

(19)



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Office européen des brevets



(11)

EP 1 048 816 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
05.12.2001 Bulletin 2001/49

(51) Int Cl.7: **E06B 3/96**

(21) Application number: **00830134.3**

(22) Date of filing: **24.02.2000**

(54) **An apparatus and method for connecting profiled elements in conditions of mutual co-planarity and unity, in the manufacture of planar frames**

Vorrichtung und Verfahren zum Verbinden von Profilelementen bei der Herstellung von planaren Rahmen

Dispositif et méthode pour raccorder des éléments profilés dans la fabrication des cadres plans

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **30.04.1999 IT RN990011**

(43) Date of publication of application:
02.11.2000 Bulletin 2000/44

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Description

[0001] The present invention relates to the technical field concerning the manufacture of frames by means of the interconnection of prefabricated profile elements, frames which, by way of non limiting indication, are destined to the construction of windows and doors, and in particular it relates to an apparatus and a method for connecting such profiled elements.

[0002] In the technology for constructing window and door frames, the fabrication of the frames by connecting various profiled elements with connecting apparatuses located in correspondence with the vertices of the frame is known.

[0003] These connecting apparatuses in general rigidly connect, by force, the paired contiguous profiled elements concurring in the various vertices assuring, in fully tightened conditions, the restoration of the continuity and co-planarity of the exterior surfaces of the connected elements even in the junction areas of the various elements.

[0004] To effect these connections the connecting apparatuses require forced connection squares - so-called pulling squares - which allow to exert on each of the profiled elements traction forces which, directed parallel to the relative axis line, thrust the profiled elements against each other in a condition of mutual unity. The forced connection squares are geometrically shaped in such a way as to orient and maintain oriented over time the profiled elements constituting the frame, assuring, in the junction areas and once mounting is complete, continuity of form and co-planarity among the various surfaces of the frame.

[0005] Since the profiled elements for the fabrication of the frames are very often provided with planar tongues for which it is necessary to restore continuity of surface and mutual unity in the junction area, the connection apparatuses are often integrated by so-called aligning squares. These are provided with arms projecting from an intermediate body, arms which are housed inside grooves of the profiled elements and which, positioning themselves astride of the junction area, maintain the tongues of the profiled elements concurring in the various vertices of the frame aligned and co-planar.

[0006] The installation of the aforesaid alignment squares is conducted inserting the arms into the grooves of the two profiled elements with a translating motion directed longitudinally to the profiled element.

[0007] As a consequence thereof, the mounting of the aligning squares needs to be conducted simultaneously with the mounting of the forced connection square, which makes the mounting operation generally difficult and, in some particular cases like those relating to profiled elements with thermal cut, which normally require two aligning squares for each forced connection square, the mounting operation is rather long and laborious.

[0008] Moreover, since the arms of the aligning squares are fastened to the related grooves of the pro-

filed elements with sliding coupling, the indispensable play for mounting does not assure the total unity of the tongues which always tend to move relative to one another if stressed to move away in a direction perpendicular to their plane of lay. The construction tolerances of the square and of the profiled elements only increase this possibility of relative motion; hence, the sought continuity and co-planarity in practice are revealed to be quite imperfect.

[0009] Yet another drawback, moreover, is represented by the fact that the tightening action performed by the forced connection squares, as a result of the inherent flexibility of the profiled elements, normally made with reduced thickness and of aluminium, does not perfectly reach the connection area of the tongues which is normally far from the forced connection junction. As a result, the approach of the tongues in mutual contact occurs only partially. This is attested by the fact that, if the junction is observed against the light, it is not infrequent to note that, in spite of the full tightening of the forced connection square, some segments of the connection area of the tongues are not in perfect contact.

[0010] DE-A-26 56 958 discloses an apparatus and a method for connecting profiled elements comprising respectively the features of the preambles of claims 1 and 10.

[0011] The aim of the present invention is to eliminate the aforesaid drawbacks by means of an apparatus according to claim 1 and a method according to claim 10.

[0012] The apparatus according to the invention has the fundamental advantage of allowing the co-planar rigid connection of the tongues with their simultaneous and mutual localised forcing, in a manner wholly independent from the forced connection square.

[0013] Such independence allows to accomplish the mounting of the frames for windows and doors with a mounting method which also constitutes the subject of the present invention and which allows the installation of the connecting body at any time and even after the complete tightening of the junction area between the two profiled elements.

[0014] All this with the advantage of having rapid and easy mounting in all situations and for all types of profiled element, regardless of their greater or lesser constructive complexity.

[0015] The aforesaid connecting apparatus has the additional advantage of being employable also in sectors other than those strictly pertaining to the construction of windows and doors, in that it can be advantageously employed also for the construction of different types of frames such as, for instance, frames for paintings.

[0016] The technical features of the invention, according to the aforesaid aims, can be clearly noted from the content of the claims that follow and its advantages shall become more readily apparent from the detailed description that follows, made with reference to the accompanying drawings, which represent an embodiment pro-

vided purely by way of non limiting example, in which:

- Figure 1 is a perspective overall view of a junction apparatus according to the invention, shown in exploded form;
- Figure 2 is a top plan view of the apparatus of Figure 1;
- Figure 3 is a section of the apparatus made according to the section line III-III of Figure 2;
- Figure 4 is a representation illustrating the apparatus during installation and use.

[0017] With reference to the accompanying drawings, the reference number 1 globally indicates an apparatus for connecting linear profiled elements 2, positioned in a condition of mutual co-planarity and concurring to form a vertex 14 of a planar frame 20, partially shown.

[0018] The profiled elements 2 have open cross section, substantially shaped as a "C" (Figures 1 and 3) and comprise planar faces 2a, wherefrom depart longitudinal, parallel, mutually opposite edges 6 folded to a right angle relative to the planar faces 2a.

[0019] In the construction of the frame 20, the profiled elements 2 are connected by the connecting apparatus 1 in a condition of mutual unity and in co-planar alignment of their faces 2a and of their longitudinal edges 6, and in direct mutual contrast in correspondence with a junction line 4 which, in the example of the figures, is inclined by 45 ° relative to the profiled elements 2.

[0020] The connecting apparatus 1 essentially comprises a connecting body 3 provided with anchoring elements 5 and so shaped as to be associated to the profiled elements 2, astride a junction 4, in contact with the planar faces 2a and with a motion directed transversely to the related plane of lay.

[0021] More in particular, the connecting body 3 is embodied by a metal plate with angular shape which can be housed between the longitudinal edges 6 of the profiled elements 2 concurring in the junction 4 and is provided with a raised, continuous edge 15, positioned along an external part of its own contour, able to be associated in contact with one of the longitudinal borders 6 of the profiled elements 2 to operate in the manner that will be explained farther on in the description.

[0022] The connecting body 3 is further provided with two seats 11, embodied by holes traversing the plate, situated in proximity to a part of the contour of the connecting body 3 opposite the provided one of the edge 15.

[0023] The aforesaid seats 11 are destined to support the anchoring elements 5 pivotingly about axes of rotation 13 transversely directed to the connecting body 3 itself.

[0024] The anchoring elements 5 comprise, each, a cylindrical pivot 10, able to rotate in the seat 11 of the connecting body 3, which, at one end, integrally bears a small planar plate 8 oriented transversely to the pivot 10 itself, and, at the other end, is provided with actuating means to rotate the plate 8, embodied in particular by a

hexagonal slot 12, coaxial to the pivot 10 (Figure 2), for the engagement of an actuating tool.

[0025] The small plate 8 has eccentric profile relative to the axis of rotation 13 of the pivot 10, and is provided with a free end 7, so dimensioned as to be able to project from the contour of the plate, arc-shaped and preferably provided with prominent teeth 9 destined to be associated to opposite longitudinal edges 6 of the profiled elements 2, wherein the free end 7 can progressively be inserted as a consequence of the rotation of the pivot 10.

[0026] The anchoring elements 5 are fastened to the connecting body 3 preferably in a permanent manner; this being obtainable in several ways, whereof the most immediate and simplest provides for the riveting onto the seat 11 of the end of the pivot 10 bearing the slot 12 for the actuating tool.

[0027] In use (Figure 4), after mutually approaching the profiled elements 2, in direct contact along the junction line 4, the connecting apparatus 1 is introduced between the longitudinal edges 6 of the profiled elements 2, with movement directed transversely to the planar faces 2a of the profiled elements 2 and approached to the profiled elements 2 with the connecting body 3 positioned in contact with the related planar faces 2a.

[0028] Starting from this initial condition wherein the connecting body 3 and the profiled elements 2 are freely movable relative to each other, acting with the actuating tool on the slot 12 of the anchoring element 5 the latter are made to rotate - arrow 16 - from its own inoperative position wherein the connecting body 3 and the profiled elements 2 are freely movable relative to each other, to an initial operative position wherein the anchoring elements 5 engage with the edges 6 of the planar profiled elements 2, in opposition to the reaction of the connecting body 3 which acts against the opposite edges 6 of the profiled elements 2 - arrow 17.

[0029] In the course of the rotation of the small plates 8 of the anchoring elements 5 and following the engagement of the teeth 9, which sink into the material of the edges 6 of the profiled elements 2, the profiled elements 2 are driven in relative sliding motion relative to the connecting body 3.

[0030] Acting alternatively on one and on the other anchoring element 5 with evidently opposite rotatory motions, the profiled elements 2 are pressed against each other along the junction line 4 until completely eliminating any contact defect along the junction line 4 and to its final operative position wherein the small plates 8 of the anchoring elements 5 are permanently inserted in the related edges 6 and the profiled elements 2 and the connecting body 3 become mutually integral in mutual co-planarity and forcing conditions.

[0031] The apparatus according to the invention fully achieves the aims indicated above; it is suitable for evident industrial application.

Claims

1. An apparatus for connecting profiled elements (2) in mutual co-planarity and unity conditions, in the manufacture of planar frames (20), comprising a connecting body (3), able to be housed astride a junction (4) of the profiled elements (2), comprising two anchoring elements (5), which are pivotingly sustained by the connecting body (3), have eccentric profile relative to their own axis of rotation (13), and are able to swivel from an inoperative position wherein the connecting body (3) and the profiled elements (2) are freely movable relative to each other, and an initial operative position wherein the anchoring elements (5) engaging on the profiled elements (2), in opposition to the reaction of the connecting body (3), drive in sliding motion the profiled elements (2) relative to the connecting body (3), to a final operative position wherein the profiled elements (2) are made integral to the connecting body (3) and are pressed in mutual contact on the junction (4)
characterised in that the connecting body (3) is shaped to be associated to the profiled elements (2) with a motion directed transversely to their plane of lay.
2. An apparatus, as claimed in claim 1, wherein the profiled elements (2) are provided with folded-back and opposite longitudinal edges (6), **characterised in that** the connecting body (3) is embodied by an angular plate which can be housed between the longitudinal edges (6) of the profiled elements (2).
3. An apparatus, as claimed in claim 2, **characterised in that** the connecting body (3) can be associated in contact of a said longitudinal edge (6) of the profiled elements (2) to contrast the force imparted by the anchoring elements (5) on said profiled elements (2).
4. An apparatus, as claimed in claim 2 or 3, **characterised in that** the anchoring elements (5) are provided with a free end (7) able to be inserted into the edges (6) of the profiled elements (2).
5. An apparatus, as claimed in claim 4, **characterised in that** the anchoring elements (5) comprise a swivelling plate (8) having the free end (7) shaped as an arc.
6. An apparatus, as claimed in claim 4 or 5, **characterised in that** the free end (7) is provided with teeth (9) which can be associated to the longitudinal edges (6) of the profiled elements (2).
7. An apparatus, as claimed in claim 5 or 6, **characterised in that** the anchoring elements (5) com-

prise a pivot (10), able to rotate in a seat (11) of the connecting body (3), said pivot (10), being integral with the plate (8) and provided with actuating means (12) to rotate the plate (8).

8. An apparatus, as claimed in claim 7, **characterised in that** the actuating means are embodied by a slot (12) obtained on the pivot (10) for the engagement of an actuating tool.
9. An apparatus, as claimed in claim 7 or 8, **characterised in that** the pivot (10) is mounted permanently on the connecting body (3).
10. A method for connecting two profiled elements (2) mutually concurring on a junction (4) with a connecting body (3), comprising the phases of associating the connecting body (3) to the profiled elements (2) between two longitudinal edges (6) thereof; rotating anchoring elements (5) pivotingly sustained by the connecting body (3), and eccentric relative to their own axis of rotation (13), from an inoperative position wherein the connecting body (3) and the profiled elements (2) are freely movable relative to each other, and an initial operative position wherein they engage on the profiled elements (2), in contact with the connecting body (3), driving them in relative sliding motion relative to the connecting body (3), to a final operative position wherein the profiled elements (3) are made integral to the connecting body (3) and are pressed in mutual contact on the junction (4), **characterised in that** in the phase of associating the connecting body (3) to the profiled elements (2) between two longitudinal edges (6) thereof, this is done with motion directed transversely to the plane of lay of the profiled elements (2).

Patentansprüche

1. Vorrichtung zum Verbinden von Profilelementen (2) im Zustand gegenseitiger Planarität und Verbundenheit bei der Herstellung von flachen Rahmen (20), versehen mit einem Verbindungskörper (3), der übergreifend auf eine Verbindung (4) zwischen den Profilelementen (2) gesetzt werden kann, enthaltend zwei Verankerungselemente (5), welche drehbar von dem Verbindungskörper (3) gehalten sind, ein exzentrisches Profil im Verhältnis zu ihrer eigenen Drehachse (13) aufweisen und in der Lage sind, sich aus einer Ruhestellung, in welcher der Verbindungskörper (3) und die Profilelemente (2) einer zu den anderen frei beweglich sind, bis in eine anfängliche Arbeitsposition zu drehen, in welcher die Verankerungselemente (5) in die Profilelemente (2) greifen, und zwar der Reaktion des Verbindungskörpers (3) entgegen wirkend, und die Profil-

elemente (2) im Verhältnis zu dem Verbindungskörper (3) in eine Gleitbewegung mitzuziehen bis hin zu einer endgültigen Arbeitsposition, in welcher die Profilelemente (2) fest mit dem Verbindungskörper (3) verbunden und in gegenseitigem Kontakt miteinander auf die Verbindung (4) gepresst sind, **dadurch gekennzeichnet, dass** der Verbindungskörper (3) so ausgeformt ist, dass er mit den Profilelementen (2) durch eine Bewegung verbunden werden kann, die quer zu deren Lageebene gerichtet ist.

2. Vorrichtung nach Patentanspruch 1, bei welcher die Profilelemente (2) mit zurück gebogenen und sich gegenüberliegenden Längskanten (6) versehen sind, **dadurch gekennzeichnet, dass** der Verbindungskörper (3) aus einer Winkelplatte besteht, die zwischen den Längskanten (6) der Profilelemente (2) aufgenommen werden kann.
3. Vorrichtung nach Patentanspruch 2, **dadurch gekennzeichnet, dass** der Verbindungskörper (3) im Kontakt an eine genannte Längskante (6) der Profilelemente (2) anschlagen kann, um der von den Verankerungselementen (5) auf die genannten Profilelemente (2) ausgeübten Kraft entgegenzuwirken.
4. Vorrichtung nach Patentanspruch 2 oder 3, **dadurch gekennzeichnet, dass** die Verankerungselemente (5) mit einem freien Ende (7) versehen sind, welches dazu bestimmt ist, in die Kanten (6) der Profilelemente (2) eingeschoben zu werden.
5. Vorrichtung nach Patentanspruch 4, **dadurch gekennzeichnet, dass** die Verankerungselemente (5) eine drehbare Platte (8) enthalten, die ein als Bogen ausgeformtes freies Ende (7) aufweist.
6. Vorrichtung nach Patentanspruch 4 oder 5, **dadurch gekennzeichnet, dass** das freie Ende (7) mit Zähnen (9) versehen ist, die den Längskanten (6) der Profilelemente (2) zugeordnet werden können.
7. Vorrichtung nach Patentanspruch 5 oder 6, **dadurch gekennzeichnet, dass** die Verankerungselemente (5) einen Zapfen (10) aufweisen, der in der Lage ist, sich in einem Sitz (11) in dem Verbindungskörper (3) zu drehen, wobei der genannte Zapfen (10) fest mit der Platte (8) verbunden und mit Betätigungsmitteln (12) versehen ist, um die Platte (8) zu drehen.
8. Vorrichtung nach Patentanspruch 7, **dadurch gekennzeichnet, dass** die Betätigungsmittel aus einem Schlitz (12) bestehen, eingearbeitet in den Zapfen (10) und zur Aufnahme eines Werkzeuges

zur Betätigung dienend.

9. Vorrichtung nach Patentanspruch 7 oder 8, **dadurch gekennzeichnet, dass** der Zapfen (10) dauerhaft an dem Verbindungskörper (3) montiert ist.
10. Verfahren zum Verbinden von zwei Profilelementen (2), die beide an einer Verbindung (4) mit einem Verbindungskörper (3) zusammenlaufen, enthaltend die Phasen des Zusammensetzens des Verbindungskörpers (3) mit den Profilelementen (2) zwischen zwei Längskanten (6) derselben; das Drehen von Verankerungselementen (5), die drehbar von dem Verbindungskörper (3) gehalten werden und exzentrisch im Verhältnis zu ihrer eigenen Drehachse (13) sind, aus einer Ruhestellung, in welcher der Verbindungskörper (3) und die Profilelemente (2) einer zu den anderen frei beweglich sind, in eine anfängliche Arbeitsposition, in welcher sie in die Profilelemente (2) greifen, und zwar im Kontakt mit dem Verbindungskörper (3); das Mitziehen derselben in eine entsprechenden Gleitbewegung im Verhältnis zu dem Verbindungskörper (3), bis hin zu einer endgültigen Arbeitsposition, in welcher die Profilelemente (2) fest mit dem Verbindungskörper (3) verbunden und in gegenseitigem Kontakt miteinander auf die Verbindung (4) gepresst werden, **dadurch gekennzeichnet, dass** in der Phase des Zusammensetzens des Verbindungskörpers (3) mit den Profilelementen (2) zwischen den beiden Längskanten (6) dieses Zusammensetzens mit einer Bewegung erfolgt, der quer zu der Lageebene der Profilelemente (2) gerichtet ist.

Revendications

1. Un dispositif pour raccorder des éléments profilés (2) réciproquement coplanaires et solidaires, dans la fabrication de cadres plans (20), comprenant un corps de liaison (3), pouvant être logé à cheval sur une jonction (4) des éléments profilés (2), et comprenant deux éléments d'ancrage (5) qui sont soutenus en rotation par le corps de liaison (3), ont un profil excentrique par rapport à leur propre axe de rotation (13), et sont capables de pivoter d'une position inopérative, dans laquelle le corps de liaison (3) et les éléments profilés (2) sont librement mobiles l'un par rapport à l'autre, et d'une position opérative initiale, dans laquelle les éléments d'ancrage (5) en s'engageant dans les éléments profilés (2), en opposition à la réaction du corps de liaison (3), entraînent en mouvement de coulissement les éléments profilés (2) par rapport au corps de liaison (3), à une position opérative finale, dans laquelle les éléments profilés (2) sont rendus solidaires du corps de liaison (3) et sont pressés en contact réciproque sur la jonction (4),

caractérisé en ce que le corps de liaison (3) est conformé pour être associé aux éléments profilés (2) avec un mouvement dirigé transversalement à leur plan d'appui.

2. Un dispositif selon la revendication 1, dans lequel les éléments profilés (2) sont pourvus de bords (6) longitudinaux, repliés et opposés, **caractérisé en ce que** le corps de liaison (3) est réalisé sous la forme d'une plaque angulaire pouvant être logée entre les bords longitudinaux (6) et les éléments profilés (2). 5
3. Un dispositif selon la revendication 2, **caractérisé en ce que** le corps de liaison (3) peut être associé en contact dudit bord longitudinal (6) des éléments profilés (2) pour contraster la force exercée par les éléments d'ancrage (5) sur lesdits éléments profilés (2). 10
4. Un dispositif selon la revendication 2 ou 3, **caractérisé en ce que** les éléments d'ancrage (5) sont pourvus d'une extrémité libre (7) pouvant être insérée dans les bords (6) des éléments profilés (2). 15
5. Un dispositif selon la revendication 4, **caractérisé en ce que** les éléments d'ancrage (5) comprennent une plaquette pivotante (8) dont l'extrémité libre (7) est conformée en arc. 20
6. Un dispositif selon la revendication 4 ou 5, **caractérisé en ce que** l'extrémité libre (7) est pourvue de dents (9) pouvant être associées aux bords longitudinaux (6) des éléments profilés (2). 25
7. Un dispositif selon la revendication 5 ou 6, **caractérisé en ce que** les éléments d'ancrage (5) comprennent un pivot (10), pouvant pivoter dans un logement (11) du corps de liaison (3), ledit pivot (10) étant solidaire de la plaquette (8) et étant pourvu de moyens d'actionnement (12) pour pivoter la plaquette (8). 30
8. Un dispositif selon la revendication 7, **caractérisé en ce que** les moyens d'actionnement sont constitués d'un creux (12) obtenu sur le pivot (10) pour l'insertion d'un outil d'actionnement. 35
9. Un dispositif selon la revendication 7 ou 8, **caractérisé en ce que** le pivot (10) est monté de manière permanente sur le corps de liaison (3). 40
10. Une méthode pour raccorder deux éléments profilés (2) réciproquement coïncidant sur une jonction (4) avec un corps de liaison (3), comprenant les phases d'association du corps de liaison (3) aux éléments profilés (2) entre leurs deux bords longitudinaux (6), de rotation des éléments d'ancrage 45

(5), soutenus en rotation par le corps de liaison (3) et étant excentriques par rapport à leur propre axe de rotation (13), d'une position inopérative, dans laquelle le corps de liaison (3) et les éléments profilés (2) sont librement mobiles l'un par rapport à l'autre, et d'une position opérative initiale, dans laquelle les éléments d'ancrage (5) s'engagent dans les éléments profilés (2), en contact avec le corps de liaison (3), et entraînent en mouvement de coulissement les éléments profilés (2) par rapport au corps de liaison (3), à une position opérative finale, dans laquelle les éléments profilés (2) sont rendus solidaires du corps de liaison (3) et sont pressés en contact réciproque sur la jonction (4), **caractérisée en ce que** la phase d'association du corps de liaison (3) aux éléments profilés (2) entre leurs deux bords longitudinaux (6) est réalisée avec un mouvement dirigé transversalement au plan d'appui des éléments profilés. 50

