



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
15.07.2015 Bulletin 2015/29

(51) Int Cl.:
E01F 5/00^(2006.01) E01F 15/14^(2006.01)

(21) Application number: **12883590.7**

(86) International application number:
PCT/ES2012/070639

(22) Date of filing: **03.09.2012**

(87) International publication number:
WO 2014/033334 (06.03.2014 Gazette 2014/10)

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME

- **MOSTAZA FÉRNANDEZ, Juan José**
E-47151 Boecillo (Valladolid) (ES)
- **FRAILE ARRANZ, Ignacio**
E-47151 Boecillo (Valladolid) (ES)
- **MANSILLA GALLO, Alberto**
E-47151 Boecillo (Valladolid) (ES)

(71) Applicant: **Fundación Cidaut**
47151 Boecillo (ES)

(74) Representative: **Capitán García, Maria Nuria**
ARS Privilegium, S.L.
Felipe IV no. 10, bajo iz.
28014 Madrid (ES)

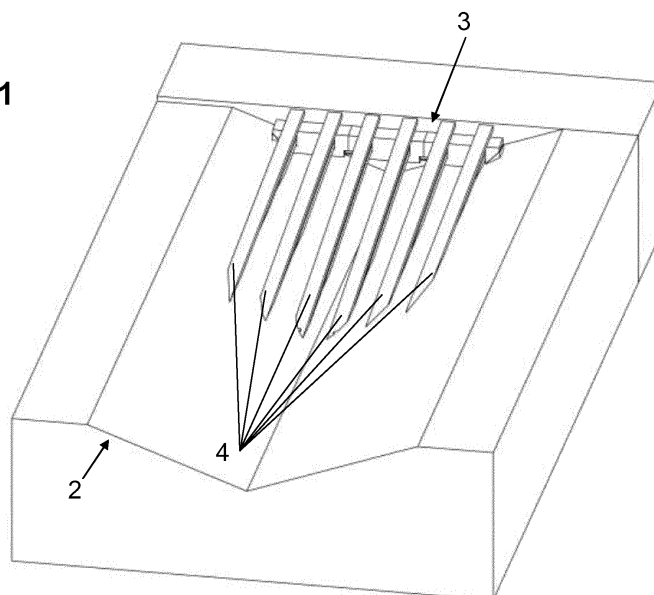
(72) Inventors:
• **MUNARETTO, Giorgio**
E-47151 Boecillo (Valladolid) (ES)

(54) **PROTECTION SYSTEM FOR AVOIDING OBSTACLES IN ROADSIDE TRENCHES**

(57) The present invention refers to a protection system for avoiding obstacles in roadside ditches that comprises: some beams deployed over the ditch, with an end on the base of the ditch and the other at a height equal

to or greater to that of the ditch, on which the separating structure is fixed to the base of the ditch and separated from the beams. Said beams are supported over the separating structure by an end fixed in the ditch.

FIG.1



Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention refers to a protection system for avoiding obstacles in roadside ditches where obstacles are commonplace, for example, the culverts.

BACKGROUND OF THE INVENTION

[0002] Many accidents that occur on the highway are due to cars that go off the road. Leaving the road may involve the car crashing against elements found in the ditches.

[0003] A commonly found element in roadside ditches are the culverts, which can be defined as works meant to provide access for vehicles from the road to the adjacent plots or to paths that meet the road while maintaining the continuity of the ditch,.

[0004] These culverts consist in a series of elements that basically comprise a tubular structure formed by several tubes or similar, with their ends finishing in masonry and concrete structures.

[0005] When a vehicle leaves the road near a culvert it will crash against the front wall of the culvert.

[0006] There are elements made to avoid these crashes by enabling the car to overcome the obstacle of the culvert.

[0007] For example, utility model publication ES1054682 describes a perfected culvert crossing that has reinforcements on the front wall, from which an inclined grill sticks out. In this case the inclined grill that will enable the car to avoid crashing against the culvert is supported on the front wall of the crossing. In this utility model the grill is a single piece, and in the event it is necessary to clean the culvert the whole grill piece must be moved.

[0008] Utility model published as no. ES2222109 describes a culvert mechanism that consists in the manufacturing of a mouthpiece of reinforced concrete and compressed with two flaps to avoid the unevenness of the culvert, a bar as a guardrail and a culvert grill. In this case the grill is also a single piece that must be completely removed when cleaning tasks are necessary.

[0009] In view of the state of the art, it may be concluded that it would be very useful to have a protection system for avoiding obstacles in the roadside ditch that is comprised of elements that can be easily removed.

DESCRIPTION OF THE INVENTION

[0010] The present invention is established and characterized in the independent claims, whereas the dependent claims describe other features of the same.

[0011] In the present invention a protection system is disclosed for avoiding obstacles in the roadside ditches, such as culvert crossings, that is, the works carried out for the purpose of maintaining the continuity of the ditch,

or enabling access for vehicles to the road from adjacent plots or paths that meet the road.

[0012] The system facilitates moving the different elements that comprise it as it is made up of pieces. This fact provides versatility to the invention when it is installed in any culvert shape and on any surface.

[0013] The system is equipped with beams that are arranged in way that creates a surface, not necessarily continuous, from the base of the culvert to the top part of the obstacle to be saved, and that covers the width of the culvert. The surface that is created with the beams guarantees the obstacle can be crossed by a vehicle without causing serious injury to the occupants of the same.

[0014] The beams are positioned in relation to each other by a separating structure that is fixed to the base of the culvert.

[0015] Culvert is understood to be the surface that defines the space located on one or both sides of a path or road, designed for surface collection and drainage of the road and its surroundings. This surface can have different shapes, being wider or narrower, with side walls having a steep incline or shallower incline.

[0016] Therefore, in light of the above, the present invention refers to a protection system for avoiding obstacles in roadside ditches that comprises: some beams deployed over the ditch, with an end on the base of the ditch and the other at a height equal to or greater to that of the ditch, on which the separating structure is fixed to the base of the ditch and separated from the beams; said beams being supported over the separating structure by an end fixed in the ditch.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The present document is supplemented with a set of illustrative figures of the preferred embodiment, but which in no way limit the invention.

Figure 1 shows a perspective view of an embodiment of the system of the invention in which the separating structure has the shape of a comb and is made up of different separating modules.

Figure 2 shows an exploded view of Figure 1 in which the support means are embodied in opposing posts and the beams display an anchoring element for their insertion in the ground.

Figure 3 shows an exploded view of an embodiment in which the separating structure has the shape of a comb and is made up of different modules, and the supporting means are a pair of blocks facing each other.

Figure 4 shows a perspective view of an embodiment in which the beams and the separating structure are installed in at an oblique manner with respect of the ditch.

Figure 5 shows a perspective view of an embodiment of the system of the invention in which the separating structure displays a structural element and separating elements.

Figure 6 shows an exploded view of Figure 5 in which are visible a structural element made up of structural modules, the anchoring element of the beams, and the support means, said means comprising two posts at the edges of the ditch.

Figure 7 shows an exploded view of an embodiment of the system of the invention in which the separating structure has a structural element on a single piece directly supported on the ditch, and separating elements.

Figure 8 shows a perspective view in which the beams are placed transversally to the longitudinal axis of the ditch.

Figure 9 shows a perspective view of an embodiment in which the separating structure displays a comb shape and that is made up of different modules, and the support means are a central fixing system which in turn comprises a leg that rests on the inside of a drainage conduit of the ditch which shows a continuation of two branches forming a V shape over which two small boxes are set.

Figure 10 shows an exploded view of Figure 9.

Figure 11 shows a perspective view of an embodiment of the system of the invention in which the separating structure is fixed to structural elements of the culvert cross over.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

[0018] In light of the foregoing, the present invention refers to a system for avoiding obstacles in roadway drainage ditches (2) which comprises some beams (4) arranged over the ditch, with one end in the base of the ditch and the other at an equal or greater height with respect of the same; on which a separating structure (3) that is fixed to the ditch enables the separation of the beams (4); said beams (4) being supported over the separating structure (3) and with one end fixed in the ditch (2).

[0019] In a particular embodiment the separating structure (3) has a comb shape having notches (3.2) on the top part for lodging the beams.

[0020] In a more particular embodiment, the separating structure having a comb shape (3) has on the top part of the notch (3.2) a bar (3.3) for restricting the movement of beams (4).

[0021] In particular, the separating structure having a comb shape (3) is made up of different separating mod-

ules (3.1) joined together.

[0022] The joining of the different separating modules having a comb shape (3.1) is done by means of connecting sleeves (3.5) that are inserted at their ends to other separating modules having a comb shape (3.1). Separating modules having a comb shape (3.1) have recesses on the bottom corners (3.1.1) from which emerge some protrusions for inserting connecting sleeves (3.4).

[0023] In a second particular embodiment, separating structure (3) is embodied as structural element (3.5), on which rest some separating elements (3.6). Preferably, the structural element (3.5) is formed by the joining of structural modules (3.5.1). In particular, the separating elements (3.6) have a bottom recess (3.6.1) and the structural modules (3.5.1) have recesses (3.5.1.1) facing each other at the ends, from which emerge some protrusions (3.5.1.2) for inserting some connecting sleeves (3.4).

[0024] In particular, the structural element (3.5) has a section formed by a bottom horizontal side, two vertical sides that emerge from the ends of the bottom side and a convex top side that is joined to both vertical sides.

[0025] The different separating elements (3.6) have rods (3.7) that are inserted into the top part of the side faces of the separating elements (3.6). To fix the separating elements (3.6) to the assembly of separation structure (3) rods (3.8) are inserted in a position transversal to the structural element (3.5), which traverses the front and back faces of the separating element (3.6).

[0026] The separating element may be fixed directly to the ditch or fixed by means of some support means (1).

[0027] In a particular embodiment, the support means (1) are embodied as two small boxes (1.4).

[0028] In another particular embodiment the support means (1) comprises two posts (1.1) placed on the edges of the ditch. As the support means (1) consist in independent pieces, they can be nestled in the ditch independently of the shape of said ditch and the distance between its edges. It is possible that the support means (1), in addition to the two posts (1.1), comprise intermediate posts (1.2) to help the support. Likewise, there may be a central fastening system (1.3), which, in turn, comprises a leg (not shown) that sits inside the drainage conduit (5), which is continued by two branches (1.3.1) having a V shape, and on which rest some small boxes (1.3.2). In a particular embodiment, the boxes (1.3.2) have a U shaped cross-section.

[0029] In an embodiment of the protection system of the invention, the beams (4) are fixed by the bottom end to the base of the ditch (3) by means of an anchoring element (4.1) inserted into the ground. Preferably, the anchoring element (4.1) is located embedded in the beam (4) itself.

Claims

1. A protection system for avoiding obstacles in road-

way drainage ditches (2) which comprises some beams (4) arranged over the ditch, with one end in the base of the ditch and the other at an equal or greater height with respect of the same, **characterized by** a separating structure (3) that is fixed to the ditch enabling the separation of the beams (4), where said beams (4) rest on separating structure (3) with one end fixed in the ditch (2)

2. Protection system in accordance with claim 1, in which the separating structure (3) has the shape of a comb and has on the top part notches (3.2) for lodging the beams. 10
3. Protection system in accordance with claim 2, in which the separating structure (3) has on the top part of the notch (3.2) a bar (3.3) for restricting the movement of the beams (4) 15
4. Protection system in accordance with claim 2, in which the separating structure having a comb shape (3) is made up of different separating modules (3.1) joined together. 20
5. Protection system in accordance with claim 4, in which the separating modules (3.1) have recesses on bottom corners (3.1.1) from which emerge some protrusions (3.1.2) for inserting connecting sleeves (3.4). 25
6. Protection system in accordance with claim 1, in which the separating structure (3) is embodied as structural element (3.5) on which some separating elements (3.6) rest. 30
7. Protection system in accordance with claim 6, in which the structural element (3.5) is formed by the joining of structural modules (3.5.1). 35
8. Protection system in accordance with claim 7, in which the separating elements (3.6) have a bottom recess (3.6.1) and structural modules (3.5.1) have facing recesses (3.5.1.1) at the ends, from which emerge some protrusions (3.5.1.2) for inserting some connecting sleeves (3.4). 40
9. Protection system in accordance with claim 6, in which the different separating elements (3.6) have rods (3.7) that are inserted in the top part of the lateral faces of separating elements (3.6), and in order to fix the separating elements (3.6) to the assembly of the separation structure (3) rods (3.8) are inserted in a transversal position to structural element (3.5), which traverse the front and back faces of the separating element (3.6). 50
10. Protection system in accordance with claim 1, in which the separating structure (3) is fixed by means 55

of some support means (1).

11. Protection system in accordance with claim 10, in which the support means (1) comprise two posts (1.1) placed at the edges of the ditch.
12. Protection system in accordance with claim 10, in which the support means (1) comprise intermediate posts (1.2) to help the support.
13. Protection system in accordance with claim 12, in which the support means comprise a central fastening system (1.3), which, in turn, comprises a leg that sits inside the drainage conduit (5), which is continued by two branches (1.3.1) having a V shape, and on which rest some small boxes (1.3.2).
14. Protection system in accordance with claim 1, in which the beams (4) are fixed by the bottom end to the base of the ditch (2) by means of an anchoring element (4.1) inserted in the ground.
15. Protection system in accordance with claim 14, in which anchoring element (4.1) is embedded in the beam (4) itself.
16. Protection system in accordance with claim 1 in which the separating structure (3) is fixed to structural elements of the culvert crossing.

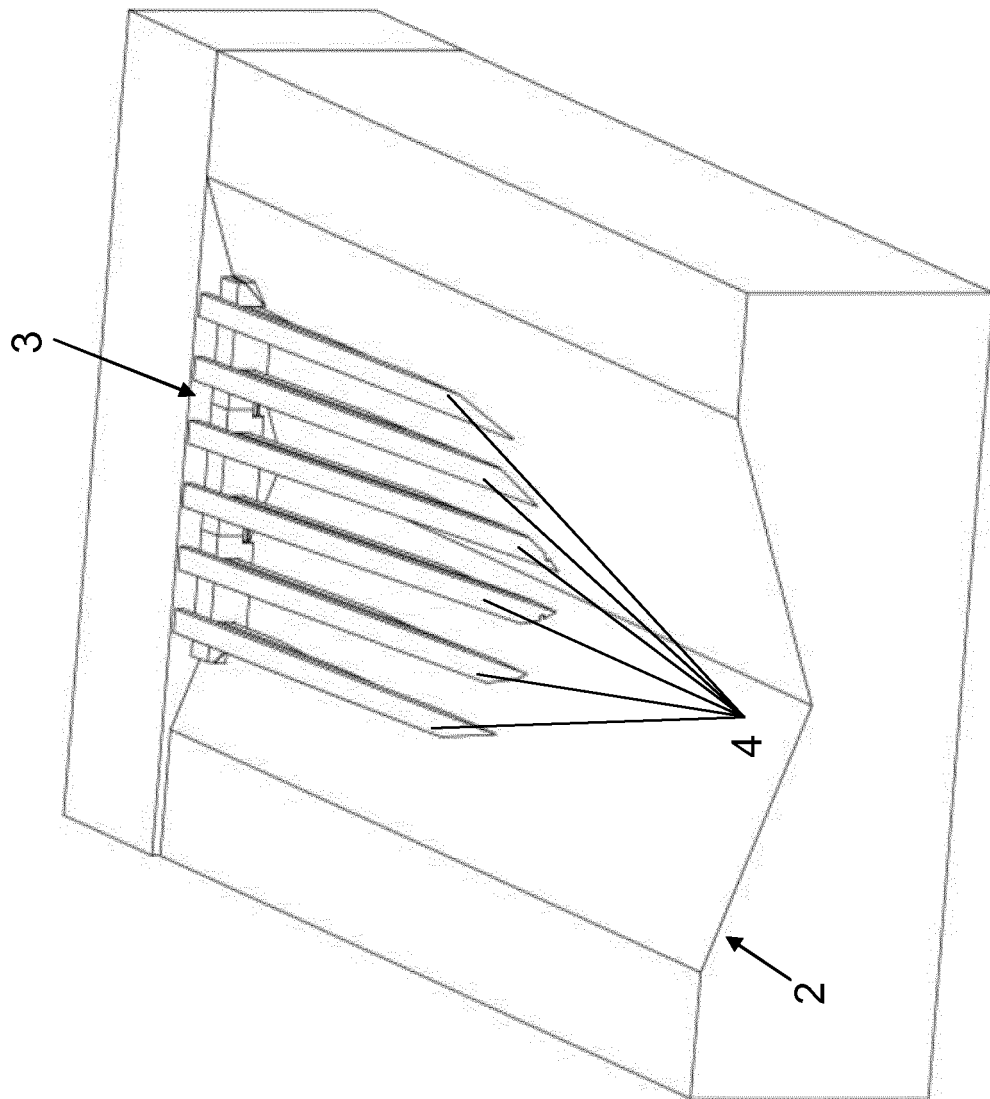
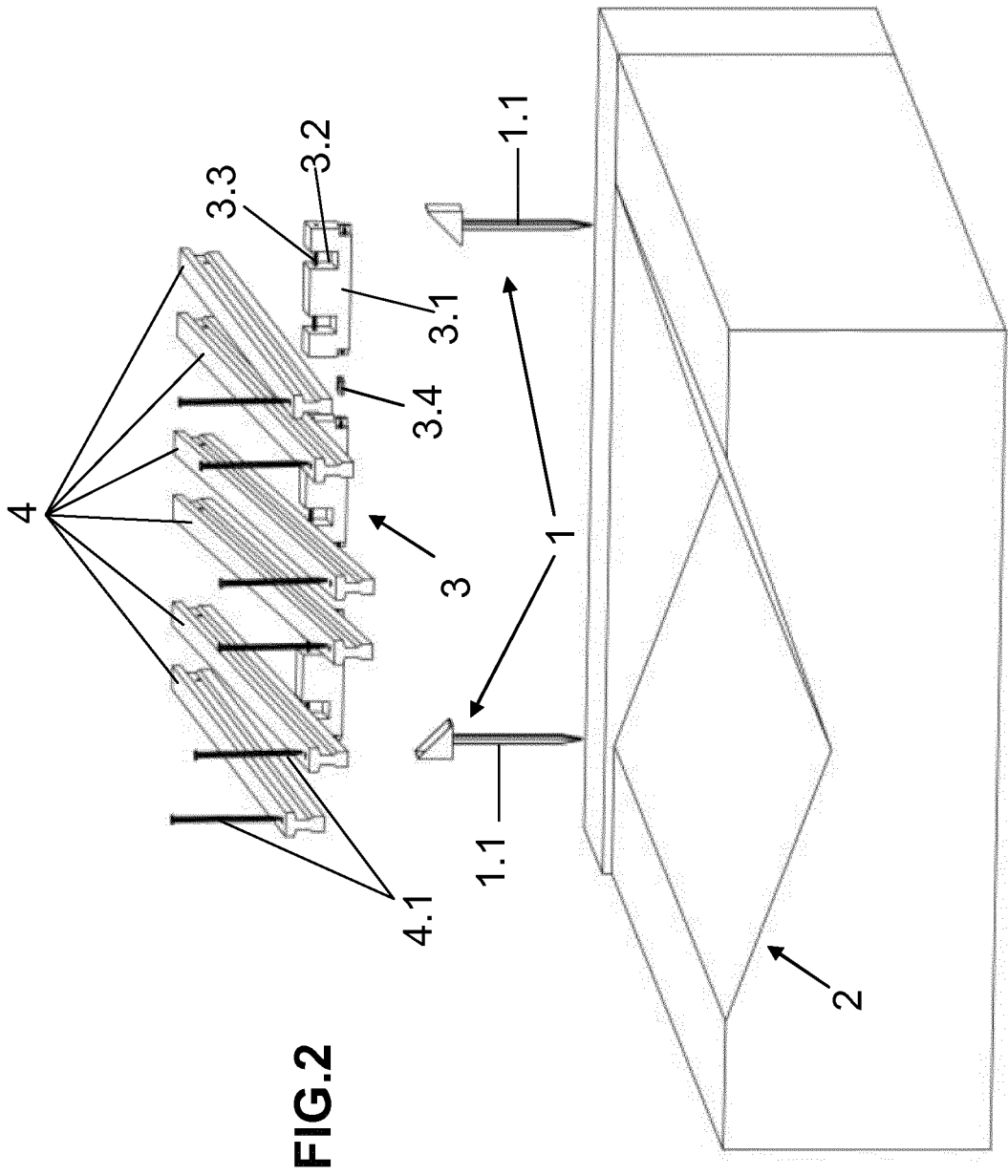
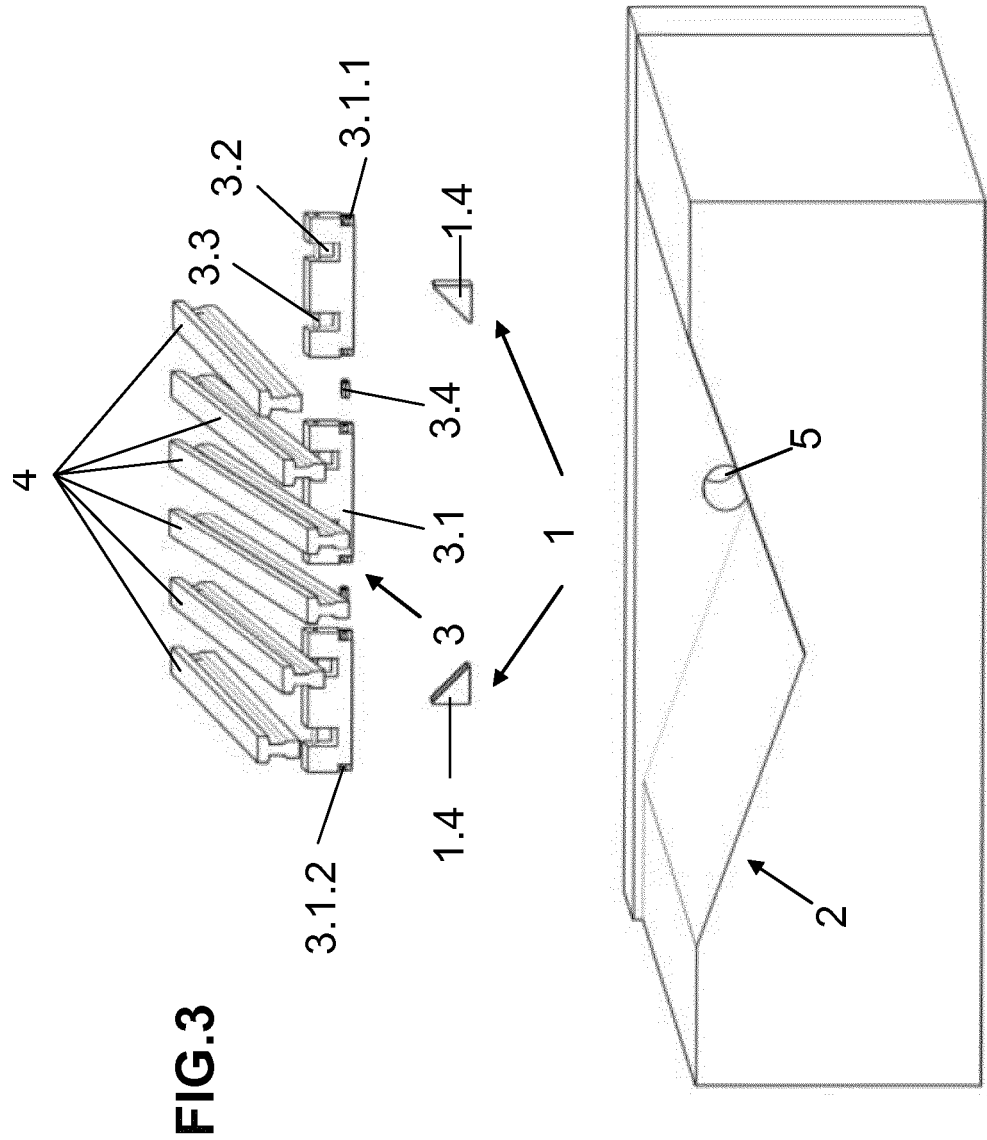


FIG.1





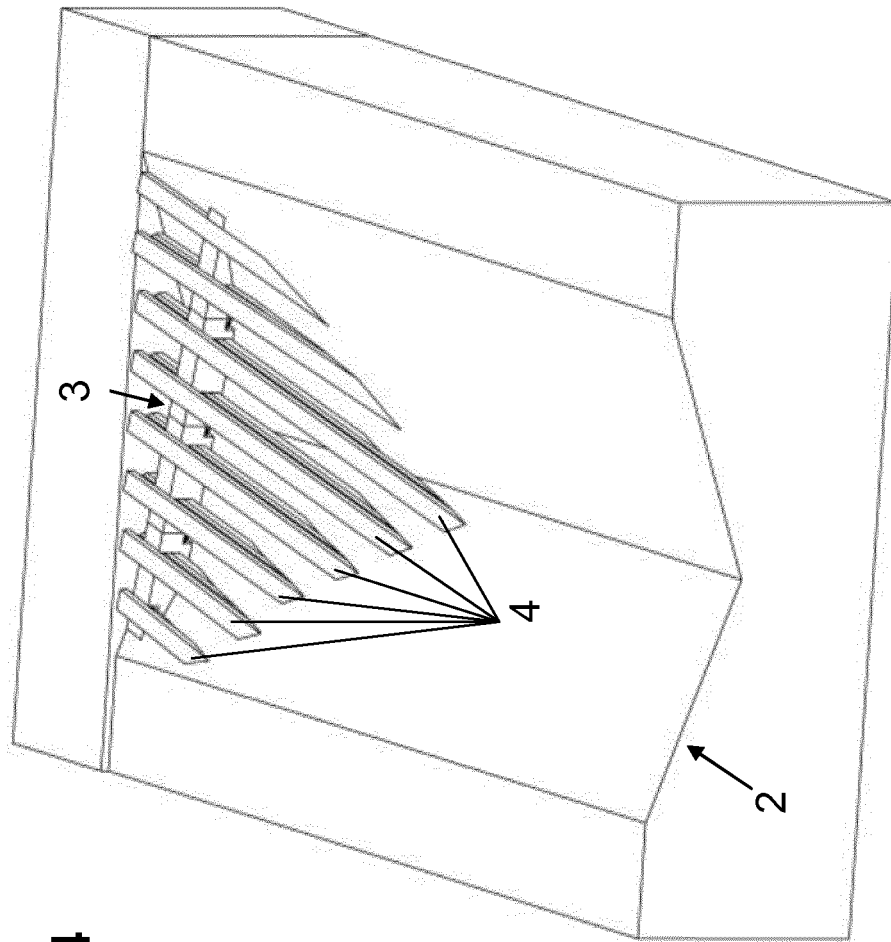


FIG.4

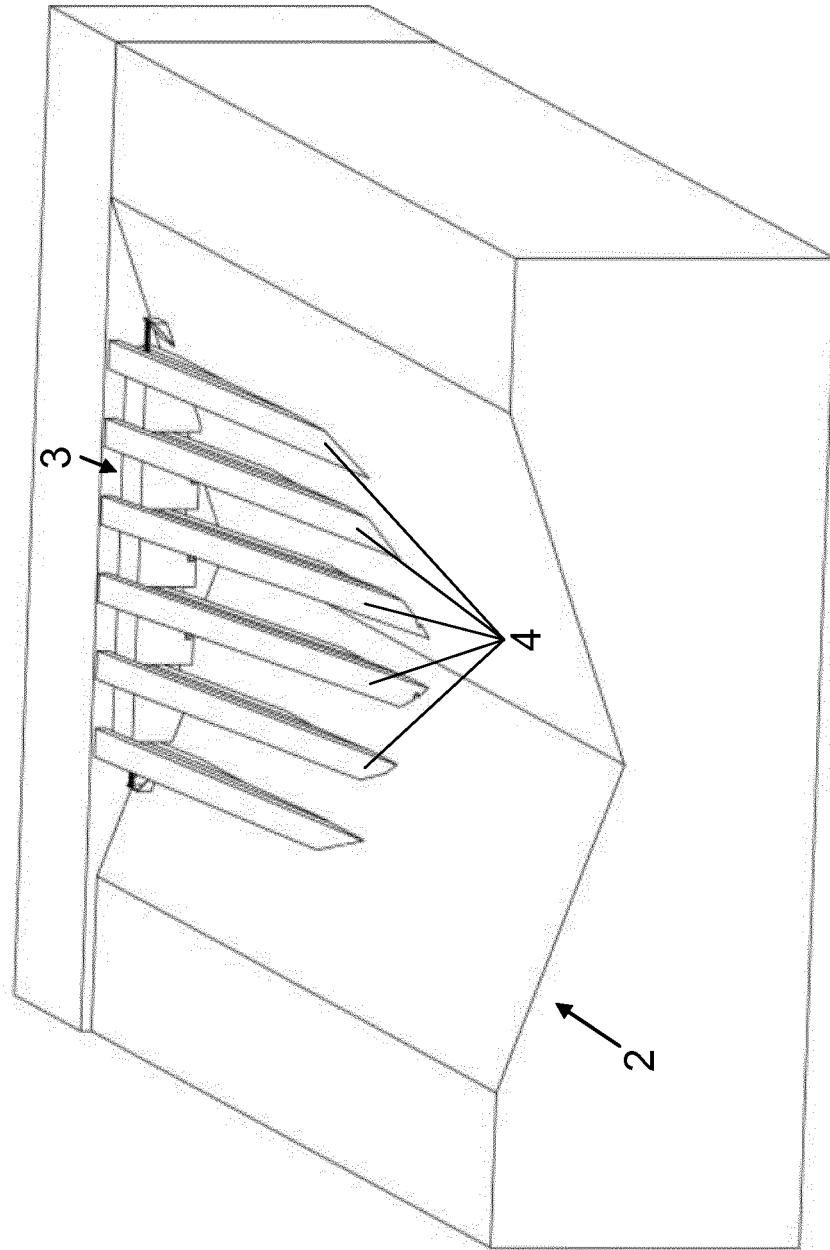


FIG. 5

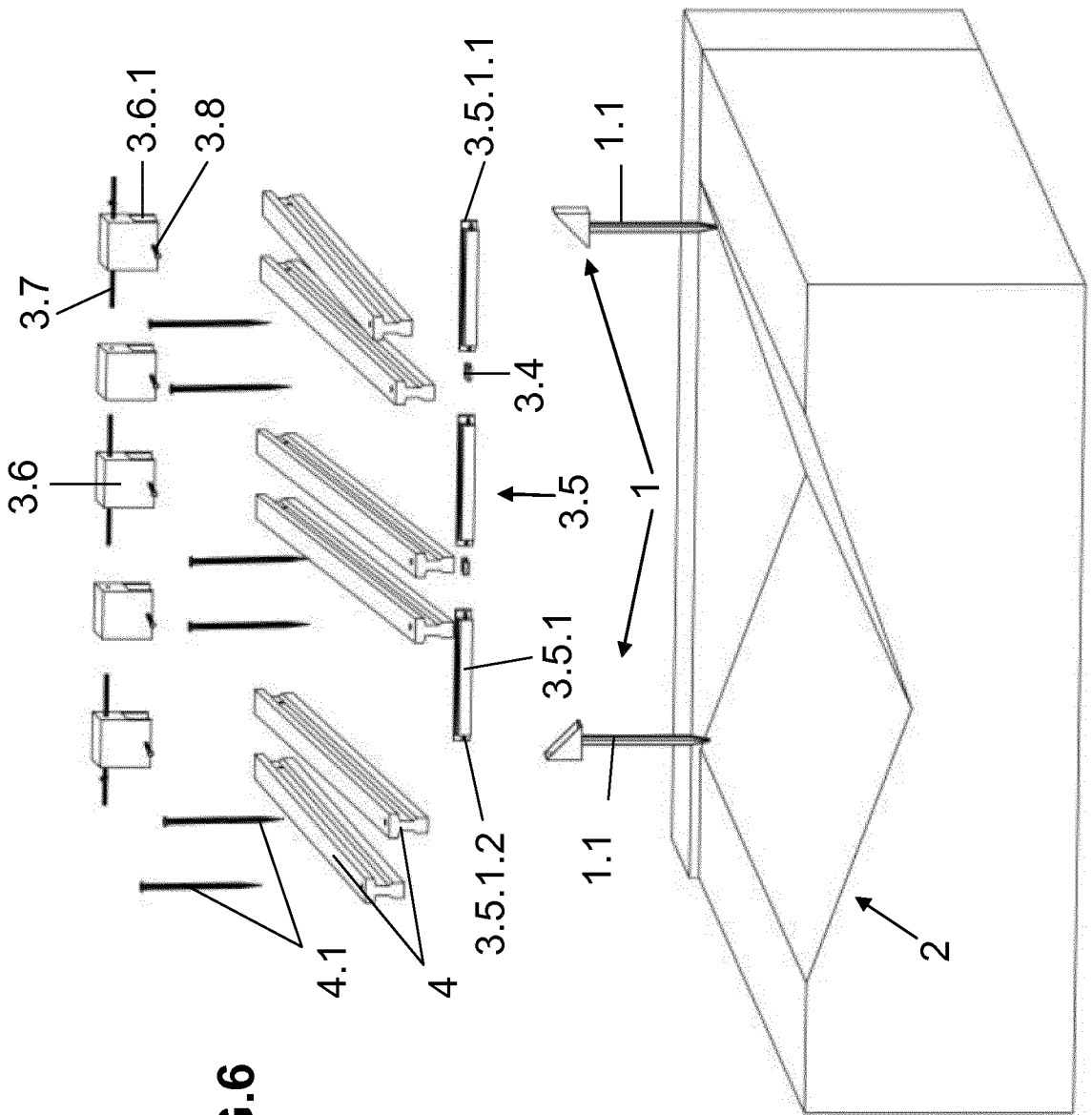
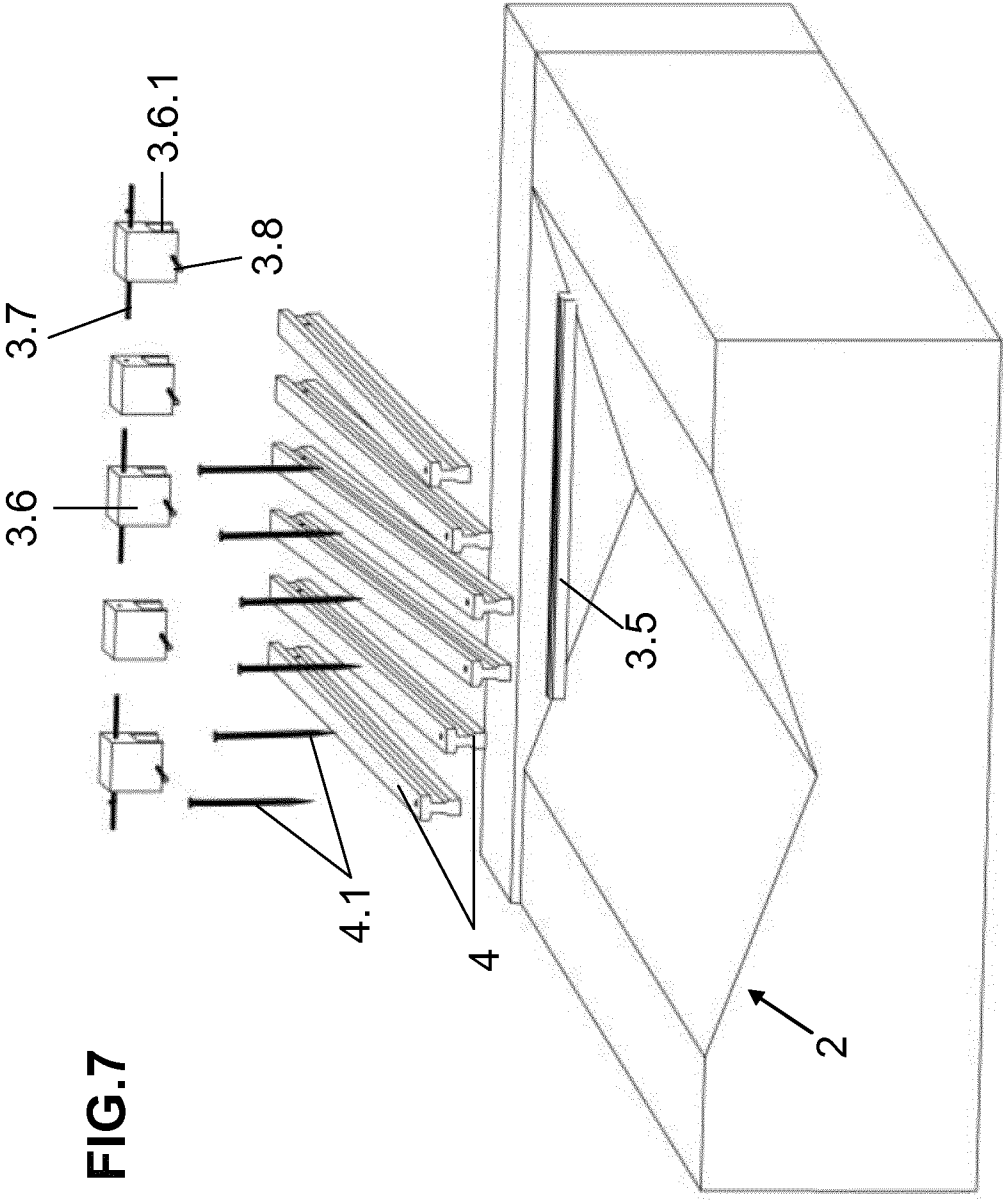


FIG.6



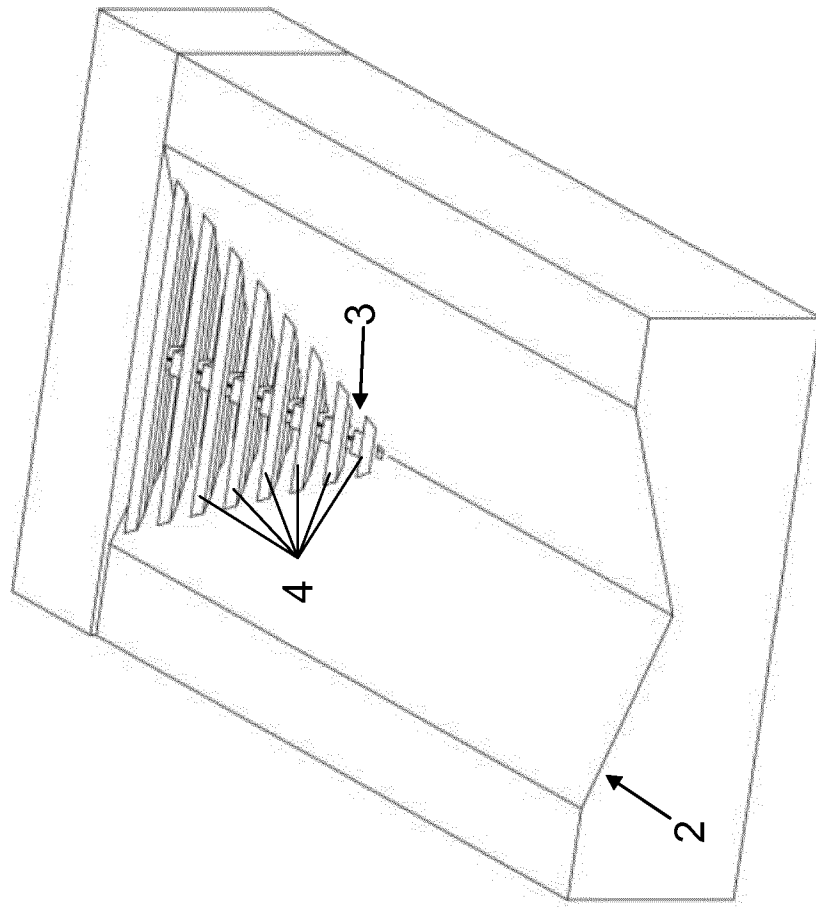
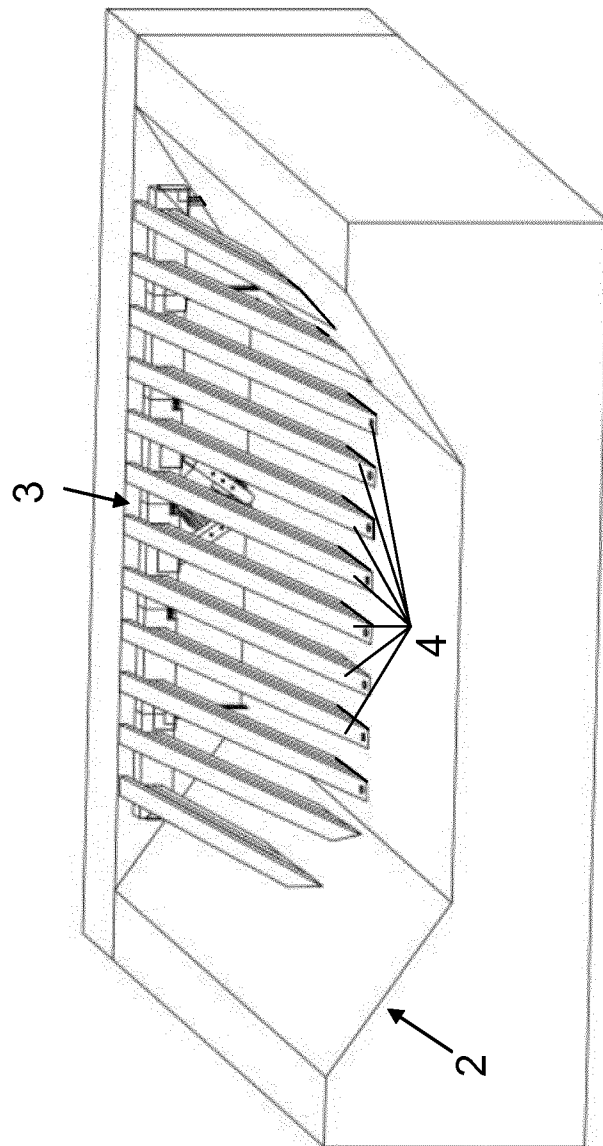


FIG. 8

FIG.9



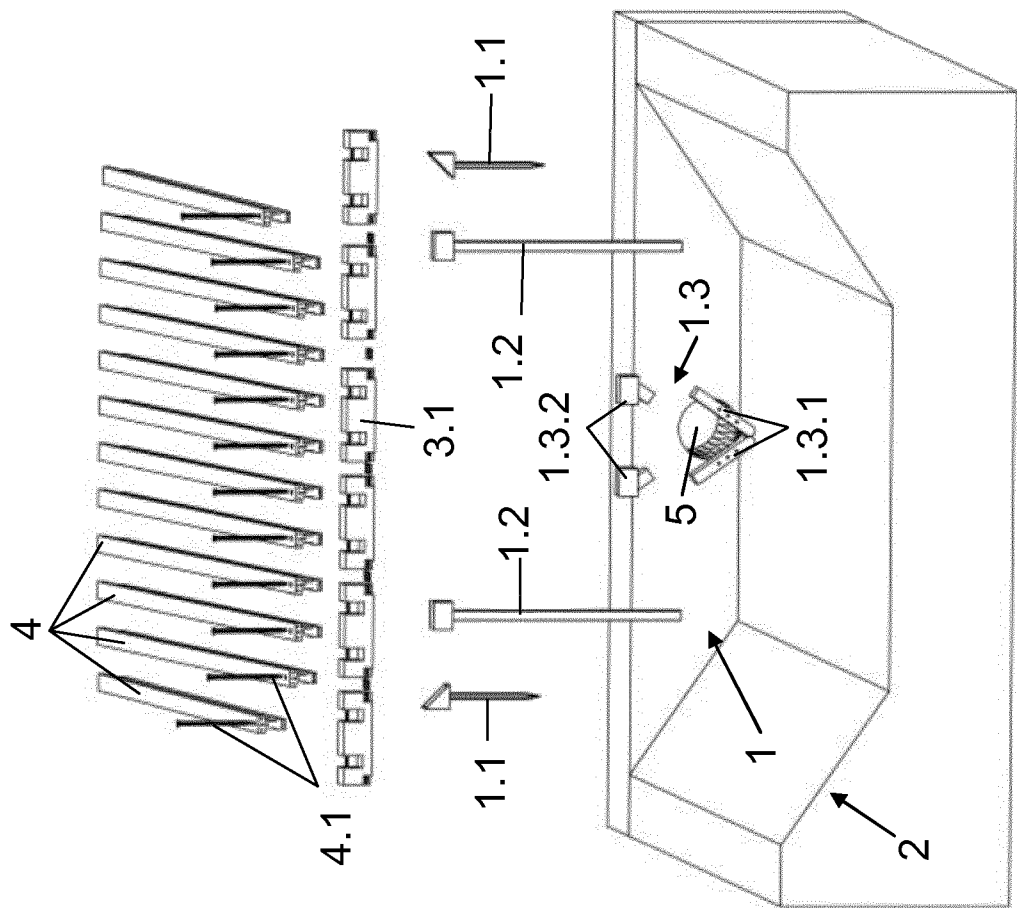
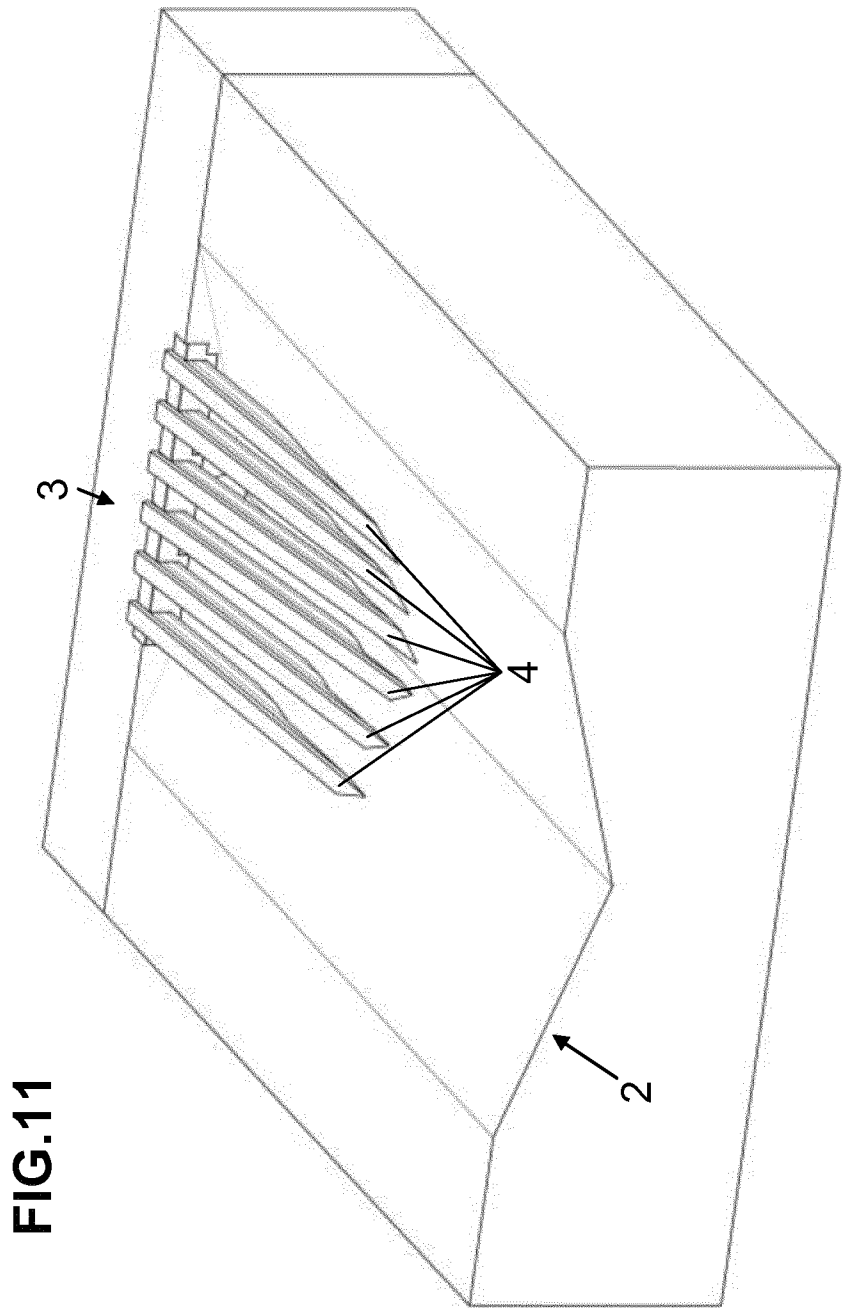


FIG. 10



INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2012/070639

A. CLASSIFICATION OF SUBJECT MATTER

E01F5/00 (2006.01)**E01F15/14** (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)

E01F

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)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ES 1054682 U (PROTOIN INGENIERIA ZAMORA S L) 16/08/2003, column 2, lines 26-65; figures	1-16
A	CA 2375006 A1 (CHRISTIAN JOSEPH JESSE) 07/09/2003, page 3, line 3 - page 5, line 5; figures	1-16
A	CA 2140317 A1 (PREVOST SIDNEY) 17/07/1996, page 2, line 29 - page 7, line 12; figures	1-16
A	ES 2222109 A1 (RODRIGUEZ CAMACHO VALENTIN) 16/01/2005, column 2, line 45 - column 4, line 47; figures	1-16
A	ES 1071977 U (GLS CONSORCIO DEL HORMIGON S L) 03/05/2010, the whole document.	1-16

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance.	
"E" earlier document but published on or after the international filing date	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"O" document referring to an oral disclosure use, exhibition, or other means.	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents, such combination being obvious to a person skilled in the art
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
25/10/2012Date of mailing of the international search report
(07/11/2012)

Name and mailing address of the ISA/

OFICINA ESPAÑOLA DE PATENTES Y MARCAS
Paseo de la Castellana, 75 - 28071 Madrid (España)
Facsimile No.: 91 349 53 04Authorized officer
Belda Soriano, Leopoldo

Telephone No. 91 3495585

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2012/070639

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9708391 A1 (STEINBAUER KLAUS) 06/03/1997, claims; figures	1-16
A	FR 2907138 A1 (COMMUNEAU ROGER) 18/04/2008, page 1, line 4 - page 4, line 27; figures	1-16
A	FR 2793820 A1 (COMMUNEAU STEPHANE) 24/11/2000, page 3, line 11 - page 4, line 35; figures	1-16
A	ES 1057265 U (BONET ROS CORNELIO) 01/07/2004, the whole document.	1-16

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2012/070639

Information on patent family members

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
ES1054682	01.01.2004	NONE	
CA2375006 A	07.09.2003	NONE	
CA2140317 A	17.07.1996	NONE	
ES2222109 AB	16.01.2005	NONE	
ES1071977	02.08.2010	NONE	
WO9708391 A	06.03.1997	AT402413 B ATA143495 A EP0846204 AB EP19960926259 AT192200 T	26.05.1997 15.09.1996 10.06.1998 13.08.1996 15.05.2000
FR2907138 A	18.04.2008	FR2907139 AB	18.04.2008
FR2793820 AB	24.11.2000	NONE	
ES1057265	16.10.2004	NONE	

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- ES 1054682 [0007]
- ES 2222109 [0008]