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(54) **Bracket for fixing sheet metal parts to beams of roofs and the like**

(57) Bracket for fixing sheet metal parts (2) to roof beams (3), comprising a first base side (10;110) on which at least two through-holes (11,111) are formed and a second side (20;120) at right angles to the base side (10; 110) and at least one first raised rib (12;112) extending between the two holes (11;111). Said base side (10;110) comprises a respective raised rib (114) extending in the longitudinal direction (X-X) between each end hole (11; 111) and the associated longitudinal side edge (10a,10b; 110a,110b).

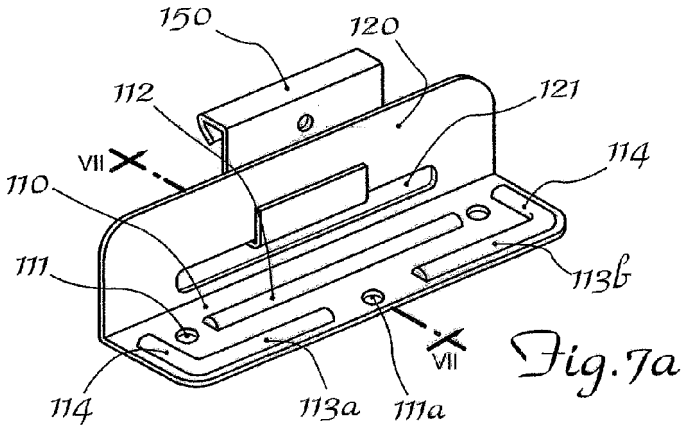

Fig.7a

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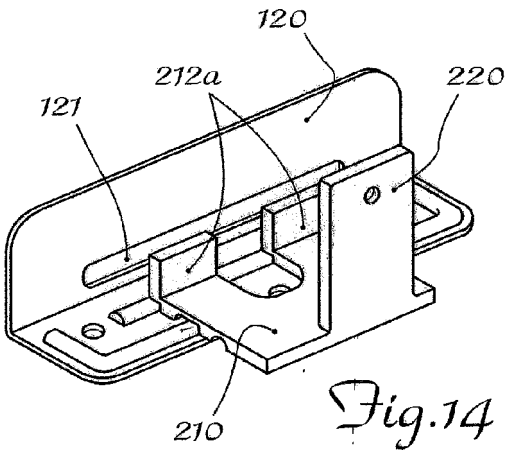

Fig.14

Description

[0001] The present invention relates to a bracket for fixing sheet metal parts to beams of roofs and the like.

[0002] It is known in the technical sector of roofs for buildings to construct 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 longitudinally fastened together so as to form the fastening joint in the transverse direction from the roof ridge to the free edge or eaves thereof.

[0003] Also known are special L-shaped brackets designed to allow fixing, by means of nailing, of the metal sheets both to a corresponding support beam (rafters arranged along the slope of the pitch of the roof) and to a reference batten which is joined to the rafters and where fixing of the metal sheet is performed; once the sheets have been fixed in position they are then definitively fastened together.

[0004] Although performing their function, the fixing brackets of the known type have a number of drawbacks due to the fact that securing thereof to the beams and the battens is performed by means of nailing guns, operation of which is such that it is not possible to maintain correct positioning of the bracket which is fixed not perfectly at right angles and in alignment with the beams and/or the battens, resulting in the roofs making a bothersome noise when changes in temperatures during the summer and winter cause expansion/retraction of the metal sheet.

[0005] In addition to this, fixing by means of nails is increasingly less suited for the high tensile loads which stress the metal sheet and tend to raise it, resulting in the need for costly maintenance operations.

[0006] A bracket according to the preamble of Claim 1 is known from EP 2 333 452 A2, AU 2008 233 436 A1 and DE 10 2005 43957 B3.

[0007] KR 2010 11655 discloses a bracket having a reinforcing rib adjacent to a base side edge, while DE 20 2011 4793 A discloses a bracket having a base side edge formed by a reinforcing rib. None of the above mentioned publications suggests a combination of ribs according to claim 1 that allows for centering of a tool with respect to the through-holes.

[0008] The technical problem which is posed therefore is that of providing a bracket for fixing sheet metal parts of roofs, able to ensure better centering, relative alignment and right-angled arrangement with the support beams during laying and fixing of the bracket itself, so as to eliminate the noise produced by the roof as a result of movements of the metal sheet.

[0009] In connection with this problem another requirement is that the bracket should allow fixing with screws at the same speed as nailing and should be inexpensive to produce and assembly.

[0010] These results are achieved according to the present invention by means of a bracket for fixing sheet metal parts to beams of roofs and the like according to the characteristic features of Claim 1.

[0011] The present invention relates furthermore to a guide tool which matches said bracket according to the characteristic features of Claim 10 and a bracket/tool assembly according to the characteristic features of Claim 12.

[0012] 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 first embodiment of a fixing bracket according to the present invention;
Figure 2 shows:	a schematic cross-section along the plane indicated by II-II in Fig. 1;
Figure 3 shows:	a schematic cross-section along the plane indicated by III-III in Fig. 1;
Figure 4 shows:	a perspective view of a second embodiment of a fixing bracket according to the present invention;
Figure 5 shows:	a schematic cross-section along the plane indicated by V-V in Fig. 4;
Figure 6 shows:	a schematic cross-section along the plane indicated by VI-VI in Fig. 4;
Figure 7 shows:	a schematic cross-section along the plane indicated by VII-VII in Fig. 4;
Figs. 7a,7b show:	respectively, a perspective view and a cross-section of the bracket according to Fig. 4 with an auxiliary sliding piece;
Figure 8 shows:	a perspective view from above of a tool matching the bracket for fixing said bracket by means of screws;
Figure 9 shows:	a perspective view from below of the tool according to Fig.8;
Figure 10 shows:	a schematic cross-section along the plane indicated by X-X in Fig. 8;
Figure 11 shows:	a schematic cross-section along the plane indicated by XI-XI in Fig. 9;
Figure 12 shows:	a schematic cross-section along the plane indicated by XII-XII in Fig. 9;
Figs. 13-15 show:	perspective views of the different relative positions of the tool/bracket; and
Figs. 16-18 show:	partially sectioned views of the sequence for fitting and fixing the bracket according to the invention.

[0013] As shown and assuming solely for the sake of convenience of description and without a limiting meaning a set of three reference axes with directions defined, irrespective of the orientation of the figures, as longitudinal X-X, transverse Y-Y and vertical Z-Z perpendicular to the other two directions, an L-shaped bracket according to the invention comprises essentially:

- a first base side 10 on which through-holes 11 for the insertion of screws 1 are formed; said holes 11 are arranged in the vicinity of the longitudinal edges 10a,10b of the base side 10; a first raised rib 12 extending in the longitudinal direction X-X and a second raised rib 13 extending the transverse direction Y-Y and at right angles to the first rib 12, to which it is preferably, but not necessarily connected, is provided between the two holes 11;
- a second side 20, extending parallel to the vertical direction Z-Z and at right angles to the first side 10; in the example shown in the figures, the free end 21 of the vertical side 20 has, preferably, a first fold 21a substantially parallel to the longitudinal direction X-X and a second fold 21b substantially parallel to the vertical direction Z-Z, the functions of which will become clear further below.

[0014] Fig. 4 shows a second embodiment of a fixing bracket according to the present invention in the form of an L which is longer in the transverse direction Y-Y; in this embodiment the bracket has a second vertical side 120 provided with a through-slit 121 extending in the transverse direction Y-Y along a suitable length and a base side 110 extending in the transverse direction Y-Y corresponding to the length of the vertical side 120.

[0015] The base side 110 has first holes 111 arranged in the vicinity of the opposite longitudinal side edges 110a,110b of the base side 110.

[0016] Between the two first holes 111 and aligned therewith the base side 110 has a first raised rib 112 extending in the longitudinal direction X-X. Between each end hole 111 and the associated side edge 110a,110b, the base 110 also has a respective raised rib 114 extending in the longitudinal direction X-X.

[0017] According to the invention it is also envisaged that a third raised rib 113a,113b extending in the transverse direction Y-Y is formed between the longitudinal end ribs 114 and a substantially central point of the base 110; preferably, but not necessarily, the transverse ribs 114 are connected to the respective longitudinal rib 112.

[0018] According to a preferred embodiment, the base 110 has a third hole 111a formed in said substantially centered position adjacent to the free transverse edge 110c of the said base side of the fixing bracket.

[0019] As shown in Figs. 7a,7b the flange may be associated with a sliding piece 150 made in the form of a Z and inserted in the longitudinal slit 121 of the second vertical side 120 and the sliding piece is fixed to the battens while the bracket is fixed to the boarding and the beams, relative sliding of the two parts thus being allowed, this being useful during fixing of the various sheet metal parts to the beams and the battens, but also so as to allow the relative movements due to the expansion caused by the variations in temperature. Figs. 8 to 12 show a tool 200 with a shape matching that of the fixing bracket according to the present invention, which tool has in turn a L shape with its base side 210 extending in the longitudinal direction X-X and vertical side 220 parallel to the vertical direction Z-Z.

[0020] The base side 210 has a central seat 211 extending inwards and open along the transverse edge 200c so as to form two longitudinal feet 212 with their free end folded in the vertical direction so as to form a respective lug 212a.

[0021] The surface 230 of the base side 210 opposite to that of the vertical side 220 has, formed therein:

- a first recess 231 extending in the transverse direction Y-Y along the entire length in the said transverse direction of the base 210;
- two recesses 232 extending in the longitudinal direction X-X and arranged on opposite sides of and adjacent to the longitudinal central seat 211 and between the first transverse recess 231 and the free edge 200c of the base side 210 of the L.

[0022] With this configuration of the tool and as shown in Figs. 13-15, the tool is designed to be arranged with its base 210 resting on the base 10,110 of the fixing bracket and with the central seat 211 centered with respect to the holes 11, 111, 111a of the base 10,110 of the L; correspondingly the transverse recess 231 and longitudinal recess 232 engage with the respective longitudinal rib 12,112 and transverse rib 13,113,114 in the corresponding opposite end positions and/or the transverse recess 231 engages with the respective transverse rib 13,113,114 in the central position, bringing in all cases the lugs 212a of the feet 212 up against the vertical side 20,120 of the bracket which is thus forced to maintain its right-angled position with respect to the base 10,110.

[0023] Conveniently and as shown in Fig. 17, the tool forms part of a screwing device 400 with a screwing head 401 so that during laying and fixing of the metal sheets 2 to the cross-beams and/or battens 3 of the roof it is possible to centre the hole 11, 111, 111a in the base 10,110 of the bracket and screw precisely the screw 1 to the cross-beam, while keeping the fixing bracket squarely arranged and properly positioned.

[0024] It is therefore clear how, as a result of the fixing bracket with guiding raised ribs and the tool according to the invention, the fixing brackets may be mounted and the metal sheets forming the roofing may be fixed to them at a laying speed which is comparable to that of nailing, but with greater precision and using screws which have a resistance to tensile stress much greater than that of nails.

[0025] The bracket, which is more squarely arranged after fixing, also ensures that a sheet metal roof is more silent since the movements due to variations in temperature occur in parallel directions which do not produce squeaking.

[0026] Although described in connection with a number of preferred embodiments and examples of the invention it is

understood that the scope of protection of the present patent is defined only by the claims which follow.

Claims

1. Bracket for fixing sheet metal parts (2) to roof beams (3), comprising a first base side (10;110) on which at least two through-holes (11,111) are formed and a second side (20;120) at right angles to the base side (10;110), it comprises at least one first raised rib (12;112) extending between the two holes (11;111) **characterized in that** said base side (10;110) comprises a respective raised rib (114) extending in the longitudinal direction (X-X) between each end hole (11;111) and the associated longitudinal side edge (10a,10b;110a,110b).

2. Fixing bracket according to Claim 1, **characterized in that** it comprises at least one second raised rib (13;113) extending in the transverse direction (Y-Y) on the base side (10;110).

3. Fixing bracket according to Claim 1, **characterized in that** said raised rib (12) situated between the two holes (11) extends in the longitudinal direction (X-X).

4. Fixing bracket according to Claim 1, **characterized in that** said raised rib (112) situated between the two holes (111) extends in the transverse direction (Y-Y).

5. Fixing bracket according to Claim 4, **characterized in that**, in the vicinity of its front edge (110c), said base side (110) has a third raised rib (113a,113b) extending in the transverse direction (Y-Y) between the longitudinal end ribs (114) and a substantially central point of the base side in the transverse direction (Y-Y).

6. Fixing bracket according to Claim 5, **characterized in that** the base side (110) has a third hole (111a) at said substantially central point.

7. Fixing bracket according to Claim 1, **characterized in that** the free end (21) of the vertical side (20) has a first fold (21a) substantially parallel to the longitudinal direction (X-X) and a second fold (21b) substantially parallel to the vertical direction (Z-Z).

8. Fixing bracket according to Claim 1, **characterized in that** the vertical side (120) has a through-slit (121) extending in the transverse direction (Y-Y) over a suitable length.

9. Fixing bracket according to Claim 8, **characterized in that** it has a Z-shaped sliding piece (150) inserted in the transverse slit (121) and displaceable inside it.

10. Tool with an L shape matching the shape of the fixing bracket according to Claim 1, having a base side (210) extending in the longitudinal direction (X-X) and vertical side (220) parallel to the vertical direction (Z-Z) and at right angles to the base side (210), **characterized in that** the base side (210) has a central seat (211) extending inwards and open along the transverse edge (200c) and **in that** the surface (230) of the base side (210) opposite to that where the vertical side (220) is situated has formed therein:

    - a first recess (231) extending in the transverse direction (Y-Y) along the entire length in the said transverse direction of the base (210);
    - two recesses (232) extending in the longitudinal direction (X-X) and arranged on the opposite sides of and adjacent to the longitudinal central seat (211) and between the first transverse recess (231) and the free edge (200c) of the base side (210) of the L;
    said recesses being suitable for mating with corresponding ribs (10;110,12;112,113a,113b,114) of the fixing bracket according to Claim 1.

11. Tool according to Claim 10, **characterized in that** it has two longitudinal feet (212) with their free end folded in the vertical direction so as to form a respective lug (212a) arranged on opposite sides of the central seat (211).

12. Use of ribs (10;110,12;112,113a,113b,114) of a fixing bracket according to claim 1 as a guiding means for corresponding recesses (231;232) of a tool according to claim 10.

13. Assembly composed of a fixing bracket according to Claim 1 and a tool according to Claim 10 for positioning and

fixing metal sheets (2) to roof beams (3).

14. Assembly according to Claim 13, **characterized in that** the tool is joined to a screwing device.

15. Assembly according to Claim 14, **characterized in that** fixing of the bracket is performed by means of screws (1).

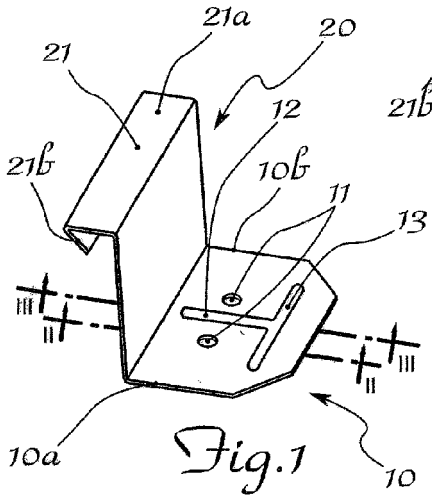

Fig.1

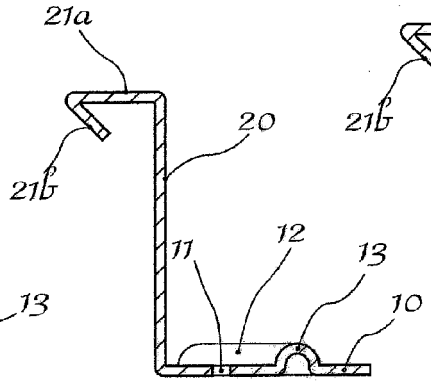

Fig.2

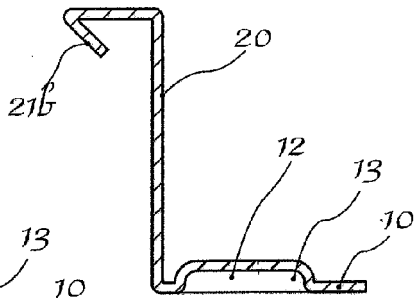

Fig.3

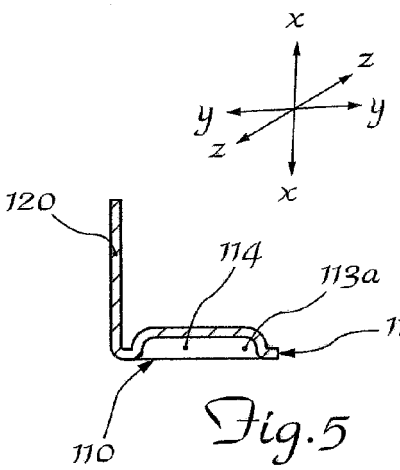

Fig.5

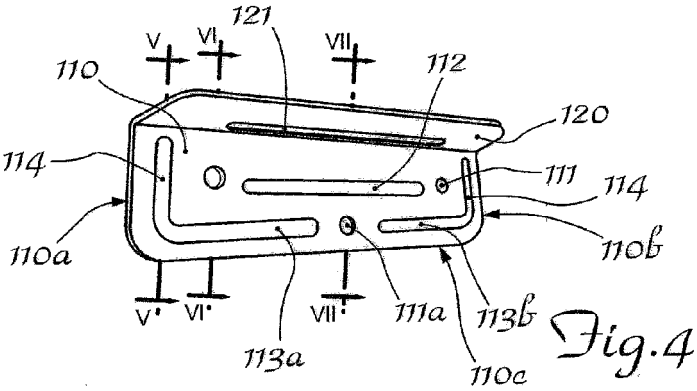

Fig.4

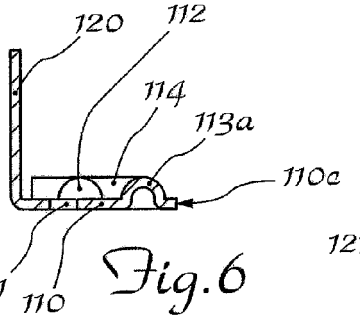

Fig.6

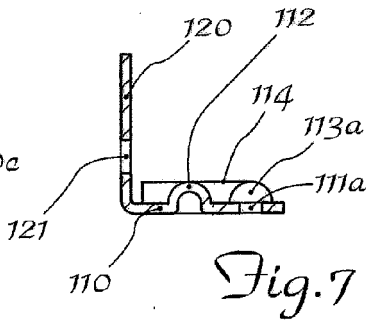

Fig.7

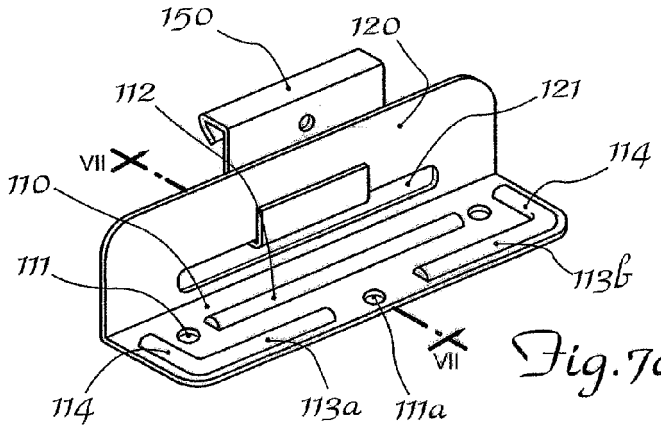

Fig.7a

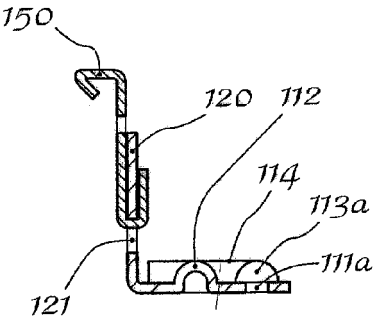

Fig.7b

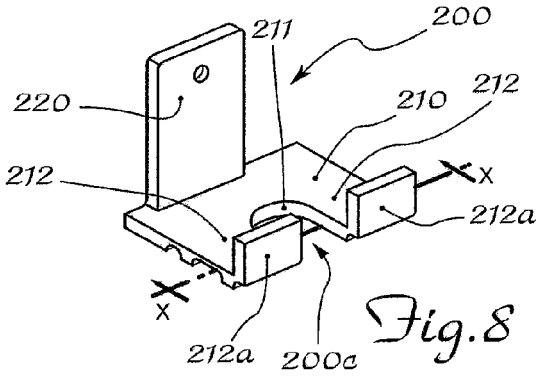

Fig.8

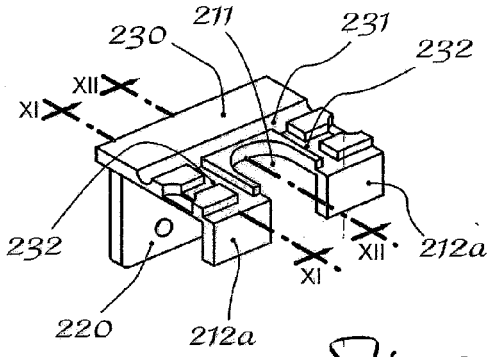

Fig.9

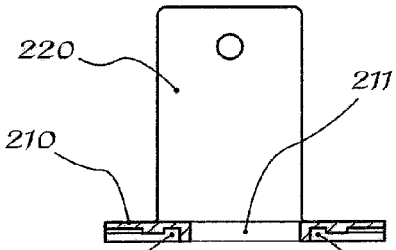

Fig.10

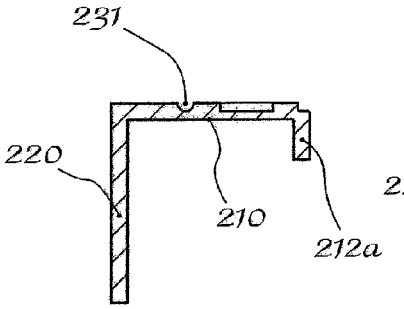

Fig.11

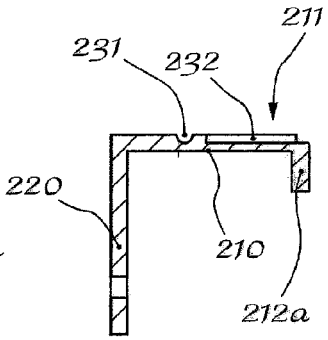

Fig.12

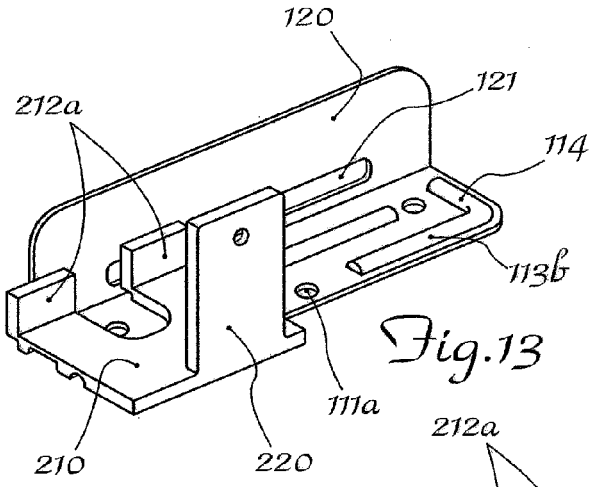

Fig.13

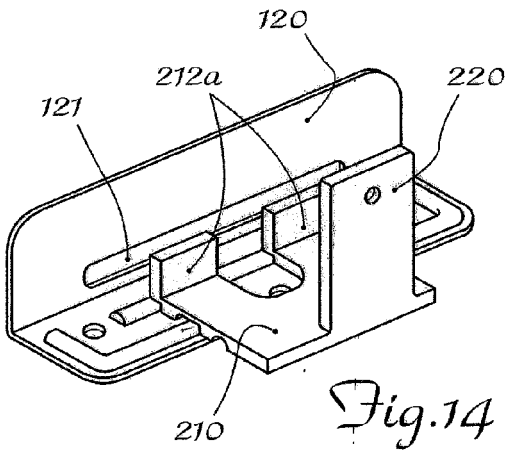

Fig.14

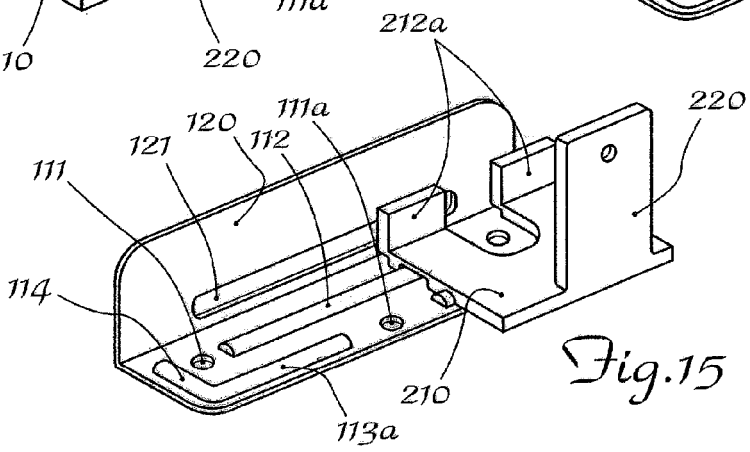

Fig.15

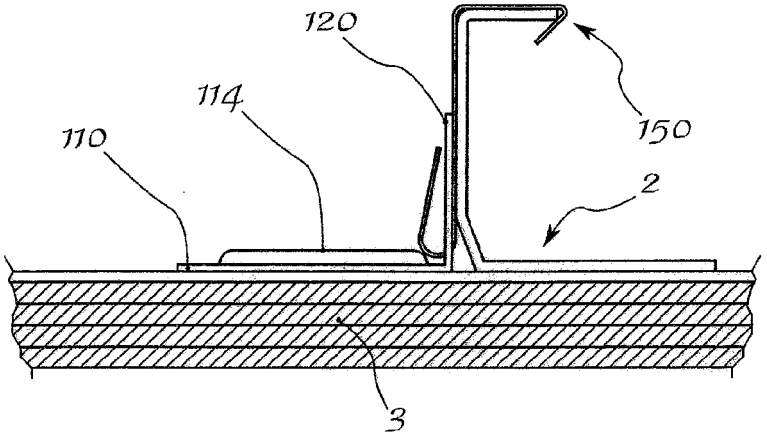

Fig.16

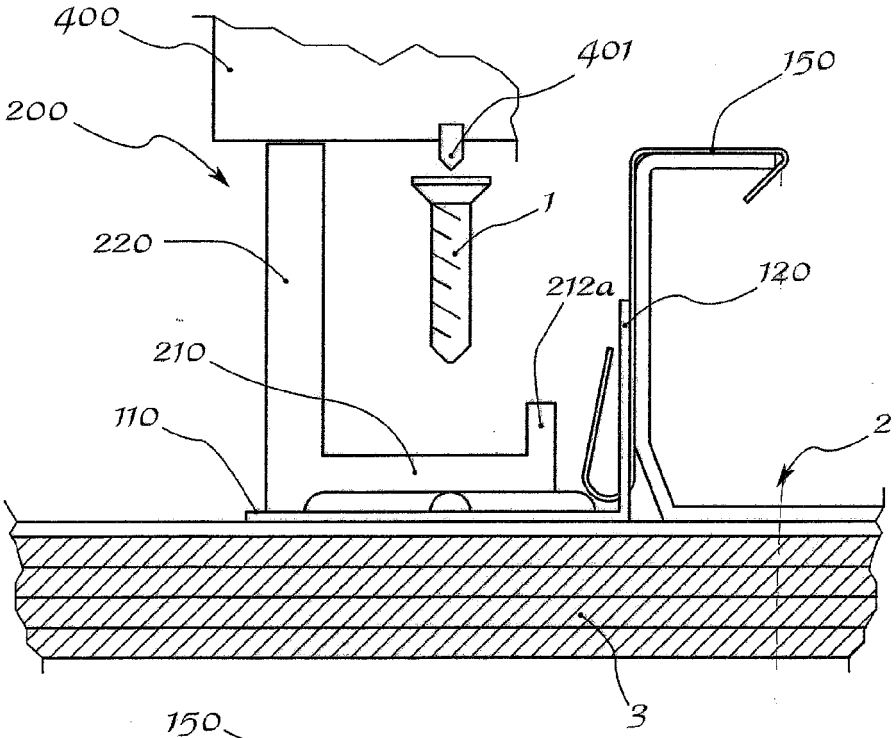

Fig.17

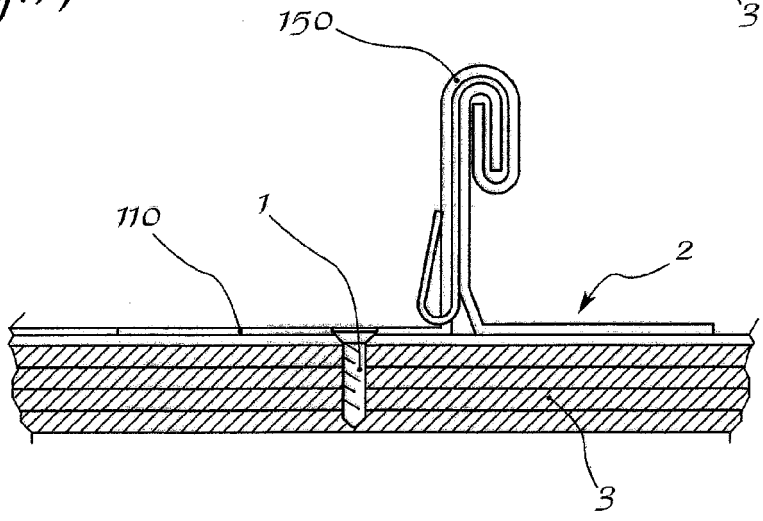

Fig.18

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EUROPEAN SEARCH REPORT

Application Number
EP 12 17 9622

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	FR 1 266 994 A (METAL HOLDING COMPANY) 17 July 1961 (1961-07-17) * figures 1-3 *	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	12 December 2012	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
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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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 17 9622

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

REFERENCES CITED IN THE DESCRIPTION

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