



EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification :
01.12.93 Bulletin 93/48

(51) Int. Cl.⁵ : **E04B 1/61**, E04B 2/74,
E04B 9/04, // E04C2/08,
E04D3/30, E04F13/12,
F16S3/02

(21) Application number : **91903046.0**

(22) Date of filing : **09.01.91**

(86) International application number :
PCT/DK91/00005

(87) International publication number :
WO 91/10787 25.07.91 Gazette 91/17

(54) INTERLOCKING DEVICE FOR JOINING TOGETHER CEILING OR WALL ELEMENTS.

(30) Priority : **15.01.90 DK 120/90**

(43) Date of publication of application :
04.11.92 Bulletin 92/45

(45) Publication of the grant of the patent :
01.12.93 Bulletin 93/48

(84) Designated Contracting States :
BE DE ES FR GB GR IT NL SE

(56) References cited :
DK-B- 151 977
GB-A- 2 118 988
NO-B- 155 706
US-A- 1 738 469
US-A- 2 478 060

(73) Proprietor : **DAMPA A/S**
Højelokkevej 4
DK-5690 Tommerup (DK)

(72) Inventor : **KNUDSEN, Kaj, Verner**
Egebakken 21
DK-5260 Odense S (DK)
Inventor : **FROMMER, Glenn**
Krengerupvej 9
DK-5690 Tommerup (DK)
Inventor : **DYRVING, Niels**
Steenlokkevej 8
DK-5690 Tommerup (DK)
Inventor : **JoRGENSEN, Ejner**
Damhusvej 29 st.
DK-5000 Odense C (DK)
Inventor : **THOMSEN, Per, M rsk**
Heliosvej 174D
DK-5250 Odense SV (DK)

(74) Representative : **Lomholt, Lars A. (DK) et al**
c/o Lehmann & Ree A/S Grundtvigsvej 37
DK-1864 Frederiksberg C (DK)

EP 0 511 279 B1

Note : Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

Description

The invention relates to an interlocking device for joining together pre-manufactured ceiling or wall elements, particularly elements produced from metal or plastic materials, the single element being bent and/or moulded in plank or plate-like open box form, in which an insulation material may be located, and the longitudinal walls of an elements being profiled in order to join the elements together to form a substantially whole, plane surface composed of the outward facing plane surfaces of the single elements.

US patent No. 1,738,469, US 2,478,060 and Danish patent No. 151.977 disclose e.g. so-called furring strips or rails for wall- or ceiling coverings, wherein the furring strips or rails after having been secured to a ceiling support beam are used for rigidly mounting a pre-manufactured plank- or plate ceiling, the elements forming together a ceiling cover and the single strip serving also as an interlocking device between adjacent single elements. US patent No. 4,520,607 further discloses a resilient mounting assembly, a so-called clip, for mounting of a ceiling cover of single elements or for mounting of a wall also of single elements which are inserted into the clip, and said clip being secured to an assembly beam which constitutes part of said building construction. The drawback of these interlocking devices is, however, that they maintain the elements in a direction of force perpendicular to the element surface so that said element surface does not form a whole from a constructional point of view, and consequently the single elements mutually do not abut tightly.

Finally, Danish patent application No. 3133/84 discloses a plate element having interlocking devices disposed on opposite sides, each element being provided with a bent interlocking device which is incorporated into the element wall and which may be placed in a corresponding interlocking device on the opposite wall of an adjacent plate element so as to allow the elements, by means of the interlocking devices, to be joined together in the direction of the entire element surface and independent of a mounting assembly in the building construction proper. However, the two interlocking devices require relatively complicated bends of the longitudinal walls on each element and thus demand a complicated manufacturing process of the single elements just as necessary precautions must be taken in storing, transporting and mounting of each element in order to safeguard the exposed bends.

Therefore, it is the object of the invention to provide a separate interlocking device for joining together adjacent ceiling or wall elements, and which eliminates the drawbacks mentioned above and which also exels in being simple to manufacture and simple to mount.

The object is obtained by joining together sepa-

rate elements by means of an interlocking device according to the characterising part of claim 1 so as to form a substantially plane surface of single elements. Furthermore, for reasons of safety the interlocking device may be produced, in a manner known per se, from a fire proof material, e.g. steel, especially in case of element surfaces which are used in industrial constructions or for ship fittings.

Particular embodiments of the interlocking device are stated in claims 2 and 3.

The invention will be further explained in the following with reference to the drawing which shows partly in perspective view and partly in diagrammatic view some non-limiting embodiments of the interlocking device and the use of it.

Fig. 1 shows a perspective exploded view of two pre-manufactured ceiling- or wall elements complete with an interlocking device for joining together the elements.

Fig. 2 shows a vertical cross-sectional view of an interlocking device ("clip-profile") according to the invention.

Fig. 3 shows a vertical cross-sectional view of a ceiling or wall element which is designed to be joined together with a corresponding element by means of an interlocking device.

Fig. 4 also shows a vertical cross-sectional view of the joining together of two ceiling or wall elements by means of the interlocking device shown in Fig. 2.

Fig. 5 shows a vertical sectional view through an interlocking device corresponding to the one shown in Fig. 2 but designed to form a notch between two adjacent elements.

Fig. 6 shows a sectional view through two adjacent ceiling or wall elements which are joined together by the interlocking device shown in Fig. 5 and with a notch between the elements.

For reasons of clarity the designations "to the left", "to the right", "up" and "down" and "vertical" and "horizontal" will be used in the following in connection with the description of the invention of both ceiling or wall elements, irrespective of the fact that in practice these designations should be used only in connection with ceiling elements.

In Fig. 1 a separately manufactured, profiled interlocking device is shown at 1 ("a clip-profile") which in joining together two adjacent ceiling or wall elements 2, 12 snaps over the longitudinal wall profile 5 on the right side of the element 2, and subsequently the wall profile 11 on the left side of the element 12 is inserted into the interlocking device in the direction towards the element 2.

In a sectional view the T-shaped interlocking device (Fig. 2) consists of a profile element 1 having a bent or doubled-back lower end made from steel, extruded aluminum or moulded plastics with a vertical stem 4 which at the top continues in a smaller, left facing surface 6, a 180° bend 7 and an upper, wider right

facing surface 8 which terminates in a longitudinal bead 9 which projects downwards towards the stem 4. By way of the bend 7 and the material used a resilient effect between the surfaces 6 and 8 is obtained.

The interlocking device is designed to be attached on the right wall 5 of the element 2 shown in Fig. 3 along its entire length by inserting the small inwardly projecting flange 3, which is provided with a longitudinal bead, between the surfaces 6 and 8 of the interlocking device so as to lock the surfaces around the flange 3 and to abut the stem 4 against the inside of the wall 5, see Fig. 4.

Subsequently, the left wall 11 having an outwardly projecting angularly bended flange 10 on the adjacent element is inserted into the interlocking device 1 between the downwards facing surface 8 of said interlocking device and the upperside of the inwardly projecting flange of the element 2, the surface 8 thereby being pushed upwards due to the bead 9 thus making the insertion possible. When the elements shown in Fig. 4 abut against each other through the vertical wall surfaces 5 and 11, the bead 9 in the surface 8 slides down along the inner surface on the wall 11 of the element 12 and thereby locks the two elements together, and at the same time the spring effect between the surfaces 6 and 8 of the interlocking device locks the flange 10 of the wall 11 tightly against the flange 3 of the wall 4.

In a sectional view Fig. 5 shows a variation of the interlocking device, the surface 8 here being wider and thus the bead 9 being further to the right. H indicates the height of the interlocking device which corresponds to the thickness of the elements to be joined. The greater width of the surface 8 corresponds to a greater width of the surface of the flange 10 in order for two adjacent elements 2 and 12 to be joined together under the formation of a notch with a given width A between the elements thereby creating a play in the element surface as a whole to fulfill esthetic requirements.

As shown in Fig. 6 the interlocking device 1 is placed on the wall 5 with the flange 3 in the same manner as described in connection with Fig. 3 and 4. Subsequently, the flange 10 of the element 12 is inserted into the interlocking device between the surface 8 of said device and the upper side of the flange 3 of the element 2 until the bead 9 slides down on the inside of the wall 11 of the element 12, and due to the spring effect between the surfaces 6 and 8 of the interlocking device tightly joins the element 12 to the element 2 under the formation of the notch between the two elements.

The length of the single interlocking device may be adapted to the length of the single ceiling- or wall element in such a manner as to allow space at each end of an element for fastening of mounting assemblies for mounting of the element in the building con-

struction and/or for the end sealing of the element. Alternatively the length of the interlocking device may constitute a fraction of the length of the single ceiling or wall element so that in locking together said elements a certain number of interlocking devices must be used for each length to be locked together in order to facilitate the locking together of long elements which may be exposed to relatively strong bending- and torsion forces during assembly, and to allow space for fastening of mounting assemblies to the building construction along the locking length.

Claims

1. An interlocking device for joining together pre-manufactured ceiling or wall elements, particularly elements produced from metal or plastic materials, the single elements being bent and/or moulded in a plank- or plate-like open box form, in which an insulation material may be located, and the longitudinal walls of the elements being profiled in order to join the elements together to form a substantially whole, plane surface of the outward facing plane surfaces of the single elements, **characterized** in that the interlocking device consists of a separately manufactured profile element ("clip-profile") (1) with a bent or doubled-back lower end made from steel, extruded aluminum or moulded plastics and having a T-shaped cross-section with a doubled-back vertical stem (4), a horizontal surface (6) projecting from the upper end of the stem and terminating in a bend (7) of 180° and continuing in a wider, upwards facing horizontal surface (8) which is resiliently connected to the surface (6) through the bend and the materials used, and wherein the surface 8 terminates in a longitudinal bead (9) which projects towards the stem (4), and that the interlocking device has such dimensions so as to allow it to be placed, by way of interference fit, on an inwardly projecting flange (3) provided with a bead on the vertical side wall (5) of a ceiling- or wall element with the surfaces (6, 8) locking around the flange (3) of the element (2) and the profile element further engaging an angularly bent flange (10) of the vertical wall (11) of an adjacent ceiling- or wall element (12), said flange also being inserted between the surfaces (6, 8).
2. An interlocking device according to claim 1, **characterized** in that the length of said device corresponds to the length of the ceiling or wall elements to be joined together minus the space occupied by the end sealings of the elements and/or the space allowed for at each end of an element for fastening of the mounting assembly of the element for mounting in the building con-

struction.

3. An interlocking device according to claim 1, **characterized** in that the length of said device is a fraction of the length of the single ceiling or wall element.

Patentansprüche

1. Verriegelungsvorrichtung für das gegenseitige Verbinden von vorfabrizierten Decken- oder Wandelementen, insbesondere von aus Metall oder Kunststoffmaterialien hergestellten Elementen, wobei die einzelnen Elemente in einer planen- oder plattenartigen, offenen Kistenform gebogen und/oder geformt sind, in der ein Isoliermaterial angeordnet werden kann, und die Längswände der Elemente in Hinblick darauf profiliert sind, die Elemente zur Bildung einer im wesentlichen ganzen, ebenen Fläche der nach außen gewandten ebenen Flächen der einzelnen Elemente miteinander zu verbinden, **dadurch gekennzeichnet**, daß die Verriegelungsvorrichtung aus einem separat hergestellten Profilelement ("Clip-Profil") (1) mit einem umgebogenen oder nach hinten gebogenen unteren Ende aus Stahl, extrudiertem Aluminium oder gegossenem Kunststoff besteht und einen T-förmigen Querschnitt mit einem nach hinten gebogenen vertikalen Schaft (4) aufweist, wobei eine horizontale Fläche (6) von dem oberen Ende des Schafts aus vorsteht und in einem Bogen (7) von 180° endet und sich in einer breiteren, nach oben gewandten horizontalen Fläche (8) fortsetzt, die mit der Fläche (6) über die Biegung und die verwendeten Materialien nachgiebig verbunden ist, und wobei die Fläche (8) in einem Längswulst (9) endet, der in Richtung auf den Schaft (4) vorsteht, und daß die Verriegelungsvorrichtung solche Abmessungen besitzt, die ihre Anbringung im Wege eines Preßsitzes auf einem einwärts vorstehenden Flansch (3) gestattet, der mit einem Wulst an der vertikalen Seitenwand (5) eines Decken- oder Wandelements vorgesehen ist, wobei die Flächen (6, 8) rund um den Flansch (3) des Elements (2) verriegeln und das Profilelement einen winkelmäßig umgebogenen Flansch (10) der vertikalen Wand (11) eines benachbarten Decken- oder Wandelements (12) gleichfalls erfaßt, wobei der Flansch ebenfalls zwischen die Flächen (6, 8) eingesetzt ist.
2. Verriegelungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Länge der Vorrichtung der Länge der Decken- oder Wandelemente, die miteinander zu verbinden sind, reduziert um den Raum, der von den Endabdichtun-

gen der Elemente eingenommen wird, und/oder den Raum entspricht, der an jedem Ende eines Elements zum Befestigen einer Montageanordnung des Elements zum Einbau in einem Gebäude belassen ist.

3. Verriegelungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Länge der Vorrichtung ein Bruchteil der Länge des einzelnen Decken- oder Wandelements ist.

Revendications

1. Dispositif à emboîtement destiné à raccorder des éléments préfabriqués de plafond et de cloison, en particulier des éléments formés de matière métallique ou plastique, les éléments séparés étant pliés et/ou moulés sous forme de caissons ouverts en forme de plaques ou de planches, dans lesquels un matériau isolant peut être placé, les parois longitudinales des éléments étant profilées afin qu'ils se raccordent en formant une surface plane et sensiblement continue avec les surfaces planes des éléments séparés tournées vers l'extérieur, caractérisé en ce que le dispositif à emboîtement est constitué d'un élément profilé (1) fabriqué séparément ("pince profilée") ayant une extrémité inférieure courbée ou doublée formée d'acier, d'aluminium extrudé ou de matière plastique moulée et ayant une section en T comprenant une tige verticale doublée (4), une surface horizontale (6) dépassant de l'extrémité supérieure de la tige et aboutissant à un coude (7) à 180° et se poursuivant par une surface horizontale plus large (8) tournée vers le haut et qui est raccordée élastiquement à ladite surface (6) par le coude et les matériaux utilisés, et dans lequel la surface 8 se termine par un cordon longitudinal (9) qui dépasse vers la tige (4), et en ce que le dispositif à emboîtement a des dimensions telles qu'il peut être placé, par ajustement serré, sur un flasque (3) dépassant vers l'intérieur, muni d'un cordon et formé sur la paroi latérale verticale (5) d'un élément de plafond ou de cloison, les surfaces (6, 8) se bloquant autour du flasque (3) de l'élément (2) et l'élément profilé coopérant en outre avec un flasque replié (10) de la paroi verticale (11) d'un élément adjacent de plafond ou de cloison (12), ce flasque étant aussi introduit entre lesdites surfaces (6, 8).
2. Dispositif à emboîtement selon la revendication 1, caractérisé en ce que la longueur du dispositif correspond à la longueur des éléments de plafond ou de cloison à raccorder, réduite de l'espace occupé par les organes d'étanchéité d'extrémité des éléments et/ou de l'espace laissé à cha-

que extrémité d'un élément pour la fixation de l'ensemble de montage de l'élément dans la construction d'un bâtiment.

5

3. Dispositif à emboîtement selon la revendication 1, caractérisé en ce que la longueur du dispositif est une fraction de la longueur d'un élément unique de plafond ou de cloison.

10

15

20

25

30

35

40

45

50

55

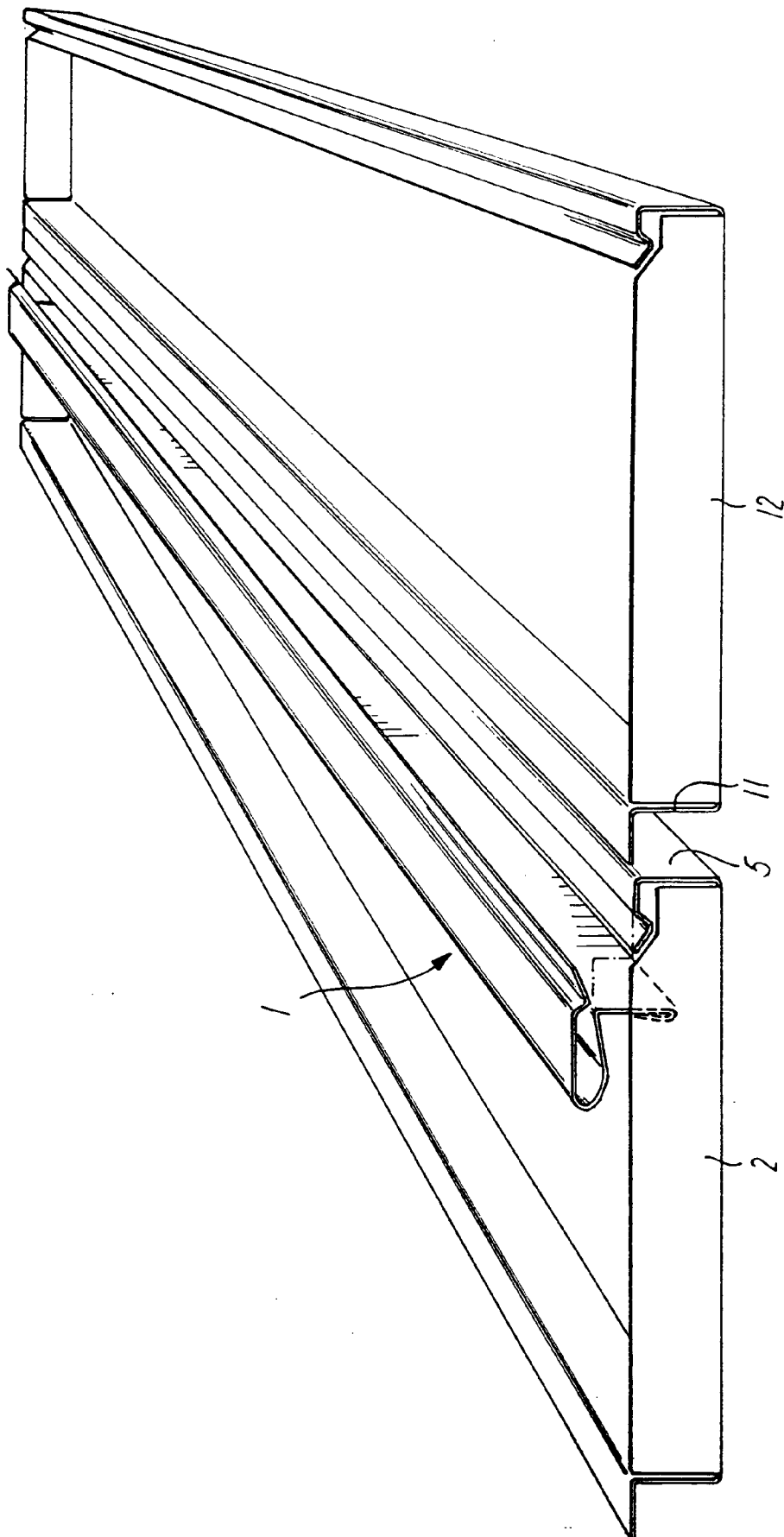


FIG. 1

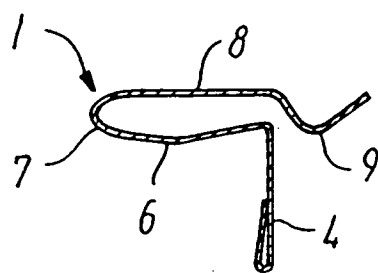


FIG. 2

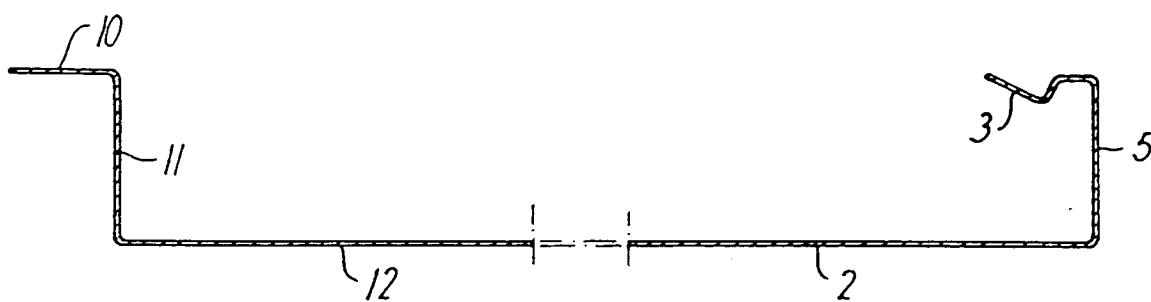


FIG. 3

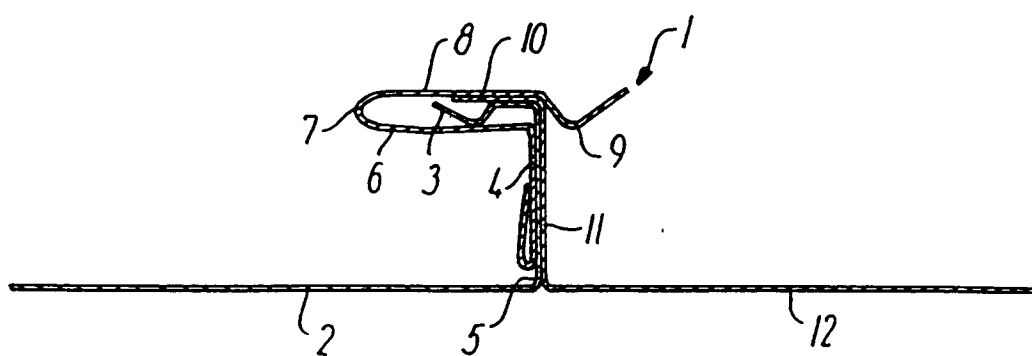


FIG. 4

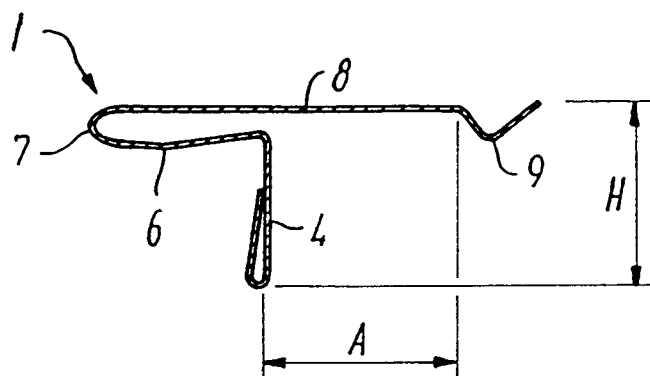


FIG. 5

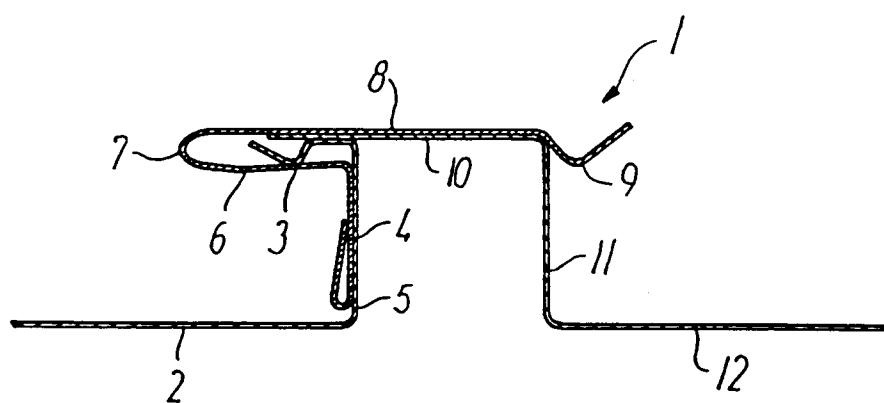


FIG. 6