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(54) Frame for windows, doors or the like

(57) The present invention relates to frames for windows, doors or the like. The frames according to the present invention comprise profiles fastened to each other by means of mechanical fastening means adapted to be housed inside adjacent profiles. The frames according to the present invention are extremely stable and durable, even if subjected to extreme weather conditions for prolonged time. Moreover, the frames according to the present invention are easy to assemble and disassemble and can be assembled and disassembled several times without damaging them.

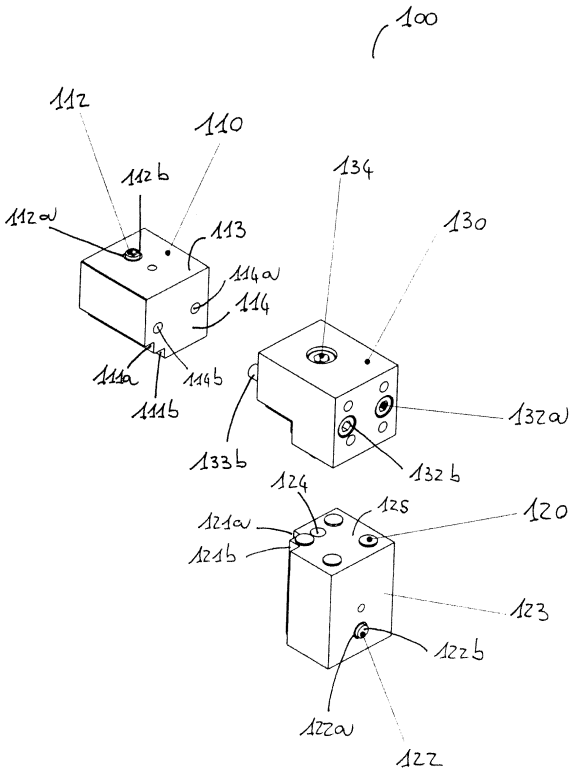

Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to the field of frames. In particular, the present invention relates to the field of frames for windows, doors or the like. Still more in particular, the present invention relates to the field of frames comprising hollow profiles.

BACKGROUND OF THE INVENTION

[0002] Frames for doors, windows or the like were traditionally made of wood. Recently, however, alternatively to wooden frames, hollow profiles have been employed. Hollow profiles are lighter and, accordingly, more easy to handle than wooden frames. Moreover, hollow profiles are typically more stable and durable than wooden frames, in particular in the presence of extreme weather conditions. In fact, hollows profiles are generally made of metals such as aluminum, iron or steel, or of plastic materials. Both metals and plastic materials are particularly resistant to extreme weather conditions and exhibit, therefore, long durability. Moreover, in the last years, composite wood-metal or wood-plastic frames have been developed wherein hollow metal or plastic profiles are combined with wooden components in order to enhance for instance the thermal insulation properties of the frame as well as its aesthetic appearance.

[0003] One of the major problems connected to the presence of hollow profiles in the formation of frames for windows, doors or the like relates to the fastening of the elements forming the frame, in particular to the fastening of adjacent profiles forming the corners of the frame. Each of the four corners of the frame is, in fact, normally build up by two adjacent profiles disposed so as to form a 90° angle and fastened to each other at the corner. Typically, adjacent profiles exhibit slanted edges so as to fit together at the corner. It is extremely important that the fastening of adjacent profiles is firm, strong and stable in order to guarantee the rigidity and stability of the frames and of the corresponding windows, doors or the like. In the systems known in the art, fastening is achieved by corner joints. Nevertheless, these joints do not guarantee a high stability and the fastening of adjacent profiles is not firm. Accordingly, the doors or windows provided with frames fastened by means of known corner joints are not stable.

[0004] A more stable form of fastening is achieved either by means of welding techniques or by means of adhesive substances. Adjacent metal profiles made of materials suitable to be welded, such as for example iron profiles, are welded to each other at the corners of the frame. In particular, the welding runs along the slanted edges of the profiles. On the contrary, when the profiles are made of materials unsuitable to be welded, such as aluminum or plastic profiles, the fastening is achieved by gluing by means of appropriate adhesive substances. The adhesive substances are firstly disposed for instance along the slanted edges of the profiles which are afterwards brought together.

[0005] Although both the welding and the employment of adhesive substances guarantee a relative stable and strong fastening of the profiles, these techniques present several problems and drawbacks.

[0006] Welding techniques require the employment of cumbersome and costly machines. Moreover, welding processes are complex and costly and require an elevated degree of experience, in particular in those cases wherein it is not only necessary to provide a stable and strong welding between the components, but also a welding whose external appearance does not degrade the appearance of the end product. One of the major drawbacks related to welding techniques concerns in fact the external appearance of the welding. The welded edges are in fact typically distorted by the welding process and the welded juncture is clearly visible for instance in the form of material which accumulates at the juncture and protrudes from the external surface of the profiles. Accordingly, the aesthetic appearance of doors or windows whose frames are formed by welded profiles may be degraded by the presence of welded junctures. Typically this problem is solved by polishing techniques that allow the improvement of the appearance of the welded junctures. Nevertheless, polishing techniques are complex, costly, and extremely time consuming. Moreover, it is extremely difficult to polish out completely the welding so that, most of the times, it is impossible to optimize the aesthetic appearance of frames comprising welded profiles. Moreover, since welding deteriorates the aesthetic appearance of the profiles, in case the profiles are to be painted or decorated, the welding process has to be performed in advance. Accordingly, painting and decoration processes can only be performed on the end products, i.e. on the assembled and welded frames. This entails several problems related to the encumbrance and to the handling of the frames. Painting and decoration require therefore large spaces and the employment of machines and structures suitable to handle heavy and cumbersome frames, in particular in case that these processes are to be performed in series in a workshop, for instance. Alternatively, these processes can only be performed in loco after the frames are mounted on the buildings. In this case, other problems arise, such as the accessibility to the mounted frames and the impossibility to paint or decorate the frames in series. Accordingly, these drawbacks contribute to increase the costs of the frames and to prolong the production times of the end products. Another drawback of the welding techniques concern the fact that welding, as well as gluing by means of adhesive substances, is basically an irreversible process or, in any case, when adjacent profiles are welded or glued to each other, it is extremely difficult and industrious to detach them. Accordingly, it is extremely important to provide the single profiles with exact sizes before welding or gluing them, in order to avoid the necessity to detach them

once they are welded or glued for instance for the purpose of shortening one of them. Moreover, since welding and gluing have to be performed in appropriate workshops provided with specific machinery, it is not possible to assemble the frames in loco, i.e. directly at the construction site. Accordingly, it is necessary to handle and transport the heavy and cumbersome ready assembled frames. Another drawback of the gluing techniques concerns the resistance of the adhesive substances. These substances, in fact, may dry or, in general, degrade with time, especially since they are permanently subjected to meteorological agents, thus compromising the stability of the frames and of the corresponding windows and doors.

OBJECT OF THE INVENTION

[0007] In view of the aforementioned problems and drawbacks relating to the known frames for doors, windows or the like, it is an object of the present invention to provide frames capable of overcoming these problems. In particular, it is an object of the present invention to provide frames comprising profiles which require neither welding nor gluing for fastening the profiles to each other. It is a further object of the present invention to provide frames which are stable and firm. In particular, it is an object of the present invention to provide frames whose fastening between adjacent profiles is strong, stable and firm so as to guarantee the rigidity and stability of the frame. It is a further object of the present invention to provide frames whose fastening is durable independently from the weather conditions the frame is subject to. It is a further object of the present invention to provide frames that can be easily and quickly manufactured. Moreover, it is an object of the present invention to provide inexpensive frames for doors, windows or the like. It is a further object of the present invention to provide frames that can be easily and quickly assembled. Moreover, it is an object of the present invention to provide frames that can be easily and quickly disassembled. It is still an object of the present invention to provide frames that can be assembled and disassembled several times without damaging the frame's components. In particular, it is an object of the present invention to provide frames comprising profiles wherein adjacent profiles can be easily and quickly either fastened to each other or detached from each other without damaging the profiles themselves. It is still an object of the present invention to provide frames that can be easily and quickly assembled in loco, i.e. directly at the construction site of the building that has to be provided with the frames. It is a further object of the present invention to provide frames comprising profiles wherein the profiles can be assembled and/or fastened to each other even in the case that the profiles have been painted and/or decorated in advance, i.e. before the assembly. It is a further object of the present invention to provide frames with an improved aesthetic appearance.

SUMMARY OF THE INVENTION

[0008] The present invention relates to frames for windows, doors or the like comprising hollow profiles.

[0009] The present invention is based on the innovative concept of providing frames comprising adjacent hollow profiles forming 90° corners fastened to each other by means of mechanical fastening means adapted to be housed inside the adjacent profiles. In particular, the present invention is based on the innovative concept of providing the frame with at least two adjacent hollow profiles disposed so as to form a 90° angle wherein each of the two adjacent hollow profiles is provided with a movable fastening element which is adapted to slide inside the profile and wherein each of the fastening elements is adapted to be engaged with a fastening corner element adapted to be housed in the corner of the frame.

[0010] According to a preferred embodiment of the present invention, a frame for doors, windows or the like is provided, said frame comprising a first profile and a second profile, said frame further comprising a first fastening element adapted to slide inside said first profile and to be fastened thereto, a second fastening element adapted to slide inside said second profile and to be fastened thereto and a fastening corner element adapted to be fastened to each of said first fastening element and second fastening element, so that said first profile and said second profile are brought in contact and firmly fastened to each other so as to be adjacent and to form a corner with an angle of 90° by operating said first fastening element and said second fastening element so that said fastening corner element is housed at least partially into the corner formed by said adjacent first and second profiles.

[0011] According to still a further preferred embodiment of the present invention, a frame for doors, windows or the like is provided, wherein the vertical cross section of said first fastening element taken in a direction perpendicular to the main direction of said first profile matches the area of the vertical cross section of the hollow of said first profile in a direction perpendicular to the main direction of said first profile and wherein the vertical cross section of said second fastening element taken in a direction perpendicular to the main direction of said second profile matches the area of the vertical cross section of the hollow of said second profile in a direction perpendicular to the main direction of said second profile.

[0012] According to still a further preferred embodiment of the present invention, a frame for doors, windows or the like is provided, wherein the first fastening element further comprises a spring loaded fastening device adapted to engage with an engaging hole provided on the first profile so as to fasten said first fastening element to said first profile and wherein the second fastening element further comprises a spring loaded fastening device adapted to engage with an engaging hole provided on said second profile so as to fasten said second fastening element to said second profile.

[0013] According to still a further preferred embodiment of the present invention, a frame for doors, windows or the like is provided, wherein the fastening corner element comprises a first arm and a second arm disposed so as to form a 90° angle and wherein said first arm comprises an upper surface adapted to be in contact with an internal surface of said first profile and a slanted surface opposed said upper surface of said first arm and wherein said second arm comprises an upper surface adapted to be in contact with an internal surface of said second profile and a slanted surface opposed said upper surface of said second arm.

[0014] According to still a further preferred embodiment of the present invention, a frame for doors, windows or the like is provided, wherein the first fastening element comprises a fastening surface and a slanted surface opposed said fastening surface and adapted to slide along said slanted surface of said first arm and wherein the second fastening element comprises a fastening surface and a slanted surface opposed said fastening surface and adapted to slide along said slanted surface of said second arm.

[0015] According to still a further preferred embodiment of the present invention, a frame for doors, windows or the like is provided, wherein by sliding the first fastening element along the first arm the fastening surface of said first fastening element comes into contact with an internal surface of the first profile so as to adhere thereon and wherein by sliding the second fastening element along the second arm the fastening surface of said second fastening element comes into contact with an internal surface of said second profile so as to adhere thereon.

[0016] According to still a further preferred embodiment of the present invention, a frame for doors, windows or the like is provided, wherein the fastening corner element further comprises a through hole adapted to house means for actuating the sliding of the second fastening element along the second arm and a through hole adapted to house means for actuating the sliding of the first fastening element along the first arm.

[0017] According to still a further preferred embodiment of the present invention, a frame for doors, windows or the like is provided, wherein the means for actuating the sliding of the second fastening element along the second arm comprises a screw and the second fastening element comprises a threaded hole adapted to be engaged with said screw and wherein the means for actuating the sliding of the first fastening element along the first arm comprises a screw and the first fastening element comprises a threaded hole adapted to be engaged with said screw.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Figure 1 displays a schematic 3D view of the fastening means according to a first embodiment of the present invention;

Figure 2 displays a schematic 3D view of a detail of a first embodiment of the present invention;

Figure 3 displays a schematic 3D view of a further detail of a first embodiment of the present invention;

Figure 4 displays a schematic 3D view of a first embodiment of the present invention before assembly;

Figure 5 displays a schematic 3D view of the fastening means according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] In the following, the present invention is described with reference to particular embodiments as shown in the enclosed drawings. Nevertheless, the present invention is not limited to the particular embodiments described in the following detailed description and shown in the figures, but, instead, the embodiments described simply exemplify several aspects of the present invention, the scope of which is defined by the appended claims.

[0020] Further modifications and variations of the present invention will be clear for the person skilled in the art. Therefore, the present description has to be considered as including all the modifications and/or variations of the present invention, the scope of which is defined by the appended claims.

[0021] For simplicity, identical or corresponding components are indicated in the figures with the same reference numbers.

[0022] Figure 1 displays a schematic 3D view of the fastening means 100 according to a first embodiment of the present invention. The fastening means 100 comprise a first fastening element 110, a second fastening element 120 and a fastening corner element 130. The first fastening element 110 and the second fastening element 120 are adapted to slide inside the profiles comprised in the frame and to be engaged with the fastening corner element 130 which is adapted to be housed in the corner of the frame. In particular, the first fastening element 110 and the second fastening element 120 are adapted to fit into a first profile 140 and a second profile 150, respectively, as can be seen in figures 2 and 3.

[0023] The shape of the first fastening element 110 is based on the shape of the hollow of the first profile 140. Still more in particular, the first fastening element 110 has an area of the vertical cross section perpendicular to the main direction of the first profile 140 fitting into the area of the vertical cross section of the hollow of the profile 140 perpendicular to the main direction of the first profile 140 shown in figure 2. Accordingly, the first fastening element 110 is adapted to fit into the first profile 140 and to slide within it. As can be seen in figures 1 and

2, the first fastening element 110 has substantially the shape of a parallelepiped provided with grooves 111a and 111b running along one of the edges of the parallelepiped. The grooves 111a and 111b correspond to the indentations 141a and 141b of the first profile 140. According to alternative embodiments of the present invention, the first profile 140 may be provided with different kinds of indentations. For instance, the first profile 140 may be provided with a single indentation or with two or more indentations. Moreover, the indentations of the profile may exhibit several shapes such as square shapes as shown in figure 2 for the indentations 141a and 141b of the profile 140, but also pointed and/or rounded shapes. Accordingly, the corresponding first fastening element will exhibit corresponding grooves so as to allow the first fastening element to match the shape of the hollow of the first profile. In this way, the first fastening element can fit into the hollow of the first profile and slide within it.

[0024] In a similar way, the second fastening element 120 is adapted to fit into the hollow of the second profile 150 and to slide within it. In particular, the shape of the second fastening element 120 is based on the shape of the hollow of the second profile 150. Still more in particular, the second fastening element 120 has an area of the vertical cross section perpendicular to the main direction of the second profile 150 fitting into the area of the vertical cross section of the hollow of the profile 150 perpendicular to the main direction of the second profile 150 shown in figure 3. Accordingly, the second fastening element 120 is adapted to fit into the second profile 120 and to slide within it. As can be seen in figures 1 and 3, the second fastening element 120 has substantially the shape of a parallelepiped provided with grooves 121a and 121b running along one of the edges of the parallelepiped. The grooves 121a and 121b correspond to the indentations 151a and 151b of the second profile 150. According to alternative embodiments of the present invention, the second profile 150 may be provided with different kinds of indentations. For instance, the second profile 150 may be provided with a single indentation or with two or more indentations. Moreover, the indentations of the second profile may exhibit several shapes such as square shapes as shown in figure 2 for the indentations 151a and 151b, but also pointed and/or rounded shapes. Accordingly, the corresponding second fastening element will exhibit corresponding grooves so as to allow the second fastening element to match the shape of the hollow of the second profile. In this way, the second fastening element can fit into the hollow of the second profile and slide within it.

[0025] As can be seen in figures 1 and 2, the first fastening element 110 is further provided with a spring loaded fastening device 112. The spring loaded fastening device 112 is provided on the first fastening element 110 as follows. The first fastening element 110 is provided with an housing hole 112a on one of its faces facing one of the sides of the first profiles 140 when the element 110 is inserted therein. In the embodiment shown in the figures, the housing hole 112a is located on the surface 113 of the first fastening element 110 facing the surface 143 of the first profile 140 when the first fastening element 110 is inserted therein. A spring (not visible in the figures) is housed into the housing hole 112a. A hollow body 112b encapsulates the spring and it is adapted to be housed into the housing hole 112a. In particular, the hollow body 112b shown in figures 1 and 2 is a cylindrical hollow body. The height of the cylinder is lower than or equal to the depth of the housing hole 112a. The spring is construed so that in its relaxed position the length of the spring is higher than the depth of the housing hole 112a. Accordingly, when the spring is relaxed, the hollow body 112b encapsulating the spring protrudes from the surface 113 of the first fastening element 110. In particular, when the spring is relaxed, the hollow body 112b encapsulating the spring is partially housed into the housing hole 112a and, at the same time, it partially protrudes therefrom. On the other hand, the spring can be compressed by exerting pressure on the apex of the hollow body 112b so as to bring said hollow body 112b to be level with the surface 113 of the first fastening element 110. Since the height of the hollow body 112b is lower than or equal to the depth of the housing hole 112a, by exerting an appropriate pressure, it is possible to push the hollow body 112b so as to be completely housed within the housing hole 112a. In the systems shown in the figures, the spring loaded fastening device 112 has cylindrical geometry: accordingly, the housing hole 112a and the hollow body 112b have matching cylindrical geometries. According to alternative solutions, the spring loaded fastening device may exhibit other geometries, such as for instance a square geometry with the housing hole and the hollow body having parallelepiped-like geometries.

[0026] As can be seen in figure 2, in order to insert the first fastening element 110 into the first profile 140, it is necessary to push the spring loaded fastening device 112 so as to bring it to be level with the surface 113 of the first fastening element 110. In other words, the spring loaded fastening device 112 is pushed so as to obtain a flat surface and to allow the first fastening element 110 to be inserted into the hollow of the first profile 140.

[0027] When the first fastening element 110 is inserted into the first profile 140, the surface 143 of the first profile 140 keeps the spring loaded fastening device 112 pushed down so as to allow the first fastening element 110 to slide within the first profile 140. The surface 143 of the first profile 140 is provided with an engaging hole 142 adapted to house the protruding portion of the spring loaded fastening device 112 when the spring is relaxed. When, by sliding the first fastening element 110 within the first profile 140, the spring loaded fastening device 112 reaches the engaging hole 142, the spring can relax so as to allow the upper portion of the hollow body 112b to be inserted into the engaging hole 142. In a preferred embodiment of the present invention, the length of the spring in its relaxed position is such that when the spring

is relaxed and the upper portion of the hollow body 112b is inserted into the engaging hole 142, the upper surface of the hollow body 112b is flush with the surface 143.

[0028] The spring loaded fastening device 112 and the engaging hole 142 allow the first fastening element 110 to be firmly and stably fastened within the first profile 140. When the spring is relaxed and the spring loaded fastening device 112 is inserted into the engaging hole 142, the first fastening element 110 can not slide within the first profile 140. On the other hand, by simply pushing down the spring loaded fastening device 112 through the engaging hole 142 by means of an appropriate tool such as for instance a screwdriver or any other tool adapted to penetrate into the engaging hole 142 and to push the spring loaded fastening device 112, it is possible to release the fastening mechanism and to allow the first fastening element 110 to slide within the first profile 140 for instance for the purpose of removing the first fastening element 110 therefrom.

[0029] In a similar way, the second fastening element 120 can be fastened within the second profile 150.

[0030] In particular, as can be seen in figures 1 and 3, the second fastening element 120 is provided with a spring loaded fastening device 122. The spring loaded fastening device 122 is provided on the second fastening element 120 as follows. The second fastening element 120 is provided with an housing hole 122a on one of its faces facing one of the sides of the second profiles 150 when the element 120 is inserted therein. In the embodiment shown in the figures, the housing hole 122a is located on the surface 123 of the second fastening element 120 facing the surface 153 of the second profile 150 when the second fastening element 120 is inserted therein. A spring (not visible in the figures) is housed into the housing hole 122a. A hollow body 122b encapsulates the spring and it is adapted to be housed into the housing hole 122a. In particular, the hollow body 122b shown in figures 1 and 3 is a cylindrical hollow body. The height of the cylinder is lower than or equal to the depth of the housing hole 122a. The spring is construed so that in its relaxed position the length of the spring is higher than the depth of the housing hole 122a. Accordingly, when the spring is relaxed, the hollow body 122b encapsulating the spring protrudes from the surface 123 of the second fastening element 120. In particular, when the spring is relaxed, the hollow body 122b encapsulating the spring is partially housed into the housing hole 122a and, at the same time, it partially protrudes therefrom. On the other hand, the spring can be compressed by exerting pressure on the apex of the hollow body 122b so as to bring said hollow body 122b to be level with the surface 123 of the second fastening element 120. Since the height of the hollow body 122b is lower than or equal to the depth of the housing hole 122a, by exerting an appropriate pressure, it is possible to push the hollow body 122b so as to be completely housed within the housing hole 122a. In the systems shown in the figures, the spring loaded fastening device 122 has cylindrical geometry: accordingly, the housing hole 122a and the hollow body 122b have matching cylindrical geometries. According to alternative solutions, the spring loaded fastening device may exhibit other geometries, such as for instance a square geometry with the housing hole and the hollow body having parallelepiped-like geometries.

[0031] As can be seen in figure 3, in order to insert the second fastening element 120 into the second profile 150, it is necessary to push the spring loaded fastening device 122 so as to bring it to be level with the surface 123 of the second fastening element 120. In other words, the spring loaded fastening device 122 is pushed so as to obtain a flat surface and to allow the second fastening element 120 to be inserted into the hollow of the second profile 150.

[0032] When the second fastening element 120 is inserted into the second profile 120, the surface 153 of the second profile 150 keeps the spring loaded fastening device 122 pushed down so as to allow the second fastening element 120 to slide within the second profile 150. The surface 153 of the second profile 150 is provided with an engaging hole 152 adapted to house the protruding portion of the spring loaded fastening device 122 when the spring is relaxed. When, by sliding the second fastening element 120 within the second profile 150, the spring loaded fastening device 122 reaches the engaging hole 152, the spring can relax so as to allow the upper portion of the hollow body 122b to be inserted into the engaging hole 152. In a preferred embodiment of the present invention, the length of the spring in its relaxed position is such that when the spring is relaxed and the upper portion of the hollow body 122b is inserted into the engaging hole 152, the upper surface of the hollow body 122b is flush with the surface 153.

[0033] The spring loaded fastening device 122 and the engaging hole 152 allow the second fastening element 120 to be firmly and stably fastened within the second profile 150. When the spring is relaxed and the spring loaded fastening device 122 is inserted into the engaging hole 152, the second fastening element 120 can not slide within the second profile 150. On the other hand, by simply pushing down the spring loaded fastening device 122 through the engaging hole 152 by means of an appropriate tool such as for instance a screwdriver or any other tool adapted to penetrate into the engaging hole 152 and to push the spring loaded fastening device 122, it is possible to release the fastening mechanism and to allow the second fastening element 120 to slide within the second profile 150 for instance for the purpose of removing the second fastening element 120 therefrom.

[0034] As can be seen in figure 1, the fastening means 100 according to a first embodiment of the present invention further comprise a fastening corner element 130.

[0035] The fastening corner element 130 is adapted to fasten at the same time both the first fastening element 110 and the second fastening element 120. Moreover, the fastening corner element 130 is adapted to be housed within the corner formed by the first profile 140 and the

second profile 150 when they are disposed adjacent to each other so as to form a 90° angle.

[0036] The fastening corner element 130 shown in the figures is provided with a right through hole 132a and with a left through hole 132b. The left and right through holes 132a and 132b are drilled into the fastening corner element 130 in a direction parallel to the direction defined by the first profile 140 when the system is assembled. The left and right through holes 132a and 132b are adapted to house fastening means such as screws 133a and 133b adapted to fasten the fastening corner element 130 to the first fastening element 110. In particular, the first fastening element 110 is provided with holes 114a and 114b drilled in the face 114 of the first fastening element 110 facing the fastening corner element 130 and adapted to engage with the fastening means housed in the through holes 132a and 132b, respectively. In particular, the holes 114a and 114b could be for instance threaded holes adapted to engage the screws 133a and 133b housed in the through holes 132a and 132b, respectively.

[0037] The fastening corner element 130 further comprises a central through hole 134 drilled into the fastening corner element 130 in a direction parallel to the direction defined by the second profile 150 when the system is assembled. The central through hole 134 is accordingly drilled in a direction perpendicular to the direction along which the right and left through holes 132a and 132b are drilled. Moreover, the central through hole 134 is drilled in the region between the right and left through holes 132a and 132b so that the central through hole 134 intersects neither the right through hole 132a nor the left through hole 132b. The central through hole 134 is adapted to house fastening means such as a screw 135 adapted to fasten the fastening corner element 130 to the second fastening element 120. In particular, the second fastening element 120 is provided with a hole 124 drilled in the face 125 of the second fastening element 120 facing the fastening corner element 130 and adapted to engage with the fastening means housed in the central through hole 134. In particular, the hole 124 could be for instance a threaded hole adapted to engage the screw 135 housed in the central through holes 134.

[0038] As can be clearly seen in figure 2, the fastening corner element 130 is further provided with grooves 131a and 131b adapted to match the grooves of the first fastening element 110 and of the second fastening element 120. In particular, with reference to the figure, the grooves 131a and 131b are L-shaped so as to match at the same time the grooves 111a and 111b of the first fastening element 110 and the grooves 121a and 121b of the second fastening element when the system is assembled. In particular, when the fastening corner element 130 is adjacent to the first fastening element 110, the horizontal portions of the grooves 131a and 131b are a continuation of the grooves 111a and 111b of the first fastening element 110. Similarly, when the fastening corner element 130 is adjacent to the second fastening element 120, the vertical portions of the grooves 131a and 131b are a continuation of the grooves 121a and 121b of the second fastening element 120.

[0039] The presence of the grooves in the fastening corner element 130 allows it to be adapted to be housed within the corner formed by the first profile 140 and the second profile 150 when they are disposed adjacent to each other so as to form a 90° angle as will be explained more in detail in the following.

[0040] In the following, the assembly process of the frame according to a first embodiment of the present invention as depicted in figures 1 to 4, will be described.

[0041] The first fastening element 110 is inserted into the first profile 140 and fastened thereto by means of the spring loaded fastening device 112 and of the engaging hole 142 as described above (see Figure 2). When the first fastening element 110 is stably and firmly fastened to the first profile 140, it is possible to fasten the fastening corner element 130 to the first fastening element. For this purpose, the screws 133a and 133b housed into the through holes 132a and 132b of the fastening corner element 130 are screwed into the threaded holes 114a and 114 b of the first fastening element 110. As can be seen in Figure 2, the first profile 140 is provided with a slanted edge 144. Accordingly, after fastening of the fastening corner element 130 to the first fastening element 110 inserted into the first profile 140 and fixed thereto, the fastening corner element 130 is partially housed into the first profile 140 as can be seen for instance in figure 4. In particular, the horizontal portions of the L-shaped grooves 131a and 131b of the fastening corner element 140 fit into the indentations 141a and 141b of the profile 140. Moreover, because of the slanted edge 144 of the first profile 140, the upper portion of the fastening corner element 130 is completely housed into the upper portion of the first profile 140.

[0042] The second fastening element 120 is inserted into the second profile 150 and fastened thereto by means of the spring loaded fastening device 122 and of the engaging hole 152 as described above (see Figure 3). As shown in figure 4, in order to assemble the frame, it is now simply necessary to fasten the fastening corner element 130 previously fastened to the first fastening element 110 provided into the first profile 140 to the second fastening element 120 provided into the second profile 150. The second profile 150 is provided with a slanted edge 154 fitting to the slanted edge 144 of the first profile 140 when the two profiles are disposed adjacent to each other so as to form a 90° angle. In order to fasten the fastening corner element 130 to the second fastening element 120, the screw 135 housed into the through hole 134 of the fastening corner element 130 is screwed into the threaded hole 124 of the second fastening element 120. The first profile 140 is provided with an access hole 145 adapted to allow the operation of the screw 135 when the fastening corner element 130 is fastened to the first profile 140 and partially housed therein as describe above. The access hole 145 allows for instance a screw driver to reach the head of the screw 135 and to operate

same. Similarly, the second profile 150 may be provided with left and right access holes adapted to allow the operation of the screws 133a and 133b when the fastening corner element 130 is fastened to the second profile 150. The right access hole 155a is visible in figures 3 and 4; the corresponding left access hole is not visible in the figures.

[0043] The portion of the fastening corner element 130 not housed into the first profile 140 will be housed into the second profile 150 after assembly of the system. In particular, the vertical portions of the L-shaped grooves 131a and 131b of the fastening corner element 140 fit into the indentations 151a and 151b of the profile 150. Moreover, because of the slanted edge 154 of the second profile 150, the lower portion of the fastening corner element 130 is completely housed into the upper-right portion of the second profile 150 as shown in figure 4.

[0044] Accordingly, when the system is assembled, the fastening corner element 130 is completely housed into the corner formed by the adjacent first and second profiles 140 and 150 fitting together by means of the slanted edges 144 and 154.

[0045] In order to disassemble the system, it is simply necessary to operate on the screw 135 through the access hole 145 so as to remove the second profile 150 with the second fastening element 120 from the fastening corner element 130.

[0046] Figure 5 displays a schematic 3D view of the fastening means 200 according to a second embodiment of the present invention. The fastening means 200 comprise a first fastening element 210, a second fastening element 220 and a fastening corner element 230. The first fastening element 210 and the second fastening element 220 are adapted to slide inside the profiles and to be engaged with the fastening corner element 230 which is adapted to be housed in the corner of the frame.

[0047] The fastening corner element 230 is L-shaped and it comprises a first arm 230a and a second arm 230b disposed so as to form a 90° angle. In the embodiment shown in figure 5, the arms 230a and 230b of the L-shaped fastening corner element 230 have the same length. Alternatively, the arms 230a and 230b may exhibit different lengths. The arms are provided with grooves 231a, 232a, 231b, 232b so as to allow the fastening corner element to be housed in the corner of the frame. In particular, the grooves 231a and 232a of the first arm 230a are adapted to match the indentations of a first profile forming the corner of the frame. The grooves 231b and 232b of the second arm are adapted to match the indentations of a second profile forming the corner of the frame. The first profile and the second profile are adapted to be disposed adjacent to each other so as to form a 90° angle. The first and the second profile may for instance be provided with slanted edges allowing the profiles to fit together. The fastening corner element 230 is accordingly adapted to be housed into the corner formed by the first and the second profile.

[0048] The first arm 230a comprises an upper surface 233a adapted to be in contact with an internal surface of the first profile. Moreover, the first arm 230a further comprises a slanted surface 234a opposite the upper surface 233a. The upper surface 233a and the slanted surface 234a are not parallel. In particular, the distance between the upper surface 233a and the slanted surface 234a increases going from the end of the first arm 230a to the juncture with the second arm 230b. Similarly, the second arm 230b comprises an upper surface 233b adapted to be in contact with an internal surface of the second profile. Moreover, the second arm 230b further comprises a slanted surface 234b opposite the upper surface 233b. The upper surface 233b and the slanted surface 234b are not parallel. In particular, the distance between the upper surface 233b and the slanted surface 234b increases going from the end of the second arm 230b to the juncture with the first arm 230a.

[0049] The first arm 230a further comprises a through hole 235a drilled between the upper surface 233a and the slanted surface 234a in proximity to the juncture between the first arm 230a and the second arm 230b. Similarly, the second arm 230b further comprises a through hole not visible in the figure and drilled between the upper surface 233b and the slanted surface 234b in proximity to the juncture between the first arm 230a and the second arm 230b.

[0050] The first fastening element 210 is adapted to slide inside a first profile. As can be seen in figure 5, the first fastening element 210 has a wedge-like shape. In particular, the first fastening element 210 comprises a slanted surface 211 and a fastening surface 212 being opposed to the slanted surface 211. The slanted surface 211 is inclined with respect to the fastening surface 212 so that the distance between the two surfaces increases going from one end of the first fastening element 210 to the other end (i.e. from right to left in the device shown in figure 5). In other words, the slanted surface 211 and the fastening surface 212 are not parallel. The slanted surface 211 is adapted to slide on the slanted surface 234a of the first arm 230a of the fastening corner element 230. Accordingly, the first fastening element 210 is adapted to slide along the first arm 230a of the fastening corner element 230.

[0051] The first fastening element 210 further comprises a threaded hole not visible in the figure facing the through hole drilled between the upper surface 233b and the slanted surface 234b of the second arm 230b of the fastening corner element in proximity to the juncture between the first arm 230a and the second arm 230b.

[0052] The second fastening element 220 is similar to the first fastening element 210. In particular, the second fastening element 220 has a wedge-like shape. The second fastening element 220 comprises a slanted surface 221 and a fastening surface 222 being opposed to the slanted surface 221. The slanted surface 221 is inclined with respect to the fastening surface 222 so that the distance between the two surfaces increases going from one end of the second fastening element 220 to the other

end (i.e. from top to bottom in the device shown in figure 5). In other words, the slanted surface 221 and the fastening surface 222 are not parallel. The slanted surface 221 is adapted to slide on the slanted surface 234b of the second arm 230b of the fastening corner element 230. Accordingly, the second fastening element 220 is adapted to slide along the second arm 230b of the fastening corner element 230.

[0053] The second fastening element 220 further comprises a threaded hole 223 facing the through hole 235a drilled between the upper surface 233a and the slanted surface 234b of the first arm 230a of the fastening corner element in proximity to the juncture between the first arm 230a and the second arm 230b.

[0054] In the following, the assembly process of the frame according to a second embodiment of the present invention as depicted in figure 5 will be described.

[0055] A screw 240 is disposed into the through hole 235a drilled between the upper surface 233a and the slanted surface 234a of the first arm 230a of the fastening corner element in proximity to the juncture between the first arm 230a and the second arm 230b. The screw is operated so as to engage the threaded hole 223 of the second fastening element. When the screw 240 is partially inserted into the threaded hole 223, the distance between the fastening surface 222 of the second fastening element 220 and the upper surface 233b of the second arm 230b of the fastening corner element 230 is small. In particular, this distance is smaller than the width of the hollow of the second profile so that the fastening corner element 230 together with the second fastening element 220 engaged thereto can be inserted into the second profile. By acting on the screw 240, in particular by further screwing said screw 240 into the threaded hole 223, the second fastening element 220 is forced to slide along the second arm 230b of the fastening corner element 230. In particular, the slanted surface 221 of the second fastening element 220 slides against the slanted surface 234b of the second arm 230b. Accordingly, the second fastening element 220 slides along the second arm 230b of the fastening corner element 230. As a consequence, during this sliding process, the distance between the fastening surface 222 of the second fastening element 220 and the upper surface 233b of the second arm 230b of the fastening corner element 230 increases. The screwing process is continued until this distance reaches the size of the width of the hollow of the second profile so as to firmly fasten the second profile to the second fastening element 220 and to the fastening corner element 230 by means of the friction between the opposite internal surfaces of the profile and the fastening surface 222 of the second fastening element 220 and the upper surface 233b of the second arm 230b of the fastening corner element 230.

[0056] The first profile is assembled to the system in a similar way. A screw 250 is disposed into the through hole drilled between the upper surface 233b and the slanted surface 234b of the second arm 230b of the fastening corner element in proximity to the juncture between the first arm 230a and the second arm 230b. The screw is operated so as to engage the threaded hole of the first fastening element. When the screw 250 is partially inserted into the threaded hole, the distance between the fastening surface 212 of the first fastening element 210 and the upper surface 233a of the first arm 230a of the fastening corner element 230 is small. In particular, this distance is smaller than the width of the hollow of the first profile so that the fastening corner element 230 together with the first fastening element 210 engaged thereto can be inserted into the first profile. By acting on the screw 250, in particular by further screwing said screw into the threaded hole of the first fastening element 210, the first fastening element 210 is forced to slide along the first arm 230a of the fastening corner element 230. In particular, the slanted surface 211 of the first fastening element 210 slides against the slanted surface 234a of the first arm 230a. Accordingly, the first fastening element 210 slides along the first arm 230a of the fastening corner element 230. As a consequence, during this sliding process, the distance between the fastening surface 212 of the first fastening element 210 and the upper surface 233a of the first arm 230a of the fastening corner element 230 increases. The screwing process is continued until this distance reaches the size of the width of the hollow of the first profile so as to firmly fasten the first profile to the first fastening element 210 and to the fastening corner element 230 by means of the friction between the opposite internal surfaces of the profile and the fastening surface 212 of the first fastening element 210 and the upper surface 233a of the first arm 230a of the fastening corner element 230.

[0057] The first and the second profile are provided with access holes adapted to allow the operation of the screws 240 and 250 for instance by means of a screwdriver. The screwdriver can reach the heads of the screws 240 and 250 through the access holes drilled in the first and the second profile, respectively.

[0058] In order to disassemble the system, it is simply necessary to operate on the screws 240 and 250 through the access holes so as to let the first and the second fastening elements to slide back in order to remove the friction with the internal surfaces of the profiles. When the first fastening element 210 slides back, in fact, the distance between the fastening surface 212 and the upper surface 233a of the first arm 230a of the fastening corner element 230 decreases until no friction at all is exerted with the internal surfaces of the first profile. Similarly, when the second fastening element 220 slides back, the distance between the fastening surface 222 and the upper surface 233b of the second arm 230b of the fastening corner element 230 decreases until no friction at all is exerted with the internal surfaces of the second profile.

[0059] The system according to the present invention can be assembled and disassembled several times in an easy and quick way. Moreover, assembly and disassem-

bly operations do not damage the profiles at all so that, even operating on painted or decorated profiles, there is no risk of damaging the aesthetic appearance of the profiles by assembling and disassembling them several times. Accordingly, assembly and disassembly of the frames according to the present invention can advantageously be performed directly in loco, i.e. on the construction site of the building to be provided with the frames. The profiles can be for instance easily and quickly decorated and/or painted in series before being assembled. Moreover, they can be advantageously transported still disassembled so as to avoid the problem of handling heavy and cumbersome frames.

[0060] Moreover, the system according to the present invention guarantees extreme stability of the fastening mechanism so as to guarantee extreme stability of the frame. Furthermore, the fastening mechanisms of the frames according to the present invention are durable independently from the weather conditions the frame is subject to.

[0061] Since the fastening mechanisms of the systems according to the present invention require neither gluing nor welding, the present invention is suitable for several kinds of frames made of different materials. In particular, the present invention is suitable for frames comprising either metal profiles or plastic profiles. Moreover, the present invention is also suitable for composite wood-metal or wood-plastic frames comprising metal or plastic profiles, respectively.

Claims

1. Frame for doors, windows or the like comprising a first profile (140) and a second profile (150), said frame further comprising a first fastening element (110) adapted to slide inside said first profile (140) and to be fastened thereto, a second fastening element (120) adapted to slide inside said second profile (150) and to be fastened thereto and a fastening corner element (130) adapted to be fastened to each of said first fastening element (110) and second fastening element (120), so that said first profile (140) and said second profile (150) are brought in contact and firmly fastened to each other so as to be adjacent and to form a corner with an angle of 90° by operating said first fastening element (110) and said second fastening element (120) so that said fastening corner element (130) is housed at least partially into the corner formed by said adjacent first and second profiles (140, 150).

2. Frame according to claim 1, wherein said first profile (140) comprises a slanted edge (144) matching with the slanted edge (154) of said second profile (150) so that said first profile (140) and said second profile (150) fit together at the corner of said frame by means of said slanted edges (144; 154).

3. Frame according to one of claims 1 or 2, wherein the first fastening element (110) and the second fastening element (120) are brought to a fastening position to said first profile (140) and to said second profile (150), respectively, by sliding said first fastening element (110) and said second fastening element (120) inside said first profile (140) and said second profile (150), respectively.

4. Frame according to one of claims 1 or 3, wherein said fastening corner element is fixed into the corner formed by said adjacent first and second profiles (140, 150).

5. Frame according to one of claims 1 to 4, wherein the vertical cross section of said first fastening element (110) taken in a direction perpendicular to the main direction of said first profile (140) matches the area of the vertical cross section of the hollow of said first profile (140) in a direction perpendicular to the main direction of said first profile (140) and wherein the vertical cross section of said second fastening element (120) taken in a direction perpendicular to the main direction of said second profile (150) matches the area of the vertical cross section of the hollow of said second profile (150) in a direction perpendicular to the main direction of said second profile (150).

6. Frame according to claim 5, wherein said first fastening element (110) comprises grooves (111a; 111b) fitting with the indentations (141a; 141b) of said first profile (140) and wherein said second fastening element (120) comprises grooves (121a; 121b) fitting with the indentations (151a; 151b) of said second profile (150).

7. Frame according to one of claims 5 or 6, wherein said first fastening element (110) further comprises a spring loaded fastening device (112) adapted to engage with an engaging hole (142) provided on said first profile (140) so as to fasten said first fastening element (110) to said first profile (140) and wherein said second fastening element (120) further comprises a spring loaded fastening device (122) adapted to engage with an engaging hole (152) provided on said second profile (150) so as to fasten said second fastening element (120) to said second profile (150).

8. Frame according to one of claims 5 to 7, wherein said fastening corner element (130) comprises a right through hole (132a) and a left through hole (132b) adapted to house fastening means (133a; 133b) for fastening said fastening corner element (130) to said first fastening element (110).

9. Frame according to one of claims 5 to 8, wherein said fastening corner element (130) comprises a

central through hole (134) adapted to house fastening means (135) for fastening said fastening corner element (130) to said second fastening element (120).

10. Frame according to one of claims 5 to 8, wherein said fastening corner element (130) comprises grooves (131a; 131b) adapted to fit with both the indentations (141a; 141b) of said first fastening element (140) and the indentations (151a; 151b) of said second fastening element (150).

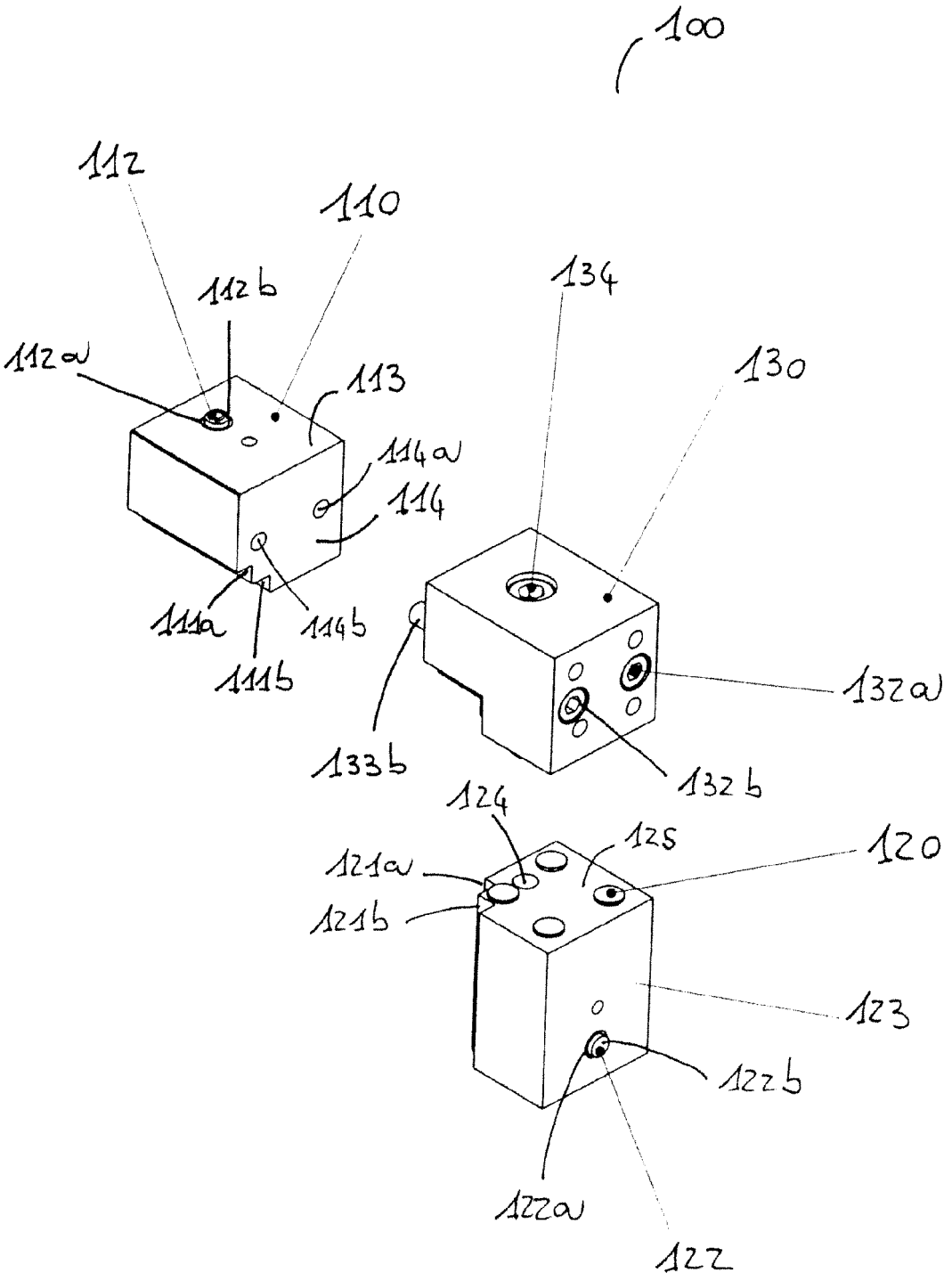
11. Frame according to one of claims 1 to 4, wherein said fastening corner element (230) comprises a first arm (230a) and a second arm (230b) disposed so as to form a 90° angle and wherein said first arm (230a) comprises an upper surface (233a) adapted to be in contact with an internal surface of said first profile (140) and a slanted surface (234a) opposed said upper surface (233a) of said first arm (230a) and wherein said second arm (230b) comprises an upper surface (233b) adapted to be in contact with an internal surface of said second profile (150) and a slanted surface (234b) opposed said upper surface (233b) of said second arm (230b).

12. Frame according to claim 11, wherein said first fastening element comprises a fastening surface (212) and a slanted surface (211) opposed said fastening surface (212) and adapted to slide along said slanted surface (234a) of said first arm (230a) and wherein said second fastening element comprises a fastening surface (222) and a slanted surface (221) opposed said fastening surface (222) and adapted to slide along said slanted surface (234b) of said second arm (230b).

13. Frame according to claim 12, wherein by sliding said first fastening element (210) along said first arm (230a) the fastening surface (212) of said first fastening element (210) comes into contact with an internal surface of said first profile (140) so as to adhere thereon and wherein by sliding said second fastening element (220) along said second arm (230b) the fastening surface (222) of said second fastening element (220) comes into contact with an internal surface of said second profile (150) so as to adhere thereon.

14. Frame according to one of claims 11 and 12, wherein said fastening corner element (230) further comprises a through hole (235a) adapted to house means (240) for actuating the sliding of said second fastening element (220) along said second arm (230b) and a through hole adapted to house means (250) for actuating the sliding of said first fastening element (210) along said first arm (230a).

15. Frame according to claim 14, wherein said means (240) for actuating the sliding of said second fastening element (220) along said second arm (230b) comprises a screw and said second fastening element (220) comprises a threaded hole (223) adapted to be engaged with said screw and wherein said means (250) for actuating the sliding of said first fastening element (210) along said first arm (230a) comprises a screw and said first fastening element (210) comprises a threaded hole adapted to be engaged with said screw.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121a
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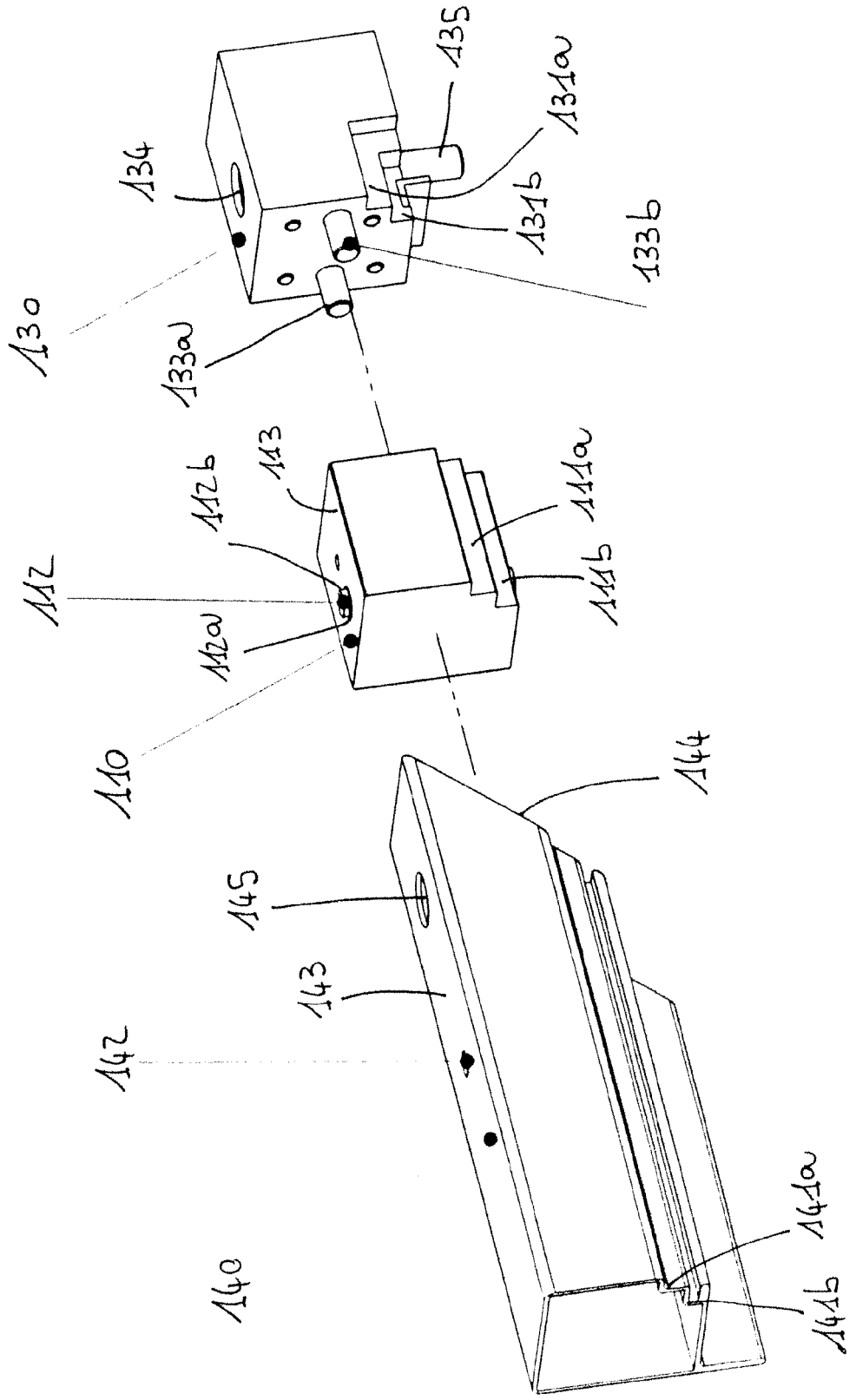
122b
122a
122

Fig. 1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131b
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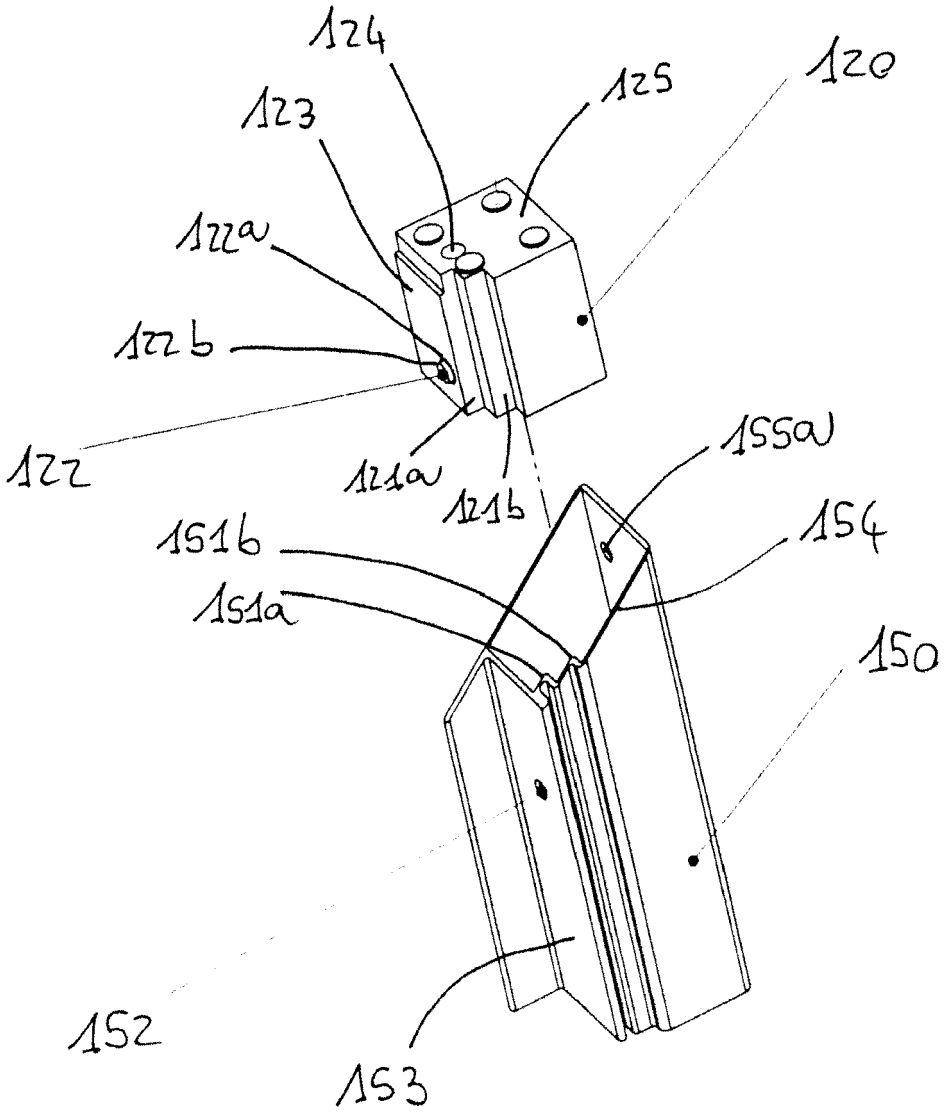
141a
141b

Fig. 2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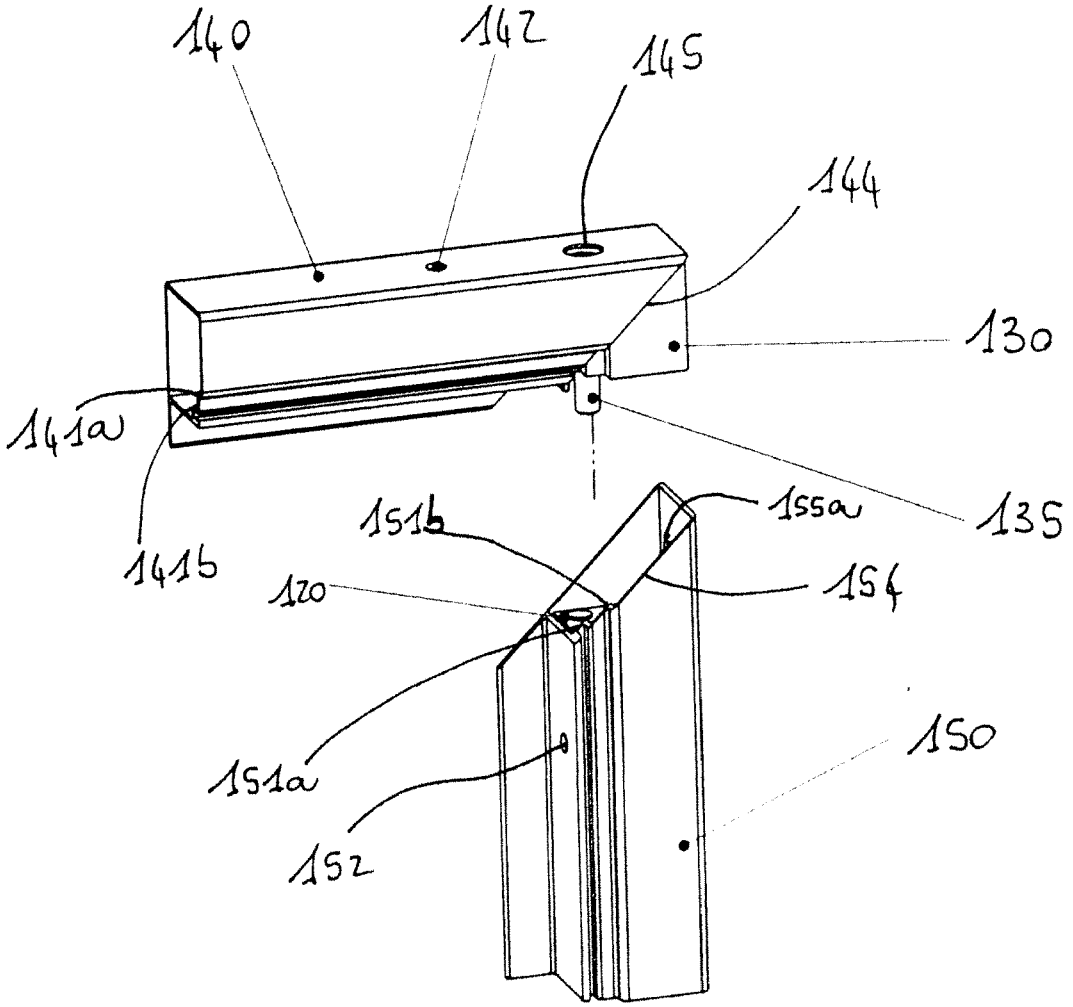
152
153

Fig. 3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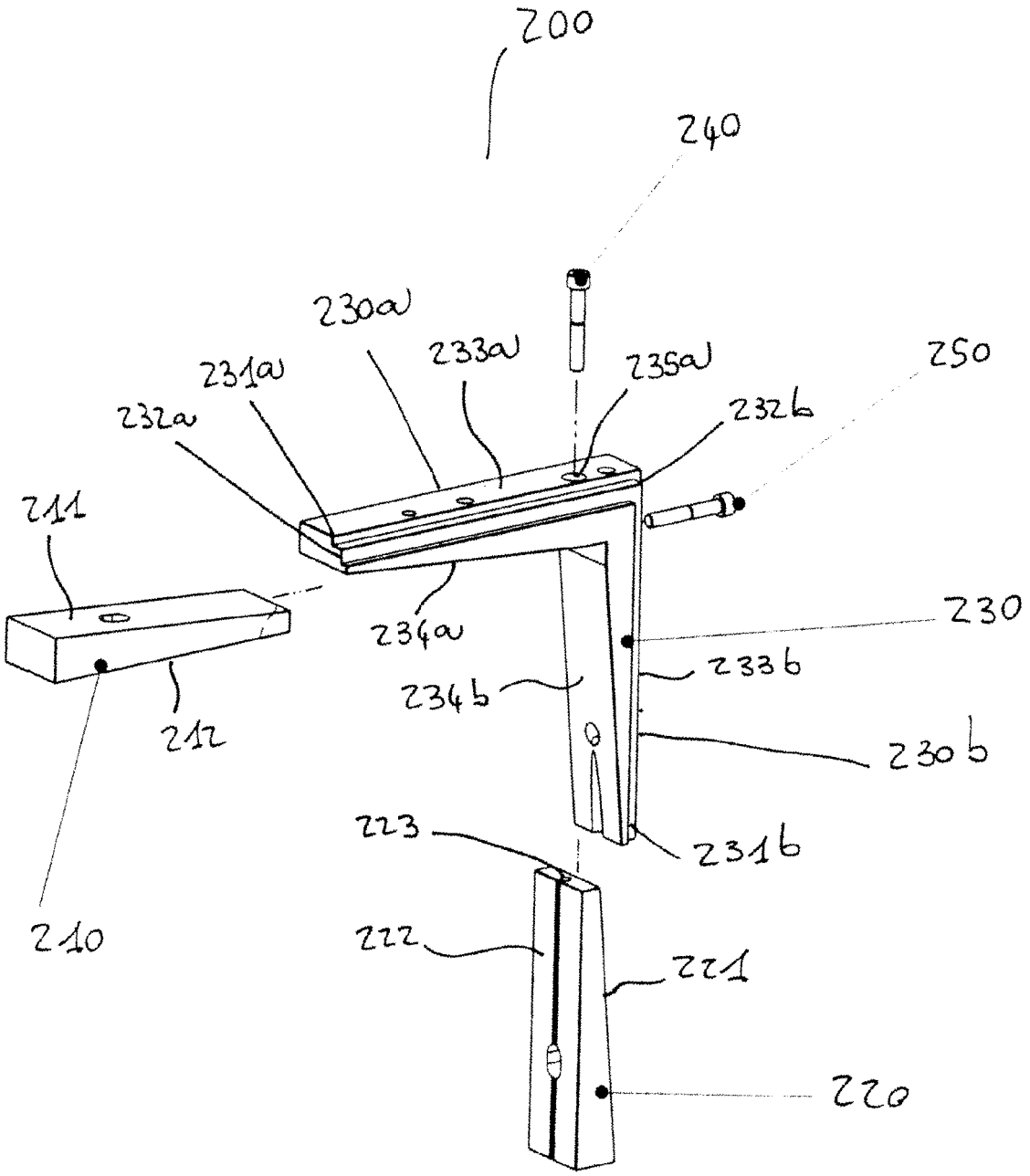
120
151a
152
150

Fig. 4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235a
250
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232b
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234a
230
233b
234b
230b
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223
231b
210
222
221
220

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 09 17 1514

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E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 May 2010	Verdonck, Benoit

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20-05-2010

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