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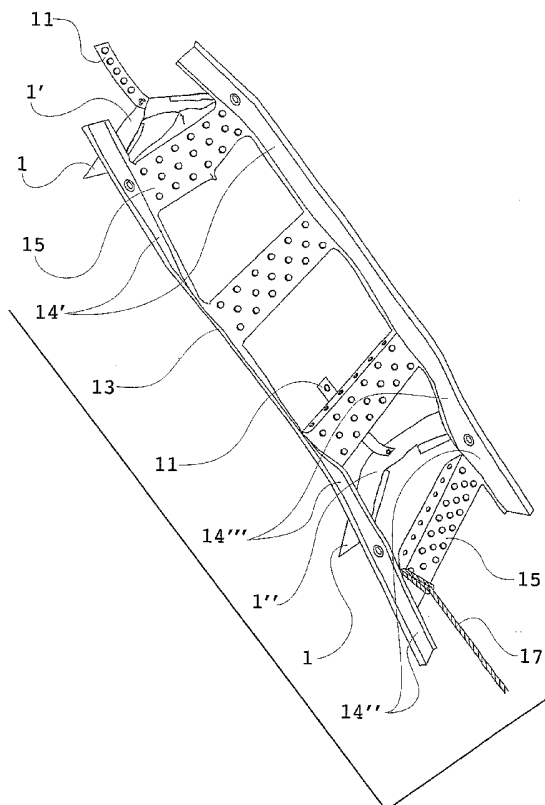
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(54) Title: HOLDER FOR A ROOF EQUIPMENT DETAIL, ROOF EQUIPMENT AGGREGATE AND ROOF EQUIPMENT DETAIL



(57) Abstract: A holder (1) for an equipment detail (13) to be mounted to roofs and the like, including a holder portion (2) for fastening to a support and engagement means (3) for co-operation with the equipment detail, is distinguished in that said engagement means includes at least two separated engagement portions (3) for engagement with the equipment detail, that the holder portion (2) is arranged at a portion of a holder which is positioned between the engagement portions (3), and that the holder is provided with a yielding zone which is yielding to forces acting on the engagement portions and counter-acting forces acting on the fastening portion. The invention also concerns a roof equipment aggregate and an equipment detail.

**HOLDER FOR A ROOF EQUIPMENT DETAIL, ROOF EQUIPMENT AGGREGATE
AND ROOF EQUIPMENT DETAIL**

Field of the invention

5 The invention concerns a holder according to the preamble of claim 1. It also concerns a roof equipment aggregate and an equipment detail for roofs.

Background of the invention

10 Holders for roof ladders, roof bridges and roof rails are previously known which are adapted for secure fastening of these equipment details to an outer roof. The equipment details are used for different types of work on the roof such as plate works, snow removal, chimney cleaning etc. Holders of
15 today aim for a safe and stable fixing of the equipment detail in order to prevent falling accidents or the like.

Aim and most important features of the invention

Equipment details of today work generally function well and
20 the aim of the present invention is to provide a development of the known equipment in the direction of enhanced economy with respect to costs for components as well as for mounting, maintenance etc. as well as enhanced security for workers being on the roof and using the equipment.

25 These aims are obtained in a device according to the above through the features of the characterizing portion of claim 1. By providing a yielding zone in the manner that is defined in this claim, at least a part of the energy to be taken up, for
30 example for stopping the fall of a worker who is connected by means of a lifeline to the equipment detail, to the equipment detail itself, which through balanced design relative to the holder, through deformation takes up this transferred energy.

The result of this is that the energy from the pull that occurs when a falling person is obstructed by the lifeline will be taken up leniently and effectively, wherefore damage to the falling person because of rough pulling loads are
5 minimized.

In particular, and which is preferred, the yielding zone is an energy receiving deformation zone of the holder, which means that the energy is taken up by the holder as well as by the
10 equipment detail itself.

It has proved to be advantageous to produce the holder as an elongated metallic body and in particular a profile body of metal plate material. Hereby is achieved that the holder is
15 easily produced through simple metal plate working such as bending of portions longitudinally with respect of each other for forming for example a web and one or two flanges.

Parameters such as material thickness, widths and lengths or
20 the different portions etc. are determined through testing, by a person skilled in the art, of the holder according to the invention in connection with an equipment detail, which is to be supported by the holder.

25 Corresponding advantages are achieved through a roof equipment aggregate including on the one hand a holder, on the other hand an equipment detail, wherein these elements are balanced to each other with respect of deformation.

30 The invention also concerns an equipment detail such as a roof ladder or a roof bridge or the like which is distinguished in that it is provided with at least one energy absorbing deformation zone which is adapted and balanced to the holder.

Corresponding advantages are obtained through this equipment detail.

Brief description of drawings

5 The invention will now be described in more detail by way of embodiments and with reference to the annexed drawings, wherein:

Fig. 1a and 1b show a holder according to the invention in
10 two different perspective views,

Fig. 2 shows a roof ladder mounted over to two holders according to the invention,

15 Fig. 3 shows a detail of the aggregate in Fig. 2 in a side view, and

Fig. 4 shows an aggregate as in Fig. 2 after energy reception of the aggregate after resisting a fall of a test
20 weight.

Description of embodiment

In fig. 1a and 1b is shown a holder 1 for equipment details to be mounted to a roof and the like in the form of a profile
25 body of bent metal plate material. Reference numeral 2 indicates a fastening portion for fastening to a support, which fastening portion is essentially centrally positioned on the elongated holder. At the ends of the holder are provided engagement portions including two obliquely upwardly directed
30 engagement elements 3, which each has a screw hole and which are intended for the fixation of an equipment detail to be carried by the holder.

In detail the profile body comprising the holder 1 is constructed with a web 4, a lower longitudinal bend 5 and a lower flange 7. Further the holder at its top portion has a second longitudinal bend 6 and an upper flange 8, which in this case is interrupted through an interruption 9. A holder screw 10 is used for fastening the holder 1 to a holder bracket 11 which in turn over a number of holes 12 for holder elements is applied to a base such as a metal plate roof etc.

In fig. 2 is shown an aggregate including two holders 1, for fixing onto a base, which are arranged to carry a roof ladder 13 of a kind that is marketed by the applicant of this application. The roof ladder 13 is formed in one piece of metal plate material and provides a number of bends and press drawings and cut-outs for forming longitudinal, angled strings 14, and between them a number of thread elements of deep drawn metal plate. This ladder construction is such that it is easily balanced to the holder as concerns energy absorbing deformation.

Fig. 3 shows more in detail how the aggregate in fig. 2 is fixed to a base 16.

Fig. 4 shows the aggregate in fig. 2 after a falling test, wherein a one hundred kilogram weight (not shown) is fastened through a lifeline 17 to the roof ladder 13 and is thereafter dropped straight down 2,5 meters. As is shown in fig. 4, the total aggregate including two holders 1 and the roof ladder 13 has resisted the fall very well but has been deformed because of the pull that occurs through the fall. The deformation that occurred of the holders 1 as well as different parts of the roof ladder 13 has brought along an advantageously lenient

energy reception in connection with that the fall of the test weight has been slowed down.

As is shown in the figure, both holders have been bent,
5 essentially at the holder portion (see fig. 1a), wherein the engagement portions that engage the roof ladder 13 have been pressed closer to each other. Hereby force has been transferred in a contracting direction to the roof ladder 13. In particular, at the left part of fig. 4, this contracting
10 force has resulted in a bending deformation of the thread being positioned to the far left on the figure at 15'.

Further, the holder 1 to the right, as seen in fig. 4, has been deformed essentially in the same way, wherein a
15 contracting force in this case has been transferred to the strings at 14'' for achieving an energy receiving deformation in the form of a compressing together of these strings in this position. Here, however, the deformation has not noticeably affected adjacent steps of the roof ladder 13. Further is
20 shown from the figure that deformations occur also in position 14''', to the left of the right holder, and at position 14', where a twisting of the strings can be seen.

Altogether, the whole aggregate has contributed to secure
25 catching up and slowing down of the falling weight through energy absorbing deformation, and the corresponding will happen in case of a fall of a person who is secured in a corresponding way to a roof ladder as is shown in fig. 4.

30 The invention can be modified within the scope of the following claims, and in particular it is applicable also to other equipment details for roofs, such as also roof bridges. The holder can be constructed otherwise even if the described

shape is preferred. In fig. 1a and 1b is shown that the upper flange is interrupted at 9, which gives an advantageous initiation of the bending in that area. The transversal section shape is preferably L-shaped at the fastening portion
5 and shallow U-shaped at the engagement portions.

The holder can, however, be constructed otherwise, for example with a somewhat wider lower flange than the upper flange. The engagement elements are to be adapted to the equipment detail
10 to be carried by the holder and can therefore be disposed otherwise and also have other means for engagement with said equipment detail. The fastening console 11 can be constructed otherwise and as an example also be an integral part of the holder instead of being a separate component as is shown. In
15 principle it is true that a similar fastening detail, as the fastening console 11, can be used for all kinds of metal plate roofs, irrespective of metal plate profile and, at occasions, roof tile imitating shape. This is one of the great advantages with respect to previously known holders.

20 Within the scope of the invention is that essentially all energy reception occurs at the equipment detail, but what is preferred is an adaption between the holder/holders and the equipment detail, so that both contribute to part of the
25 energy reception which is not insignificant.

The invention is applicable on different types of roofs. Besides, what is shown, on metal plate roofs, it may also be used for tile covered or slate roofs, web or roofing-felt
30 covered roofs etc. It can of course find its use also on other support structures such as walls and the like. In case of tiles, as an example, the fastening detail needs to be adapted for passing the tile layer for fastening to a support surface

which in that case often is comprised of tongued and grooved boards.

5 Alternative fastening details are clamping holders for fixing through clamping to vertical metal plate edge folds at folded metal plate roofs. Also screw holders for metal plate edge folds can come into question.

CLAIMS

1. Holder (1) for an equipment detail (13) to be mounted to roofs and the like, including a holder portion (2) for
5 fastening to a support and engagement means (3) for co-operation with the equipment detail, **characterised in**
- that said engagement means includes at least two separated engagement portions (3) for engagement with the equipment detail,
10 - that the holder portion (2) is arranged at a portion of a holder which is positioned between the engagement portions (3) and
- that the holder is provided with a yielding zone which is yielding to forces acting on the engagement portions and
15 counter-acting forces acting on the fastening portion.
2. Holder according to claim 1, **characterized in that** the yielding zone is an energy absorbing deformation zone for bending deformations.
- 20 3. Holder according to claim 1 or 2, **characterized in that** it is an elongated element with the fastening portion (2) essentially centrally positioned.
- 25 4. Holder according to claim 1, 2 or 3, **characterized in that** the engagement portions (3) are arranged at the respective ends of the holder.
5. Holder according to any of the previous claims,
30 **characterized in that** the engagement portions (3) include, as seen in a using position, upwardly, sideways or downwardly directed engagement elements.

6. Holder according to any of the previous claims, **characterized in that** it is comprised of a metal body including at least two portions (4; 7; 8) that are longitudinally bent with respect of each other.

5

7. Holder according to claim 6, **characterized in that** the metallic body has a transversal sectional shape that varies along it's length extension.

10 8. Holder according to claim 7, **characterized in that** said transversal sectional shape is L-shaped at the fastening portion.

15 9. Holder according to claims 7 or 8, **characterized in that** said transversal sectional shape is U-shaped at the engagement portions.

10. Holder according to any of the previous claims, **characterized in that** it is comprised of a profile body.

20

11. Holder according to any of the previous claims, **characterized in that** it is produced from a metal plate material.

25 12. Holder according to any of the previous claims, **characterized in that** it includes a fastening bracket for fastening to the fastening portion and for fixing to a support.

30 13. Roof equipment aggregate including an equipment detail and at least one holder according to any of the claims 1-12, wherein the yielding zone of the holder is balanced to at

least one energy absorbing deformation zone of said equipment detail.

14. Roof equipment aggregate according to claim 13,

5 **characterized in that** the equipment detail is any element from the group: a roof ladder, a roof bridge.

15. Equipment detail from the group: a roof ladder, a roof bridge, for co-operation with a holder according to any of the
10 claims 1-12, **characterized in that** it is provided with at least one energy absorbing deformation zone which is balanced to the holder.

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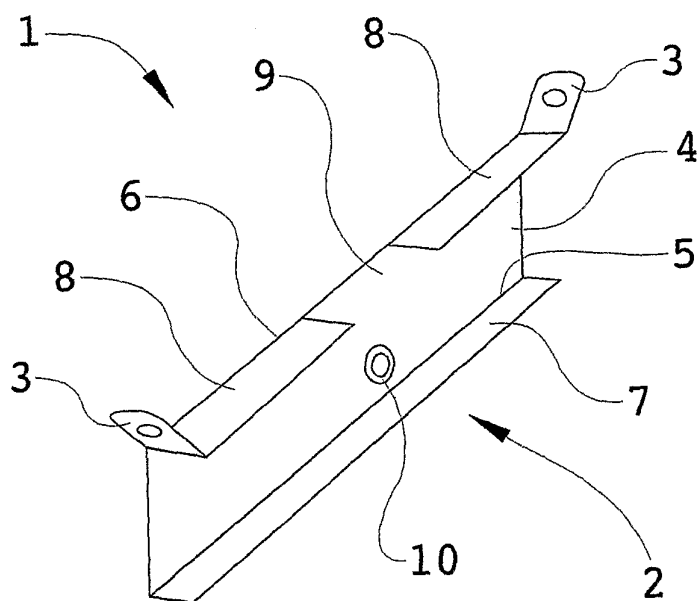


Fig 1a

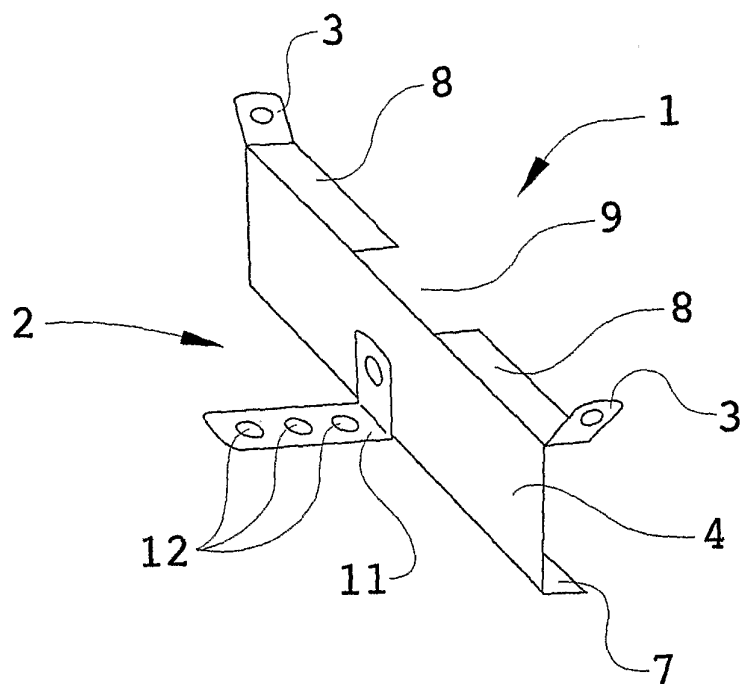


Fig 1b

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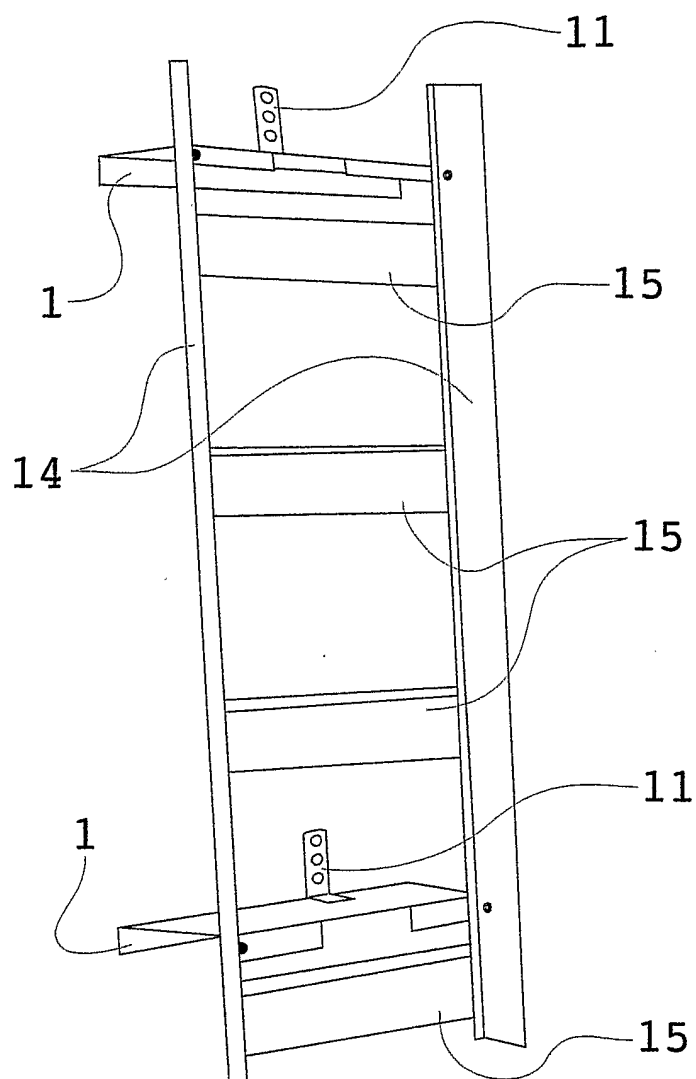


Fig 2

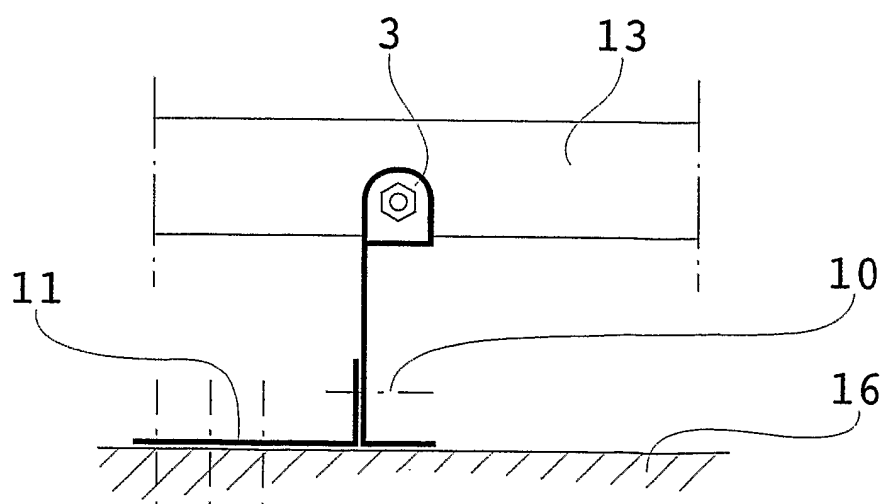
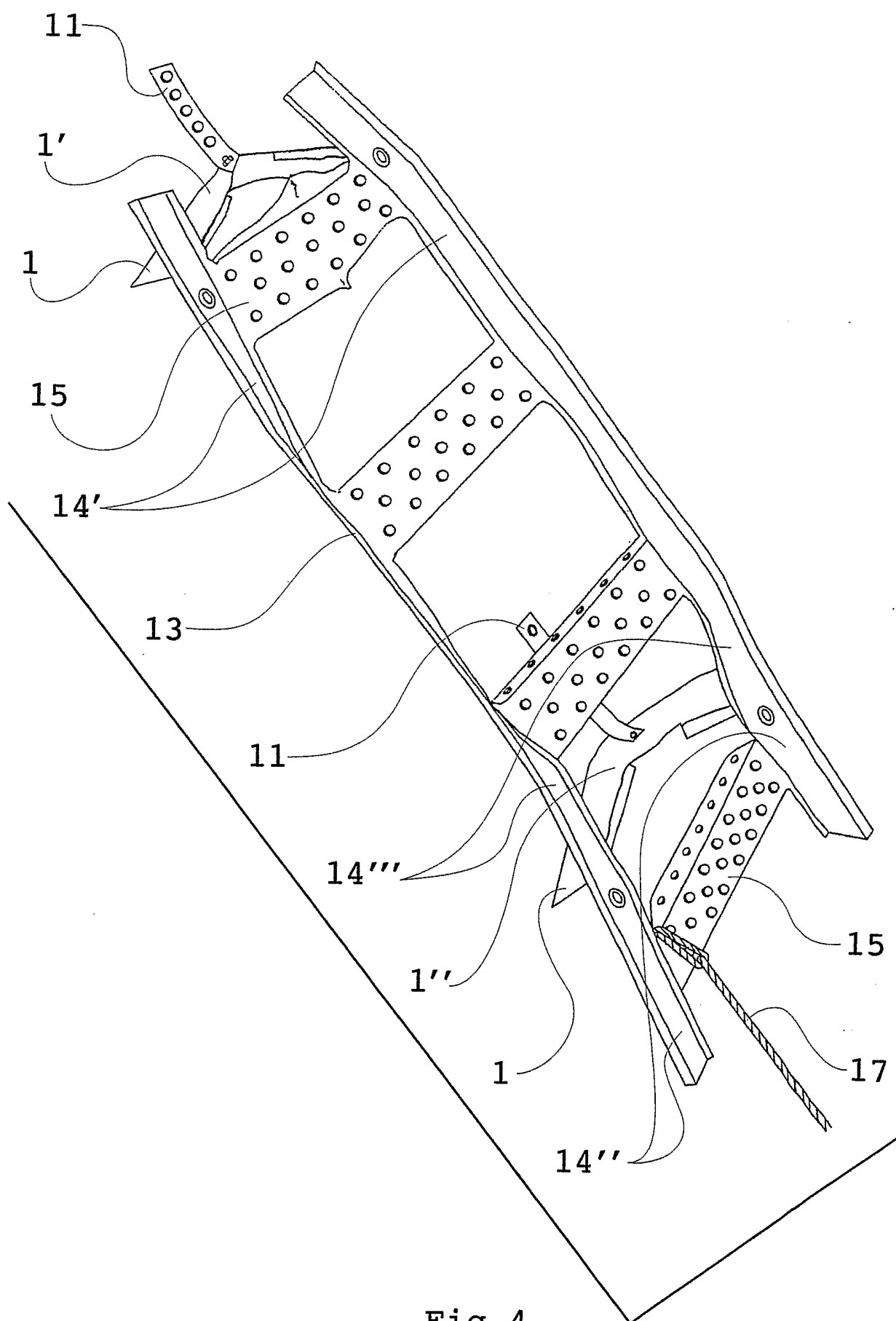


Fig 3

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2005/001468

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: E04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SE 0203782 A (ORIMA-TUOTE OY), 29 June 2003 (29.06.2003), figure 1, abstract --	1-15
A	SE 460135 B (WELAND STÅL AB), 11 Sept 1989 (11.09.1989), figures 1-3, abstract --	1-15
A	WO 8505395 A1 (GRÄNGES ALUMINIUM AKTIEBOLAG), 5 December 1985 (05.12.1985), page 2, line 3 - line 11; page 4, line 1 - page 5, line 9, figures 1-2, abstract --	1-15
A	SE 462926 B (M. ELGENBERG), 17 Sept 1990 (17.09.1990), figures 1-6, abstract --	1,13-15

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2005/001468

Continuation of second sheet

E04D 13/12 (2006.01)

INTERNATIONAL SEARCH REPORT

Information on patent family members

26/11/2005

International application No.

PCT/SE 2005/001468

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