

PATENT SPECIFICATION

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(54) IMPROVEMENTS RELATING TO GABIONS

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5 It is known that linings or other protective structures formed from gabions may be used to prevent erosion of or landslides on the banks of rivers and lakes, coasts, mountains and other exposed ground surfaces. Gabions are parallelepipedic boxes or containers, usually formed from metal mesh, and in use are filled with ballast such as gravel, crushed rock, rubble, and the like, before being closed by a lid. The protective linings or structures are formed by connecting a large number of filled and closed gabions together.

10 A simple form of gabion which has been used extensively is formed from a base sheet of metal mesh which can be folded to form the bottom, two opposite side walls, and the lid of the gabion, and two smaller sheets of metal mesh which form the two end walls of the gabion. The two smaller sheets are connected to the base sheet by means of stitching with metal wire of the same quality as that used for the manufacture of the mesh, but any other connection system may be used so long as the two smaller sheets may be folded relative to the portion of the base sheet which forms the bottom of the gabion.

15 20 25 30 35 40 The manufacture of these gabion elements is carried out at a factory, but their erection into boxes ready to receive ballast is effected on site during the positioning of the protective lining to be formed by the gabions. The erection consists of first folding the base sheet in such a way as to arrange its parts intended to form the side walls of the gabion perpendicularly to the part forming the bottom. In this phase the sheets forming the end walls are also arranged vertically and their edges which extend

tend perpendicularly to the bottom are stitched, again with the use of metal wire, to the vertical edges of the side walls formed from the base sheet. At this stage the part of the base sheet intended to form the lid of the gabion is not connected to the upper edges of the end walls and the other side wall, since the gabion box must be left open for the purpose of filling it with ballast.

To form the protective lining, the erected empty boxes are arranged one beside another with side walls adjacent each other, and the adjacent vertical and upper edges of the boxes are connected by means of stitching with metal wire. The interconnected boxes are then filled with ballast, following which the lids are folded downwards to close the boxes, each closure being made permanent by stitching the free edges of the lids to the adjacent upper edges of the side and end walls of the boxes.

Another known type of gabion is known as the mattress type. Each such gabion comprises a parallelepipedic container having a number of compartments and is arranged to cover an appreciable area of the ground to be protected without any break in its continuity, rather in the manner of a mattress and hence the name. The container has a height which is considerably less than its length and its width, and is manufactured from a large base sheet of metal mesh of such dimensions that it can form the bottom, the longitudinal side walls, and the transverse end walls of the container. To the bottom portion of the base sheet there are fixed, by means of stitching in such a manner as to ensure a hinged connection, a number of smaller secondary sheets which are proportioned and arranged so that they can be erected to form partition walls which divide the container into separate compartments.



A protective lining is formed by connecting together a number of mattress-type gabions side by side, each filled with ballast and having a lid or lids of metal mesh attached to its upper edges to close all of the compartments. The advantage which this construction offers in relation to a lining formed from the simple box gabions described earlier lies in the continuity and strength of the protective lining obtained. This advantage derives from the fact that each gabion mattress covers an extent of ground of appreciable dimensions and possesses a continuous bottom wall and continuous longitudinal side walls while being divided into a number of separate compartments as is necessary to provide correct and uniform distribution of the ballast.

A disadvantage of both arrangements, however, is that when erected gabions are positioned and connected side by side to form a protective lining, there is duplication of metal mesh material at the adjacent walls of neighbouring gabions. While this adds to the strength of the resulting lining, it could nevertheless be considered an unnecessary duplication, and therefore a waste of metal mesh material.

With the aim of avoiding, or at least greatly reducing, such duplication, according to the present invention an element for use in forming a gabion consists solely of a rectangular bottom panel of metal mesh, three rectangular metal mesh panels extending along three edges of the bottom panel for providing the gabion with three walls of equal height, and at least one further metal mesh panel which is attached to and extends across the bottom panel parallel to two of its edges and which, in use, forms a partition wall.

As will be appreciated, when an element in accordance with the invention is erected on site so that its wall panels are perpendicular to the bottom panel, and each edge which meets another edge or wall is stitched by metal wire to that edge or wall, a gabion is formed which is minus one wall and a lid. Obviously, if a single gabion is to be formed from the erected element, metal mesh panels must be stitched to the element as required to form the missing wall and lid. However, if a protective lining comprising a large number of gabions is to be formed, erected elements in accordance with the invention are positioned and connected together side by side so that the missing wall of each element is provided by a wall of a neighbouring element, thereby avoiding duplication of metal mesh material at the junctions between these elements. Furthermore, if the lining is to comprise more than one layer of gabions, the lids of the or each covered layer of gabion elements will be formed by the bottoms of the covering layer of gabion elements, and it is therefore only necessary to provide additional metal mesh material to form the lids for the top layer or elements. By careful design and arrangement of the erected elements in accordance with the invention,

a protective lining of gabions can therefore be formed in which duplication of metal mesh material at the junctions between neighbouring gabions is substantially reduced, or even avoided altogether.

Elements in accordance with the invention may be constructed to form box type gabions or mattress type gabions, and in each case the bottom panel and at least the two side wall panels on opposite edges of the bottom panel of the element are preferably provided by an integral sheet of metal mesh material. The remaining wall panel or panels of the element may be stitched to the bottom panel by means of metal wire, but any other connection system which allows the panels to fold relative to the bottom panel may be used if preferred. Preferably all the metal mesh material used in the element in accordance with the invention is corrosion resistant, the mesh material being made, for example, from galvanised wire or plastics coated wire.

Preferably the or each panel for forming a partition wall extends parallel to the edge of the bottom panel which is without a wall, i.e. perpendicularly to the two side wall panels on opposite edges of the bottom panel, and has a height which is equal to that of the side walls.

Examples of the element in accordance with the invention will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of a partly erected element, also showing the separate metal mesh panels which would be required to complete a single gabion from the element;

Figure 2 is a perspective view of a partially erected element which is similar to that shown in Figure 1 except that it has different dimensions; and,

Figure 3 is a view similar to Figure 2 but showing another element having different dimensions.

Figure 1 shows an element 1 comprising a two metres square bottom panel 2 of galvanised wire metal mesh, three rectangular wall panels 3, 4 and 5, also of galvanised wire metal mesh and each two metres by one metre, along three edges of the bottom panel 2, and a similar rectangular partition wall panel 6 attached to the bottom panel 2 along its centre line which perpendicularly bisects its edges along which the two opposite side wall panels 3 and 5 extend. The two side wall panels 3 and 5 are formed integrally with the bottom panel 2 from a single metal mesh base sheet, and the other side wall panel 4 and the partition wall panel 6 are each connected to the bottom panel 2 by metal wire stitching (not shown).

For ease of handling and transport the wall panels 3, 4, 5 and 6 are folded substantially flat relative to the bottom panel 2, but when the element 1 is to be erected to form a gabion on site, the walls 3, 4, 5 and 6 are raised perpendicularly to the bottom panel 2, (only the wall panel 3 being shown fully raised in Figure 1),

and the meeting wall panels are connected together by galvanised wire stitching (not shown) to secure the element 1 in its erected box like condition. If a single gabion is required, an additional rectangular metal mesh panel 8 (two metres by one metre) must be stitched to the free edge 9 of the bottom panel 2 and to the free upright edges 10 and 11 of the side wall panels 3 and 5 respectively, in order to close the open side of the erected element 1. In addition, when the gabion so formed from the element 1 and the additional wall panel 8 has been filled with stones, a two metre square sheet of metal mesh 12 is placed over the element 1 as a lid and is stitched to the upper edges of the wall panels 3, 4, 5, 6 and 8. If more than one gabion is required and these are to be connected together, an additional wall panel 8 will be required only for the final gabion which is erected. In the case of each earlier gabion, the open side of the erected element 1 is closed by one of the side walls 3, 4 and 5 of the element 1 which is erected to form the next gabion. Also, the lids 12 will only be required if the erected gabions are not going to be covered by a further layer of gabions.

Figure 2 shows an element 13 which differs from the element 1 of Figure 1 only in that its side walls 14, 15 and 16 and its partition wall 17 are all only half a metre in height instead of one metre. The construction of the element 13 is otherwise identical to that of the element 1.

Figure 3 shows an element 18 which is also identical in construction to the element 1 of Figure 1 except that it is only half the size, comprising a rectangular bottom panel 19 which is two metres by one metre, a pair of similarly sized rectangular side wall panels 20 and 21 formed integrally with the bottom panel 19 on the opposite longitudinal edges thereof, a one metre square rectangular panel 22 stitched along one of the edges of the bottom panel 19 between the two side walls 20 and 21, and a similar one metre square rectangular panel 23, for forming a partition wall, stitched to the bottom panel 19 across its centre line parallel to the shorter edges.

WHAT WE CLAIM IS:—

1. An element for use in forming a gabion, the element consisting solely of a rectangular bottom panel of metal mesh, three rectangular metal mesh panels extending along three edges

of the bottom panel for providing the gabion with three walls of equal height, and at least one further metal mesh panel which is attached to and extends across the bottom panel parallel to two of its edges and which, in use, forms a partition wall.

2. An element according to claim 1, in which the bottom panel and at least the two opposite side wall panels are formed from an integral sheet of metal mesh material.

3. An element according to claim 1 or claim 2, in which the or each panel for forming a partition wall extends parallel to the edge of the bottom panel which is without a wall.

4. An element according to any one of the preceding claims, in which the or each panel for forming a partition wall has a height which is equal to that of the side wall panels.

5. An element according to any one of the preceding claims, in which the metal mesh material of the element is made of galvanised wire or plastics coated wire.

6. An element according to claim 1, substantially as described with reference to Figure 1, of Figure 2, or Figure 3 of the accompanying drawings.

7. A protective lining on a water course or other exposed ground surface which is subject to erosion, comprising a number of elements according to any one of the preceding claims which have their wall panels erected and secured perpendicularly to the bottom panels and which are connected together side by side to form a layer of connected gabions, each element having the edge of its bottom panel not provided with a wall panel closed by a wall panel of a neighbouring element.

8. A protective lining according to claim 7, comprising more than one layer of gabions, the lids of the gabions in the top layer being formed by one or more separate sheets of metal mesh material, and the lids of the gabions in each other layer being formed by the bottom panels of the gabions in the layer above.

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Figure 3 shows an element 18 which is also identical in construction to the element 1 of Figure 1 except that it is only half the size, comprising a rectangular bottom panel 19 which is two metres by one metre, a pair of similarly sized rectangular side wall panels 20 and 21 formed integrally with the bottom panel 19 on the opposite longitudinal edges thereof, a one metre square rectangular panel 22 stitched along one of the edges of the bottom panel 19 between the two side walls 20 and 21, and a similar one metre square rectangular panel 23, for forming a partition wall, stitched to the bottom panel 19 across its centre line parallel to the shorter edges.

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3. An element according to claim 1 or claim 2, in which the or each panel for forming a partition wall extends parallel to the edge of the bottom panel which is without a wall.

4. An element according to any one of the preceding claims, in which the or each panel for forming a partition wall has a height which is equal to that of the side wall panels.

5. An element according to any one of the preceding claims, in which the metal mesh material of the element is made of galvanised wire or plastics coated wire.

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