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(54) **Bracket for roof equipment, roof protection system and method for mounting a roof protection system**

(57) A bracket (1) for roof equipment (4) including a fastening portion (2) for fastening on a roof and an engagement portion (3) for cooperation with said roof equipment, wherein the engagement portion extends in a direction upwardly from the fastening portion, at an angle to the roof, as seen in a using position, wherein the engagement portion has receiving holes (5) for receiving snow protection equipment. Said receiving hole includes a hole portion (11) which connects two widening hole portions (13,14) for forming of a continuous and closed cut-out for a holding profile (4) which comprises said receiving hole. The invention also concerns roof protection equipment and a method for mounting.

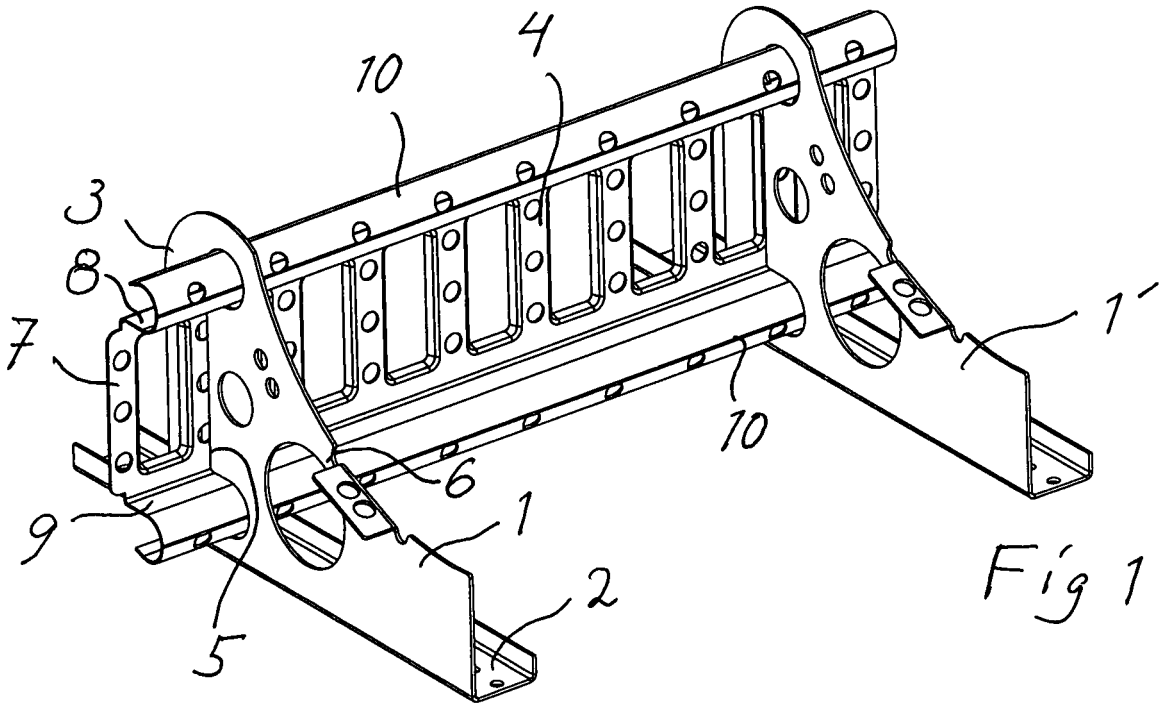

Fig 1

EP 1 852 562 A2

Description

Field of the invention

[0001] The invention concerns a bracket for roof equipment according to the preamble of claim 1. The invention also concerns a roof protection system and a method for mounting a roof protection system.

Background of the invention

[0002] Roof equipment in the form of snow racks which are intended to comprise blockings against roof avalanches are typically mounted as close to the base of the roof as possible. A known bracket for such a roof equipment consists of a metal plate bent in L-shape, which is fastened to the roof in a way which depends on the type of roofing and which comprises a number of holes for snow rack pipes.

[0003] The known bracket has also been possible to use for fastening holding profiles in the form of so called profile boards, which are comprised of metal plate profiles which, by having a more considerable covering in vertical direction than three rack pipes (which is a common equipment) provide a more effective protection against roof avalanches. For fastening, these holding profiles are equipped with special fittings, which are inserted sideways of the holding profile and fixed by screw fasteners in holes in each bracket positioned along the base of the roof.

[0004] Mounting of holding profiles in this way is, however, laborious and requires accurate fitting work, i.a. since the spacing between the holes of the holding profile not always corresponds to the position of the brackets.

[0005] Further, provision of special fittings adapted to the holding profiles are required as well as individual fastening at the respective bracket which altogether results in a costly and laboriously applicable solution.

Aim and most important features of the invention

[0006] It is an aim of the present invention to provide a bracket as stated initially wherein the problems of the background art are avoided or at least reduced.

[0007] In particular it is an aim to provide an economically more advantageous solution which furthermore is safe and easily mounted.

[0008] These aims are obtained in a bracket of the kind mentioned above through the features of the characterising portion of claim 1.

[0009] Hereby is achieved that a holding profile can be simply inserted into the receiving holes in the brackets mounted on the roof with good fit. This solution results in that besides the fact that the mounting will be fast, in that the holding profile is secured against forces in the direction of the roof pitch, also if the holding profile is not individually fixed to each bracket, since the fact that the construction with a slot-shaped hole portion of the receiving hole such that it closely connects to the shape of the holding profile results in that the latter is secured over its width.

[0010] Further is allowed use of simple fastening means for fixing the holding profile to a bracket, for example ordinary angle-irons and metal plate screws.

[0011] The construction of the receiving hole should further connect as close as possible (connect) to the shape of the holding profile, such that unnecessary play is avoided without for that sake the insertion through a plurality of brackets positioned after one another is made difficult.

[0012] In a preferred embodiment of the invention, the widened hole portions are dimensioned for receiving and cooperation with conventional rack pipes. This way it is achieved that the bracket will become a combination bracket which can be used for different applications with further improved economy.

[0013] It is preferable if the bracket has a weakened deformation portion for the reception of loads over a predetermined level. This is an essential advantage when using a roof protection system for anchoring life lines for roof workers.

[0014] By the bracket and/or the holding profile being made in a metal plate material, the use of simple and economic machining methods and low manufacturing costs are possible.

[0015] The invention also concerns a roof protection system including a plurality of brackets and at least one holding profile and a method for mounting a roof protection system.

Brief description of drawings

[0016] The invention will now be described in more detail by way of embodiments and with reference to the annexed drawings, wherein:

Fig. 1 shows a roof protection system including two brackets and a holding profile,
Fig. 2 shows the roof protection system in Fig. 1 during the process of inserting a holding profile into a bracket,
Fig. 3 shows a bracket according to the invention in larger scale, and
Fig. 4 shows in a side view the roof protection system with, besides the holding profile, a roof bridge mounted to the bracket over a holder.

Description of embodiments

[0017] The roof protection system in Fig. 1 includes two brackets 1 and 1' and a holding profile 4. Each bracket is made from a shaped and bent metal plate detail and includes a fastening portion 2 for fastening to a substrate in the form of a roof and a portion bent upwardly to an angle of essentially 90° thereto in the form of an engagement portion 3 which is constructed for cooperation with

different types of roof equipment.

[0018] For that purpose the bracket 1 has a receiving hole 5 for receiving the holding profile 4. The holding profile 4 has a shallow U-shape with a web 7 and two, essentially in a right angle thereto, upstanding legs 8 and 9, which each one ends in rounded portions 10. These rounded portions are directed upwardly in the direction along the roof and through the rounded configuration the holding profile 4 comprises a good and gentle anchoring point for a life line for a roof worker.

[0019] In Fig. 2 is shown, for explanatory purposes, the roof protection system in Fig. 1 in the process of inserting the holding profile 4 into the receiving hole 5 in the bracket 1'. The bracket 1 in Fig. 3 is shown in a larger scale, whereof is shown the fastening portion 2 and the engagement portion 3, whereof the latter comprises the receiving hole 5.

[0020] The receiving hole 5 has a slot-shaped hole portion 11 with a central web portion 12 and two leg portions 15 and 16 at an angle to the web portion 12. The leg portions 15 and 16 widen from the web portion 12 and are terminated in widened hole portions 13 and 14, which are formed with such dimensions that they, on a one hand, are capable of receiving rack pipes, when the bracket is to be used for fastening one or more roof racks, on the other hand, be adapted to with good fit receive the rounded portions 10 of the holding profile 4.

[0021] 17 indicates a an additional hole for receiving rack pipes, which is positioned between the widened hole portions 13 and 14, however without being positioned such that it any way interferes with the slot-shaped hole portion 11 of the receiving hole 15.

[0022] The bracket 1 further comprises a deformation portion 6, which allows deformation and tearing apart, respectively, at loads exceeding pre-determined values for the purpose of preventing inelastic pull from a falling person having a life line fastened in a rack pipe or a holding profile which is arranged a the bracket 1.

[0023] The bracket 1 also comprises a support 18 for fastening a per se known holder for a roof/walking bridge.

[0024] When using the bracket for rack pipes or a rolled profile in the hole portion 13, at a certain load on the pipe in the direction in a downward direction, in the direction of the roof pitch, (downwardly to the right as seen in Fig. 3), the bracket will be deformed in such a way that the pipe is pressed down into the web portion 12 down against the fastening portion 2 of the bracket. This happens by the pipe being brought down into the leg portion 15 which becomes evenly narrower in the direction from the widened hole portion 13, which results in that the bracket is given a possibility to stay with its fasteners in a roof despite a strong pull-load. This is because the lever, which the force on the bracket acts upon, this way will be displaced from the top of the hole portion 13 in the direction against the bottom of the bracket, which results in that there will occur essentially shear forces acting on the fastenings which results in that a pull out from the roof can be avoided.

[0025] Fig. 4 shows a bracket 21 mounted on a roof with a roof plane indicated with interrupted line at 22. A holding profile 25 is inserted into the receiving hole of the bracket. Further, a roof bridge 24 is mounted on the bracket 21 over a holder 23. The holder 23 is formed as an arch of a circle in order to adjoin to a contacting surface against a corresponding support surface 26 which is formed as an arch of a circle on the bracket. This construction results in that the holder can be fixed in different positions such that the roof bridge 24 can be mounted horizontally, essentially irrespective of the prevailing roof pitch. With 28 is indicated a fastener (corresponding to the fastener 18 in Fig. 3) for fastening the holder 23. At (one of) the positions marked with F_1 the holder is fixed to the bracket by for example screw fasteners. At the positions marked with F_2, the roof bridge is fixed to the holder by for example screw fasteners.

[0026] It is an advantage to be able to combine the different functions of the inventive bracket into one single unit. On the one hand are achieved advantages with respect to handling such as simpler storage, simpler mounting on site on a roof, reduced tampering on the roof. Further is achieved the advantage that the holding profile can be positioned on an optimal position on a roof as seen from a snow protection point of view without this being a bar against the positioning of the roof bridge in the same place. During work on the roof it can be an advantage having the holding profile mounted close to the roof bridge, since the latter can prevent that certain tools and certain work material used by a roof worker falls down from the roof. Further it is easy for the roof worker to apply his life line (see above).

[0027] The invention can be modified within the scope of the following claims. It is preferred that the bracket and the holding profile are manufactured as bent metal plate details, but also other solutions such as welded details can come into question.

[0028] The receiving hole in the bracket can be shaped differently for adapting to a holding profile with different configuration. It is, however, an advantage to shape the bracket with widened hole portions that can be used for more than one purpose.

Claims

1. Bracket (1) for roof equipment (4) including a fastening portion (2) for fastening on a roof and an engagement portion (3) for cooperation with said roof equipment, wherein the engagement portion extends in a direction upwardly from the fastening portion, at an angle to the roof, as seen in a using position, wherein the engagement portion has receiving holes (5) for receiving snow protection equipment, wherein said receiving hole includes a hole portion (11) which connects to widening hole portions (13,14) for forming of a continuous and closed cut-out for a holding profile (4) which comprises said receiving hole, **char-**

acterised in

- **that** said hole portion (11) which connects to widened hole portions (13,14) is a slot shaped hole portion (11) and
- **that** the slot shaped hole portion (11) has a shallow U-shaped configuration with a web portion (12) essentially extending in said direction and a leg portion (15,16) adjoining to each end of the web portion, each one with an extension at an angle thereto, and each one adjoining to a widened hole portion (13,14),

whereby the form of the receiving hole closely connects to the shape of the holding profile.

2. Bracket according to claim 1, **characterised in that** the receiving hole (5) has an extension essentially in said direction.

3. Bracket according to claim 1 or 2, **characterised in that** said widened hole portions (13,14) are dimensioned for receiving and cooperating with rack pipes.

4. Bracket according to any of the previous claims, **characterised in that** it has a fastener (18,28) for fastening a holder (23) for a roof/walking bridge (24).

5. Bracket according to any of the previous claims, **characterised in that** it has a weakened deformation portion (6) for receiving loads above a pre-determined level.

6. Bracket according to any of the previous claims, **characterised in that** it is comprised of a metal plate detail with the engagement portion (3) bent in an essentially right angle to the fastening portion (2).

7. Bracket according to any of the previous claims, **characterised in that** it has additional hole (17) for rack pipes.

8. Bracket according to any of the previous claims, **characterised in that** at least one outer leg portion (15) evenly transforms narrowing in the direction from an outer hole portion (13).

9. Roof protection system including a plurality of brackets (1,1') according to any of the previous claims, **characterised in that** it includes at least one holding profile (4), which has a web (7) and two legs (8,9) which are terminated with rounded chute-shaped profile portions (10), wherein the holding profile has a transversal sectional shape which is adapted for insertion into the receiving holes of the brackets, such that the form of the receiving hole closely connects to the shape of the holding profile.

10. Roof protection system according to claim 9, **characterised in that** the web (7) of the holding profile along it's length exhibits distributed holes (19) having collared edges.

11. Method for mounting a roof protection system according to claim 8 or 9, wherein a holding profile (4) which has a web and two legs which are terminated with rounded chute-shaped profile portions are inserted into receiving holes arranged in a plurality of brackets, said receiving holes including a slot-shaped hole portion which connects to widened hole portions for forming a continuous and closed hole, whereby the shape of the receiving holes closely connects to the shape of the holding profile.

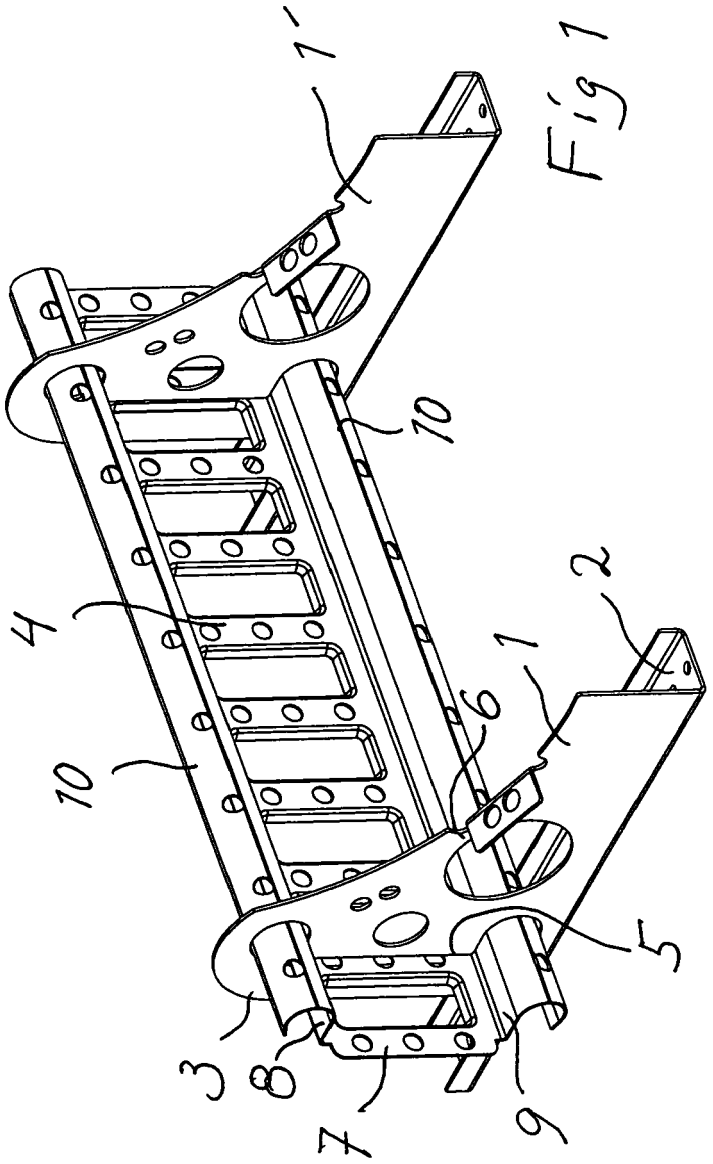

Fig 1

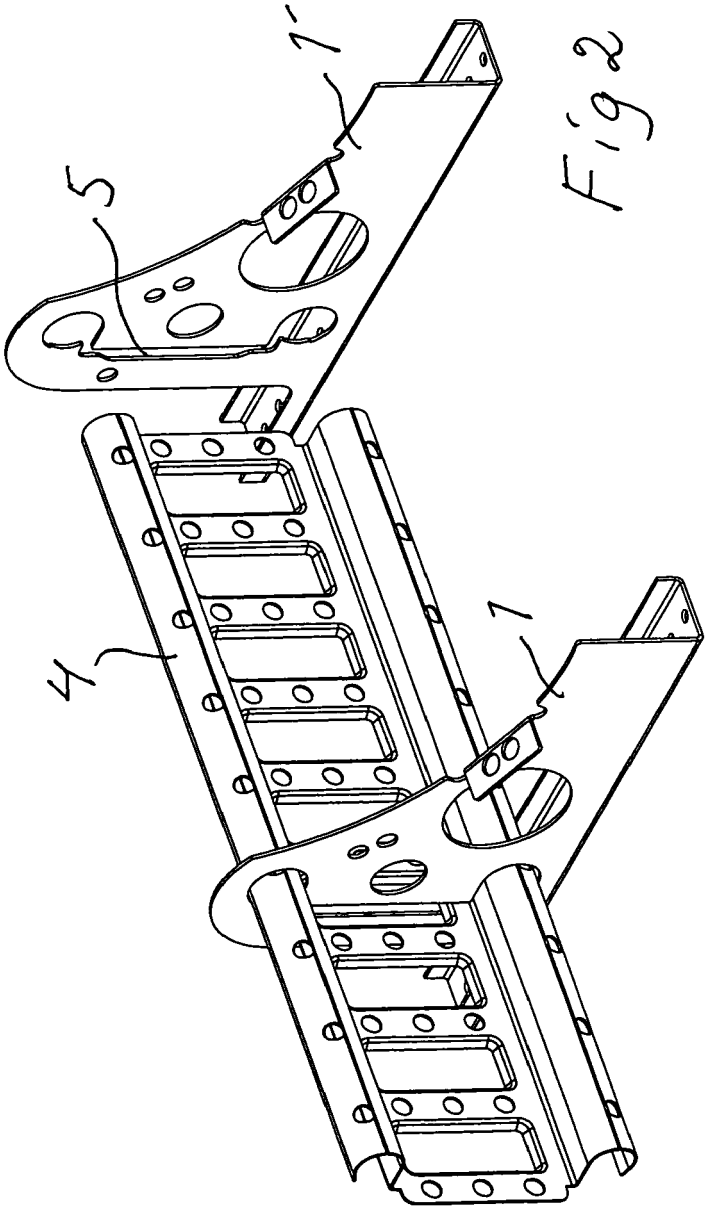

Fig 2

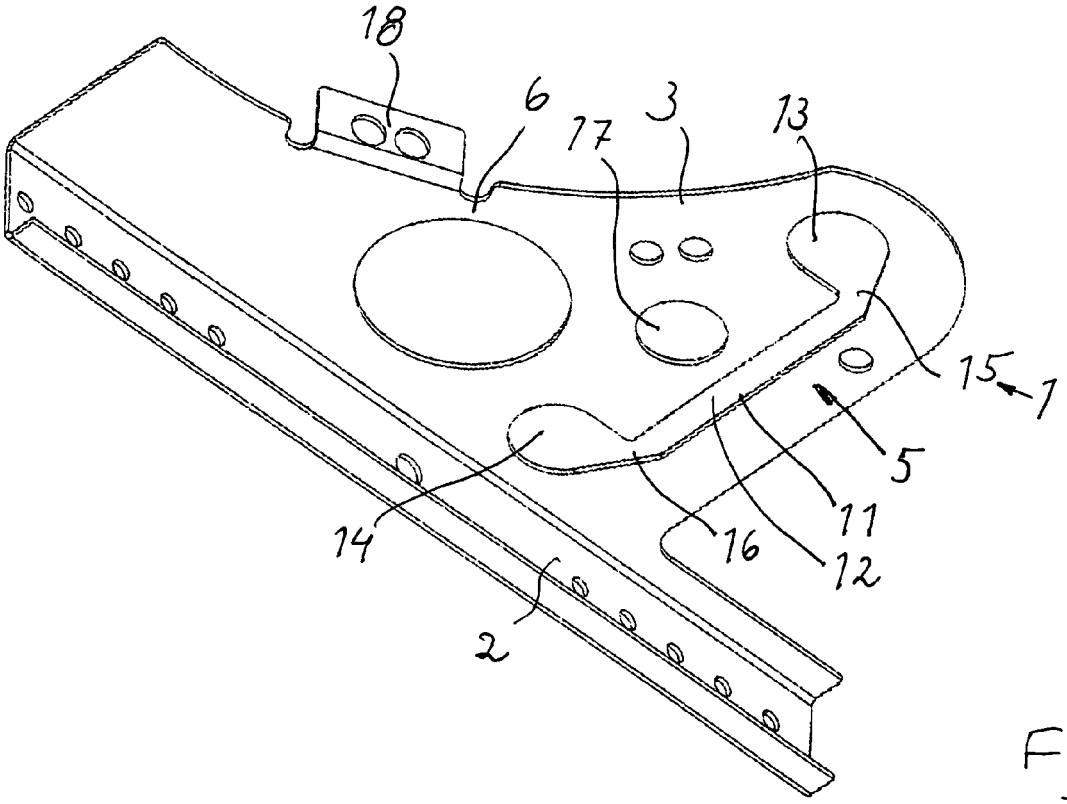

Fig3

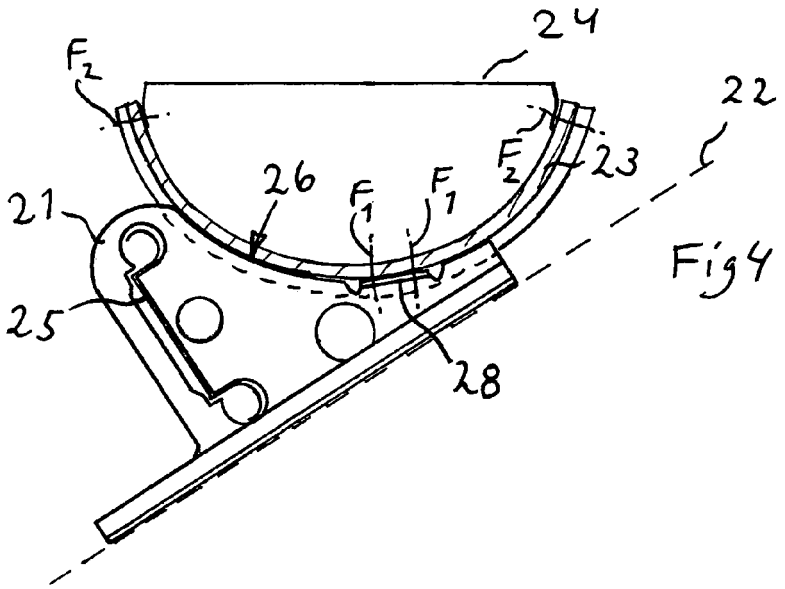

Fig4