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(54) **GABION FOR ALL TYPES OF NATURAL STONE AND WASTE**

(57) The connection of multiple meshes formed by electrowelded rods with wires, staples or similar means so as to form a gabion causes deformations when filled with natural stone or any type of rubble. In addition, connecting the short or long side meshes and the base mesh by bending the ends of the rods to form a "U" or "Z" prevents gabions from being fitted one on top of another, with small gaps separating gabions which generate instability when multiple gabions are stacked to form a wall. The invention overcomes these problems using staples which are positioned so as to connect the meshes while allowing certain degree of movement there between, covering the meshes and leaving some clearance, thereby forming flexible connections.

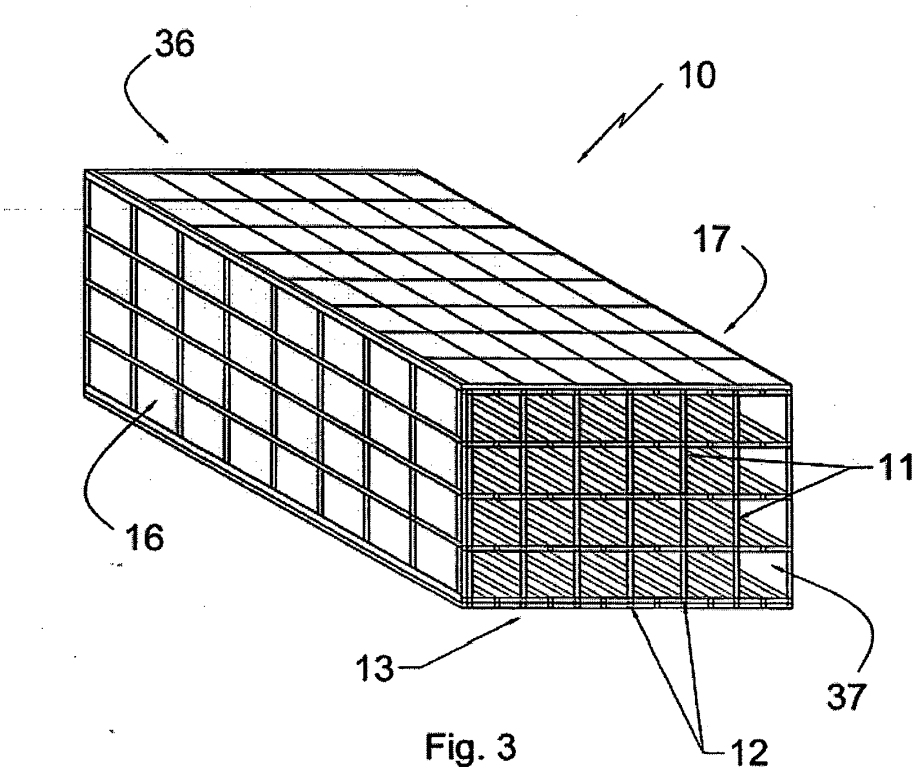

Fig. 3

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Description

Object of the invention.

[0001] More specifically the invention refers to improvements in gabions, a concept comprising all types of cages manufactured with grid meshes manufactured with welded rods, forming assemblies of any configuration and shape, which are filled with natural stones and any type of building rubble, either recovered stones, pieces of concrete, asphalt, plastics of any kind, wood and similar materials of any nature or colour.

[0002] These improvements are focused on the manner of joining the grid meshes, that enable its structural stability to be improved, once the gabions are loaded with the corresponding stones and/or rubble, as well as improving the stiffness of the cross-linked mesh joints by the use of staples that are fitted to join the meshes, but allowing certain movement between them, by leaving a certain play, thus achieving flexible joints, that stabilises the gabion and ensures the shapes are preserved when they are filled with the aforementioned materials.

State of the art.

[0003] Cages for stone known as gabions, have been used for more than a century in building containment walls, stabilising embankments, channelling water in rivers, building fences, separation walls and similar uses. Gabions are built with meshes formed by electro welded rods or rods welded with other techniques, forming grids, where the dimensions of the grid depend on the type of stones and/or rubble they contain.

[0004] The dimensions of the gabions and their weight, implies that for distances more than approximately 150-200 m, the repercussion of the cost of transport, once the gabion is finished and filled with stones, may represent an important percentage in the pricing of its manufacturing and placement, therefore, it is important how the gabions are manufactured, manipulated and moved, so as to minimise the aforementioned manufacturing transport and placement costs.

[0005] As a precedent of the invention, we can mention for instance Swiss patent no. 367.113, which describes and claims a gabion filled with gravel, which is composed of meshes made of bars at the intersection points, so that these meshes joined form a geometrical body, and are joined together by means of wires.

[0006] Another type of gabion is that of USA patent no. 5.860.551 formed by six elements in the manner of assembled meshes, their handling is facilitated by the provision of a raising step, fixed to the bottom of the gabion frame to facilitate movement.

Scope of the invention.

[0007] To improve spatial stability of conventional gabions, avoiding total or partial deformation of the gabion as a result of being filled with stones, plastic, wood, rubble and other materials, thus affecting their shape, for instance a prism, a cube, a sphere, a polyhedron and any other known figure, deforming its different faces. This spatial stability is achieved, in contrast to the current state of the art, by replacing the rigid joints of the different faces of the gabion by flexible joints of the meshes that it is made of, so that the load resulting from filling the gabion is spread out better on the inside of the same, once this operation has been carried out and the subsequent vibration of the gabion when filled with these materials.

[0008] Additionally, another of the aims of the invention is to focus on the aforementioned spatial stability, by the use of interior transversal meshes that join two or more lateral exterior meshes, so as to avoid them deforming or moving and thus modifying the initial shape, by regularly spreading the forces generated by the materials inside the gabion on the faces or short or long side meshes.

[0009] Another of the aims of the invention is to improve the stability of a collection of gabions located vertically, one on top of the other, by building in situ small posts inside the gabion, with their lower ends embedded in the foundations of a wall formed by placing one or more gabions on top of each other, which allows, when putting several gabions on top of each other vertically, to form a wall preserving verticality without wall stability problems caused by this superposition.

[0010] Another of the aims of the invention is the modification of the manner of building the base of the gabion, which optionally (according to its interior load, and its application) is built by the superimposing of two meshes joined together, by corresponding staples, thus avoiding sagging and/or deformation of the base when the interior weight of the filling material of the gabion surpasses certain limits.

[0011] Another of the aims of the invention, is the flatness of the different gabion faces, which once assembled, thanks to joining of two or more adjacent meshes by means of rings, avoids the faces bulging, as a result of the bending of the vertical rods in their lower ends of the side meshes thanks to their "U" or "Z" shaped configuration to hold the side meshes to the base mesh, as happens in some types of gabions manufactured according to common systems on the market.

Description of the invention.

[0012] In one of the possible embodiments of the invention, the joining of two or more meshes to form the gabion is achieved by using staples, that surround two or more rods of the confronted meshes to be joined, leaving, contrary to the current state of the art, a certain play between the perimeter of the gabion and these rods which enables, once the gabion has been filled and vibrated, that the different meshes that it is composed of on the outside, can move a certain distance with regard to their neighbours, so that they maintain their shape, instead of deforming, so that, by placing two or more

gabions one on top of the other or side by side, they will maintain their original shape and there is no space or volume between them as a result of the inherent deformation caused by the weight of their load, which would cause unstable gabions when placed on top of each other, and when making a wall, could cause them not to support one on top of the other so they would not preserve their verticality, and could cause a gabion to fall to the ground with the resulting danger and damage. The meshes used to make the different faces of the gabion are formed by metal rods or of any other resistant material, welded together, forming grids of dimensions that depend on the dimensions of the stones or any other type of material, in the gabion and of the resulting weight of the gabion.

[0013] In addition, the invention is characterised according to other purposes announced above, by reinforcing the stability of the gabion by joining the two short or long side meshes by means of internal grid meshes, that are joined to said short or long side meshes by means of staples, sharing the tension generated by the internal load of the gabion uniformly.

[0014] For this purpose, according to the type of load of the gabion the distance between reinforcement meshes will be equal or different, as well as the dimensions and configuration of the grid of these meshes, and the diameter of the rods that the gabion is made of. Additionally, the invention is characterised by incorporating some resources into the gabion to facilitate placing two or more gabions on top of each other by providing small perpendicular posts at the settling base, comprising a rod or (bar grating) surrounded by a tubular element with concrete or similar material acting as a pillar, with its end embedded in the foundations.

[0015] Additionally, the invention is characterised by improving the structural stiffness of the base mesh of the gabion by incorporating a superimposed second reinforcement mesh, with an equal or different grid, joined to this base mesh by staples, so that the two meshes form a reinforced mesh base.

[0016] To move the gabions from the place where they are made to the place where they are to be used, metal wires, plastic, or fabric straps are used with loops on one end, while on the opposite ends they are joined to the said cable by means of terminals.

[0017] Below is a list of the parts of the invention that can be seen in the annexed drawings with the aid of the corresponding identification numbers; (10) gabion, (11) horizontal rods, (12) vertical rods, (13) base of the gabion, (14) cover of the gabion (10), (15) base reinforcement mesh (13), (16 - 17) Long side meshes, (18) staples, (19) comb, (20) hook, (21), (22) loops, (23) strap, (24) hook, (25) hook, (26) space, (27) Bar grating, (28) reinforcement material, (29) cylindrical tube, (30) grids, (31) meshes of reinforcement, (32) terminal, (33) wall, (34) handrails, (35) gabions, (36 - 37) Short side meshes, (38) support, (39) foundation, (40) cable, (41) rings, (42) screws.

[0018] Other details and characteristics shall be shown throughout the description below referring to drawings attached to this report which are shown for illustrative but not limiting purposes a practical embodiment of the invention.

Description of the drawings

[0019]

Figure 1 is a top plan view of a gabion (10) with a prism shape in one of the possible embodiments.

Figure 2 is a front elevation view of the gabion (10) shown in the previous figure.

Figure 3 is a side front perspective view of the gabion (10).

Figure 4 is a top plan view of a staple (18) as used to join two or more long side, short meshes, reinforced base or not and the cover.

Figure 5 is a top plan view of the comb (19) formed by joining several staples (18) that are fitted with a stapler.

Figure 6 is a front elevation view of the hook to spread the load (20), the ends of which are bent to form closed loops (22).

Figure 7 is a top plan view of the strap (23), the ends of which are bent over forming the closed loops (22).

Figure 8 is a hook to spread the load (24) enabling the gabion to be raised (10) without deforming it (10).

Figure 9 is a section through A - A', according to figure 1.

Figure 10 is a detail of the joint of a side mesh (16) with a base mesh (13) by means of a staple (18) leaving some play (16).

Figure 11 is a perspective view of the tube (29) built inside the gabion (10).

Figure 12 is a front elevation view of a covering gabion (35), built in a factory wall (33), by means of a handrail (34), and a bracket (38).

Figure 14 is a front elevation view of a sling formed by a metal cable, a plastic and/or textile strap (40), installed in the base (13) of a gabion (10), with the aid of the rings (41).

Figure 15 is a detail by "2" according to previous figure 14.

Description of a preferred embodiment of the invention.

[0020] In one of the preferred embodiment of the invention, as can be seen in Figure 1, a gabion (10) is formed by the joining of long (16-17) and short side meshes (36-37) respectively, forming the larger and smaller base sides of the gabion respectively, joined to a base (13), formed by one or more meshes (15) overlapping the base mesh (13), all joined (13-15) by staples (18) see Figure 9, forming a prism-shaped gabion (10), which may adopt (as can be seen in Figures 1 and 3,) a prism-shaped configuration, although other geometrical figures are possible, being closed (10) by a cover (14).

[0021] The long and (36-37) short side meshes (16-17), such as those that form part of the base (13), reinforced or not with a second reinforcement mesh (15) with the same or different size of grid (30), are built with horizontal and vertical rods (11-12) welded together forming grids (30) of (30) different sizes depending on type of material used for filling as well as of the type of force they exert on the meshes of the gabion, this filling for instance on the meshes (15-30), forming the base (13) of the gabion (10), use a smaller size of grid (30) to avoid the edged of the material projecting from the same (30), which on placing the gabion down (10) on the ground, or on another gabion (10) of the same or different size, could affect its settling and stability. According to one of the purposes of the invention, joining two or more meshes (16), (13) and (37) for instance, is done, as can be seen in Figure 10, by staples (18), the configuration of which (as an example, but not exclusively in this manner) can be seen in in Figure 4, which (18) come off a comb (19), through stapling gun (18), not shown in the illustrations. According to another of los purposes of the invention, the staples (18) connect two or more rods (11), as may be seen in Figure 10, but leaving a certain gap and/or play, so that joining two or more meshes (16), (13) and (37) for instance, leaves a gap (26), between the inner perimeter of the staple (18) and these rods (11) and (12), so that there is an elastic joint between meshes (16-13-37), giving the gabion spatial stability (10) after being loaded, vibrated and placed, or not the cover has the capacity to vary the distance between the different faces, and should be placed in its operating position.

[0022] According another of the purposes of the invention and also to improve the spatial stability of the gabion (10), between two short or long side meshes (16-17) there are two meshes (16), joined by transversal internal meshes (31), perpendicular or not to these long side bases (16-17), and short side bases (36-37), see Figure 9, thus avoiding deformation by the load, or when two or more gabions are placed on top of each other (10), forming a wall, by spreading the load generated by the filling materials of the gabions (10) between the different meshes.

[0023] The transversal reinforcement meshes (31) may have the same or different configurations and grid size (30), firstly according to the weight of the filling load, the dimensions of the gabion (10) or the rod, or its placement regarding the separation between two or more meshes (31) can be the same or different.

[0024] Additionally according to another of the purposes of the invention, to improve the transportability of the gabions (10) there are bent rods (20-24), as can be seen in Figures 6 and 8, which act as a hook (20) formed by a metal U-shaped rod, the ends of which are bent to form closed loops (22), or the hook (24) formed by a U-shaped ben rod, whose arms are bent in convergence and whose free ends are bent on themselves forming loops (22).

[0025] The fitting of these hooks (20-24) shown in Figures 6 and 8 is done by passing them through the horizontal rods (11) of the reinforcement base (13-15) so that the loops (22) locate the hooks (20-24) on the ends of a cable and with a conventional crane (not shown in the figures), the gabions can be moved (10) from where they were made to the means of transport, and when they arrive at the placement area, facilitate the unloading of the gabion (10) from the means of transport, and its placement in the desired location, on the the corresponding foundations.

[0026] According to another of the purposes, as may be seen in Figure 11, to aid the rigidity of several gabions (10) on top of each other by their reinforcement base (13), a Bar grating has been fitted (27) perpendicular to the reinforcement base (13) of the gabion (10) and embedded in the foundations (39), and then a cylindrical tube (29) is placed around it, and finally concrete is poured between the cylindrical tube (29), and the bar grating (27), forming a compact post that facilitates the vertical rigidity of a wall when two or more gabions are placed (10) on top of each other, which if these posts did not exist, could become unstable, either by the weight of one or more of the gabions (10) on top of each other, or as a result of the thrust generated by the materials the sliding of which is what the containment wall is intended to prevent with two or more gabions (10).

[0027] According to another of the purposes of the invention, the gabions (35), in another different format to (10), as represented in Figure (12), with a thickness less than these gabions (10), can form a covering for a wall (33), as it has a "U"-shaped transversal section handrail (34), on which a support rests with an "L"-shaped transversal section (38), secured to one of the large bases of the gabion (35) by welding, bolts, clamps, or a similar technical resource.

[0028] According to another property of the invention, as may be seen in Figures 14 and 15, another possibility for moving a gabion (10) from where it is made to the transport medium, and from this to the final placement location, a cable is used (40), secured to one or more rods (12) of the base (13) of the gabion (10), by means of rings (41), the free ends of which are joined with bolts (42), clamping the rings (41) to the cable (40) and rods (12), so that the force of the weight of the filling material is spread regularly on most of the base area (13) being reinforced or not with another mesh (15) according to the weight of the filling material.

[0029] This cable (40), as can be seen in Figure 14, has on its free ends triangles or loops, the lower base of which is what holds these rods (12) by means of the rings (41) and bolts (42), whereas the opposite ends of the cable (40) are joined to (40) again by terminals (32), a gabion being suspended (10), by means of a conventional hook or similar device (25) secured to the cable of a conventional crane, not shown in the illustrations. Instead of wires (40) rods (20) and (23) can be used, in the configuration shown in in figures 6 and 8, in which it can be seen how the rod (20) is bent into a "U" shape (21) and the ends form loops (22), while the rod (24) is bent into

a triangular shape (21) whose ends are bent to form loops (22).

[0030] In some instances and for special gabion shapes (10), longitudinal rods are used (23) with ends forming loops (22), to secure the long (16-17) or short (36-37) side meshes, as can be seen in Figure 7.

[0031] Having sufficiently described this invention using the Figures attached, it is easy to understand that any changes judged to be suitable may be made, whenever these changes do not alter of the essence of the invention summarised in the following claims.

Claims

1. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** formed by joining meshes, forming a closed body of any shape, being filled before closing the body, with a mesh as a cover. Filling with natural stone, plastic, pieces of wood or building rubble of any kind, **characterised in that**, the gabion (10) is made of two or more meshes with variable grid (30), these meshes being joined by staples (18), so that between the inner perimeter of the staples (18) and the rods (11-12) of the meshes there is a tolerance or play (26) that allows the joints of the meshes that configure the gabion (10) an elasticity, reinforcing two or more short or long side meshes (36-37) and (16-17), through a or more inner transversal meshes (31) for reinforcement, which join two or more short (36-37) or long (15-16) sides.

2. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that**, when the gabions (10) have to be moved, they are fitted with rods (20-24) the base of which (21) pass under the base reinforcement (13) showing the loops at their ends (22) above the upper base (14) or cover of the gabion (10).

3. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the preceding claims **characterised in that** the rod (20) has a concave base (21) the ends of which are extended into vertical parts with the free ends bent into the shape of loops (22), these vertical parts being parallel to one another.

4. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the preceding claims **characterised in that** the rod (24) has a flat base (21) the ends of which converge and end in closed loops (22).

5. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that**, when two or more gabions are placed on top of each other (10) perpendicularly to the base mesh (13) of said gabion (10) there is a Bar grating (28), surrounded by a cylindrical tube (29) filling the space between the Bar grating (27) and the tube (29) with concrete, embedding the lower end of the Bar grating (27) into the foundations (39).

6. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** two or more meshes (15-16) and (13) are joined by one or more staples (18) using a stapling gun (18) from a comb (19).

7. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** the transversal reinforcement meshes (31) are joined to the short and long meshes (16-15) and (32-33), respectively by means of staples (18).

8. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** for covering walls (33), gabions (35) of a small width are used (33), with the aid of horizontal handrails (34), these handrails (34) being secured to the walls (33) into which the supporting elements are fitted (38) joined to the gabions (35) by welding.

9. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claims 1 and 8 **characterised in that** the horizontal handrails (34) have a "U"-shaped transversal section.

10. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claims 1 and 8 **characterised in that** the supporting elements (38) for the gabions (35) have an "L"-shaped transversal section.

11. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** a cable is used (40) for moving a gabion (10), secured to one or more rods (12) of the base (13) of the gabion (10), by means of rings (41), whose free ends are joined by bolts (42), clamping the rings (41) to the cable (40) and rods (12).

12. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claims 1 and 11 **characterised in that** the cable (40), has on its free ends triangles or loops the lower base of which is secured to the rods (12) by means of the rings (41) and bolts (42), while the opposite ends are joined to the cable (40) by terminals (44).

13. **- "GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claims 1, 11 and 12 **characterised in that** the wires (40) are

of steel, plastic, or fabric straps.

14. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** the grids (30) of the transversal reinforcement meshes (31) will be of the same dimensions and configuration as the grids of the meshes (16-17- 36-37).

15. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** the grids (30) of the reinforcement meshes (31) will be of different dimensions and configuration as the grids of the meshes (16-17-36-37).

16. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** the distance between two or more transversal reinforcement meshes (31) will be the same.

17. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** the distance between two or more transversal reinforcement meshes (31) will be different.

Amended claims under Art. 19.1 PCT

1. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** formed by joining meshes, forming a closed body of prism shape, being filled before closing the body, with a mesh as a cover. Filling with natural stone, plastic, pieces of wood or building rubble of any kind, said meshes being jointed by clips **characterised in that**, the gabion (10) is made of two or more meshes with variable grid (30), these meshes being joined by staples (18), so that between the inner perimeter of the staples (18) and the rods (11-12) of the meshes there is a tolerance or play (26) that allows the joints of the meshes that configure the gabion (10) an elasticity, reinforcing two or more short or long side meshes (36-37) and (16-17), through a or more inner transversal meshes (31) for reinforcement, which join two or more short (36-37) or long (15-16) sides.

2. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** when the gabions (10) have to be moved, they are fitted with rods (20-24) the base of which (21) pass under the base reinforcement (13) showing the loops at their ends (22) above the upper base (14) or cover of the gabion ()

3. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the preceding claims **characterised in that** the rod (20) has a concave base (21) the ends of which are extended into vertical parts with the free ends bent into the shape of loops (22), these vertical parts being parallel to one another.

4. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the preceding claims **characterised in that** the rod (24) has a flat base (21) the ends of which converge and end in closed loops (22).

5. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** when two or more gabions are placed on top of each other (10) perpendicularly to the base mesh (13) of said gabion (10) there is a Bar grating (28), surrounded by a cylindrical tube (29) filling the space between the Bar grating (27) and the tube (29) with concrete, embedding the lower end of the Bar grating (27) into the foundations (39).

6. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** two or more meshes (15-16) and (13) are joined by one or more staples (18) using a stapling gun (18) from a comb (19).

7. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** the transversal reinforcement meshes (31) are joined to the short and long meshes (16-15) and (32-33), respectively by means of staples (18).

8. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claim 1 **characterised in that** a cable is used (40) for moving a gabion (10), secured to one or more rods (12) of the base (13) of the gabion (10), by means of rings (41), whose free ends are joined by bolts (42), clamping the rings (41) to the cable (40) and rods (12).

9. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE",** according to the claims 1 and 8 **characterised in that** the cable (40), has on its free ends triangles or loops the lower base of which is secured to the rods (12) by means of the rings (41) and bolts (42), while the opposite ends are joined to the cable (40) by terminals (44).

10. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claims 1, 8 and 9 **characterised in that** the wires (40) are of steel, plastic, or fabric straps.

11. - **"GABION FOR ALL TYPES OF NATURAL**

STONE AND RUBBLE", according to the claim 1 **characterised in that** the grids (30) of the transversal reinforcement meshes (31) will be of the same dimensions and configuration as the grids of the meshes (16-17- 36-37).

12. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** the grids (30) of the horizontal reinforcement meshes (31) will be of different dimensions and configuration as the grids of the meshes (16-17- 36-37).

13. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** the distance between two or more transversal reinforcement meshes (31) will be the same.

14. - **"GABION FOR ALL TYPES OF NATURAL STONE AND RUBBLE"**, according to the claim 1 **characterised in that** the distance between two or more transversal reinforcement meshes (31) will be different.

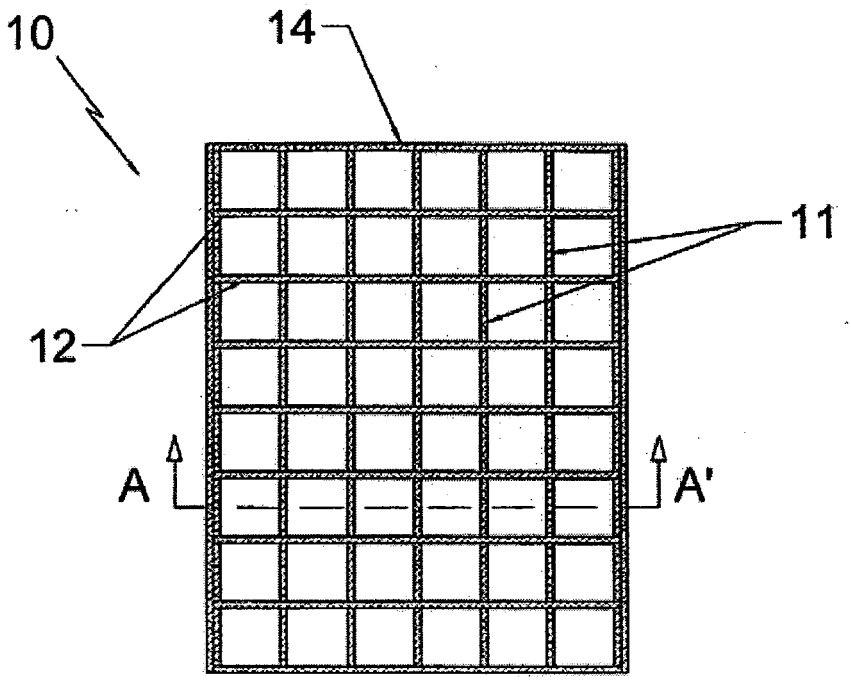


Fig. 1

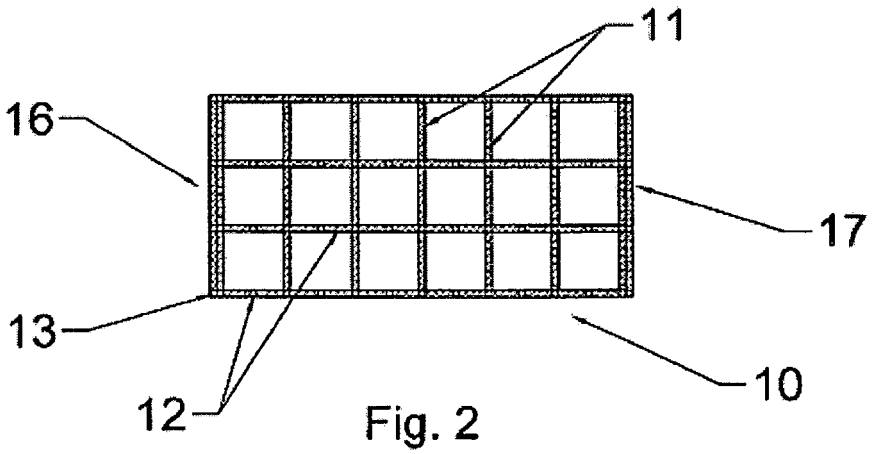


Fig. 2

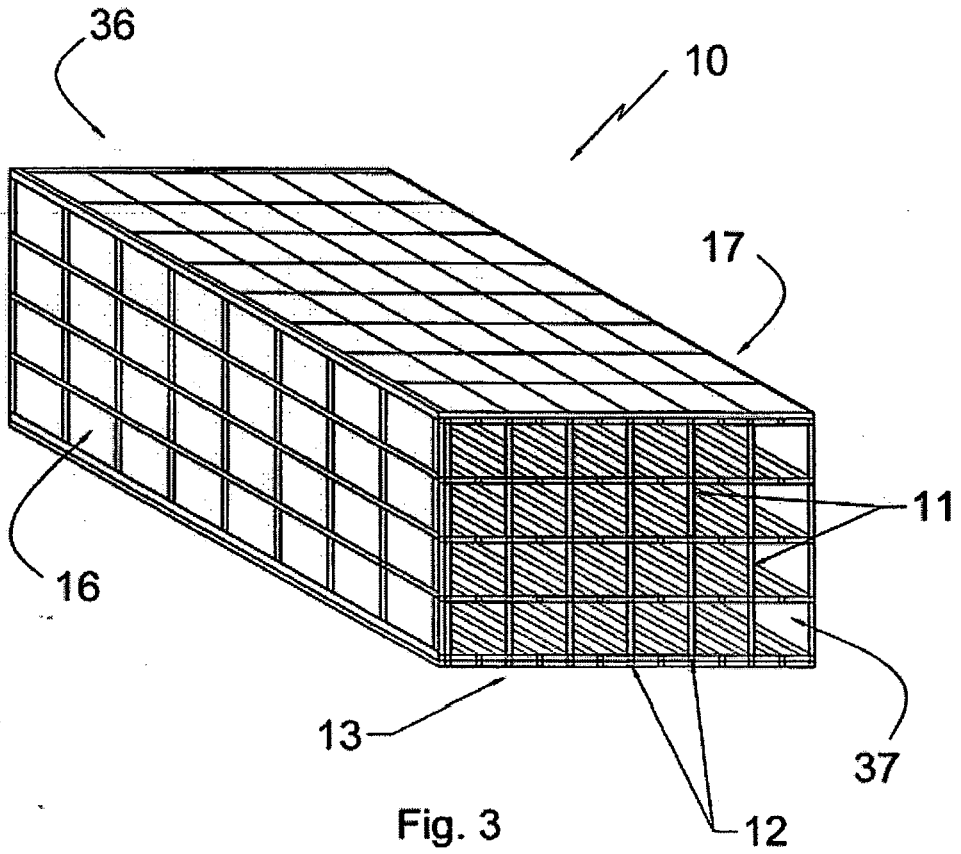


Fig. 3

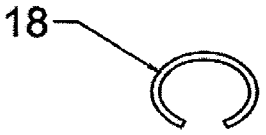


Fig. 4

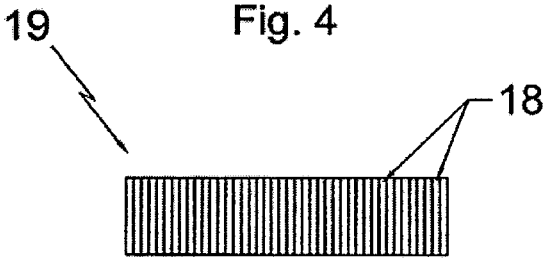


Fig. 5

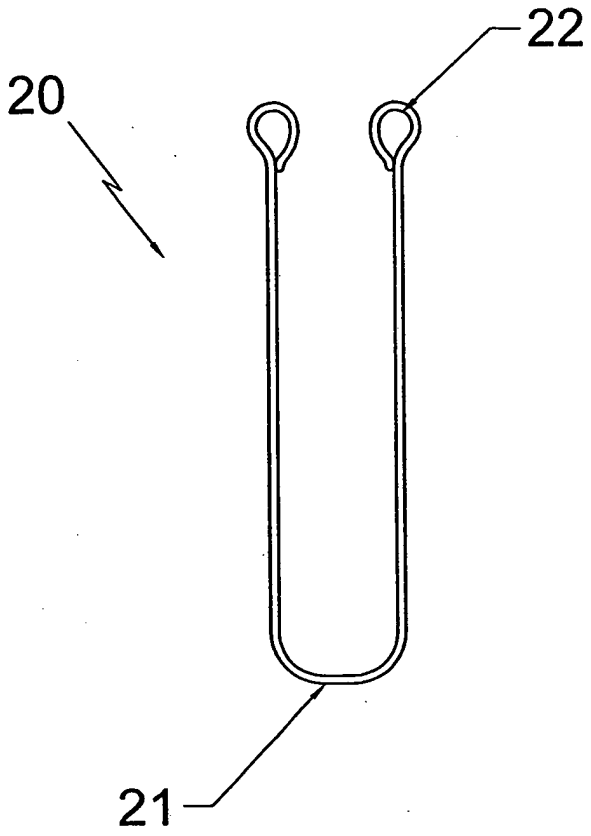
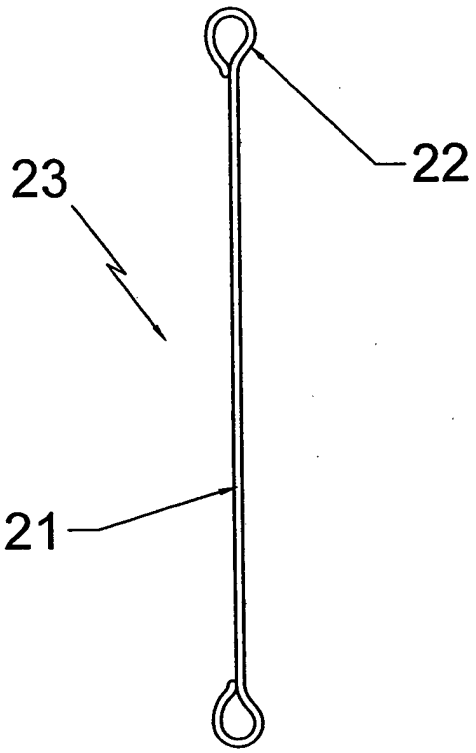


Fig. 6



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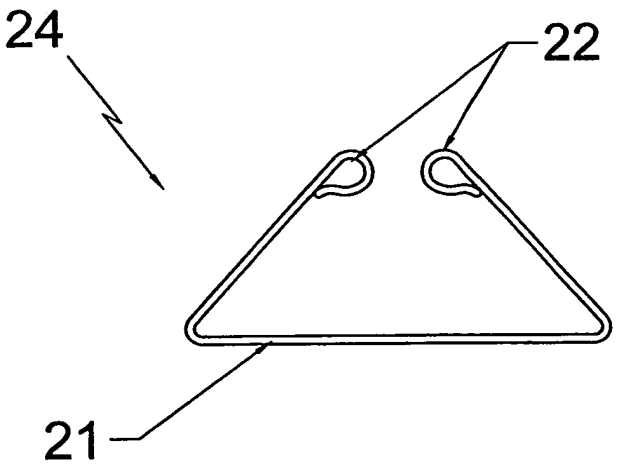


Fig. 8

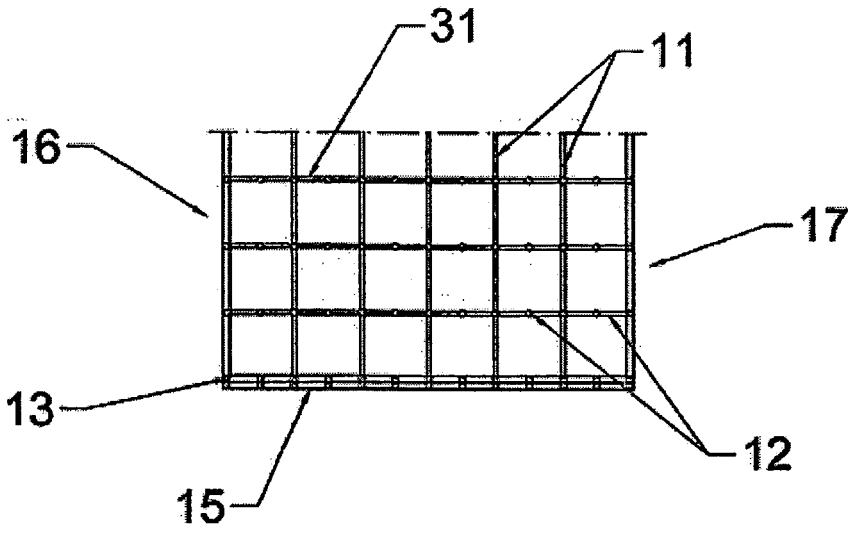


Fig. 9

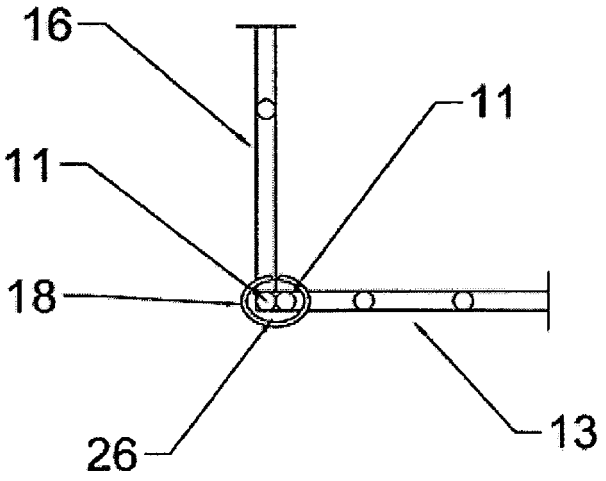


Fig. 10

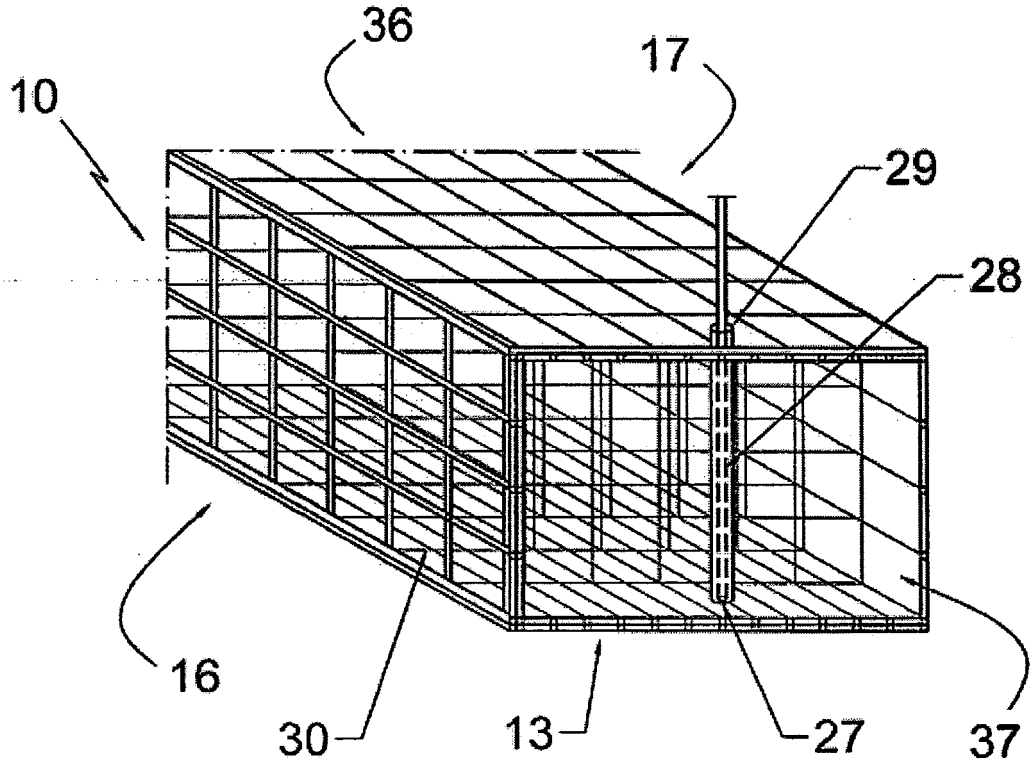


Fig. 11

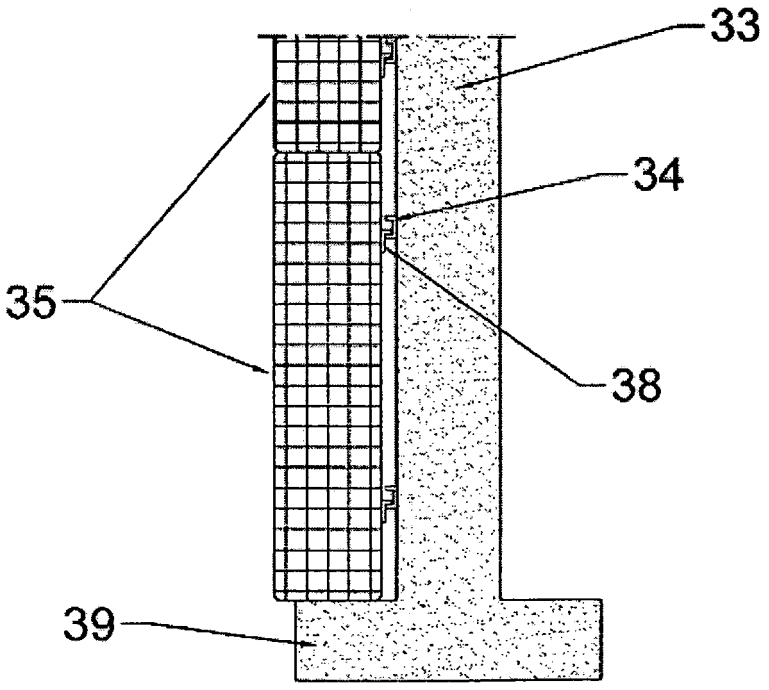


Fig. 12

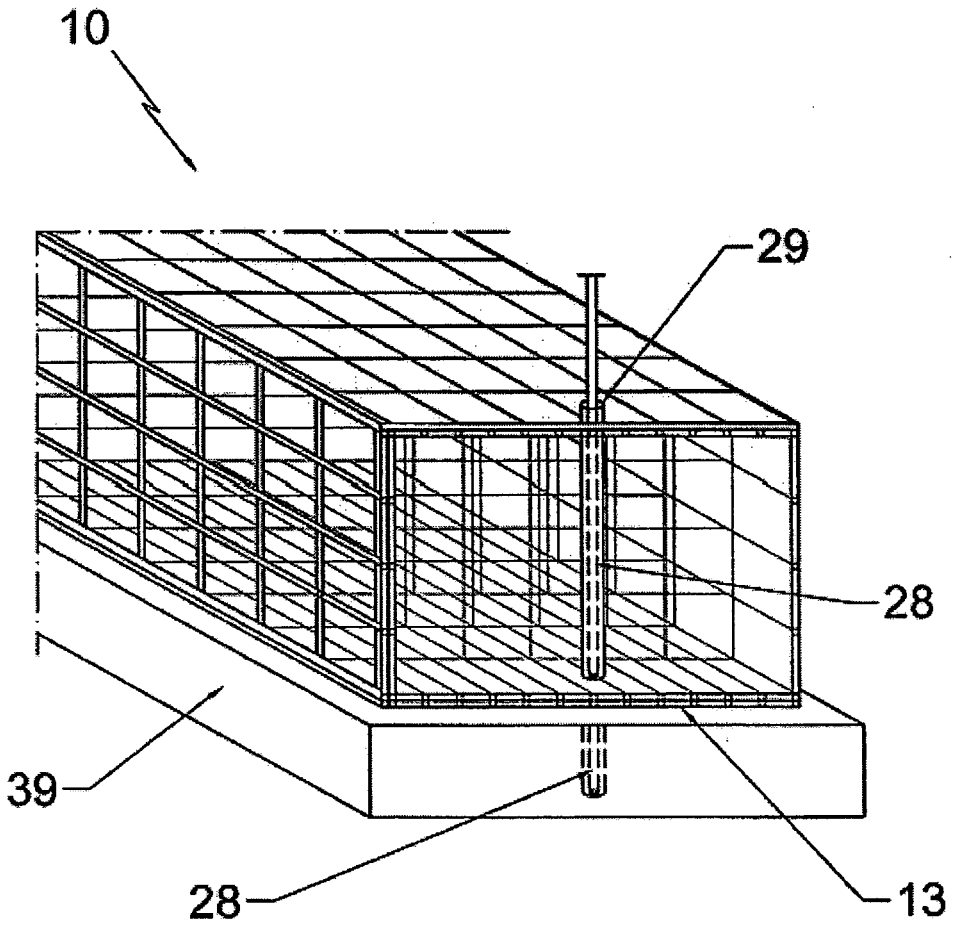


Fig. 13

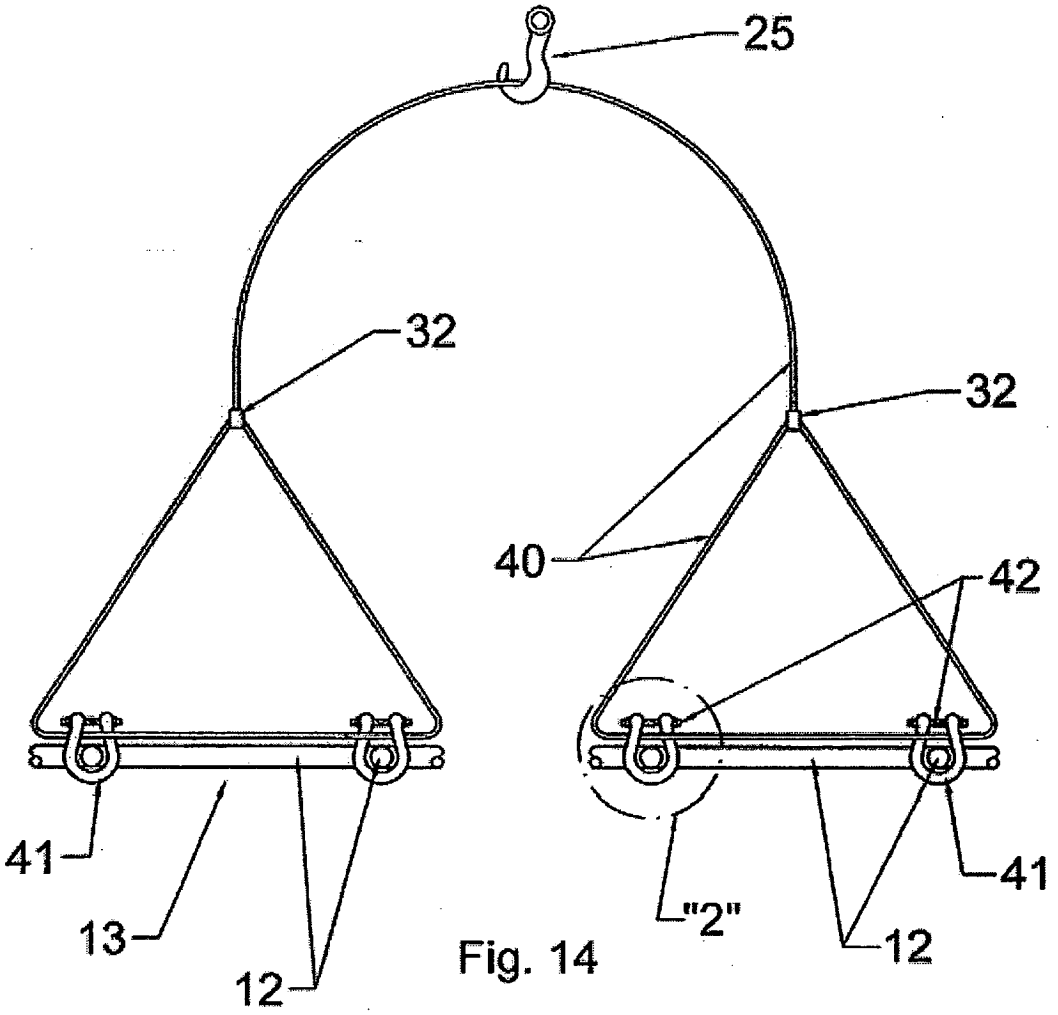
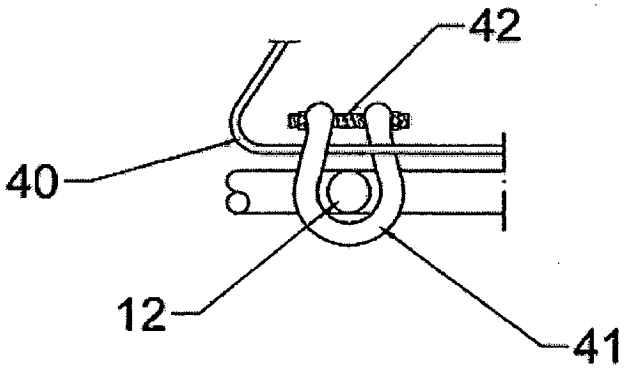


Fig. 14



Detail"2"

Fig. 15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2009/070382

A. CLASSIFICATION OF SUBJECT MATTER

E02D 29/02 (2006.01)
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)
E02D29/02

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

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

INVENES,EPODOC,WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 845863 A (PENFOLD FENCING AND ENGINEERIN; KENNETH MCKELL) 24.08.1960, page 1, lines 10-22; page 4, lines 7-99; figures 1,5,7.	1,6,7,14-17
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Y	GB 2438204 A (HESCO BASTION LTD) 21.11.2007, page 5, lines 12-18; page 11, line 20 - page 15, line 17; figures 10,13.	2-4
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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14.April.2010 (14.04.2010)	**(16/04/2010)**
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer F. J. Riesco Ruiz Telephone No. +34 91 349 68 69

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 2009/070382

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 2008010784 A1 (FLUM) 17.01.2008, the whole document.	6,7
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ ES 2009/070382

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REFERENCES CITED IN THE DESCRIPTION

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- US 5860551 A **[0006]**