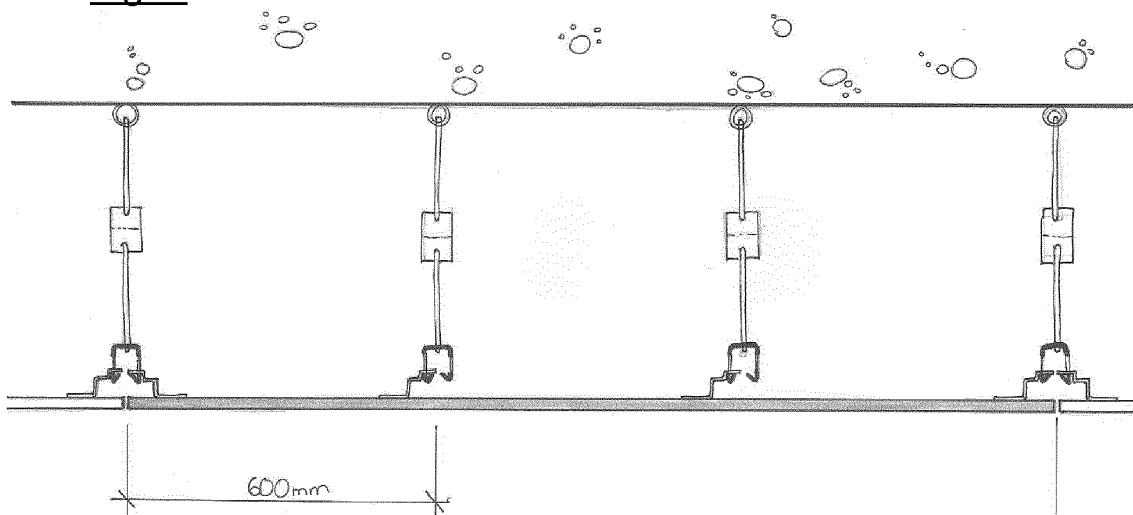


Fig. 3

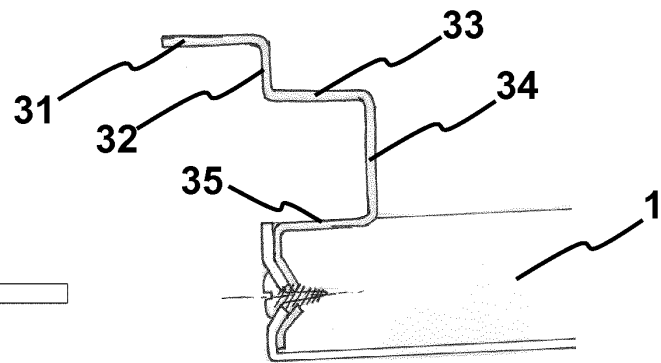


Fig. 5

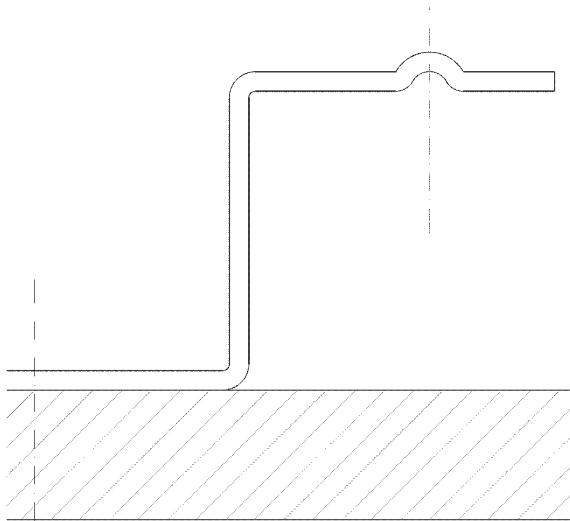


Fig. 4

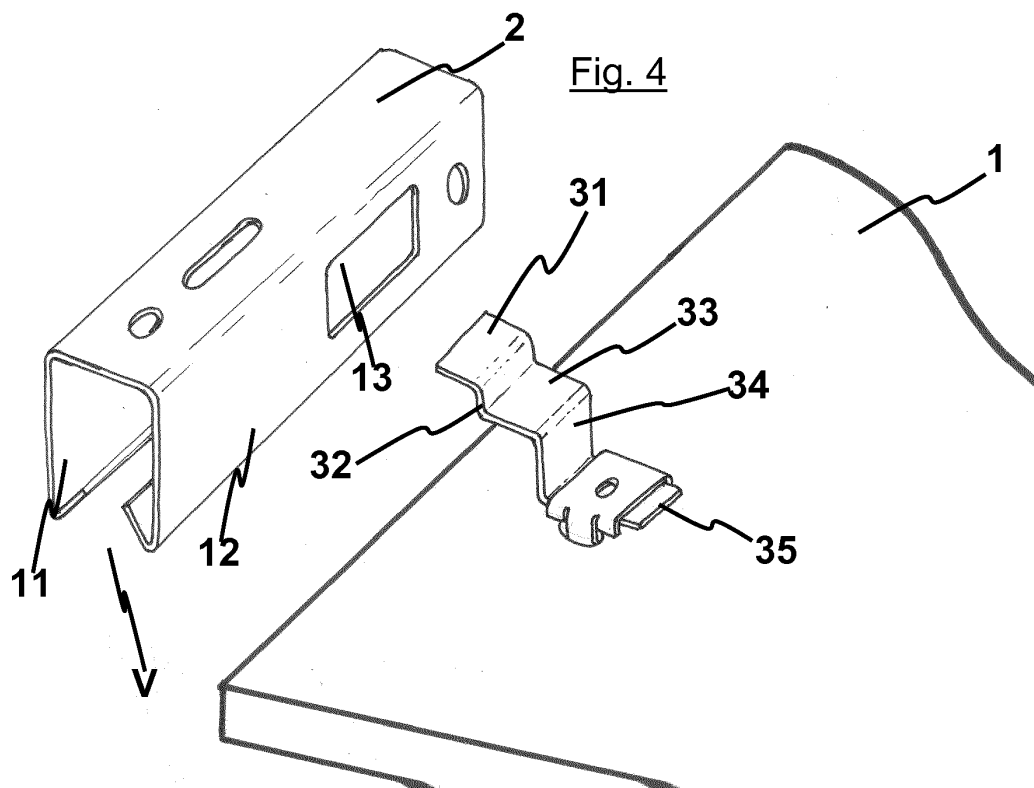
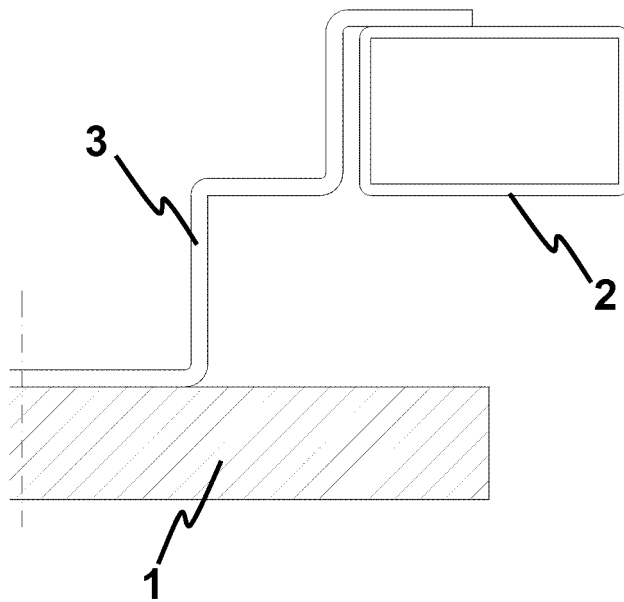
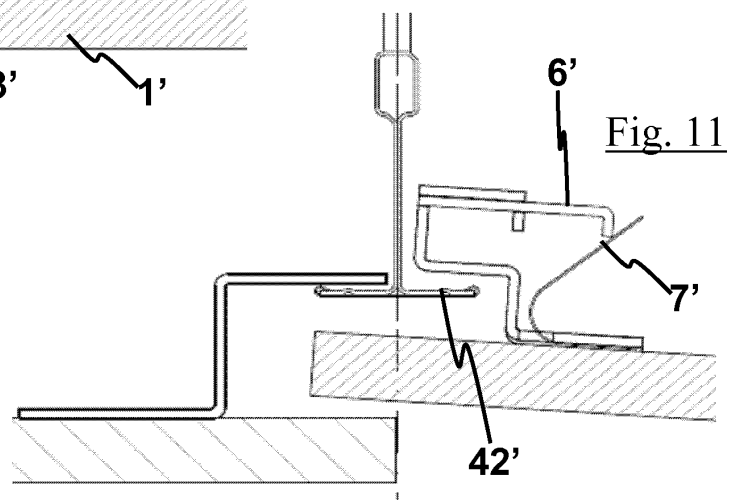
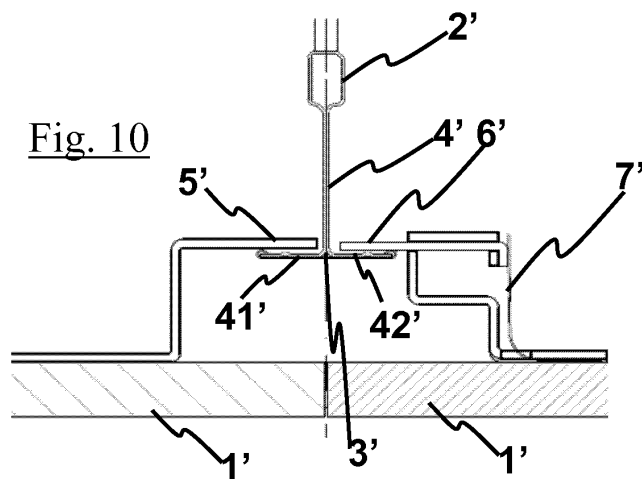
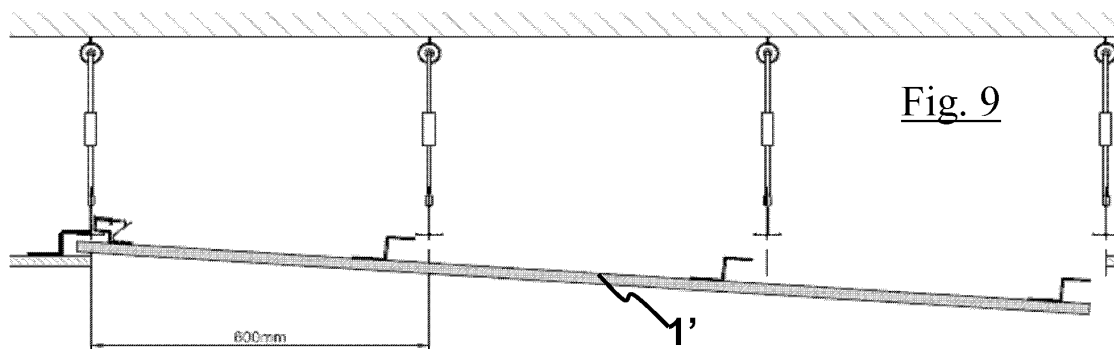
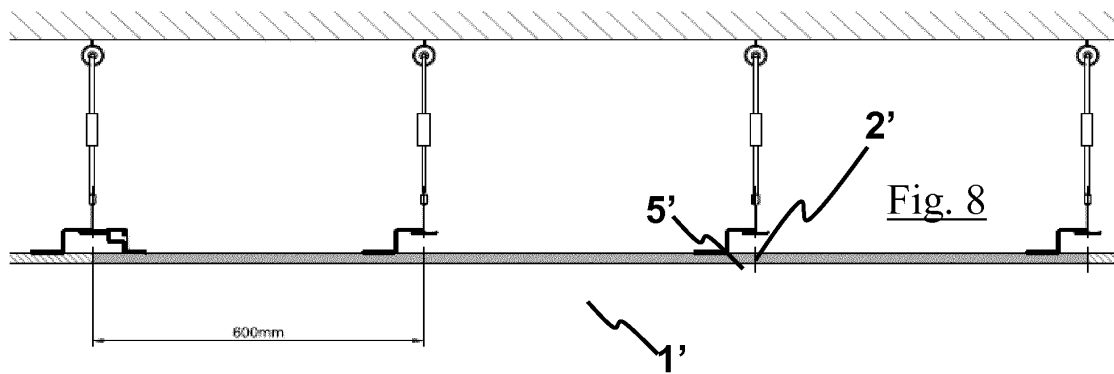


Fig. 7





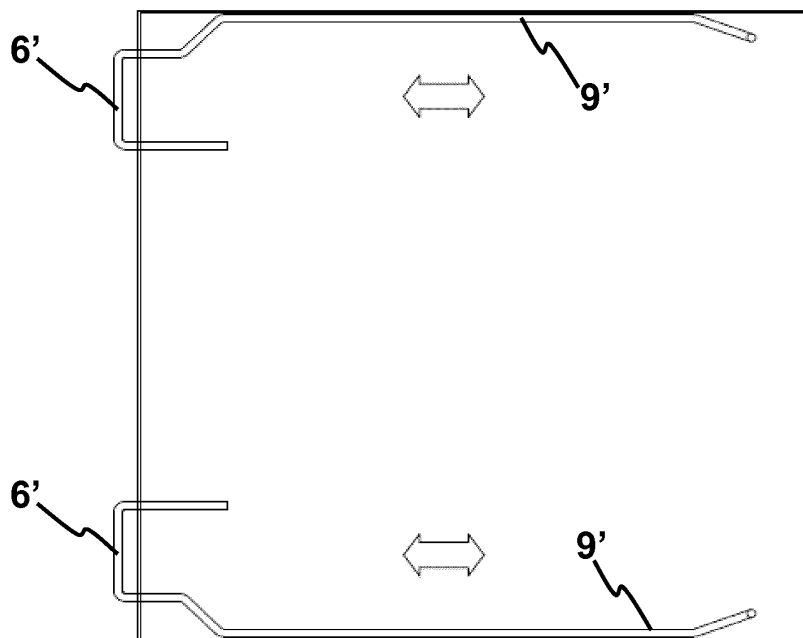
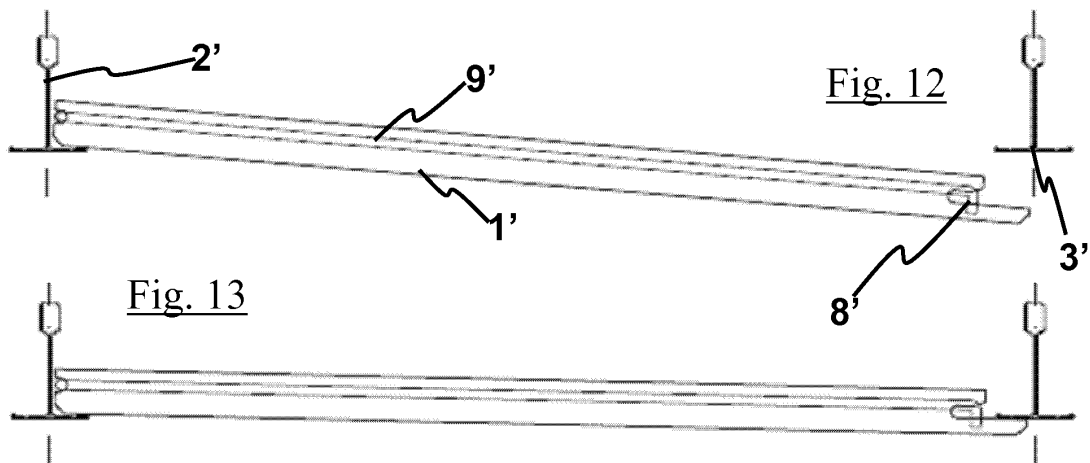
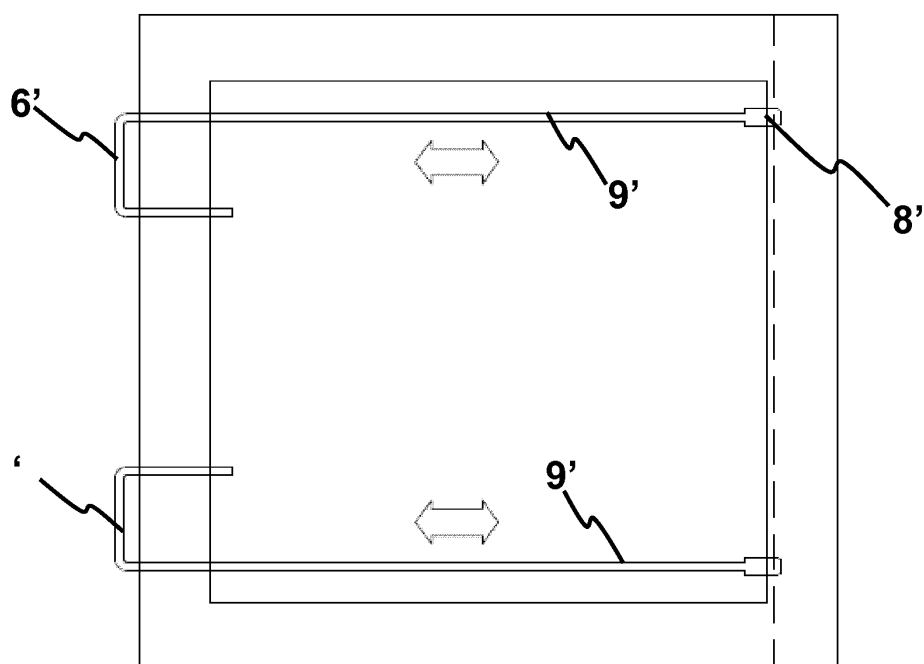
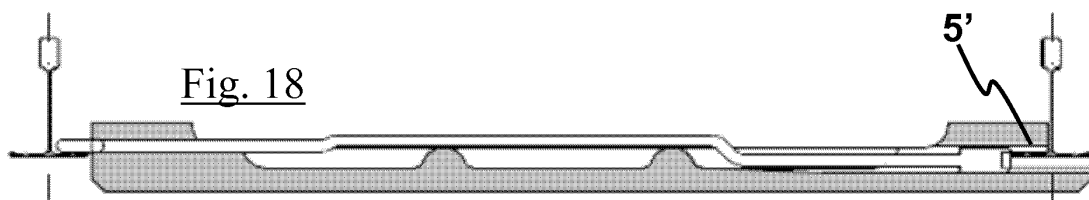
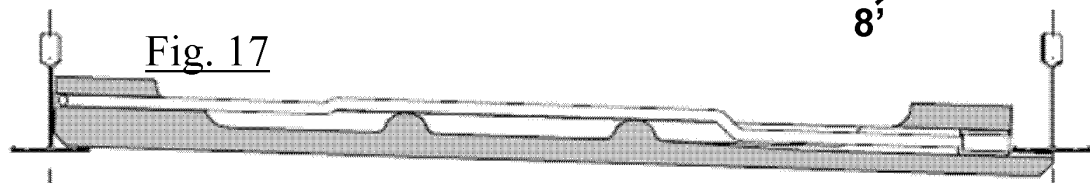
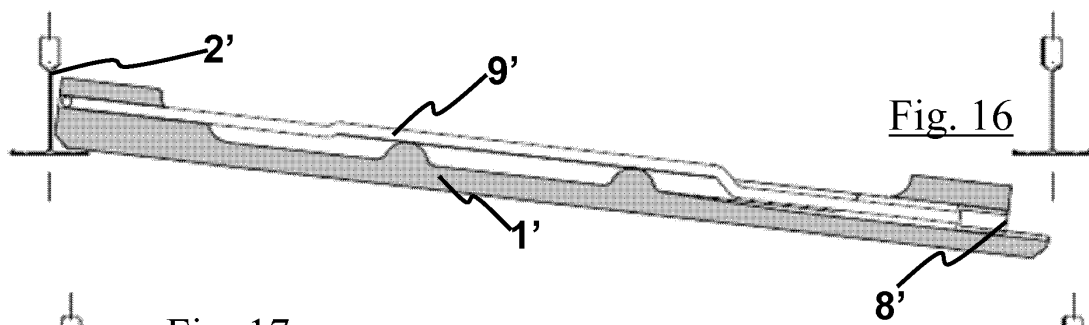


Fig. 15



REFERENCES CITED IN THE DESCRIPTION

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