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(54) **A BUILDING SYSTEM AND A BRACKET FOR SUCH BUILDING SYSTEM**

GEBÄUDESYSTEM UND KLAMMER FÜR SOLCH EIN GEBÄUDESYSTEM

SYSTÈME DE CONSTRUCTION ET SUPPORT POUR UN TEL SYSTÈME DE CONSTRUCTION

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Description

[0001] The present invention relates to a building system with at least one profile and at least one bracket for attaching a building element to a profile, said profile having a bottom and two side walls defining an opening in the profile.

[0002] Such a bracket for a building system is described in WO 2013/079070 A1. This bracket consists of a bi-stable spring having two positions, an open position and a closed position, respectively. The bracket is designed for being inserted in the profile of a building element.

[0003] International patent application WO 2011/033148A1 describes a panel fastening device comprising a baseplate and a catch both being produced from a non-ferromagnetic material. The catch being movable longitudinally on said baseplate and comprising a magnet or magnetic part, such that said magnet moves the catch towards a closed position on the baseplate when the panel is located in the erection position and the magnet is close to a metal framework for supporting roof or wall panels that carry the closure device. This device utilizes a magnetic connection by moving a catch into a locked position when being attracted by a metal counterpart. However, the connection is not magnetically releasable after it has once been locked in position.

[0004] AU 2006202122A1 discloses a connection system for interconnecting two elements such as panels in abutting relationship. The connection system comprises an abutting face on each panel. Magnets are accommodated in recesses in the vertical sides of the panels adjacent the abutting faces for attracting the two faces into face-to-face abutting relationship for the sake of ease installation. The locking of panels is secured by separate restraint means. Thus the magnets are only considered installation means.

[0005] US 3,292,328 discloses a self-supporting panel partition with magnetic latch means therefor. The disclosure generally relates to partitions and, in particular, to demountable partitions for use within buildings utilizing a standard magnetic attachment system using permanent magnets simply in order to retain panels in position.

[0006] EP-A-1 467 039 discloses a wall comprising panel parts and post parts which are attached magnetically to each other by permanent magnets provided with holders, wherein mutual influencing of the magnets is prevented.

[0007] In DE 102005015270 an adjustable direct suspension device for ceiling and wall profiles is disclosed which has body whose external contour corresponds approximately to internal contour of profile. The body has a screw in the form of an adjustment screw with a union sleeve. The body is trapezoidal and has two grooves corresponding to the profile edges.

[0008] FR2534986A1 shows a system according to the preamble of claim 1.

[0009] It is an object of the invention to provide a build-

ing system and a bracket therefor for mounting building components on a profile of a building element, which allows for easy attachment of the bracket.

[0010] This object is achieved by a building system of the initially mentioned kind, wherein the side walls and bottom of the profile form a dovetailed profile opening where the profile side walls hereby form an angle of less than 90° with the profile bottom, and wherein the bracket comprises flexible side engagement members that are adapted to be biased against the side walls of the profile for mounting the bracket therein.

[0011] In a building system according to the invention, a building element can be attached to a profile in a simple manner by using a bracket.

[0012] According to the invention, the bracket comprises a mounting plate a bi-stable plate spring, which is pivotally connected at both ends to side engagement members at the innermost edges thereof and that the side engagement members are connected at their outermost edges to the mounting plate.

[0013] After insertion of the bracket into the profile the bi-stable plate spring abuts the side engagement members against the side walls of the profile whereby a pressure is exerted and locking position is achieved. It is found advantageous that the bracket is attachable to and also detachable from the profile simply by manipulating the bi-stable plate spring. To further increase the securing strength of the profile and the retention of the bracket in the profile, the side walls and plate parts are suitably dovetailed. Accordingly, the side walls and bottom of the profile form a dovetailed profile opening where the profile side walls hereby form an angle of less than 90° with the profile bottom.

[0014] In other words, the axis of the spring, even if it is bendable, provides a strong locking force of the bracket in the profile in the locked position.

[0015] The bi-stable plate spring may preferably be made of a strip of leaf spring steel.

[0016] According to the invention, the bi-stable plate spring is attached to the side engagement members with a curved configuration, so that during insertion into the opening of the profile the curved plate spring abuts against the bottom of the profile whereby a pressure is exerted on the plate spring so that it is substantially straightened into a stable locking position.

[0017] In an advantageous use of the building system and the bracket according to the invention, at least one bracket is mounted onto an exterior wall panel, at the mounting plate thereof for attachment of the wall fitting to the profile.

[0018] In an embodiment of the invention, a tongue of a magnet sensitive material is provided on the underside of the spring whereby an expedient manner of releasing the bracket from the profile is obtained without having to use tools which is especially advantageous if the bracket is hidden.

[0019] Preferably, this outer covering on the outer side of the mounting plate can be obtained by a wall lining

being mounted on the outer side of the mounting plate. The bracket can be designed for the mounting of various building components, simply by suitable design of the mounting plate. The building components could include wall linings, wall covering panels and similar exterior building covers, as well as electric sockets, sanitary equipment and other wall mounted building equipment, including furniture, bathroom fitting etc. It is also realised that the brackets can be used for retaining water pipes, electrical cables or the like inside the groove opening of the profile.

[0020] The side walls of the profile may advantageously be provided with ribs. This increases the retention of the bracket inside the profile to prevent any vertical displacement of the bracket relative to the profile.

[0021] In the following the invention is described in further detail with reference to the drawings in which

Fig. 1 shows a building element with insulation material prior to being provided with a wall lining;

Fig. 2 shows a bracket in a first operation mode for attaching on the building element;

Fig. 3 shows the bracket in fig 2 in a second operation mode;

Fig. 4 shows an alternative embodiment of a bracket in a first operation mode for attachment in a building element;

Fig. 5 shows the bracket according to fig. 4 in a second operation mode, whereas

Figs. 6 - 8 show the fundamental operation principles of the bracket according to figs. 4 and 5;

Figures 9-11 show another embodiment of a bracket for a building system according to the invention.

Fig. 12 shows a schematic perspective view of a bracket in relation to the second embodiment.

[0022] Fig. 1 shows a building element shown as an insulation material 1 enclosed by plate parts provided with profiles defining one or more profile openings or profile grooves for receiving mounting brackets therein.

[0023] Each opening comprises a bottom 4 and rails with side walls 2, 3 having a dovetailed cross section or in other words, having inclined walls 2, 3 which narrow down from the bottom 4 towards the opening of the profile. The side walls 2, 3 hereby form an angle of less than 90° with the profile bottom 4.

[0024] The building elements can be mounted adjacent each other to form a building system, such as a wall, ceiling or separation deck of a building.

[0025] The inside walls 2, 3 of the rails facing towards the opening of the profile may be provided with ribs 11,

11a as shown in figs. 2 and 3 intended for engaging with the sides of the bracket. The bracket may be provided with complementary ribs (not shown).

[0026] Referring to figs. 2 and 3, the construction of a first embodiment for a bracket is now explained in detail.

[0027] The bracket basically comprises a mounting plate 8, side engagement members 7, 7a and a plate spring 5, which is pivotally hinged at both ends to the innermost edges of the side engagement members 7, 7a. By the term "innermost" is meant the edges facing towards the bottom 4 of the profile. At the outermost edge of the side engagement members 7, 7a, the engagement parts 7, 7a, connect to the mounting plate 8.

[0028] One or more brackets may be attached to a wall lining 10, such as an exterior inner or outer wall panel, which thereby is mountable to the building element.

[0029] The mounting plate 8 has edges 9, 9a shown as bent parts of the mounting part 8. These edges 9, 9a are to engage with the bent edges of the plate-like side engagement members 7, 7a for the retention of the mounting plate 8 between the edges and thereby retain the mounting plate 8 in the bracket between the side engagement members 7, 7a whilst allowing for an angular displacement there between as the bracket is locked in the profile (see description thereof below). The mounting plate 8 may extend along the entire length of the profile or have a width for instance similar to the side engagement members 7, 7a and/or the plate spring 5. The mounting plate 8 and the side engagement members 7, 7a may be attached in a pivotally engagement either as a permanent attachment or a loose attachment.

[0030] The plate spring 5 is of the bi-stable type having a first stable form with a convex curvature as shown in fig. 2, and a second stable form where the plate spring 5 is straight, as shown in fig. 3.

[0031] The side engagement members 7, 7a end at the innermost top in hinges 14, 14a shaped as rotary joints with plate parts 6, 6a to which the ends of a curved spring 5 is attached whereas the opposite ends of the plate parts are attached on the hinges 14, 14a. It is realised by the invention that the other means of angularly displaceable attachment than hinges may be provided.

[0032] Furthermore, the outer sides of the side engagement members 7, 7a may be provided with ribs, not shown, for engagement with the ribs 11, 11a on the profiles of the building element.

[0033] In fig. 2, the bracket is shown prior to being inserted in the profile of the building element shown in fig. 1. The inclined walls of the building element engage with ribs on the outer side of the side engagement members 7, 7a (not shown).

[0034] When the bracket is guided from the position in fig. 2 into the profile, the convex curved plate spring 5 abuts on the bottom 4 whereas the side engagement members 7, 7a are close to the walls of the plate parts 2, 3. As the bracket is then further pressed into the profile opening, the plate spring 5 will be caused to transform its shape from the first stable form to the second straight

form and thereby cause the side engagement members 7, 7a into engagement with the profile side walls 2, 3, preferably even such that the plate spring 5 exercise a spring force on the side engagement members 7, 7a and thereby enhances the surface engagement between the side engagement members 7, 7a and the profile side walls 2, 3.

[0035] In this way, a very strong coupling is obtained as the spring in straight condition can absorb significant compressive forces, which means that the bracket cannot be removed easily from the profile.

[0036] The spring is constructed as a bi-stable spring causing the coupling of the bracket to the profile being able to be carried out as a "click coupling" with the spring being clicked in place from the position in fig. 2 to the position in fig. 3.

[0037] In a further embodiment of the invention, a tongue 12 is shown in figs. 2 and 3, the tongue is magnetically sensitive. This tongue 12 is attached to the interior surface of the spring 5 near the plate part 6. As shown, the tongue 12 is detached of the spring at its free end.

[0038] The function of the tongue 12 is the following: When the bracket is guided from the position in fig. 2 to the position in fig. 3, the tongue 12 will be in the position in fig. 2 when the spring 5 meets the bottom, in this position the tongue is pointing downwards as it follows the movement of the plate part 6. When the bracket is locked inside the profile opening in the position shown in fig. 3 the tongue 12 points somewhat outwards.

[0039] If the tongue is subjected to magnetic forces in the position in fig. 3, the tongue will be pulled outwards and click the bi-stable spring 5 whereby the plate part 6 can be released from the building element 1 after which the spring will be in the curved position in fig. 2.

[0040] In this way, a hidden mounting of a wall lining 10 can be removed from a building element without use of tools other than a magnet.

[0041] It is also to be noted that it is possible to provide spacers (not shown) on the bottom 4 of the profile resulting in the spring straightening and leaving a small space between the spring and the bottom 4 upon contact with the spaces.

[0042] Referring to figs. 4 - 8, an alternative construction of the bracket is shown.

[0043] In these figures, mounting blocks are designated 16, 17 and are connected to each other by a spring 19 of the bi-stable type. On the outer side of the mounting blocks 16, 17, ribs 18, 18a are provided for engaging ribs on a building element - not shown - with parallel ribs.

[0044] In the figures, a pawl 20 extending from the mounting block 17 is shown. A corresponding pawl 20a is on the mounting block 16 which cannot be seen in the figure but which is shown in the following figures.

[0045] In fig. 4, the bracket is shown in a position with a curved spring before being inserted in the rails of the building element, whereas fig. 5 shows the bracket in a position in which it has been inserted into the building

element and with a stretched spring.

[0046] Referring to figs. 6 - 8, the fundamental construction of the bracket is explained.

[0047] The figures show the spring 19 and pawl 20 and the pawl 20a.

[0048] These pawls 20, 20a are connected to the ends of the spring 19.

[0049] Finally is seen a U-shaped block, a magnet sensitive mass, lifting and clicking the bi-stable spring as shown in fig. 6.

[0050] If the pawls 20, 20a are forced up, the spring 19 will be in the stretched position in fig. 7.

[0051] When the spring is clicked and guided back to the curved, unlocked position, the pawls 20, 20a pivot down. Fig. 8 shows the position of the pawls when the bracket is removed from the profile. The connecting pieces 21, 21a follow the magnet sensitive mass 22 and function as levers that fall into notches under the pawls which thereby are retained when the bi-stable spring is stretched, i.e. straightened, to the locked position. The pawls disengage the connecting pieces when the magnet sensitive mass is lifted and first the connecting pieces tilt and then the bi-stable spring clicks into the position shown in fig. 6.

[0052] With reference to figures 9-11, a second embodiment of a bracket is shown in a building system according to the invention. A profile of the same kind as shown in figures 1-3 is provided. This profile has a bottom 4 and side walls 2, 3 whereby the groove or opening is formed in which a bracket is received.

[0053] The bracket, which is shown in fig. 9 prior to mounting in the profile groove opening, is made from sheet metal which is folded into a U-like shape with a bracket mounting plate portion 8 and two upright side engagement members 7, 7a with exterior wing flanges 22, 22a provided on the distal ends of said side engagement members 7, 7a.

[0054] The sheet metal of preferably 0.5-1.5 mm in thickness provides a flexibility of the bracket, in particular the side engagement members 7, 7a will flex as the bracket is advanced into the groove opening of the profile to the position as shown in fig. 10. This flexibility in the sheet metal provides a biasing force which forces the side engagement members 7, 7a and their exterior wing flanges 22, 22a onto the side walls 2, 3 of the profile and thereby provides a firm retention of the bracket in the profile groove opening. The side walls 2, 3 are preferably provided with ribs 11, 11a. The exterior wing flanges 22, 22a are provided with indentations 24, 24a on their exterior distal edges. These indentations engage with the ribs 11, 11a on the side walls 2, 3 to further increase the retention force.

[0055] As also shown in figs. 9-11, the bracket can be pre-mounted on a wall panel 10. The wall panel 10 can be mounted via screws 13 (see fig. 11) or other means. The advantage of this building component mounting according to the invention is also that the profile itself is not penetrated by any fastening means and the profile re-

mains intact and provides a vapour barrier for the building system.

[0056] Additionally, the space between the bottom 4 of the profile and the bracket mounting plate portion 8 leaves a room for e.g. pipes, cables or other building installations.

[0057] The brackets may have a relative small length covering only a small portion of the groove opening in the profile or the bracket could have a "full" length, i.e. the same length as the profile. If the brackets are relatively narrow, e.g. made of strips of material, it is also realised that several brackets can be mounted in the same profile groove opening. With reference to fig. 12, such a short bracket according to the second embodiment, which is also described above with reference to figures 9-11, is shown before being mounted in the profile groove.

Claims

1. A building system comprising at least one profile having a bottom (4) and two side walls (2, 3) defining an opening in the profile, and at least one bracket on a wall panel attachable to said profile, the side walls (2, 3) and bottom (4) of the profile form a dovetailed profile opening where the profile side walls (2, 3) hereby form an angle of less than 90° with the profile bottom (4), the bracket comprises flexible side engagement members (7, 7a) that are adapted to be biased against the side walls (2, 3) of the profile for mounting the bracket therein, wherein the bracket comprises a mounting plate (8) and a bi-stable plate spring (5), **characterized in that** said spring (5) is pivotally connected at both ends to the flexible side engagement members (7, 7a) at the innermost edges thereof and that the flexible side engagement members (7, 7a) are connected at their outermost edges to the mounting plate (8), where said flexible side engagement members (7, 7a) are biased against the side walls (2, 3) of the profile by the bi-stable plate spring (5) having a first stable form with a convex curvature and a second stable form where the bi-stable plate spring (5) is substantially straightened into a stable locking position and thereby cause the flexible side engagement members (7, 7a) into engagement with the profile side walls (2, 3), and **in that** the bi-stable spring (5) is attached to the flexible side engagement members (7, 7a) with a curved configuration, so that during insertion into the opening of the profile the curved bi-stable plate spring (5) abuts against the bottom (4) of the profile whereby a pressure is exerted on the bi-stable plate spring (5) so that it is straightened into a stable locking position.
2. A building system according to claim 1, wherein the bracket is made from sheet metal which is folded

into a U-like shape with a bracket mounting plate portion and two upright side engagement members with exterior wing flanges provided on the distal ends of said side engagement members.

3. A building system according to claim 2, wherein the flanges are provided with indentations.
4. A building system according to any of the preceding claims, wherein the side walls of the profile are provided with ribs.
5. A building system according to any of claims 1-4, wherein at least one bracket is mounted onto a wall fitting, such as an exterior wall panel, at the mounting plate thereof for attachment of the wall fitting to the profile.
6. A method of removing, in the building system of any of the claims 1-5, said bracket mounted on a wall panel from said profile, the building system including a tongue of magnetically sensitive material provided on the underside of the spring, using a magnet to pull said tongue outwards and click the bi-stable spring.

Patentansprüche

1. Gebäudesystem umfassend mindestens ein Profil aufweisend einen Boden (4) und zwei Seitenwände (2, 3), die eine Öffnung im Profil definieren, und mindestens eine Klammer auf einer Wandplatte, die am Profil befestigt werden kann, indem die Seitenwände (2, 3) und der Boden (4) des Profils eine schwalbenschwanzförmige Profilöffnung bilden, wodurch die Profilseitenwände (2, 3) einen Winkel von weniger als 90° mit dem Profilboden (4) bilden, indem die Klammer flexible Seiteneingriffselemente (7, 7a) umfasst, die dafür ausgelegt sind, gegen die Seitenwände (2, 3) des Profils zum Montieren der Klammer darin vorgespannt zu werden, wobei die Klammer eine Montageplatte (8) und eine bistabile Plattenfeder (5) umfasst, **dadurch gekennzeichnet, dass** die Feder (5) an beiden Enden mit den flexiblen Seiteneingriffselementen (7, 7a) an den innersten Kanten davon drehbar verbunden ist, und dass die flexiblen Seiteneingriffselemente (7, 7a) an den äußersten Kanten mit der Montageplatte (8) verbunden sind, wo die flexiblen Seiteneingriffselemente (7, 7a) gegen die Seitenwände (2, 3) des Profils durch die bistabile Plattenfeder (5) mit einer ersten stabilen Form mit einer konvexen Krümmung und einer zweiten stabilen Form vorgespannt sind, wo die bistabile Plattenfeder (5) im Wesentlichen in eine stabile Verriegelungsposition ausgerichtet ist und dadurch die flexiblen Seiteneingriffselemente (7, 7a) in Eingriff mit den Profilseitenwänden (2, 3) bringen, und dass

die bistabile Feder (5) an den flexiblen Seiteneingriffselementen (7, 7a) mit einer gekrümmten Ausformung befestigt ist, so dass die gekrümmte bistabile Plattenfeder (5) während der Einführung in die Öffnung des Profils gegen den Boden (4) des Profils anliegt, wodurch ein Druck auf die bistabile Plattenfeder (5) ausgeübt wird, so dass sie in eine stabile Verriegelungsposition ausgerichtet wird.

2. Gebäudesystem nach Anspruch 1, wobei die Klammer aus Metallblech hergestellt ist, das zu einer U-ähnlichen Form gefaltet ist mit einem Klammermontageplattenteil und zwei aufrechtstehenden Seiteneingriffselementen mit Außenflügelanschlüssen auf den distalen Enden der Seiteneingriffselemente.
3. Gebäudesystem nach Anspruch 2, wobei die Flansche mit Einschnitten versehen sind.
4. Gebäudesystem nach einem der vorgehenden Ansprüche, wobei die Seitenwände des Profils mit Rippen versehen sind.
5. Gebäudesystem nach einem der Ansprüche 1-4, wobei mindestens eine Klammer auf einer Wandbefestigung, wie beispielsweise einer Außenwandplatte, an der Montageplatte davon zum Befestigen der Wandbefestigung am Profil montiert ist.
6. Verfahren zum Entfernen, im Gebäudesystem nach einem der Ansprüche 1-5, der Klammer, die auf einer Wandplatte montiert ist, vom Profil, indem das Gebäudesystem eine Zunge aus einem magnetisch empfindlichen Material enthält, die auf der Unterseite der Feder vorgesehen ist, unter Verwendung eines Magneten zum Ziehen der Zunge nach außen und Klicken der bistabilen Feder.

Revendications

1. Système de construction comprenant au moins un profilé ayant un fond (4) et deux parois latérales (2, 3) définissant une ouverture dans le profilé, et au moins un support sur un panneau de paroi pouvant être fixé audit profilé, les parois latérales (2, 3) et le fond (4) du profilé formant une ouverture de profilé en queue d'aronde où les parois latérales de profilé (2, 3) forment ainsi un angle inférieur à 90° avec le fond de profilé (4), le support comprenant des éléments de mise en prise latéraux flexibles (7, 7a) qui sont adaptés pour être sollicités contre les parois latérales (2, 3) du profilé pour monter le support à l'intérieur de celui-ci, le support comprenant une plaque de montage (8) et un ressort à lame bistable (5),

caractérisé en ce que ledit ressort (5) est relié de manière pivotante au niveau des deux extré-

mités aux éléments de mise en prise latéraux flexibles (7, 7a) au niveau des bords les plus à l'intérieur de ceux-ci, et en ce que les éléments de mise en prise latéraux flexibles (7, 7a) sont reliés au niveau de leurs bords les plus à l'extérieur à la plaque de montage (8), lesdits éléments de mise en prise latéraux flexibles (7, 7a) étant sollicités contre les parois latérales (2, 3) du profilé par le ressort à lame bistable (5) ayant une première forme stable avec une courbure convexe et une deuxième forme stable, le ressort à lame bistable (5) étant essentiellement redressé dans une position de verrouillage stable et amenant ainsi les éléments de mise en prise latéraux flexibles (7, 7a) en prise avec les parois latérales de profilé (2, 3), et en ce que le ressort bistable (5) est fixé aux éléments de mise en prise latéraux flexibles (7, 7a) avec une configuration incurvée si bien que, pendant l'insertion dans l'ouverture du profilé, le ressort à lame bistable incurvé (5) vient en butée contre le fond (4) du profilé, une pression étant exercée sur le ressort à lame bistable (5) si bien qu'il est redressé dans une position de verrouillage stable.

2. Système de construction selon la revendication 1, dans lequel le support est fait de tôle qui est pliée dans une forme de U avec une partie de plaque de montage de support et deux éléments de mise en prise latéraux verticaux avec des brides d'aile extérieures prévues sur les extrémités distales desdits éléments de mise en prise latéraux.
3. Système de construction selon la revendication 2, dans lequel les brides sont pourvues d'indentations.
4. Système de construction selon l'une quelconque des revendications précédentes, dans lequel les parois latérales du profilé sont pourvues de nervures.
5. Système de construction selon l'une quelconque des revendications 1 à 4, dans lequel au moins un support est monté sur un raccord mural, tel qu'un panneau mural extérieur, au niveau de sa plaque de montage pour la fixation du raccord mural au profilé.
6. Procédé d'élimination, dans le système de construction de l'une quelconque des revendications 1 à 5, dudit support monté sur un panneau de paroi à partir dudit profilé, le système de construction comprenant une languette de matériau magnétiquement sensible disposée sur la face inférieure du ressort, à l'aide d'un aimant pour tirer ladite languette vers l'extérieur et cliquer le ressort bistable.

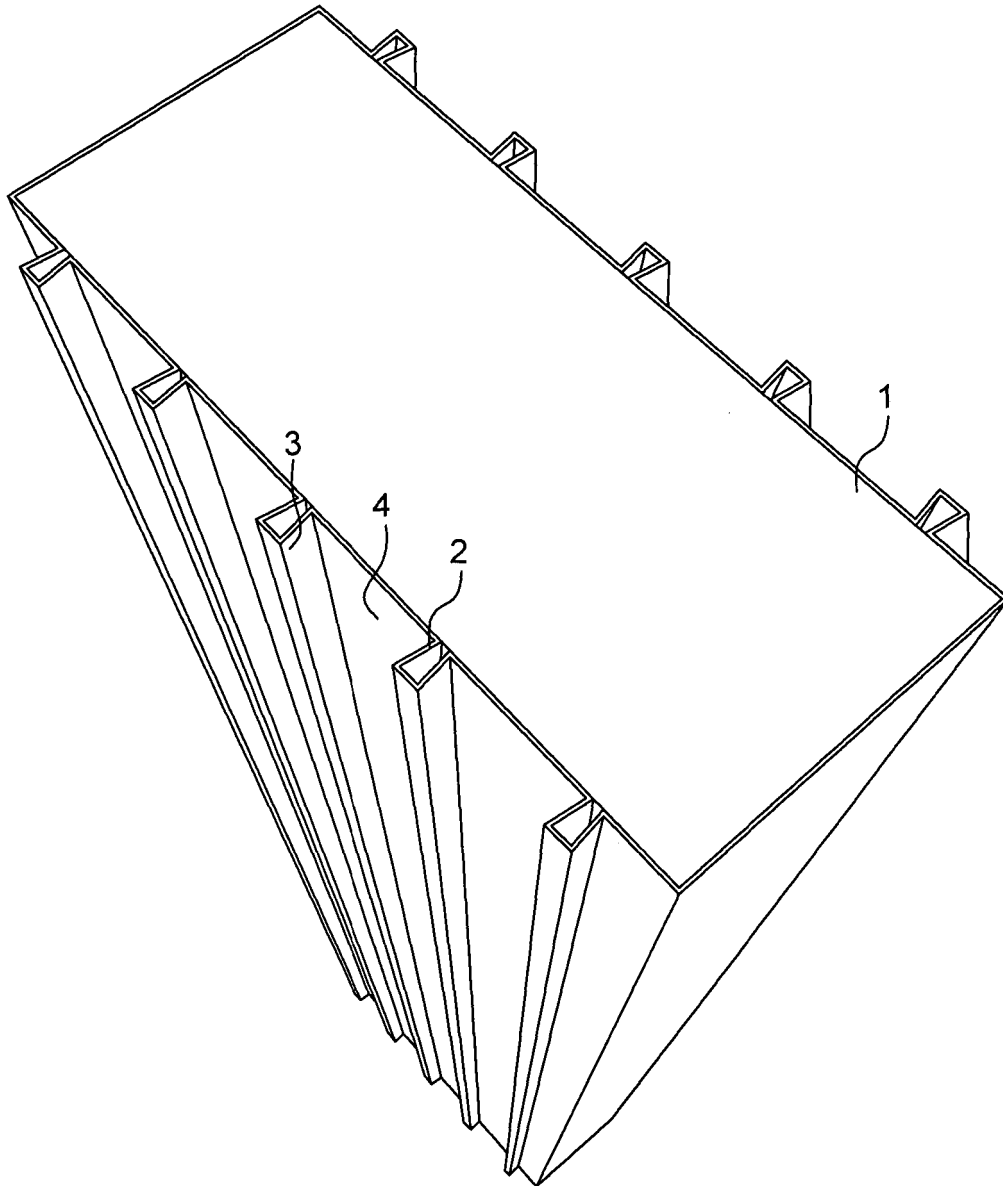


FIG. 1

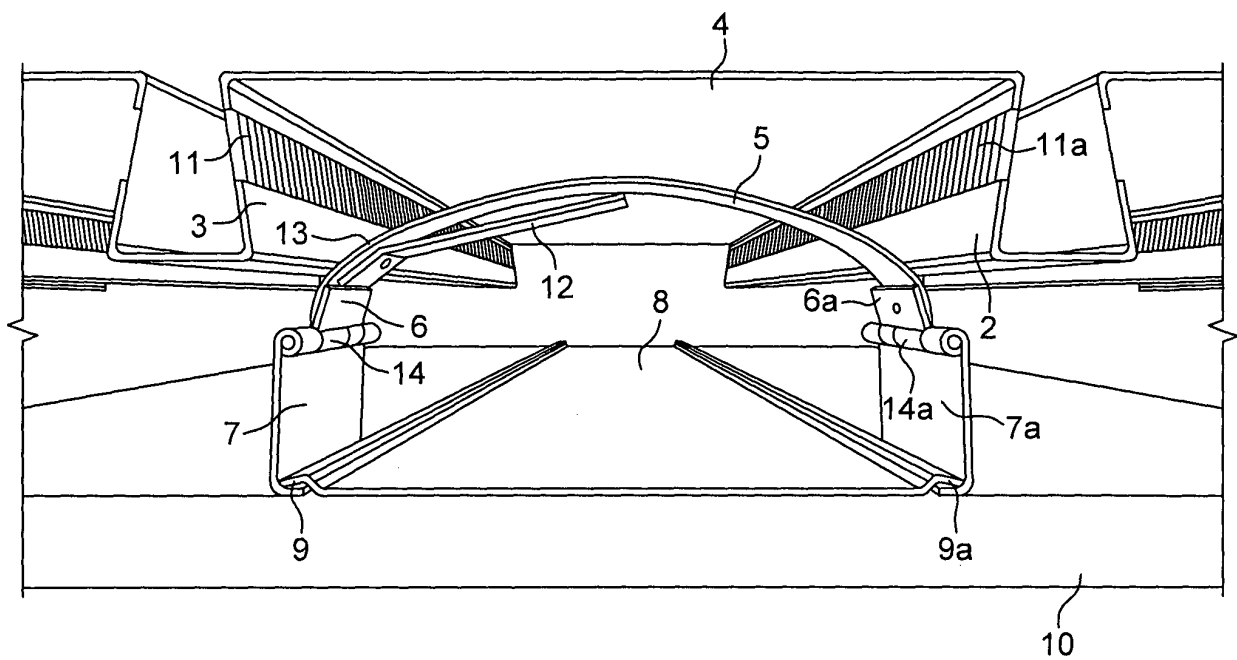


FIG. 2

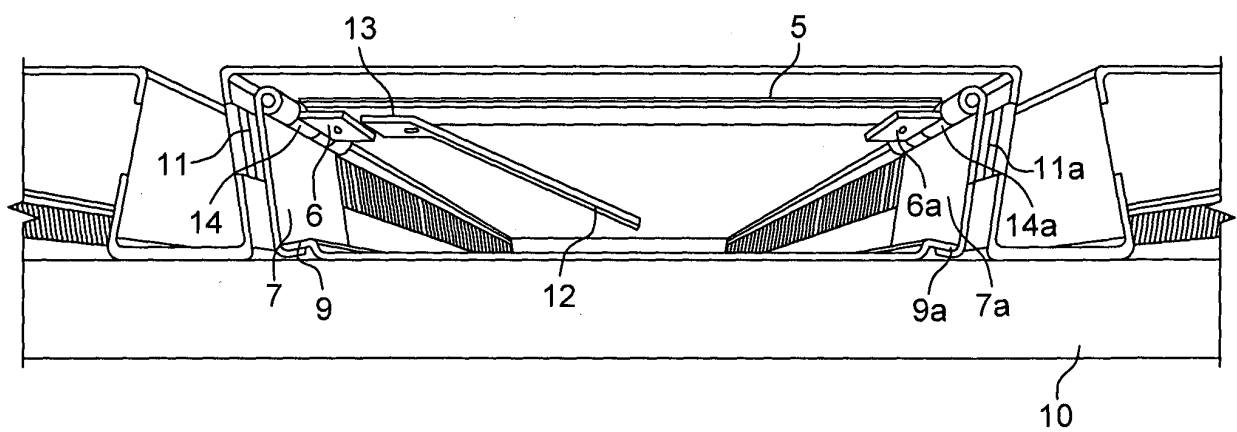


FIG. 3

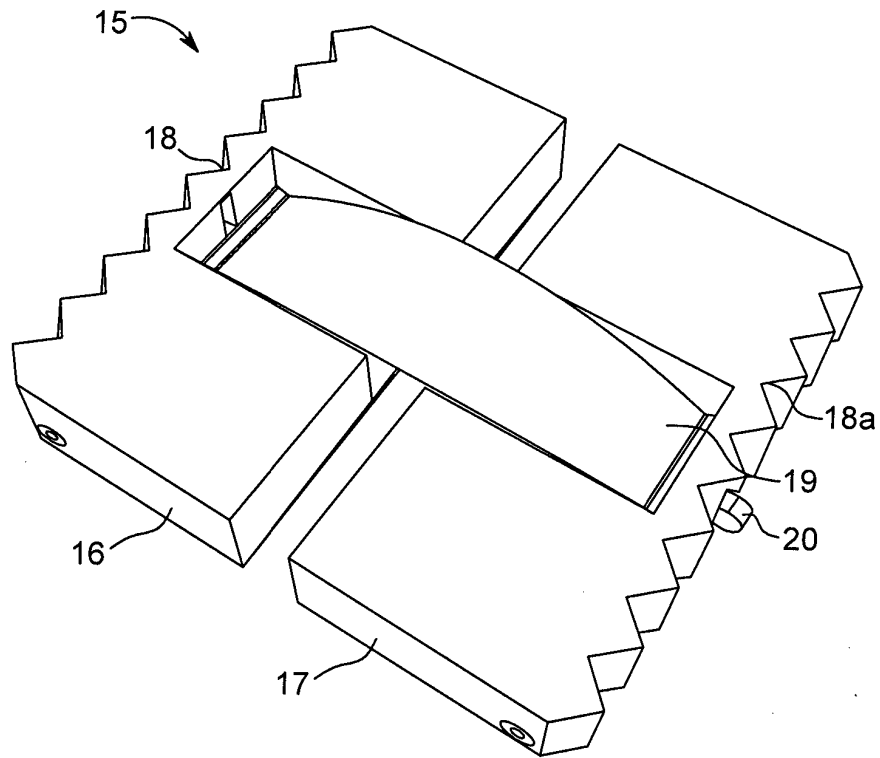


FIG. 4

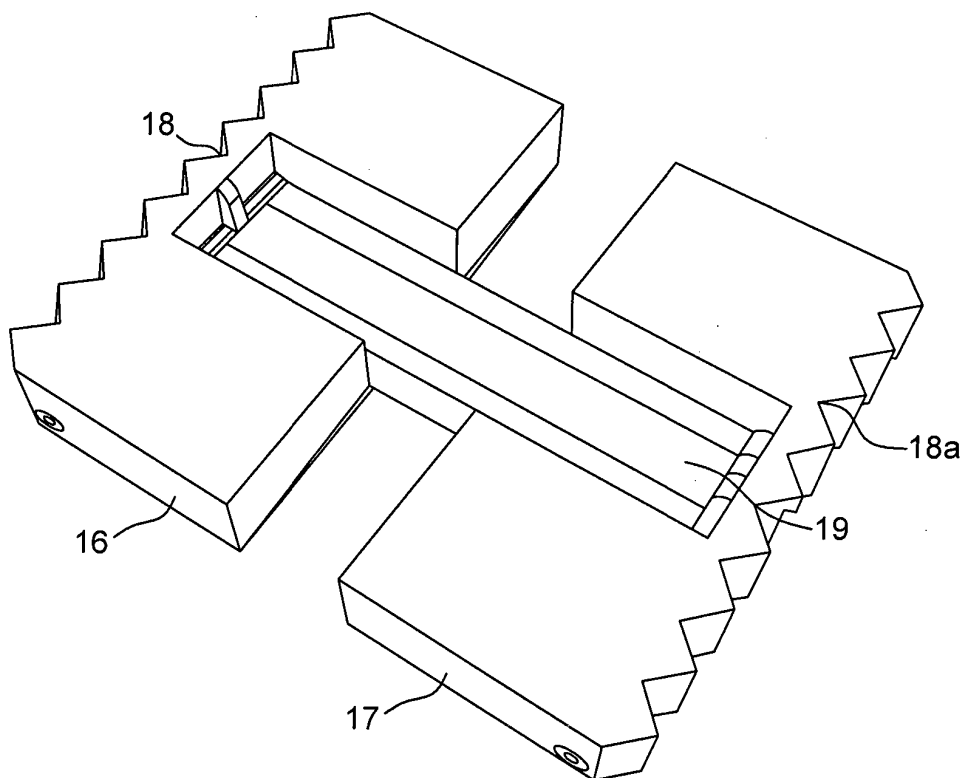


FIG. 5

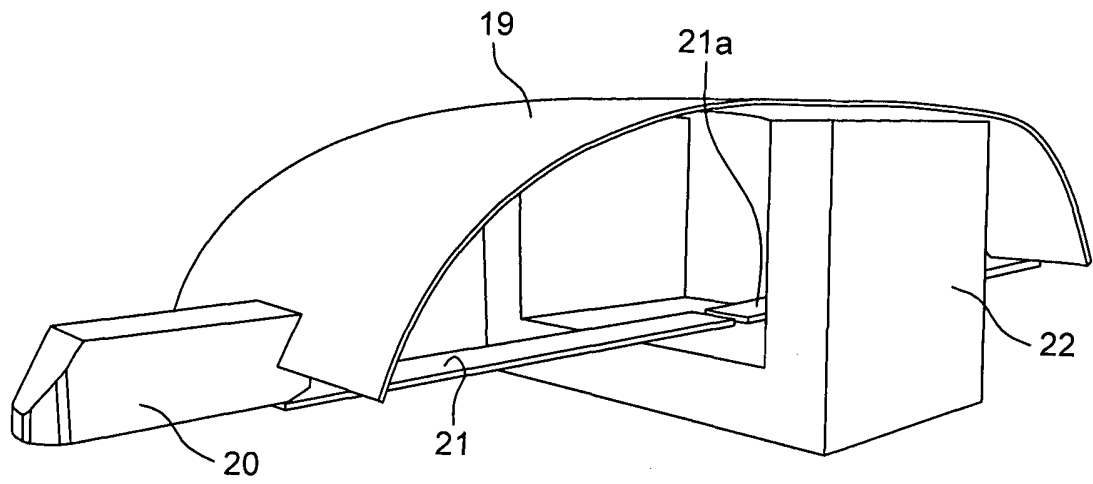


FIG. 6

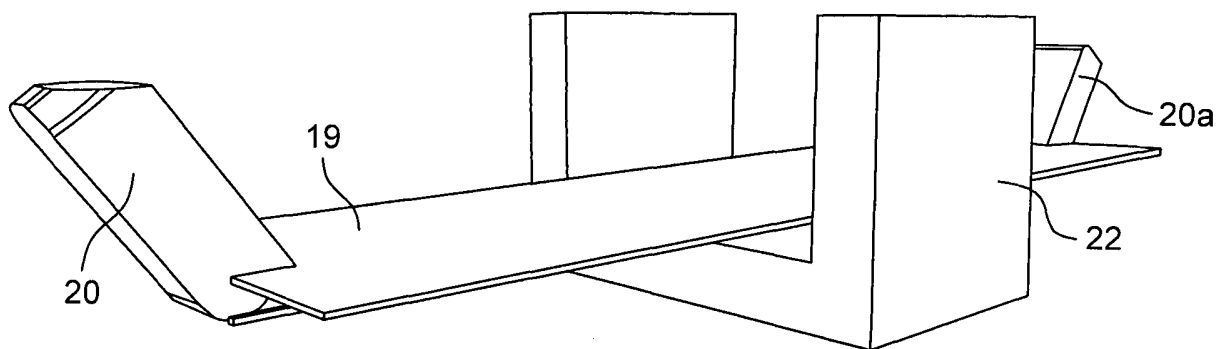


FIG. 7

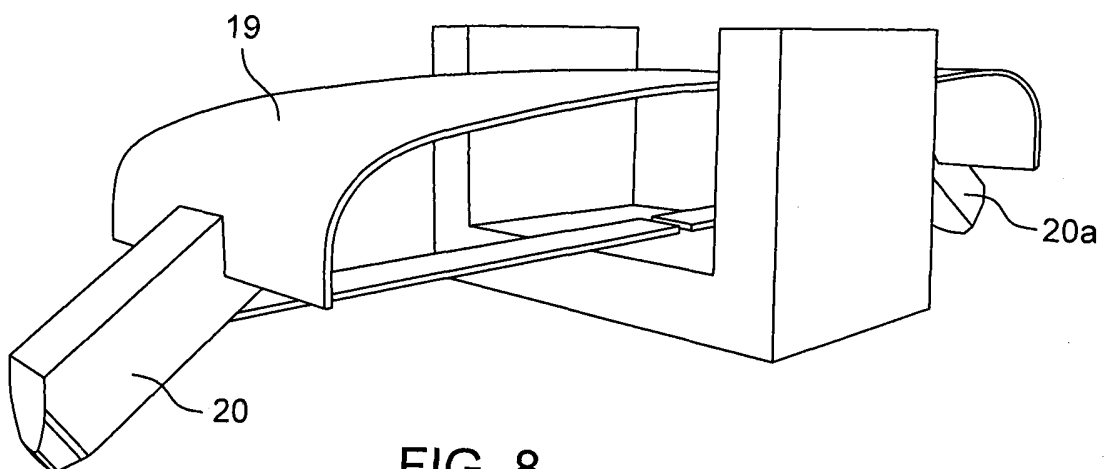


FIG. 8

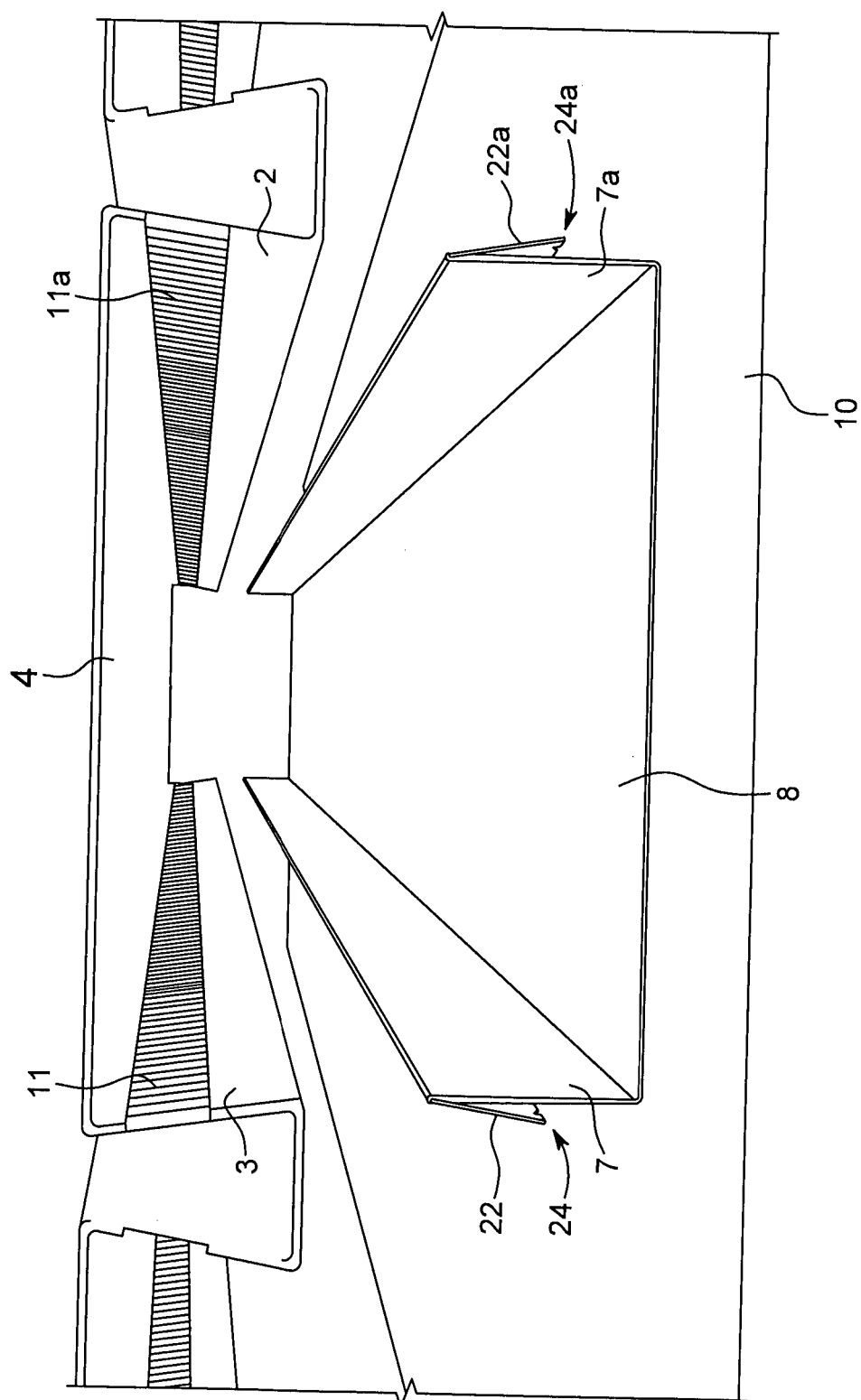


FIG. 9

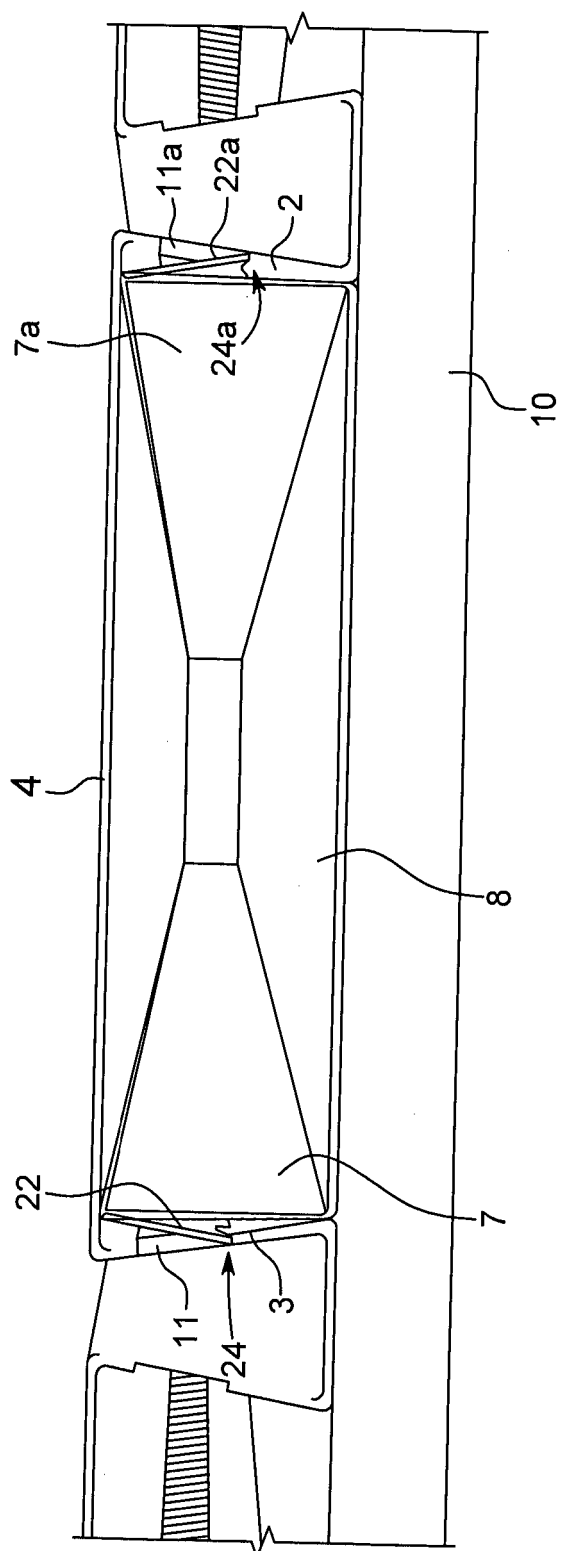


FIG. 10

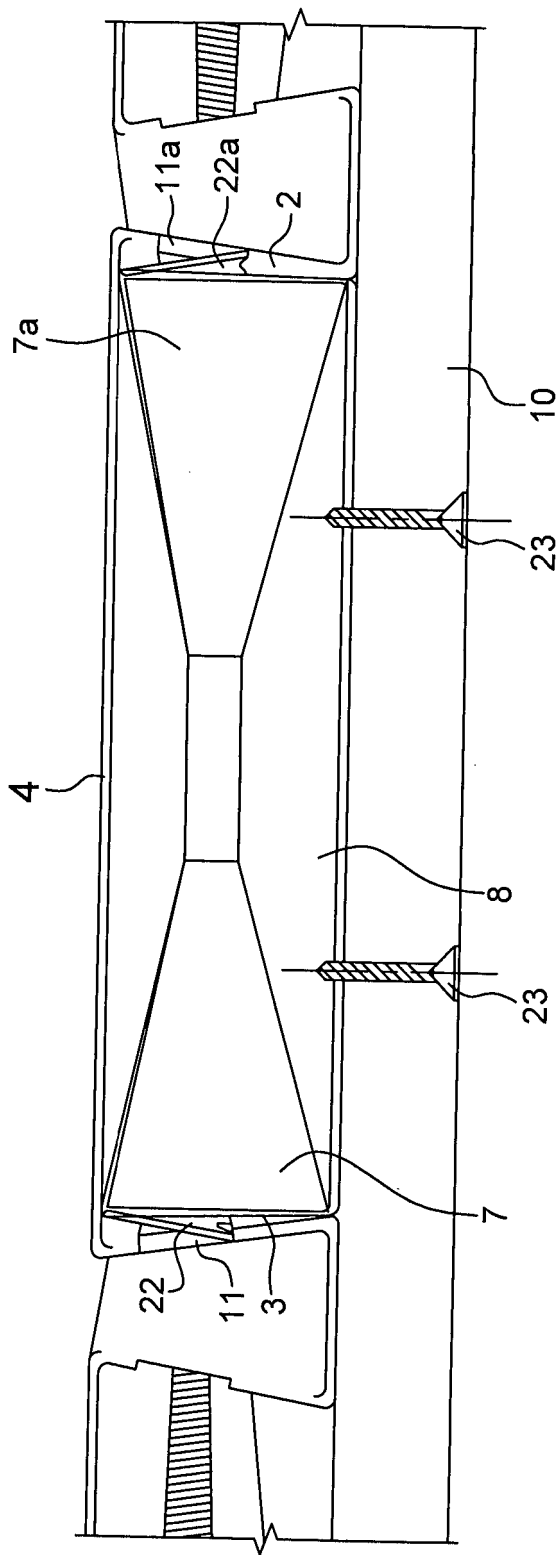


FIG. 11

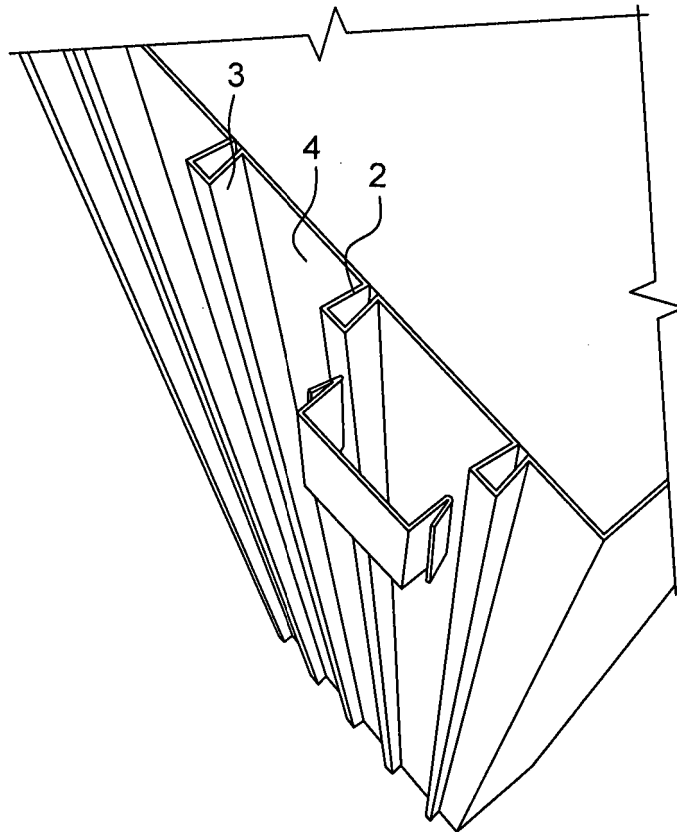


FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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