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(71) Applicant: **NIFF Srl**
33170 Pordenone (IT)

(72) Inventor: **MAJER, Edoardo**
33170 PORDENONE (IT)

(74) Representative: **Vinci, Marcello**
Ufficio Veneto Brevetti
Via Sorio 116
35141 Padova (IT)

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(54) **MODULAR HAIL GUARD FOR MOTOR CARS**

(57) The invention is a hail guard for motor cars, comprising a tubular structure or a section bar structure (S1, S2, S3) to which a protection net (R) is fixed, said structure (S1, S2, S3) comprising: two generically linear supporting bases (S1) whose ends (S1a) are generically inclined upwards; four supports (S2) connected and fixed to said supporting bases (S1) in such a way that they

substantially face upwards; two net holding elements (S3) suited to be connected and fixed to the upper ends (S2b, S2'b) of two right and left supports (S2, S2') in such a way that they substantially lie on a plane that is orthogonal to the supporting bases (S1). The protection net (R) is fixed to said net holding elements (S3) and kept tensioned by the entire structure (S1, S2, S3).

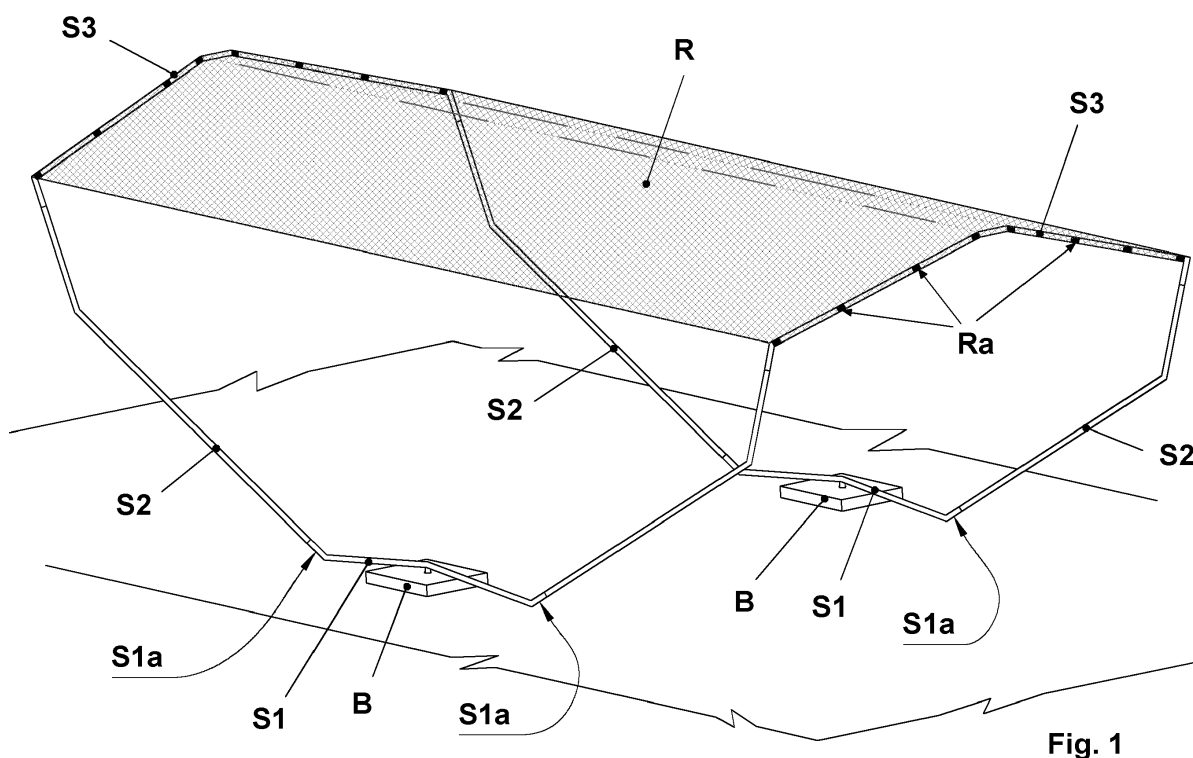


Fig. 1

Description

[0001] The present patent concerns hail protection guards for motor cars.

[0002] Motor cars are constantly exposed to weather agents, both when they are running and when they are parked in public areas.

[0003] The bodies of motor cars are designed and manufactured in such a way that they can resist weather agents such as ice, rain, sun, but they are strongly affected by the action of hail. Small-sized hail pellets have limited kinetic energy and therefore bounce on car bodies without damaging them.

[0004] Bigger hail pellets, instead, seriously damage car bodies and force car owners to sustain the cost of expensive repair operations.

[0005] Usually car drivers try to protect their cars by sheltering them under bridges, overpasses or porticoes that are situated near the place where it is hailing.

[0006] The damages caused by hail are considerable for car dealers that keep several vehicles parked outdoors.

[0007] It is not possible to shelter all of the vehicles inside the car dealer's premises, which normally are already occupied by other vehicles.

[0008] The construction of carports or fixed roofs to protect the vehicles that are parked outdoors is very expensive and limits the visibility of the vehicles offered for sale.

[0009] Folding hail guards are known, which are suited to be positioned on each individual motor vehicle.

[0010] Said hail guards need to be secured to the vehicle in such a way that they cannot be lifted and transported by the wind. This means that there is the risk of scratching the car body with the fixing hooks, or even of damaging the car body while installing the guard on the motor vehicle or removing it from the same.

[0011] Said hail guards must be removed every time a motor vehicle has to be driven on public roads, for example for a trial drive offered to a potential buyer, and re-positioned on the motor vehicle itself when it is parked outdoors again. In the long or short time interval during which a hail guard is not used, it occupies some space, thus limiting the passage or manoeuvring space available for other vehicles, or it is necessary to fold it.

[0012] In order to overcome all of the above mentioned drawbacks, a new modular hail guard for motor cars has been designed and constructed.

[0013] It is one object of the present invention to provide a new hail guard for motor cars that is able to effectively protect from hail the car positioned under it.

[0014] It is another object of the present invention to provide a new hail guard that does not need to be installed or mounted on the car to be protected.

[0015] It is another object of the present invention to provide a new hail guard that allows the motor car to move with no need to remove the guard itself.

[0016] It is another object of the present invention to

provide a new hail guard that does not constitute a hindrance for other cars when it is not used.

[0017] It is a further object of the present invention to provide a light hail guard structure that is easy to transport and to install.

[0018] It is another object of the present invention to provide an elastic hail guard structure that is capable of keeping the protection net always tensioned.

[0019] These and other direct and complementary objects are achieved by the new modular hail guard for motor cars comprising a modular structure which is suited to rest on the ground and to which a protection net is fixed, said protection net having thick meshes and being suited to cover the entire motor car.

[0020] The modular structure is suited to rest on the ground, at the sides of the motor car, and to support and tighten the net above the motor car.

[0021] Said structure comprises, in its main parts, the following elements:

- two first elements, hereinafter referred to as supporting bases, suited to rest on the ground at the sides of the motor car to be protected and generically parallel to the latter;
- four second elements, hereinafter referred to as supports, connected and fixed to said supporting bases in such a way that they substantially face upwards;
- two third elements, hereinafter referred to as net holding elements, suited to be connected and fixed to the upper ends of two right and left, front or rear supports, in such a way that they substantially lie on a plane that is orthogonal to the supporting bases.

[0022] In particular, the shape and size of said supporting bases and said supports are such that it is possible to arrange said two net holding elements so that their height exceeds the height of the motor vehicle to be protected and that the mutual distance between said two net holding elements exceeds the length of the motor vehicle to be protected.

[0023] According to the invention, each one of said supporting bases has a generically arched shape, with the concave side facing downwards and the ends facing upwards.

[0024] According to the invention, furthermore, each supporting base is provided with elements, parts or projections that allow it to be fixed to the ground or to be inserted in or fixed to a base.

[0025] The length of each one of said two net holding elements exceeds the width of the motor vehicle to be protected, in such a way that the distance between each supporting base and the corresponding supports and the opposite supporting base with the corresponding supports exceeds the width of the motor vehicle to be protected.

[0026] It is preferable for each net holding element to be in a generically arched shape, with the concave side facing downwards and the ends facing downwards.

[0027] According to an alternative embodiment of the invention, said net holding element comprises two portions that are angled with respect to each other, similarly to the two sloping sides of a roof, with the ends facing downwards.

[0028] According to the invention, said supporting bases, said supports and said net holding elements are constituted by elements that are suited to be fixed to each other by means of elements or devices that prevent them from coming off, so that they can be easily and rapidly joined to each other.

[0029] The elements that make up the modular structure can be made of a metal tube or section bar, laminated timber, plastic reinforced by fiberglass, Kevlar or other suitable materials.

[0030] The modular structure is thus constituted by two supporting bases positioned at the sides of the motor vehicle, two pairs of supports or rods joined to said supporting bases and facing upwards, and two completing upper net holding arches or elements, each one of which is joined to the upper ends of the two front or rear supports or rods.

[0031] The protection net is constituted by a net made of a resistant plastic material whose meshes are sufficiently thick to hold the hail pellets that may damage the body of the motor vehicle.

[0032] Said protection net is tensioned and fixed between said two net holding elements, in such a way as to cover the entire area included between said net holding elements, said supports and said supporting bases.

[0033] According to the invention, coupling elements are provided that are suited to fix the protection net to the net holding elements.

[0034] Said coupling elements are preferably constituted by clips with C-shaped cross section that are suited to be pressure-fitted on the net holding elements.

[0035] According to a first embodiment of the invention, said coupling elements are separate objects: the procedure for fixing the protection net in this case comprises the step of positioning the edge of the net on the net holding element and the step of applying the coupling elements in such a way that said edge of the protection net is held between the coupling elements and the net holding element.

[0036] According to a second embodiment of the invention, said coupling elements are joined to the edge of the protection net: the protection net is fixed by simply tensioning the net and applying the corresponding coupling elements to the net holding element.

[0037] Moving the net holding elements of the modular structure towards each other means subjecting the two lateral arches to elastic tension, each one of said two lateral arches being constituted by a supporting base and two rods or supports, which facilitates the application of the protection net.

[0038] Once the protection net has been applied, said two lateral arches, formed by supporting base and supports, keep the protection net that is positioned above

the motor vehicle tensioned.

[0039] A further embodiment of said supports is possible, that is, an embodiment according to which their upper terminal portion is U-shaped.

5 **[0040]** Each support with U-shaped upper terminal portion is joined to a supporting base and makes it possible to support two net holding elements.

[0041] In this way it is possible to obtain two or more new hail guards positioned side by side, using single supporting bases and supports shared by the two net holding elements of two adjacent structures.

10 **[0042]** The characteristics of the new modular hail guard for motor cars will be highlighted in greater detail in the following description, with reference to the attached drawings that are enclosed hereto by way of non-limiting example.

Figure 1 shows an axonometric view of an example of embodiment of the new modular hail guard for motor cars.

Figures 1a and 1b respectively show a front view and a side view of the new modular hail guard for motor cars.

25 **[0043]** The new modular hail guard comprises a supporting structure (S1, S2, S3) and a protection net (R) with thick meshes.

[0044] Said supporting structure (S1, S2, S3) comprises two supporting bases (S1), four supports (S2), two net holding elements (S3).

30 **[0045]** Figure 2 shows a side view of an example of embodiment of a supporting base (S1).

[0046] Said supporting base (S1) is generically in the shape of an arch whose concave side faces downwards and whose ends (S1a) face upwards.

35 **[0047]** Each supporting base (S1), furthermore, comprises parts or projections (S1b) that allow it to be fixed to the ground or inserted in or fixed to a base (B).

[0048] According to this example, the supporting base (S1) comprises a linear element (S1b), central and facing downwards, which is suited to be inserted in a hole made in a base (B), for example made of cement, or in a hole specifically made for this purpose in the ground, in the asphalt or in the surface on which the motor vehicle to be protected is parked.

45 **[0049]** Figure 3a shows a side view of a first example of embodiment of a support (S2).

[0050] Said support (S2) has a generically linear shape and its terminal portion (S2b) is angled with respect to the main portion (S2a), the latter being longer than the support (S2) itself. The end of the main portion (S2a) of said support (S2) is suited to be joined to the end (S1a) of a supporting base (S1), while the end of the angled terminal portion (S2b) of said support (S2) is suited to be joined to an end (S3b) of a net holding element (S3).

50 **[0051]** Figure 3b shows a top view of a second example of embodiment of a support (S2').

[0052] According to said second example, the support

(S2') has its angled terminal portion (S2'b) in the shape of a U and suited to be joined to the ends (S3b) of two net holding elements (S3).

[0053] Figure 4 shows a front view of an example of embodiment of a net holding element (S3).

[0054] In this example, the net holding element (S3) comprises two portions (S3a', S3a'') that are angled with respect to each other and face downwards like the sloping sides of a roof, with their ends (S3b) bent downwards.

[0055] Each end (S3b) of said net holding element (S3) is suited to be joined to the end of the angled terminal portion (S2b, S2'b) of a support (S2, S2').

[0056] The protection net (R) is constituted by a net made of a resistant plastic material, whose meshes are sufficiently thick to hold the hail pellets that may damage the body of the motor vehicle.

[0057] On two opposite edges of said protection net (R) there are coupling means (Ra) that are suited to fix the protection net (R) to the net holding elements (S3).

[0058] Said coupling elements (Ra) are constituted by clips with C-shaped cross section, which are such that they can be pressure-fitted to the net holding elements (S3).

[0059] To assemble the supporting structure (S1, S2, S3) it is necessary to connect the various elements, that is, the supporting bases (S1), the supports (S2) and the net holding elements (S3) in such a way as to build a supporting structure as shown in Figure 1.

[0060] The example illustrated in Figures 1, 1a, 1b is suited to protect a single motor vehicle. The protection net (R) is fixed to the net holding elements (S3) by means of said coupling elements (Ra).

[0061] The arched configuration of the two lateral supporting bases (S1) allows them to be bent, in such a way as to move the two net holding elements (S3) near each other and properly fix the protection net (R).

[0062] Furthermore, the tension exerted on the supports (S2) and on the net holding elements (S3) by the two supporting bases (S1) makes it possible to keep the protection net (R) applied to the two net holding elements (S3) tensioned.

[0063] Figure 5 shows an axonometric view of a second example of embodiment of the new modular hail guard, in which supports (S2') with U-shaped terminal portion (S2'b) are used.

[0064] In this example, the lateral supporting bases (S1) are joined to supports (S2) with single terminal portion (S2b), while the intermediate supporting bases (S1) are joined to supports (S2') with U-shaped terminal portion (S2'b).

[0065] The example shown in Figure 5 is suited to protect several motor vehicles positioned side by side.

[0066] Therefore, with reference to the above description and the attached drawings, the following claims are expressed.

Claims

1. Hail guard for motor cars, comprising a tubular structure or a section bar structure (S1, S2, S3) to which a protection net (R) is fixed, **characterized in that** said structure (S1, S2, S3) comprises:

- two generically linear supporting bases (S1) whose ends (S1a) are generically inclined upwards, suited to rest on the ground at the sides of the motor car to be protected and substantially parallel to the latter;
- four supports (S2) connected and fixed to said supporting bases (S1) in such a way that they substantially face upwards;
- two net holding elements (S3) suited to be connected and fixed to the upper ends (S2b, S2'b) of two right and left, front or rear supports (S2, S2'), in such a way that they substantially lie on a plane that is orthogonal to the supporting bases (S1),

and wherein said protection net (R) is fixed to said net holding elements (S3), *and wherein* said protection net (R) is kept tensioned by the entire structure (S1, S2, S3).

2. Modular hail guard for motor cars according to claim 1, **characterized in that** said supports (S2) comprise a main linear portion (S2a) and a terminal portion (S2b, S2'b) that is inclined with respect to said main portion (S2a).

3. Modular hail guard for motor cars according to the preceding claims, **characterized in that** said two supporting bases (S1) together with the respective front and rear supports (S2) constitute two elastic arches that are suited to maintain said two net holding elements (S3) spaced from each other and to maintain the protection net (R) fixed to said two net holding elements (S3) tensioned.

4. Modular hail guard for motor cars according to the preceding claims, **characterized in that** each supporting base (S1) is substantially in the shape of an arch whose concave side faces downwards and whose ends (S1a) face upwards.

5. Modular hail guard for motor cars according to the preceding claims, **characterized in that** the underside of said supporting base (S1) is provided with a central projection (S1b) that allows it to be fixed to the ground or inserted in or fixed to a base (B).

6. Modular hail guard for motor cars according to the preceding claims, **characterized in that** said net holding element (S3) comprises two central portions (S3a', S3a'') that are angled with respect to each

other and face downwards, whose ends (S3b) are bent downwards.

7. Modular hail guard for motor cars according to claims 1, 2, 3, 4, 5, **characterized in that** said net holding element (S3) comprises an arched central portion (S3a) whose concave side faces downwards. 5
8. Modular hail guard for motor cars according to the preceding claims, **characterized in that** said supports (S2') have their terminal portion (S2'b) in the shape of a U, *and wherein* each end of said U-shaped terminal portion (S2'b) is suited to be connected to one end (S3b) of a net holding element (S3). 10
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9. Modular hail guard for motor cars according to the preceding claims, **characterized in that** it comprises elastic coupling elements (Ra) with cross section in the shape of a C or an omega, suited to hold the edge of the protection net (R) on the net holding elements (S3). 20
10. Modular hail guard for motor cars according to the preceding claims, **characterized in that** said coupling elements (Ra) are fixed to at least two opposite edges of the protection net (R). 25

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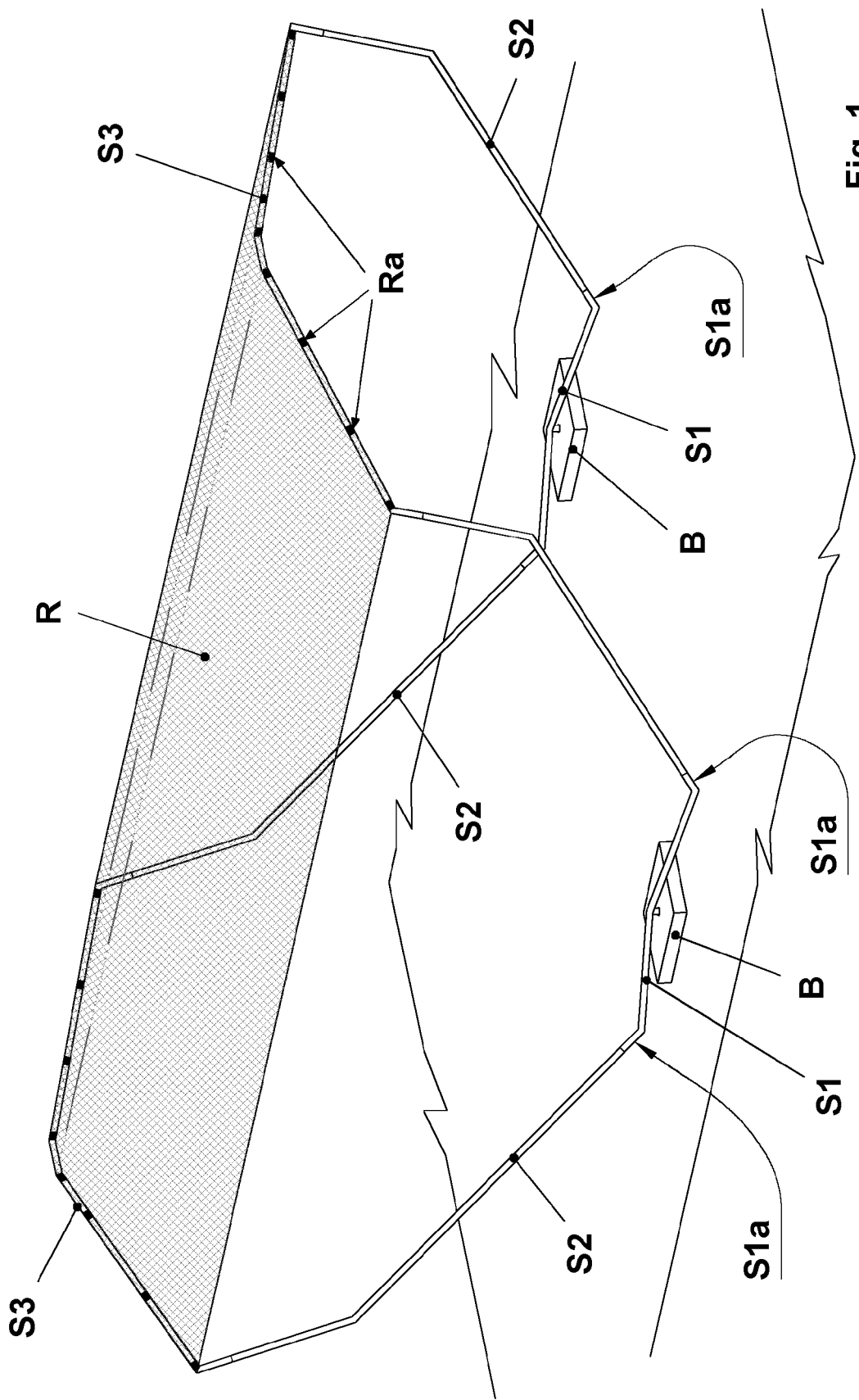


Fig. 1

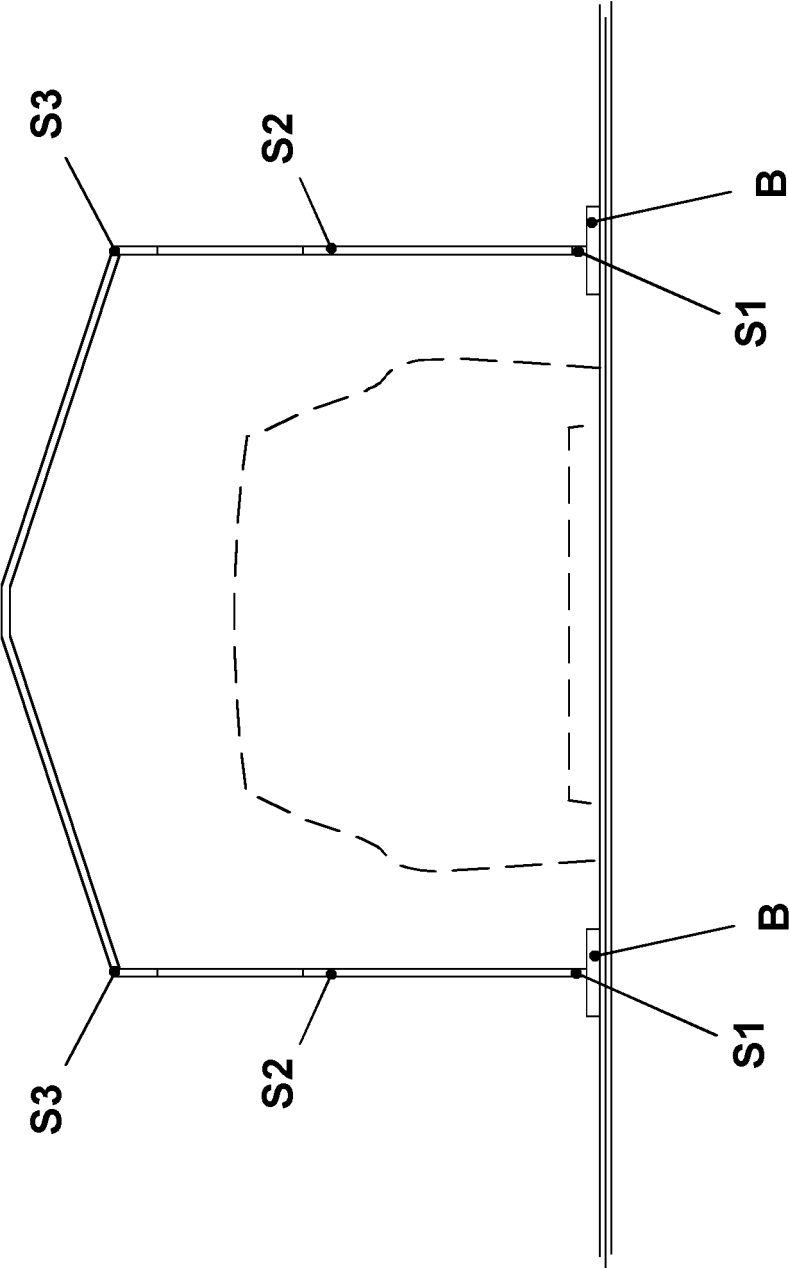


Fig. 1a

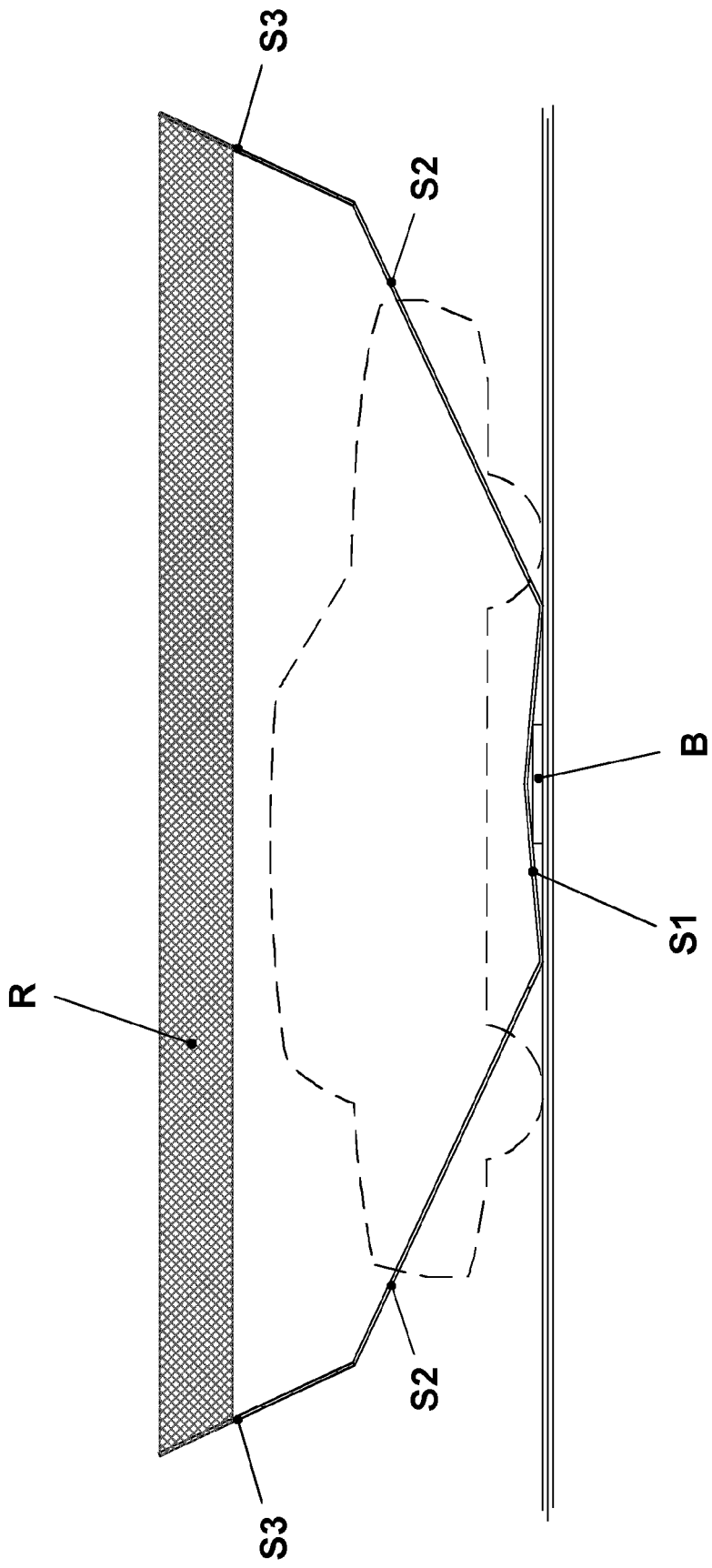


Fig. 1b

Fig. 4

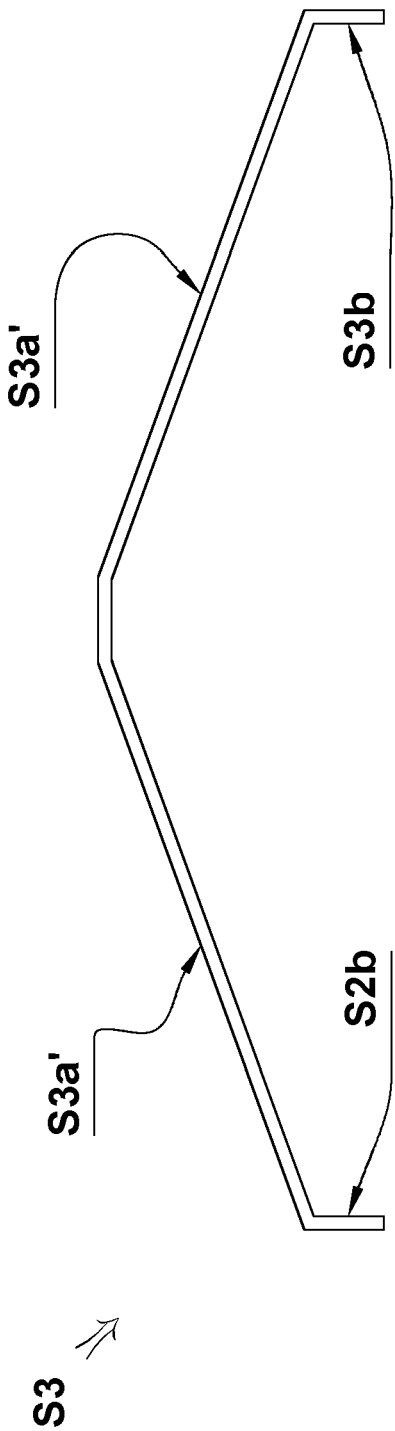
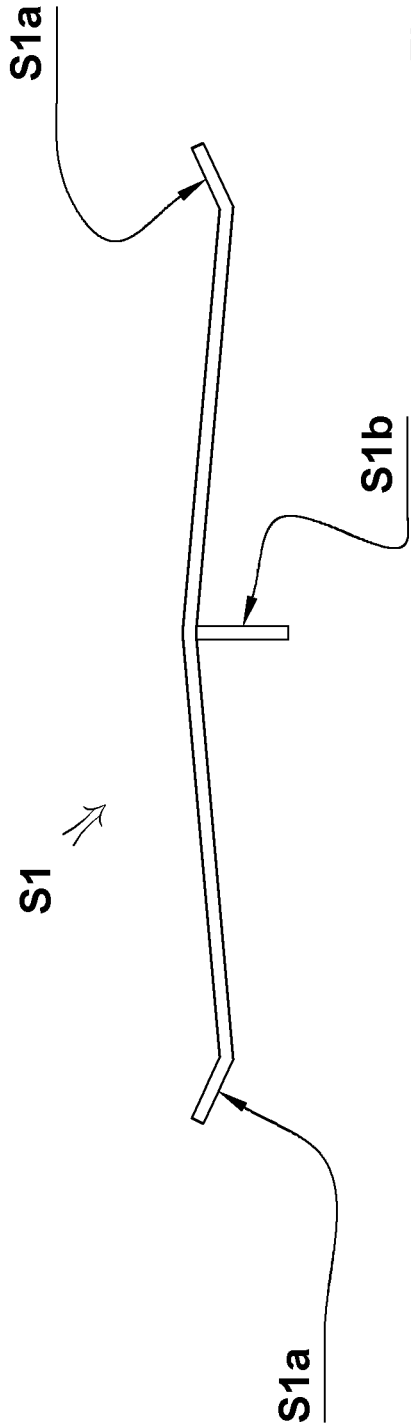


Fig. 2



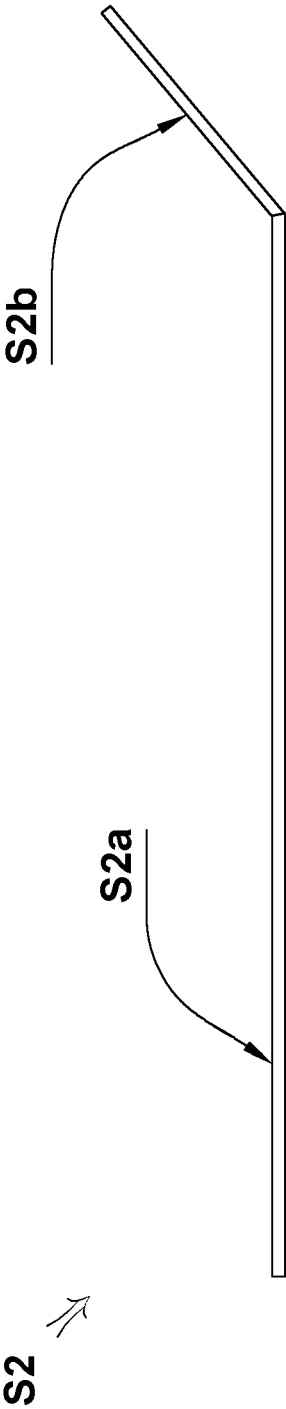


Fig. 3a

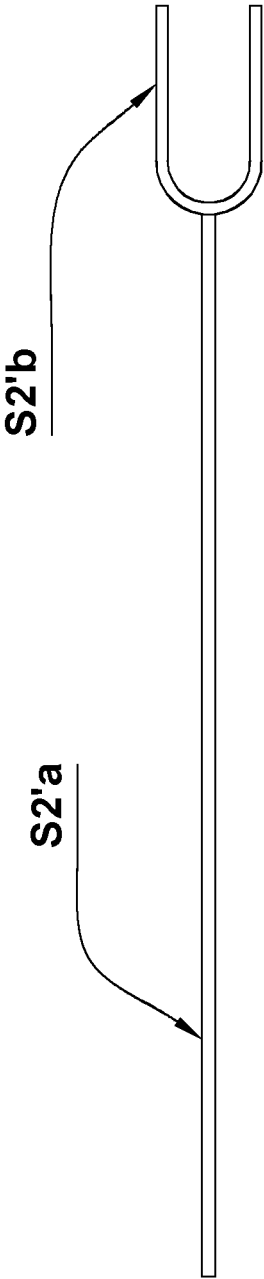


Fig. 3b

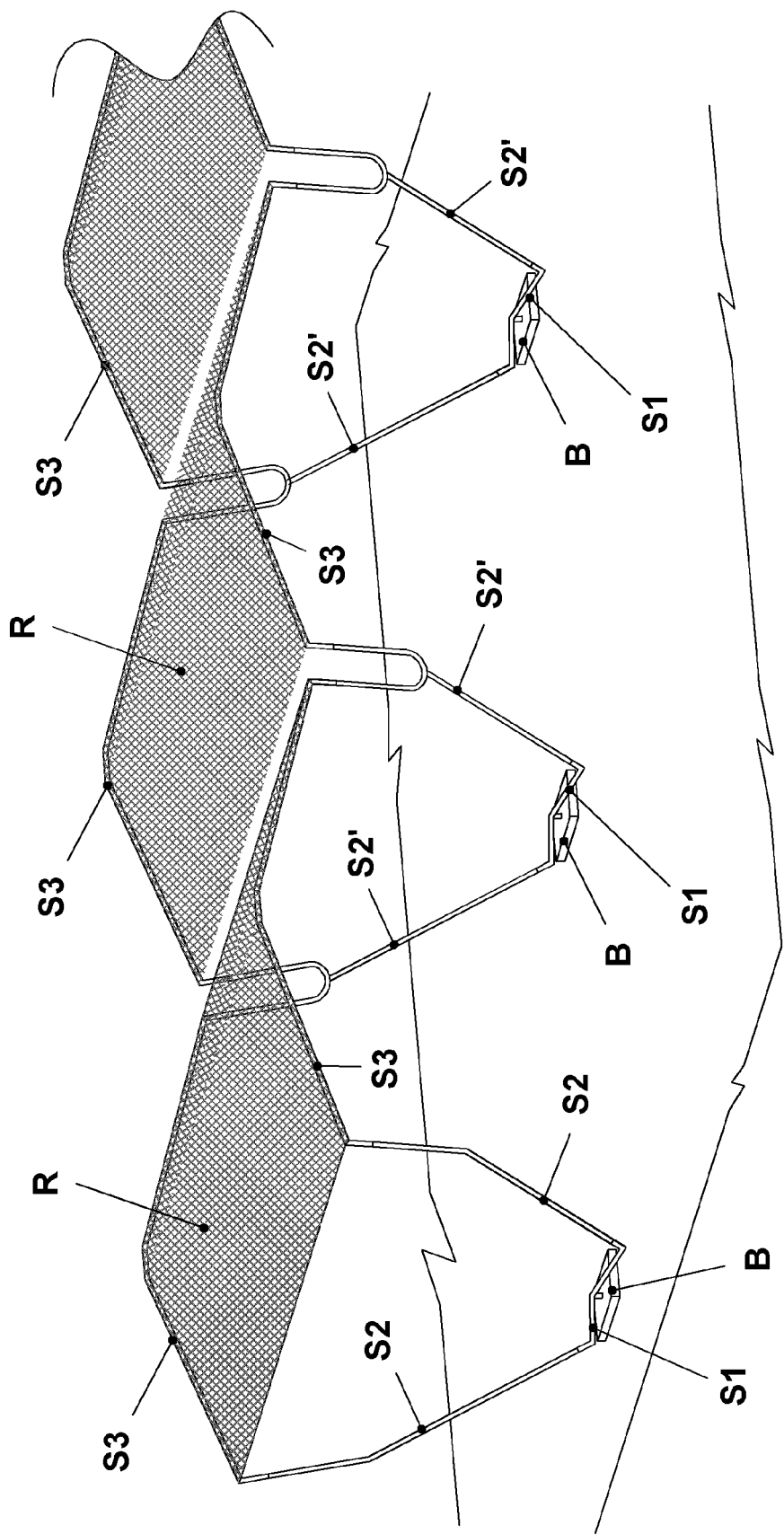


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 16 17 1500

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			E04H B60J
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 October 2016	Examiner Verkerk, Ewout
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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