

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets

(11) Publication number:

**0 337 570**  
**A1**

(12)

# EUROPEAN PATENT APPLICATION

(21) Application number: 89200898.8

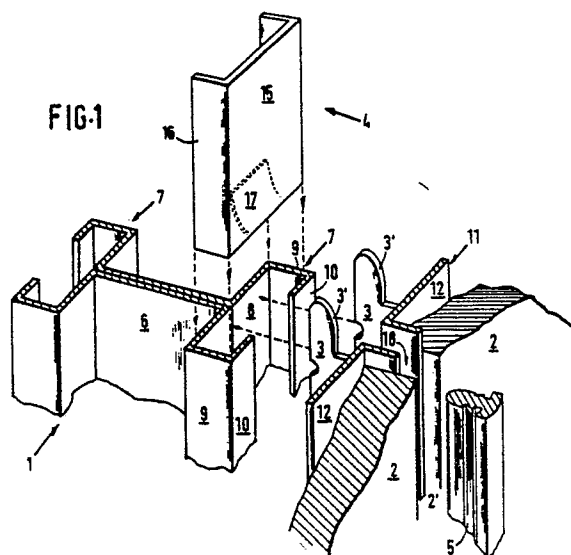
(51) Int. Cl.<sup>4</sup>: **E04F 13/08**

(22) Date of filing: 11.04.89

(30) Priority: 11.04.88 NL 8800925

(43) Date of publication of application:  
18.10.89 Bulletin 89/42(84) Designated Contracting States:  
**BE DE GB NL**(71) Applicant: **Bruynzeel Intersysteem B.V.**  
**Wattweg 19**  
**NL-4622 RA Bergen op Zoom(NL)**(72) Inventor: **Opdam, Josephus**  
**Tinbergenplantsoen 23**  
**NL-3356 BZ Papendrecht(NL)**(74) Representative: **Smulders, Theodorus A.H.J.,**  
**Ir. et al**  
**Vereenigde Octrooibureaux Nieuwe Parklaan**  
**107**  
**NL-2587 BP 's-Gravenhage(NL)**(54) **A panel fastening set.**

(57) A fastening assembly for blind fastening wall panels (2), in a detachable manner, to a rearward supporting structure of partitions or wainscoting. The fastening set comprises channel sections (7) forming part of uprights (1) of the rearward supporting structure. At least one side wall (9) of each channel section (7) has an inwardly extending edge (10), as well as connecting elements (11, 19, 23) attachable along upright side edges (2') of panels (2) and provided with hook-shaped lips (3) extending from the rear of panels (2). The set also comprises locking elements (4) movable in the channel sections (7) and adapted to coact with hook-shaped lips (3) extending into the upright channel section (7) for clamping the panel edge zones against the channel sections (7).



EP 0 337 570 A1

### A panel fastening set

This invention relates to a fastening set for blind fastening wall panels, in a detachable manner, to channel sections forming part of a rearward supporting structure, said set comprising connecting elements attachable to the wall panels and provided with portions projecting from the rear of the panels, said portions being adapted to coact with the channel sections for connecting the panels with the supporting structure.

A fastening set of this type is known from Dutch patent 176,962. In this known panel fastening set, the channel sections are horizontal cross beams having straight, upright channel edges and the fastening elements are nailing plates provided on the back of the panels and having at mid-height a rearwardly flanged, bridge-shaped portion into which a bent strip can be inserted from below and which is adapted to engage with the obliquely downwardly extending lower end over an upright channel edge of a horizontal channel section of the rearward supporting structure. Through gravity and through coaction of the inclined lower end of the bent strips with the upright channel edges, a wall panel is pulled through wedging action into contact with the supporting structure. In this arrangement, for the wall panels to be mounted in a truly vertical position requires the channel sections to be mounted accurately horizontally and the nail plates to be accurately aligned on the panels. When there are a plurality of rows of nailing plates and horizontal cross beams at different levels, the wedging action can ensure an optimum pulling of a wall panel against the rearward supporting structure only at one level. Consequently, the panels fastened with the known fasteners will not be entirely rattle-free. Moreover, it is difficult with large panels having a plurality of rows of nailing plates, to hook these all simultaneously onto the respective cross channel edges. As, in this known panel fastening set, the clamping force through wedging action is produced solely by the weight of the panels, the panel may sag in the long run and become concave at some fastening places, partly under the influence of vibrations.

It is an object of the present invention to provide a panel fastening set ensuring a rattle-free fastening, which is insensitive to vibrations occurring in the course of time, which set enables accurate, controlled fastening at different levels, and enables a panel to be secured to the backing structure at different points of attachment successively, e.g. step by step, level-wise, which is favourable for large panels of comparatively flexible material, and further enables to compensate for substantial tolerances in the backing structure. This

last is important, since the erection of the supporting structure has to take place on the construction floor, where accurate levelling is difficult.

These objects are achieved with a panel fastening set of the above described type whose channel sections form part of uprights of the rearward supporting structure, at least one side wall of each channel section having an inwardly extending edge, and the connecting elements of which are attachable along upright side edges of the panels and are provided with hook-shaped lips projecting from the rear of the panels, and further locking elements movable in the channel sections and adapted to coact with hook-shaped lips extending into the upright channel sections for clamping the panel edge zones against the channel sections.

In the system according to the present invention, a wall panel to be fastened can be inserted into a channel-like upright section with hooked lips rearwardly extending into the side edge zones at different levels and at each level, e.g. starting below, the hooked lips can coact with separate locking elements to pull the panel at each level against the upright sections, so that it is fixed through clamping action and friction at each point of attachment.

For producing clamping force between a panel edge and a rearward upright channel section, according to the present invention, the locking element may be constructed as an element movable with sliding fit in the upright channel section, said element having a rigid wall extending across the opening of the channel section, with which wall the locking element can engage behind hook-shaped lips of a panel connecting element inserted into the channel section, with the interengagement taking place over a surface inclined relatively to the longitudinal direction of the channel. The clamping force in this case is produced substantially through wedging action.

Another possibility for producing the clamping force is to construct the locking element as an element movable with sliding fit in the upright channel section, said element having a resilient portion extending across the opening of the channel section, with which portion the locking element can engage behind hooked lips of a panel fastening element inserted into the channel section. In this case, the clamping force is produced substantially through spring action.

A third possibility for producing the clamping force is to design the locking element as a substantially U-shaped spring element made of bar stock and movable in the upright channel section, the underside of said spring element extending

across the opening of the channel section and comprising a portion bent over forwardly relatively to the main surface of the U-shaped spring element to substantially parallel to said main surface, said underside being adapted to engage behind hook-shaped lips of a panel fastening element inserted into the channel section. Here, too, the clamping force is produced by spring action.

According to the present invention to provide for the case where wall panels have to be fastened side by side, the upright channel section may be substantially C-shaped in cross section, with each locking element being adapted to engage with hooked lips of adjoining panels. The width of the upright channel section may then be such that when hooked lips of adjoining wall panels extend into the channel section, there is a gap between opposite panel edges, through which the locking elements are accessible for sliding movement, which gap can be closed with a joint cover section.

For positioning partitions, the supporting structure may comprise uprights having a web with channel sections on either side thereof.

By constructing the fastening elements with a platelike portion attachable to the back of a wall panel and wherein the hooked lips are bounded by cut-outs and can be bent out of the plane of the plate-like portion, panels fitted with such fastening elements can be stacked in flat condition for purposes of storage and transport. The hooked lips can be bent into the working position at the place of use. Preferably, the lips are T-shaped, so that the edge strip section can be used universally for both edges of the wall panels.

It is observed that US patent 3,509,669 discloses a fastening set for fastening wall panels to channel sections, wherein the channel sections form part of uprights of the supporting structure disposed there-behind, and at least one side wall of each channel section has an inwardly extending edge. That fastening set, however, does not serve for blind fastening the wall panels in a detachable manner - these are secured from the front by means of screws -, but for fastening shelf brackets to the rearward supporting structure, which brackets project at right angles to the wall panels.

Some embodiments of the panel fastening set according to the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a diagrammatic, perspective view showing a detail of the fastening set according to the invention;

Fig. 2 shows also in perspective view, an edge strip;

Figs. 3a and 3b are detail cross-sectional views taken on the line III-III of Fig. 1, showing the operation of the locking element in two different embodiments;

Fig. 4 shows a fastening element in the form of a clip;

Fig. 5 shows a fastening element in the form of a nailing plate; and

Figs. 6a and b are a front view, and a side view, respectively, of another variant of the locking element.

In the embodiment shown in Fig. 1, a channel section upright 1 of a supporting structure is designed to support wall panels 2 on either side, as conventional with a partition. It will be understood that the panel fastening system can also be used for wainscoting. For fastening the panels 2 to the upright section 1, use is made of hooked lips 3 and a locking element 4. Besides, Fig. 1 shows a joint cover section 5.

In greater detail, upright section 1 includes a web 6 having on either side a channel 7 which is C-shaped in cross section with a bottom 8, upright side walls 9 and inwardly extending edges 10.

As shown also in Fig. 2, each wall panel 2 is provided at its longitudinal edges 2' with fastening elements 11 in the form of angle sections having in the section leg 12 cut-outs 13 defining lips 3 which in this example are T-shaped, and are shown in Fig. 2 bent out of the plane of the section leg 12. The angle sections 11 are preferably fastened to the panels in the manner as described in European patent 0099162, i.e. by blanking a lip by means of a punching tool and driving said lip through the opening 14 formed thereby into the subjacent material, e.g. plaster cardboard, plaster fibre board, particled board, melamine and the like of the wall panel 2.

Also forming part of the fastening set is the locking element 4, constructed in the form shown in Fig. 1 as a channel section having a bottom 15 and upright side walls 16. Besides, there is shown a resilient tongue 17, whose function will be described hereinafter. The locking element is a sliding fit in the channel section 7, in the manner indicated by dotted lines in Fig. 1, so that a plurality of locking elements 4 can be placed in the channel section 7 in predetermined positions.

For a description of the panel fastening system, reference is made to Figs. 1, 3a and 3b.

Starting from the position shown in Fig. 1, the panels 2 are moved towards upright 1, with the lips 3 being positioned between the inwardly extending edges 10 in the channel section 7. At the side facing panels 2, lips 3 have a bent edge 3' inclined with respect to the longitudinal direction of channel 7 and at least the bent upper end of said edges 3'

must be moved past the channel edges 10. Subsequently, the locking element 4 is displaced in channel 7 in such a manner that it slides behind edges 3' of lips 3. Using the channel section edges 10 as a support, bottom portion 15 of the locking element thereby presses (see Fig. 3b), lips 3 in the direction of the channel bottom 8 and thereby pulls panels 2 against channel section 7 of upright 1. Because at any level at which lips 3 are present, it is possible to exert a strong clamping force by means of a locking element 4, which is accessible through the space 18 between adjoining panels 2, the panels can be fastened in a rattle-free manner, which effect can be enhanced still further by the resilient tongue 17, which presses against the edges 3" of lips 3 in the manner shown in Fig. 3a. Edges 3", in this case, need not be inclined, except perhaps their end portions, which function as lead-in edges.

The panel fastening is completed by positioning the joint cover section 5 in the interspaces 18, or by filling the joints with a joint filler.

Figs. 4 and 5 show variant embodiments of the fastening element 11.

Fig. 4 shows a fastening element in the form of a clip 19 having a platelike portion 20 in which bendable lips 3 are formed, defined by a cut-out 13. At the free end of a flanged edge 21, there are formed points 22 adapted to be driven into a panel edge 2 for fastening clip 19. A number of such clips 19 can be substituted for an edge strip 11. At the other edge of the platelike portion places 14 are indicated for punching lips extending into panel 2, similarly as described with respect to the edge strip in Fig. 2.

Fig. 5 shows a fastening element in the form of a nailing or clamping plate 23 having lips 3 and points 24. Such plates 23 can also replace edge strips 11.

Figs. 6a and b are a front and a side view, respectively, of a further variant of the locking element 4 installable in a very simple manner and manufacturable in a highly inexpensive manner. The locking element shown in Fig. 6 is a substantially U-shaped spring element made of bar stock. The underside 25 of the U-shaped spring element 4 is formed by bending the bar material, after a planar U-shaped element has been formed, with respect to the main surface of the U, i.e. with respect to the plane of Fig. 6a. This bending is continued until the underside 25 forms an essentially hooked portion adapted to cooperate through clamping action with the lips 3 for pressing said lips 3 backwards with respect to edges 10 of the channel sections and for clamping the panels. The free ends of legs 26 of spring element 25 are flanged for proper handling of the element and preferably are interspaced in such a manner that

the spring element is somewhat clamped between the side edges 9 of the channel section, thereby further facilitating the positioning.

It will be understood that the invention is not restricted to the embodiments described. For instance, wedging action between lips 3 and locking element 4 can also be effected by imparting a wedge shape to portion 15 of the locking element.

Moreover, although similar drawbacks are concerned here as those mentioned with respect to Dutch patent 176,962, fastening element 11 can be used with a fixed, supporting, horizontal edge of the rearward structure, e.g. of a cross beam or an upright having a channel section wherein fixed, horizontally extending bearing edges are provided at different levels. The downwardly extending portions of the T-shaped lips 3, in fact, can be hung over such an edge. Here too, when suspension takes place at different levels, the wedging action can be optimum at one of the levels only. An advantage of this method over the clamping plates with bent strips as described in Dutch patent 176,962 is that lips 3 are always accessible laterally for inspection, correction and the like.

## Claims

1. A fastening set for blind fastening wall panels (2), in a detachable manner, to channel sections (7) of a rearward supporting structure, which set comprises connecting elements (11, 19, 23) attachable to the rear of the wall panels (2) and provided with portions (3) projecting from the rear of the panels and being adapted to coact with the channel sections (7) for connecting the panels with the supporting structure, characterized in that the channel sections (7) form part of uprights (1) of the rearward supporting structure, at least one side wall (9) of each channel section (7) having an inwardly extending edge (10), that the connecting elements (11, 19, 23) are attachable along upright side edges (2') of panels (2) and are provided with hook-shaped lips (3) extending from the rear of panels (2), and that there are further provided locking elements (4) movable in the channel sections (7) and adapted to coact with hook-shaped lips (3) extending into the upright channel sections (7) for clamping the panel edge zones against the channel sections (7).

2. A panel fastening set as claimed in claim 1, characterized in that the locking element (4) is constructed as an element movable with sliding fit in the upright channel section (7), said element having a rigid wall (15) extending across the opening of the channel section with which wall (15) the locking element (4) can engage behind hook-shaped lips (3) of a panel connecting element (11)

inserted in channel section (7), and the interengagement takes place over a surface (3') inclined with respect to the longitudinal direction of the channel.

3. A panel fastening set as claimed in claim 1, characterized in that the locking element (4) is constructed as an element movable with sliding fit in the upright channel section (7), said element having a resilient portion (15) extending across the opening of the channel section (7), with which portion (15) the locking element (4) is adapted to engage behind lips (3) of the panel fastening element (11) inserted into the channel section.

4. A panel fastening set as claimed in claim 1, characterized in that the locking element (4) is constructed as a substantially U-shaped spring element made of bar stock and movable in the upright section (7), the underside (25) of said spring element extending across the opening of the channel section (7) and comprising a portion bent over forwardly with respect to the main surface of the U-shaped spring element to substantially parallel to said main surface, said underside being adapted to engage behind lips (3) of the panel fastening element (11) inserted into the channel section.

5. A panel fastening set as claimed in any one of the preceding claims, characterized in that the upright channel section (7) has a substantially C-shaped cross section and each locking element (4) is adapted to engage with the hook-shaped lips (3) of adjoining panels (2, 2).

6. A panel fastening set as claimed in claim 5, characterized in that the width of the upright channel section (7) is such that, when hook-shaped lips (3) of adjoining wall panels (2, 2) extend into the channel section (7), there is provided a gap (18) closable by a joint cover section (5) or otherwise between opposed panel edges (2', 2'), through which gap the locking elements (4) are accessible for sliding movement.

7. An upright for use as a part of the panel fastening set as claimed in any one of the preceding claims, characterized by a web (1) having channel sections (7) on either side thereof.

8. A fastening element for use as a part of the panel fastening set as claimed in any one of claims 1-6, characterized by a platelike portion (12, 20, 23) attachable to the rear of a panel (2) near a panel edge (21) and which portion is provided with hook-shaped lips (3) projecting in the position of use from the rear wall of the panel.

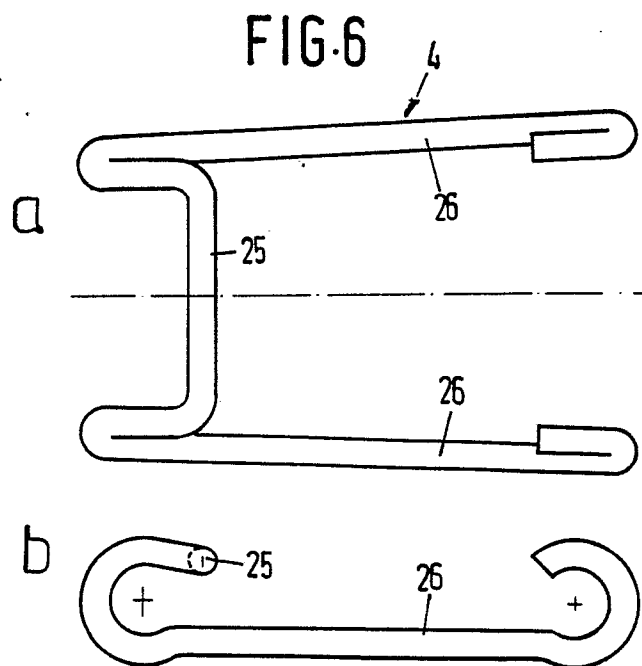
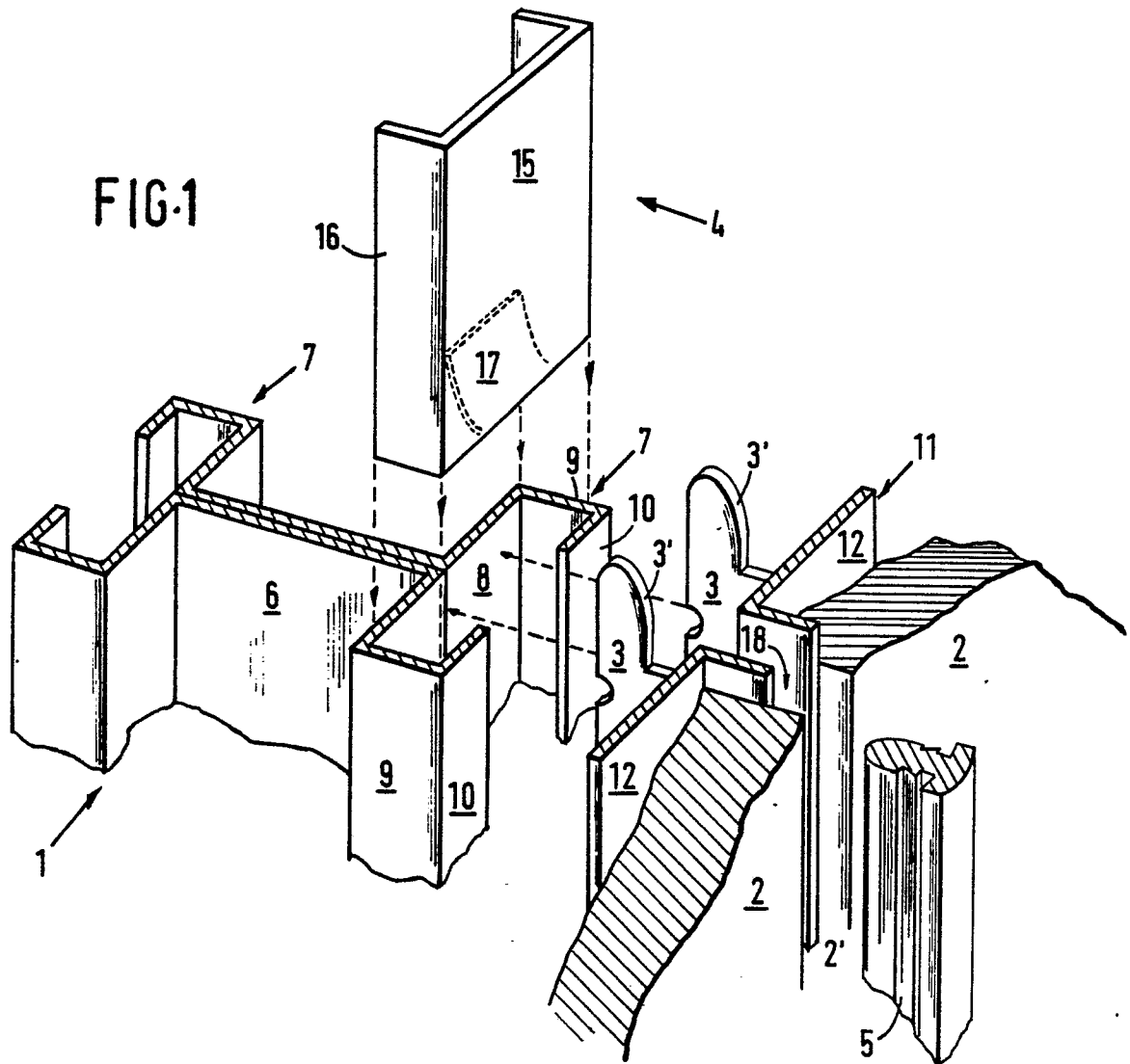
9. A fastening element as claimed in claim 8, characterized in that the hook-shaped lips (3) are defined by cut-outs (13) and are adapted to be bent out of the plane of the platelike portion (12, 20, 23) of the fastening element (11, 19, 23).

10. A fastening element as claimed in claim 8 or 9, characterized in that the lips (3) are T-shaped.

11. A fastening element as claimed in any one of claims 8-10, characterized in that this element (11) is constructed as an angle section (11) attachable as an edge strip to a panel (2) and is provided in one of the section legs (12) with longitudinally spaced lips (3) defined by cut-outs (13).

12. A fastening element as claimed in any one of claims 8-10, characterized in that this element (19) is constructed as a clip (19) having a platelike portion (20), a flanged edge (21) and points (22) extending from the free end of said edge underneath the platelike portion (20).

13. A fastening element as claimed in any one of claims 8-10, characterized in that this element is constructed as a nailing plate (23).



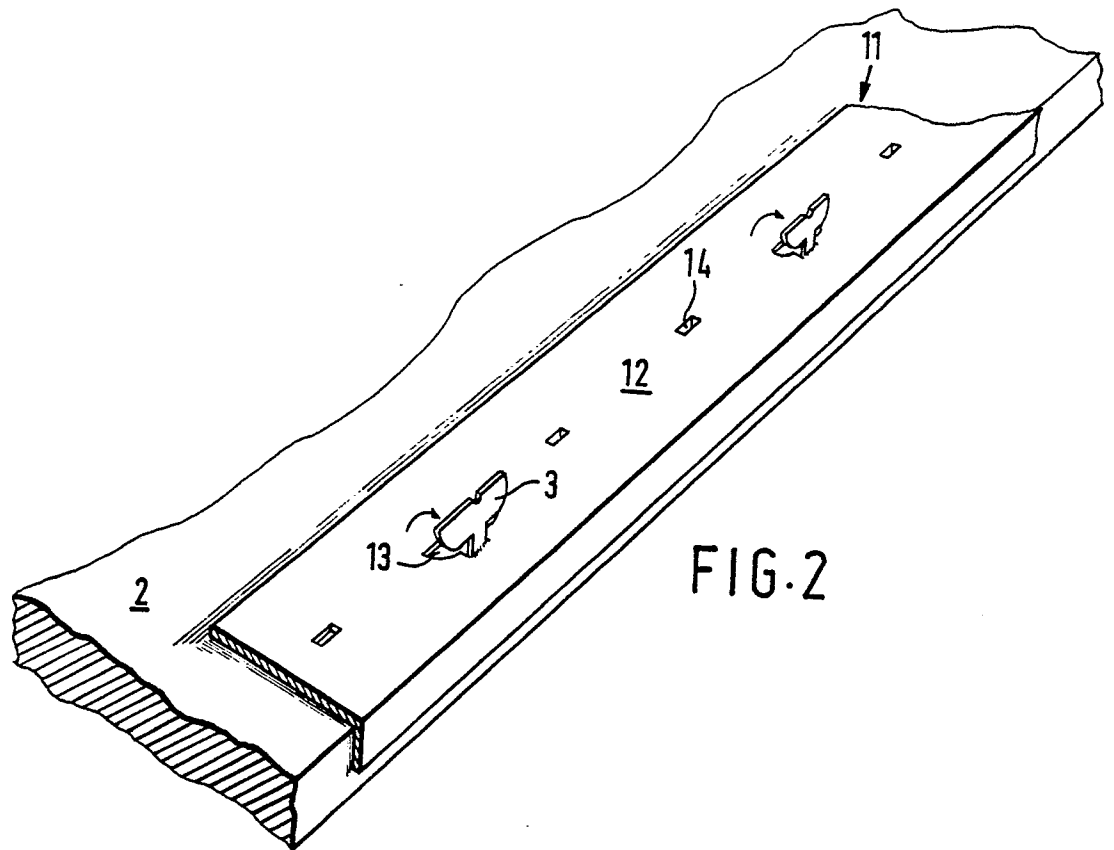


FIG. 2

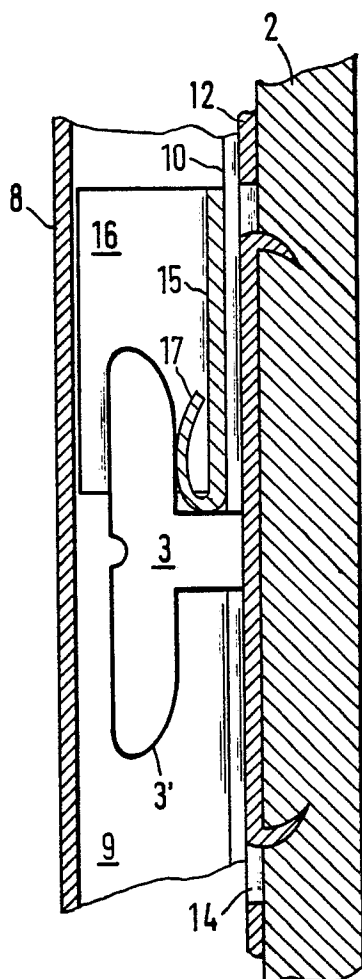


FIG. 3a

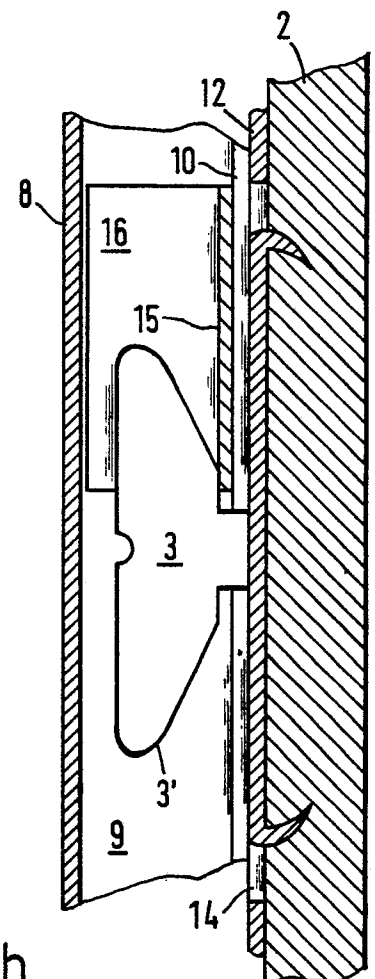


FIG. 3b

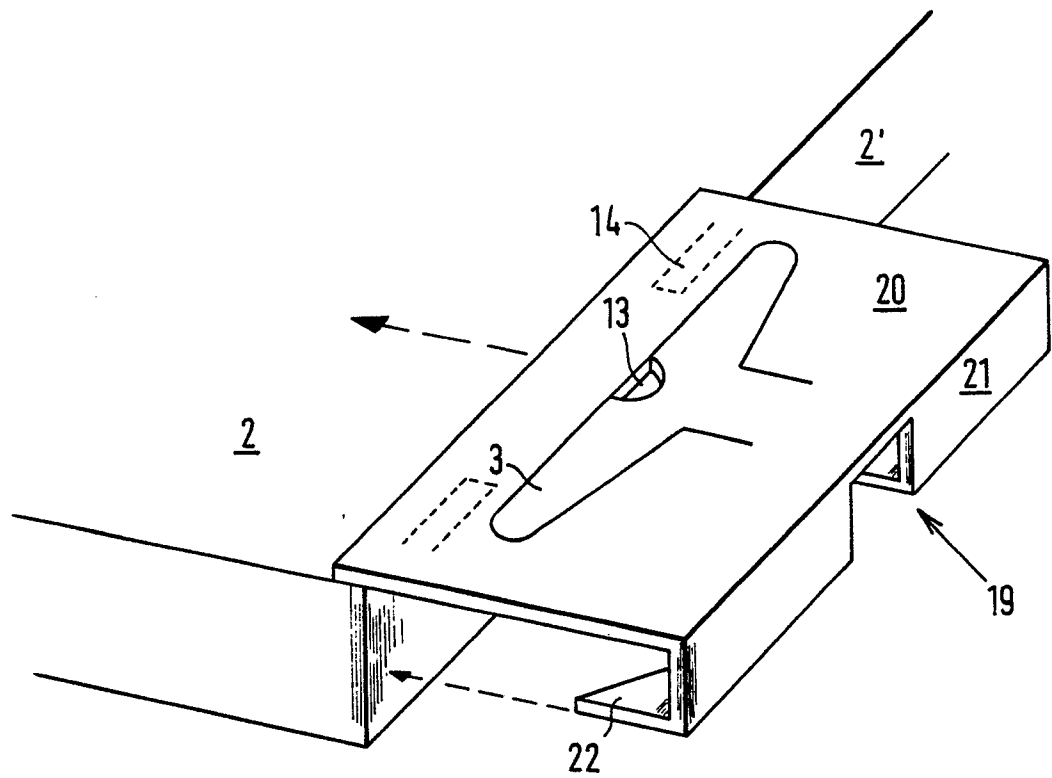


FIG. 4

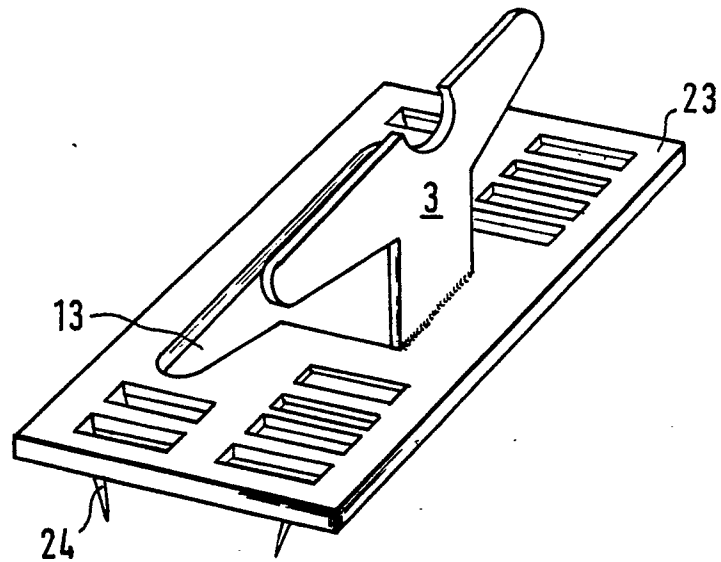


FIG. 5





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-3 509 669 (PLEMENG) * Column 2, lines 30-72; column 3, lines 1-25; column 4, lines 1-8; figures 1-5 *	1,5-7	E 04 F 13/08
A	DE-A-3 703 350 (PEGLAU) * Column 2, lines 38-68; column 3, lines 1-60; figures 1-10 *	1,11	
A	US-A-2 335 302 (OLSEN) * Page 2, column 1, lines 7-75; column 2, lines 1-15; figures 1-4 *	2,10,12	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			E 04 F E 04 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-07-1989	Examiner SCHOLS W.L.H.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			