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(54) **AN IMPROVED CONTAINMENT GABION FOR CONTAINING AND CARRYING INERT MATERIAL**

VERBESSERTES SICHERHEITSBEHÄLTERGABION ZUM AUFBEWAHREN UND TRANSPORTIEREN VON INERTEM MATERIAL

GABION DE RETENUE AMÉLIORÉ DESTINÉ À CONTENIR ET À TRANSPORTER UN MATÉRIAU INERTE

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(73) Proprietor: **Metallurgica Ledrense - Societa Cooperativa**
38067 Ledro (TN) (IT)

(72) Inventor: **TIBONI, Fabio**
38067 Ledro (TN) (IT)

(74) Representative: **Simino, Massimo**
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano (IT)

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a containment gabion as defined in the preamble of claim 1 for containment and transport of inert material, in particular a containment gabion comprising metal mesh walls.

BACKGROUND OF THE INTENTION

[0002] In the field of building and civil works, particular baskets or gabions, mainly made of metal, and adapted to be filled with substantially inert materials, such as bricks, rocks, stones and/or pebbles, are known to be used to form retaining bases/walls, embankments or means for retaining unstable banks.

[0003] These gabions are installed after having been filled, on site, with inert materials, to create a permeable and monolithic structure.

[0004] Typically, these gabions are identified by flat perimeter walls, each consisting of a metal mesh, which are connected together to form a container that identifies therein an empty volume designed in use to be filled with the inert material. These gabions have an opening at their top for filling it with the inert material.

[0005] Generally, the structure of the aforementioned gabions has the shape of a parallelepiped with a quadrilateral support base and four vertical walls, such vertical walls being connected both laterally to each other and to the support base, to thereby define the aforementioned internal volume open at its top.

[0006] Various methods of connecting the aforementioned vertical walls to the support base are known in the art.

[0007] For example, welding methods are known for constraining the surfaces at their adjacent sides, or elements such as ropes/cables can be used to engage and constrain together peripheral portions of the walls and/or support bases to be constrained together.

[0008] Alternatively, jointing methods have been suggested in which one or more of the horizontal/vertical rods of each metal mesh wall are bent to various shapes, for the bends to be anchored to the closest rods of the adjacent wall.

[0009] This jointing method is quite simple and can ensure the holding ability of the structure of the containment gabion even without the addition of external elements.

[0010] Nevertheless, it should be noted that the above methods of connecting the vertical walls to the support base do not ensure adequate stability of the structure of the containment gabion as a whole, as the inert material is being unloaded, loaded and transported.

[0011] For example, EP 1505211 discloses a Z-shaped hook for connecting the vertical wall and the support base, such that the first two horizontal rods of the support base are both encircled.

[0012] EP 3073017 A1 discloses a containment gabion for containment and transport of inert material substantially as defined in the preamble of claim 1 and provides J-shaped hooks which, nevertheless, do not ensure optimum structural strength of the gabion in certain conditions of use, during loading, transport and unloading operations.

[0013] Nevertheless, this arrangement does not achieve proper stability of the gabions during unloading or assembly, and makes it difficult to stack the gabions when forming retaining walls.

SUMMARY OF THE INVENTION

[0014] In view of the above considerations, the need is apparently felt by the manufacturers of inert material-containing gabions to be able to construct and provide gabions with a structure that can address the above discussed issues.

[0015] Furthermore, the need is strongly felt for a containment gabion that can ensure the stability of its structure during loading, unloading and transport, without causing deformation or warping of the structure due to unstable or not perfectly coplanar ground support.

[0016] Thus, the present invention is based on the technical problem of designing and providing gabions for containing inert materials that can meet the above mentioned needs, while obviating the above described prior art drawbacks.

[0017] According to the present invention, this object is fulfilled by a containment gabion for containing inert material as defined in claim 1.

[0018] A critical aspect in this object is the specific and peculiar shape of the hooks provided at the ends of the vertical rods of the vertical walls, i.e. the hooks designed to ensure fixation of the vertical walls of the containment gabion to the support base of the containment gabion.

BRIEF DESCRIPTION OF THE FIGURES

[0019] Further features and advantages of the improved containment gabion for containment and transport of inert material of the present invention will result from the following description of one preferred embodiment thereof, which is given by way of illustration and without limitation with reference to the accompanying figures, in which:

- Figure 1 shows a perspective view of the containment gabion of the present invention, filled with inert material;
- Figure 2 shows in detail a hook used for connecting the vertical walls to the support base of the containment gabion as defined in claim 1;
- Figure 3 shows a possible embodiment of a hook designed to allow transport of the containment gabion of Figure 1;
- Figure 4 shows a sectional view of the hook of Figure 3, and

- Figure 5 illustrates a perspective view of a detail of a short vertical wall of the containing gabion of Figure 1 only.

DETAILED DESCRIPTION OF THE INVENTION

[0020] Referring to the accompanying figures, numeral 1 generally designates a containment gabion of the invention, specifically a gabion for containment and transport of inert material.

[0021] The containment gabion 1 comprises a hollow body identified by a plurality of side walls having a metal mesh structure comprising a support base 2 from which vertical walls 3 project.

[0022] Preferably, the aforementioned metal mesh structure is formed with perpendicular metal rods in criss-crossed arrangement, joined together to form rectangular or square metal mesh.

[0023] As used herein, "rod" refers to a strong member, such as a reinforcing rod, bar or shaft or any rigid member mainly extending in an axial direction, having a substantially constant cross-section, e.g. a circular, elliptical or square cross section and a diameter ranging from 1 mm to15 mm.

[0024] The rods used to form the aforementioned containment gabion 1 are preferably made of a metal zinc-aluminum alloy to ensure adequate galvanic corrosion resistance.

[0025] In the illustrated example, the containment gabion 1 is in the form of a parallelepiped comprising a substantially rectangular support base 2 and four vertical walls 3.

[0026] It shall be understood that the shape of the containment gabion may also differ from the above, namely in terms of the shape of the support base which can also have a different configuration, such as a square shape or a different shape, for the purpose of fulfilling particular requirements.

[0027] The vertical walls 3 comprise a mesh structure formed by vertical rods 4 and horizontal rods 6 joined together to form the aforementioned metal mesh structure.

[0028] The support base 2 identifies a ground support plane of the gabion 1 and comprises a mesh structure formed by a first order of first horizontal rods 2o parallel to a first side of the containment gabion 1 and by a second order of second horizontal rods 2v orthogonal to said first horizontal rods 2o.

[0029] Each vertical wall 3 is connected to the support base 2 at a lower end 3a thereof and to the two adjacent vertical walls at respective lateral ends 3b.

[0030] As mentioned above, in the illustrated embodiment, the support base 2 has a substantially rectangular shape, with two long sides and two short sides being thus identified therein. Accordingly the vertical walls 3 do not have equal extents, as long walls 3c and short walls 3d are provided, which are designed to be arranged and engaged with the aforementioned long and short sides of the rectangular support base 2, respectively,

[0031] According to the illustrated embodiment, the aforementioned first order of first horizontal rods 2o extends parallel to the aforementioned long sides of the rectangular support base 2.

[0032] It should be noted that the aforementioned horizontal rods 2v are welded to the first horizontal rods 2o and are placed both above and below the first horizontal rods 2o to impart strength to the support base 2. Therefore, as shown in Figure 2, the first horizontal rods 2o of the support base 2 are parallel to the long sides of the base and are sandwiched between two orders of second horizontal rods 2v parallel to the short sides of the support base 2.

[0033] Due to the above described structure, the containment gabion 1 defines an internal volume that is or can be filled with inert material, such containment gabion having for this purpose a top opening through which the internal volume of the containment gabion can be filled with the internal material.

[0034] Referring to the illustrated embodiment, the connection between the lower end 3a of the vertical walls 3 and the support base 2 is ensured by the provision of hooks 5, namely first hooks 5b or second hooks 5a, which are preferably provided at the lower ends of the vertical rods 4 of each vertical wall 3.

[0035] These hooks 5 may have different shapes depending on the relevant vertical wall.

[0036] In particular, for the above discussed short vertical walls 3d, such connection is conveniently provided by means of a U-shaped second hook 5a, provided at the lower ends of the vertical rods 4, such U-shaped second hook 5a being able to fasten the vertical rods 4 of the vertical wall 3 to the rod of said second order of second horizontal rods 2v of the support base 2 that is closest to the respective vertical rod 4 of the wall to be connected, as shown in Figure 5.

[0037] The aforementioned fastening system with the U-shaped second hook 5a can be conveniently used also to constrain the vertical walls 3 to each other at the adjacent lateral ends.

[0038] That is, as shown in Figure 1, the U-shaped second hooks 5a are provided at the ends of the horizontal rods of the long vertical walls 3c, to fasten each horizontal rod 4 of a long vertical wall 3c to the first vertical rod 6 of each adjacent short vertical wall 3c.

[0039] On the other hand, in order to ensure connection of the vertical rods 4 of the long vertical walls 3c to the structure of the support base 2, first hooks 5b with a J-like shape are conveniently used.

[0040] More in detail, as shown in Figure 2, each J-shaped first hook 5b comprises, at the lower end of its respective vertical rod 4 of the long vertical walls 3c:

- a vertical portion 5c substantially perpendicular to the ground support plane identified by the support base 2;
- a first bending point 5d extending as a continuation

of said vertical portion 5c around a first horizontal rod 2b of the support base 2, said first horizontal rod 2b being the horizontal rod of said first order of first horizontal rods 2o which is closest to said vertical portion 5c, whereby the aforementioned first horizontal rod 2b is the outermost horizontal rod 2b and close to the relevant long vertical wall 3c;

- a first portion 5e extending as a continuation of said first bending point 5d parallel to and below the ground support plane identified by the support base 2, until it surpasses a second horizontal rod 2c of said first order of first horizontal rods 2o of said support base 2, said second horizontal rod 2c being more spaced from said vertical portion 5c than said first horizontal rod 2b;
- a second portion 5f extending between opposite ends as a continuation of the first portion 5e with a direction of development inclined with respect to the ground support plane identified by the support base 2, so as to extend towards the inside of the containment gabion 1 until it surpasses a third horizontal rod 2d of the aforementioned first order of first horizontal rods 2o of said support base 2, said third horizontal rod 2d being more spaced from said vertical portion 5c than said second horizontal rod 2c;
- a second bending point 5g extending as a continuation of the aforementioned second portion 5f to hook the aforementioned third horizontal rod 2d, and
- a third portion 5h extending as a continuation of the second bending point 5g and having a direction of development incident to the ground support plane identified by the support base 2.

[0041] At said first bending point 5d, the first hook 5b engages the aforementioned first horizontal rod 2b by defining a substantially 90° curve around said first horizontal rod 2b.

[0042] Preferably, the aforementioned first straight portion 5e is a straight portion and is substantially parallel to the ground support plane identified by the support base 2.

[0043] This first straight portion 5e is useful to impart proper stability to the containment gabion 1 during unloading and assembly, i.e. when no load of inert material is present. Also, the first straight portion 5e facilitates stacking of a plurality of gabions for creating complex structures.

[0044] As mentioned above, the aforementioned second portion 5f extends downstream of the first straight portion 5e, to above the third horizontal rod 2d.

[0045] The aforementioned second bending point 5g can hook and anchor the structure of the first hook 5b to hook said third horizontal rod 2d, the subsequent third portion 5h being also useful for this purpose.

[0046] That is, the second bending point 5g encircles the aforementioned third horizontal rod 2d through substantially 180°, whereas the subsequent third portion 5h ensures that this bending point will not be released from the aforementioned third horizontal rod 2d.

[0047] Advantageously, the aforementioned second portion 5f of the first hook 5b:

- extends between opposite ends from an end portion of the first portion 5e to the aforementioned second bending point 5g and
- comprises an intermediate portion which is more displaced towards the inside of said containment gabion (1), and hence is more distant from the lower support plane of the containment gabion 1, with respect to an ideal straight line I passing through said opposite ends of said second portion 5f.

[0048] According to the embodiment of Figure 2, the aforementioned second portion 5f of the first hook 5b comprises two inclined portions f', f" converging in a vertex (50).

[0049] With respect to an ideal straight line I passing through the aforementioned opposite ends of the second portion 5f (as shown in Figure 2 by a broken line), the aforementioned vertex 50 is more displaced towards the inside of the containment gabion 1.

[0050] Preferably, the aforementioned ideal straight line I passing through the opposite ends of the second portion 5f is inclined by an angle α of 12° to 70°, more preferably an angle of 18° to 40°, with respect to the aforementioned ground support plane identified by the support base 2.

[0051] Preferably, the aforementioned two portions f' and f" converging in the aforementioned vertex 50 are two straight portions.

[0052] Preferably the aforementioned vertex subtends an angle λ of 110° to 170°, more preferably an angle λ of 145° to 165°, for example of 160°.

[0053] According to one embodiment, not shown, the aforementioned second portion 5f of the first hook 5b comprises a curvilinear profile whose convexity faces the interior of the containment gabion.

[0054] Preferably, the aforementioned second portion 5f of the first hook 5b remains substantially contained in the thickness of the support base 2.

[0055] Preferably, the aforementioned third portion 5h extends from said second bending point (5g) for a section of 18 mm to 50 mm, more preferably for a section of 20 mm to 45 mm and even more preferably for a section of 25 mm to 30 mm.

[0056] Preferably, the aforementioned third portion 5h is a straight portion, preferably a straight portion extending in a direction substantially parallel to the aforementioned ideal straight line I passing through the opposite ends of the second portion 5f.

[0057] Preferably, the aforementioned third straight portion 5h is inclined by an angle β with respect to the ground support plane identified by said support base 2 which is of 8° to 22°, more preferably by an angle β of 10° to 18°.

[0058] Preferably, at least most of the aforementioned

third straight portion 5h remains contained in the thickness of the support base 2.

[0059] It should be noted that the second bending point 5g and the third straight portion 5h are designed to increase the safety of the hook 5b to ensure a firmer constraint and impart a higher structural stability to the containment gabion 1 during loading and transport.

[0060] Preferably, each of the opposite vertical walls 3 of said gabion extending along the two long sides of the support base 2 comprises a plurality of said first hooks 5b whereby the vertical rods 4 of the long vertical walls 3c are fastened to the base 2.

[0061] Concerning transport of the containment gabion 1, according to the embodiment as shown in Figures 3 and 4, which is also known, for example, from EP 3073017 A1, the containment gabion 1 comprises at least two comb-like hooks 7 comprising a substantially flat quadrangular body 7a extending in a longitudinal direction, and having a top edge 7b and a bottom edge 7c.

[0062] At the bottom edge, the comb-like hook 7 comprises a plurality of comb teeth 7d, substantially extending the body 7a and bent at least partially into a U shape.

[0063] Each comb-like hook 7 also comprises a plurality of holes 7e formed in the body 7a and longitudinally arranged along such body 7a.

[0064] Each of the two long vertical walls 3c of the containment gabion 1 comprises, as described above, a plurality of horizontal rods 6, including a top horizontal rod 6a differing from the others by being the farthest rod from the support base 2.

[0065] In light of the above, each comb-like hook 7 partially engages the top horizontal rod 6a by the aforementioned U-shaped comb teeth 7d, while the comb-like hook 7 is left free of rotating about the top horizontal bar 6a.

[0066] During transport, the containment gabion 1 is lifted by hoist means, not shown, which hook the containment gabion 1 at the holes 7e of the two comb-like hooks 7, the latter assuming thus a position transverse to the support plane.

[0067] Once the containment gabion 1 has been positioned, it is released from the hoist means and the comb-like hooks 7 are rotated to such a position that the body 7a, substantially parallel to the support plane, will rest on the inert material itself or on a closing surface 8, if any.

[0068] Therefore, these comb-like hooks afford simple and practical transport, and can assume a position that ensures the lack of bulk transverse to the support surface once transport has been completed, thereby allowing a plurality of gabions to be stacked one above the other to form complex structures such as barriers and/or retaining walls.

[0069] Concerning stable positioning of the gabion 1 on the ground, it should be noted that parts of the hooks 5 projecting from the lower part of the support plane identified by the support base 2 may be of hindrance as they cause warping or other deformations of the structure of the containment gabion itself before it is filled, which warping and deformation will permanently remain once the structure has been filled with the inert material.

[0070] As explained in the introduction hereof, such deformation and warping are undesired as they prevent the upper opening from being properly closed by the upper cover.

[0071] The improved containment gabion obviates these problems in that the aforementioned second portion (5f) of the first hooks (5b) is not straight, but comprises two inclined portions (f', f") converging in a vertex (50) so as to be more displaced toward the inside of the containment gabion 1, that is, upwards, thereby increasing the space that can be occupied by the third portion 5h which extends as a continuation of the second bending point 5g.

[0072] Therefore, in the improved containment gabion of the present invention, the end portion of the first hooks 5b, i.e. the aforementioned third portion 5h, finds room to be advantageously accommodated in the thickness of the support base in its entirety or for a prevalent part thereof, thus not affecting the coplanarity of the support plane identified by the lower part of the support base 2.

[0073] Thus, the improved containment gabion of the present invention is able to ensure stability of the structure during loading, unloading and transport, and can also simplify assembly of the single containment gabion and stacking of a plurality of gabions to form complex monolithic structures.

[0074] Those skilled in the art will obviously appreciate that a number of changes and variants may be made to the confinement gabion as described hereinbefore to fulfill specific and contingent requirements.

Claims

1. Containment gabion (1) for the containment of inert material comprising a hollow body having an internal space suitable for containing inert material, wherein:

   - said hollow body is identified by a plurality of side walls having a metal mesh structure comprising a support base (2) from which vertical walls (3) project;
   - said support base (2) identifies a ground support plane of said gabion (1) comprising a network structure formed by a first order of first horizontal rods (2o) parallel to a first side of said containment gabion (1) and by a second order of second horizontal rods (2v) orthogonal to said first horizontal rods (2o);
   - each vertical wall (3) comprises a mesh structure formed by vertical rods (4) and by horizontal rods (6) joined together to form the above-mentioned metal mesh structure;
   - each vertical wall (3) is constrained to said support base (2) at one of its lower ends (3a) and adjacent vertical walls (3) at respective lateral ends (3b),

and wherein at least one vertical wall (3) extending parallel to said first order of first horizontal rods (2o) comprises at least one vertical rod (4) which, at the lower end (3a) of said vertical wall (3), comprises a first hook (5b) having:

- a vertical portion (5c) substantially perpendicular to the ground support plane identified by said support base (2);
- a first bending point (5d) extended, in continuation of said vertical portion (5c), around a first horizontal rod (2b) of said support base (2), said first horizontal rod (2b) resulting to be the horizontal rod of said first order of first horizontal rods (2o) which is closest to said vertical portion (5c);
- a first portion (5e) extended in continuation of said first bending point (5d) parallel to and below said ground support plane identified by said support base (2) until it surpasses a second horizontal rod (2c) of said first order of first horizontal rods (2o) of said support base (2), said second horizontal rod (2c) being more spaced from said vertical portion (5c) than said first horizontal rod (2b);
- a second portion (5f) extended between opposite end ends in continuation of said first portion (5e) with a direction of development inclined with respect to said ground support plane identified by said support base (2), so as to extend towards the inside of said containment gabion (1) until a third horizontal rod (2d) of said first order of first horizontal rods (2o) of said support base (2), said third horizontal rod (2d) being more spaced from said vertical portion (5c) than said second horizontal rod (2c) ;
- a second bending point (5g) extended in continuation of said second portion (5f) to hook said third horizontal rod (2d) and
- a third portion (5h) extended in continuation of said second bending point (5g) and having an incident direction of development with respect to said ground support plane identified by said support base (2), **characterized in that:**

said second portion (5f) of said first hook (5b) comprises an intermediate portion more displaced towards the inside of said containment gabion (1) with respect to an ideal straight line (I) passing through said opposite ends of said second portion (5f).

2. Containment gabion (1) according to claim 1, wherein said second portion (5f) of said first hook (5b) comprises two inclined portions (f', f") converging in a vertex (50), said vertex (50), being more displaced towards the inside of said containment gabion (1) than said ideal straight line (I) passing through said opposite ends of said second portion (5f).

3. Containment gabion (1) according to claim 2, wherein said second portion (5f) of said first hook (5b) is identified by two inclined portions (f', f") converging in said vertex (50), preferably said two inclined sections are two straight sections.

4. Containment gabion (1) according to claim 3, wherein said two inclined portions (f', f") converging in a vertex (50) are inclined by an angle λ comprised between 110° and 170°, preferably by an angle λ between 145° and 165°.

5. Containment gabion (1) in accordance with claim 1, wherein said second portion (5f) of said first hook (5b) comprises a curvilinear profile section with convexity facing the interior of said containment gabion (1).

6. Containment gabion (1) according to any one of claims 1 to 5, wherein said second portion (5f) of said first hook (5b) remains substantially contained in the thickness of said support base (2).

7. Containment gabion (1) according to any one of claims 1 to 6, wherein said ideal straight line (I) passing through said opposite ends of said second portion (5f) is inclined by an angle α between 12° and 70°, more preferably by an angle comprised between 18° and 40° with respect to said ground support plane identified by said support base (2) .

8. Containment gabion (1) according to any one of claims 1 to 7, wherein said third portion (5h) is a straight portion, preferably it is a straight portion extending from said second bending point (5g) for a section comprised between 18 mm and 50 mm, more preferably for a section comprised between 20 mm and 45 mm.

9. Containment gabion (1) according to any one of claims 1 to 8, wherein said first portion (5e) of said hook (5b) is a straight portion.

10. Containment gabion (1) in accordance with any one of claims 1 to 9, wherein:

- said second horizontal rod (2c) is adjacent to said first horizontal rod (2b) and/or
- said third horizontal rod (2d) is adjacent to said second horizontal rod (2c).

11. Containment gabion (1) in accordance with any one of claims 1 to 10, wherein:

- said support base (2) has a longer side than the other sides and
- said first order of first horizontal rods (2o) parallel to a first side of said containment gabion

(1) is extended parallel to said longer side of the support base (2).

12. Containment gabion (1) according to claim 11, wherein each of the opposite vertical walls (3) of said containment gabion (1) extending parallel to a longer side of the support base (2) comprises a plurality of said first hooks (5b) .

13. Containment gabion (1) according to any one of claims 1 to 12, comprising a plurality of second hooks (5a), preferably U-shaped, to connect the lower end of at least one vertical wall (3d) parallel to said second order of second horizontal rods (2v) with the horizontal rod (2v) of said second order of second horizontal rods (2v) which is closest to said wall (3).

Patentansprüche

1. Behälter-Metallkasten (1) zum Aufnehmen von Inertstoffen, umfassend einen Hohlkörper aufweisend einen Innenraum, der geeignet ist, Inertstoffe aufzunehmen, wobei:

- der Hohlkörper durch eine Mehrzahl von Seitenwänden aufweisend eine Metallgitterstruktur, die eine Stützbasis (2) umfasst, aus welcher Vertikalwänden (3) vorstehen, identifiziert wird;
- die Stützbasis (2) eine Bodenstützebene des Metallkastens (1) identifiziert, die eine Netzstruktur umfasst, die durch eine erste Anordnung von ersten Horizontalstäben (2o), die sich parallel zu einer ersten Seite des Behälter-Metallkastens (1) erstrecken und durch eine zweite Anordnung von zweiten Horizontalstäben (2v), die sich orthogonal zu den ersten Horizontalstäben (2o) erstrecken, gebildet wird;
- jede Vertikalwand (3) eine Gitterstruktur umfasst, die durch Vertikalstäben (4) und Horizontalstäben (6) gebildet wird, die miteinander verbunden sind, um die oben erwähnte Metallgitterstruktur zu bilden;
- jede Vertikalwand (3) an der Stützbasis (2) an einem ihrer unteren Enden (3a) befestigt ist und benachbarte Vertikalwände (3) an den jeweiligen seitlichen Enden (3b),

und wobei mindestens eine Vertikalwand (3), die sich parallel zu der ersten Anordnung von ersten Horizontalstäben (2o) erstreckt, mindestens einen Vertikalstab (4) umfasst, der am unteren Ende (3a) der Vertikalwand (3) einen ersten Haken (5b) umfasst, der Folgendes aufweist:

- einen Vertikalabschnitt (5c), der sich im Wesentlichen senkrecht zu der Bodenstützebene erstreckt, die durch die Stützbasis (2) gebildet wird;
- einen ersten Faltungspunkt (5d), der sich als Verlängerung des Vertikalabschnitts (5c) um einen ersten Horizontalstab (2b) der Stützbasis (2) erstreckt, wobei der erste Horizontalstab (2b) der Horizontalstab der ersten Anordnung der ersten Horizontalstäbe (2o) ist, die dem Vertikalabschnitt (5c) am nächsten liegt;
- einen ersten Abschnitt (5e), der sich als Verlängerung des ersten Faltungspunkts (5d) parallel zu und unterhalb der durch die Stützbasis (2) identifizierten Bodenstützebene erstreckt, bis er einen zweiten Horizontalstab (2c) der ersten Anordnung der ersten Horizontalstäbe (2o) der Stützbasis (2) überragt, wobei der zweite Horizontalstab (2c) mehr von dem Vertikalabschnitt (5c) als der erste Horizontalstab (2b) beabstandet ist;
- einen zweiten Abschnitt (5f), der sich zwischen gegenüberliegenden Enden als Verlängerung des ersten Abschnitts (5e) mit einer Entwicklungsrichtung erstreckt, die in Bezug auf die durch die Stützbasis (2) identifizierte Bodenstützebene geneigt ist, so dass er sich in Richtung der Innenseite des Behälter-Metallkastens (1) bis zu einem dritten Horizontalstab (2d) der ersten Anordnung der ersten Horizontalstäbe (2o) der Stützbasis (2) erstreckt, wobei der dritte Horizontalstab (2d) mehr von dem Vertikalabschnitt (5c) als der zweite Horizontalstab (2c) beabstandet ist;
- einen zweiten Faltungspunkt (5g), der sich als Verlängerung des zweiten Abschnitts (5f) erstreckt, um den dritten Horizontalstab (2d) zuzuhaken, und
- einen dritten Abschnitt (5h), der sich als Verlängerung des zweiten Faltungspunkts (5g) erstreckt und der eine einfallende Entwicklungsrichtung in Bezug auf die durch die Stützbasis (2) identifizierte Bodenstützebene aufweist,

dadurch gekennzeichnet, dass:

d er zweite Abschnitt (5f) des ersten Hakens (5b) einen Zwischenabschnitt aufweist, der in Bezug auf eine ideale gerade Linie (I), die sich durch die gegenüberliegenden Enden des zweiten Abschnitts (5f) erstreckt, mehr zu der Innenseite des Behälter-Metallkastens (1) verschoben ist.

2. Behälter-Metallkasten (1) nach Anspruch 1, wobei der zweite Abschnitt (5f) des ersten Hakens (5b) zwei geneigte Abschnitte (f', f") umfasst, die in einem Scheitelpunkt (50) zusammenlaufen, wobei der Scheitelpunkt (50) mehr zu der Innenseite des Behälter-Metallkastens (1) als die ideale gerade Linie (I), die sich durch die gegenüberliegenden Enden des zweiten Abschnitts (5f) erstreckt, verschoben ist.

3. Behälter-Metallkasten (1) nach Anspruch 2, wobei der zweite Abschnitt (5f) des ersten Hakens (5b) durch zwei geneigte Abschnitte (f', f''), die in dem Scheitelpunkt (50) zusammenlaufen, identifiziert wird, wobei die beiden geneigten Abschnitte vorzugsweise zwei gerade Abschnitte sind.

4. Behälter-Metallkasten (1) nach Anspruch 3, wobei die beiden geneigten Abschnitte (f', f''), die in einem Scheitelpunkt (50) zusammenlaufen, um einen Winkel λ zwischen 110° und 170°, vorzugsweise um einen Winkel λ zwischen 145° und 165°, geneigt sind.

5. Behälter-Metallkasten (1) nach Anspruch 1, wobei der zweite Abschnitt (5f) des ersten Hakens (5b) einen gekrümmten Profilabschnitt mit einer der Innenseite des Behälter-Metallkastens (1) zugewandten konvexen Form aufweist.

6. Behälter-Metallkasten (1) nach einem der Ansprüche 1 bis 5, wobei der zweite Abschnitt (5f) des ersten Hakens (5b) im Wesentlichen in der Dicke der Stützbasis (2) enthalten bleibt.

7. Behälter-Metallkasten (1) nach einem der Ansprüche 1 bis 6, wobei die sich durch die gegenüberliegenden Enden des zweiten Abschnitts (5f) erstreckende ideale gerade Linie (l) um einen Winkel α zwischen 12° und 70°, vorzugsweise um einen Winkel zwischen 18° und 40°, in Bezug auf die durch die Stützbasis (2) identifizierte Bodenstützebene geneigt ist.

8. Behälter-Metallkasten(1) nach einem der Ansprüche 1 bis 7, wobei der dritte Abschnitt (5h) ein gerader Abschnitt ist, vorzugsweise ein gerader Abschnitt, der sich von dem zweiten Faltungspunkt (5g) um einen Schnitt zwischen 18 mm und 50 mm, besonders bevorzugt um einen Schnitt zwischen 20 mm und 45 mm erstreckt.

9. Behälter-Metallkasten (1) nach einem der Ansprüche 1 bis 8, wobei der erste Abschnitt (5e) des Hakens (5b) ein gerader Abschnitt ist.

10. Behälter-Metallkasten (1) nach einem der Ansprüche 1 bis 9, wobei:

- der zweite Horizontalstab (2c) an den ersten Horizontalstab (2b) angrenzt und/oder
- der dritte Horizontalstab (2d) an den zweiten Horizontalstab (2c) angrenzt.

11. Behälter-Metallkasten (1) nach einem der Ansprüche 1 bis 10, wobei:

- die Stützbasis (2) eine längere Seite als die anderen Seiten aufweist und wobei
- sich die erste Anordnung der ersten Horizontalstäbe (2o) parallel zu einer ersten Seite des Behälter-Metallkastens (1) parallel zu der längeren Seite der Stützbasis (2) erstreckt.

12. Behälter-Metallkasten (1) nach Anspruch 11, wobei jede der gegenüberliegenden Vertikalwände (3) des Behälter-Metallkastens (1), die sich parallel zu einer längeren Seite der Stützbasis (2) erstrecken, eine Mehrzahl der ersten Haken (5b) umfasst.

13. Behälter-Metallkasten (1) nach einem der Ansprüche 1 bis 12, umfassend eine Mehrzahl von zweiten Haken (5a), die vorzugsweise U-förmig ausgebildet sind, um das untere Ende mindestens einer Vertikalwand (3d), die sich parallel zu der zweiten Anordnung der zweiten Horizontalstäbe (2v) erstreckt, mit dem Horizontalstab (2v) der zweiten Anordnung der zweiten Horizontalstäbe (2v), der der Wand (3) am nächsten liegt, zu verbinden.

Revendications

1. Gabion de confinement (1) pour le confinement de matériaux inertes comprenant un corps creux ayant un espace interne approprié pour contenir des matériaux inertes, dans lequel :

- ledit corps creux est identifié par une pluralité de parois latérales ayant une structure en treillis métallique comprenant une base d'appui (2) à partir de laquelle des parois verticales (3) font saillie ;
- ladite base d'appui (2) identifie un plan d'appui au sol dudit gabion (1) comprenant une structure en réseau formée par un premier ordre de premières tiges horizontales (2o) parallèles à un premier côté dudit gabion de confinement (1) et par un second ordre de deuxièmes tiges horizontales (2v) orthogonales auxdites premières tiges horizontales (2o) ;
- chaque paroi verticale (3) comprend une structure en treillis formée par des tiges verticales (4) et par des tiges horizontales (6) réunies pour former la structure en treillis métallique susmentionnée ;
- chaque paroi verticale (3) est contrainte à ladite base d'appui (2) à l'une de ses extrémités inférieures (3a) et aux parois verticales adjacentes (3) à leurs extrémités latérales respectives (3b),

et dans lequel au moins une paroi verticale (3) s'étendant parallèlement audit premier ordre de premières tiges horizontales (2o) comprend au moins une tige verticale (4) qui, à l'extrémité inférieure (3a) de ladite paroi verticale (3), comprend un premier crochet (5b) ayant :

- une partie verticale (5c) sensiblement perpendiculaire au plan d'appui au sol identifié par ladite base d'appui (2) ;
- un premier point de flexion (5d) étendu, dans le prolongement de ladite partie verticale (5c), autour d'une première tige horizontale (2b) de ladite base d'appui (2), ladite première tige horizontale (2b) étant la tige horizontale de ladite première série de premières tiges horizontales (2o) qui est la plus proche de ladite partie verticale (5c) ;
- une première partie (5e) étendue dans le prolongement dudit premier point de flexion (5d) parallèlement à et sous ledit plan d'appui au sol identifié par ladite base d'appui (2) jusqu'à ce qu'elle dépasse une deuxième tige horizontale (2c) dudit premier ordre de premières tiges horizontales (2o) de ladite base d'appui (2), ladite deuxième tige horizontale (2c) étant plus espacée de ladite partie verticale (5c) que ladite première tige horizontale (2b) ;
- une deuxième partie (5f) étendue entre les extrémités opposées dans le prolongement de ladite première partie (5e) avec une direction de développement inclinée par rapport audit plan d'appui au sol identifié par ladite base d'appui (2), de manière à s'étendre vers l'intérieur dudit gabion de confinement (1) jusqu'à une troisième tige horizontale (2d) dudit premier ordre de premières tiges horizontales (2o) de ladite base d'appui (2), ladite troisième tige horizontale (2d) étant plus espacée de ladite partie verticale (5c) que ladite deuxième tige horizontale (2c) ;
- un second point de flexion (5g) étendu dans le prolongement de ladite deuxième partie (5f) pour accrocher ladite troisième tige horizontale (2d) et
- une troisième partie (5h) étendue dans le prolongement dudit second point de flexion (5g) et ayant une direction de développement incidente par rapport audit plan d'appui au sol identifié par ladite base d'appui (2),

caractérisé en ce que :

ladite deuxième partie (5f) dudit premier crochet (5b) comprend une partie intermédiaire plus déplacée vers l'intérieur dudit gabion de confinement (1) par rapport à une ligne droite idéale (I) passant par lesdites extrémités opposées de ladite deuxième partie (5f).

2. Gabion de confinement (1) selon la revendication 1, dans lequel ladite deuxième partie (5f) dudit premier crochet (5b) comprend deux parties inclinées (f', f") convergeant en un sommet (50), ledit sommet (50) étant plus déplacé vers l'intérieur dudit gabion de confinement (1) que ladite ligne droite idéale (I) passant par lesdites extrémités opposées de ladite deuxième partie (5f).

3. Gabion de confinement (1) selon la revendication 2, dans lequel ladite deuxième partie (5f) dudit premier crochet (5b) est identifiée par deux parties inclinées (f', f") convergeant dans ledit sommet (50), de préférence lesdites deux sections inclinées sont deux sections droites.

4. Gabion de confinement (1) selon la revendication 3, dans lequel lesdites deux parties inclinées (f', f") convergeant en un sommet (50) sont inclinées d'un angle λ compris entre 110° et 170°, de préférence d'un angle λ compris entre 145° et 165°.

5. Gabion de confinement (1) selon la revendication 1, dans lequel ladite deuxième partie (5f) dudit premier crochet (5b) comprend une section de profil curviligne avec une convexité orientée vers l'intérieur dudit gabion de confinement (1).

6. Gabion de confinement (1) selon l'une quelconque des revendications 1 à 5, dans lequel ladite deuxième partie (5f) dudit premier crochet (5b) reste sensiblement contenue dans l'épaisseur de ladite base d'appui (2).

7. Gabion de confinement (1) selon l'une quelconque des revendications 1 à 6, dans lequel ladite droite idéale (I) passant par lesdites extrémités opposées de ladite deuxième partie (5f) est inclinée d'un angle α compris entre 12° et 70°, plus préférentiellement d'un angle compris entre 18° et 40° par rapport audit plan d'appui au sol identifié par ladite base d'appui (2).

8. Gabion de confinement (1) selon l'une quelconque des revendications 1 à 7, dans lequel ladite troisième partie (5h) est une partie droite, de préférence une partie droite s'étendant à partir dudit second point de flexion (5g) pour une section comprise entre 18 mm et 50 mm, plus préférentiellement pour une section comprise entre 20 mm et 45 mm.

9. Gabion de confinement (1) selon l'une quelconque des revendications 1 à 8, dans lequel la première partie (5e) dudit crochet (5b) est une partie droite.

10. Gabion de confinement (1) selon l'une quelconque des revendications 1 à 9, dans lequel :

- ladite deuxième tige horizontale (2c) est adjacente à ladite première tige horizontale (2b) et/ou
- ladite troisième tige horizontale (2d) est adjacente à ladite deuxième tige horizontale (2c).

11. Gabion de confinement (1) selon l'une quelconque des revendications 1 à 10, dans lequel :

- ladite base d'appui (2) a un côté plus long que les autres côtés et
- ledit premier ordre de premières tiges horizontales (2o) parallèles à un premier côté dudit gabion de confinement (1) est étendu parallèlement audit côté le plus long de la base d'appui (2).

12. Gabion de confinement (1) selon la revendication 11, dans lequel chacune des parois verticales opposées (3) dudit gabion de confinement (1) s'étendant parallèlement à un côté plus long de la base d'appui (2) comprend une pluralité desdits premiers crochets (5b).

13. Gabion de confinement (1) selon l'une quelconque des revendications 1 à 12, comprenant une pluralité de seconds crochets (5a), de préférence en forme de U, pour relier l'extrémité inférieure d'au moins une paroi verticale (3d) parallèle audit second ordre de deuxièmes tiges horizontales (2v) avec la tige horizontale (2v) dudit second ordre de deuxièmes tiges horizontales (2v) qui est la plus proche de ladite paroi (3).

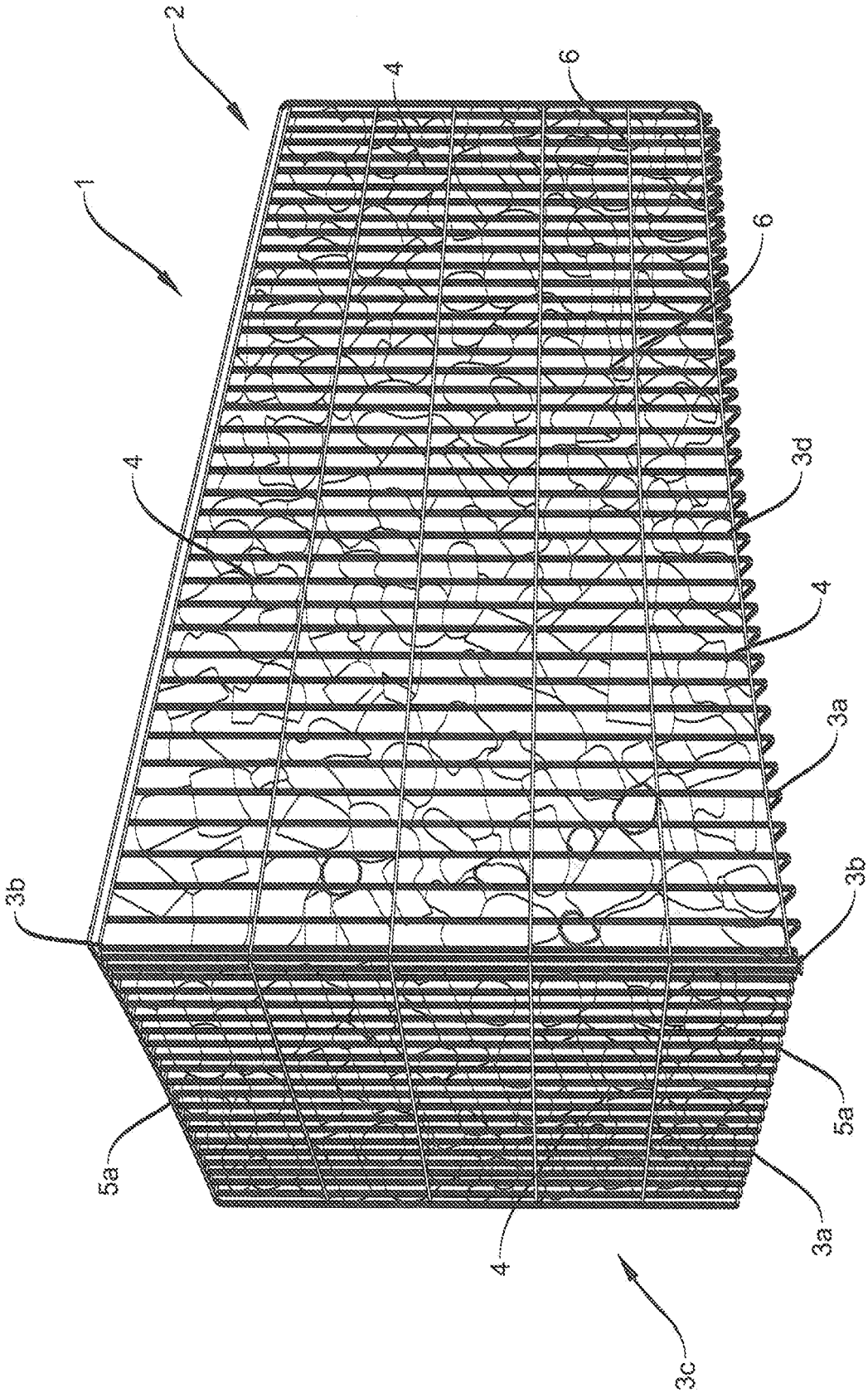

FIG. 1

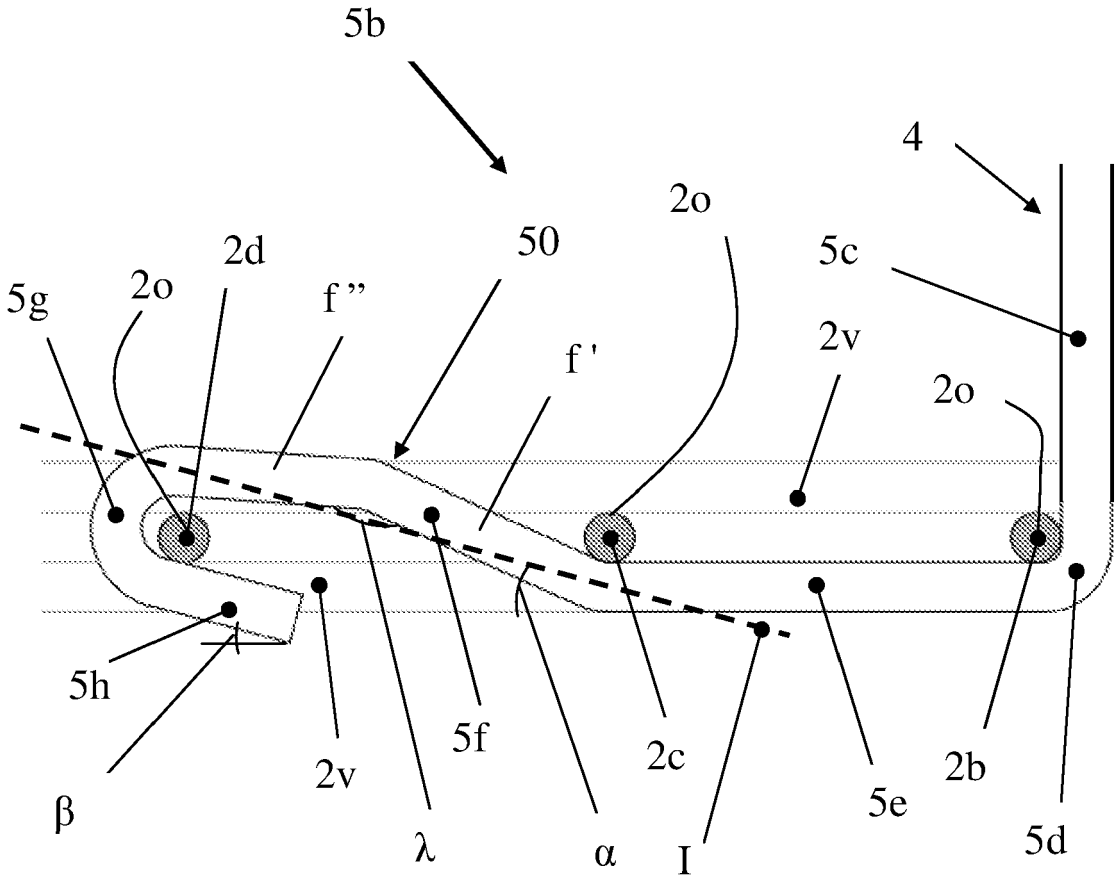

Fig. 2

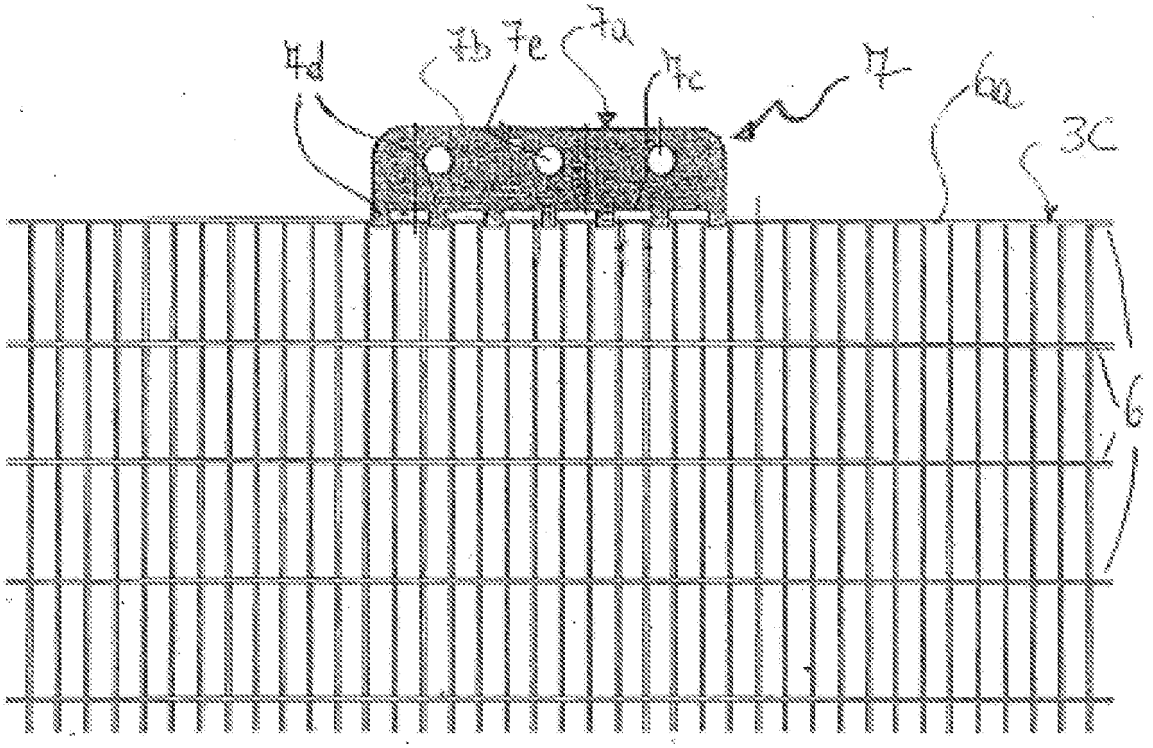

Fig. 3

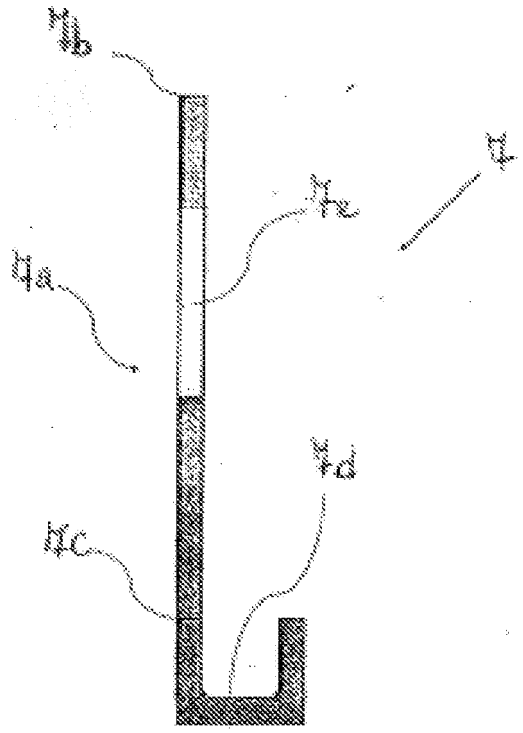

Fig. 4

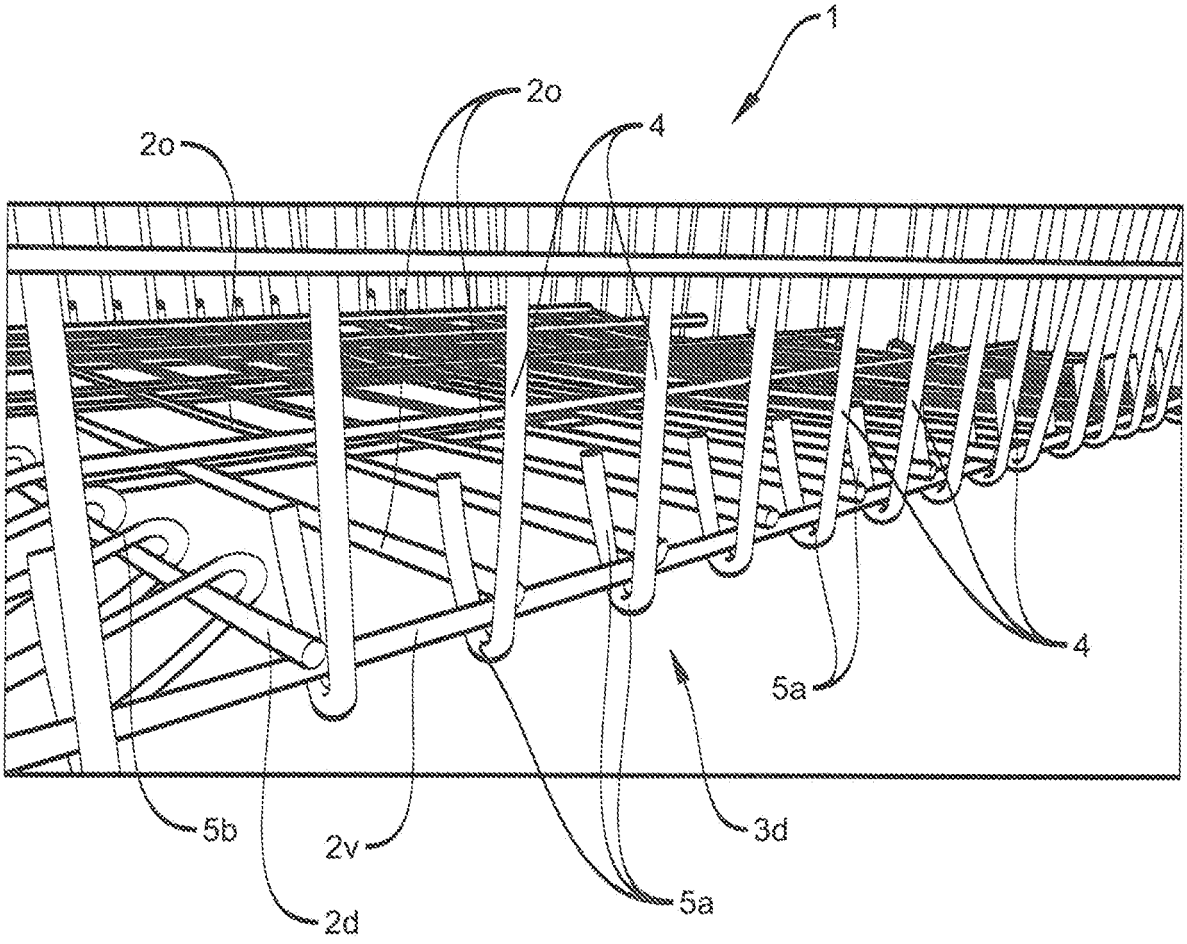

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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