



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.08.2019 Bulletin 2019/32

(51) Int Cl.:
E04F 15/02 (2006.01)

(21) Application number: **19155515.0**

(22) Date of filing: **05.02.2019**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **Seelen, Johannes Josephus Hendrikus**
2215 XV Voorhout (NL)
• **Wiegant, Bartholomeus Maria**
2051 KP Overveen (NL)

(74) Representative: **V.O.**
P.O. Box 87930
Carnegieplein 5
2508 DH Den Haag (NL)

(30) Priority: **06.02.2018 NL 2020387**

(71) Applicant: **SW International B.V.**
2352 AZ Leiderdorp (NL)

(54) **FASTENERS AND KITS OF PARTS**

(57) A fastener for attaching a board or plank to a support structure, in particular in order to form a deck or wall or the like including multiple juxtaposed boards or planks. The fastener comprises a base portion and at least one snap-fit connector for interlockingly engaging a corresponding snap-fit element of the board or plank, in particular formed as a dovetail groove. The snap-fit

connector includes a support member protruding from the base portion in a substantially upward direction. The support member is provided with at least a first hook member. The snap-fit connector is configured such that the first hook member can flex about a respective virtual axis extending substantially in the substantially upward direction.

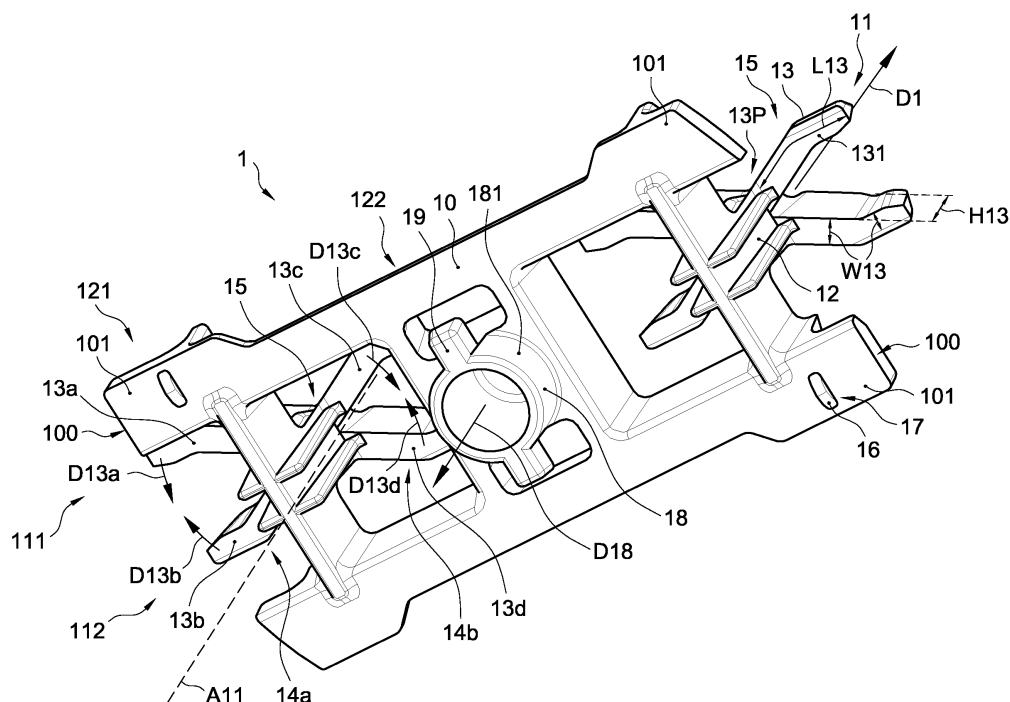


FIG. 1

Description

[0001] The present disclosure relates to methods and fasteners for attaching boards or planks to a support structure. In particular, a number of planks or boards, which for instance may be formed from wood, plastic or a wood-plastic composite material, may be installed substantially parallel to each other to substantially form a surface. For example, the attachment system for attaching boards or planks may be used to form for instance floors, especially outdoor decks, floor coverings or floor claddings, walls, for instance fences, wall coverings or cladding, ceiling claddings, etc.

[0002] Traditionally, traditional fasteners such as screws are often used to attach boards to a support structure, which may be formed by interspaced joists extending substantially parallel to each other and substantially transverse to the boards. Typically, holes are drilled into the boards before the boards are tightly screwed onto the joist. Not only does such attachment require proper tools, it is also labour-intensive and error-prone. Moreover, the outer surface of the then formed floor or the like often comprises imperfections such as screw heads that stay visible or may even protrude from the floor or the like. Such protruding screw heads or splinters resulting from the drilling may be highly undesirable.

[0003] For instance in order to counteract one or multiple of the above mentioned problems of traditional board attachment methods, alternative attachment systems have been proposed.

[0004] For example, international publication WO 2006/011 173 A1 discloses a wooden floor laying system comprising fasteners (supports 3) to be attached to parallel joists (base supports 1), wherein upper sides of said fasteners are provided with snap-fit connectors (two end tabs 5 and two central tabs 6) having, when seen in a direction in line with the boards (boards 9) to be attached, a substantially V-shaped cross-section, wherein a first leg of the V-shape forms an upwardly extending wall and the second leg of the V is slanted downwards from the upper end of said wall and is free at its outer end to be clipped into a respective half-dovetail groove provided in the lower or lateral side of the board, which groove extends in the length direction of said board.

[0005] A similar system is known from U.S. patent application publication US 2009/0 094 925 A1, which discloses a fastener (fastening element 3) comprising a base (6, 7) provided with snap-fit connectors (projecting part 8 shown in Figs. 6, 7 and 9) to interlockingly engage corresponding dovetail grooves (recesses 4) extending in the longitudinal direction of elongate boards (covering boards 1) to be installed. The respective snap-fit connector (projecting part 8) comprises an upwardly extending central wall (full tongue 8a) provided with harpoon-shaped tenons (10) which are oriented obliquely away from the central wall (8a) in the direction of the base (6, 7) and which tenons (10) are elastically deformable such as to temporarily flex towards said central wall (8a) about

a virtual axis extending in the longitudinal direction of the dovetail groove.

[0006] Although such snap-fit attachment systems, which have boards with pre formed grooves to be clipped onto fasteners having snap-fit connectors, can have serious advantages over the traditional board instalment methods in which boards are screwed onto joist, such snap-fit attachment systems still have serious drawbacks. For example, it is noted that although the snap-fit connectors may prevent the boards from being lifted after being clipped onto the respective fasteners, the boards may accidentally be pushed out of place in the longitudinal direction of the boards, which can be very dangerous, for instance in case of a high level deck. Other disadvantages, which can depend on which known snap-fit attachment system is utilized, may for instance lay in that installing the fasteners onto a joist may be error-prone and/or labour-intensive, and/or that the fasteners may for instance be of a relatively expensive and/or relatively complex and/or relatively large design.

[0007] In a first aspect of the present disclosure, it is an object to provide an alternative method and/or fastener for attaching boards or planks to a support structure. In particular, it can be an object of the invention to provide a board or plank fastener and/or a board or plank attachment system, wherein at least one of the disadvantages of the prior art fasteners or systems is counteracted. More in particular, it can be an object of the invention to provide a fastener which on the one hand incorporates one or more advantages of known snap-fit attachment systems, e.g. no visible screw heads, and which on the other hand counteracts at least one of the disadvantages of the above mentioned snap-fit attachment systems. In particular embodiments, the present disclosure may aim at providing a method, system and/or fastener for snap-fitting attachment of planks or boards, which method, system and/or fastener may counteract that the installed boards or planks can be accidentally pushed out of position.

[0008] For instance thereto, the present disclosure provides for a fastener for attaching a board or plank to a support structure, in particular in order to form a deck or the like including multiple juxtaposed boards or planks, said fastener comprising a base portion and at least one snap-fit connector for interlockingly engaging a corresponding snap-fit element, in particular an elongate slot or recess, more in particular a dovetail groove, of the board or plank, wherein said snap-fit connector includes a support member protruding from the base portion in a substantially upward direction, said support member being provided with at least a first hook member, characterised in that said snap-fit connector is configured such that said first hook member can flex about a respective virtual axis extending substantially in the substantially upward direction. It will be appreciated that the substantially upward direction is a relative direction, which may correspond to a use position of the fastener in which such fasteners can be used to form a substantially horizontal deck or the like, e.g. a use position of the fastener in

which such fasteners can be used to attach planks or boards, positioned in a flat orientation, onto the upper surfaces of juxtaposed interspaced joists positioned such as to form a substantially horizontal grid.

[0009] By arranging the snap-fit connector such that its one or more hook members can flex about a substantially upward virtual axis, i.e. an axis substantially in line with the direction in which the board or plank is pushed onto the fastener's snap-fit connector during installation of said board or plank, the hook member may provide for relatively much friction, in particular relatively much static friction, between the snap-fit connector and the board or plank, as a result of which may be counteracted that the installed boards or planks can be pushed out of position accidentally. Thereby for example enabling one to install a relative safe outdoor deck or the like, in a relatively easy manner, for instance without the need of additionally cementing or gluing the boards or planks to the fasteners by means of polymer mounting kit or the like, as is recommended with prior art board fastening systems in which the hook members of the snap-fit connectors flex about a virtual axis substantially in line with the longitudinal direction of their board's dovetail groove.

[0010] Further, the present disclosure provides for a fastener for attaching a board or plank to a support structure, in particular in order to form a deck or the like including multiple juxtaposed boards or planks, said fastener comprising a base portion and at least one snap-fit connector for interlockingly engaging a corresponding snap-fit element, in particular an elongate slot or recess, more in particular a dovetail groove, of the board or plank, wherein said snap-fit connector includes a support member protruding from the base portion in a substantially upward direction, said support member being provided with at least a first hook member, said fastener further comprising a pin or plug protruding from the base portion in the substantially upward direction, said pin or plug being arranged to be clamped in a section located more to the outside or lower section of the snap-fit element of the board or plank, in particular when said snap-fit element is substantially formed as a dovetail groove. In particular, when seen in a longitudinal direction extending from the pin or peg towards the first snap-fit connector and perpendicular to the upward direction, the pin or peg can have, at least at one height level below the lower edge of said hook member, a width which is wider than the corresponding width of the first snap-fit connector's support member's lower portion at said height level.

[0011] By providing the fastener by such a pin or plug, which, more or less like a dowel rod, may be clamped in a lower, relatively narrow, section of the dovetail groove in the board or plank, it may be counteracted that the installed boards or planks can be pushed out of position accidentally. Thereby for example enabling one to install a relative safe outdoor deck or the like, in a relatively easy manner, for instance without the need of additionally cementing or gluing the boards or planks to the fasteners by means of polymer mounting kit or the like, as is rec-

ommended with prior art board fastening systems in which the snap-fit connectors prevent movement of the boards or planks mostly in a direction opposite to the direction in which said boards or planks are pushed onto the snap-fit connectors.

[0012] Besides, the present disclosure provides for a kit of parts for attaching one or more boards or planks to a support structure, in particular in order to form a deck or the like including multiple juxtaposed boards or planks, wherein said kit of parts comprises at least one fastener for attaching a board or plank to a support structure, said fastener comprising a base portion and at least one snap-fit connector for interlockingly engaging a corresponding snap-fit element of the board or plank, wherein the kit of parts further comprises at least one support element to form part of the support structure, in particular wherein said at least one support element is substantially formed as an elongate profile to be attached to a support face of a joist of the support structure, and wherein the fastener and the support element are arranged such that the fastener can be mounted to said support element by means of a mounting mechanism substantially formed as a bayonet catch.

[0013] By mounting the fastener to the support element by means of a mounting mechanism substantially formed as a bayonet catch, the fasteners may be mounted to the support element in a relatively fast and relatively simple manner, which may allow relatively easy removal, in particular in comparison with prior art systems in which the fasteners had to be screwed onto a joist or the like. Additionally or alternatively, the bayonet catchlike mounting mechanism may serve as a positioning means that can counteract that the fastener is not mounted in the right location and/or the right position, as a result of which can be counteracted that snap-fit connectors of fasteners mounted for instance to multiple substantially parallel support elements may not be sufficiently in line with each other to allow a board or plank, provided with a dovetail groove or the like, to be clipped onto said fasteners' snap-fit connectors.

[0014] Further advantageous embodiments according to aspects of the present disclosure are described in the appended claims and the description of the figures below.

[0015] By way of non-limiting examples only, embodiments of different aspects of the present disclosure will now be described with reference to the accompanying figures in which:

Fig. 1 shows a schematic perspective view of an embodiment of a fastener according to an aspect of the present disclosure; and

Fig. 2 shows a schematic perspective exploded view of an embodiment of a construction including the fastener of Fig. 1, and further including an embodiment of a corresponding support element, an embodiment of a joist, and an embodiment of a board or plank.

[0016] It is noted that the figures show merely preferred

embodiments according to the invention. In the figures, the same or similar reference signs or numbers refer to equal or corresponding parts.

[0017] Figure 1 shows an exemplary embodiment of a fastener 1, which fastener 1 is shown in the partly cut-away exploded view of Figure 2 as well. The fastener 1 is for attaching a board 2 or plank 2 to a support structure 5. Advantageously, the fastener 1 may be used to form a construction, in particular a surface or surface construction, more in particular a deck or the like, including multiple juxtaposed boards 2 or planks 2. For example, the boards 2 or planks 2 may be used to form for instance a floor, especially an outdoor deck, a floor covering or floor cladding, a wall, such as a fence or other wall, a wall covering or cladding, a ceiling cladding, or the like. The board 2 or planks 2 may for instance be formed from wood, plastic or a wood-plastic composite material.

[0018] In the exemplary deck construction shown in the partly cutaway exploded view of Figure 2, the support structure 5 comprises multiple joists 4, each for instance formed by a respective wooden beam, located substantially parallel to each other, and support elements 3, each of which support elements 3 can be formed as a respective elongate profile 30, which can be attached to a support face 40 of the respective joist 4 of the support structure 5. The support face 40 can be considered as the face 40 facing the boards 2 or planks in the installed position of the construction. In case of a deck, said support face 40 can thus be formed by the upper side of the joist 4.

[0019] It will be appreciated that in other configurations of the construction, for instance when the boards or planks form a wall surface or a ceiling, the support face 40 may be formed by a side face or a bottom face of a support beam 4 or the like.

[0020] In the shown exemplary embodiment, the fastener 1 can be attached to the support element 3 formed as an elongate profile 30 by means of a mounting mechanism substantially formed as a bayonet catch, as will be discussed below in more detail. However, in alternative embodiments, one or more alternative mechanisms or methods may be utilised to attach the fasteners to the elongate profile 30. Actually, also embodiments are possible in which the fastener 1 can be attached to the support structure 5 in an alternative manner. For example, the support structure may comprise wooden joists to which fasteners 1 can be mounted, in particular directly thereto, for instance by means of screws or the like. Preferably, the fastener 1, in particular a base portion 10 of said fastener 1, may be arranged for attachment to a support structure 5 and/or to a support element 3, which preferably may be formed as an elongate profile 30.

[0021] Besides, it is noted that although in the here shown exemplary embodiment the support structure 5 includes a support element 3 that comprises a joist 4 to which an elongate profile 30 is attached. However, the elongate profile 30 may in alternative embodiments be of such design that a separate joist 4 may be omitted

completely. For example, the support element 3 may in embodiments be formed as a substantially beam-shaped profile, for instance an extrusion profile, preferably being provided with attachment means to attach fasteners 1 to said profile. In embodiments, the elongate profile may thus form a joist itself.

[0022] With respect to the elongate profile 30, which thus may form a joist, it is noted that it can advantageously be formed by an extrusion process. Additionally or alternatively, the elongate profile 30, which may be an extrusion profile, may be formed from a metal or metal alloy, for instance from aluminium or an aluminium alloy.

[0023] Further, it is noted that the schematic perspective exploded view of Figure 2 is a partly cutaway view. In particular, only one support element 3, one fastener 1 and one plank 2 or board 2 are shown, while a normal deck will comprise multiple of each of them. Moreover, each of the board 2 and the support element 3, and each of the support element's elongate profile 30 and support beam 44, are here partly cutaway as a result of which they are shown as relatively short objects, while they can usually be much longer.

[0024] In the shown embodiment, the elongate profile 30, which may be thus much longer than the partly cut-away section shown in Figure 2, is of such design that, in case of a deck construction, its bottom surface 38 is, in the installed position, substantially spaced apart from the joist's upper surface 40, as only relatively small bottom regions 31 are abutting the joist's upper surface 40. This may allow moist coming from below, which often pulls up through wood, to escape at the upper surface 40 of the joist 4.

[0025] Preferably, the elongate profile 30 is provided with openings 32, in particular through holes 32, allowing moisture to escape. Advantageously, the openings 32 may be arranged for mounting a respective fastener 1 to the profile 30. Preferably, more openings 32 are provided than needed for mounting the fasteners 1, such as to allow that at least a number of the openings 32 can be kept free from fasteners 1 and can stay open to allow moisture to evaporate at the upper surface 40 of the joist 4.

[0026] Alternatively or additionally, the profile 30 may be of such design that it can allow moisture to escape in a substantially sideways direction D5.

[0027] The profile 30 can be provided with attachment means 33 for attaching the fasteners 1 to the profile 30. Said attachment means 33 may for instance be formed by the openings 32, but may be of a different design in alternative embodiments. Preferably, said attachment means 33 may be located at predetermined locations, preferably interspaced in the longitudinal direction D3 of the elongate profile 30, such that it can be facilitated that the fasteners 1 can be located at the right desired position in a relatively easy and/or relatively error-proof manner. In preferred embodiments, the profile 30 may be provided with multiple sets of attachment means 33, which for instance can correspond with planks 2 or boards 2 having

different widths W2, and/or which can correspond with different configurations of snap-fit elements 21, such as differently positioned and/or interspaced dovetail grooves 21 or the like, located for instance at bottom sides 20 of the planks 2 or boards 2, in case of a deck construction.

[0028] It will be appreciated that for instance directions, such as an upward direction D1, mentioned in the description, and/or other allocations, such as a bottom side, are based on the assumption that the planks 2 or boards 2 are mounted in order to form a deck or flooring. It will be appreciated that in alternative constructions, such as ceilings, the whole construction and therefore all relative directions may be inverted and/or may be turned to some extent, e.g. in case of a wall cladding, in which the construction may be turned about 90 degrees. For reasons of clarity and a concise description, the present exemplary embodiments will be explained only on the basis of a substantially horizontal surface constructions, such as a deck.

[0029] In the shown embodiment, the plank 2 or board 2, which may also be considered a slat 2, for instance in case of a wall cladding, comprises two parallel dovetail grooves 21. However, in alternative embodiments, the board or plank may alternatively, or additionally, be provided with one or more other snap-fit elements 21 for interlocking engagement with a snap-fit connector 11 of the fastener 1. Preferably, the snap-fit element 21 of the board or plank, which can be substantially formed as an elongate slot 21 or recess 21, may be arranged such as to facilitate that said plank or board 2 can be clipped onto a corresponding snap-fit connector 11 of the respective fastener 1 when said plank or board is pushed with its outer face 20, which faces the support structure 5 in the installed state of the deck or the like, towards the fastener 1, e.g. in a substantially downward direction D2.

[0030] As also can be seen in the exemplary embodiment of Figure 2, the fastener 1 comprises a base portion 10. In the shown embodiment, the fastener 1 further comprises two snap-fit connectors 11. However, in alternative embodiments, the fastener 1 may comprise an other number of snap-fit connectors 11, such as for example one, three or four snap-fit connectors 11. The snap-fit connector 11 is for interlockingly engaging a corresponding snap-fit element 21, in particular an elongate slot 21 or recess 21, more in particular a dovetail groove 21, of the board 2 or plank 2. For example, said snap-fit element 21, in particular such groove 21, may be provided at a side of the board 2 or plank that faces the support structure 5 in the installed state of the deck or the like. In case of a deck or flooring or the like, the grooves 21 or other snap-fit elements 21, in particular recesses 21, may for instance be located at bottom sides of the planks 2 or boards 2.

[0031] The snap-fit connector 11 of the fastener 1 includes a support member 12 protruding from the base portion 10 in a substantially upward direction D1. Although the support member 12 is here provided with four

hook members 13, it may in other embodiments be provided with another number of, at least one, hook members 13. Said hook member 13 can be formed as a flexible arm 13 and/or may be considered as a leg 13. In particular said hook member 13 can be an elongate hook member 13 having a length L13 being substantially larger than its width W13 and substantially larger than its height H13.

[0032] The snap-fit connector 11 is configured such that said at least one hook member 13, 13a, in particular a resilient hook member 13, more in particular an elongate resilient hook member 13, can bend or flex about a respective virtual axis A1 extending substantially in the substantially upward direction D1. Preferably, the snap-fit connector 11 is configured such that said at least one hook member 13, can bend or flex merely about said substantially upwardly extending virtual axis A1, and can preferably thus neither substantially flex or bend about a virtual axis extending substantially in the longitudinal direction of the hook member 13, nor substantially flex or bend about a virtual axis extending substantially in the width direction of the support element 3, nor substantially flex or bend about a virtual axis extending substantially in the direction of the local width W13, W13P of the hook member 13.

[0033] For instance thereto, the hook member 13 can be attached to the support member at a proximal end 13P of said hook member 13, which is contrary to the relatively standard design of prior art fastener's snap-fit connectors which usually have tenons that are attached to a support member along a longitudinal side edge of such a tenon.

[0034] It is further noted that the height of the flexible hook member 13 may preferably have a height H13 being larger than its width, such that it can be counteracted that the hook member 13 will flex in another direction than substantially about the respective virtual axis A1 extending substantially in the substantially upward direction D1.

[0035] Advantageously, the flexible hook member 13 may, at a certain location, have a reduced width W13P, preferably at or near the proximal end 13P of said hook member 13. For instance, said reduced width W13P can be formed by means of a notch 133 or the like, such as can be seen in Figure 2.

[0036] As a result of arranging the hook member 13 such as to allow it to bend or flex about said substantially upwardly extending virtual axis A1, it can be facilitated that, when the board 2 or plank 2, which is provided with at least one elongate snap-fit recess 21, is pushed, in the mounting direction D2, onto the snap-fit connector 11, the hook member 13, 13a of said snap-fit connector 11 can flex or bend in a substantially sideward direction D13a, in particular such that such bending or flexing take substantially place in a virtual plane P11 extending substantially parallel with the bottom side face 20 of the plank 2 or board 2, and thus substantially transverse to the mounting direction D2. This is contrary to more or less standard prior art snap-fit hook members, which flex or bend substantially in a bending or flexing direction sub-

stantially within a virtual plane P9 extending substantially in the mounting direction D2 and substantially transverse to the longitudinal direction D21 of the elongate snap-fit recess 21. Advantageously, the hook member 13 can merely flex or bend in a substantially sideward direction D13a, and the opposite sideward direction, in particular such that such bending or flexing can substantially only take place in said virtual plane P11 extending substantially parallel with the bottom side face 20 of the plank 2 or board 2.

[0037] Advantageously, the support member 12 can further be provided with at least a second hook member 13b that can flex about a respective virtual axis, in particular substantially the same virtual axis A1, that is extending substantially in the substantially upward direction D1. The first hook member 13a can then protrude at and/or from a first lateral side of the support member 12, while the second hook member 13b can then protrude at and/or from the opposite lateral side of the support member 12. In particular, when seen from above, i.e. in a direction D2 opposite to the upward direction D1, the first hook member 13a and the second hook member 13b may substantially form a V-shaped hook construction 14a, which also can be seen from below, as is the case in Figure 1.

[0038] When clipping on the board 2 or plank 2, the first hook member 13a and the second hook member 13b can then flex towards each other, in particular within a virtual plane P11 substantially transverse to the clip-on direction D2 or so-called mounting direction D2. The snap-fit connector 11 can thus be flexed to temporarily narrow in order to be pushed into the elongate snap-fit recess 21, through a relatively narrow section 211 of the elongate snap-fit recess 21, which preferably is substantially formed as a dovetail groove or so-called swallowtail groove or so-called fantail groove. Once the hook members 13 reach the relatively wide section 212, located more inward in the plank or board, the hook members 13 can snapback toward their respective initial positions and can hook behind respective stop surfaces 213 of the snap-fit recess 21, in particular by means of lower surfaces 131 or edges or the hook members 13.

[0039] In advantageous embodiments, the support member 12 can further be provided with a third hook member 13c and a fourth hook member 13d, both of which may then be arranged for flexing or bending about a respective virtual axis A11 extending substantially in the substantially upward direction D1. Said third hook member 13c protrudes at and/or from the first lateral side 111 of the support member 12 and the fourth hook member 13d protrudes at and/or from an opposite lateral side 112 of the support member 12. Like the first and second hook members 13a, 13b, the third hook member 13c and the fourth hook member 13d can also flex towards each other, in particular in directions D13c, D13d directed to a virtual central plane P8 of the support member 11, which virtual central plane P8 may extend substantially in the upward direction D1 and in the longitudinal direction

D21 of the elongate snap-fit recess 21.

[0040] In embodiments, the fastener 1 and/or its base portion 10 may be of a substantially elongate design, preferably such that the elongate direction D10 of the fastener 1 and/or its base portion 10 may substantially extend in the width direction D30 of the elongate profile 30 or other support element 3.

[0041] It is noted that the first hook member 13a and the second hook member 13b can both be located at a distal side 121 of the support member 12, while the third hook member 13c and the fourth hook member 13d can then be located at the opposite proximal side 122 of the support member 12. In the longitudinal direction D21 of the elongate snap-fit recess 21 and/or in the elongate direction D10 of the fastener 1 and/or its base portion 10, said distal side 121 may be located before the support member, while the proximal side 122 may be located behind said support member 12 when seen in said longitudinal direction D21 and/or in said elongate direction D10.

[0042] As mentioned before, when seen from above, i.e. in a direction D2 opposite to the upward direction D1 the first hook member 13a and the second hook member 13b may together substantially form a first V-shaped hook construction 14a. When seen from above, or from below, the third hook member 13c and the fourth hook member 13d may substantially form a second V-shaped hook construction 14b. When seen from above, or from below, i.e. in the upward direction D1, said first V-shaped hook construction 14a and said second V-shaped hook construction 14b can together form a substantially X-shaped hook construction 15.

[0043] It will be appreciated that respective hook members 13a, 13b; 13c, 13d may form pairs 14a; 14b or hook constructions 14a; 14b that can narrow and flex back toward its initial position by flexing or bending substantially in a virtual plane P11 substantially transverse to the upward direction D1, i.e. that the hook members 13a, 13b; 13c, 13d of such pair 14a; 14b can thus bend or flex about a respective or a common virtual axis A1 extending substantially in the substantially upward direction D1.

[0044] When, during use of the installed board 2 or plank 2, a force is applied to said board 2 or plank 2 which tend to shift said board or plank in its longitudinal direction and/or the longitudinal direction D21 of its elongate snap-fit recess 21, the hook members 13a, 13b; 13c, 13d of a respective pair 14a; 14b may as a result be forced outward with respect to each other, i.e. may be forced in opposite direction away from the virtual central plane P8 of the support member 11, which virtual central plane P8 may extend substantially in the upward direction D1 and in the longitudinal direction D21 of the elongate snap-fit recess 21. As a result of the pair's hook members that then may tend to spread outwardly, the friction forces between said hook members 13a, 13b; 13c, 13d and the contact surfaces of the elongate snap-fit recess 21 in contact with said hook members 13a, 13b; 13c, 13d may increase, thereby facilitating that it can be counteracted

that an installed plank or board can shift accidentally, in particular said board or plank is not cemented or glued onto a fastener or support structure 5.

[0045] In case of a substantially X-shaped hook construction 15, or in other cases of two substantially oppositely directed substantially V-shaped hook constructions 14a, 14b, which may each form a respective pair 14a, 14b of hook members 13a, 13b; 13c, 13d, it may be facilitated that one 14a of the two V-shaped hook constructions 14a, 14b can tend to spread when forces tend to push or pull the board or plank forward in the longitudinal direction D21 of the elongate snap-fit recess 21, while the other one 14b can tend to spread when forces tend to push or pull the board or plank rearwards in said longitudinal direction D21 of said recess 21.

[0046] In order to facilitate that the snap-fit hook member 13 can be temporarily pushed away from its initial position in order to clip on the board 2 or plank 2, said hook member 13, 13a can preferably be provided with a run-on surface 130, which may slope outwards in a direction towards the fastener's base portion 10, as can be seen in Figure 2. Additionally, or alternatively, the recess 21 of the plank 2 or board 2 may be provided with a run-on surface 214, which for instance can be formed by a rounded or bevelled edge 214 defining an entrance opening 215 of the recess 21.

[0047] Preferably the run-on surface 130 of the snap-fit connector 11 may, in the installed position, be substantially parallel with the corresponding contact surfaces 230 of the elongate snap-fit recess 21, in particular in order to enhance friction between the board 2 or plank 2 and the fastener 1.

[0048] It will be appreciated, that by making the hook member 13 flex or bend about a respective virtual axis A1 extending substantially in the substantially upward direction D1, the hook member 13 may, when seen in the longitudinal direction D21 of the elongate snap-fit recess 21, have a shape that at least partly can substantially correspond with the shape of the relatively wide section 212 of said recess 21, which seems to be impossible when the hook member would have been arranged to flex about a virtual axis extending parallel with the longitudinal direction D21 of the elongate snap-fit recess 21, as is the case with snap-fit connectors of more less standard prior art fasteners. As a result, the snap-fit connector 11 of the present fastener 1 may provide for relatively much static friction between its one or more hook members 13 and the corresponding snap-fit recess 21 of the board 2 or plank 2.

[0049] Advantageously, in particular to provide for relatively much static friction, a respective pair 14 of hook members 13 forming a substantially V-shaped hook construction 14 and/or the snap-fit connector 11 itself, may have a length, extending in the longitudinal direction D21 of the elongate snap-fit recess 21 and/or in the elongate direction D10 of the fastener 1 and/or its base portion 10, which length is then larger than the width of said pair 14 and/or said snap-fit connector 11 itself. For example, the

hook members 13, which may be considered legs 13 of the snap-fit connector 11, may be of a kinked or bent design, such that a proximal portion of said leg 13 or hook member 13 attached to the support member 12 extends relatively much outwards, while a distal portion of said leg or hook member is extending more in the longitudinal direction D21 of the elongate snap-fit recess 21 and/or in the elongate direction D10 of the fastener 1 and/or its base portion 10.

[0050] In preferred embodiments of the fastener 1, the fastener 1 may comprise a second snap-fit connector 11b, in particular of substantially similar design as the first snap-fit connector 11a. Said second snap-fit connector 11b can then also be for interlockingly engaging a snap-fit element 21, in particular an elongate snap-fit recess 21, of the board 2 or plank 2. Preferably, both the first and second snap-fit connectors 11a, 11b may, during use, be snapped into the same snap-fit element 21. Two, or even more, snap-fit connectors 11 of the fastener 1 may thus be positioned substantially in line, in particular in the longitudinal direction D21 of the elongate snap-fit recess 21 and/or in the elongate direction D10 of the fastener 1 and/or its base portion 10.

[0051] Additionally or alternatively, the fastener 1 may comprise a pin 18 or plug 18 that protrudes from the base portion 10 in the substantially upward direction D1. Said pin 18 or plug 18 can then be arranged to be clamped in a section 211 located more to the outside or lower section of the snap-fit recess 21 of the board 2 or plank 2, which relatively outwardly positioned section 211 of the snap-fit recess 21 can in particular be formed as a relatively narrow section 211 of the elongate snap-fit recess 21.

[0052] The plug 18 or pin 18, which may, more or less like a dowel rod, be clamped in a lower, relatively narrow, section 211 of the recess 21 in the board or plank, may be relatively wide with respect to a corresponding width of the support member 12 of the snap-fit connector 11. For example, in the installed position, the pin 18 or plug 18 may, at the narrowest level of the relatively narrow section 211, be wider than the support member 12, wherein said width extends in a direction substantially transverse to the upward direction D1 and/or the mounting direction D2, and substantially transverse to the longitudinal direction D21 of the elongate snap-fit recess 21 and/or the elongate direction D10 of the fastener 1 and/or its base portion 10.

[0053] When seen from above, i.e. in a direction D2 opposite to the upward direction D1, the support member 12 of the respective snap-fit connector 11 can have a lower portion 120 located below a lower edge or a lower surface 131 of the one or multiple hook members 13. Then, when seen in a longitudinal direction D10, D2 extending from the pin 18 or peg 18 towards said snap-fit connector 13 and perpendicular to the upward direction D1, the pin 18 or peg 18 can have, at least at one height level below the lower edge or the lower surface 131 of said hook member 13, a width which is wider than the corresponding width of said snap-fit connector's support

member's lower portion 120 at said height level.

[0054] Although the pin 18 or plug 18 may in embodiments thus be relatively wide, in particular to clamp in the lower or more outwardly located section 211 of the elongate snap-fit recess 21, the lower portion 120 of the support member 12 may alternatively or additionally also be arranged to clamp in the lower, or more outwardly located, relatively narrow section 211 of the elongate snap-fit recess 21. For example in such embodiments, the pin 18 or plug 18 may be omitted.

[0055] In embodiments in which the fastener 1 is provided with one or more plugs 18 or pins 18, said plug 18 or pin 18 may advantageously extend substantially parallel with the support member 12 of a respective one of the one or more snap-fit connectors 11 and/or with a similar support member 12 of an optional additional second snap-fit connector 11b. Additionally, or alternatively, the pin 18 or plug 18 may, when seen from above, or from below, i.e. in the direction D2 opposite to the upward direction D1, be substantially located on a virtual line between the first snap-fit connector 11a and the second snap-fit connector 11b.

[0056] Regarding the fastener 1, it is noted that said fastener 1 may be formed as a device 1 arranged to be mounted or so-called attached or fastened to a profile 30 or other support element 3, in particular arranged to be mounted to a correspondingly arranged profile 30 or other correspondingly arranged support element 3 in a twist and lock like manner, i.e. with a bayonet like catch system. In particular, the fastener 1, especially its base portion 10, may be provided with a downward protruding element 18, which preferably can protrude in a downward direction D18, directed substantially opposite to the upward direction D1.

[0057] Preferably, the downward protruding element 18 may have a section 181 with substantially circular or cylindrical outer face that can correspond with a substantially circular or cylindrical part 321 of an opening 32 of an attachment means 33 of an elongate profile 30 or other support element 3. In particular, this may prevent that, in the installed position of the fastener 1, the fastener 1 allows play in the longitudinal direction D3 of the elongate profile 30 or other support element 3, as it is found that such play can be highly unwanted during installation of the plank 2 or board 2. For example thereto, the downward protruding element 18 may be relatively rigid, for instance its width in the longitudinal direction D3 of the support element 3 and/or its diameter may be relatively large, e.g. at least 10%, preferably at least 15% or even at least 20% of the width of the fastener 1 and/or its base portion 10, which width extends in the longitudinal direction D3 of the support element 3. Additionally or alternatively, the downward protruding element 18 may preferably be rigidly connected to the base portion 10 of the fastener 1, for instance thus not being connected to the base portion 10 via a flexing arm or the like that allows play in the longitudinal direction D3 of the support element 3.

[0058] The downward protruding element 18 may be provided with one or more substantially sideward protruding or radial protruding members 19 that, in a first rotational position of the fastener 1, can slide through a corresponding recess part 322 of the opening 32 when the downward protruding element 18 is inserted into the substantially circular or cylindrical part 321 of said opening 32. Upon rotation or twisting of the fastener 1 about a substantially upwardly extending virtual axis, the one or more substantially sideward protruding or radial protruding members 19 can lock behind, below and/or within the support element 3, such as to prevent that the then rotated fastener 1 cannot be pulled back, in an upward direction, from the support element 3.

[0059] Further, the fastener 1 and/or support element 3 can be arranged to limit the extent to which the fastener 1 can be rotated after its downward protruding element 18 is inserted into the opening 32. For example, as in the here shown exemplary embodiment of Figure 1, the fastener 1, in particular its base portion 10, can be provided with one or more stop surfaces 100, which may cooperate with corresponding stop surfaces, for instance formed by a wall part 300, of the elongate profile 30 or other support element 3. Actually, in embodiments, the substantially sideward protruding or radial protruding members 19 may be omitted, as for instance substantially sideward protruding, e.g. distally and/or proximally protruding, base portion elements 101, which, upon rotation of the fastener 1, may engage with a corresponding locking portion 301 of the support element 3, which locking portion 301 for instance may be formed by a flange 301 of said support element 3 that can for example be formed as an elongate profile 30.

[0060] Preferably, the fastener 1 and/or support element 3 can be arranged to push the one or more substantially sideward protruding or radial protruding members 19 against the support element 3 and/or to push the one or more base portion elements 101 against a respective locking portion 301 in the installed position of the fastener 1, for example by means of a spring. As in the exemplary embodiment shown in Figure 1, the lower end of the base portion 10 can be provided with one or more wedge or chock like structures 17 with run-on surfaces 16 that can facilitate that said one or more protruding members 19 and/or said one or more base portion elements 101 can be clamped and/or pressed against a respective portion of the support element 3 in the installed position of the fastener 1.

[0061] Although the bayonet like catch system is here shown in the context of a fastener 1 having a snap-fit connector configured such that its one or more hook members 13 can flex about a respective virtual axis A1 extending substantially in the substantially upward direction D1, it is explicitly noted that the bayonet like catch system can also be advantageously utilised in another fastener 1 for attaching a board 2 or plank 2 to a support structure 5, for instance another fastener 1 comprising a base portion 10 and at least one snap-fit connector for

interlockingly engaging a corresponding snap-fit recess 21 or other corresponding snap-fit element 21 of the board 2 or plank 2, e.g. a relatively standard snap-fit connector having one or more hook members that flex about a virtual axis extending in the longitudinal direction D21 of the elongate snap-fit recess 21 and/or in the elongate direction D10 of the fastener 1 and/or its base portion 10.

[0062] The fastener 1 may be integrally formed, in particular moulded, for instance in an injection moulding process. Additionally, or alternatively, the fastener 1 may be made of a plastic material, for instance allowing its one or more snap-fit connectors 11 and/or one or more hook members 13 thereof to flex.

[0063] It is noted that for the purpose of clarity and a concise description, features are described herein as part of the same or separate embodiments, however, it will be appreciated that the scope of the disclosure may include embodiments having combinations of all or some of the features described, in particular combinations of features of different aspects. For example, it will be appreciated that features of a fastener disclosed in the context of a fastener with a snap-fit connector configured to let its one or more hook members flex about a respective substantially upwardly extending virtual axis, can also be advantageously included in an embodiment of a fastener not necessarily having such snap-fit connector, but for instance being arranged to be mounted to a support element by means of a mounting mechanism substantially formed as a bayonet catch.

[0064] Further, it is noted that the invention is not restricted to the embodiments described herein. It will be understood that many variants are possible.

[0065] Such and other variants will be apparent for the person skilled in the art and are considered to lie within the scope of the invention as formulated in the following claims.

Claims

1. Fastener for attaching a board or plank to a support structure, in particular in order to form a deck or wall or the like including multiple juxtaposed boards or planks, said fastener comprising a base portion and at least one snap-fit connector for interlockingly engaging a corresponding snap-fit element, in particular an elongate slot or recess, more in particular a dovetail groove, of the board or plank, wherein said snap-fit connector includes a support member protruding from the base portion in a substantially upward direction, said support member being provided with at least a first hook member, **characterised in that** said snap-fit connector is configured such that said first hook member can flex about a respective virtual axis extending substantially in the substantially upward direction.
2. Fastener according to claim 1, wherein the support member is further provided with a second hook member that can flex about a respective virtual axis extending substantially in the substantially upward direction, wherein the first hook member protrudes at a first lateral side of the support member and the second hook member protrudes at an opposite lateral side of the support member, and wherein the first hook member and the second hook member can flex towards each other.
3. Fastener according to claim 2, wherein, when seen from above, i.e. in a direction opposite to the upward direction, the first hook member and the second hook member substantially form a V-shaped hook construction.
4. Fastener according to claim 2 or 3, wherein the support member is further provided with a third hook member and a fourth hook member, both of which can flex about a respective virtual axis extending substantially in the substantially upward direction, wherein said third hook member protrudes at the first lateral side of the support member and the fourth hook member protrudes at an opposite lateral side of the support member, and wherein the third hook member and the fourth hook member can flex towards each other.
5. Fastener according to claim 4, wherein the first hook member and the second hook member are located at a distal side of the support member and the third hook member and the fourth hook member are located at the opposite proximal side of the support member.
6. Fastener according to claim 5, wherein, when seen from above, i.e. in a direction opposite to the upward direction, the first hook member and the second hook member substantially form a first V-shaped hook construction, and wherein, when seen from above, the third hook member and the fourth hook member substantially form a second V-shaped hook construction.
7. Fastener according to claim 6, wherein, when seen from above, i.e. in the direction opposite to the upward direction, said first V-shaped hook construction and said second V-shaped hook construction together form a substantially X-shaped hook construction.
8. Fastener according to any one of the preceding claims, further comprising a second snap-fit connector, in particular of substantially similar design as the first snap-fit connector, said second snap-fit connector being for interlockingly engaging a corresponding snap-fit element of the board or plank, in particular the same snap-fit element to be engaged by the first snap-fit connector.

9. Fastener according to any one of the preceding claims, further comprising a pin or plug protruding from the base portion in the substantially upward direction, said pin or plug being arranged to be clamped in a section located more to the outside or lower section of the snap-fit element of the board or plank, in particular when said snap-fit element is substantially formed as a dovetail groove. 5
10. Fastener according to claims 8 and 9, wherein the pin or plug extends substantially parallel with the support member of the first snap-fit connector and/or with a similar support member of the second snap-fit connector; and/or wherein the pin or plug, when seen from above, i.e. in a direction opposite to the upward direction, is substantially located on a virtual line between the first snap-fit connector and the second snap-fit connector. 10 15 20
11. Fastener according to claim 9 or 10, wherein, when seen from above, i.e. in a direction opposite to the upward direction, the support member of the first snap-fit connector has a lower portion located below a lower edge of the one or multiple hook members; and wherein, when seen in a longitudinal direction extending from the pin or peg towards the first snap-fit connector and perpendicular to the upward direction, the pin or peg has, at least at one height level below the lower edge of said hook member, a width which is wider than the corresponding width of the first snap-fit connector's support member's lower portion at said height level. 25 30 35
12. Kit of parts for attaching a board or plank to a support structure, in particular in order to form a deck or wall or the like including multiple juxtaposed boards or planks, said kit of parts comprising: 40
- at least one fastener for attaching a board or plank to a support structure, said fastener comprising a base portion and at least one snap-fit connector for interlockingly engaging a corresponding snap-fit element of the board or plank; and 45
- at least one support element to form part of the support structure, in particular wherein said at least one support element is substantially formed as an elongate profile to be attached to a support face of a joist of the support structure, **characterised in that** the fastener is a fastener according to any one of the preceding claims 1-11, and/or **in that** the fastener and the support element are arranged such that the fastener can be mounted to said support element by means of a mounting mechanism substantially formed as a bayonet catch. 50 55
13. Kit of parts for attaching a board or plank to a support structure, in particular in order to form a deck or wall or the like including multiple juxtaposed boards or planks, said kit of parts comprising:
- at least one fastener according to any one of claims 1-11; and
- at least one board or plank, wherein said board or plank is provided with a snap-fit element for interlocking engagement with the at least one snap-fit connector of the fastener, in particular wherein said snap-fit element is substantially formed as an elongate slot or recess, more in particular a dovetail groove.

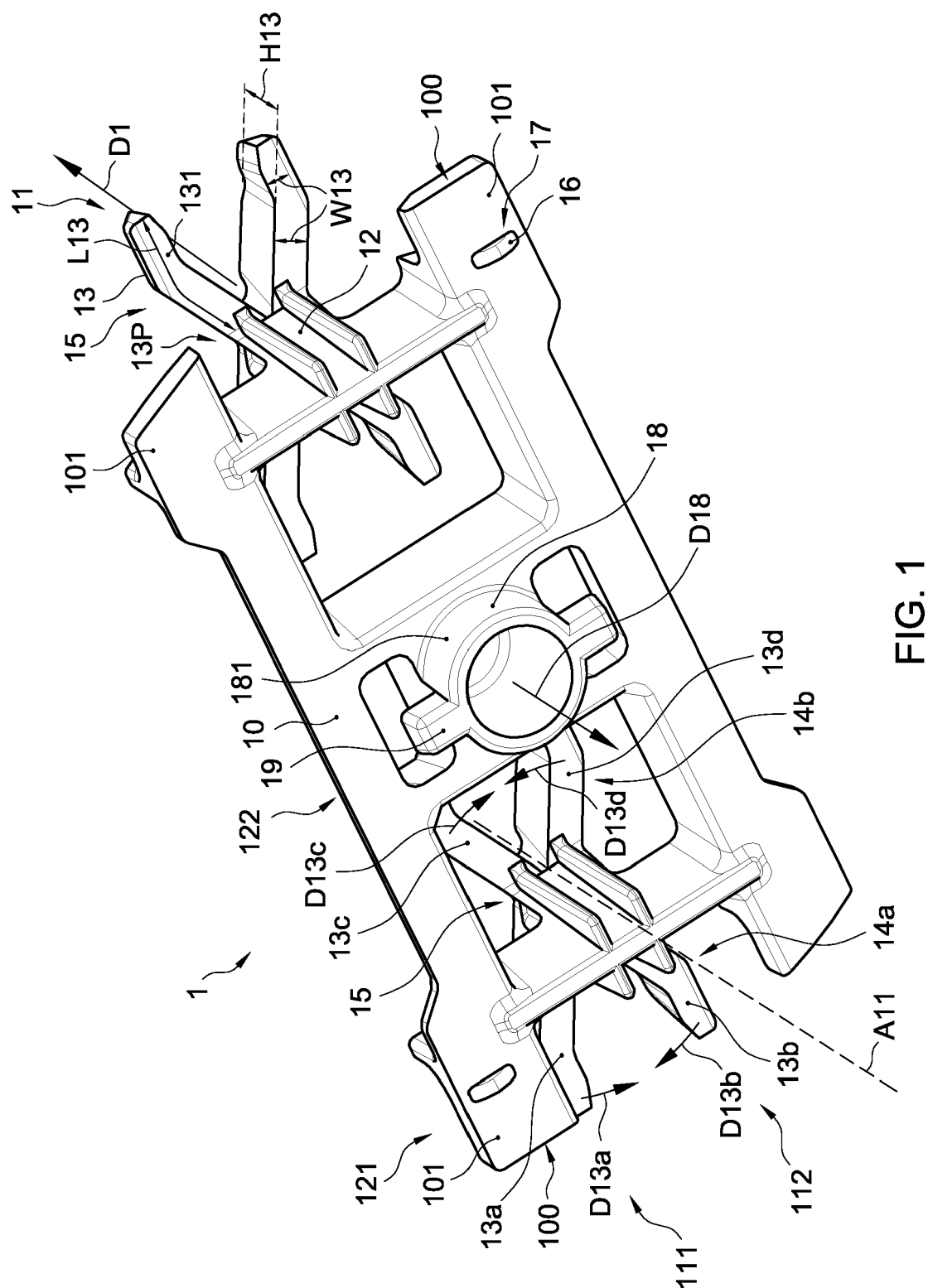
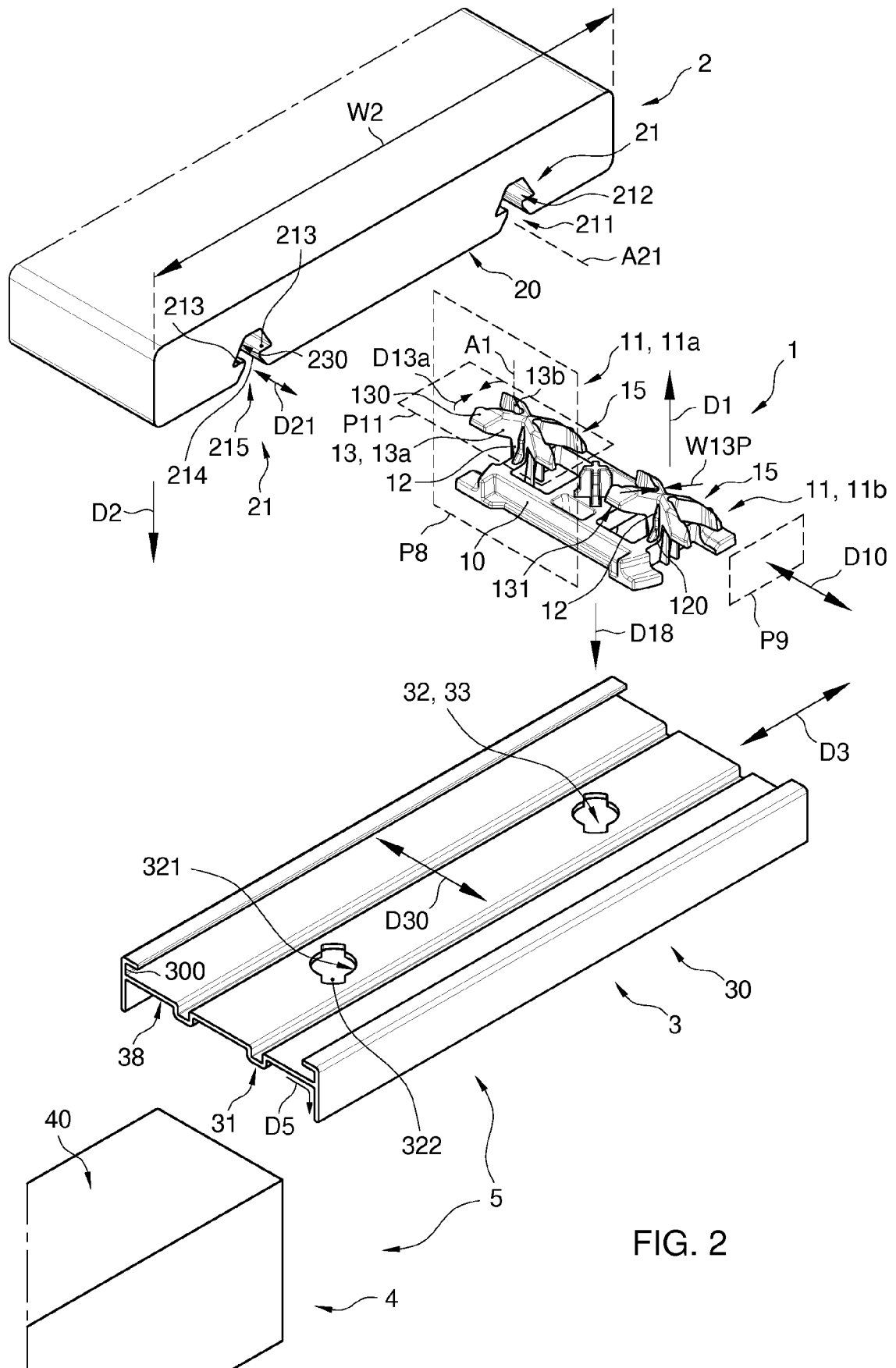


FIG. 1





EUROPEAN SEARCH REPORT

Application Number
EP 19 15 5515

5

10

15

20

25

30

35

40

45

50

55

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 20 2007 002282 U1 (MOELLER GMBH & CO KG [DE]) 19 June 2008 (2008-06-19)	1-7, 12, 13	INV. E04F15/02
Y	* figures 1, 9-11 * * paragraph [0034] - paragraph [0035] * * paragraph [0057] - paragraph [0061] *	8-11	
Y	US 2006/053720 A1 (OH SANG-CHUL [KR]) 16 March 2006 (2006-03-16) * figures 5, 12 * * paragraph [0042] *	8	
Y	WO 2007/051934 A1 (DECK SYSTEME SARL [FR]; ANDRES WILFRIED [FR]; JUNG ERIC [FR]) 10 May 2007 (2007-05-10) * figure 6 * * page 12, line 27 - line 33 *	9-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 May 2019	Examiner Estorgues, Marlène
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 15 5515

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-05-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202007002282 U1	19-06-2008	NONE	
US 2006053720 A1	16-03-2006	AU 2003284861 A1	30-06-2004
		CN 1723326 A	18-01-2006
		JP 3880058 B2	14-02-2007
		JP 2006509133 A	16-03-2006
		KR 20030008146 A	24-01-2003
		US 2006053720 A1	16-03-2006
		WO 2004053259 A1	24-06-2004
WO 2007051934 A1	10-05-2007	EP 1945881 A1	23-07-2008
		WO 2007051934 A1	10-05-2007

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2006011173 A1 [0004]
- US 20090094925 A1 [0005]