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(54) **ROOF BATTEN CONNECTOR**

(57) A roof batten connector comprising a sleeve (1,11,24,30), wherein a first end of the sleeve (1,11,24,30) is sized to accommodate a first roof batten

(14,27) in use, and a second end of the sleeve (1,11,24,30) is sized to accommodate a second roof batten (15,28) in use.

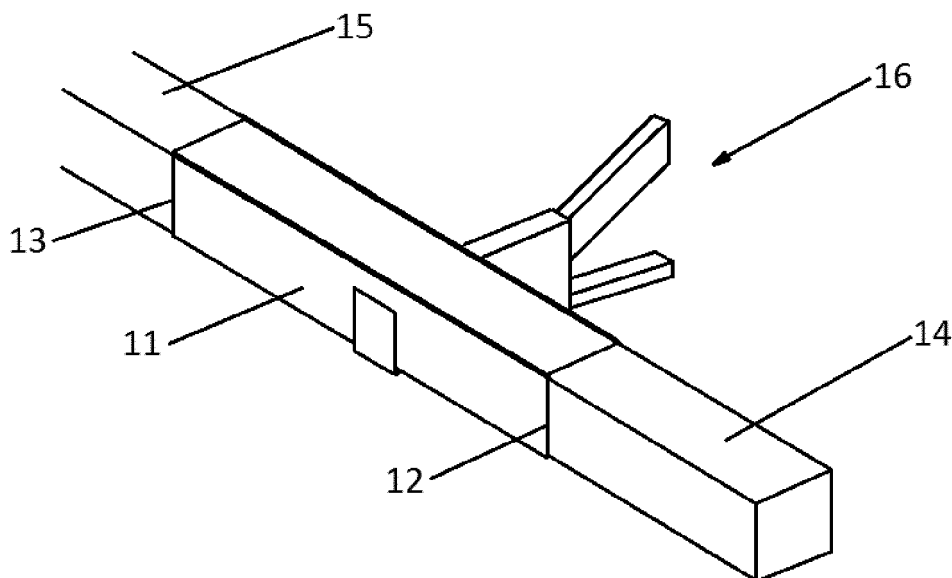


Fig. 6

Description

[0001] This invention relates to a roof batten connector and a kit of parts comprising such a roof batten connector and a crimping tool or fixing means. The invention also relates to a method of connecting roof battens.

Background

[0002] Tiled roofs are typically constructed by arranging concrete, ceramic or slate tiles over a wooden framework. The wooden framework is formed of a plurality of parallel wooden beams called roof battens (or roof lath) that lie perpendicularly to the roof rafters. The roof battens are nailed into roofing joists or roof trusses and are used to support roof tiles. A roofing membrane, comprising e.g. felt, is normally disposed between the roof battens and the rafters.

[0003] Roof battens are generally sold in standard cross-sectional sizes, e.g. 18mm x 36mm, 25mm x 38mm, 25mm x 50mm, or 30mm x 50mm. They are also sold in standard lengths, and must be cut to fit the width of the particular roof to which they are to be attached. This results in a large amount of waste, as the off-cuts are usually too small to be re-used.

[0004] To overcome the drawbacks associated with prior art, the present invention provides a method and apparatus for connecting roof battens together, such that undersized roof battens, or off-cuts of longer roof battens, can be used to support tiles on a roof. The roof batten connector of the present invention retains roof battens in a co-axial relationship, and adds little to the overall width and height of the roof battens.

Summary of the Invention

[0005] In accordance with a first aspect of the present invention there is provided a roof batten connector comprising a sleeve, wherein a first end of the sleeve is sized to accommodate a first roof batten in use, and a second end of the sleeve is sized to accommodate a second roof batten in use.

[0006] In accordance with a second aspect of the present invention there is provided a method of connecting roof battens, the method comprising: providing a sleeve, a first end of the sleeve being sized to accommodate a first roof batten in use, and a second end of the sleeve being sized to accommodate a second roof batten in use; inserting a first roof batten into the first end of the sleeve; and inserting a second roof batten into the second end of the sleeve.

[0007] A portion of the sleeve may be inwardly deformable to grip the first roof batten in use.

[0008] A portion of the sleeve may be inwardly deformable to grip the second roof batten in use.

[0009] The sleeve may be inwardly deformed to grip the first and / or second batten by a crimping tool.

[0010] The sleeve may comprise at least one perfora-

tion thorough which a first fixing means may pass to secure the sleeve to the first roof batten in use.

[0011] The sleeve may comprise at least one perforation thorough which a second fixing means may pass to secure the sleeve to the second roof batten in use.

[0012] The first or second fixing means may comprise one of the list comprising: a nail, a screw, a rivet, and a staple.

[0013] The sleeve may comprise a metal material. For example, the sleeve may be formed of folded sheet metal.

[0014] The sleeve may further comprise an insert of substantially cruciform cross-section. Such an insert could be located equidistant the first and second ends of the sleeve.

[0015] A portion of the sleeve could project into an interior of the sleeve, and said portion could comprise a serrated edge.

[0016] Perforations may extend substantially along the entire length of the sleeve.

[0017] In accordance with a third aspect of the present invention there is provided a kit of parts comprising a roof batten connector in accordance with the first aspect of the invention, where a portion of the sleeve is inwardly deformable to grip the first and / or second batten, and a crimping tool.

[0018] In accordance with a fourth aspect of the present invention there is provided a kit of parts comprising a roof batten connector in accordance with the first aspect of the invention, where the sleeve comprises at least one perforation through which fixing means may be passed to attach the sleeve to the first and / or second batten, and fixing means.

Detailed description

[0019] The invention will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 schematically shows a cross-sectional view of a roof batten connector in accordance with a first embodiment of the invention;

Fig. 2 schematically shows a cross-sectional view of a roof batten connector in accordance with a second embodiment of the invention;

Fig. 3 schematically shows a cross-sectional view of a roof batten connector in accordance with a third embodiment of the invention;

Fig. 4 schematically shows a cross-sectional view of a roof batten connector in accordance with a fourth embodiment of the invention;

Fig. 5 schematically shows a perspective view of the roof batten connector of Fig. 1 in use;

Fig. 6 schematically shows a perspective view of a crimping tool being used on the roof batten connector of Fig. 1;

Fig. 7 schematically shows a more detailed perspective view of the crimping tool of Fig. 6;

Fig. 8 schematically shows a perspective view of a roof batten connector in accordance with a fifth embodiment of the invention in use;

Figs. 9a and 9b schematically show cross-sections of a roof batten connector in accordance with a sixth embodiment of the invention; and

Fig. 10 shows a perspective view of the roof batten connector of Figs. 9a and 9b.

[0020] Fig. 1 schematically shows a cross-sectional view of a roof batten connector in accordance with a first embodiment of the invention. The roof batten connector comprises a sleeve 1.

[0021] The sleeve 1 comprises side walls 2 and 3 which are upstanding from a base 4. Side wall 2 is connected to the base 4 at a corner 5. Side wall 3 is connected to the base 4 at a corner 6. In the pictured embodiment, the sleeve 1 is formed of a sheet of 0.5 mm thick mild steel which has been folded to produce corners 5 and 6, such that the base 4 has a width approximately equivalent to the width of a roof batten to be accommodated, and side walls 2 and 3 have a height approximately equivalent to a roof batten to be accommodated. The sleeve 1 further comprises a top wall 7 which is connected to the top edges of side walls 2 and 3. The width of the top wall 7 is approximately equivalent to the width of a roof batten to be accommodated.

[0022] In the embodiment shown in Fig. 1, the base 4, side walls 2 and 3, and the top wall 7 are integrally formed with one another. Alternatively, the base 4, side walls 2 and 3, and the top wall 7 could be discrete components connected to each other, for example, by welding.

[0023] The roof batten connector of Fig. 1 is designed to contact a roof batten on four sides (i.e. on the top, the bottom, and both lateral sides) in use.

[0024] Due to the dimensions of the base 4, top wall 7 and side walls 2 and 3 being approximately equivalent to that of a roof batten to be accommodated, the sleeve forms an interference fit with a roof batten inserted into the sleeve 1.

[0025] Fig. 2 schematically shows a cross-sectional view of a roof batten connector in accordance with a second embodiment of the invention. Like reference numerals from Fig. 1 have been retained where appropriate.

[0026] The roof batten connector of Fig. 2 is similar to that shown in Fig. 1, in that it also comprises side walls 2 and 3 upstanding from a base 4, to which they are connected at corners 5 and 6, and a top wall 7 which is connected to the side wall 3 at a corner 8. However, in the roof batten connector of Fig. 1, the base 4 and top wall 7 are at substantially 90 degrees to the side walls 2 and 3, to produce a sleeve of substantially rectangular cross section. In the roof batten connector of Fig. 2, a corner 8 between the side wall 3 and the top wall 7 is an acute angle, and top wall 7 is not connected to side wall 2. The top wall 7 therefore projects downwardly into the sleeve 1 towards the base 4.

[0027] This allows the sleeve 1 to accommodate roof

battens of different cross sectional area. For example, if the base 4 is 25mm in width and the side walls 2 and 3 are 50mm in height, the sleeve 1 can accommodate both 25mm x 38mm roof battens and 25mm x 50mm roof battens. This is particularly advantageous, as both 25mm x 38mm and 25mm x 50mm are standard roof batten sizes.

[0028] Fig. 3 schematically shows a cross-sectional view of a roof batten connector in accordance with a third embodiment of the invention. Like reference numerals from Fig. 2 have been retained where appropriate.

[0029] The roof batten connector comprises a sleeve 1 comprising a base 4, side walls 2 and 3 and a top wall 7. However, the sleeve further comprises an insert 9. The insert 9 is a piece of metal having a substantially cruciform cross section which is connected to the base 4, side walls 2 and 3 and the top wall 7 of the sleeve 1. It is located approximately half way along a longitudinal extent of the sleeve 1, equidistant a first and second end of the sleeve 1. The insert 9 of Fig. 3 is integrally formed with the sleeve 1. Alternatively, the insert 9 could be a separate component connected to the sleeve 1 by, for example, welding.

[0030] The insert 9 serves a dual purpose. Firstly, it serves to preserve the shape of the sleeve 1 and prevents it from collapsing, for example, during transit. Secondly, it serves as an anchoring points for roof battens during use. A first roof batten may be inserted into a first end of the sleeve 1 and until it meets the insert 9. The first roof batten may then be hammered in a longitudinal direction on the sleeve 1 until the insert 9 is forced into an end grain of the first roof batten. If hammered with sufficient force, the first roof batten will become wedged on the insert 9, preventing it from being easily withdrawn from the sleeve 1. The same process can be repeated for a second roof batten in a second end of the sleeve 1 to join the first and second roof battens and the sleeve 1 together.

[0031] Fig. 4 schematically shows a cross-sectional view of a roof batten connector in accordance with a fourth embodiment of the invention. Like reference numerals from Fig. 3 have been retained where appropriate.

[0032] Fig 4 illustrates a further embodiment where the insert 9 is connected to the corners between the base 4, side walls 2 and 3 and top wall 7. The function and operation of the insert 9 is the same as that described with respect to Fig. 3 above.

[0033] Fig. 5 schematically shows a perspective view of the roof batten connector of Fig. 1. The roof batten connector 10 comprises a sleeve 11 substantially as set out in Fig. 1. The sleeve 11 has a first end 12 and a second end 13 opposite to the first end 12. A first roof batten 14 has been inserted into the first end 12 of the sleeve 11. A second roof batten 15 has been inserted into the second end 13 of the sleeve 11. Due to the interference fit between the sleeve 11 and the first and second roof battens 14 and 15, the entire assembly can function as one continuous roof batten and tiles can safely be placed thereon. A small gap has been left between

the first roof batten 14 and the second roof batten 15 within the sleeve 11 to allow for water expansion of the first and second roof battens 14 and 15. However, water expansion should be minimal, as roof battens are typically formed of tanned wood.

[0034] As can be seen in Fig. 5, the roof batten connector 1 maintains the connected first and second roof battens 14 and 15 in a co-axial relationship. The sleeve 11 adds little to the width of either roof batten.

[0035] Fig. 6 schematically shows a perspective view of a crimping tool 16 being used on the roof batten connector of Fig. 5. As pictured in Fig. 6, the crimping tool 16 is being used to deform a portion of the sleeve 11 inwardly to grip the first roof batten 14. Alternatively or additionally, the crimping tool 16 could be used to deform a portion of the sleeve 11 inwardly to grip the second roof batten 15.

[0036] The crimping tool 16 of Fig. 6 is shown in greater detail in Fig. 7. The crimping tool 16 comprises a body 17 which contains a mechanism which connects first handle 20 and second handle 21 to a projection 22. The mechanism in body 17 is such that when first handle 20 is moved in the direction indicated by arrow A, the projection 22 moves in the direction indicated by arrow B. Such mechanisms are generally well-known in the art from, for example, section setting pliers. Prior art section setting pliers may be adapted for use with the roof batten connector of the present invention.

[0037] The crimping tool 16 further comprises a plate 18 and a connecting arm 19 which connects the plate 18 to the body 17. The plate 18, connecting arm 19 and body 17 are dimensioned to accommodate the sleeve of a roof batten connector. In use, the plate 18 and body 17 bear against the side walls of a sleeve accommodated in the crimping tool 16, and the base of the sleeve is supported by the connecting arm 19 of the crimping tool 16. The first handle 20 is then operated which moves projection 22 towards plate 18. This causes a portion of the side wall of the sleeve to deform inwardly. If a roof batten is accommodated in the sleeve, the projection 22 also pierces the wood of the roof batten, forcing a portion of the side wall of the sleeve into the interior of the roof batten. This is a crimping process which causes the roof batten to attach to the sleeve. Once the crimping process is complete, first handle 20 may be operated in the opposite direction to arrow A (the first handle 20 is typically biased in this direction) to release the projection 22 from the roof batten and sleeve, while still leaving a portion of the sleeve crimped on the roof batten.

[0038] Fig. 8 schematically shows a perspective view of a roof batten connector in accordance with a fifth embodiment of the invention. The roof batten connector 23 comprises a sleeve 24 having a first end 25 and a second end 26. A first roof batten 27 has been inserted into the first end 25 and a second roof batten 28 has been inserted into the second end 26.

[0039] A series of perforations 29 extends substantially along the entire length of the sleeve 24. A fixing means,

such as felt nails, can be hammered through the perforations 29 to attach the sleeve 24 to the first roof batten 27 and / or the second roof batten 28.

[0040] Figs. 9a and 9b schematically show cross-sections of a roof batten connector in accordance with a sixth embodiment of the invention.

[0041] The roof batten connector comprises a sleeve 30. The sleeve 30 comprises a top wall 31. A pair of side walls 32 and 33 are connected to the top wall 31, both at substantially 90 degrees. At a lower end of side wall 32 there is connected a first base 34 at a first corner 35. At a lower end of side wall 33 there is connected a second base 36 at a second corner 37. The two corners 35 and 37 are substantially 90 degrees, giving the sleeve 30 an overall cross section of substantially rectangular shape of approximately the same size as a roof batten to be accommodated by the sleeve 30.

[0042] The cross-section of Fig. 9a has been taken at a first end of the sleeve 30. The cross-section of Fig. 9b has been taken approximately half way along a longitudinal extent of the sleeve 30, equidistant a first and second end of the sleeve.

[0043] As can be seen in Fig. 9b, the two corners 35 and 37 are acute angles, and so the base 34 and base 36 project upward into an interior of the sleeve 30. The cross-section of the sleeve 30 varies continuously between the cross-section at a first end shown in Fig. 9a and the cross-section approximately half way along a longitudinal extent of the sleeve 30 shown in Fig. 9b. As a result, during insertion of a roof batten into a first end of the sleeve 30, the base 34 and 36 initially support roof batten at the first end and then progressively bite further into the interior of the inserted roof batten as it is moved further towards the centre of the sleeve 30. When a roof batten is fully inserted into the sleeve (i.e. up to the longitudinal centre of the sleeve 30) the roof batten is firmly gripped in the sleeve due to the bases 34 and 36.

[0044] Optionally, one or both the bases 34 and 36 could have a serrated edge. In practice, this has been found to increase the ease of insertion of a roof batten into the sleeve 30, as a serrated edge more easily cuts into the roof batten compared to a smooth edge.

[0045] The sleeve 30 is symmetrical about its longitudinal centre, so that the above procedure can be repeated for a second roof batten inserted into a second end of the sleeve 30, resulting in the first and second roof battens being firmly gripped in a co-axial relationship with each other and the sleeve 30.

[0046] Fig. 10 schematically shows a perspective view of the roof batten connector of Figs. 9a and 9b. Like reference numerals have been retained where appropriate. A series of perforations, one of which is indicated at reference numeral 38, extends substantially along the entire length of the sleeve 30 in top wall 31. A fixing means, such as felt nails, can be hammered through the perforations to attach the sleeve 30 to a first roof batten and / or a second roof batten.

[0047] The invention is not limited to the specific em-

bodiments disclosed above, and other possibilities will be apparent to those skilled in the art. For example, where an insert is present, it may take a different form to that shown in Figs. 3 and 4. Inserts may comprises a single cross member, or a plurality of projections, extending from the base, side walls or top wall of the sleeve.

Claims

1. A roof batten connector comprising a sleeve, wherein a first end of the sleeve is sized to accommodate a first roof batten in use, and a second end of the sleeve is sized to accommodate a second roof batten in use. 5
2. A roof batten connector according to claim 1, wherein a portion of the sleeve is inwardly deformable to grip the first roof batten in use. 10
3. A roof batten connector according to any preceding claim, wherein a portion of the sleeve is inwardly deformable to grip the second roof batten in use. 15
4. A roof batten connector according to either of claims 2 and 3, wherein the sleeve is inwardly deformed by a crimping tool in use. 20
5. A roof batten connector according to any preceding claim, further comprising an insert of a substantially cruciform cross section. 25
6. A roof batten connector according to claim 5, wherein the insert is located equidistant between the first and second ends of the sleeve. 30
7. A roof batten connector according to any preceding claim, wherein a portion of the sleeve projects into an interior of the sleeve, said portion comprising a serrated edge. 35
8. A kit of parts comprising:
 - a roof batten connector according to any of claims 2 to 4; and 40
 - a crimping tool. 45
9. A method of connecting roof battens, the method comprising: 50
 - providing a sleeve, a first end of the sleeve being sized to accommodate a first roof batten in use, and a second end of the sleeve being sized to accommodate a second roof batten in use; 55
 - inserting a first roof batten into the first end of the sleeve; and
 - inserting a second roof batten into the second

end of the sleeve.

10. A method according to claim 9, further comprising the step of inwardly deforming a portion of the sleeve to grip the first roof batten.

11. A method according to either of claims 9 and 10, further comprising the step of inwardly deforming a portion of the sleeve to grip the first second batten.

12. A method according to either of claims 10 and 11, wherein the step of inwardly deforming a portion of the sleeve is performed by a crimping tool.

13. A method according to any of claims 9 to 12, wherein the sleeve further comprises an insert of a substantially cruciform cross section.

14. A method according to claim 13, wherein the insert is located equidistant between the first and second ends of the sleeve.

15. A method according to any of claims 9 to 14, wherein a portion of the sleeve projects into an interior of the sleeve, said portion comprising a serrated edge.

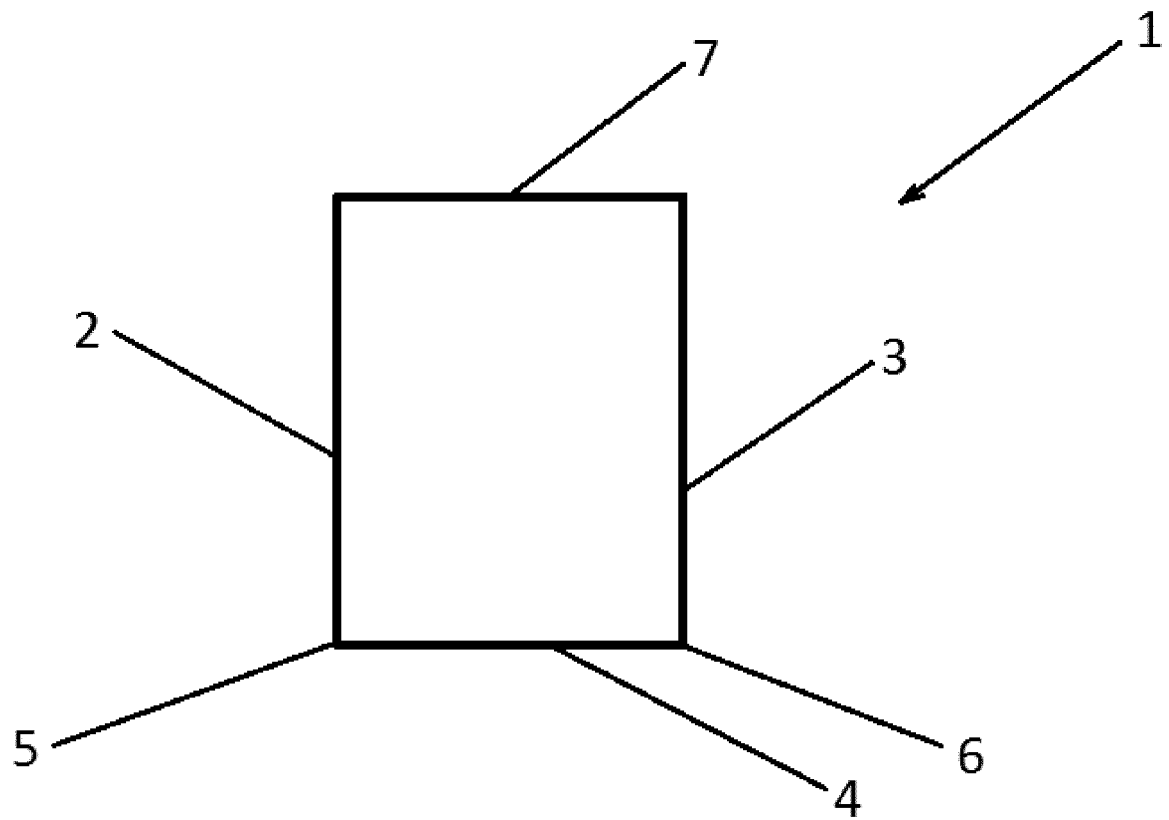


Fig. 1

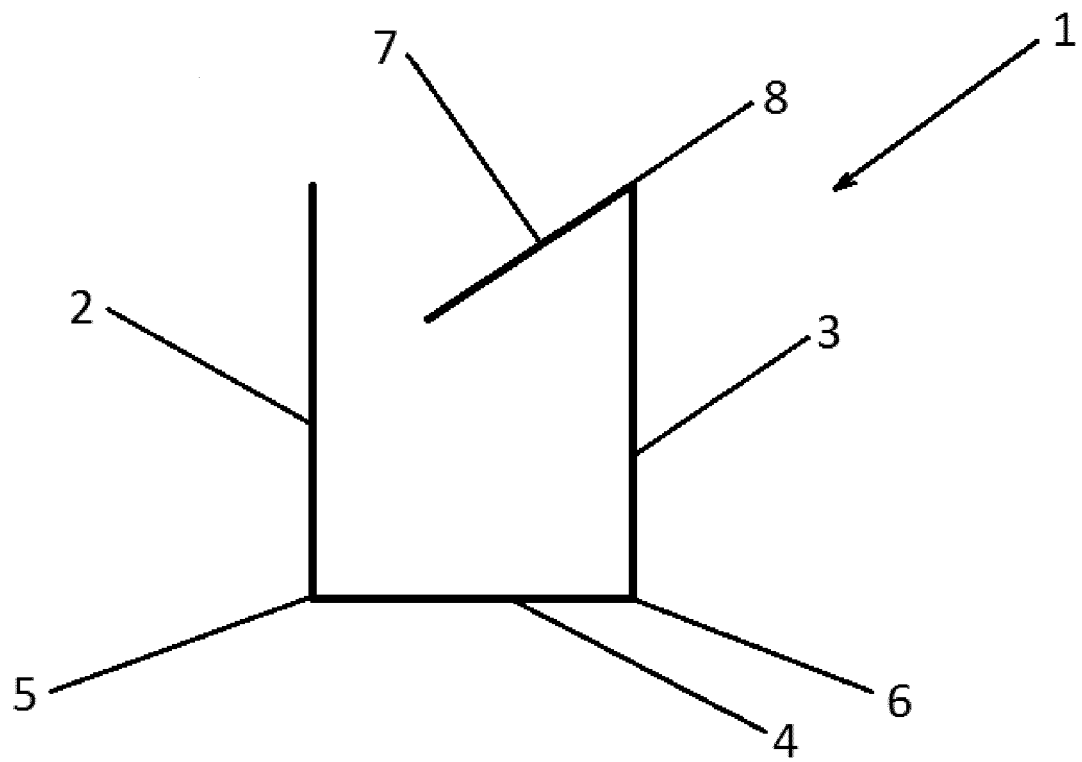


Fig. 2

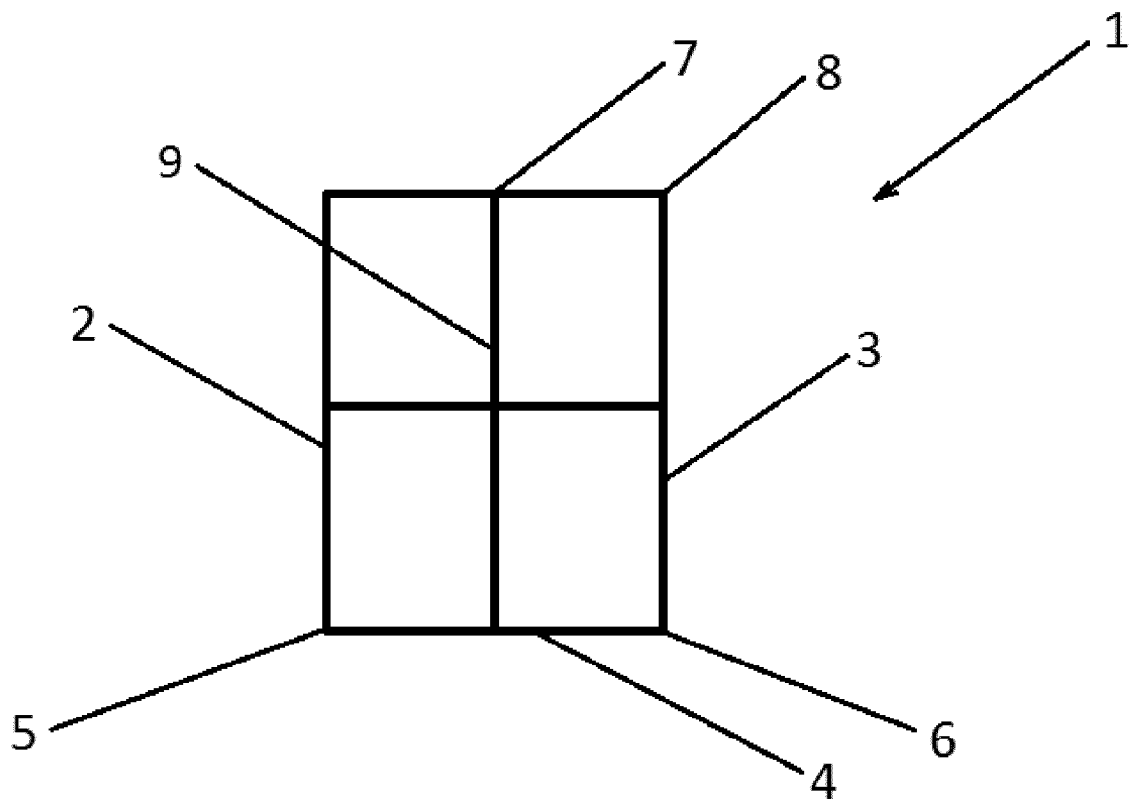


Fig. 3

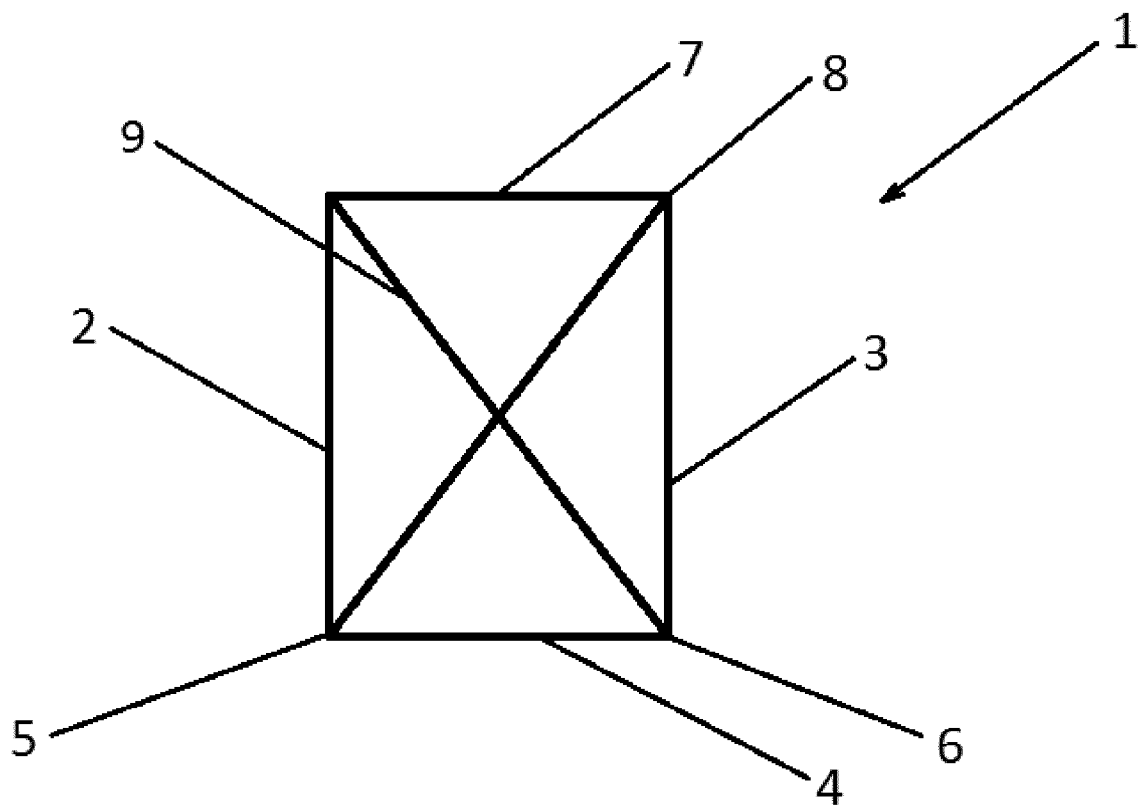


Fig. 4

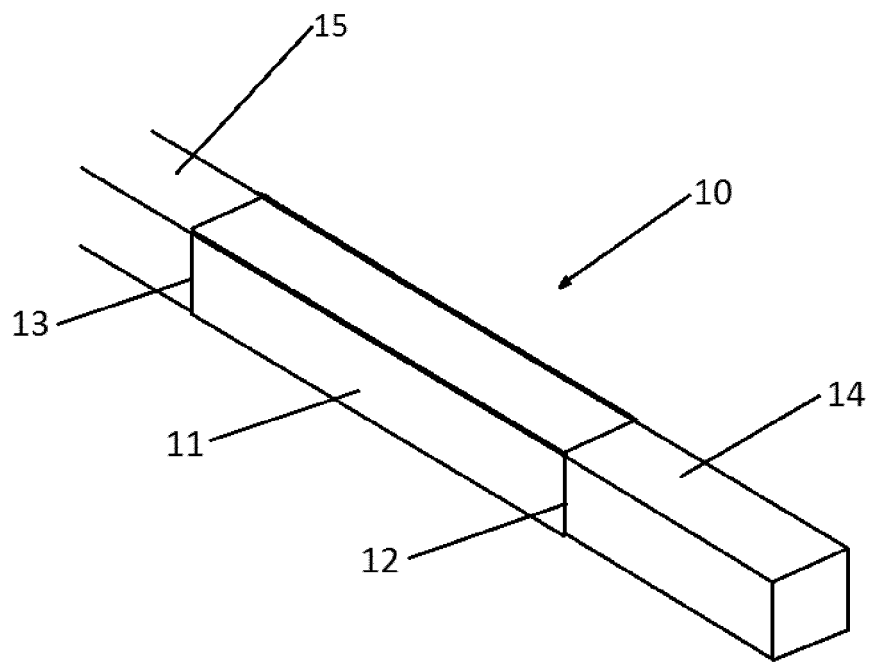


Fig. 5

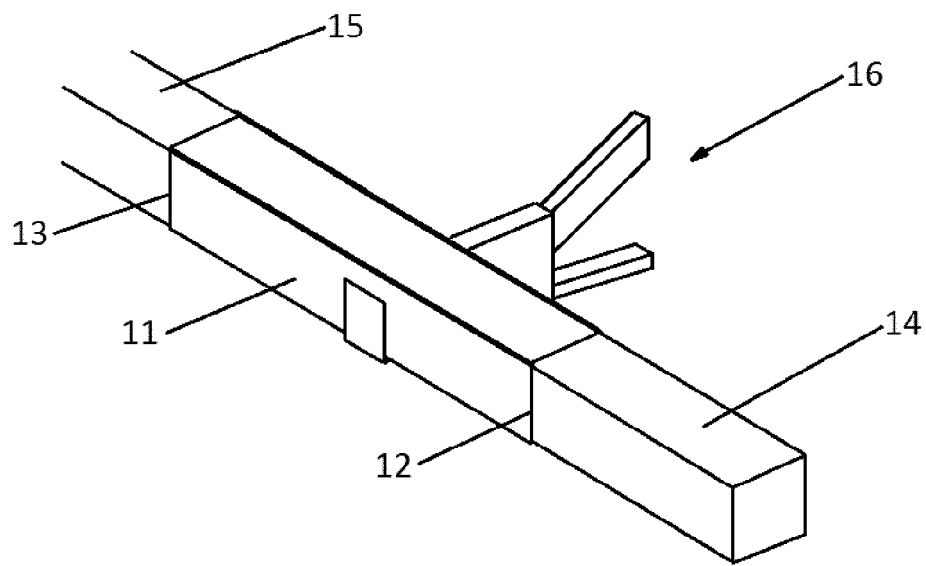


Fig. 6

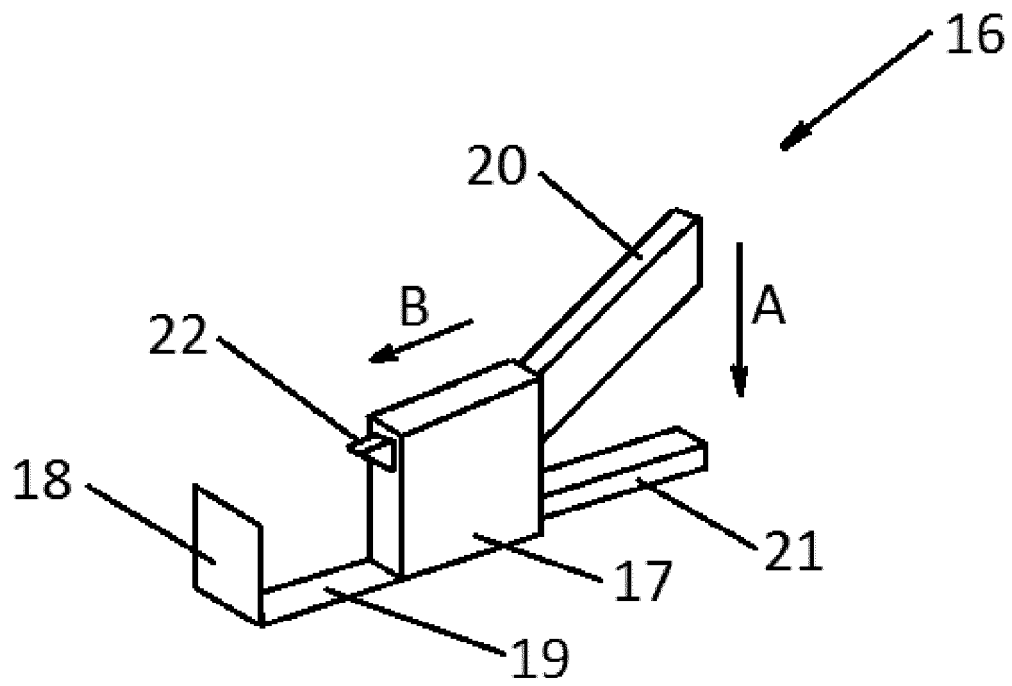


Fig. 7

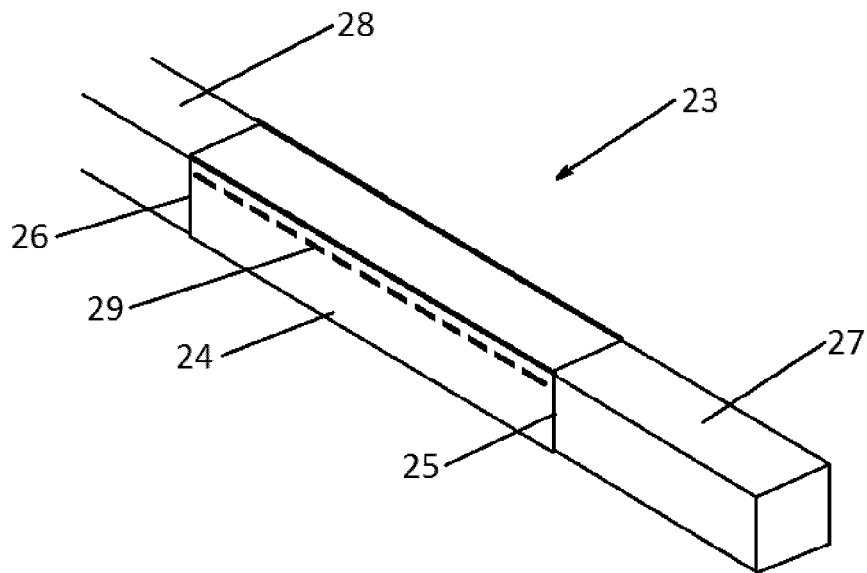


Fig. 8

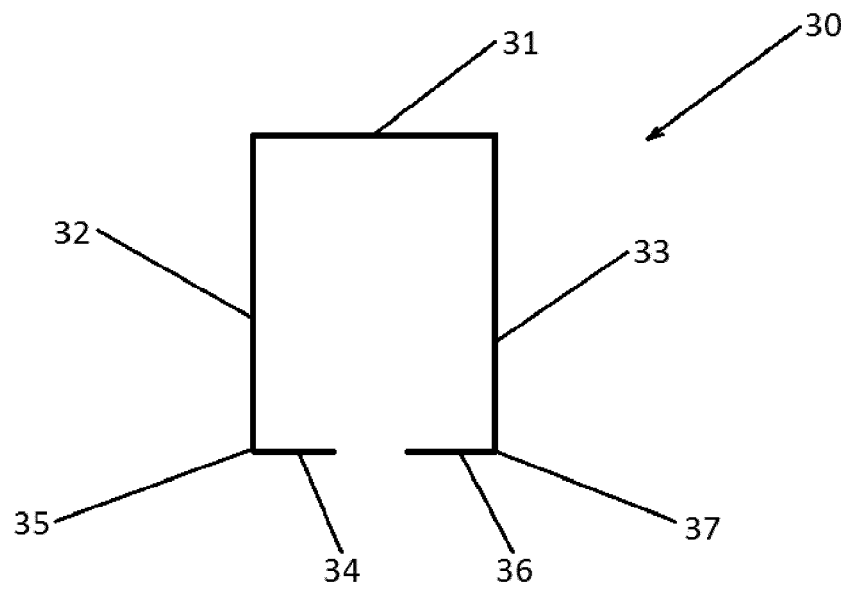


Fig. 9a

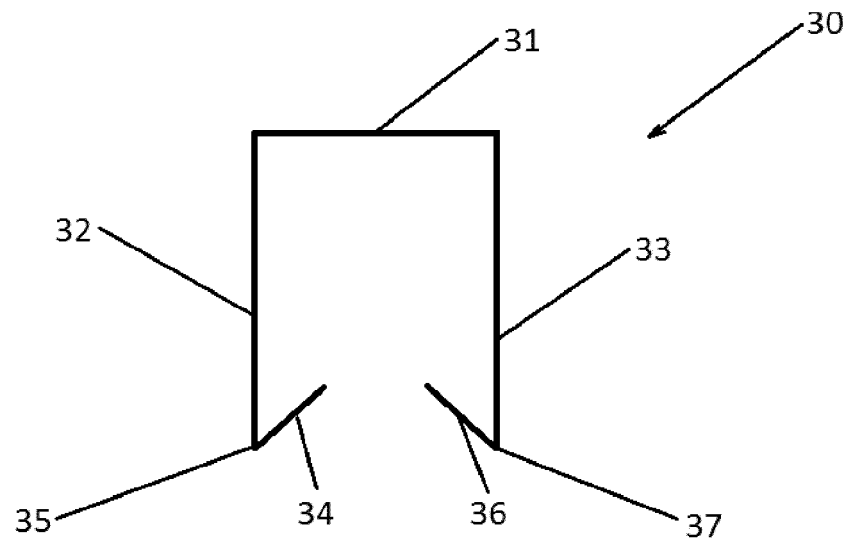


Fig. 9b

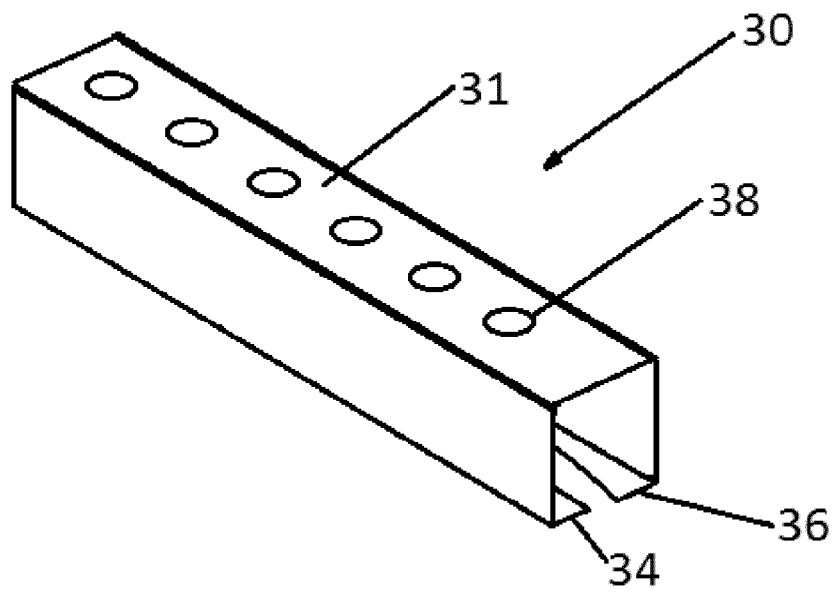


Fig. 10



EUROPEAN SEARCH REPORT

Application Number
EP 15 19 6330

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 March 2016	Leroux, Corentine
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82