(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 738 319 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.06.2014 Bulletin 2014/23

(51) Int Cl.:
E04D 3/362 *(2006.01)* ***B25B 23/00*** *(2006.01)*
E04D 15/04 *(2006.01)*

(21) Application number: **13195123.8**

(22) Date of filing: **29.11.2013**

(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

(30) Priority: **03.12.2012 IT MI20122064**

(71) Applicant: **Schatzer Alois S.r.l.**
39040 Bressanone (BZ) (IT)

(72) Inventor: **SCHATZER, Alois**
39040 Bressanone (BZ) (IT)

(74) Representative: **Raimondi, Margherita**
Dott. Ing. Prof. Alfredo Raimondi S.r.l.,
Piazzale le Cadorna, 15
20123 Milano (IT)

(54) **Clamp for securing metal sheets to beams of covering surfaces, roofs and the like**

(57) Clamp for securing metal sheets (2) to roofing beams (3), comprising a base surface (10) with a larger dimension extending in the longitudinal direction (X-X) and smaller dimension extending in the transverse direction (Y-Y) and a bearing surface (20) at right angles to the base surface (10) and integral therewith, at least two through-holes (11) formed in the base surface, and end holes (11), each consisting of one of said through-holes (11) and being formed in the base surface (10) in the vicinity of one (10a;10b) of its opposite transverse side edges (10a,10b), at least one pair of stiffening and guiding ribs (15) formed on the base surface (10), that comprises a raised rib (13) extending in the transverse direction (Y-Y) between each end hole (11) and the associated transverse side edge (10a,10b) of the base surface (10); a continuous, raised, stiffening and guide rib (14) extending in the longitudinal direction (X-X) and formed at a certain distance from the longitudinal free edge (10c) of the base surface (10), the opposite ends of the longitudinal rib (14) being connected to the end of each transverse end rib (13), directed towards the free edge (10c) of the base surface and at least one pair of stiffening and guiding ribs (15) extend between the longitudinal rib (14) and the bearing surface (20), the opposite ends of said ribs (15) being respectively connected to the said longitudinal rib (14) and to the bearing surface (20).

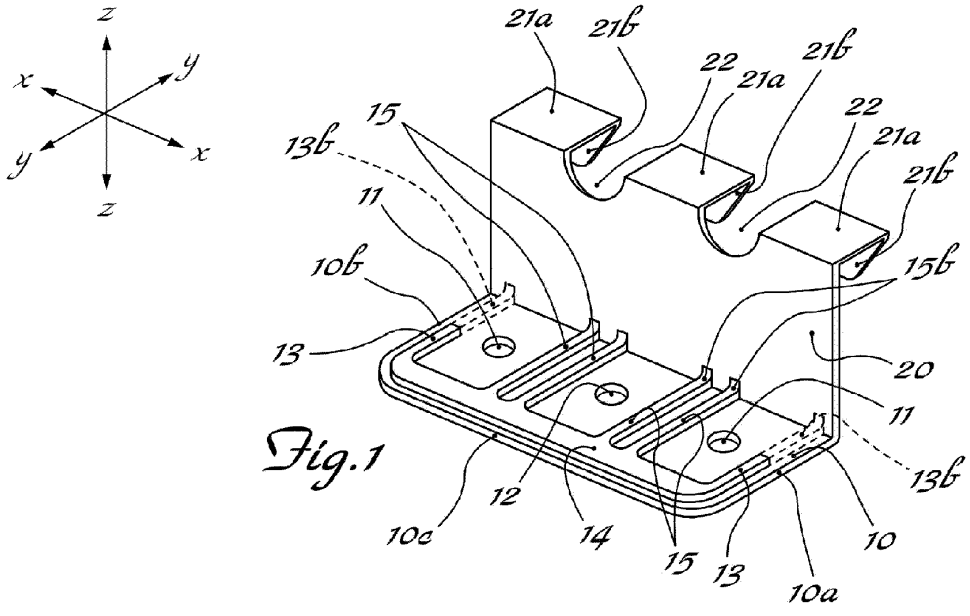


Fig.1

EP 2 738 319 A1

Description

[0001] The present invention relates to a clamp for securing metal sheets to beams of covering surfaces, roofs and the like.

[0002] It is known, in the technical sector relating to the roofing of buildings, to construct the roofs using metal sheets which are arranged on top of the wooden roof beams to which they are fixed by means of positioning brackets and then crimped together longitudinally in order to perform fastening in the transverse direction from the roof ridge to the free edge or gutter of the roof.

[0003] Also known are special L-shaped clamps which allow fixing, by means of nailing, of the metal sheets both to an associated support beam (rafters arranged along the slope of the roof hip) and to a locating stringer fixed to the rafters, where the metal sheet is fixed; once fixed in the position the sheets are then definitively crimped together.

[0004] A clamp according to the preamble of Claim 1 is known from EP 2,333,452 A2.

[0005] KR 2010 11655 U discloses a clamp having a reinforcing rib between an end hole and the associated base edge and DE 20 2011 4793 A discloses a clamp which has an edge of the base surface formed with a reinforcing rib.

[0006] DE 20 2006 9674 A illustrates a securing clamp having perimetral edges in the form of a raised rib and two raised ribs formed on a base surface and also extending towards a bearing surface.

[0007] AU 2008 233436 A illustrates a clamp with raised ribs formed in a base surface and connected to a bearing surface.

[0008] Although performing their function, the clamps of the known type have a number of drawbacks arising from the fact that securing thereof to the beams and to the rafters is performed by means of nail guns, use of which does not allow correct positioning of the clamp to be maintained, the clamp being fixed in a manner not perfectly at right angles to and aligned with the beams and/or with the stringers, resulting in the roof making an annoying noise when changes in temperature during the summer and winter cause expansion and retraction of the metal sheet.

[0009] In addition, fixing performed using nails is increasingly less suitable for the high tractional loads which stress the metal sheet and tend to raise it, resulting in costly maintenance operations.

[0010] The technical problem which is posed, therefore, is that of providing a clamp for securing metals sheets for roofing, which is able to allow better centring, relative alignment and right-angled positioning with respect to the support beams during laying and fixing of the clamp, in order to prevent the roof noise resulting from the movements of the metal sheet.

[0011] In connection with this problem it is also required that the clamp should have a high strength and stability and therefore low deformability and that it should be easy and inexpensive to produce and apply in particular in connection with apparatus for inserting/screwing fixing screws which require correct centring of the screws with the respective hole.

[0012] These results are achieved according to the present invention by a clamp for securing metal sheets to beams of covering surfaces, roofs and the like according to the characteristic features of Claim 1.

[0013] Therefore a clamp according to the invention for securing metal sheets to roofing beams comprises a base surface with a larger dimension extending in the longitudinal direction and smaller dimension extending in the transverse direction and a bearing surface at right angles to the base surface and integral therewith, at least two through-holes formed in the base surface, and end holes, each consisting of one of said through-holes and being formed in the base surface in the vicinity of one of its opposite transverse side edges; such a clamp may advantageously comprise a combination of the following elements:

- a raised rib extending in the transverse direction between each end hole and the associated transverse side edge of the base surface;
- a continuous, raised, stiffening and guide rib which extends in the longitudinal direction at a certain distance from the longitudinal free edge of the base surface and the opposite ends of which are connected to the end of each transverse end rib, directed towards the free edge of the base surface;
- at least one pair, preferably at least two pairs, of stiffening and guide ribs formed in the base surface between the longitudinal rib and the bearing surface, the opposite ends of said ribs being respectively connected to the said longitudinal rib and to the bearing surface.

[0014] According to preferred embodiments:

the bearing surface may have a free edge with recessed zones situated between first folds substantially parallel to the transverse direction,
each first fold may moreover have a free end folded towards the bearing surface at an angle of between 115° and 165° and preferably between 135° and 145°;
moreover, the transverse stiffening and guide ribs may have an end for connection to the bearing surface provided with a fold extending in a vertical direction parallel to the bearing surface;
the transverse end ribs may have an end directed towards the bearing surface and connected thereto;
at least one additional through-hole may be situated between the two end holes adjacent to the opposite transverse side edges of the base surface.

[0015] Further details may be obtained from the following description of a non-limiting example of embodiment

of the subject of the present invention provided with reference to the accompanying drawings in which:

Figure 1: shows a perspective view of a clamp according to the present invention;
Figure 2: shows a perspective view of a clamp according to the present invention during mounting on a roof;
Figure 3: shows a perspective view of a centring tool for applying screws for fixing the clamp according to the present invention;
Figure 4: show a perspective view, from below, of centring tool according to Fig. 3;
Figure 5: show a perspective view of the centring tool in a position aligned with an end hole of the clamp;
Figure 6: show a perspective view of the centring tool in a position aligned with a central hole of the clamp;
Figure 7: shows a schematic cross-sectional view of the clamp according to Fig. 1 during mounting on a roof; and
Figure 8: shows a schematic cross-sectional view of the clamp according to Fig. 1 in the mounted and closed condition.

[0016] As shown and assuming solely for the sake of simplification of the description and without a limiting meaning a set of three reference axes with directions defined independently of the orientation of the figures, i. e. longitudinal direction X-X, corresponding to the larger dimension of the clamp, transverse direction Y-Y corresponding to smaller direction of the clamp, and vertical direction Z-Z, perpendicular to the two other directions, an L-shaped clamp according to the present invention comprises essentially a base surface 10, with a larger dimension extending in the longitudinal direction X-X and smaller dimension extending in the transverse direction Y-Y, integral with a bearing surface 20 which extends parallel to the vertical direction Z-Z and is perpendicular to the surface 10 and the dimension of which in the longitudinal direction X-X corresponds to the length of the base surface 10;
first holes 11 are formed in the base surface 10, being arranged in the proximity of the opposite transverse side edges 10a,10b of the base surface 10.

[0017] Between the two first end holes 11 and in alignment therewith the base surface 10 has at least one third hole 12 situated between the two said holes 11.

[0018] The base 10 has a respective raised rib 13 extending in the transverse direction Y-Y between each end hole 11 and the associated side edge 10a,10b.

[0019] A further continuous raised rib 14 extending in the longitudinal direction X-X is formed at a certain distance from the longitudinal free edge 10c of the base surface 10 between the edge 10c itself and the holes 11; preferably the opposite ends of the longitudinal rib 14 are connected to the end of each transverse end rib 13, directed towards the free edge 10c of the base surface.

[0020] According to the invention it is also envisaged that at least one pair -preferably at least two pairs- of transverse ribs 15 is/are formed between the longitudinal rib 14 and the vertical bearing surface 20, the opposite ends of said ribs 15 being respectively connected to the said longitudinal rib 14 and to the bearing surface 20; preferably the connecting portion between the end directed towards the surface 20 and the surface itself is formed by a bent part 15b extending in the vertical direction Z-Z from the end of the rib 15, so as to strengthen the fold between the bearing surface 20 and the base surface 10 and drastically reduce the possibilities of relative deformation.

[0021] It is envisaged moreover that the free edge 21 of the vertical surface 20 has recessed zones 22 situated between first folds 21a substantially parallel to the transverse direction Y-Y and that each fold 21a has a free end 21b in turn folded towards the second surface 20 at an angle of between 115° and 165°, and preferably between 135° and 145°, for bending and closing the clamp without difficulty on the rafter 3 of a roof. All the ribs of the flange perform the dual function of stiffening the flange itself and acting as a guide for a centring tool 200 for inserting and screwing fixing screws 1.

[0022] Figs. 3 and 4 show said tool 200 which has a form which complements that of the fixing clamp according to the present invention, said tool having in turn an L shape with a base side 210 extending in the transverse direction Y-Y and vertical side 220 parallel to the vertical direction Z-Z.

[0023] The base side 210 has a central seat 211 extending inwards and open along the transverse edge 200c so as to form two transverse feet 212, with their free end bent in the vertical direction so as to form a respective lug 212a.

[0024] The following are formed on the bottom surface 230 of the base side 210 opposite to that from which the vertical side 220 extends:

- a first recess 231 extending in the longitudinal direction X-X along the whole length of the base side 210 in the said longitudinal direction and with a width in the transverse direction Y-Y such as to contain the longitudinal rib 14;
- two recesses 232 extending in the transverse direction Y-Y between the first longitudinal recess 231 and the free edge 200c of the base side 210 of the L and arranged adjacent and on opposite sides with respect to the central seat 211 and the transverse direction Y-Y. Said recesses 232 having a width such that in the direction X-X they contain at least one of the transverse ribs 15 of a pair. With this configuration of the tool and as shown in Figs. 5 and 6, said tool is designed to be arranged with its base 210 resting on the base surface 10 of the clamp and with the central seat 211 centred with respect to a hole 11 of the base 10 of the L; correspondingly, the lon-

gitudinal recess 231 and transverse recesses 232 engage with the respective longitudinal rib 14 and transverse ribs 13,15 in the end or central positions, such that the lugs 212a of the feet 212 are always positioned against the vertical bearing surface 20 of the clamp which is thus forced to maintain its position at right angles to the base surface 10.

[0025] Conveniently and as shown in Fig. 7 the tool 200 forms part of a screwdriver device 400 with a screwing head 401 so that, during laying and securing of the metal sheets 2 to the cross-members and/or rafters 3 of the roof, it is possible to centre the hole 11,12 in the base surface 10 of the clamp and screw precisely the screw 1 into the said cross-member, while keeping the clamp properly aligned and positioned.

[0026] As shown in Figs. 7 and 8, during laying and securing of the metal sheets 2 to the cross-members and/or rafters 3 of the roof, the screws 1 are applied centring the holes 11 in the base surface 10 of the clamp, so as to then perform fastening to the cross-member or rafter 3, while keeping the clamp properly aligned and positioned also during folding over (Fig. 8) of the free edges 21a, 21b of the surface 20 for definitive securing together.

[0027] It is therefore clear how the clamp according to the invention allows application and fixing to metal sheets forming a roof covering with a laying speed comparable to that of nailing, but with a greater precision and using screws which ensure a tractional strength much greater than that of nails.

[0028] The improved alignment of the clamp and strengthening thereof by means of the pairs of transverse ribs also ensure, after fixing, a more silent behaviour of the sheet-metal roof since the movements due to the changes in temperature occur in directions perpendicular to the direction of laying of the metal sheets and are therefore absorbed by the strengthened clamps, preventing any squeaking noise.

[0029] According to preferred embodiments the clamp:

- has end ribs 13 connected to the bearing surface 10 by means of a connecting portion 13b;
- is formed by means of cold-moulding.

[0030] Although described in connection with certain constructional forms and certain preferred examples of embodiment of the invention, it is understood that the person skilled in the art may make modifications to the dimensions of the various elements forming the clamp and that the scope of protection of the present patent is defined solely by the following claims.

Claims

1. Clamp for securing metal sheets (2) to roofing beams (3), comprising a base surface (10) with a larger dimension extending in the longitudinal direction (X-X) and smaller dimension extending in the transverse direction (Y-Y) and a bearing surface (20) at right angles to the base surface (10) and integral therewith, at least two through-holes (11) formed in the base surface, and
end holes (11), each consisting of one of said through-holes (11) and being formed in the base surface (10) in the vicinity of one (10a;10b) of its opposite transverse side edges (10a,10b),
at least one pair of stiffening and guiding ribs (15) formed on the base surface (10),
characterized in that it comprises a raised rib (13) extending in the transverse direction (Y-Y) between each end hole (11) and the associated transverse side edge (10a,10b) of the base surface (10); a continuous, raised, stiffening and guide rib (14) extending in the longitudinal direction (X-X) and formed at a certain distance from the longitudinal free edge (10c) of the base surface (10), the opposite ends of the longitudinal rib (14) being connected to the end of each transverse end rib (13), directed towards the free edge (10c) of the base surface and **in that** said at least one pair of stiffening and guiding ribs (15) extend between the longitudinal rib (14) and the bearing surface (20), the opposite ends of said ribs (15) being respectively connected to the said longitudinal rib (14) and to the bearing surface (20).

2. Clamp according to Claim 1, **characterized in that** said pairs of ribs (15) are at least two pairs.

3. Clamp according to Claim 1 or 2, **characterized in that** the free edge (21) of the bearing surface (20) has recessed zones (22) situated between first folds (21a) substantially parallel to the transverse direction (Y-Y).

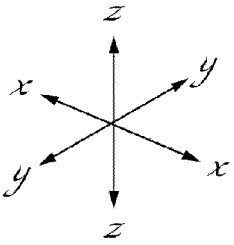
4. Clamp according to Claim 3, **characterized in that** each fold (21a) has a free end (21b) folded towards the bearing surface (20) at an angle of between 115° and 165° and preferably between 135° and 145°.

5. Clamp according to any one of the preceding claims, **characterized in that** the transverse stiffening and guide ribs (15) have an end for connection to the bearing surface (20) provided with a fold (15b) extending in a transverse direction (Z-Z) parallel to the said bearing surface (20).

6. Clamp according to any one of the preceding claims, **characterized in that** the transverse end ribs (13) have an end directed towards the bearing surface (13b) and connected thereto.

7. Clamp according to any one of the preceding claims, **characterized in that** it has at least one additional through-hole (12) situated between the two holes

(11) adjacent to the opposite transverse side edges (10a,10b) of the base surface (10).



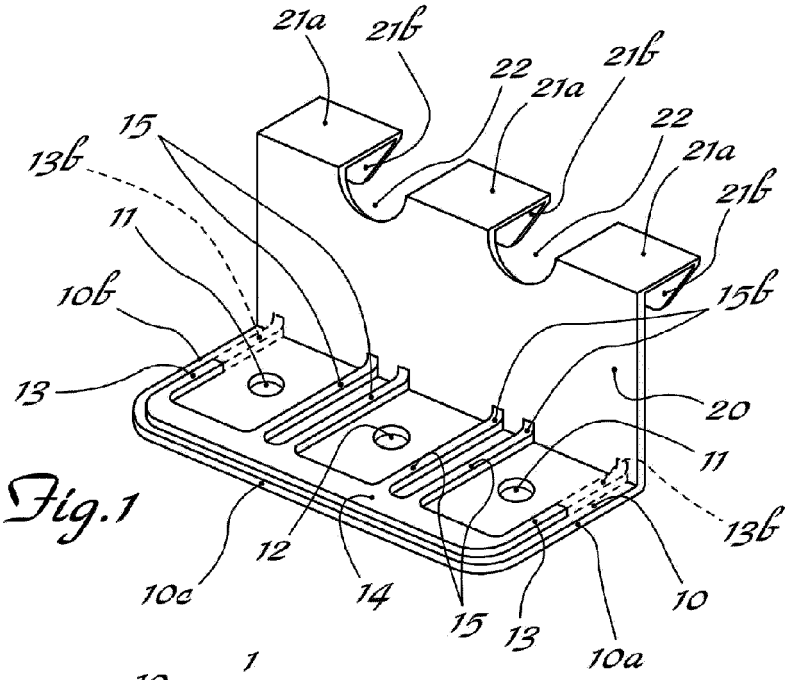


Fig.1

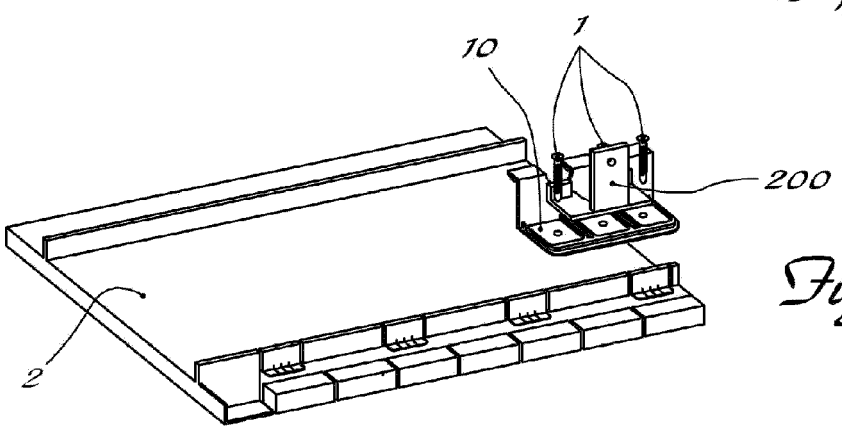


Fig.2

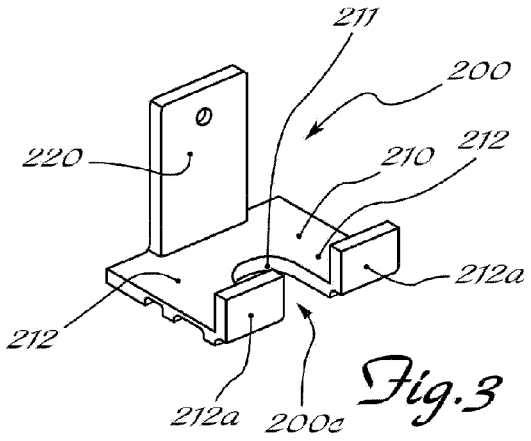


Fig.3

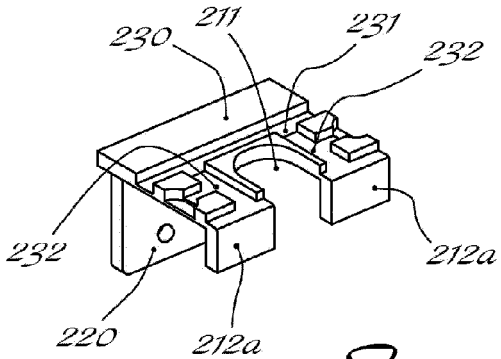


Fig.4

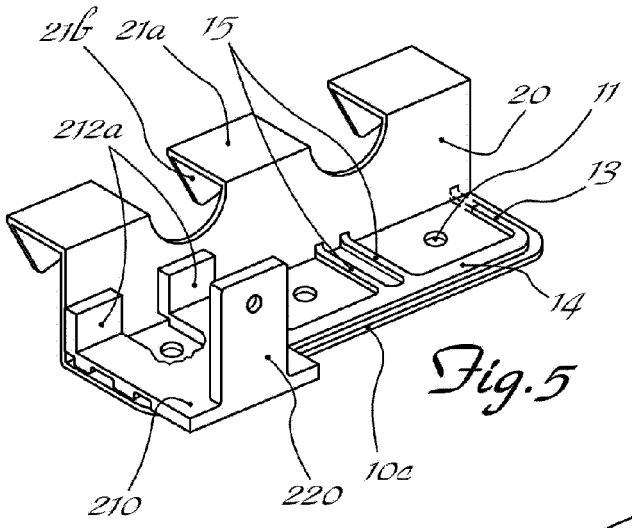
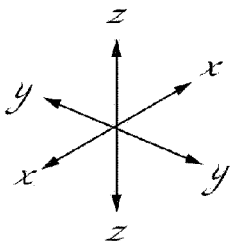


Fig.5



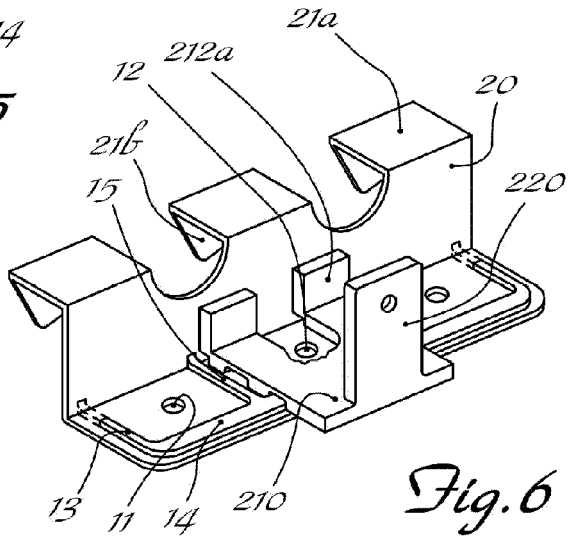


Fig.6

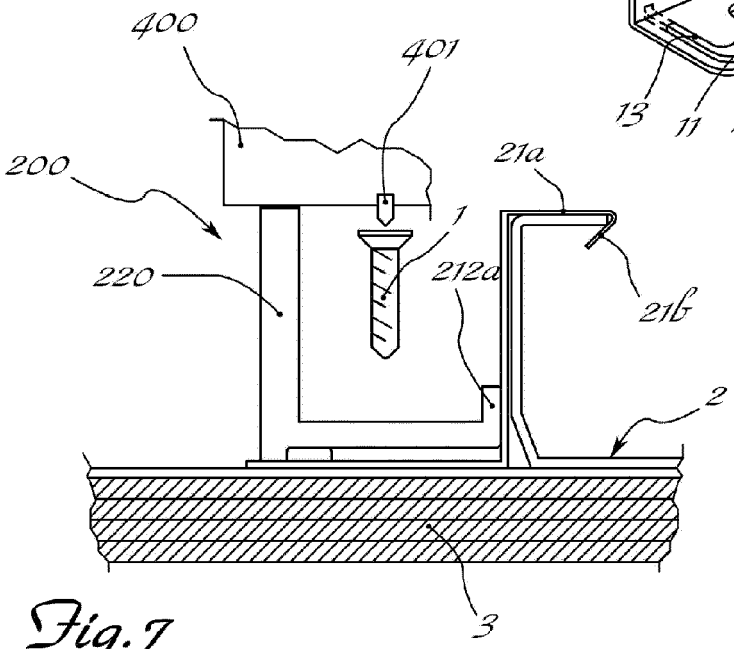
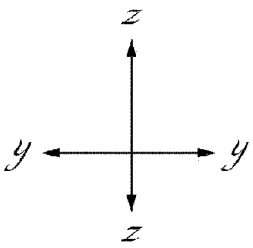


Fig.7



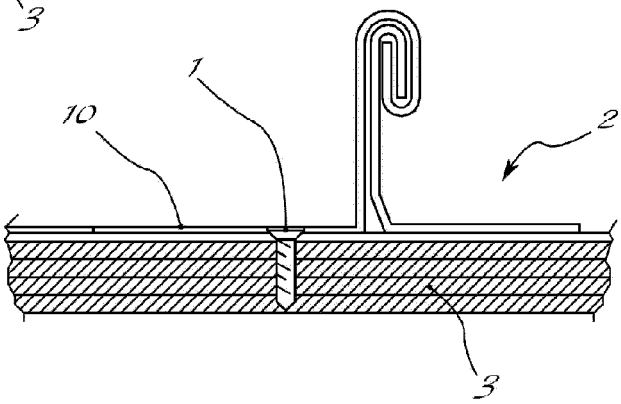


Fig.8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 13 19 5123

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	DE 20 2006 009674 U1 (ENERGIEBAU SOLARSTROMSYSTEME G [DE]) 2 November 2006 (2006-11-02) * figure 1 *	1-7	INV. E04D3/362 B25B23/00 E04D15/04
A,D	EP 2 333 452 A2 (BB STANZ UND UMFORMTECHNIK GMBH [DE]) 15 June 2011 (2011-06-15) * figure 1 *	1-7	
A,D	AU 2008 233 436 A1 (MITEK HOLDINGS INC) 13 May 2010 (2010-05-13) * figure 1 *	1-7	

TECHNICAL FIELDS SEARCHED (IPC)
E04D
B25B
E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 March 2014	Bauer, Josef

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 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 19 5123

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.

18-03-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202006009674 U1	02-11-2006	NONE	
EP 2333452 A2	15-06-2011	DE 102009047152 A1	26-05-2011
		EP 2333452 A2	15-06-2011
AU 2008233436 A1	13-05-2010	AU 2008233436 A1	13-05-2010
		NZ 580627 A	27-05-2011

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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

- EP 2333452 A2 **[0004]**
- KR 201011655 U **[0005]**
- DE 2020114793 A **[0005]**
- DE 2020069674 A **[0006]**
- AU 2008233436 A **[0007]**