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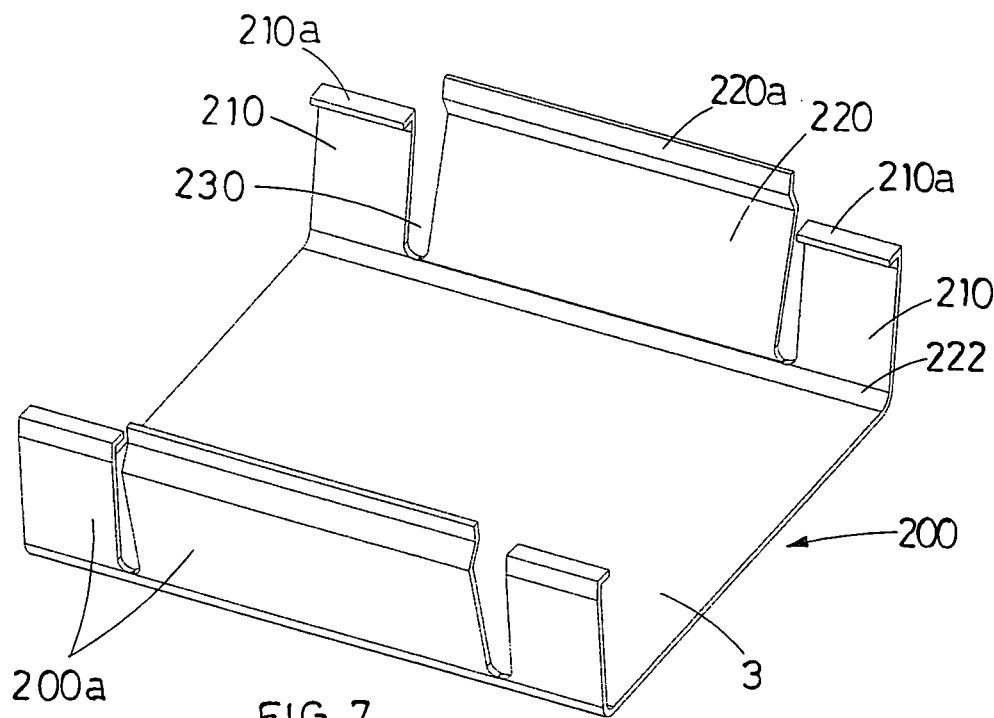
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(54) **Universal system used to fix profiles containing slat actuating means inside the uprights of a window frame with adjustable slats**

(57) The present invention refers to a universal system used to fix a slat-holding profile inside the longitudinal groove in the upright of a metal window frame with adjustable slats. In particular, the system provides for mounting suitable elastic elements or springs in the longitudinal

borders of the slat-holding profile, which are designed to interfere and get blocked with respect to the longitudinal borders of the aforementioned destination groove, thus being able to "bridge" the dimensional difference between the width of the groove and the width of the slat-holding profile.



**FIG. 7**

## Description

**[0001]** The present patent application for industrial invention refers to a universal system used to fix a profile containing slat actuating means inside the uprights of a window frame with adjustable slats.

**[0002]** Shutters are largely used both for windows and French windows.

**[0003]** Most shutters consist in a rectangular bearing frame fixed to multiple adjustable slats.

**[0004]** Traditionally, these shutters are made of wood, although metal shutters have been recently introduced on the market.

**[0005]** According to traditional manufacturing techniques, the frame is obtained by joining suitable metal profiles at right angle. In such a bearing structure, the two opposite uprights are provided with a longitudinal groove with basically square or rectangular cross-section in the centre of their internal side.

**[0006]** The groove exactly houses a suitable metal profile designed to support the traditional adjustable slats and contain the actuating mechanisms.

**[0007]** Practically, the two profiles contained in the slots of the uprights are provided with corresponding regularly spaced series of holes in specular position, used to pivot the lateral pins of the series of slats mounted in the metal frame.

**[0008]** The profiles contain the mechanisms used to connect the adjustable slats in such a way that the user can actuate a single external lever to determine the simultaneous rotation of all slats.

**[0009]** The mutual fixing between the slat-holding profile and the corresponding upright of the frame is traditionally obtained by means of "snap-in" coupling; in particular, coupling is produced because of the energetic interference between the borders of the opening on the upright and the longitudinal steps externally provided on the borders of the slat-holding profile.

**[0010]** This technology has certainly proven efficacious from the technical-functional viewpoint, although it is impaired by an inconvenience that negatively affects the assembly of traditional shutters.

**[0011]** The inconvenience refers to the fact that, during the production of a similar frame, the cross-section of each profile used to support and operate the slats must be identical to the cross-section of the longitudinal groove on the internal side of the uprights of the traditional bearing frame.

**[0012]** Otherwise, the necessary snap-in coupling between the slat-holding profile and the groove on the upright of the frame cannot be obtained.

**[0013]** All of the above requires the forced coupling between the upright of the metal frame and the slat-holding profile; it being evident that a profile with slightly larger or smaller cross-section than the aforementioned groove would not be contained in the groove or would be loose respectively, thus being unable to get blocked inside the groove with the necessary rigidity and stability.

**[0014]** The purpose of the present invention is to remedy the aforementioned limitation in the traditional manufacturing technique of metal frames for shutters. More precisely, the system of the invention has been devised to allow the stable mounting of slat-holding profiles with not necessarily identical cross-section to the groove, inside the longitudinal groove of the upright of a traditional frame.

**[0015]** Evidently, also in the presence of the new system of the invention, it will be impossible to mount a profile with larger cross-section inside the groove, while it will be possible to contain profiles with a smaller cross-section inside the said groove.

**[0016]** This will favour the activity of metal frame manufacturers, who will no longer be forced to strictly comply with the said constraint existing between the cross-section of the slat-holding profile and the cross-section of the groove.

**[0017]** The solution that has permitted to achieve this technical-functional result consists in the presence of especially designed elastic elements (springs) in the external sides of both borders of the slat-holding profile.

**[0018]** The springs that externally protrude on the borders of the slat-holding profile are designed to create interference between the borders and the corresponding borders of the groove when the profile is inserted in the groove. Moreover, they are also designed to provide stable snap-in coupling of the profile inside the groove.

**[0019]** The description below clearly illustrates the structure and operation of the said springs, which have been designed to have a variable compression tolerance to bridge possible gaps existing between the lateral border of the slat-holding profile and the corresponding lateral border of the groove.

**[0020]** Reference is made to the possible gaps determined by the difference existing from time to time between the cross-section of the slat-holding profile and the groove on the upright of the frame.

**[0021]** According to a first embodiment of the fixing system of the invention, the two springs applied on the lateral borders of the slat-border profile are physically separate; in this case, a specific spring is designed to guarantee the efficacious grip to the border of the profile.

**[0022]** According to a second embodiment of the fixing system of the invention, the two springs are combined by means of a suitable "connection bridge", although they are still efficiently joined with the lateral borders of the corresponding slat-holding profile.

**[0023]** Finally, it must be noted that the springs designed to engage against the longitudinal borders of a slat-holding profile are not preferably provided with continuous development, meaning that the length of each spring is not equal to the corresponding profile.

**[0024]** Each spring (either in the individual or double version) has a very limited length. This requires to mount multiple springs, one after the other, with suitable distance between two springs, along the borders of the slat-holding profile.

**[0025]** The decision to use "short" springs is determined by technical-functional and economical reasons, it being evident that small dimensions and easy handling of the springs make production and installation on the profile easier.

**[0026]** For purposes of clarity the description of the invention continues with reference to the enclosed drawing, which is intended for purposes of illustration only and not in a limiting sense, whereby:

- figure 1 is the view of a section of slat-holding profile equipped with an "individual" spring used to obtain the fixing system of the invention;
- figure 2 is a top view of the same profile as fig. 1;
- figure 3 is a front view of the individual spring mounted on the profile shown in the previous figures;
- figure 4 is a side view of the same spring shown in figure 3;
- figures 5 and 6 are two perspective views of a section of slat-holding profile equipped with a "double" spring used to obtain the fixing system of the invention;
- figure 7 is an axonometric view of the spring shown in figures 5 and 6;
- figure 8 is a transversal cross-section of the slat-holding profile, complete with fixing springs, contained in the groove in the upright of the frame.

**[0027]** With reference to figure 1, the fixing system of the invention is designed to be actuated on slat-holding profiles (1) of the type provided with a basically U-shaped cross-section, with a front wall (10) centrally provided with holes (11) designed to pivot the lateral pins of the adjustable slats, from which two special symmetrically opposite longitudinal borders (12) protrude in perpendicular direction.

**[0028]** Each border (12) is externally provided with a continuous step (12a) in central position with respect to height.

**[0029]** Another characteristic of the borders (12) is the lower rounded end (12b), it being provided that the rounded end (12b) and the step (12a) are joined by an inclined plane (12c).

**[0030]** This typical structure of the two lateral borders (12) of the slat-holding profile (1) can be used to actuate the universal fixing system of the invention.

**[0031]** In particular, as mentioned earlier, the system provides for the application of an elastic element used to block the profile (1) in the groove on the internal side of the upright (M) of the frame in external position in each border (12) of the profile (1), as shown in figure 8.

**[0032]** In the "individual" version, the spring (2) consists in a suitably shaped metal blade.

**[0033]** In particular, as shown in figures 3 and 4, the spring (2) is provided with a lower continuous inward-curved border (20) from which two intrinsically elastic hooks (21) protrude upwards at the ends.

**[0034]** The cross-section of each hook (21) includes a first rectilinear upward section coupled with a short flat

end (21 a) with inward direction.

**[0035]** A special elastic tongue (22) is situated in intermediate position between the two hooks (21), protruding from the lower curved border (20).

5 **[0036]** In particular, the elastic tongue (22) is higher than the hooks (21) and physically separated from them by the presence of two intermediate notches (23) perpendicular to the lower curved border (20).

10 **[0037]** As shown in the same figures, the cross-section of the elastic tongue (22) includes a first rectilinear section with upward direction ending with a hook-like profile (22a).

15 **[0038]** When the entire spring (2) is in rest position, the elastic tongue (22) spontaneously tends to maintain a higher outward inclination with respect to the two lateral hooks (21), as expressly shown in figure 4.

20 **[0039]** Figure 2 illustrates the coupling modes of the spring (2) with a corresponding section of the longitudinal border (12) of the slat-holding profile (1); it being evident that coupling is made possible by the intrinsic elasticity of the spring (2) and by the fact that the profile of the spring has been designed according to the specific cross-section of the border (12).

25 **[0040]** As shown in fig. 2, thanks to suitable inward curving, the lower continuous border (20) of the spring is exactly matched (or "fastened") with the lower rounded end (12b) of the border (12). At the same time, the short flat end (21a) of each hook (21) is firmly engaged against the step (12) situated in external position on the border (12) from up down.

30 **[0041]** Since the step (12a) is external with respect to the lower rounded end (12b) of the border (12), the first rectilinear section of both hooks is forced to assume an outward inclination in order to touch the inclined plane (12c) that connects the step (12a) and the rounded end (12b).

35 **[0042]** As shown in figure 2, following to the coupling of the spring (2) with the corresponding section of the border (12) of the profile (1), the central elastic tongue (22) of the spring (2) has a higher outward inclination than the rectilinear sections of the hooks (21), thus being situated at a certain distance from the inclined plane (21c) of the border (12) of the profile (1).

40 **[0043]** When the entire slat-holding profile (1) is contained in the groove on the internal side of the upright of the bearing frame, the "protruding" position of the elastic tongue (22) allows the tongue (22) to suffer the interference of the lateral borders of the groove that contains the profile (1); reference is made to figure 8 (although figure 8 refers to a profile equipped with a "double" spring as illustrated below).

45 **[0044]** Interference determines the compression of all the elastic tongues (22) of the multiple springs (2) applied to the slat-holding profile (1) towards the external side of the corresponding longitudinal border (12).

50 **[0045]** It can be otherwise said that the compression of the tongue (12) reduces the transversal cross-section of the profile (1), thus allowing its insertion in the groove

on the upright.

**[0046]** However, once the profile (1) has been completely inserted, because of the spontaneous tendency of the tongues (22) to diverge outwards, the tongues (22) energetically press against the lateral walls of the groove on the upright that contains the slat-holding profile (1).

**[0047]** The energetic pressure exercised by the tongues (22) of the multiple springs (2) applied on the longitudinal borders (12) of a slat-holding profile (1) prevents the profile (1) from accidentally mismatching from the groove on the upright.

**[0048]** This description clearly explains the reason why the tongues (22) of the springs (2) can be efficiently used to fix a slat-holding profile (1) in the grooves of uprights provided with different cross-sections.

**[0049]** The higher or lower width of the cross-section of the groove with respect to the cross-section of the profile (1), i.e. the distance between the two longitudinal borders (12), can be "bridged" thanks to the ability of the tongues (22) to compress towards the longitudinal borders (12) according to the higher or lower interference with the lateral walls of the groove on the upright.

**[0050]** Evidently, the higher or lower interference is the result of a limited or a large "gap" between the borders (12) of the profile (1) and the internal walls of the groove, respectively.

**[0051]** As mentioned earlier, the spring of the invention can be also realised according to a second embodiment (200), defined as "double" and expressly illustrated in figures 5, 6 and 7.

**[0052]** As shown in the said figures, the double spring (200) is provided with a rectilinear bridge (3) used to connect the base of two metal blades (200a) that are basically identical to the individual springs (2).

**[0053]** As shown in fig. 7, each metal blade (200a) includes a continuous base border (222), two lateral hooks (210) with rectilinear profile and top flat ends (210a) with inward direction, and a central tongue (220) that tends to maintain a more external position and is provided with a top hook-like end (220a); it being provided that, also in this case, the two lateral hooks (210) and the central tongue (220) are independent due to the presence of two suitable intermediate notches (230).

**[0054]** The only difference is that, in this second case, the metal blades (200a) are not provided with the lower curved border (20) that is typical of the individual springs (2).

**[0055]** The absence of the lower curved border (20) is justified by the fact that the firm adhesion of the double spring (200) with the longitudinal borders (12) of the slat-holding profile (1) is obtained according to a different principle compared to the individual springs (2). Due to co-operation between the bridge (3) and the two opposite blades (200a), the double spring (200) is characterised by a boxed structure that exactly surrounds the two longitudinal borders (12) of the profile (1), causing forced coupling.

**[0056]** As shown in figs. 5 and 6, the two shaped blades

(200a) of the double spring (200) can efficiently "grip" the external face of the longitudinal borders (12), by taking advantage of the usual presence of the steps (12a), while the connection bridge (3) touches the lower ends (12b) of the borders (12).

## Claims

**1.** System used to fix slat-holding profiles inside the grooves on the uprights of window frames, of the type to be actuated in case of slat-holding profiles (1) with basically U-shaped cross section, with a front wall (10) with regularly spaced holes (11), from which two special symmetrically opposite longitudinal borders (12) protrude, each border being externally provided with a continuous step (12a) joined by means of an inclined plane (12c) with a lower rounded end (12b), **characterised in that** it provides for the application of suitable elastic elements or springs (2, 200) in external position in each border (12) of the profile (1) that are designed to interfere, with the longitudinal borders of the groove during coupling between the profile (1) and the groove on the upright (M), thus creating the firm "snap-in" coupling between the profile (1) and the groove.

**2.** System as defined in claim 1, **characterised in that** the elastic elements (2, 200) are able to bridge, within certain limits, the difference in value between the width of the profile (1), meaning the distance between the external sides of the longitudinal borders (12), and the width of the groove on the upright (M) of the frame, meaning the distance between the two longitudinal borders of the groove.

**3.** Spring for actuation of the fixing system illustrated in the above claims, **characterised in that** it consists in a special shaped blade with a lower continuous rectilinear inward-curved border (20), from which two intrinsically elastic hooks (21) protrude upwards, being situated, with the interposition of corresponding notches (23), in lateral position on an elastic tongue (22) with a hook-like upper end (22a) and provided with height and external inclination higher than the hooks (21); it being provided that the lower curved border (20) of the spring (2) exactly engages with a corresponding section of the rounded end (12b) of the longitudinal border (12) of the slat-holding profile (1), while thanks to the presence of suitable short flat inward-folded ends (21), the lateral hooks (21) of the spring (2) can firmly engage the longitudinal step (12a) in external position on the border (12) of the slat-holding profile (1); it being provided that, in the latter case, the rectilinear section of each hook (21) is exactly engaged against the inclined plane (12c) that acts as connections between the external step (12a) and the rounded end

(12b) in external position on the longitudinal border (12)..

**3.** Spring for actuation of the fixing system illustrated in claims 1 and 2, **characterised in that** it includes a rectilinear bridge (3) with width basically identical to the distance between the two longitudinal borders (12) of the slat-holding profile (1), used to connect the base of two metal blades (200a) in symmetrically opposite position, each of them being provided with a base continuous border (222), from which two intrinsically elastic hooks (222) and a central elastic tongue (220) with a hook-like upper end (22a) and height and external inclination higher than the hooks (210) protrude; it being provided that the lower curved border (20) of the spring (2) exactly engages with a corresponding section of the rounded end (12b) of the longitudinal border (12) of the slat-holding profile (1) while, thanks to the presence of suitable short flat inward-folded ends (200a), the lateral hooks (21) of the spring (230) can firmly engage the longitudinal step (12a) in external position on the border (12) of the slat-holding profile (1); it being provided that, in the latter case, the rectilinear section of each hook (21) is exactly engaged against the inclined plane (12c) that acts as connection between the external step (12a) and the rounded end (12b) in external position on the longitudinal border (12).

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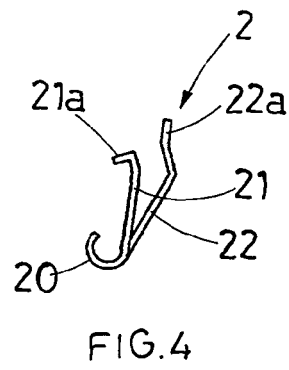
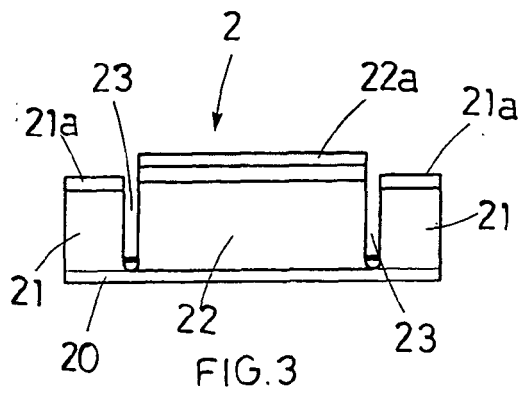
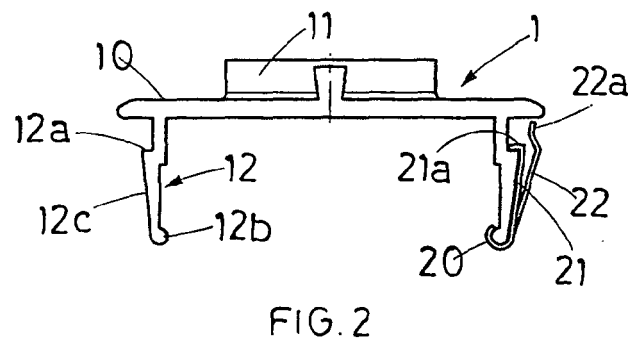
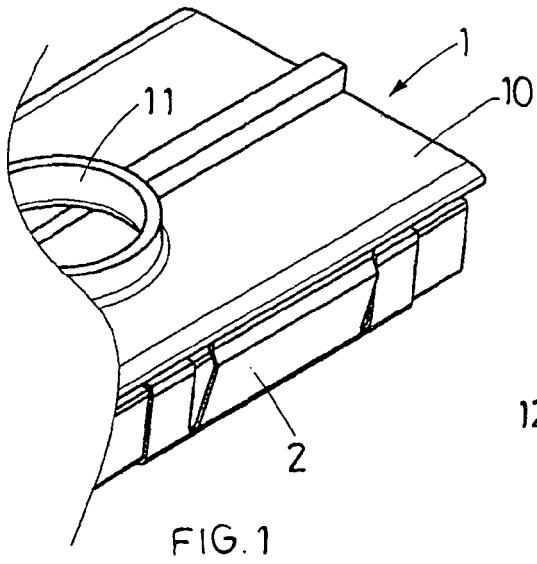
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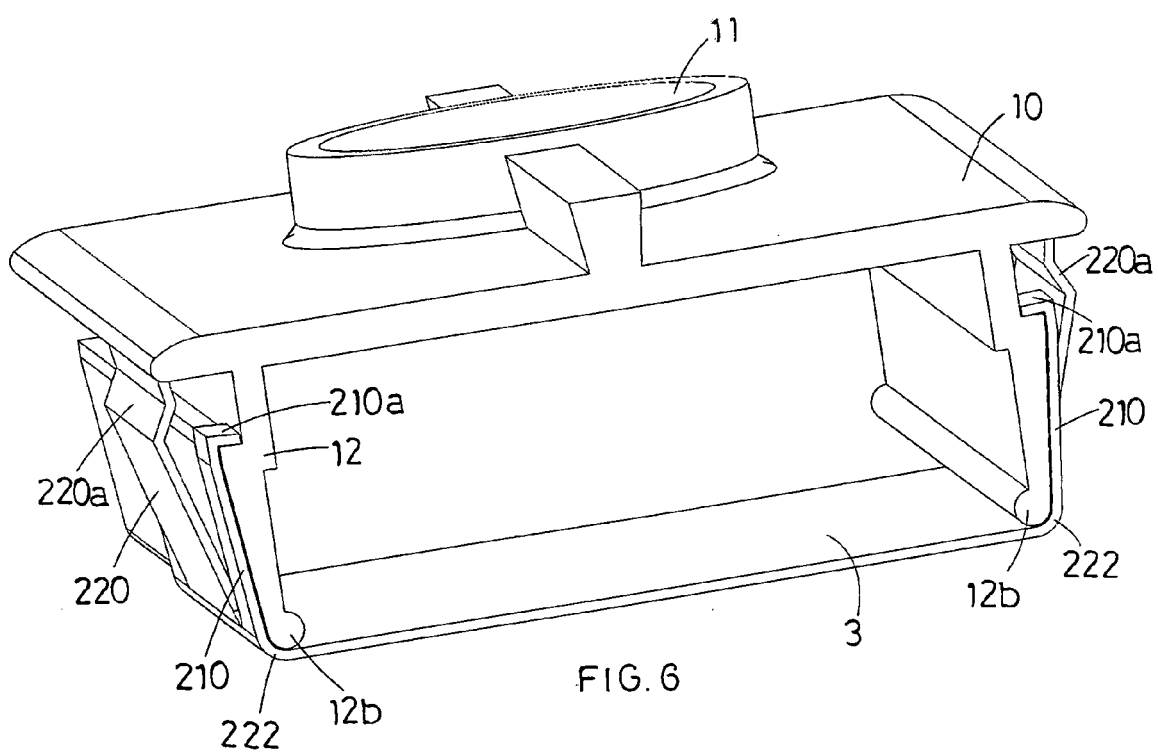
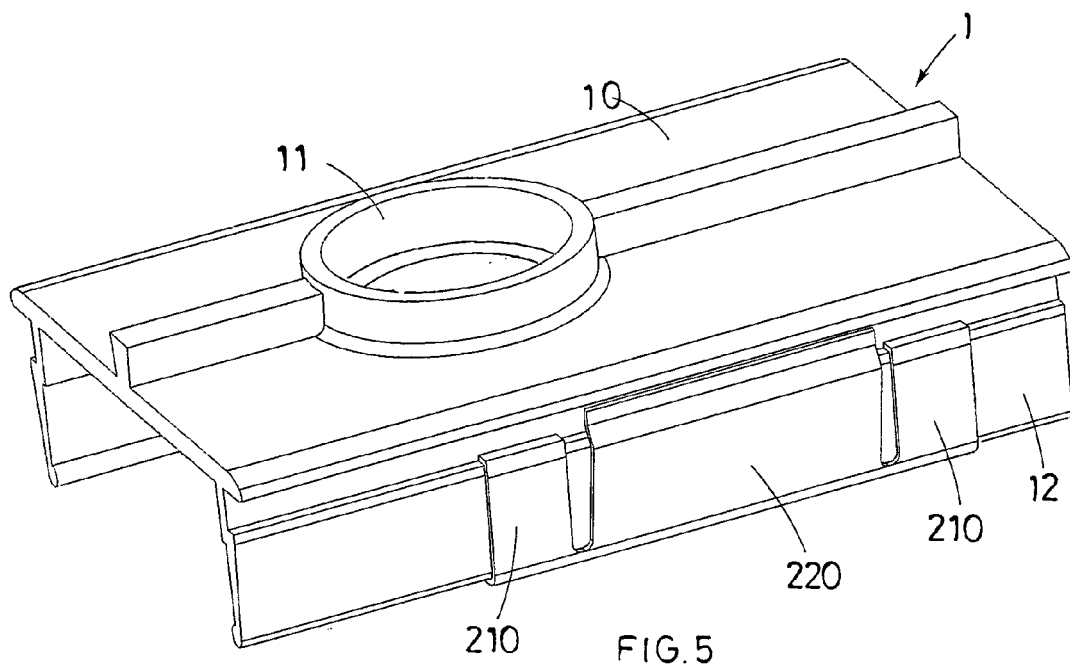
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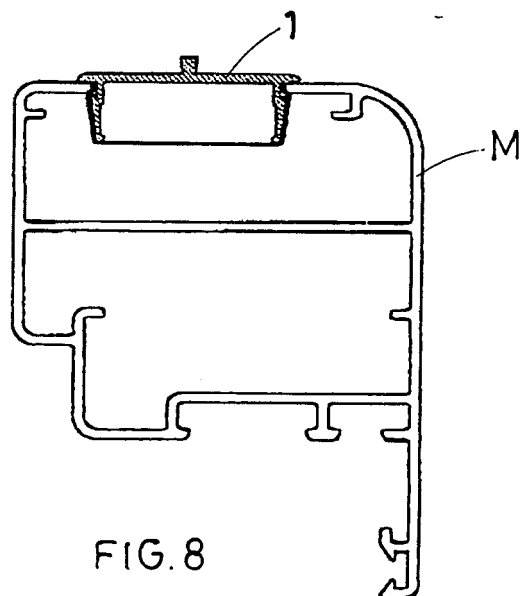
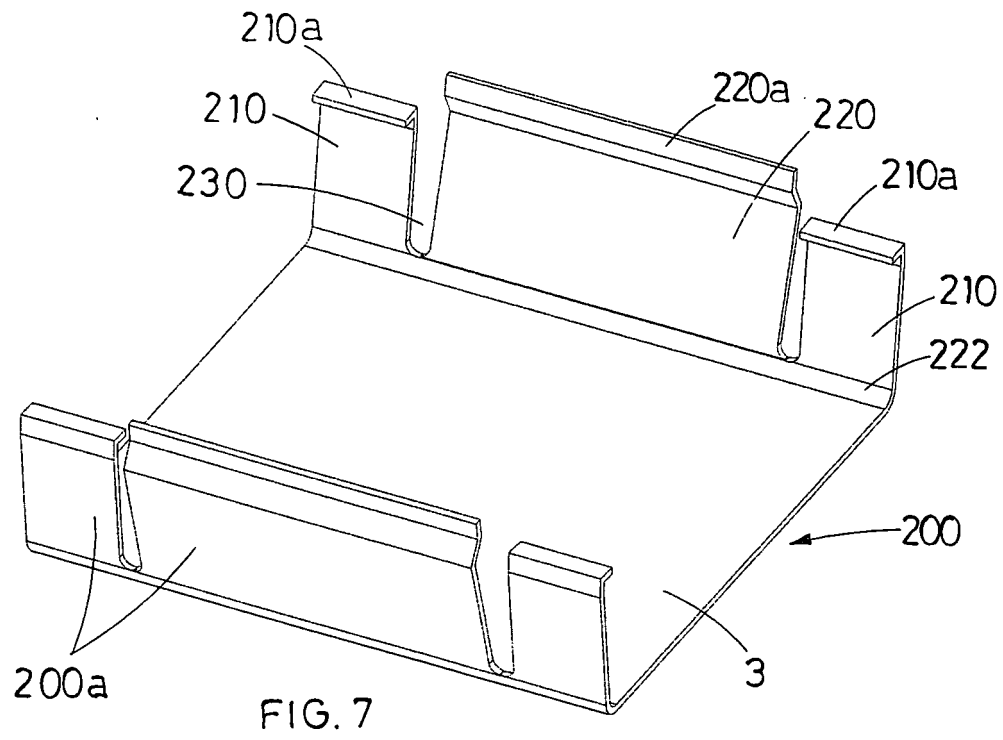
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Application Number  
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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |                                                      |                                         |
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| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                              |                                                      |                                         |
| Place of search<br>Munich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                              | Date of completion of the search<br>27 November 2006 | Examiner<br>Peschel, Gerhard            |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>-----<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                              |                                                      |                                         |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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