(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 296 464 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.03.2018 Bulletin 2018/12

(51) Int Cl.:
E01F 13/04 *(2006.01)* ***E06B 11/02*** *(2006.01)*
E01F 13/02 *(2006.01)*

(21) Application number: **17191146.4**

(22) Date of filing: **14.09.2017**

(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
Designated Validation States:
MA MD

(30) Priority: **15.09.2016 DK 201670707**

(71) Applicant: **Damkjær, René**
8700 Horsens (DK)

(72) Inventor: **Damkjær, René**
8700 Horsens (DK)

(74) Representative: **Awapatent A/S**
Strandgade 56
1401 Copenhagen K (DK)

(54) A GATE BEING COMPLETELY RETRACTABLE INTO A SUBTERRANEAN CHAMBER

(57) A gate (1) being free-standing and completely retractable into a chamber (2) in the ground (3), the gate comprising a gate frame (4) and two opposite posts (5, 6), each of the two opposite posts comprising an inner tube (7, 8) arranged in the chamber, a guide rail (13), an outer tube (9, 10) forming a side element of the gate frame (4) and being arranged such as to be movable on the guide rail between a retracted position in which the outer tube is arranged extending over the inner tube in such a way that the gate frame (4) and the two opposite posts (5, 6) are completely retracted into the chamber (2) in the ground (3) and an extended position in which the outer tube is arranged extending from the inner tube in such a way that the gate frame (4) and the two opposite posts (5, 6) are positioned above the chamber (2) in the ground (3), and a hydraulic cylinder (11, 12) comprising a cylinder bore (12a) and a piston rod (12b), the hydraulic cylinder being arranged within the inner tube and connected to the outer tube such as to enable moving the outer tube between the retracted position and the extended position.

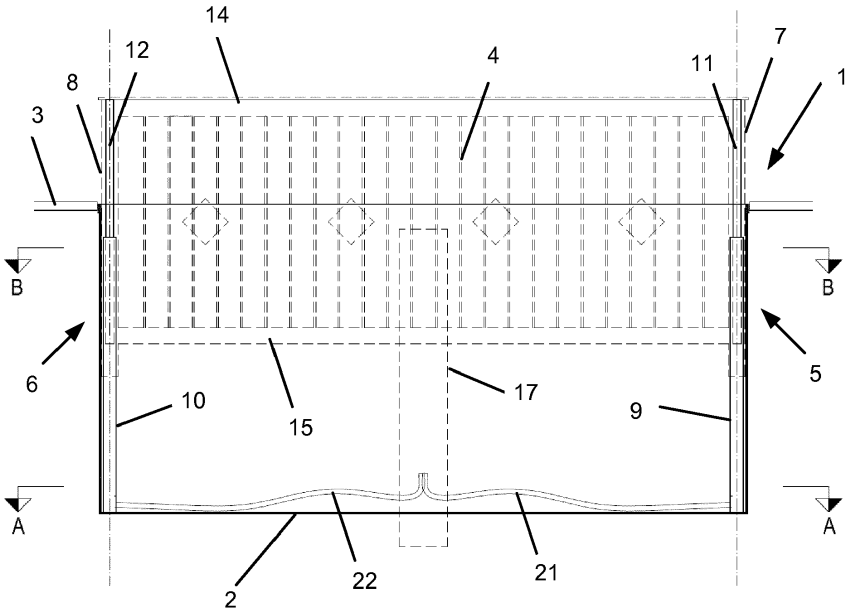

Fig. 1B

EP 3 296 464 A1

Description

[0001] The present invention relates to a free-standing gate adapted for being completely retractable into a chamber in the ground, the gate comprising a gate frame with two opposite posts.

[0002] EP 0163180 A3 describes a gate which is completely retractable into a chamber in the ground, and which comprises two corner posts in the form of stationary guide rails. One cylinder-piston device acted upon by a hydraulic drive unit is provided to raise and lower the gate. The cylinder-piston device is arranged centrally on the gate in a pipe shaped to accommodate the cylinder-piston device. The chamber in the ground comprises a rather complex lid assembly for protection of the electrical circuitry and hydraulics also being arranged in the chamber in the ground.

[0003] However, with such a gate there is a risk that the vertical movement of the gate frame executed by the centrally arranged cylinder-piston arrangement will, especially over time, become slanting, which would be detrimental to the functionality of the gate as it may block during its movement. Furthermore such a gate is a rather complex structure with an expensive lid assembly which may be prone to not closing off the chamber in the ground properly over time due to wear. Finally, such a gate is also less aesthetically pleasing, particularly in an extended position.

[0004] Therefore, there is a desire in the art to provide a gate of the type mentioned in the introduction which is more robust and durable, especially with respect to its vertical movement but also with respect to the life time of the hydraulic components and the durability of the corner posts.

[0005] In light of the above it is therefore an object of the invention to develop and provide a gate which is more robust and durable with respect to both its vertical movement and the life time of the hydraulic components.

[0006] Furthermore, it is an object of the invention to provide a gate which is less noisy during operation, which is simple in construction and which is more aesthetically pleasing.

[0007] These and other objects are according to the invention solved by means of a gate being free-standing and completely retractable into a chamber in the ground, the gate comprising a gate frame and two opposite posts, each of the two opposite posts comprising an inner tube arranged in the chamber, a guide rail, an outer tube forming a side element of the gate frame and being arranged such as to be movable on the guide rail between a retracted position in which the outer tube is arranged extending over the inner tube in such a way that the gate frame and the two opposite posts is completely retracted into the chamber in the ground and an extended position in which the outer tube is arranged extending from the inner tube in such a way that the gate frame and the two opposite posts are positioned above the chamber in the ground, and a hydraulic cylinder comprising a cylinder bore and a piston rod, the hydraulic cylinder being arranged within the inner tube and connected to the outer tube such as to enable moving the outer tube between the retracted position and the extended position.

[0008] By providing a gate with such a structure of the two opposite posts, and especially a gate with a hydraulic cylinder being arranged within the inner tube and connected to the outer tube such as to enable moving the outer tube between the retracted position and the extended position, a gate is provided which is more robust and durable with respect to both keeping its vertical movement vertical over time and to the life time of the hydraulic cylinders. This is especially obtained in that the structure of the posts, at least in the retracted position, enables the hydraulic cylinder to be protected and held by both the inner tube and the outer tube, and in that the inner tube in turn is, at also protected and held by the outer tube. Such a gate is furthermore also more aesthetically pleasing, especially in the extended position.

[0009] The provision of a guide rail provides further stability, also over time, to the vertical movement, and furthermore considerably reduces the noise caused while the gate is in movement.

[0010] In an embodiment the outer tube comprises a square or rectangular cross-section, and the inner tube comprises a square or rectangular cross-section.

[0011] Thereby a particularly durable and simple to produce and assemble post structure is obtained.

[0012] In an embodiment the hydraulic cylinder comprises a circular or oval cross-section.

[0013] In an embodiment the guide rail is arranged on an inner surface of the outer tube.

[0014] In an alternative embodiment the guide rail is arranged on an outer surface of the inner tube.

[0015] By either of the two above-mentioned arrangements a particularly robust and well functioning post structure in terms of the relative movement of the outer tube with respect to the inner tube is achieved.

[0016] In an embodiment the guide rail is a nylon guide rail. Thereby, a particularly robust and particularly low-noise guide rail and thus gate is provided for.

[0017] In an embodiment the gate further comprises a hydraulic drive system for driving the hydraulic cylinder, the hydraulic drive system being arranged in a separate further chamber in the ground and being connected to the hydraulic cylinder by hydraulic piping arranged in protective tubing.

[0018] By arranging the hydraulic drive system in a separate further chamber in the ground, and by connecting the hydraulic drive system to the hydraulic cylinders by means of hydraulic piping arranged in protective tubing, full protection of these relatively delicate components against external influences is achieved as the separate further chamber may be kept closed towards the surroundings, and in particular the surroundings above ground, even when the gate is in its extended position. Thereby a longer life time of the gate is ensured.

[0019] The protective tubing is in an embodiment pro-

viding extra durability and resistance galvanized protective tubing.

[0020] In an embodiment the gate further comprises electrical circuitry and a control unit for controlling the hydraulic drive system, the electrical circuitry and the control unit being arranged in the separate further chamber in the ground, and the hydraulic drive system is directly connected to the control unit and comprises a pressure relief valve for deactivating the gate when it reaches either of the retracted position and the extended position.

[0021] By arranging also the electrical circuitry and the control unit in a separate further chamber in the ground full protection of these components against external influences is achieved as the separate further chamber may be kept closed towards the surroundings, and in particular the surroundings above ground, even when the gate is in its extended position.

[0022] By connecting the hydraulic drive system directly to the control unit and by providing a pressure relief valve for deactivating the gate when it reaches either of the retracted position and the extended position, safe operation of the gate is ensured in that it is ensured that the movement of the gate is terminated in due course.

[0023] In an embodiment the gate further comprises electrical circuitry and a control unit for controlling the hydraulic drive system, the electrical circuitry and the control unit being arranged in the separate further chamber in the ground, and/or a pump unit arranged in the separate further chamber in the ground, and/or a cover element adapted for covering the separate further chamber in the ground.

[0024] By arranging the electrical circuitry and the control unit in a separate further chamber in the ground full protection of these components against external influences is achieved as the separate further chamber may be kept closed towards the surroundings, and in particular the surroundings above ground, even when the gate is in its extended position.

[0025] By providing a pump unit arranged in the separate further chamber in the ground, penetrating water, particularly ground water, may be removed from the separate further chamber in a simple manner. The pump may be controlled by the control unit.

[0026] By providing a cover element adapted for covering the separate further chamber in the ground, the separate further chamber may be kept closed towards the surroundings above ground in a particularly simple manner, while still allowing access to the separate further chamber for maintenance purposes.

[0027] Furthermore, by providing a separate further chamber for housing the electrical circuitry, hydraulics, control unit and/or pump, a less complex gate with very few components arranged in the chamber in the ground and the remaining more delicate components stored in the separate further chamber in the ground is provided for. Such a gate is also particularly aesthetically pleasing, especially in the extended position.

[0028] In an embodiment the gate further comprises a top profile element dimensioned such as to act as a cover element covering the chamber in the ground when the gate is in the retracted position.

[0029] Thereby protection of the chamber in the ground and the gate parts arranged therein from external influences, in particular precipitation such as rain and snow, when the gate is in its retracted position is obtained in a particularly simple manner which is also aesthetically pleasing to a user. Separate lid constructions, whether simple or complex, for the chamber in the ground may be omitted, and a less costly construction is thus obtained.

[0030] In an embodiment the gate further comprises a casing arranged in the chamber in the ground, the casing preferably being made of steel, such as galvanized or stainless steel, or concrete.

[0031] Thereby, protection of the chamber in the ground and the gate parts arranged therein from external influences, such as moisture or plant roots, which may otherwise penetrate from the surrounding ground, is obtained.

[0032] In an embodiment the gate further comprises a further casing arranged in the separate further chamber in the ground, the further casing preferably being made of steel, such as galvanized or stainless steel, or concrete.

[0033] Thereby, protection of the separate further chamber in the ground and the parts arranged therein from external influences, such as moisture or plant roots, which may otherwise penetrate from the surrounding ground, is obtained.

[0034] To enable power supply of the gate, and in particular of the control system, the gate is simply connected to mains, or to another suitable electrical energy source capable of delivering electricity with a voltage of 230 V or otherwise corresponding to the mains voltage.

[0035] In an embodiment the gate, and in particular the control unit of the gate where provided, may be operated by means of any one or more of a remote control, a mobile telephone (for instance by text message or through an application), a keyboard (for instance by entering a pass code), a key or key card system.

[0036] Thereby simple and easy operation is enabled, for instance for a user while sitting in his vehicle.

[0037] In an embodiment the gate may comprise or be electronically connected to a clock enabling timing the operation of the gate to be effected at a desired time.

[0038] In an embodiment the gate may comprise a security system comprising at least one photo cell and a signalling system, such as e.g. a green and a red light or a sound emitter, such as to signal to a driver or other passing person when passage of the gate is safe.

[0039] Further embodiments of the gate according to the invention appear from the below detailed description as well as from the respective dependent claims.

[0040] The invention will now be described in more detail below by means of a non-limiting example of a presently preferred embodiment and with reference to the

schematic drawings, in which:

Fig. 1A shows a schematic side view of a gate with a gate frame and two opposite posts for receiving the gate, the gate being in an extended position above the ground,

Fig. 1B shows a schematic side view of a gate with a gate frame and two opposite posts as well as a chamber in the ground for receiving the gate, the gate being indicated with dashed lines as being in a partially retracted position partially within in the chamber in the ground,

Fig. 2 shows a cross section through the gate and chamber of Fig. 1B along the line A-A,

Fig. 3 shows a cross section through the gate and chamber of Fig. 1B along the line B-B,

Fig. 4 shows a cross section through the gate of Fig. 1A along the line C-C,

Fig. 5 shows a top view of the gate of Fig. 1A along the line D-D,

Fig. 6 shows a cross section through the gate and chamber of Fig. 1B in a direction perpendicular to the side view of Fig. 1B along the line E-E in Fig. 2,

Fig. 7 shows a side view of the gate in a fully extended version above the ground, and

Fig. 8 shows an enlarged cross sectional view through an embodiment of a post of the gate corresponding to the box F indicated in Fig. 4.

[0041] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which currently preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided for thoroughness and completeness, and fully convey the scope of the invention to the skilled person.

[0042] Referring first to Figs. 1A and 1B, a gate 1 and a chamber 2 in the ground 3 according to the invention is shown. The gate 1 is of the type being free-standing and completely retractable into the chamber 2 in the ground 3. The gate 1 generally comprises a gate frame 4 and two opposite posts 5 and 6. Reference is in the following also made to Fig. 8, showing a cross section of the post 6. The posts 5 and 6 are generally identical or similar in construction.

[0043] The gate frame 4 may be any suitable gate frame, and may be provided with any suitable pattern or shape, such as a pattern or shape complying with the wishes of a buyer or customer, typically in the form of a plurality of bars and/or plates. Typically the gate frame 4 is rectangular and made of a durable metal, such as stainless and/or surface coated steel. The gate 1, particularly the gate frame 4, comprises a top profile element 14 (cf. Figs. 1 and 7), which is optionally dimensioned such as to act as a cover element covering the chamber 2 in the ground 3 when the gate 1 is completely retracted into the chamber 2 in the ground 3.

[0044] The gate frame 4 may in an embodiment be modular, and thus provided as a plurality of modules of a suitable and/or predetermined size and connected by means of attachment means such as bolts. The plurality of modules may be of the same size or of two or more mutually different sizes. A modular gate frame has the advantage that it may be custom made to have the exact size desired by the customer. The use of bolts or the like to attach the modules to one another has the advantage of saving production costs, especially production costs associated with welding.

[0045] Each of the two opposite posts 5 and 6 generally comprise an inner tube 9, respectively 10, arranged in the chamber 2 in the ground 3, a guide rail 13 (cf. Fig. 8) and an outer tube 7, respectively 8, forming a side element of the gate frame 4.

[0046] The outer tubes 7 and 8 are arranged such as to be movable on the guide rail 13 between a retracted position and an extended position. Different positions of the gate 1 corresponding to the positions A, B, C and D shown in Figs. 1A and 1B are illustrated in the cross-sectional views of Figs. 2 to 5, where Fig. 2 illustrates the fully retracted position, Figs. 3 and 4 two different positions between the fully retracted and fully extended position and Fig. 5 illustrates the fully extended position.

[0047] In the fully retracted position the outer tube 7, 8 is arranged extending over the inner tube 9, 10 in such a way that the gate frame 4 and the two opposite posts 5, 6 are completely retracted into the chamber 2 in the ground 3. In the fully extended position the outer tube 7, 8 is arranged extending from the inner tube 9, 10 in such a way that the gate frame 4 and at least the outer tubes 7, 8 of the two opposite posts 5, 6 are positioned completely above the chamber in the ground - cf. also Fig. 7.

[0048] Each post 5, 6 further comprises a hydraulic cylinder 11, respectively 12, comprising a cylinder bore (Cf. 12a on Fig. 8) and a piston rod (Cf. 12b on Fig. 8). The hydraulic cylinders 11, 12 are arranged within the respective inner tube 9, 10 and are connected to the respective outer tube 7, 8 such as to enable moving the outer tube 7, 8 between the retracted position and the extended position. The connection between the hydraulic cylinders 11, 12 and outer tubes 7, 8 may be made by means of screws 24, 25, 26, 27 (cf. Fig. 8), which may be countersunk for a more aesthetically pleasing appearance of the gate 1, or bolts.

[0049] The outer tubes 7, 8 and the inner tubes 9, 10 comprise in the embodiment shown on the drawing a square cross-section. Other cross sectional shapes such as e.g. rectangular or even circular or oval is also feasible.

[0050] The hydraulic cylinders 11 and 12 comprise a circular or oval cross-section. Other cross sectional shapes are in principle also feasible. The hydraulic cylinders 11 and 12 may be any type of hydraulic cylinder known per se providing a sufficient lifting force to move the gate between the retracted and extended position.

[0051] Referring again also to Fig. 8, the guide rail 13

is arranged on an outer surface of the inner tube 10, but may alternatively be arranged on an inner surface of the outer tube 8. The guide rail is a nylon guide rail, but may also be a guide rail made of a suitable metal. Optionally, the guide rail may also be provided with a coating or lubricant for lowering friction and/or noise and/or wear.

[0052] Referring now to Figs. 1 to 6, where Fig. 6 shows a cross sectional side view of the gate 1 according to Fig. 1, the gate 1 further comprises a separate further chamber 17 in the ground 3 being completely separate from the chamber 2 in the ground 3. Thus, the respective chambers 2 and 17 are arranged adjacent to but distanced from one another in the ground.

[0053] As illustrated on Fig. 6, the gate 1 comprises, arranged in the separate further chamber 17 in the ground 3, a hydraulic drive system 16 for driving the hydraulic cylinders 11 and 12. The hydraulic drive system is connected to the hydraulic cylinders 11 and 12 by hydraulic piping 21, respectively 22 (cf. Fig. 1B), arranged in protective tubing and lead through the spacing, e.g. a part of the ground 3, separating the chambers 2 and 17 from one another and through inlets 23 (cf. Fig. 6) in the inner tubes 9 and 10 at the bottom of the inner tubes 9, 10 and thus the hydraulic cylinders 11 and 12. The hydraulic oil used in the hydraulic system may in one embodiment be an environmentally friendly bio oil or bio-based oil.

[0054] The gate 1 further comprises electrical circuitry and a control unit commonly denoted 18 on Fig. 6 for controlling the hydraulic drive system 16. The electrical circuitry and the control unit 18 are arranged in the separate further chamber 17 in the ground 3. The hydraulic drive system 16 is directly connected to the control unit 18 and the hydraulic drive system 16 comprises a pressure relief valve 28 (cf. Fig. 6) for deactivating the gate 1 when it reaches either of the retracted position and the extended position.

[0055] The gate 1 also comprises a pump unit 19 arranged in the separate further chamber 17 in the ground 2 at the bottom or lower end of the separate further chamber 17. The pump 19 may be connected to the ordinary sewer system, or it may be provided with a separate sump or well, for disposal of water.

[0056] The separate further chamber 17 is furthermore provided with a cover element 20 covering the separate further chamber 17 in the ground 3. The cover element 20 is adapted such that it may be opened and closed after being installed on the separate further chamber 17 in the ground 3. The cover element may be made of steel, such as galvanized or stainless steel, or of iron, such as cast iron.

[0057] The gate 1 further comprises a protective casing 29 arranged in the chamber 2 in the ground 3. The casing 29 is preferably made of steel or concrete.

[0058] The gate 1 also comprises a protective further casing 30 arranged in the separate further chamber 17 in the ground 3. The further casing 30 is preferably made of steel or concrete.

[0059] As a finalizing touch, the ground 3 adjacent to the chamber 2 in the ground 3, and optionally also the separate further chamber 17 in the ground 3, and thus surrounding the gate 1, may be provided with a suitable and desired surfacing 31, such as gravel, asphalt or flagstones.

[0060] The person skilled in the art realizes that the present invention by no means is limited to the preferred embodiments described above. On the contrary, many modifications and variations are possible within the scope of the appended claims.

List of Reference Numerals

[0061]

1	Gate
2	Chamber in the ground
3	Ground
4	Gate frame
5	Post
6	Post
7	Outer tube (part of gate)
8	Outer tube (part of gate)
9	Inner tube
10	Inner tube
11	Hydraulic cylinder (arranged in 9)
12	Hydraulic cylinder (arranged in 10)
13	Guide rail
14	Top element of 4
15	Bottom element of 4
16	Hydraulic drive system
17	Separate (additional) chamber
18	Control unit (and electric circuitry)
19	Pump element (immersion pump)
20	Cover (on 17)
21	Hydraulic piping (between 16 and 11)
22	Hydraulic piping (between 16 and 12)
23	Hydraulic inlet in 9 to 11
24	Screw/Bolt
25	Screw/Bolt
26	Screw/Bolt
27	Screw/Bolt
28	Pressure release valve
29	Casing in 2
30	Casing in 17
31	Surfacing

Claims

1. A gate being free-standing and completely retractable into a chamber in the ground, the gate comprising a gate frame and two opposite posts, each of the two opposite posts comprising:

   an inner tube arranged in the chamber,
   a guide rail,

an outer tube forming a side element of the gate frame and being arranged such as to be movable on the guide rail between a retracted position in which the outer tube is arranged extending over the inner tube in such a way that the gate frame and the two opposite posts is completely retracted into the chamber in the ground and an extended position in which the outer tube is arranged extending from the inner tube in such a way that the gate frame and the two opposite posts are positioned above the chamber in the ground, and
a hydraulic cylinder comprising a cylinder bore and a piston rod, the hydraulic cylinder being arranged within the inner tube and connected to the outer tube such as to enable moving the outer tube between the retracted position and the extended position.

2. A gate according to claim 1, wherein the outer tube comprises a square or rectangular cross-section, and wherein the inner tube comprises a square or rectangular cross-section.

3. A gate according to any one of the above claims, wherein the hydraulic cylinder comprises a circular or oval cross-section.

4. A gate according to any one of the above claims, wherein the guide rail:

is arranged on an inner surface of the outer tube, or
is arranged on an outer surface of the inner tube, and/or
is a nylon guide rail.

5. A gate according to any one of the above claims, and further comprising a hydraulic drive system for driving the hydraulic cylinder, the hydraulic drive system being arranged in a separate further chamber in the ground and being connected to the hydraulic cylinder by hydraulic piping arranged in protective tubing.

6. A gate according to claim 5, wherein the gate further comprises electrical circuitry and a control unit for controlling the hydraulic drive system, the electrical circuitry and the control unit being arranged in the separate further chamber in the ground, and wherein the hydraulic drive system is directly connected to the control unit and comprises a pressure relief valve for deactivating the gate when it reaches either of the retracted position and the extended position.

7. A gate according to any one of the above claims, and further comprising:

electrical circuitry and a control unit for controlling the hydraulic drive system, the electrical circuitry and the control unit being arranged in the separate further chamber in the ground, and/or
a pump unit arranged in the separate further chamber in the ground, and/or
a cover element adapted for covering the separate further chamber in the ground.

8. A gate according to any one of the above claims, and further comprising a top profile element dimensioned such as to act as a cover element covering the chamber in the ground when the gate is in the retracted position.

9. A gate according to any one of the above claims, and further comprising a casing arranged in the chamber in the ground, the casing preferably being made of steel or concrete.

10. A gate according to any one of claims 5 to 9, and further comprising a further casing arranged in the separate further chamber in the ground, the further casing preferably being made of steel or concrete.

11. A gate according to any one of the above claims, wherein the gate frame is modular and comprises a plurality of modules.

12. A gate according to claim 11, wherein the plurality of modules of the gate frame is attached to one another by means of attachment means such as bolts.

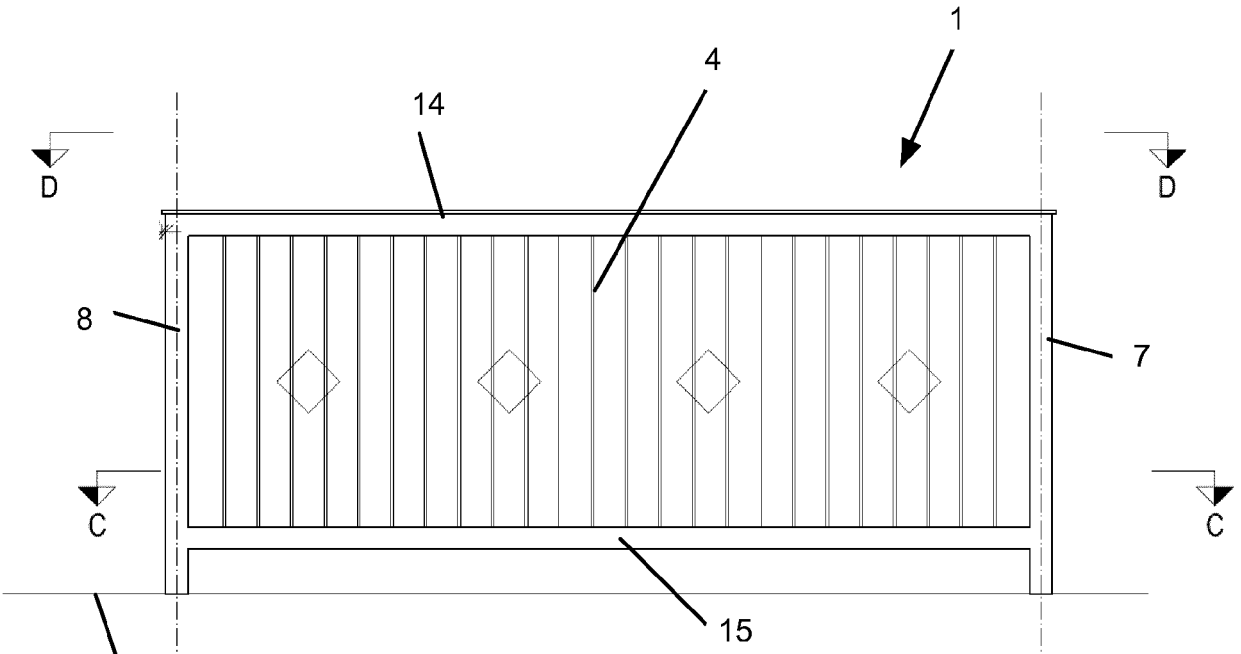

Fig. 1A

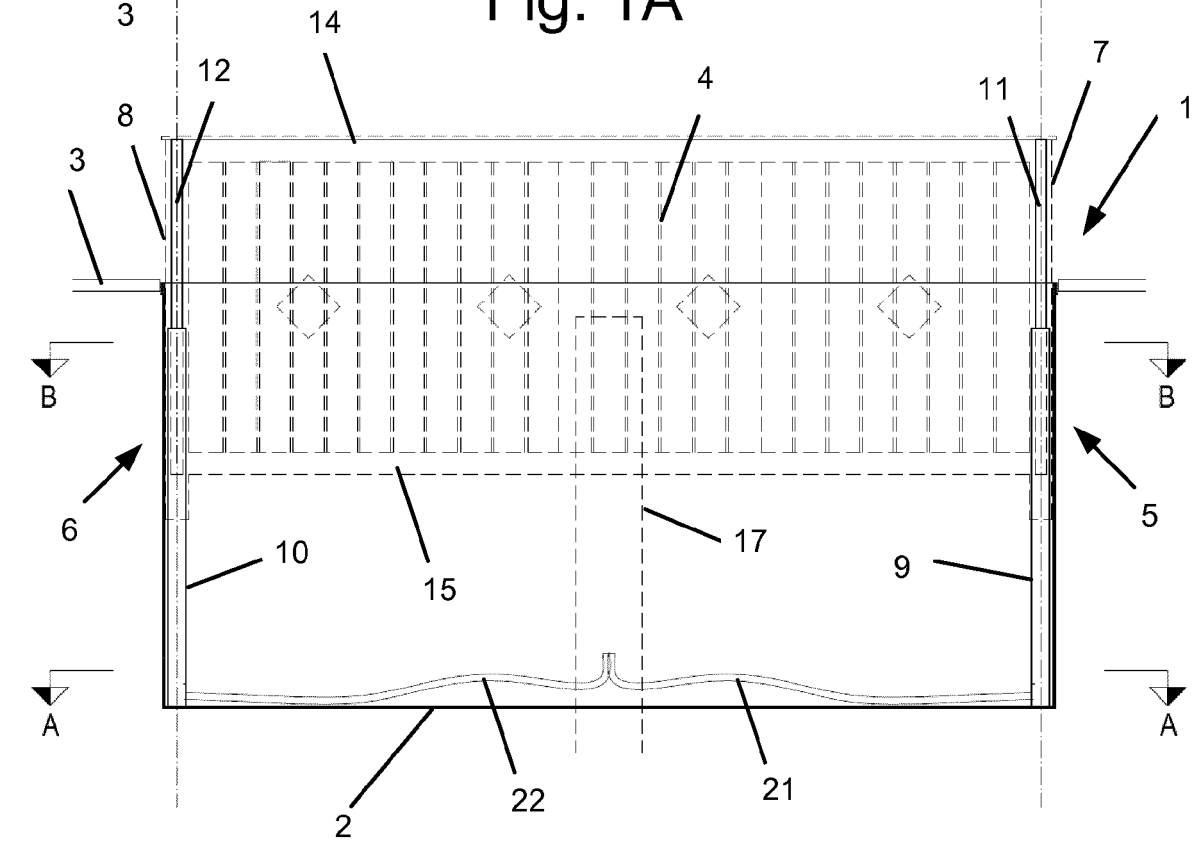

Fig. 1B

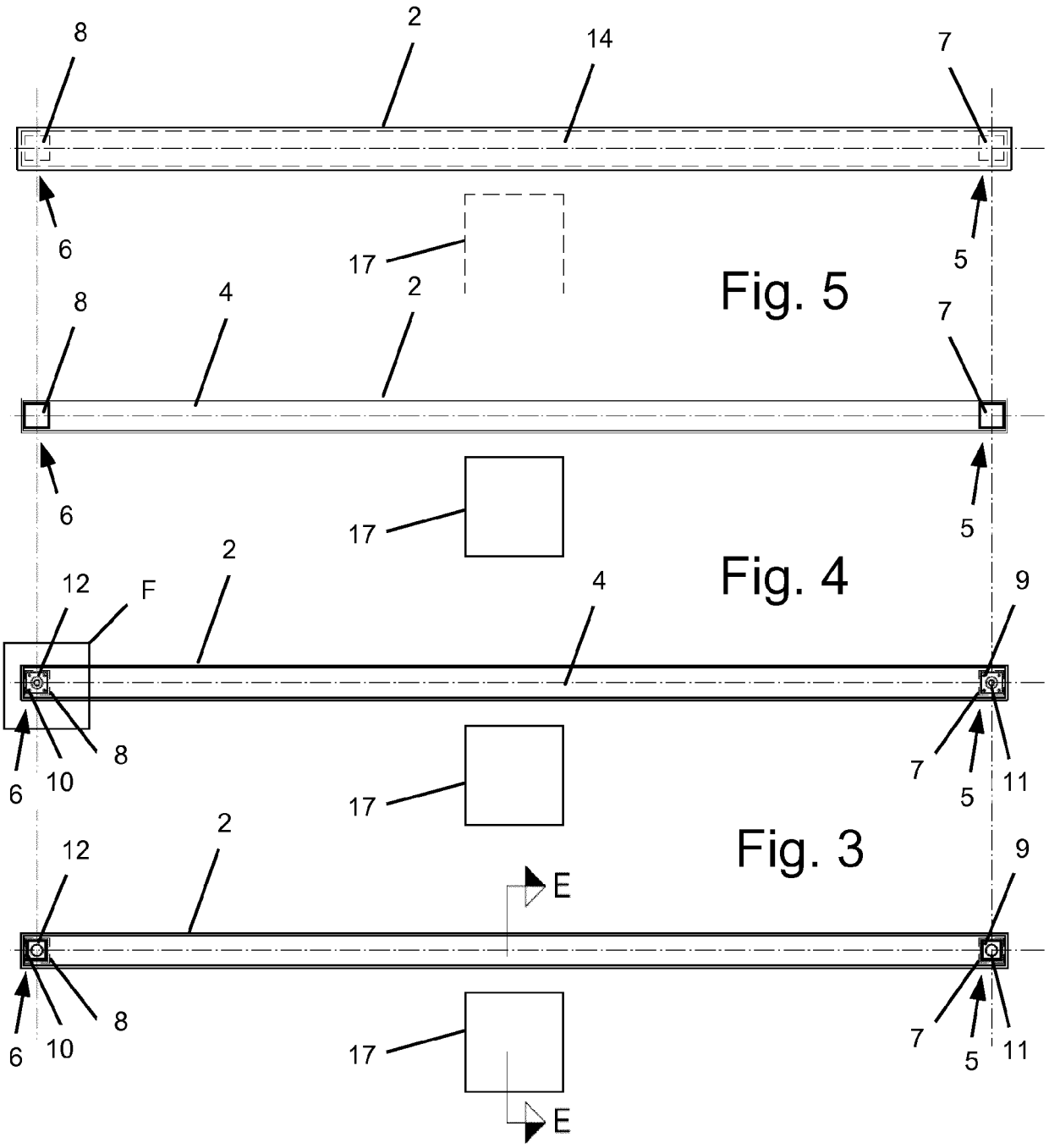

Fig. 5

Fig. 4

Fig. 3

Fig. 2

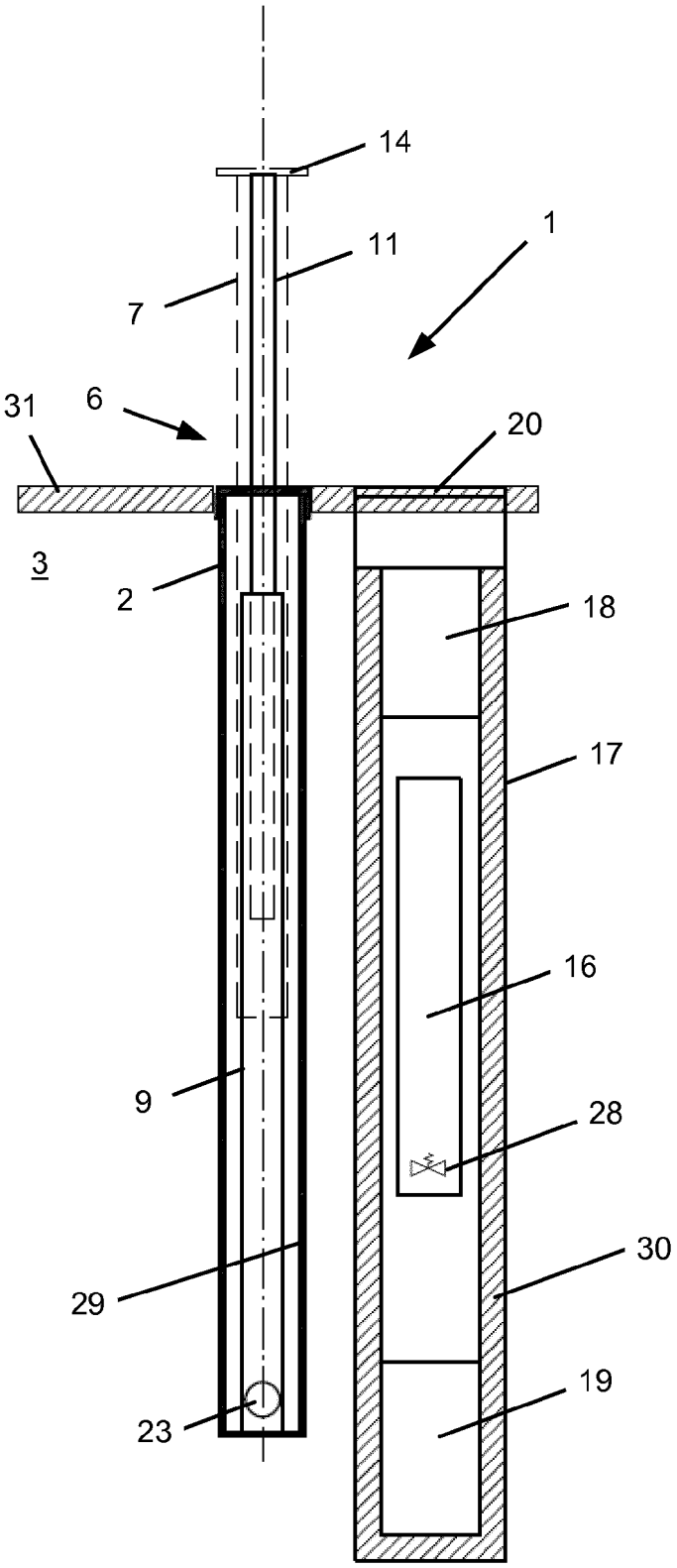

Fig. 6

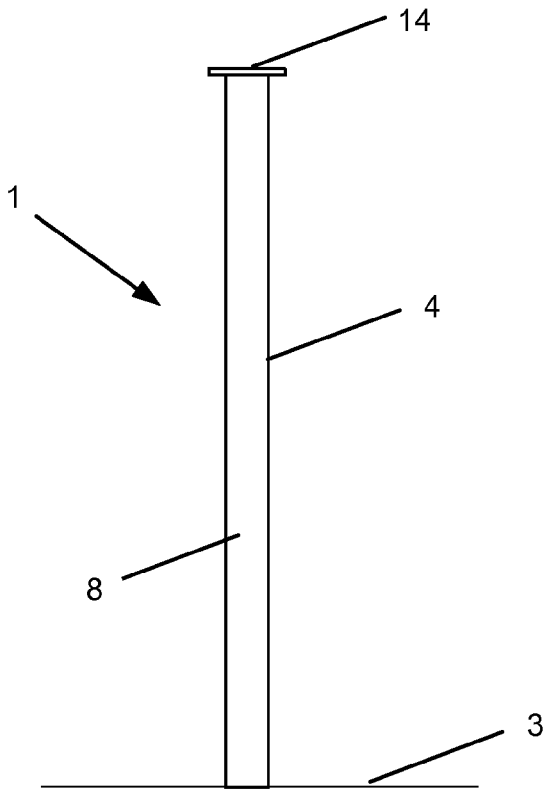

Fig. 7

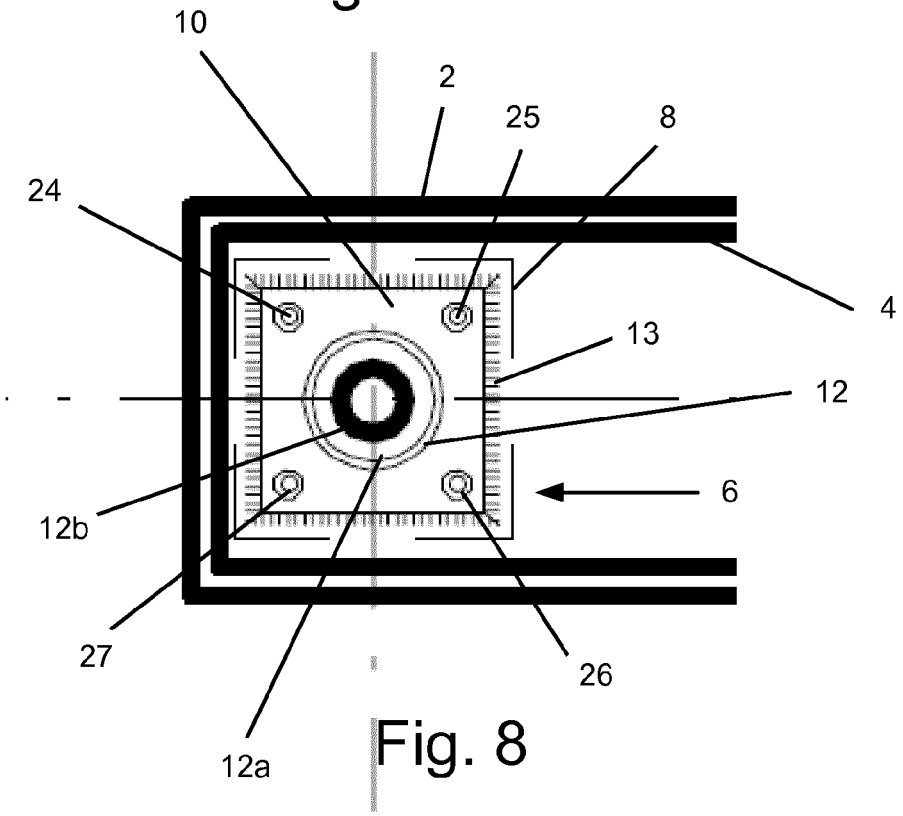

Fig. 8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 19 1146

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 191 150 A2 (OMNIA SRL [IT]) 27 March 2002 (2002-03-27) * paragraph [0014]; figures 1, 2, 7 *	1-12	INV. E01F13/04 E06B11/02 E01F13/02
X	GB 2 297 990 A (WITHERS PAUL ROBERT PRIOR [GB]) 21 August 1996 (1996-08-21) * figures 1, 4, 5 *	1-12	
X	ES 2 255 374 A1 (PINEIRO PEREZ ALFREDO [ES]) 16 June 2006 (2006-06-16) * column 1 - column 2; figures 1, 2 *	1-12	
X	NL 1 000 881 C2 (JACOB STEENBERGEN [NL]) 28 January 1997 (1997-01-28) * page 4, line 1 - line 7; figures 1-3 *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)
E01F
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 November 2017	Cobusneanu, D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 19 1146

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-11-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1191150 A2	27-03-2002	AT 355416 T	15-03-2006
		DE 60126878 T2	08-11-2007
		EP 1191150 A2	27-03-2002
		IT UD20000182 A1	25-03-2002
GB 2297990 A	21-08-1996	NONE	
ES 2255374 A1	16-06-2006	NONE	
NL 1000881 C2	28-01-1997	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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

- EP 0163180 A3 **[0002]**