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(54) DEVICE FOR SUPPORTING TRAFFIC BARRIERS, TRAFFIC BARRIER SYSTEM AND INSTALLING METHOD

(57) It is described a device (100) supporting traffic barriers, comprising: a metallic web (1) shaped for defining a container (3); a stabilizing material (4) housed in the container (3); wherein the metallic web (1) enables to insert a pole (301) of a traffic barrier so that it passes through the container (3) and said stabilizing material (4) is configured for countering displacements of said pole.

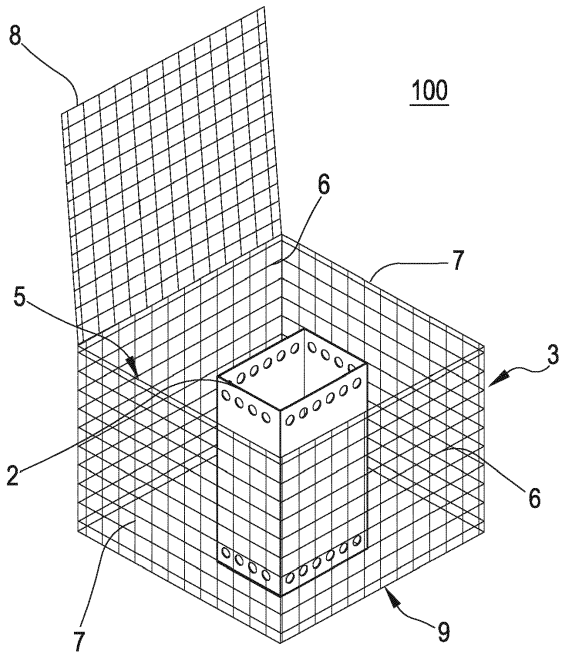

FIG.1

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Description

TECHNICAL FIELD

[0001] The present invention refers to supporting techniques for installing traffic barriers.

PRIOR ART

[0002] The traffic barriers currently used on the roads are largely formed by steel bands connected to the supporting ground by poles inserted in it, known also as *guardrails.*

[0003] The performances of such barriers are due to a tight relationship between the elements forming the barriers themselves and the supporting ground in which they are installed.

[0004] Installing the traffic barriers requires, according to the European standard, a preemptive certification by "real" impact tests in suitable test fields. For executing the "real" impact tests, the supporting ground is a continuation of the back of the traffic barrier and exhibits an excellent geotechnical quality. More specifically, the ground is such to provide a very high cooperation to the poles, in order to enable to bend the poles upon the test impacts at about the level at which the pole is inserted in the supporting field: this underlies the behavior of the barrier which causes a controlled bouncing of the colliding vehicle.

[0005] However, the Applicant observes that the barriers and the poles thereof are often installed on a soft ground, both at the edge of the roads and the traffic dividing areas, which are spaced by few tenths of centimeters from the pole of the barrier or are structurally less strong than the ones in the test field: the consequence is that the strength offered by the barrier is much less than the one found in the impact test.

[0006] Moreover, the grounds in which the traffic barriers are installed, besides being, in many instances, less compact and less resistant than the ones of the "real" test, often are covered by a grassed vegetal ground which does not contribute to the strength of the overall system.

[0007] It is also observed that such installation grounds are longitudinally inhomogeneous due to structural changes tied to the variability of the road structure. In addition, the humidity and temperature conditions of the installation grounds change during the year as the weather and atmospheric conditions change.

[0008] Consequently, in the road applications it is not possible to have with certainty the same behavior found in the impact test which, besides being mandated by regulations, is fundamental for containing the impacting vehicles in the road surface.

SUMMARY

[0009] The Applicant has felt the need of proposing a technique of mounting/installing traffic barriers which, operating on the real supports of a road, enables to obtain safety barriers having performances analogous or identical to the ones obtained with the "real" impact test and which, preferably, are homogenous all along the length of the installation and with characteristics less variable over time than the ones of the barriers installed in the conventional way.

[0010] According to a first aspect, the invention refers to a device for supporting traffic barriers as defined by claim 1 and by preferred embodiments thereof, described by claims 2-8. In a second aspect, the invention refers to a traffic barrier system described in claim 9 and to particular embodiments defined in claims 10 and 11. According to a third aspect, the invention refers to a method of installing traffic barriers as described by claim 12 and by preferred embodiments, according to claims 13 and 14.

BRIEF DESCRIPTION OF THE FIGURES

[0011] In the following some exemplifying non limiting embodiments will be described with reference to the attached figures, wherein:

Figure 1 shows a schematic perspective view of an example of a supporting device for a single pole of a traffic barrier, including a metallic web container;

Figure 2 exemplifyingly shows a guiding element which can be included in said supporting device;

Figure 3 is a perspective view of an embodiment of the container useable in the supporting device, having multiple housings, for plural poles of traffic barriers;

Figure 4 shows a cross-section at a pole, of a road laterally provided with a traffic barrier system mounted by the supporting device according to an example of the invention;

Figure 5 shows a cross-section at a pole, of a road provided with the traffic barrier system mounted as a traffic dividing area by the supporting device.

DETAILED DESCRIPTION

[0012] Figure 1 schematically shows an example of a supporting device for a pole of a traffic barrier 100.

[0013] The supporting device 100 shown in Figure 1, comprises a metallic web 1 forming a container 3 housing a stabilizing material 4 (shown only in Figures 4 and 5). A pole 301 (shown in Figures 4 and 5) of a traffic barrier is inserted inside the container 3 and stabilizing material 4. The stabilizing material 4 has the function of countering the displacement of the pole 301, particularly, when a vehicle impacts against the traffic barrier.

[0014] The stabilizing material 4 is advantageously selected so that it shows high performances in terms of stability and homogeneity also under varying temperature and humidity conditions.

[0015] Preferably, the stabilizing material 4 is of a gran-

ular matter and, particularly, comprises rocks. Rocks 4 can comprise stones and/or pebbles (for example river pebbles) and/or crushed stones. According to the application, rocks of different sizes can be used.

[0016] According to a possible implementation alternative to the use of rocks, the stabilizing material 4 can be scarcely viscous lean having a suitable maximum size. As an alternative to the lean, also other types of artificial mixes can be used for countering the displacement of the stably and homogeneously inserted pole 301, also as the temperature and humidity conditions vary. For example, concrete exhibiting low concentrations of cements can be used.

[0017] The container 3 can be shaped in order to take different shapes among them, for example, the cubic, cylindrical shape or the parallelepiped shape having a rectangular base. In the example in Figure 1, the metallic web 1 defines a single parallelepiped compartment 5 delimited by first facing lateral walls 6 and second facing lateral walls 7. Further, the metallic web 1 is advantageously provided with a cover 8 opposite to a bottom wall 9. Preferably, the metallic web 1 is made of galvanized steel.

[0018] In the example in Figure 1, the container 3 is adapted to receive a single infixed pole 301 of a traffic barrier. The container 3 can exhibit varying sizes as a function of its use. For example, the container 3 can have a plan size of 50 x 50 and a height H less than or equal to 30 cm, or can exhibit a greater height, equal, for example, to half the length of the sunken pole, the whole being adjusted according to the energy class of the traffic barrier to be supported: the size and shape of the meshes of the metallic web 1 depend also on the type of the used stabilizing material 4.

[0019] According to a particular embodiment, the supporting device 100 is provided with a guiding element 2 to be placed inside the metallic web 1 and having the function of guiding the pole 301 when the same is infixed in the traffic barrier. Such guiding element 2 enables to insert the pole 301 without any hindrance to the latter.

[0020] The guiding element 2 (Figure 2) can contain a filling material 10 (shown in Figures 4 and 5) or can be empty, in other words without such filling material. The guiding element 2, as shown in Figure 2, exhibits at least one opening 11 for inserting the pole. The guiding element 2 can have also a structural function for devices of very high strength class. The filling material 10, when provided, is such to enable to forcedly insert the pole 301 to be supported.

[0021] When the filling material 10 is not provided, the guiding element 2 will exhibit a size adjusted based on the pole 301 to be contained and, particularly, proximate to the size of the pole 301 for advantageously preventing undesired displacements of the pole itself.

[0022] According to the example shown in the figures, the guiding element 2 exhibits a parallelepiped shape and is provided with lateral walls 12, is open at the upper portion (opening 11) and can exhibit a lower wall 13 when is filled, or can have an opening also at the bottom if it is not filled. Shapes of the guiding element different from the ones shown in the figure are not excluded, such as for example a tubular or patterned shape based on the shape of the pole.

[0023] Preferably, the guiding element 2 is made of galvanized steel or of plastics; if it has also a structural function, it will have a thickness and/or cross-section adapted to the strength to exert, in order to offer a strength in addition to the one offered by the stabilizing material 4. According to particular implementations, the guiding element 2 can be structured in order to exhibit important structural functions but only in relation to the separation from the stabilizing material 4.

[0024] According to a preferred implementation, the filling material 10, to be possibly inserted in the guiding element 2, is of a monogranular matter having a size much smaller than the size of the granules of the material placed inside the container 3.

[0025] For example, the filling material 10 is sand, particularly, coarse sand. It is also possible to use granules of plastic material, polystyrene of high hardness. It is observed that using the guiding element 2 filled with the filling material 10 enables to very easily mount the poles at distances determined by the project of the barrier to be supported.

[0026] The guiding element 2 is fixed to the metallic web 1, for example by a metal wire (not shown) passing through the holes 14 made in the lateral walls 12 of the guiding element 2 itself, possibly also only in the lower portion thereof.

[0027] Figure 3 shows a container 3 analogous to the one of Figure 1, but such to define four or more compartments 5 (separated but adjacent), each destined to contain a respective pole 301 or, when required, a respective guiding element 2.

[0028] Advantageously, as outlined in Figure 3, the cover 8 of the metallic web 1, if provided, can be provided with access openings 15 made at the opening 11 of each underlying guiding element 2 (if provided). Such access openings 15 enable to insert the poles 301. If the openings are not provided, the pole 301 is inserted by forcing the meshes of the metallic web 1.

[0029] According to a particular implementation, the bottom wall 9 of the container 3 is provided with outlet openings 16, each placed at the area wherein a respective guiding element 2 devoid of the bottom wall 13 is fixed. According to this embodiment, the pole of the traffic barrier passes through the guiding element 2 and exits the bottom wall 9. It is also possible, without outlet openings, forcing the meshes of the bottom wall 9 for enabling the pole 301 to pass through.

[0030] When the filling material 10 is used, for preventing it from escaping from the bottom opening of the guiding element 2, can be provided, at the bottom portion of the guiding element 2, a small bottom wall made of breakable material closing the outlet opening 16, which at the same time enables, by breaking, the pole 301 to pass

through. For example, such bottom small wall which closes the outlet opening 16, can be made of an unwoven fabric.

[0031] Figure 4, which refers to an installation example, shows a system of traffic barriers 200 comprising a length of a traffic barrier 300 and a supporting device 100 including, for example, the guiding element 2 and the filling material 10.

[0032] According to the example in Figure 4, the supporting device 100 is placed at the edge of a roadway 302 and is partially sunken, that is partially infixed in the ground 303. The upper portion of the container 2 or, if provided, the cover 8 is positioned, according to the example, about at the level of the wearing course of the roadway 302.

[0033] The traffic barrier or guardrail 300 can be of a known type and comprises at least one pole 301 placed so that it passes through the access opening 15 of the container 3 and the opening 11 of the guiding element 2, so that it is sunken in the filling material 10.

[0034] In the example shown in Figure 4, the guiding element 2 is open at the bottom (if it is not present the above described small bottom wall) and the pole 301 passes through the outlet opening 16 for being infixed in the underlying ground 303.

[0035] The plastic barrier 300, in the shown example, further comprises at least one spacing body 304, and one or more horizontal bands 305, for example, of a known type. The band 305 can particularly have a triple-, quadruple-wave shape or can be a simple shape band, open or closed, however it can have different shapes or elements, in a number greater or less than the shown one, provided that it has one or more poles 301.

[0036] The guiding element 2 and pole 301 infixed in it, are preferably placed in a position asymmetrical to a centerline of the container 3, parallel to the roadway 302. Specifically, the pole 302 is proximate to the wall of the metallic web 1 directly facing the roadway 302.

[0037] Figure 5 shows another installation example of the traffic barrier system 200, in which two supporting devices 100 are placed at the center of a road having two roadways 302, for acting as a traffic dividing area, for sustaining two traffic barriers 300.

[0038] It is observed that the supporting device 100 is also useable for already installed traffic barriers. In this way, one or more containers 3, placed adjacent or around the pole 301, already infixed in the ground, can be inserted (by digging) in the ground. Then, the stabilizing material 4 can be inserted in the container 3 for ensuring to counter the displacement of the pole 301. In such case, the guiding element 2 is preferably omitted.

[0039] Advantageously, it is observed that the supporting device 100 enables to obtain the same behavior obtained in a test field, for all the traffic barriers to be used in varying strength classes, from the lowest (H1) to the highest class (H4), according to a classification of the European standards EN 1317.

[0040] Moreover, such supporting device 100 can enable a behavior equivalent to the one obtained in a test field with reference to absorption of an impact with a limited displacement in the predefined space, and also with reference to the control of the decelerations at sustainable levels without injuring both the passengers, in case of an impact against light vehicles, and free-falling motorcyclists.

[0041] When heavy vehicles are impacted, the traffic barrier 300 supported by the device 100 can enable to contain and redirect the heavy vehicles, as it happens during the qualification tests.

[0042] Therefore, the supporting device 100 and barrier system 200 enable to offer, once installed, the same impact resistances found in the test fields where a determined plastic barrier 300 is tested.

[0043] It is observed that the described supporting devices 100 can be directly used in the qualification tests themselves, with shapes analogous to the implemented ones. By operating in this way, it is no more necessary any other evaluation, besides the real tests themselves, if the same supporting device as the one used in the test is installed in the installation area.

[0044] Particularly, it is observed that the container 3 provided with the stabilizing material 4 forms a homogeneous structure with cannot be substantially altered by the humidity and temperature conditions and meets its function in the transversal dimension predefined and limited in the space, calculated with reference to the type of barrier and of the energy efficiency class.

[0045] In this way, the poles 301, and therefore the traffic barrier 300, offer a strength such to, in situ, reproduce the behavior in the test field wherein the ground has an excellent quality and transversal dimensions so extended to be considered unlimited.

[0046] This correspondence can be found by performing, for example, a dynamic test on a pole 301 infixed in a test field according to the crash test EN 1317, and then by repeating the evaluation on a pole 301 installed in the supporting device 100, suitably calibrated according to the size and filling material type, on the ground where the barrier is installed in order to obtain in both cases the same behavior: the strength provided by the stabilizing material 4 must deform the pole 301 just in the area where it projects from the container 3, according to what has been verified during the impact test; the correspondence refers also to the time during which the deformation was obtained (dynamic test).

[0047] The tests, repeated for several poles and also under varying humidity and temperature conditions, give always homogeneous results because the structure of the supporting device 200 is not sensitive to this type of variations, maintaining always a substantial match to the ones obtained on the test fields which have proven the validity of the present solution.

[0048] It is also observed that by placing several traffic barriers 300 installed in supporting devices 100, juxtaposed to each other along a roadway, it will be obtained a homogeneous impact strength along the whole road-

way itself; this homogeneity is not obtainable by the traditional techniques which do not provide any modifications of the road edges and no action aimed at correcting the strength variation of the supporting ground with the humidity and temperature.

[0049] It is also observed that a further advantage of the invention is due to the fact that the supporting device 100 can be used for mounting plastic barriers of a known type and therefore does not necessarily require to modify the present traffic barriers.

[0050] Moreover, the supporting device 100 is easily transportable towards the installation area, because its components can be separately transported and assembled in situ.

Claims

1. Device (100) for supporting traffic barriers, comprising:

a metallic web (1) shaped in order to define a container (3);
a stabilizing material (4) housed into the container (3) ;

wherein:

the metallic web (1) enables to insert a pole (301) of a traffic barrier into the container (3), and
said stabilizing material (4) is configured for countering displacements of the pole (301).

2. Supporting device (100) according to claim 1, further comprising:

a guiding element (2) placed inside the container (3) and stabilizing material (4), the guiding element being provided with at least one opening (11) for enabling to insert the pole (301);

wherein:

the guiding element (2) is filled with a filling material (10) in which the pole (301) is inserted;
or
the guiding element (2) is configured for being crossed by the pole (301) in the absence of the filling material and exhibits size proximate to the one of the pole destined to cross the guiding element itself.

3. Supporting device (100) according to claim 2, wherein the guiding element (2) is structured so that to exhibit a thickness and/or a cross-section such to have the function of stabilizing the pole (301) besides the one provided by the stabilizing material (4).

4. Device (100) according to at least claim 2, wherein:

the stabilizing material (4) includes a first granular matter, and the filling material (10) includes a second granular matter; the second granular matter comprises granules having size less than the size of further granules of the first granular matter.

5. Device (100) according to at least one of the preceding claims, wherein:

said stabilizing material (4) comprises at least one of the following materials: crushed stones, river pebbles, concrete exhibiting low concentrations of cements, conglomerates, lean.

6. Device (100) according to at least claim 2, wherein the filling material (10) is at least one of the following materials: sand, coarse sand, beads of plastic material, polystyrene.

7. Device (100) according to at least claim 1, wherein said metallic web (1) is made of galvanized steel.

8. Device (100) according to at least claim 2, wherein said guiding element (2) is a guiding element of plastics with or without a bottom.

9. System of traffic barriers (300), comprising:

at least one supporting device (100) defined by at least one of the preceding claims,
at least one length of a traffic barrier (300) provided with a respective pole (301) inserted into the container (3).

10. System of barriers according to claim 9 and at least according to claim 2, wherein the metallic web (1) has a parallelepiped shape and wherein said guiding element (2) is fixed to a bottom wall (9) of the metallic web (1) and in a position asymmetrical to a centerline of the container (3).

11. System according to claim 9 or 10, further comprising:

a plurality of supporting devices (100), each defined by at least one of the preceding claims from 1 to 8, and adapted to house a respective pole (301); said supporting devices of the plurality being placed adjacent to each other.

12. Method of installing traffic barriers (300), comprising:

installing a pole (301) of a traffic barrier (300) in the ground,
providing at least one supporting device (100),

comprising:

a metallic web (1) shaped in order to define a container (3);
a stabilizing material (4) housed in the container (3) ;
installing said at least one supporting device (100) in the ground so that the stabilizing material (4) of the container (3) can counter displacements of the pole (301).

13. Installing method according to claim 12, wherein the pole (301) installing step comprises:

arranging the pole (301) inside the container (3) provided with the stabilizing material (4).

14. Installing method according to claim 12 or 13, wherein the supporting device (100) is provided at the edge of a roadway (302) or in the correspondence of a traffic dividing area of said roadway and so that an upper wall (8) of the metallic web (1) is substantially placed at the level of the wearing course of said roadway.

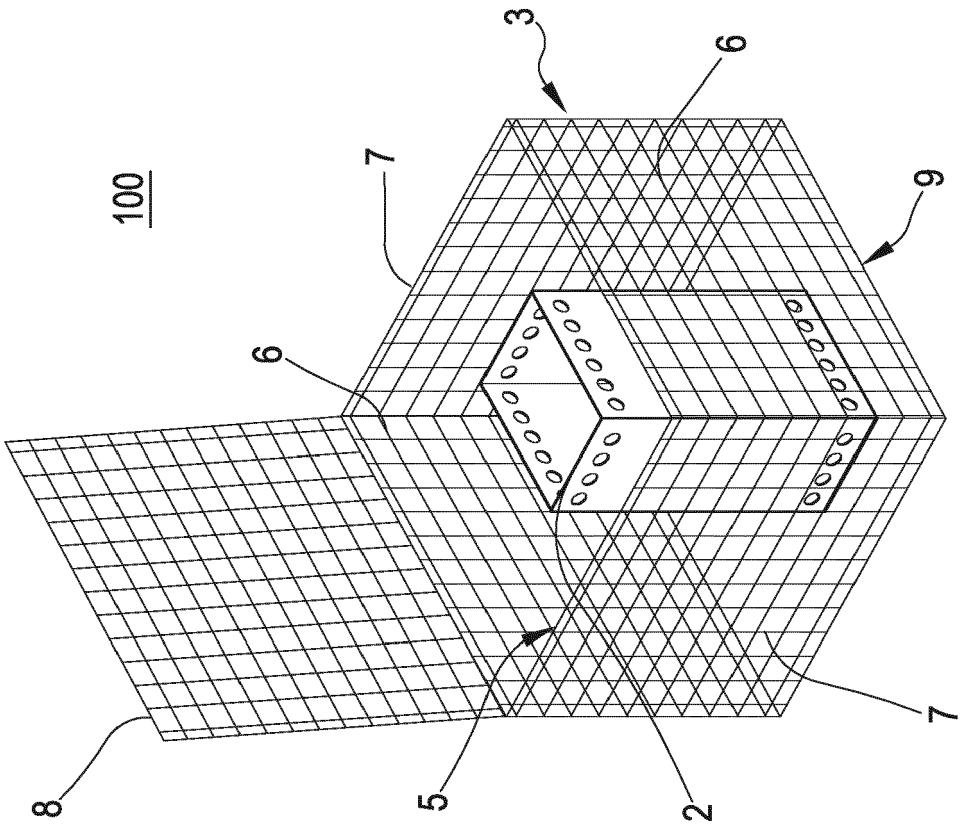

FIG.1

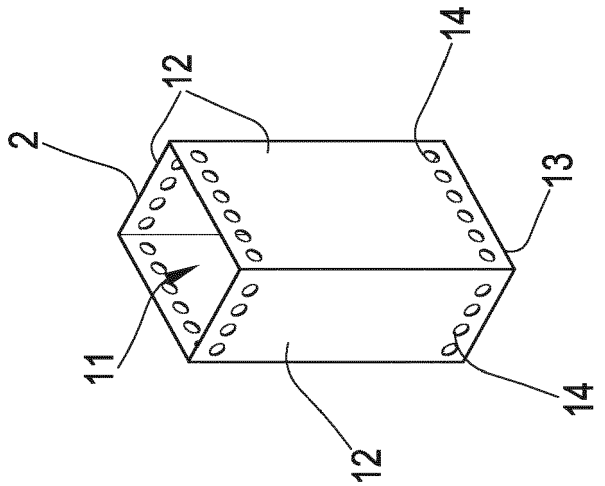

FIG.2

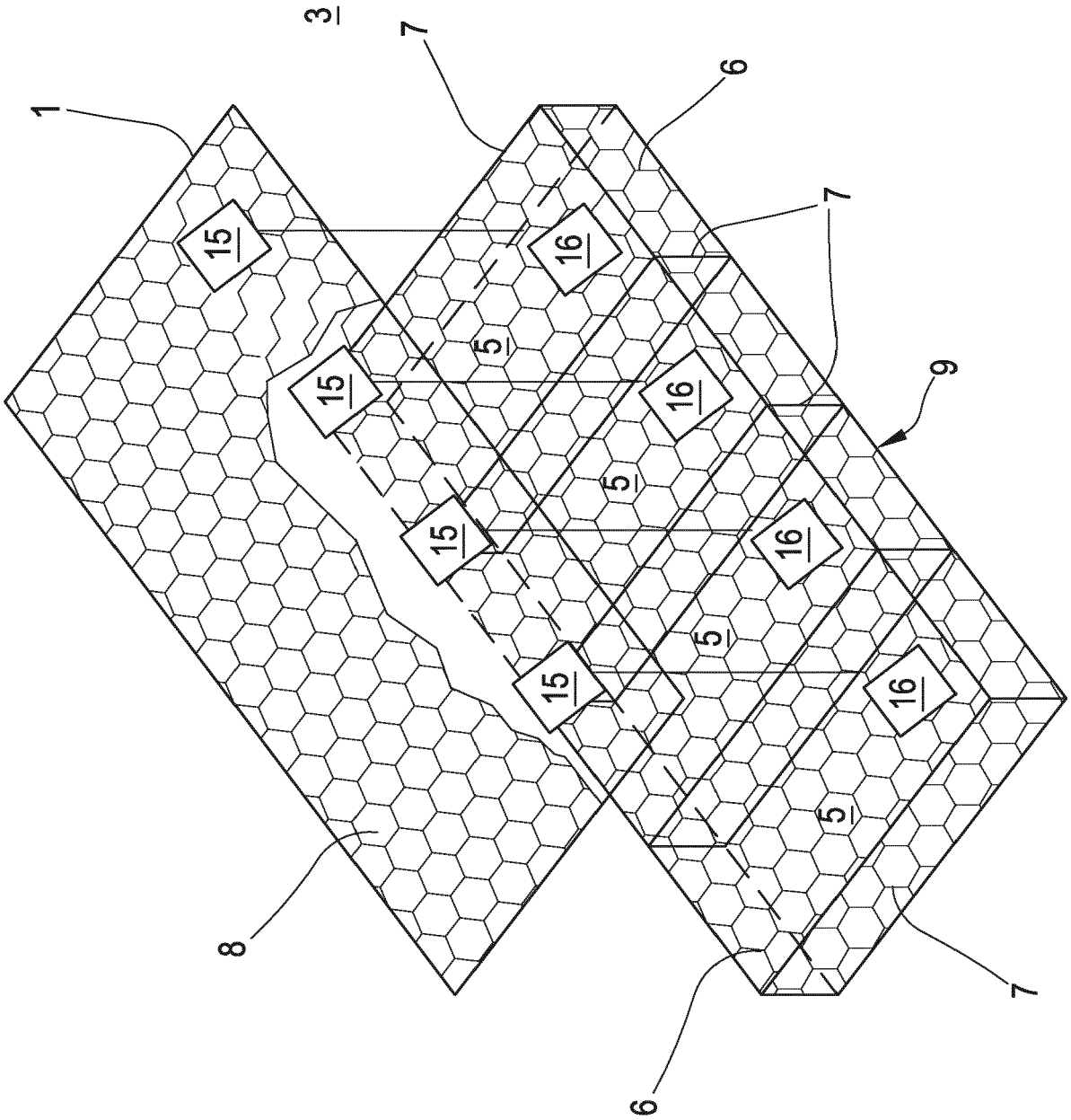

FIG.3

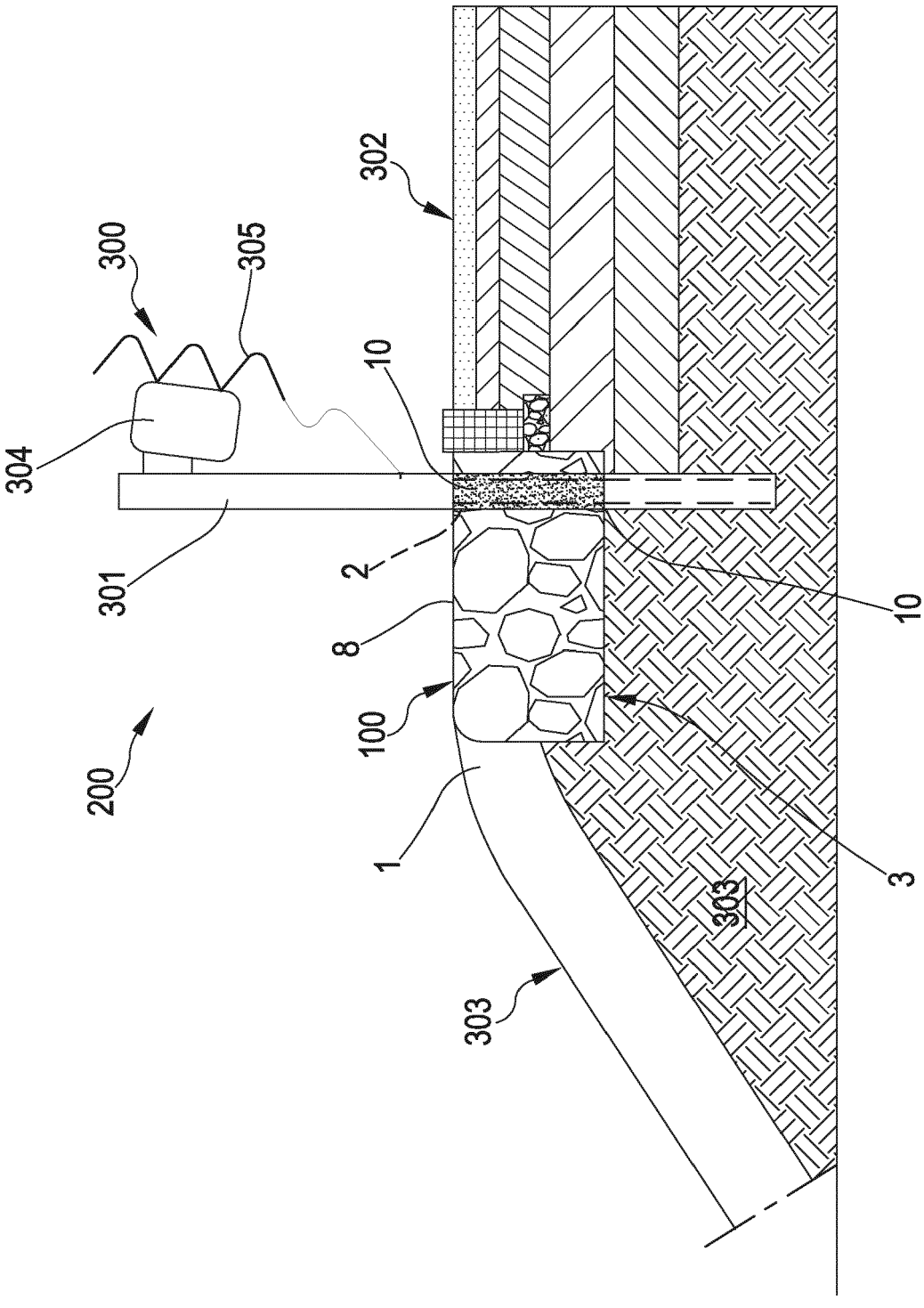

FIG.4

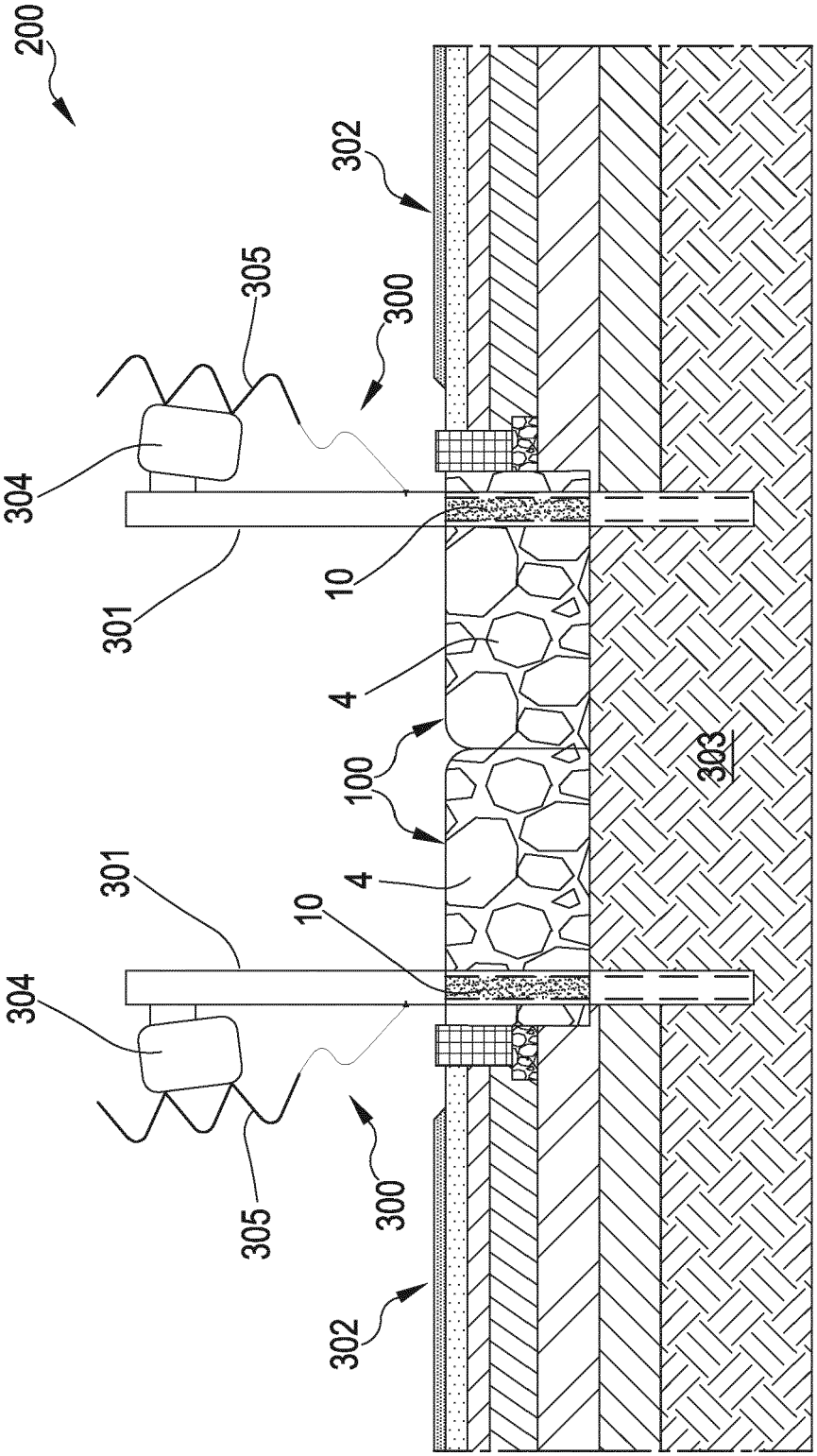

FIG.5

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EUROPEAN SEARCH REPORT

Application Number
EP 16 20 0311

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E01F
E04H
E02D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 April 2017	Stern, Claudio

CATEGORY OF CITED DOCUMENTS

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