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(54) **Corner joint for door or window frames**

(57) The present invention concerns a set of elements suited to make frames or casings (1) for doors, windows, door/window panels or the like; said set comprises a first element (1ti) and a second element (1m), suited to be connected to each other in such a way as to preferably form a substantially right angle.

The second element (1m) comprises a seat (1ma) suited to at least partially house a portion (1tis) of the first element. Said seat is open on at least three sides and closed on the remaining three sides.

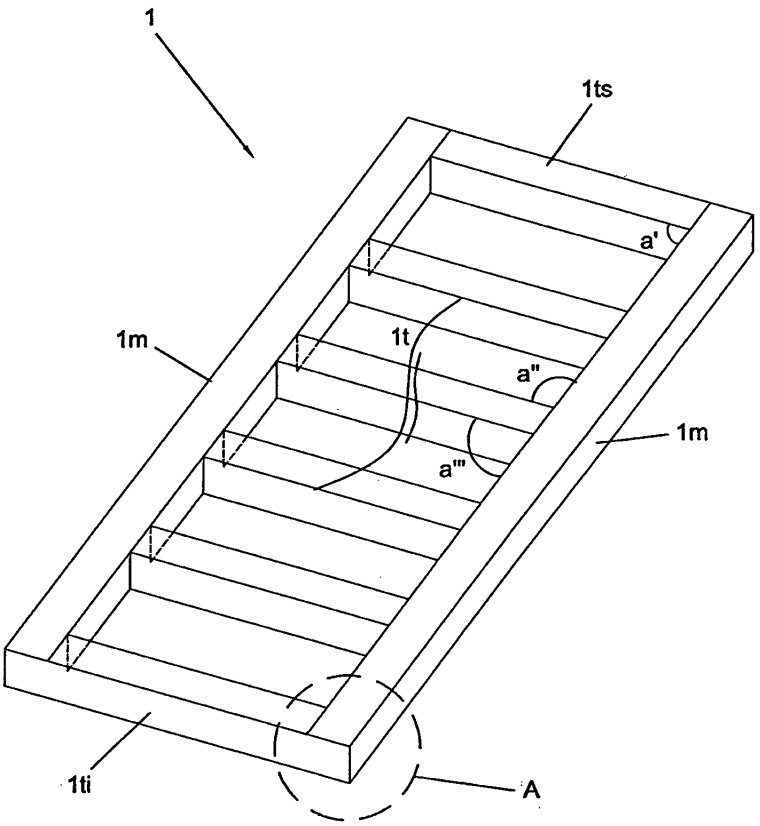

fig.1

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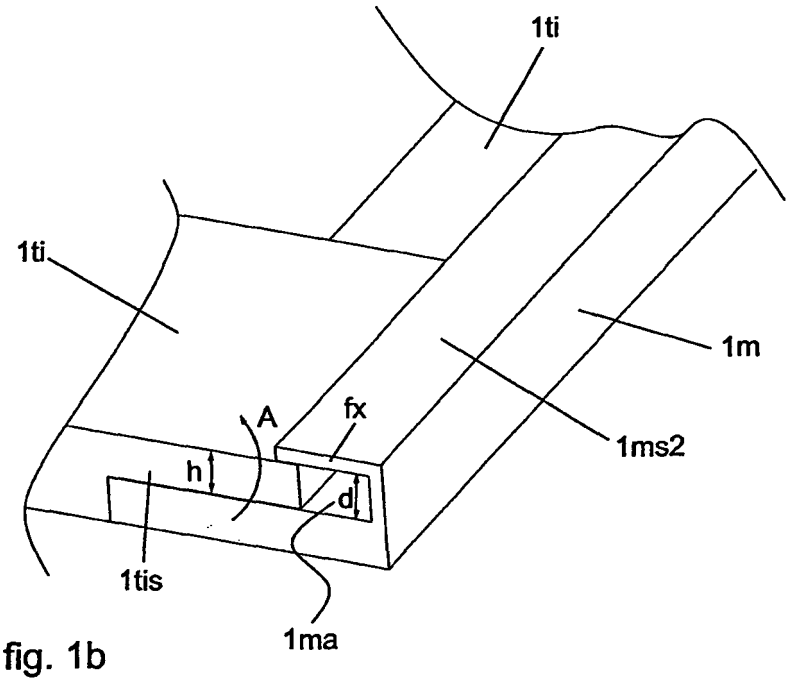

fig. 1b

Description

[0001] The present invention concerns the manufacture of doors, windows, door/window panels or the like.

[0002] In particular, the present invention concerns the manufacture of panels or doors for wardrobes, lockers or the like. More precisely, the present invention concerns the manufacture of casings or frames used for making doors, windows, door/window panels or the like, in particular door panels for wardrobes or equivalent pieces of furniture.

[0003] In greater detail, the present invention concerns a system or set of elements suitable for making doors, windows, door/window panels or the like, for example door panels for wardrobes or equivalent pieces of furniture.

[0004] In particular, the present invention concerns a system or set of jambs and cross members suited to make said frames or casings.

[0005] The present invention relates in particular to the way in which two of said elements can be connected to each other and fixed to each other in such a way as to form a right angle, thus substantially a 90-degree angle. According to the present invention, said at least two elements can be connected to each other in such a way as to form an L-shaped joint, that is, a joint with a right angle, and/or a T-shaped joint, that is, a joint with at least two right angles, or solutions with angles different from 90-degree angles.

[0006] According to the state of the art, there are frames suited to make doors or windows and/or sliding and/or revolving doors for wardrobes or equivalent pieces of furniture. In particular, frames are known which are made of various materials, like for example wood, plastic and aluminium, as well as frames made of combined materials, for example plastic and wood, plastic and aluminium, and aluminium and wood. One of the crucial points in the manufacture of doors or panels of the type mentioned above is represented by the construction of frames featuring suitable stability, lightness, resistance and capable of being assembled with relatively simple operations at competitive prices. In particular, one of the most delicate operations in the construction of a frame for doors, windows or panels is the connection of the different elements that make up the frame. Said elements usually comprise two or more jambs, depending on the dimensions of the door or panel, and two or more cross members; the jambs, that is, the elements of the frame that once the door or panel has been assembled extend in a substantially vertical direction, are connected to the cross members, that is, the elements that once the door or panel has been assembled extend in a substantially horizontal direction, so that said jambs and said cross members, in the case of rectangular or square doors or panels, form substantially right angles, that is, substantially 90-degree angles. It is therefore necessary to make sure that the frame guarantees the necessary stability, thus preventing the same from losing the shape it assumed during assembly when the door or panel is used for the intended application; otherwise, also the door or panel would lose its original shape.In other words, the angles between the different components of the frame must maintain their original amplitude over time. It is also desirable to be able to ensure that the elements of the frame, jambs and cross members, can be constructed with relatively simple and inexpensive processes, and that also the assembly of the frame can be completed in reasonable times, at a low cost and with relatively simple operations that do not require the use of complex and costly machinery. It is also convenient to be able to ensure that the operations for making the components of the frame and for the assembly of the latter allow the use of different types of material, that is, materials with different characteristics in terms of specific weight, resistance, toughness, flexibility, etc.

[0007] Different solutions are currently known that are intended to simplify and standardize both the construction of the components of a frame and the assembly of the frame itself.In particular, solutions are known that are suited to guarantee the precision and repeatability of the angles defined by the elements of frames or casings.

[0008] Solutions are also known that are suited to simplify the processes required for connecting two elements of a frame so that, once connected to each other, they form angles having a precise amplitude, in particular 90-degree angles.

[0009] Similarly, other solutions are known that have the purpose to guarantee the stability of a frame, in particular the stability of the connections made between the various components of the same. According to the state of the art, for example, there are solutions intended to connect two components with each other so that the same, once the connection has been completed, define one or more 90-degree angles, which require the use of bonding agents, screws, nails or similar means; another solution is also known, according to which the elements for the assembly of frames are provided with surfaces suited to strike against or in any case come into contact with each other and suitably oriented, in particular in such a way as to orient the two elements to be connected according to predefined directrices. For example, in particular in the case of wooden components, the ends of two elements are cut according to a 45-degree angle, in such a way as to obtain two transversal surfaces on said ends; when said two surfaces are placed in contact with each other, the elements are arranged at right angles in relation to each other and then they can be connected using bonding agents, screws, or similar means. According to other proposed solutions, it is also possible to provide one of the two elements to be connected with a projection, properly oriented and having a defined shape, suited to engage into a seat having a corresponding shape created in the other element. The precision with which said projection and said seat are carried out determines the precision with which the two elements will be oriented in relation to each other. The same applies

to simpler solutions, like for example the creation of oblique striking surfaces, in particular at 45 degrees with respect to the longitudinal axis of the element; only in the case of surfaces that are exactly at 45 degrees the two elements of the frame will be oriented in such a way as to define exactly a 90-degree angle. Other solutions have been proposed and are known in the art, in which different materials are used, like for example plastic or metal; in particular, the increasingly widespread use of these materials instead of wood or the like has led to the need to find different solutions, aimed at ensuring precise, stable and resistant connections, as well as at standardizing and accelerating assembly operations. In particular, in the case of metal section bars, for example aluminium section bars, various solutions have been proposed, ranging from the construction of section bars specifically created for this purpose, to solutions related to the cutting or shaping of said section bars, including solutions for glueing, sealing or even screwing together two section bars so that, once connected, they define angles having a predefined amplitude.

[0010] However, notwithstanding the efforts made, the solutions known in the state of the art are still characterized by several problems and/or drawbacks. In particular, in spite of all the efforts made and the undeniable results achieved, it is still difficult to make light and at the same time stable frames, capable of maintaining their original shape, as intended at the moment of assembly, over time; the frame elements tend to detach from each other, with the consequence that the amplitude of the angles between the various components of the frame changes. When, on the other hand, an acceptable degree of stability is achieved, this goes to the detriment of the simplicity of the construction process, and in fact construction times and costs increase. The increase in costs is often due also to the use of section bars with a complex shape, which are therefore difficult to work and assemble. In other cases, the stability of the frame has been obtained by using a large number of additional components, like rivets, screws, bonding agents, etc.

[0011] The main object of the present invention is therefore to at least partially solve the problems that characterize the known solutions.

[0012] In particular, it is one object of the present invention to propose a solution that makes it possible to construct frames for doors, windows, door/window panels and the like characterized by high durability and stability. In greater detail, one object of the present invention is to develop a solution that allows the components of a frame to be connected in such a way as to guarantee that the angles according to which said components are connected during assembly of the frame do not vary over time. A further object of the invention is to propose a method for connecting the various components of a frame with predefined angles, by means of a simple process characterized by low costs. It is a further object of the present invention to propose a process that makes it possible to assemble different frames and to use different elements, for example different metal section bars. It is another object of the present invention to propose a solution for connecting the elements of a frame with each other in a stable manner while at the same time limiting the use of additional components like screws, rivets, nails, bonding agents, as well as of more complex processes like sealing or the like.

[0013] The present invention is based on the general assumption that the elements of a frame can be connected to each other in a simple and effective manner by properly shaping said elements or components; the invention is also based on the assumption that stable connections between the two components of a frame can be obtained by properly shaping the parts of said components that are intended to come into contact with each other, in particular by properly shaping the striking surfaces of said elements or components. The present invention is also based on the further assumption that stable connections can be obtained by placing several different surfaces of the various components to be connected against each other. In particular, making several different surfaces, oriented along different planes, strike against each other means increasing the stability of the connection. Furthermore, the opposition between the different surfaces in contact makes it possible to position in advance the elements to be connected during the assembly steps; this prevents or at least limits the need to use special equipment to keep the elements in the correct position during assembly. Instead, the elements to be connected will assume their mutual final position already during assembly, with no need to use said equipment. According to the spirit of the present invention, it has also been considered that the different striking surfaces counteract the mutual movement of the different components also once the assembly has been completed, thus guaranteeing the desired stability. As a consequence of the above, another advantage is a limited use of additional components. The present invention, furthermore, also derives from the consideration that suitable counteracting surfaces can be obtained in a simple and effective way on different types of elements, in particular on section bars that have different shapes and are made with different materials.

[0014] According to a first embodiment, the subject of the invention is a set of elements according to claim 1, that is, a set of elements suited to make casings or frames for doors, windows, door/window panels or the like, said set comprising at least one first element and one second element, said first and second elements being elongated in shape and suited to be connected to each other in such a way as to form a substantially and preferably right angle, said second element comprising a seat suited to house at least partially a portion of said first element, said seat being open on three sides and closed on the remaining three sides. In fact, it has been proven that a seat according to claim 1 makes it possible to counteract the mutual movement of said first and second elements in at least one direction.At the same time, however, the fact

that said seat is open on three sides allows the first element to be freely positioned along the second element, while seats that are closed on four or more sides make it possible to arrange the two elements to be connected only in mutually predefined positions. Furthermore, the creation of a longitudinal seat open on three sides is simplified and possible on elements having different shapes, in particular on section bars having different shapes.

[0015] Further embodiments of the present invention are described in detail in the dependent claims.

[0016] A further embodiment of the present invention proposes a process for making elements suited to be assembled to form a frame for doors, windows, door/window panels or the like. According to said process, starting from a section bar with a predefined shape and removing suitable portions of said section bar, it is possible to obtain an element comprising several striking surfaces suited to come into contact with corresponding striking surfaces of a second element of the frame to be connected to said first element. Said striking surfaces counteract the mutual undesired movement of the two elements connected to each other, both when they are connected during the assembly of the frame and when the frame is used.

[0017] According to a further embodiment of the invention, the elements to be connected to each other have a substantially elongated shape and each of them is provided with a main body and portions that extend from said main body; the sizes of the main body and of the portions extending from it are selected in such a way as to guarantee the coincidence of the external surfaces of the two elements once the assembly and the connection have been carried out, that is, so that the external surfaces lie on coincident planes.

[0018] According to a further embodiment of the present invention, at least one of the elements is an aluminium section bar comprising a first and a second tubular portion with substantially rectangular or square or equivalent cross section. Inside said tubular sections there are seats with substantially cylindrical cross section, suited to house connection joints; said connection joints comprise a cylindrical main body suited to be housed in said cylindrical seats and a truncated cone-shaped head extending from said cylindrical body and suited to be housed in seats or grooves with substantially triangular cross section. The two elements are thus fixed together by inserting the cylindrical body of the joint into the cylindrical seat of a first element and the truncated cone-shaped head of the joint into the seat with triangular cross section of the second element.

[0019] Further advantages, objects and characteristics, as well as further embodiments of the present invention are defined in the claims and will be illustrated in the following description with reference to the enclosed drawings; in the drawings, equivalent or corresponding characteristics and/or components are identified by the same reference numbers. In particular:

- Figure 1 shows a schematic view of a frame for doors, windows or door/window panels of the type that can be manufactured using the present invention;
- Figure 1a shows a perspective view of two assembly elements according to a first embodiment of the present invention;
- Figure 1b shows a perspective view of the two elements of Figure 1a, once the assembly has been completed;
- Figure 2a shows two assembly elements according to a further embodiment of the present invention;
- Figure 2b shows the elements of Figure 2a connected to each other;
- Figure 2c schematically shows further details of the elements carried out according to the present invention;
- Figure 3a shows a first section bar suited to make assembly elements according to the present invention;
- Figures 3b and 3c show the process to be applied to obtain a first connection element according to the present invention from the section bar shown in Figure 3a;
- Figure 3d shows a side view of the connection element according to the present invention obtained from the section bar of Figure 3a;
- Figures 3e and 3f show how two elements of the present invention are fixed using additional fixing means like cylindrical joints with truncated cone-shaped head;
- Figure 4 schematically shows a second section bar suited to make a second assembly element according to the present invention, as well as, partially, the method used to obtain said second element according to the present invention from said section bar;
- Figure 4b schematically shows further stages of the process to be applied to obtain a connection element according to the present invention from the section bar shown in Figure 4a;
- Figure 4c shows a side view of the connection element according to the present invention obtained from the section bar of Figure 4a.

[0020] Although the present invention is described below with reference to its embodiments illustrated in the drawings, the present invention is not limited to the embodiments described below and illustrated in the drawings. On the contrary, the embodments described and illustrated herein clarify some aspects of the present invention, the scope of which is defined in the claims.

[0021] The present invention has proved particularly advantageous when applied to the manufacture of frames for doors, windows, door/window panels or the like, for example doors of wardrobes or equivalent pieces of furniture. Furthermore, the present invention has proved particularly advantageous when applied to the construction or assembly of aluminium frames; therefore,

the description below will focus on the components and the assembly of aluminium frames for doors, windows, door/window panels or the like, as well as on the explanation of the advantages deriving from the use of aluminium section bars. It should be pointed out, however, that the present invention is not limited to the construction of said frames, in particular of said frames for doors, windows, door/window panels or the like, or to the use of section bars. On the contrary, the present invention can be conveniently applied in any situation in which two elongated elements like two bars, two box-shaped elements or two section bars, etc. must be connected to each other in such a way as to form one or more angles with predefined amplitude, in particular one or more preferably right angles.

[0022] A frame of the type that can be constructed by means of the present invention is described below with reference to Figure 1.

[0023] The frame 1 shown in Figure 1 comprises two side jambs 1m and a plurality of cross members, in particular a first upper cross member 1ts, a lower cross member 1ti and a plurality of intermediate cross members 1t. It is clear from the following description that the number of cross members as well as the number of side jambs may vary according to the final dimensions of the frame; in particular, more than two jambs, for example two side jambs and one or more intermediate side jambs can be provided, said side and intermediate jambs being connected to one another by a variable number of cross members. Figure 1 clearly shows that the jambs and the cross members are connected to each other in such a way as to form one or more substantially right angles a', a" and a"'.

[0024] A first embodiment of the present invention is described here below with reference to Figure 1a; in particular, the description illustrates how, according to the present invention, at least one jamb 1m and one cross member 1ti of the type shown in Figure 1 are connected to each other. In Figure 1a, the components and/or the characteristics of the present invention already described above and shown in Figure 1 are identified by the same reference numbers.

[0025] Figure 1b shows a jamb 1m and a side element 1ti mutually positioned in such a way as to form at least one right angle; for example, the jamb 1m of Figure 1b may correspond to the right jamb shown in Figure 1a, the cross member 1ti may correspond to the lower cross member shown in Figure 1.

[0026] It is clear, however, that the following description can be applied also to the connection of other jambs and/or cross members of Figure 1, for example to the connection of the jamb 1m with an intermediate cross member It of Figure 1, or even to the transversal connection of the left jamb of Figure 1 with any one of the upper, lower or intermediate cross members of Figure 1.

[0027] Both the element or jamb 1m and the cross member 1ti of Figure 1a are elongated in shape; Figure 1a thus relates to the ends of said side element or jamb 1m and said cross member 1ti.

[0028] The cross member 1ti comprises a main body 1tip with predefined thickness H.

[0029] A portion 1tis whose thickness h is inferior to the thickness H of the main body 1tip extends from the same main body 1tip.

[0030] The element 1ti thus comprises a substantially flat upper main surface 1ss as well as a first front surface 1sf2.

[0031] The terminal portion 1tis projecting from the main body 1tip comprises a lower surface 1si opposite the upper surface 1ss and substantially parallel to it.

[0032] Furthermore, the main body 1tip comprises a second front surface 1sf1 that intersects the lower surface 1si of the terminal portion 1tis in such a way as to form with it a substantially right angle.

[0033] The terminal portion 1tis projects from the main body 1tip of a length Lm.

[0034] Also the second element or jamb 1m shown in Figure 1a comprises a main body 1mp with an upper surface 1ms.

[0035] A secondary body 1mb extends from said main body 1mp and comprises a first wall 1ms1 extending from the main body 1mp substantially at right angles and a second wall 1ms2 substantially parallel to the surface 1ms of the main body 1mp and therefore forming a substantially right angle with the first wall 1ms1. The main body 1mp and the walls 1ms1 and 1ms2 thus define a seat 1ma that in the example shown in Figure 1a extends over the whole length LL of the element or jamb 1m. It will be apparent here below that the length of the seat 1ma, that is, its extension in the direction of the total length LL of the element 1m can be selected as desired. Therefore, the seat 1ma is delimited by the surface 1ms of the main body 1mp, by the surface 1msf of the wall 1ms1 and by the surface 1msi of the wall lms2. It is thus clear that the seat 1ma is open on three sides and closed on the remaining three sides, in particular at least on the three sides defined by the walls 1ms2 and 1ms1 and by the main body 1mp.

[0036] The mutual connection or positioning of the two elements 1m and 1ti of Figure 1a takes place according to the broken line arrow of Figure 1a and in particular as shown in Figure 1b, in which the characteristics or components of the present invention already described with reference to previous figures are identified by the same reference numbers.

[0037] It is clear from Figure 1b that the terminal part 1tis of the element 1ti projecting from the main body 1tip is at least partially inserted in the seat 1ma of the element 1m. In this way, the lower surface 1si of the projecting portion 1tis comes into contact with the surface 1ms of the element 1m. In the same way, the front surface 1sf1 of the main body 1tip comes into contact with the surface 1msf1 of the main body 1mp of the element 1m. In the example shown in Figure 1b, the front surface 1sf2 of the projecting portion 1tis of the cross member 1ti does not come into contact with the surface 1msf of the wall 1ms1

of the element 1m. In any case, it is possible to select the length Lm of the portion 1tis and the width 1mt of the main body 1mp so that the two surfaces 1sf2 and 1msf come into contact with each other. In Figure 1b, the arrow A highlights one of the advantages offered by the two elements 1ti and 1m represented therein; in fact it is clear that the wall 1ms2 prevents the accidental rotation of the element 1ti in the direction of the arrow A. Increased stability of the connection is thus obtained, due to the opposition between the projection 1tis and the seat 1ma of the element 1m, in particular of its wall 1ms2. The distance d between the surface 1msi and the surface 1ms of the element 1m is selected so that it substantially coincides with the thickness h of the projecting part 1tis. In this way, by inserting said projection 1tis in the seat 1ma it is possible to obtain the counteracting effect between said projection and at least said surfaces 1ms and 1msi, counteracting effect that further increases the stability of the connection. A further advantage offered by the set of elements 1m and 1ti represented in Figures 1a and 1b relates to the fact that, being the seat 1ma open on three sides, the element 1ti can be positioned as desired along the whole length LL of the element 1m, contrary to what happens with solutions according to which the cross member can be arranged only in predefined positions, in particular in those positions in which a seat closed on more than three sides has been previously created.

[0038] A further embodiment of the present invention is described here below with reference to Figures 2a and 2b; as usual, the characteristics or component parts shown in Figures 2a and 2b and previously described with reference to other figures are identified by the same reference numbers.

[0039] The embodiment shown in Figures 2a and 2b differs from the one shown in Figures 1a and 1b substantially in that the terminal part 1tis projecting from the main body 1tip comprises two sub-portions, in particular one first sub-portion with thickness h' and one second sub-portion with thickness h inferior to h'. In this way, the projecting part 1tis comprises two front striking surfaces, in particular one surface 1sf2' and one surface 1sf2.As in the case of the embodiment shown in Figures 1a and 1b, the element 1ti of Figure 2a comprises a main body 1tip with thickness H>h' which therefore in turn comprises a front striking surface 1sf1. Figure 2b clearly shows that the sub-portion with thickness h of the projecting portion 1tis is inserted in the seat 1ma in such a way as to prevent the accidental and undesired rotation of the element 1ti in the direction schematically shown by the arrow A.

[0040] Furthermore, the stability of the connection, also in the case of the embodiment shown in Figures 2a and 2b, can be increased or improved by properly choosing the thicknesses and the lengths, in particular the sizes of the parts intended to come into contact with each other.

[0041] The distance between the surfaces 1ms and 1msi can for example be selected so that it is equal to the thickness h or slightly exceeds it. In the same way, the length Lm can be selected in such a way as to allow contact between the front surfaces 1sf2 and 1msf and/or between the surfaces 1sf2 and the surface 2ms of the wall 1ms2.The contact between the surfaces 1sf2 and 1msf is obtained in particular by selecting the length Lm so that it substantially corresponds to the length 1mt. The embodiment shown in Figures 2a and 2b offers the further advantage that, if the thicknesses h' and h are selected so that the difference h'-h corresponds to the thickness hx of the wall 1ms2, the upper surface 1ss of the element 1ti will thus lie on the same plane as the surface 1mss of the wall 1ms2. In this way, the application of completing elements to the frame 1 will be simplified, as the same frame will not present any steps and/or obstacles. In the same way, if the thickness H of the main body 1tip, the thickness h' of the sub-portion projecting from said main body and the thickness hp of the main body of the element 1m are properly selected, also the lower surfaces of the element 1ti and of the element 1m opposite the surfaces 1ss and 1mss will lie substantially on the same plane and therefore it will be possible to avoid the presence of steps or obstacles that might complicate the application of additional elements like strips, panels or the like to the frame.

[0042] Figure 2c shows a further embodiment of the present invention. According to this embodiment, the wall 1ms2 of the element 1m comprises a projection 1x that extends from the surface 1msi and thus towards the main body 1mp. In the same way, the terminal projecting part 1tis comprises a second projection ly that extends from the surface 1ss. The mutual action of the projections 1x and 1y further prevents the projection 1tis from accidentally coming out of the seat 1ma. The solution shown in Figure 2c can be applied to any one of the two embodiments described above, in particular to the one shown in Figures 1a and 1b and the one shown in Figures 2a and 2b. Variants of the solution shown in Figure 2c are also possible, for example variants in which only one projection, 1x or 1y, is provided.

[0043] With reference to Figures 3a, 3b and 3c, in which, as usual, parts previously described are identified by the same reference number, a process for making an element according to the present invention is described here below, in particular a cross member 1ti of the type shown in Figures 1a and 1b, starting from a metal section bar, for example an aluminium section bar.

[0044] The section bar 11ti shown in Figure 3a, for example, as anticipated, a metal section bar, but also a section bar made of a plastic or similar material, comprises an upper wall 11tis and a lower wall 11tii opposite to it.The upper and lower walls 11tis and 11tii are connected to each other by transversal walls 11til and 11tir as well as by one or more intermediate walls 11tic. The assembly of upper, lower and side walls thus defines two adjacent portions of the section bar, in particular two tubular portions 11tit and 11tit' with substantially rectangular cross section. The section bar 11ti also comprises substantially cylindrical seats 11tig that extend from the upper wall 11tis. By removing the portion 11tiX highlight-

ed by hatching in Figure 3b from the end of the section bar 11tii, for example by milling or similar processes, the section bar 11ti of Figure 3c is obtained, that is, a section bar comprising a main body 11tip from which a projecting portion 11tisp extends, said projecting portion including a lower wall 11tii and transversal walls that extend substantially at right angles from this lower wall and comprise side walls 11til' and 11tir' as well as intermediate walls 11tic'. The height h of the walls 11til', 11tir' and 11tic' is inferior to the height H of the main body 11tip.Proceeding with the removal of the portions 11tix' highlighted by hatching in Figure 3c from the walls 11til', 11tir' and 11tic', walls 11til', 11tir' and 11tic' will be obtained, said walls comprising a sub-portion with height h and a second sub-portion with height h'>h.

[0045] The side view of the section bar obtained is shown in Figure 3d and substantially coincides with the side view of the connection element 1ti shown for example in Figure 2a, the only difference lying in that in Figure 3d the section bar is overturned.

[0046] The section bar shown in Figure 3d can be used in the same way as the connection element 1ti shown in Figure 2a and thus be connected to an element or jamb comprising a seat suited to house the portion with thickness h.

[0047] In Figure 3e the element 1ti, obtained from a section bar according to the process described above with reference to Figures from 3a to 3c, is shown in combination with an element 1m and in particular connected to it. The end with thickness h is thus housed in the seat 1ma defined by two walls 1ms1 and 1ms2 of the element 1m. In particular, also the element 1m is obtained from a section bar comprising two adjacent tubular sections that are substantially rectangular in shape. All the considerations made above in relation to the embodiments shown in Figures 1a and 1b, 2a and 2b can be applied also to the embodiment shown in Figure 3e, therefore also in the case of connection elements obtained from section bars, for example from metal section bars or the like.

[0048] Figure 3f shows the detail of Figure 3e highlighted by the broken line circle.

[0049] It is clear from Figure 3f that a connection joint g, comprising a substantially cylindrical main body and a truncated cone-shaped head gt is used to fix the elements 1ti and 1m of Figure 3e to each other.The joint g, in particular its main body, is inserted in the cylindrical seat 11 tig of the element 1ti, while the truncated cone-shaped head is inserted in a longitudinal groove 1mr obtained in the element 1m. The joint g is fixed in the desired position by means of a counteracting screw v, thus preventing the elements 1ti and 1m from accidentally disengaging from each other.

[0050] The cylindrical body gc of the joint g is inserted in the seat 11tig through the striking surface 1sf1; successively the truncated cone-shaped head gt is slided in the groove 1mr until the desired position for the element 1ti has been reached. At this point, the two elements 1t and 1ms can be fixed to each other through the insertion of the screw v.

[0051] Figures from 4 to 4d illustrate a process suited to carry out an element according to the present invention starting from a section bar that is different from the one shown in Figure 3 a.

[0052] The resulting element, for example, is suited to be used as an intermediate cross member 1t for assembling frames of the type shown in Figure 1.

[0053] Also the section bar shown in Figure 4a comprises an upper wall 11tis and a lower wall 11tii, as well as side walls 11til and 11tir.

[0054] The assembly of the upper, lower and side walls defines two tubular sections 11tit with substantially rectangular cross section, the upper section of which comprises a substantially cylindrical seat 11tig.

[0055] By removing the parts highlighted by hatching from the section bar 11ti of Figure 4a the element shown in Figure 4b is obtained, that is, a section bar whose end comprises a lower wall 11tii and walls 11til' and 11tir' transverse to it.By removing the portions 11tx' from said walls 11til' and 11tir' a connection element 1tip of the type shown in Figure 4c is obtained, that is, a connection element whose end comprises a portion 1tis projecting from a main body 1tip with thicknesses h, h' and H, respectively.

[0056] Figure 4c clearly shows that the connection element 1t represented therein is completely similar to the connection element 1ti shown in Figure 2a, and it is therefore suited to be connected to any one of the elements 1m shown in Figures 1a, 2a and 3a. The end with thickness h will thus be housed in a seat 1ma of any one of said elements or jambs 1m, in a way similar to the one described above.

[0057] Also in the case of the element 1t of Figure 4c it is possible to use a joint of the type shown in Figure 3f, whose cylindrical main body will be housed in the seat 11tig and whose truncated cone-shaped head will be housed in a corresponding groove 1mr with triangular cross section.

[0058] It is clear that the same solution proposed can be used to make a connection between elements 1m and 1t forming angles in the desired amplitudes, even different from 90 degrees, like for example 45-degree or 30-degree angles.

[0059] It has thus been shown that the invention described above achieves all the set objects.In particular, it makes it possible to construct highly resistant and stable frames for doors, windows, door/window panels for pieces of furniture or similar articles. It also ensures high precision of the angles defined by the various elements of the frame, as well as ease of assembly and reduced costs.

[0060] While the present invention has been described with reference to the particular embodiments shown in the figures, it should be noted that the present invention is not limited to the specific embodiments illustrated and described herein; on the contrary, further variants of the

embodiments described herein fall within the scope of the present invention, which is defined in the claims.

Claims

1. Set of elements suited to make casings or frames (1) for doors, windows, door/window panels or the like, said set of elements comprising at least one first element (1ti) and one second element (1m), said first and second element being suited to be connected to each other in such a way as to preferably form a substantially right angle, said second element (1m) comprising a seat (1ma) suited to house at least partially a portion (1tis) of said first element; **characterized in that** said seat is open on at least three sides and closed on the remaining three sides.

2. Set of elements according to claim 1), **characterized in that** said second element (1m) comprises a longitudinal main body (1mp) with predefined thickness and a longitudinal secondary body (1mb) that extends in the direction of the length of said main body, and **in that** said seat (1ma) is obtained in said secondary body (1mb).

3. Set of elements according to claim 2), **characterized in that** said secondary body (1mb) of said second element (1m) comprises a first wall (1ms1) that extends from said main body (1mp) and one second wall (1ms2) that extends from said first wall (1ms1).

4. Set of elements according to claim 3), **characterized in that** said seat (1ma) is delimited by a surface (1ms) of said main body (1mp), by a second surface (1msf) of said first wall (1ms1) adjacent to said first surface (1ms) and forming with it a substantially right angle, and by a third surface (1msi) of said second wall (1ms2) substantially parallel to said surface (1ms) and adjacent to said second surface (1msf) and forming with it a substantially right angle.

5. Set of elements according to claim 4), **characterized in that** said third surface (1msi) comprises counteracting means (1x) suited to engage with said portion (1tis) of said first element in such a way as to prevent it from accidentally coming out of said seat.

6. Set of elements according to any of the claims from 1) to 5), **characterized in that** said seat extends longitudinally over the whole length of said second element (1m).

7. Set of elements according to any of the claims from 1) to 6), **characterized in that** said portion (1tis) of said first element (1ti) extends from the main body (1tip) of said first element in the direction of the length of said first element (1ti).

8. Set of elements according to claim 7), **characterized in that** said portion (1tis) comprises at least one terminal sub-portion whose thickness (h) substantially corresponds to the distance (d) between said third and first surface (1msi, 1msf) of said second element (1m).

9. Set of elements according to claim 8), **characterized in that** said portion (1tis) comprises a second sub-portion whose thickness (h') exceeds said thickness (h) and extending between said main body (1tip) and said first sub-portion with thickness (h).

10. Set of elements according to claim 8) or 9), **characterized in that** said first sub-portion with thickness (h) comprises counteracting elements (1y) suited to cooperate with said counteracting elements (1x) of said second element (1m) in such a way as to prevent the accidental detachment of said first element from said second element.

11. Set of elements according to claim 9) or 10), **characterized in that** the thickness (hx) of said second wall (1msr) of said second element (1m) substantially corresponds to the distance between said thicknesses (h) and (h').

12. Set of elements according to any of the claims from 8) to 11), **characterized in that** said difference H-h' between the thickness of said main body (1tip) of said first element (1ti) and the thickness h' of said second sub-portion of said first element (1ti) substantially corresponds to the thickness (hp) of said main body (1mp) of said second element (1m).

13. Set of elements according to any of the claims from 1) to 12), **characterized in that** at least one of said first and second element (1ti, 1m) is obtained from an aluminium section.

14. Set of elements according to any of the previous claims, **characterized in that** said angle is substantially a right angle.

15. Frame (1) for doors, windows, door/window panels or the like, comprising a first element (1ti) and a second element (1m) fixed to each other in such a way as to form a substantially right angle, **characterized in that** said first element and said second element are carried out according to one of the claims from 1) to 14).

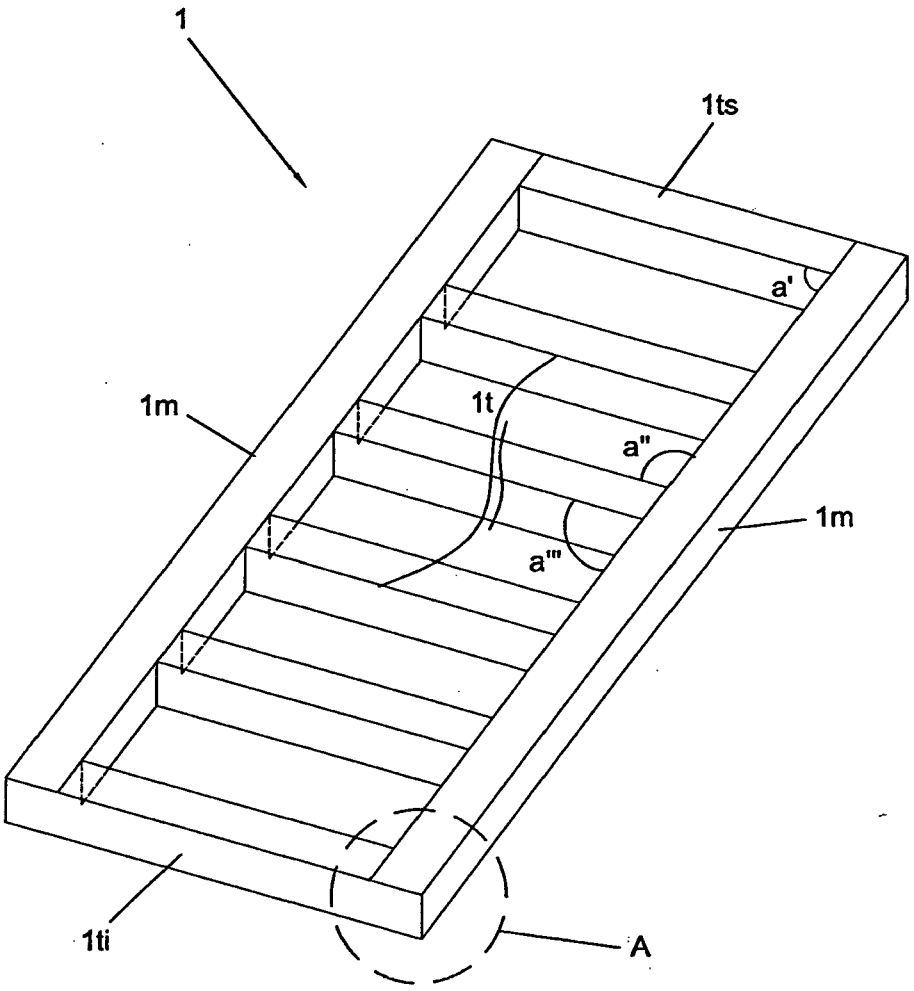

fig.1

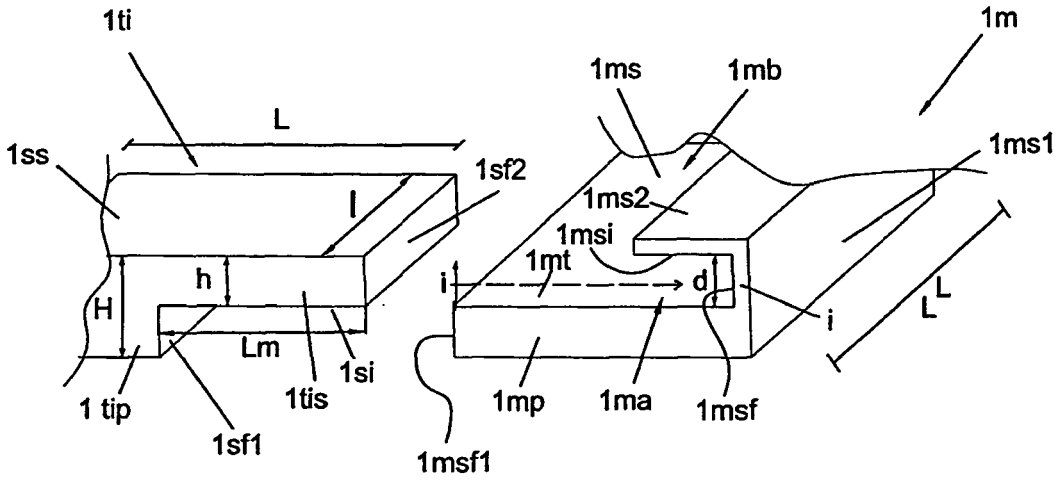
1ti
L
1ss
1sf2
l
h
H
Lm
1si
1tis
1 tip
1sf1
1ms
1mb
1m
1ms1
1ms2
1msi
1mt
i
d
i
L
L
1mp
1ma
1msf
1msf1

fig. 1a

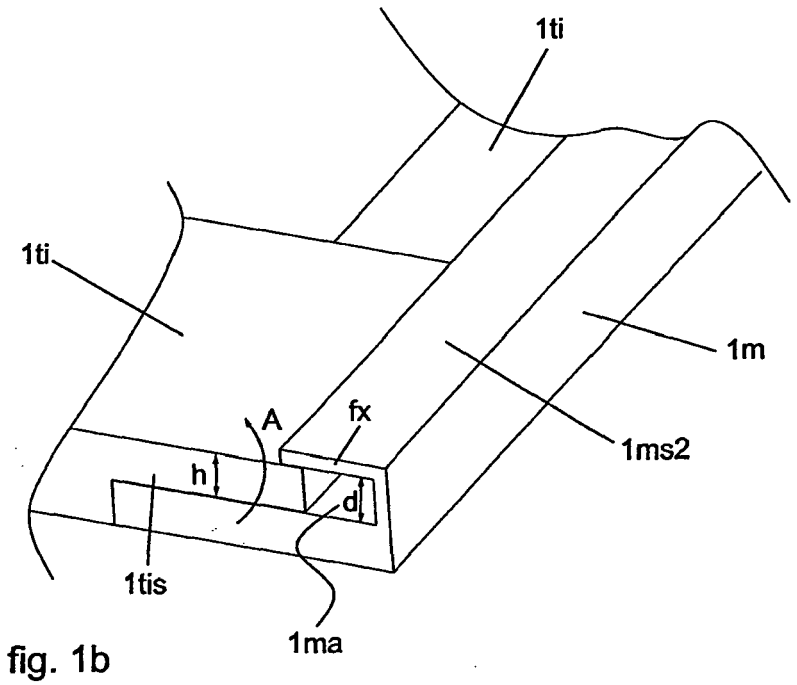
1ti
1ti
1m
A
fx
1ms2
h
d
1tis
1ma

fig. 1b

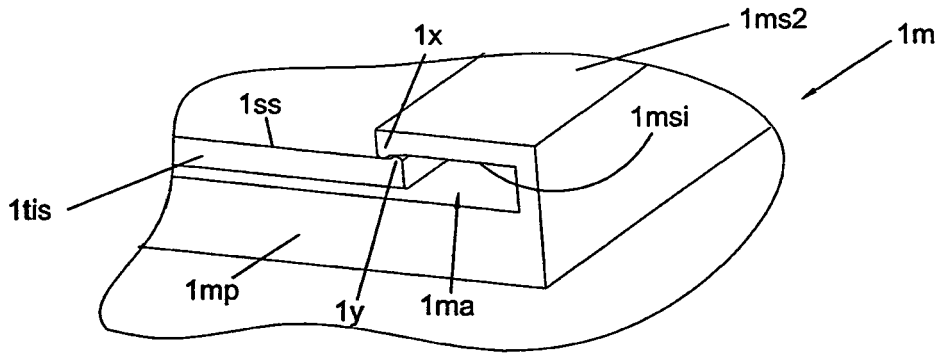

fig. 2c

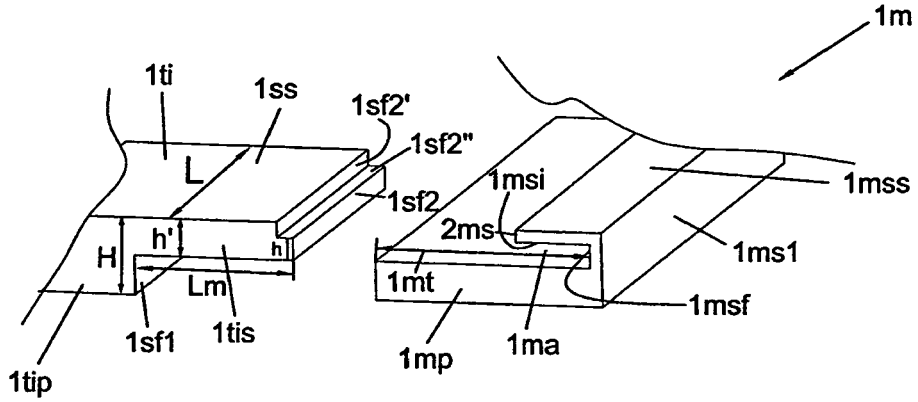

fig. 2a

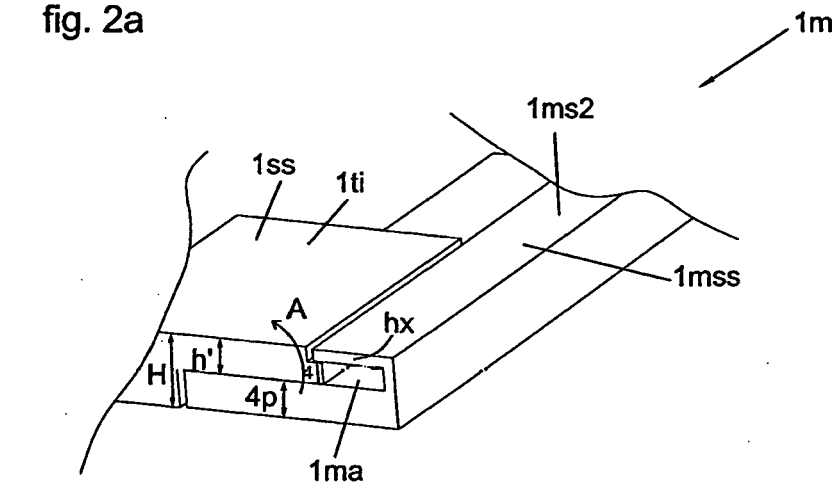

fig. 2b

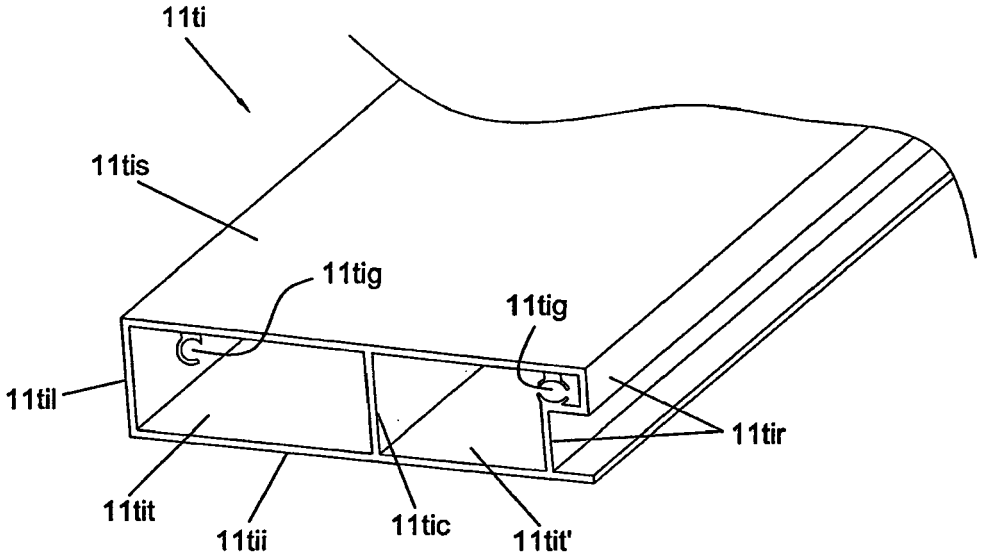
11ti
11tis
11tig
11tig
11til
11tir
11tit
11tii
11tic
11tit'

fig. 3a

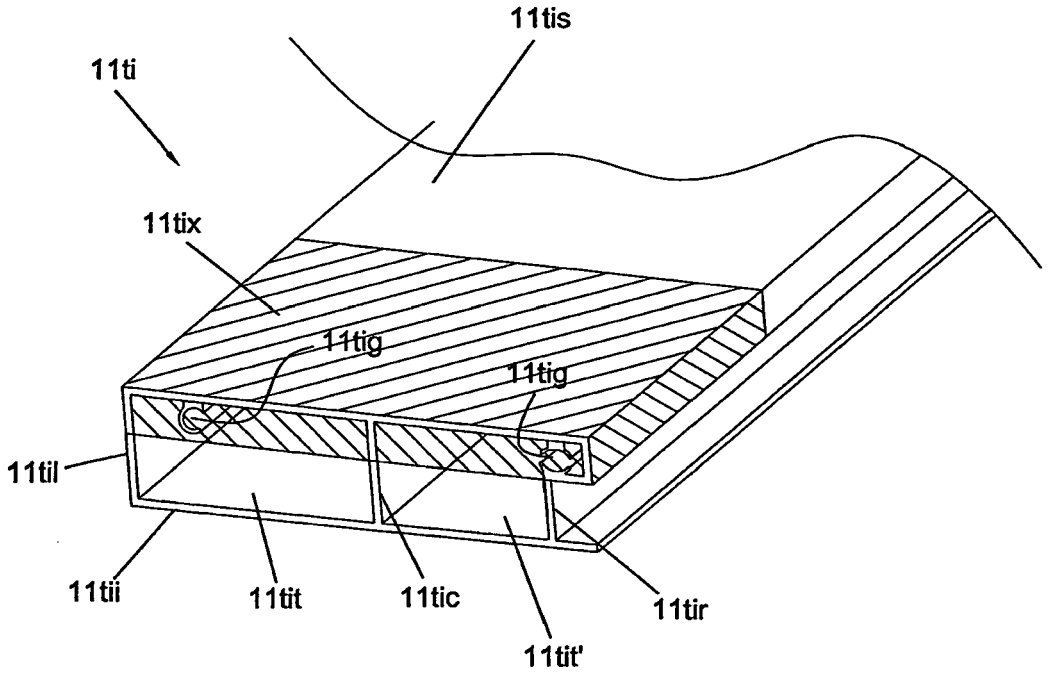
11tis
11ti
11tix
11tig
11tig
11til
11tii
11tit
11tic
11tir
11tit'

fig. 3b

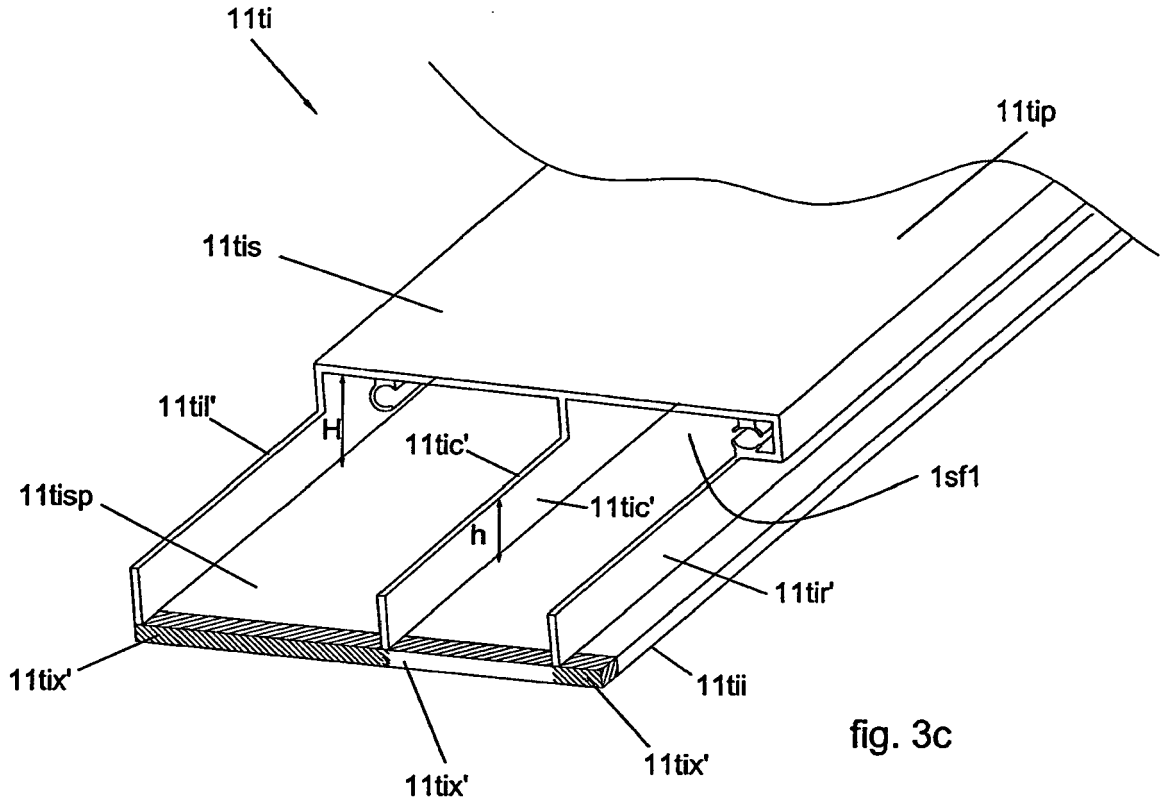
11ti
11tip
11tis
11til'
H
11tic'
11tisp
h
11tic'
1sf1
11tir'
11tix'
11tii
11tix'
11tix'

fig. 3c

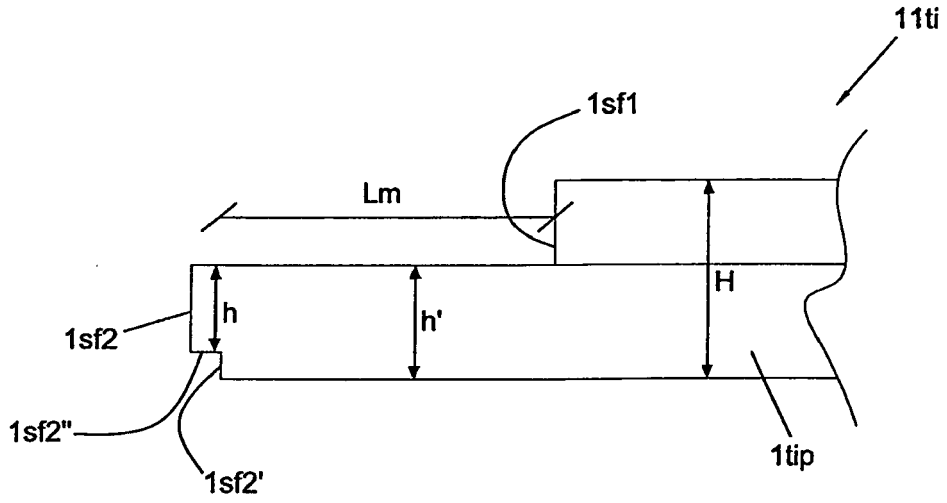
11ti
1sf1
Lm
H
h
h'
1sf2
1sf2"
1sf2'
1tip

fig. 3d

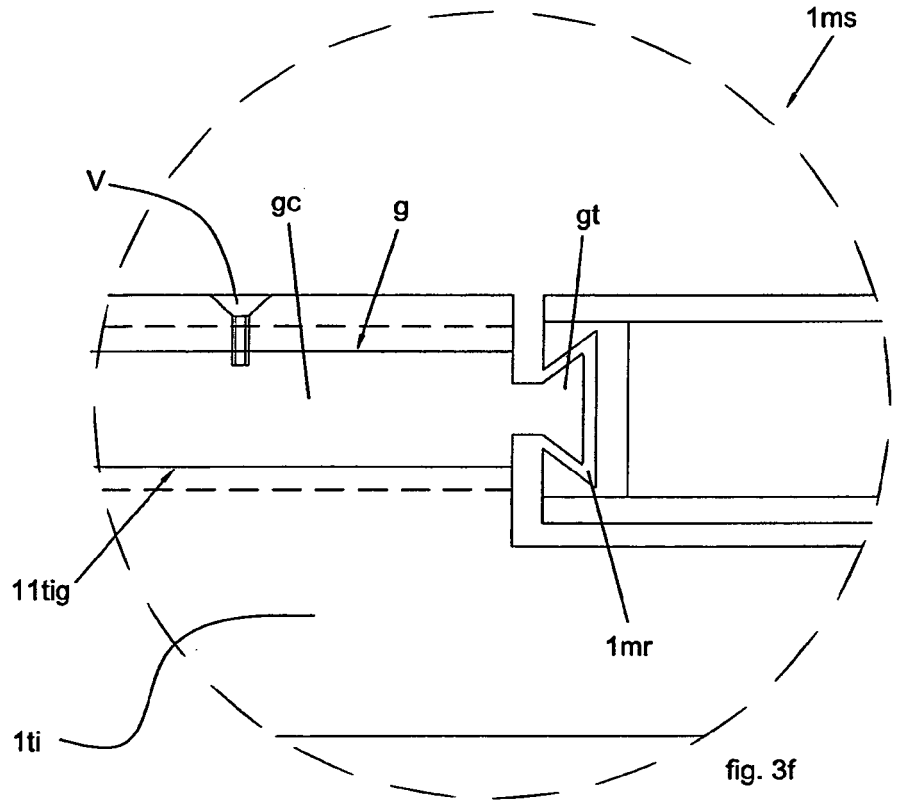
1ms
V
gc
g
gt
11tig
1mr
1ti

fig. 3f

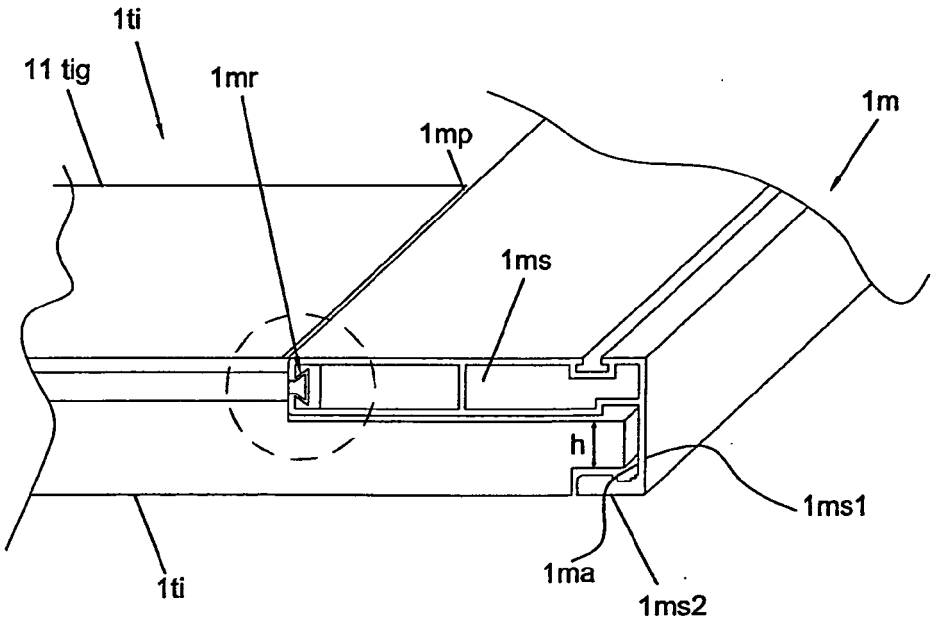
1ti
11 tig
1mr
1mp
1m
1ms
h
1ms1
1ti
1ma
1ms2

fig. 3e

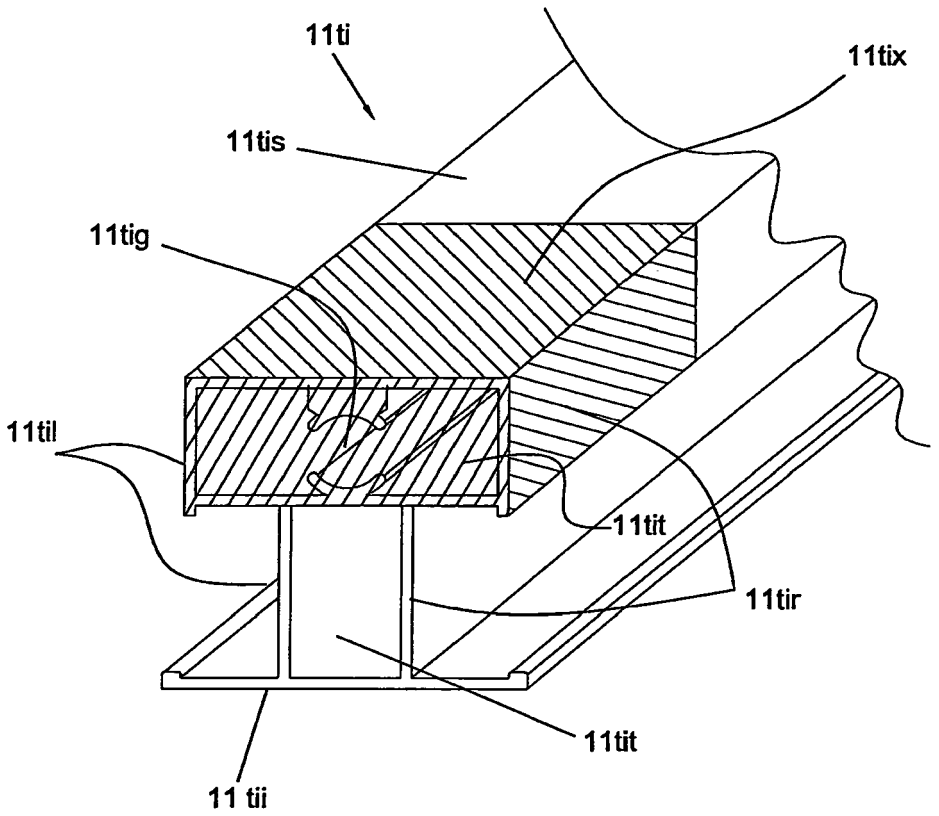

fig. 4a

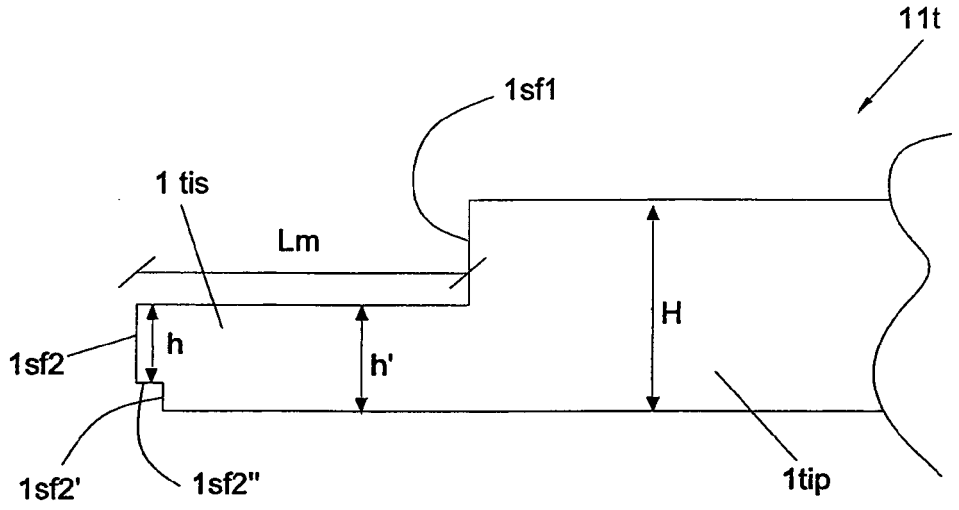
11t
1sf1
1 tis
Lm
H
h
h'
1sf2
1sf2'
1sf2"
1tip

fig. 4c

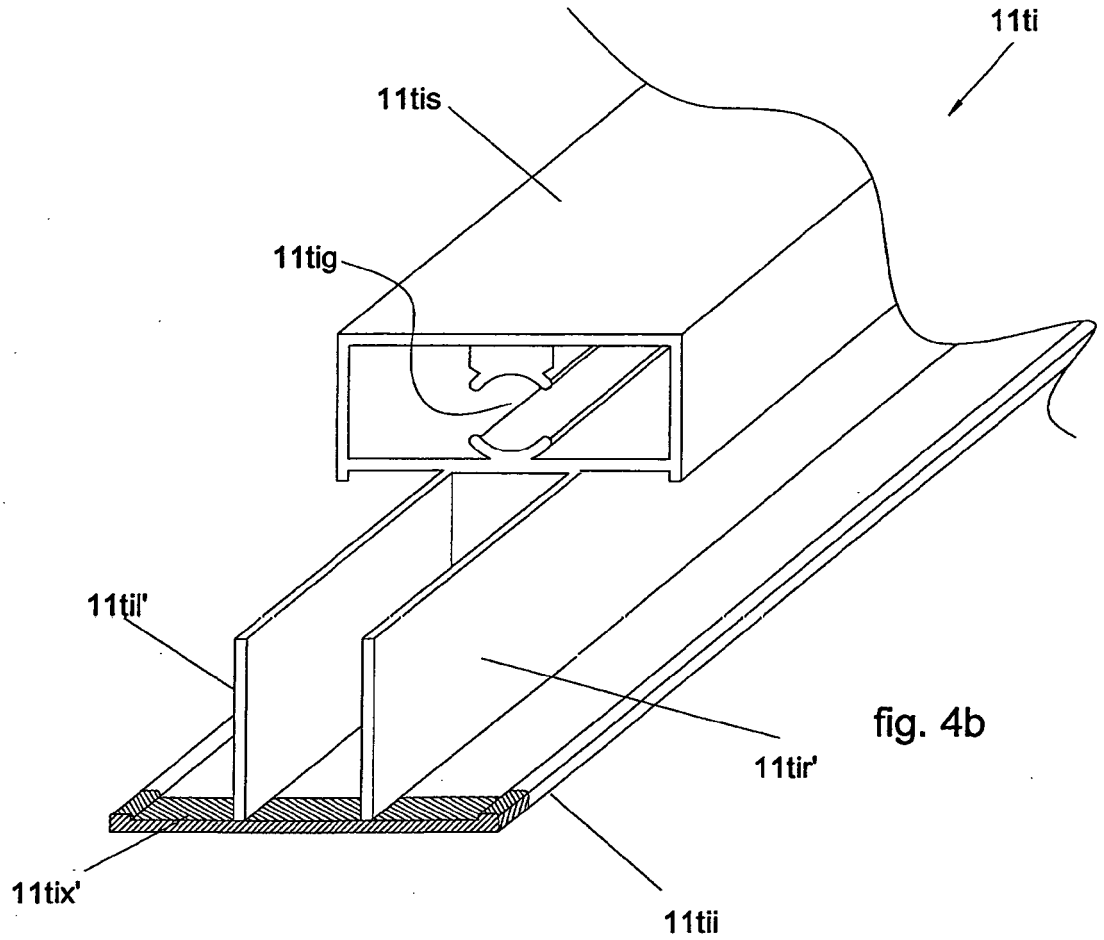
11ti
11tis
11tig
11til'
11tir'
11tix'
11tii

fig. 4b

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EUROPEAN SEARCH REPORT

Application Number
EP 09 01 4394

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 200 22 155 U1 (BUCHNER KARL [DE]) 17 May 2001 (2001-05-17) * figure 4 * -----	1-2,6-7, 13-15	INV. E06B3/984 E06B3/96
X	DE 40 31 537 A1 (FRIEDERICH GUNTER [DE]) 9 April 1992 (1992-04-09) * the whole document * -----	1-2,6-7, 13-15	
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X	US 1 436 858 A (JACOB BURHEN REINHART) 28 November 1922 (1922-11-28) * the whole document * -----	1-10, 13-15	

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	1 February 2010	Schwertfeger, C

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1

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01-02-2010

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