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(54) **System for locking a slat in a shutter, and relative shutter**

(57) A system (100) for locking a slat (10) on a support structural bar (20) of a shutter (1000). The system (100) comprises a through opening (30) obtained on the support structural bar (20) in which the slat (10) is inserted. The system (100) is characterized in that at least two

portions (30A*, 30A**) of the edge (30A) of the through opening (30) are provided with elastic lamellae (40, 41) facing each other suited to clamp the external surface (10A) of the slat (10), when the slat (10) itself is inserted into the respective through opening (30).

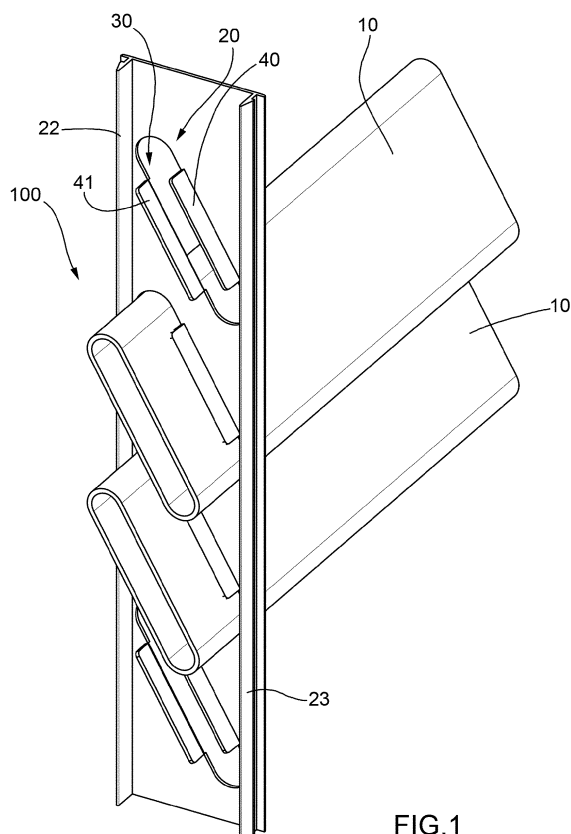


FIG.1

Description

[0001] The present invention relates to a system for locking a slat in a shutter, and to a shutter assembled using said system.

[0002] Although only the case of an open shutter with fixed slats will be considered herein, the teachings of the present invention may be advantageously used whenever a slat (of any shape) of any type of shutter with any support structural bar must be assembled.

[0003] As known, a shutter with fixed slats comprises a plurality of slats blocked on two parallel lateral uprights that serve as supporting shoulders.

[0004] Each slat is generally obtained by cutting to size an aluminum extruded painted bar (e.g. 6 meters) whose cross section is very often oval in shape (but can be of other shapes).

[0005] The two lateral uprights are provided with through-openings in which are inserted the slats. In particular, each of the two ends of each slat is inserted in a respective through opening obtained on a respective side upright. Obviously each slat has a profile which substantially follows the shape of the edge of the respective through opening.

[0006] During the assembly of each slat on the uprights it is very important that each through opening of a first side upright is as specular as possible to the corresponding opening obtained on the opposite upright. All this with the obvious purpose to ensure that the slats, in use, are as parallel to each other as possible. In addition, for the same reason the through openings in which the ends of the slats are inserted must allow a certain clearance so as to enable the installer to adjust the position in the space of the slats themselves to give them the correct parallelism.

[0007] The through openings in which the ends of the slats are inserted must perform, in addition, an effective clamping function of the same to prevent any of them to accidentally slip out from a respective through opening.

[0008] It has been devised, For this purpose, for example, an embodiment wherein each through opening, in addition to the usual oval shape, has two narrowing points of its edge. The two narrowing points, which are opposite to each other, performing a certain locking action on the respective slat, would prevent the unwanted slippage of the same.

[0009] This solution has, however, at least three main disadvantages:

- (1) the tightening action on the slat performed by the narrowing is not sufficient to prevent the accidental slipping out of the slat itself;
- (2) when the installer inserts the slat in the respective through openings said slat rubs against the narrowing points causing a consequential abrasion of the paint layer; since the side uprights are generally very thin any scratches found on the surface of the slat are visually perceivable by an external observer, and

this fact, of course, is deemed unsatisfactory by the buyer who very often requires the supplier to replace the damaged slats, with a consequent economic loss to the manufacturer and/or the installer; and

(3) the tightening action on the slats performed by the through openings is not sufficient to counteract the action of wind upon the same slats, which, for this reason, begin to vibrate causing an annoying noise.

[0010] The main purpose of the present invention is, therefore, to provide a system for locking a slat in a shutter which is free from the drawbacks described above and, at the same time, is easy and economical to produce.

[0011] Furthermore, another object of the present invention is to provide a shutter whose assembly requires the use of said system.

[0012] According to this invention there is provided, therefore, a system for locking a slat in a shutter as claimed in claim 1 or in any of the claims depending directly or indirectly on claim 1.

[0013] Moreover, always according to the dictates of the present invention, a shutter is provided whose assembly requires the use of said system; shutter that is claimed in claim 6 or in any of the claims depending directly or indirectly on the above claim 6.

[0014] For a better understanding of the present invention, a preferred embodiment is now described, purely by way of non limiting example and with reference to the accompanying drawings, in which:

- Figure 1 shows a three dimensional view of the system main object of the present invention;
- Figure 2 shows a plan view of the system illustrated in Figure 1;
- Figure 3 shows a section A-A obtained on the plan of Figure 2;
- Figure 4 shows a three dimensional view of an assembly of some assembled elements belonging to a shutter, which is, in turn, a further object of the present invention;
- Figure 5 shows an exploded view of the assembly shown in Figure 4; and
- Figure 6 illustrate a side view of the assembly shown in Figure 4.

[0015] In the attached figures, with 100 is indicated as a whole, a system for locking a slat 10 in a shutter 1000 according to the teachings of the present invention.

[0016] The system 100 comprising a through opening 30 obtained on a support structural bar 20 in which the slat 10 is inserted.

[0017] As shown in particular in Figure 2, at least two portions 30A*, 30A** of the edge 30A of the through opening 30 are provided with protruding elements 40, 41 facing each other and suited to clamp the external surface 10A of the slat 10 once it has been inserted into the respective through opening 30.

[0018] Incidentally, although the present description refers to elliptical cross sectional slats, the teachings of the present invention are applicable to any slat having any cross section.

[0019] At least one of the protruding elements 40, 41 is an elastic lamella.

[0020] In a preferred embodiment both the protruding elements 40, 41 are elastic lamellae. Thus each pair of elastic lamellae 40, 41 which is located on the same edge 30A performs an elastic clamping action on one end of the relative slat 10.

[0021] Preferably, but not necessarily, each elastic lamella 40, 41 is inclined at an angle (α) with respect to a plane (Φ) perpendicular to a plane (Ψ) on which a flat face 21 of the support structural bar 20 substantially lies.

[0022] Advantageously, the angle (α) ranges from 3° to 7°, and depends on the type of material with which the slats 10 and/or the support structural bar 20 are made.

[0023] In particular the angle (α) is 5°.

[0024] Preferably, to allow easy insertion of the slat 10 into the through opening 30, the edge 30A of the through opening 30 itself is slightly larger than the profile of the slat 10

[0025] (also of a few tenths of a millimeter). In this way the insertion takes place without any substantial interference between the surface of the slat 10 and the edge 30A. In said case only the inner surfaces of the slats 40, 41 interfere with each other and the external surface of the slat 10. The installer, then, receives no annoying resistance from the edge 30A at the insertion of the slat 10. For these reasons, the assembly of the slats 10 occurs in a much easier and faster way.

[0026] As shown in particular in Figures 1, 3, 5, in addition to the aforementioned flat face 21, the structural bar 20 comprises two ratchet gear 22, 23 that protrude from the flat face 21 itself from the same surface from which the abovementioned elastic lamellae 40, 41 protrude (see below).

[0027] With reference in particular to Figures 4, 5, 6, the shutter 1000 (shown only partially in the cited figures 4, 5, 6) comprises a panel 50 which is also advantageously made with an aluminum profile.

[0028] Said panel 50 (Figure 6) comprises a box-shaped body 51 from which a wall 52 protrudes.

[0029] The box-shaped body 51 provides, in turn, two wings 53 and 54, each wing 53, 54 being provided with a respective ledge 53A, 54A.

[0030] As shown in particular in Figures 4, 6, when the structural bar 20 is mounted on the panel 50 each ratchet gear 22, 23 engages the corresponding ledge 53A, 54A of the box-shaped body 51 in a click-in manner.

[0031] The panel 50, on the opposite side in which there are two wings 53, 54, provides reliefs 55A-55E that protrude from the box-shaped body 51 and from the wall 52. Said reliefs 55A-55E are used to receive and/or support door and/or window frames (not shown).

[0032] The present invention also relates to a shutter 1000 which comprises at least one innovative system

100 of the type previously described.

[0033] The shutter 1000 also comprises:

- (a) two panels 50 parallel to each other;
- (b) a plurality of slats 10 inserted in two respective pluralities of through openings 30 obtained on two support structural bars 20 coupled to the two panels 50 in a click-in manner.

[0034] The assembly of the slats 10 on the shutter 1000 is as follows:

- (A) summarily insert a first end of all the slats 10, cut to size, in the corresponding through-openings 30 obtained on a first support structural bar 20;
- (B) engage in a click-in manner the ratchet gear 22, 23 of the first support structural bar 20 with the ledges 53A, 54A of the box-shaped body 51 of a first panel 50;
- (C) summarily insert a second end of all the slats 10, cut to size, in the corresponding openings 30 obtained on a second support structural bar 20;
- (D) engage in a click-in manner the ratchet gear 22, 23 of the second support structural bar 20 with the ledges 53A, 54A of the box-shaped body 51 of a second panel 50; and
- (E) adjust the position of the slats 10 so as to ensure an acceptable parallelism between each other.

[0035] As shown in particular in Figure 6, since the ends of the slats 10 remain within the space of the box-shaped body 51 defined by the wings 53, 54 and by the flat face 21, even if the paint that is located on the surfaces 10A of the ends should be somehow scratched, such surfaces 10A would still be hidden from view and therefore would not be noticed by the user.

[0036] Note, also, that for the same locking action performed by the pairs of lamellae 40, 41 on each slat 10, the specific pressure on the surface 10A (and also on the layer of paint) is therefore much lower than that which would have been if the previously described system with reference to the background art were used in which, as we said, the narrowing of the edges of the through openings are used.

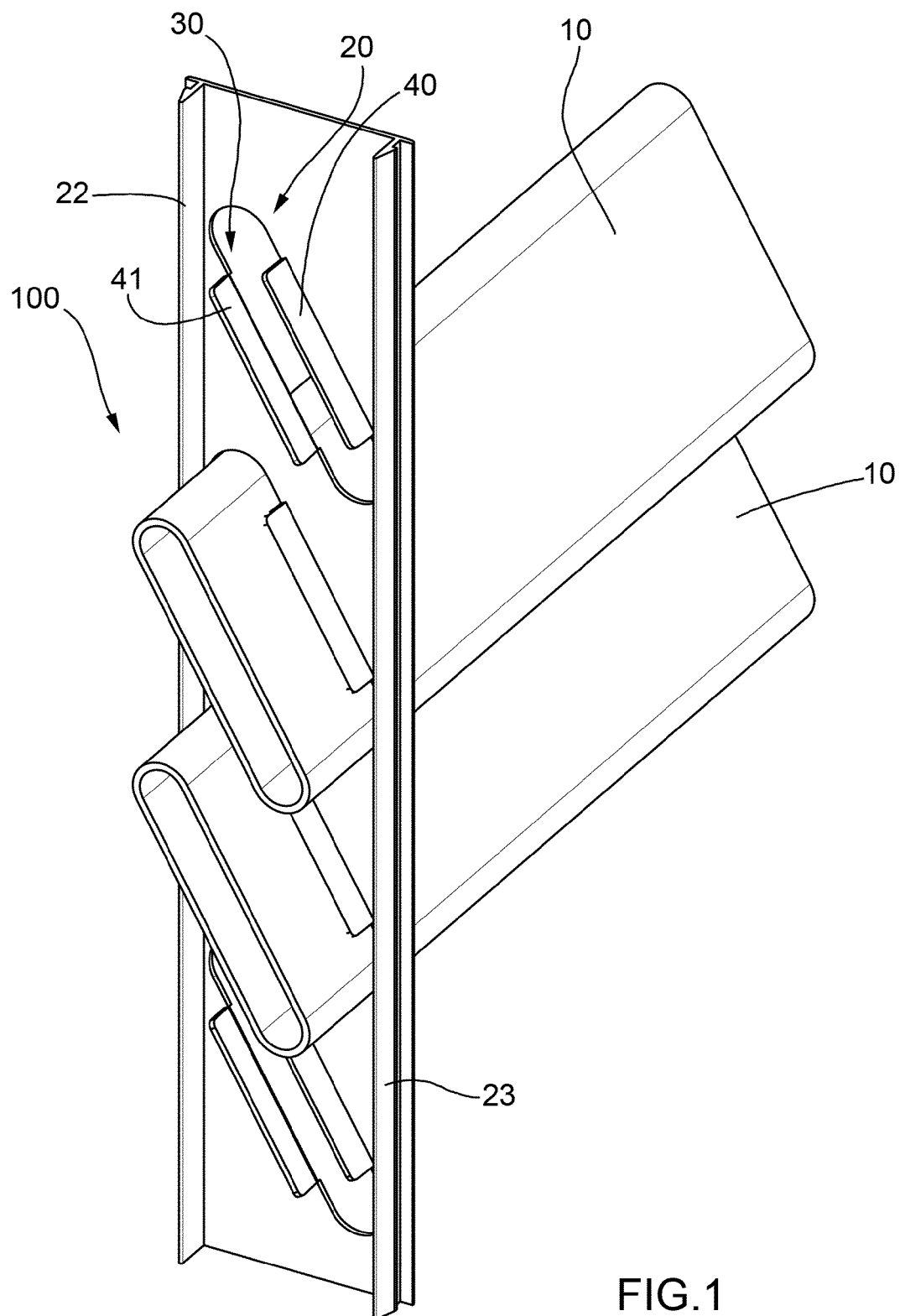
[0037] The main advantages of the system for locking a slat in a shutter and the relative shutter objects of the present invention are the following:

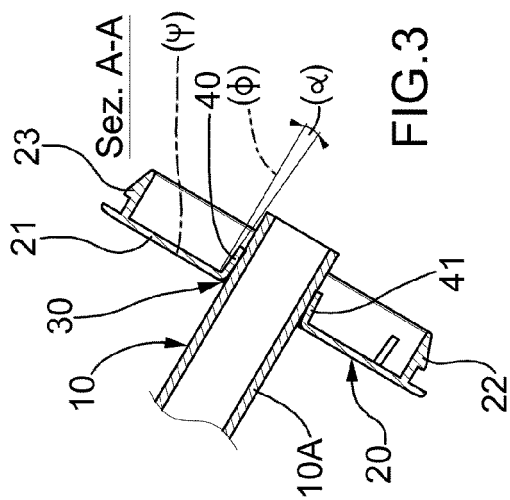
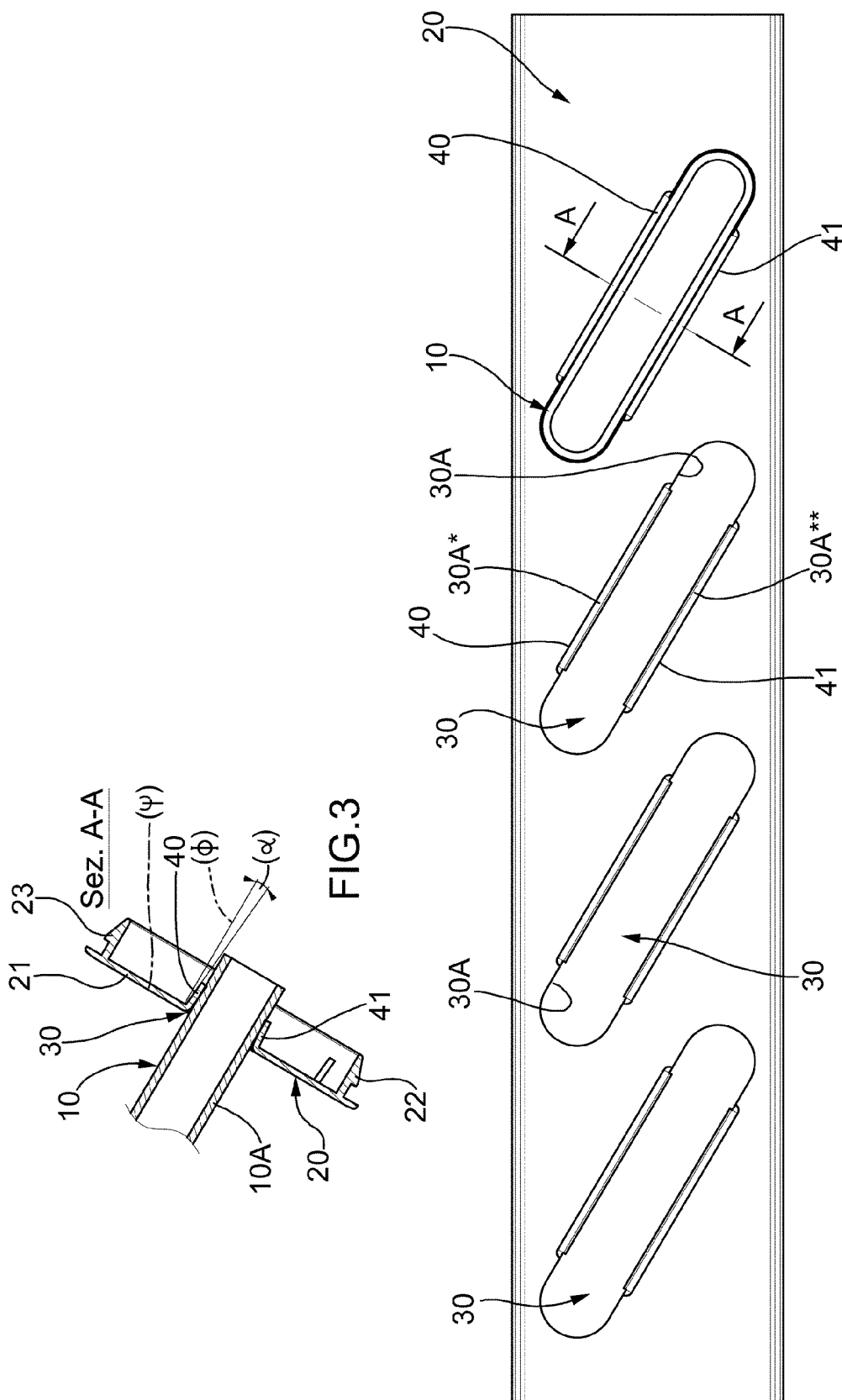
- the tightening action performed by the elastic lamellae is sufficient to prevent the accidental slipping out of the slats;
- any scratches that may be created when the installer adjusts the position of the slat are not visually perceptible by an external observer; this fact involves greater customer satisfaction and, therefore, a considerable reduction in the number of slats replaced as being considered damaged; and
- the tightening action of the slats performed by the

through-openings is sufficient to counteract the action of the wind on the slats themselves, avoiding the occurrence of annoying vibration and noise.

Claims

1. A system (100) for locking a slat (10) on a support structural bar (20) of a shutter (100); system (100) comprising a through opening (30) obtained on said support structural bar (20), in which said slat (10) is inserted; system (100) **characterized in that** at least two portions (30A*, 30A**) of the edge (30A) of said through opening (30) are provided with protruding elements (40, 41) facing each other, which are suited to clamp the external surface (10A) of said slat (10), when said slat (10) is inserted into said through opening (30). 10
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2. A system (100), according to Claim 1, **characterized in that** at least one of said protruding elements (40, 41) is an elastic lamella (40, 41). 25
3. A system (100), according to Claim 2, **characterized in that** said elastic lamella (40, 41) is inclined at an angle (α) with respect to a plane (Φ), which is perpendicular to a plane (Ψ), on which a flat face (21) of said support structural bar (20) substantially lies. 30
4. A system (100), according to Claim 3, **characterized in that** said angle (α) ranges from 3° to 7°, in particular 5°. 35
5. A system (100), according to any of the preceding Claims, **characterized in that** said edge (30A) of said through opening (30) is larger than the profile of said slat (10). 40
6. A shutter (1000) **characterized in that** it comprises at least one system of the type claimed in any of the Claims from 1 to 5. 45
7. A shutter (1000), according to Claim 6, **characterized in that** it comprises: 50
 - (a) two panels (50) parallel to each other;
 - (b) a plurality of slats (10) inserted into two respective pluralities of through openings (30) obtained on two support structural bars (20), which are coupled to said two panels (50) in a click-in manner. 55
8. A shutter (1000), according to Claim 7, **characterized in that** each support structural bar (10) comprises respective ratchet gear (22, 23), which engage in a click-in manner corresponding ledges (53A, 54A) provided on a corresponding panel (50). 55
9. A shutter (1000), according to Claim 8, **characterized in that** said ratchet gear (22, 23) and said protruding elements (40, 41) are both protruding from a flat face (21) of said support structural bar (20) from the same side. 5
10. A shutter (1000), according to any of the Claims from 7 to 9, **characterized in that** said panel (50) is provided with means (55A-55E) suited to receive locking means. 10





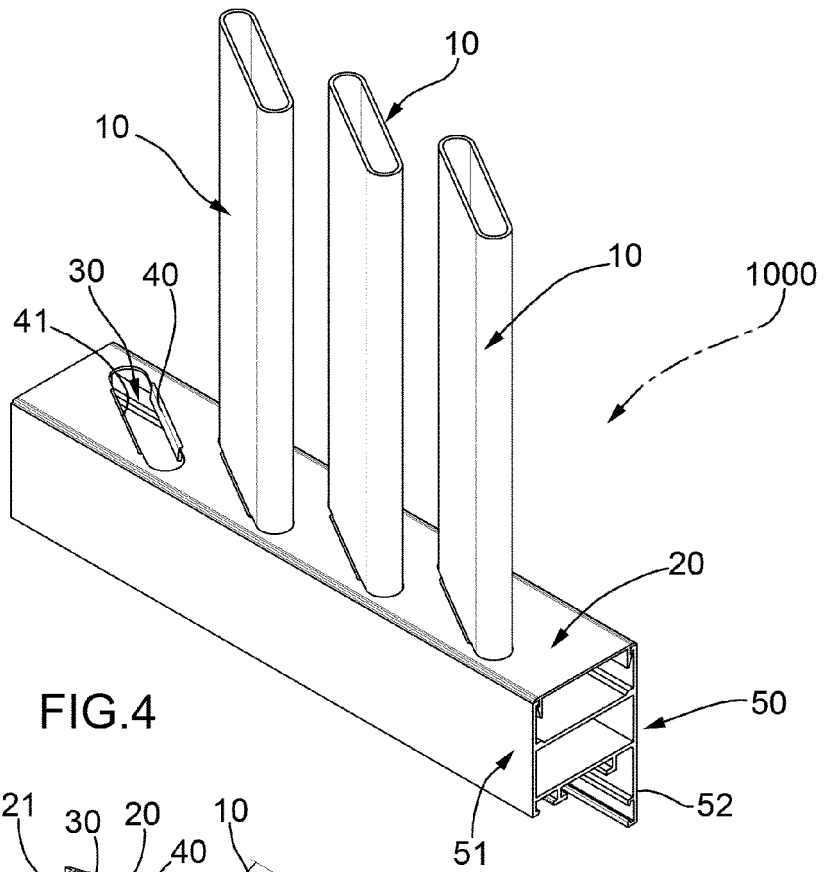


FIG. 4

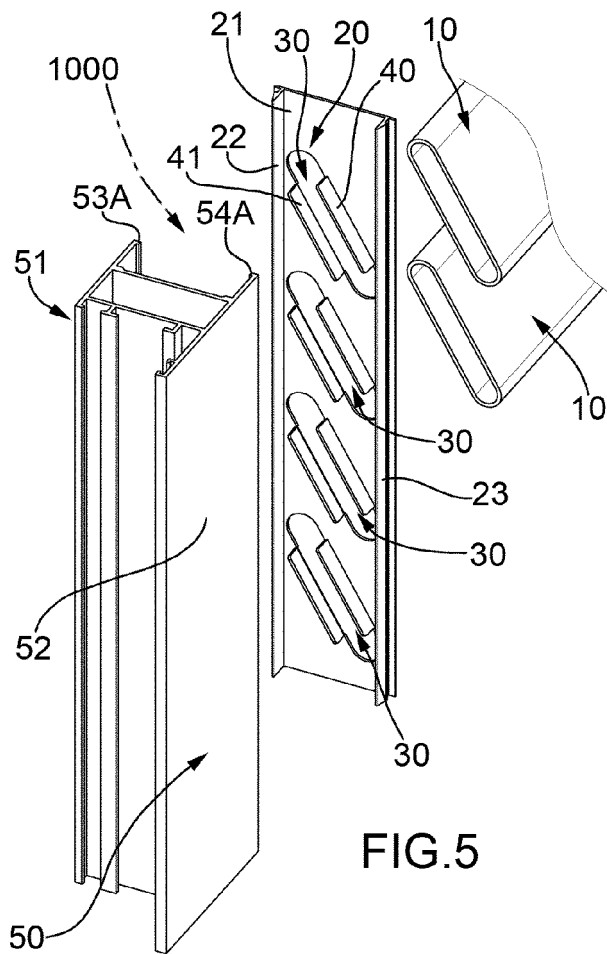


FIG. 5

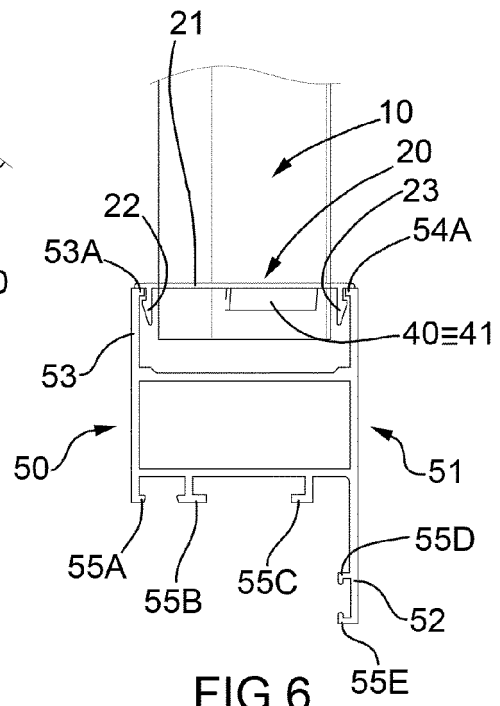


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 12 16 0011

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	* page 1, lines 3-6 * * page 13, line 3 - page 14, line 20; claims 1,15-22; figures 13-14,26-29 *	6-10	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
Place of search		Date of completion of the search	Examiner
Munich		18 July 2012	Kofoed, Peter
CATEGORY OF CITED DOCUMENTS 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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