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(54) **AUTOMATIC TRANSIT-DISSUADING COLUMN**

(57) The present invention refers to an automatic foldaway column-shaped dissuader (10) comprising a formwork (12) fixed in the soil, a structural unit (14) fixed removably in the formwork (12), and a column (16) received in the inside of the structural unit (14) and coupled to it through one or more pistons (46) adapted to move the column (16) vertically with respect to the structural unit (14).

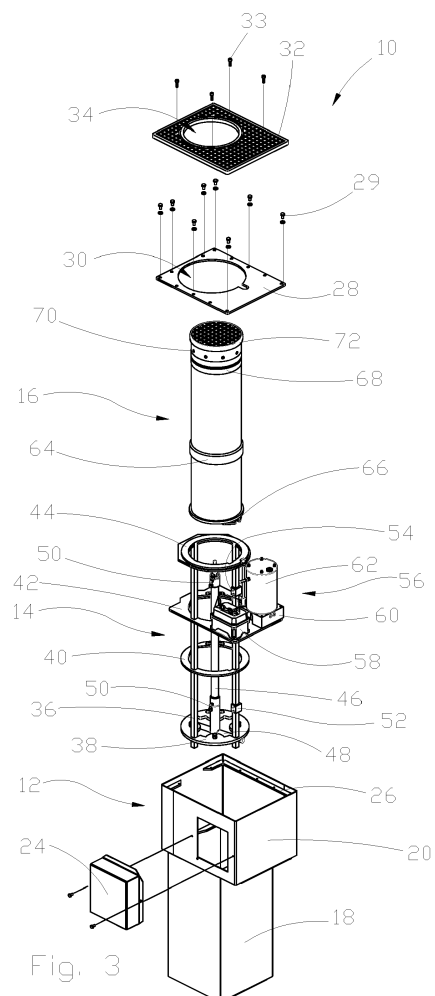


Fig. 3

Description

[0001] The present invention refers in general to a transit column-shaped dissuader. More particularly, the present invention refers to an apparatus acting as a transit dissuader, comprising a column-shaped element that is movable vertically so as to be raised or lowered with respect to the road paving on which the whole equipment is fixed

[0002] As is known, in particular urban areas, such as public gardens, historical centers, parking areas, limited traffic zones and more, the traffic of large vehicles such as cars and trucks is prevented while the access of bicycles and pedestrians is permitted so that fixed barriers such as curbstones or other barriers are mounted in said places. In case it is necessary the passage of special vehicles, such as ambulances or other rescue vehicles, motor vehicles or vehicles to effect occasional activities, such as maintenance works for the non-accessible area, removals and more, said fixed barriers must be dismantled manually, which involves a cost in time and the necessity of utilizing suitable tools.

[0003] More easily removable barriers have been, therefore, conceived, for example barriers hinged to ground so as to be lowered by rotating them around one or more ground pivots which can be positioned in the two positions of dissuasion and passage by means of suited padlocks or equivalent means. Barriers of this kind can be utilized more easily but it is still necessary to actuate them manually.

[0004] In order to remove said drawback, automatic movement bars are also utilized which can rotate from a horizontal position blocking the passage to reach a vertical position so as to let the passage free. Devices of this type are practical to be used but these devices always remain in sight and have a negative visual impact, especially in case these devices are mounted in historical centers or environments with similar aesthetic needs.

[0005] The above problems have been removed by utilizing disappearing columns as transit dissuading elements. These columns move vertically and prevent vehicles of determined dimensions to pass when the columns are positioned out of the surface, there being the possibility for said columns of retracting into the ground by means of pneumatic, hydraulic, electrical devices and more so as to free the access.

[0006] These disappearing column apparatuses have removed the aesthetic problems since the columns are lowered when it is necessary to let the passage free and the upper surface of the column is positioned essentially at the same height of the ground. In this way, the column is hidden and does not hinder, even minimally, the lightest vehicles.

[0007] The column may be raised from the road paving so as to prevent vehicles from entering a restricted traffic zone, such as parking lots, cycle paths, residential entrances and more, or may be lowered until it disappears completely to let the passage free.

[0008] In addition to being used before entrances as impediment to safeguard public or private accesses, the columns of this type may be positioned also to protect shop windows of particular interest or in defense against unwanted intrusions.

[0009] For any application there is always the possibility of removing the impediment with a remote control which lowers the dissuasive column flush with the paving so that the article is totally invisible and the passage of vehicles is allowed when it is considered appropriate.

[0010] The column transit dissuaders according to prior art have some drawbacks.

[0011] Such dissuaders often do not meet the anti-breakthrough requirements because their structures are not strong enough since these structures are designed to ensure only the movement of the column.

[0012] Furthermore, the column transit dissuaders realized according to prior art are complex and difficult to be installed, which involves a considerable amount of time for the assembly and installation to the ground and requires experienced staff for their assembly.

[0013] An aim of the invention is to remove the above-mentioned drawbacks and more by providing a column transit dissuader that is easy to be assembled and maintained.

[0014] Another aim of the invention is to provide a column transit dissuader having a simple but robust structure.

[0015] All the above aims and advantages are achieved according to the invention through an automatic foldaway column-shaped dissuader comprising a formwork fixed in the soil, a structural unit fixed removably in the formwork, a column received in the inside of the structural unit and coupled to the structural unit through at least one piston adapted to move the column vertically in respect to the structural unit.

[0016] In particular, the automatic foldaway column-shaped dissuader is characterized by the fact that the structural unit comprises at least three vertical uprights fixed to the structural unit and the column comprises at least one guide ring adapted to translate among the at least three or more uprights according to the development direction of the at least three uprights so as to guide the movement of the column relative to the structural unit in a rectilinear direction.

[0017] Through this conformation, the column may be translated stably in a vertical direction that is perfectly rectilinear.

[0018] Advantageously, the three or more uprights may be fixed to one another by at least two flanges, in particular the three or more uprights may be fixed to one another by a base flange, an intermediate flange and an upper flange. In this way, it is possible to obtain a strong structure which is capable of supporting also undesired shocks on the column.

[0019] Besides, the automatic dissuader according to the invention may comprise at least one stroke end device fixed at an adjustable height on one of the at least

three uprights to block the movement of the column upwards or downwards. The fact that the position of the stroke end device is adjustable allows to decide during the assembly phase or also subsequently the height to be reached by the column, or it is possible to adjust the perfect leveling of the column, when it is completely lowered, with respect to the paving.

[0020] In particular, a lower stroke end device may be fixed at an adjustable height in the lower part of one of the at least three uprights to block the movement of the column downwards. Besides, an upper stroke end device may be fixed at an adjustable height in the upper part of one of the at least three uprights to block the movement of the column upwards.

[0021] Advantageously, a bearing plate may be comprised which is fixed to the three or more uprights in the upper part of the structural unit and on which control and adjusting devices rest which allow the column to be moved and adjusted.

[0022] In this way, the control and adjusting devices, such as a hydraulic unit, a junction box, may be easily accessible also when the structural unit is fixed in the formwork.

[0023] In particular, the control and adjusting devices are positioned externally to the at least three vertical uprights so that such devices are easily accessible in order to facilitate all the possible adjustments and interventions of installation and upkeep.

[0024] Besides, the automatic dissuader according to the invention may comprise a rotation blocking element which is fixed to the column and in which a cavity is formed and is shaped in a homologue way to one of the at least three uprights so that said cavity receives perfectly, as a result of the form coupling, one of the three or more uprights and allows a vertical translation of said blocking element relative to said upright while preventing the column to rotate around the axis of translation during its movement.

[0025] Advantageously, at least one through-opening may be formed in the bottom of the formwork so that fluids such as rain water can flow away from the upper part of the column and/or structural unit to the ground by passing through the inner part of the automatic dissuader.

[0026] Besides, the piston may be fixed rotatably in the lower part of the structural unit so that the piston itself may rotate in the vertical plane to adapt to possible movements of the column as, for example, in the assembly phase.

[0027] Moreover, according to the invention, the structural unit and all devices allowing the movement of the column and the adjustment of said movement are contained in the formwork. In this way, the transit dissuader is easy to be assembled and easy to be used.

[0028] Advantageously, the dissuader according to the invention may comprise a branching box comprising a single connector to feed and control the automatic dissuader so that it is sufficient to insert a single cable to

carry out the complete wiring of the automatic dissuader.

[0029] In this way, for an installation, removal, upkeep or an internal inspection it is sufficient to disconnect the connector in order to free the automatic dissuader from the cable.

[0030] In addition, the column may comprise an edge protector, the diameter of the column being less than the diameter of the edge protector and less than the diameter of the at least one guide ring in order to prevent the column from being scratched.

[0031] Further features and details of the invention will be better understood from the following specification, provided by way of a non-limiting example, as well as from the annexed drawings, wherein:

Fig. 1 is an axonometric view of a transit dissuader, object of the present patent of invention, with the relative column being raised;

Fig. 2 is an axonometric view of the dissuader in Fig. 1 with the column being lowered;

Fig. 3 is an axonometric exploded view of the transit dissuader represented in the Figures 1 and 2;

Fig. 4 is an axonometric view of an element of the transit dissuader represented in Figure 3.

[0032] With reference to the annexed drawings, in particular Figure 1, number 10 denotes a transit dissuading device comprising a formwork 12, a structural unit 14, received in the formwork 12, and a column 16 that is translated vertically inside the structural unit 14 so as to be raised from a paving in which the dissuading device 10 is fixed.

[0033] Preferably, the formwork 12 is made of steel galvanized and the other elements of the dissuader, in particular the structural unit 14, are fixed to the formwork 12.

[0034] The formwork 12 is embedded under the pavement using concrete surrounded by a cage of steel reinforcement and comprises a lower box-shaped body 18 and an upper box-shaped body 20 which communicate with each other. Both the lower box-shaped body 18 and the upper box-shaped body 20 are hollow and are shaped like a parallelepiped.

[0035] Openings are formed in the bottom of the lower box-shaped body 18 and are to let pass any fluid entering the formwork 12.

[0036] The upper box-shaped body 20 has a wider rectangular base surface than that of the lower box-shaped body 18 and comprises an outer box 24 allowing an easy access to some devices of the structural unit 14 of the dissuader 10.

[0037] In particular, the box 24 is fixed to the upper box-shaped body 20 only with two screws, with a consequent advantage in the phase of installation and implementation of the article. In fact, the removal of the box 24 makes easier the connecting stages for all the electrical cables in work before the actual installation, allowing to perform a test of the dissuading device itself.

[0038] Besides, the upper box-shaped body 20 includes a supporting frame 26 fixed internally and in correspondence of the upper portion of the same upper box-shaped body 20.

[0039] A fixing plate 28 is fixed with screws 29 to the supporting frame 26. A first passage hole 30 is formed in the fixing plate 28 and may be crossed by the column 16.

[0040] In turn, a covering plate 32 is joined through four screws 33 to the fixing plate 28. A second passage hole 34 is formed in the covering plate 32 and ensures the passage of the column 16.

[0041] For reasons of clearness, reference number 29 in Fig. 3 denotes only one screw for locking the fixing plate 28 while reference number 33 in Fig. 3 denotes only one screw for the locking of the covering plate 32.

[0042] The structural unit 14 is made preferably of steel and all the components allowing the lifting and lowering movement of the column 16 are constrained to the structural unit 14.

[0043] The structural unit 14 is so shaped to facilitate the vertical displacement of the column 16. This displacement takes place with a mechanical sliding along four steel uprights.

[0044] The four vertical uprights, only one of them being denoted by the reference number 36, perform the function of guiding the column 16 in its vertical translation.

[0045] The four vertical uprights 36, seen from above, are disposed so as to identify the four vertices of a square so that the column 16 having a circular section is received among the uprights 36.

[0046] The four vertical uprights 36 are fixed to one another through a base flange 38, an intermediate flange 40, a bearing plate 42 and an upper flange 44.

[0047] The four vertical uprights 36, the flanges 38, 40, 44 and the bearing plate 42 allow to stiffen the entire structure of the device 10 and to absorb any external shocks against the column 16.

[0048] The lower and upper portions of the four vertical uprights 36 are fixed to the base flange 38 and to the upper flange 44, respectively, both having a ring shape, while the central portions are locked to the intermediate flange 40, also shaped like a ring, and above this, to the bearing plate 42.

[0049] Besides, as it appears from Figure 4, according to an embodiment of the invention, first bulkheads 22 may be arranged between the bearing plate 42 and the upper flange 44, and second bulkheads 23 may be vertically disposed between the intermediate flange 40 and the bearing plate 42.

[0050] The first bulkheads 22 and the second bulkheads 23 protect the column 16 and what is present among the four vertical uprights 36, which results in a consequent advantage as regards the safety in the laying phase avoiding any accidental impacts or cuts.

[0051] A hydraulic piston 46 is disposed among the four vertical uprights 36 and is fixed to the base flange 38, and has a rod with free end fixed to the column 16

by means of a self-locking nut, not visible in the figures.

[0052] The hydraulic piston 46 or other double-acting actuator allows the raising and lowering movement of the disappearing column 16. The hydraulic piston 46 is fixed to the base of the structural unit by means of a tubular body 48. This constraint enables the piston to rotate on the vertical plane in order to be adapted to any movements of the column 16.

[0053] Two flexible hoses for hydraulic lines, not shown in the figures, convey the hydraulic flow inside the piston 46 through two hydraulic angled connectors 50.

[0054] A first magnetic stroke end device 52 and a second magnetic stroke end device 54 are fixed to the lower portion and to the upper portion of one of the four uprights 36, respectively.

[0055] The two stroke end devices 52, 54 are to stop the column 16 in the raised or lowered position and are fixed to the structural unit 14 by means of screws so as to enable a vertical adjustment and modify the extreme positions of the column 16.

[0056] The two stroke end devices 52, 54 are embedded in a particular resin hermetically so as to prevent these devices from coming into contact with moisture.

[0057] A hydraulic control unit 56 and a branching box 58 are fixed on the bearing plate 42.

[0058] The hydraulic control unit 56 includes a valve body 60, preferably of aluminum, two hydraulic connections, not shown in the figures, to which the flexible hoses reaching the piston are connected, pressure regulators of maximum and minimum pressure of the thrust force and a manual releasing device. An oil reservoir 62 is arranged on the top of the valve body 60, the electric motor being arranged inside the oil reservoir.

[0059] Possible accessories may be inserted and conveniently connected into the valve body 60, such as an electromagnetic valve that enables to instantly lower the disappearing column in the absence of electrical power supply, and a pressure regulator that intervenes to prevent the column 16 from being lifted when an obstacle is on the column itself.

[0060] The bearing plate 42 is fixed in the upper part of the structural unit 14 so that the hydraulic control unit 56 is easily accessible and all the possible adjustments and maintenance interventions by an installer are facilitated.

[0061] The branching box 58 of the electrical connections is a certified box, sealed against any infiltrations of external water. Also the branching box is positioned in the upper part of the structural unit 14, near the hydraulic control unit 56.

[0062] All the electrical connections of the hydraulic control unit 56 are carried out inside the branching box 58 during the productive process in the factory, for example the electrical connections regarding the power supply to the motor, the magnetic stroke end devices 52, 54, the eventual electromagnetic valve and the possible pressure switch.

[0063] The disappearing column 16 is the dissuasive

cylindrical element that may be lifted from the ground level.

[0064] The column 16 may slide freely inside the structural unit 14 and is fixed at its upper part, by means of a self-locking nut, to the rod of the hydraulic piston 46.

[0065] The lifting and lowering movement takes place through a mechanical sliding of a guide ring 64 along the four vertical uprights 36 of the structural unit 14. The guide ring 64 has a circular perimeter edge that is included perfectly into a square whose vertices correspond to the four uprights 36, seen from above. In this way, the column 16 performs a perfectly rectilinear movement during its vertical translation.

[0066] Besides, the column 16 may include one or two of the devices described here below.

[0067] In addition, the column 16 includes a rotation blocking element 66 which prevents the column 16 itself from rotating during the translation. In fact, a cavity is formed in the blocking element 66 and receives perfectly one of the four uprights 36 because this cavity is shaped according to a shape coupling.

[0068] Preferably, the column 16 is made of steel to which a treatment against corrosion is performed and which is varnished with polyester powder.

[0069] The column is made easily visible by applying a retro-reflective strip 68 homologated according to the Highway Code on its upper portion.

[0070] Besides, LED lights 70 are applied on the same upper portion of the column 16 and are illuminated intermittently when the column 16 rises, descends or is stationary in its dissuasive position, so that the column 16 is well visible also at night. On the contrary, the lights 70 are turned off when the column is completely lowered.

[0071] Inside the column 16, and more precisely in the upper part, a resonant "buzzer" device is fixed and starts working during the rising and lowering movements of the column 16.

[0072] Furthermore, a rubber edge protector 72 is installed at the top of the column to protect the column 16 against accidental impacts and to make the circular edge profile of the column totally innocuous.

[0073] The transit column-shaped dissuader 10 according to the invention has several advantages in comparison with the disappearing columns produced according to prior art.

[0074] First of all, the dissuader according to the invention is simple to be installed since few elements form the product: once the formwork 12 has been cemented, it is sufficient to insert and fix conveniently the entire structural unit 14 with the relative disappearing column 16 inside the formwork; now, the dissuader is ready to be utilized.

[0075] The four uprights 36 inside the structural unit 14 along with the guide ring 64 fixed to the column 16 allow a rectilinear movement for the entire run of the column 16.

[0076] Another advantage is the conformation of the frame of all the elements, which are rigidly welded to-

gether and form the steel structural unit 14, in particular the presence of the four uprights 36 fixed to the flanges 38, 40, 44 and to the bearing plate 42.

[0077] The hydraulic control unit 56 is positioned in the upper part of the formwork 12 and structural unit 14 in which it is incorporated and is external to the column 16 so that it is comfortably and quickly accessible, the maintenance and adjustment being easy and rapid.

[0078] Besides, all the rain fluids flow down to the base of the formwork 12 in through-openings formed in the bottom 18 of the formwork because there is no hermetic seal among the structural elements, i.e. formwork 12, structural unit 14 and disappearing column 16.

[0079] The dissuader according to the invention enables to intervene for the maintenance or repair in a simple way: the removal of the column is done by freeing the covering plate 32 by removing the screws 33, removing the cap of the column and unscrewing the self-locking nut, and subsequently lifting the column 16 and/or the structural unit 14.

[0080] Consequently, also in the case of an impact, it is very simple and rapid to replace the column only by unscrewing some screws.

[0081] Moreover, an only feeding connector is fixed to the branching box. Through this innovative solution it is sufficient to insert an only cable to make the complete cabling of the dissuader. In order to install, remove, maintain or to simply attend to an internal inspection it is sufficient to disconnect the only connector so as to free the cable of the dissuader.

[0082] Another advantage consists in the fact that all the several devices are received inside the formwork 12: the dissuader 10 has all the functional autonomy because it is provided with the dissuasive disappearing column 16 with the relative devices that make the column visible, such as the LED lights 70 and the homologated retro-reflective strip 68, and the resonant identifying devices such as a buzzer, the hydraulic piston 46 enabling the movement, the hydraulic control unit 56 with the possible safety accessories such as the electromagnetic valve and the pressure switch, the manual releasing device for the lowering of the column and the magnetic stroke ends 52, 54 for the positioning of the column 16.

[0083] Hydraulic accessories such as the electromagnetic valve and the pressure switch may be installed and removed easily at any time without having to intervene in the hydraulic circuit.

[0084] In addition, the column comprises also the rubber edge protector 72 to protect the upper circular edge of the column 16 so as to protect the column from accidental impacts.

[0085] Another advantage of the solution according to the invention is that the diameter of the column and the diameter of the edge protector 72 of the one or more guide rings 64 are different from each other so as to prevent the column from being scratched.

[0086] Variants are possible which are to be considered as included in the scope of protection; for example,

the number of the vertical uprights or the number of guide rings may be different from those that have indicated previously.

Claims

1. Automatic foldaway column-shaped dissuader (10) comprising:

- a formwork (12) fixed in the soil,
- a structural unit (14) fixed removably in the formwork (12),
- a column (16) received in the inside of the structural unit (14) and coupled to the structural unit through at least one piston (46) adapted to move the column (16) vertically in respect to the structural unit (14),

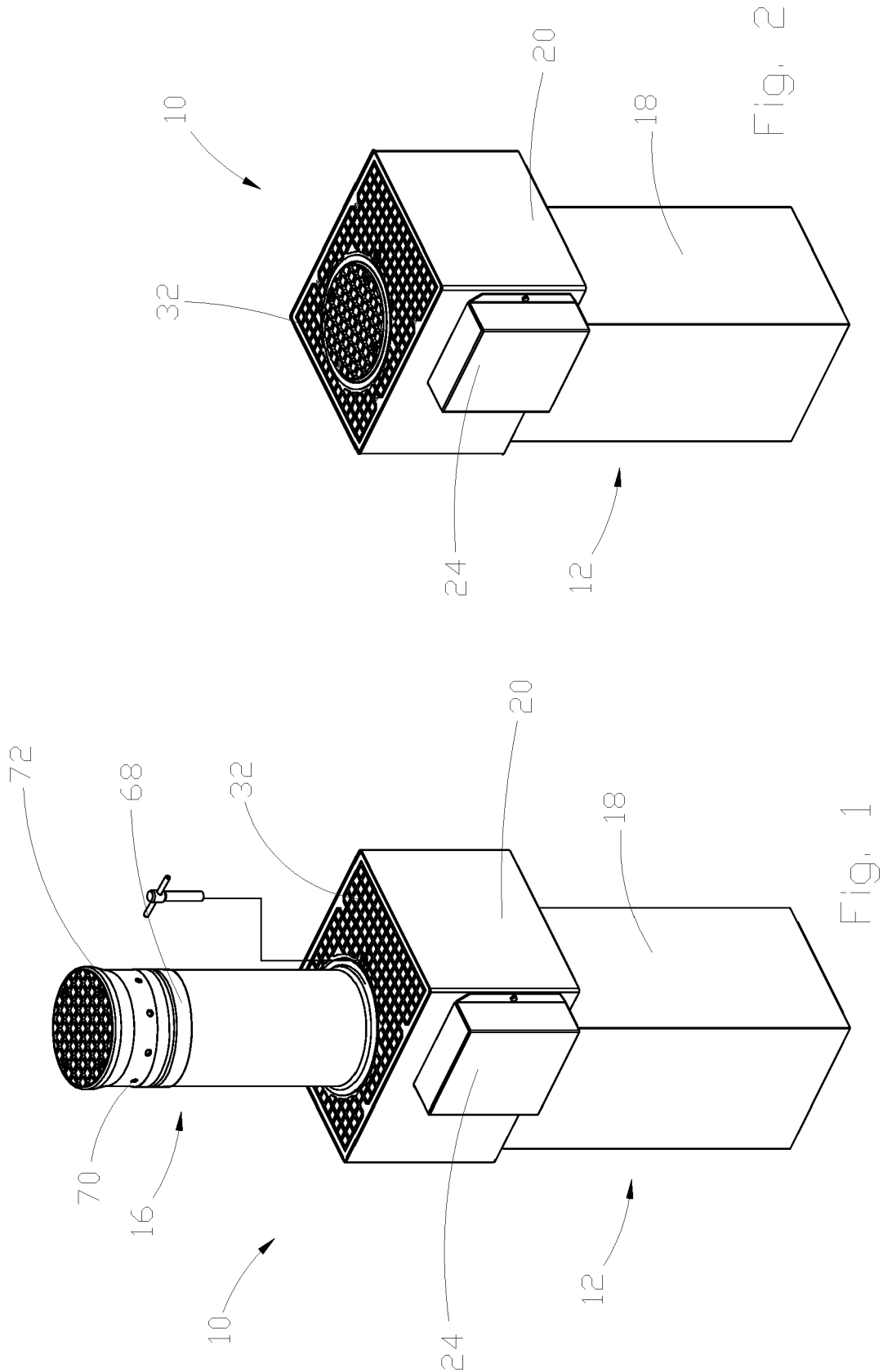
characterized by the fact that:

the structural unit (14) comprises at least three vertical uprights (36) fixed to the structural unit (14) and the column (16) comprises at least one guide ring (64) adapted to translate among the at least three uprights (36) according to the development direction of the at least three uprights (36) so as to guide the movement of the column (16) relative to the structural unit (14) in a rectilinear direction.

2. Automatic dissuader (10) according to the preceding claim, wherein the at least three uprights (36) are fixed to one another by at least two flanges (38, 40, 44).
3. Automatic dissuader (10) according to the preceding claim, wherein the at least three uprights (36) are fixed to one another by a base flange (38), an intermediate flange (40) and an upper flange (44).
4. Automatic dissuader (10) according to one of the preceding claims, wherein at least one stroke end device (52, 54) is fixed at an adjustable height on one of the at least three uprights (36) to block the movement of the column (16) upwards or downwards.
5. Automatic dissuader (10) according to the preceding claim, wherein a lower stroke end device (52) is fixed at an adjustable height in the lower part of one of the at least three uprights to block the movement of the column (16) downwards and wherein an upper stroke end device (54) is fixed at an adjustable height in the upper part of one of the at least three uprights to block the movement of the column (16) upwards.
6. Automatic dissuader (10) according to one of the preceding claims, wherein a bearing plate (42) is com-

prised which is fixed to the at least three uprights (36) in the upper part of the structural unit (14) and on which control and adjusting devices (56, 58, 60, 62) rest which allow the column (16) to be moved and adjusted, said control and adjusting devices (56, 58, 60, 62) being positioned externally to the at least three vertical uprights (36) so as to be easily accessible in order to facilitate all the possible adjustments and interventions of installation and upkeep.

7. Automatic dissuader (10) according to one of the preceding claims, wherein a rotation blocking element (66) is comprised which is fixed to the column (16) and a cavity is formed in said locking element and is shaped in a homologue way to one of the at least three uprights (36) so that said cavity receives perfectly, as a result of the form coupling, one of the at least three uprights (36) and allows a vertical translation of said blocking element (66) relative to said upright (36) while preventing the column (16) to rotate around the axis of translation during its movement.
8. Automatic dissuader (10) according to one of the preceding claims, wherein the structural unit (14) and all devices (46, 52, 54, 56, 58, 60, 62) allowing the movement of the column (16) and the adjustment of said movement are contained in the formwork (12).
9. Automatic dissuader (10) according to one of the preceding claims, wherein a branching box (58) is comprised which comprises a single connector to feed and control the automatic dissuader (10) so that it is sufficient to insert a single cable to carry out the complete wiring of the automatic dissuader (10) and for an installation, removal, upkeep or an internal inspection it is sufficient to disconnect the connector in order to free the automatic dissuader from the cable.
10. Automatic dissuader (10) according to one of the preceding claims, wherein the column (16) comprises an edge protector (72), the diameter of the column (16) being less than the diameter of the edge protector (72) and the diameter of the at least one guide ring (64) in order to prevent the column (16) from being scratched.



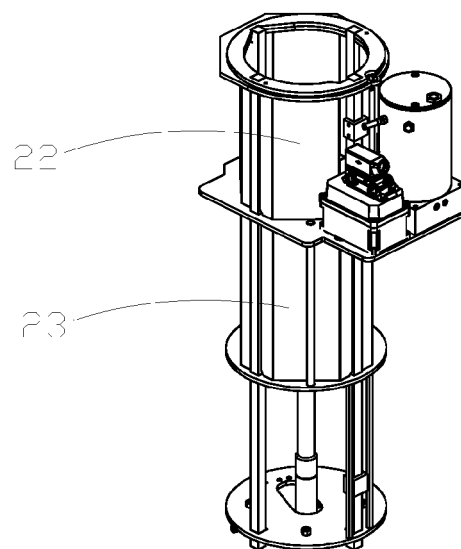
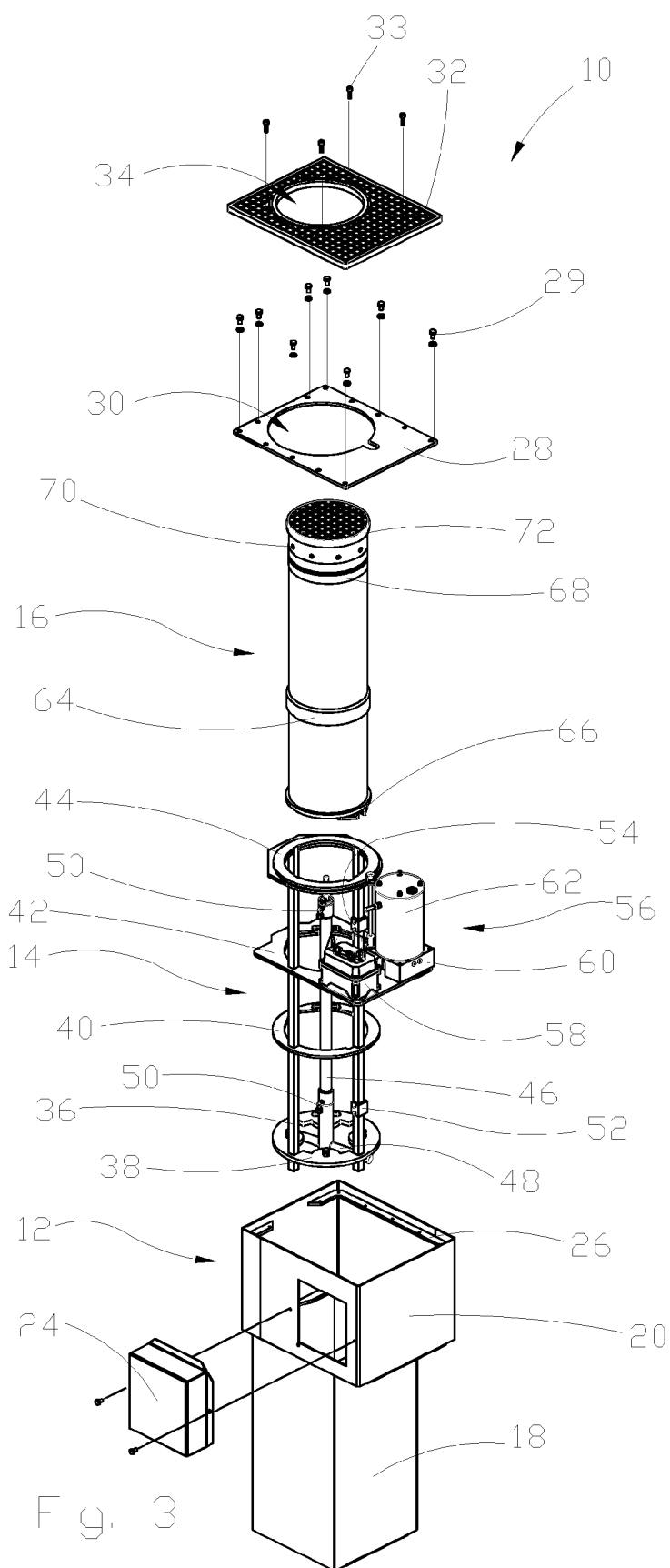


Fig. 4



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Application Number
EP 16 17 4800

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 October 2016	Examiner Flores Hokkanen, P
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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