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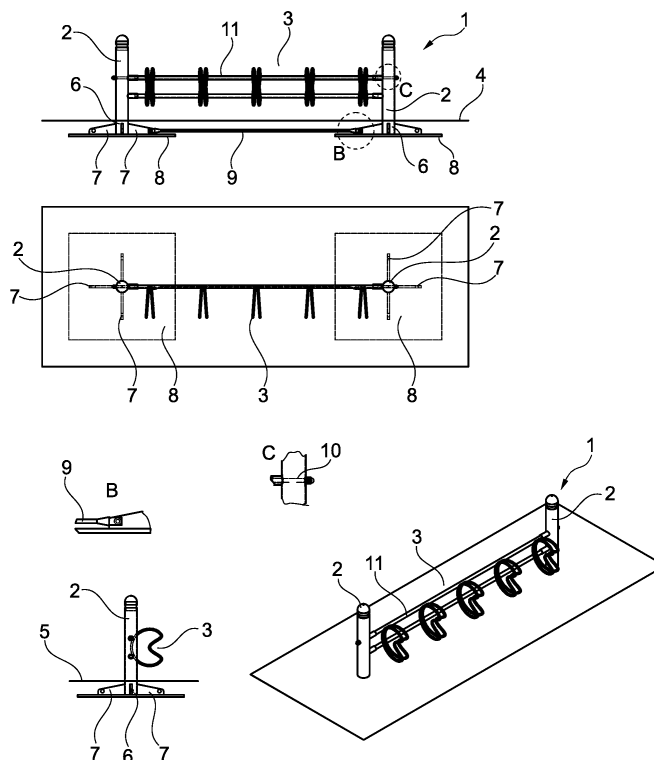
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KH MA MD TN(71) Applicant: **Veksø A/S****7000 Fredericia (DK)**(72) Inventor: **OLSEN, Ole Christian****8700 Horsens (DK)**(74) Representative: **Zacco Denmark A/S****Arne Jacobsens Allé 15****2300 Copenhagen S (DK)**(30) Priority: **12.09.2018 DK PA201870584****(54) DEVICE FOR PROTECTION AGAINST TERRORISM AND PROTECTION ARRANGEMENT**

(57) A device (1, 11) is described for terrorism protection of roads, squares and the like with a road surfacing (4), which device comprises an upper part (2, 12) that is arranged to project above the road surfacing (4), and a lower part that is suitable to extend below the road surfacing, wherein the lower part comprises one or more tilting protections (7, 8, 17, 18) that are rigidly connected with the upper part of the device and extend horizontally

in one plane in parallel with the road surfacing and has a largest extent in this horizontal plane in the range of 60 to 250 cm, preferably in the range of 75 to 200, such as in the range of 85 to 150 cm. Furthermore, a protection arrangement is described, comprising several of such devices as well as the use of such devices or protection arrangements for terrorism protection of an area.

**Fig. 1****EP 3 623 531 A1**

Description

[0001] The present invention relates to a device and a protection arrangement for terrorism protection of e.g. roads and squares as well as the use of such devices and protection arrangements for such purpose.

Background

[0002] Requirements for protection of public squares, roads and buildings against the possibility of executing acts of terrorism with motor vehicles by e.g. running down persons in these areas, are increasing.

[0003] It is an object of the present invention to provide devices and protection arrangements for this use, which are simple to install in existing urban open spaces. A further object is to provide devices and protection arrangements, which can both be efficient and have limited harmful effect on motor vehicles and their passengers, which unintentionally collide with them.

Brief description of the invention

[0004] The present invention relates to a device for terrorism protection of roads, squares and the like with a road surfacing, which device comprises an upper part, which is arranged to project above the road surfacing, and a lower part that is suitable to extend below the road surfacing, wherein the lower part comprises one or more tilting protections that are rigidly connected with the upper part of the device and extend horizontally in one plane in parallel with the road surfacing and has a largest extent in this horizontal plane in the range of 60 to 250 cm, preferably in the range of 75 to 200, such as in the range of 85 to 150 cm.

[0005] By means of this device it is obtained that a terrorism protection device can be mounted in an urban environment as it only has to be dug down into minimal depth, typically less than about 50 cm, whereby the underlying technical installations are not affected. Thus, terrorism protection can be established in practically all locations without extensive change of technical installations, such as sewage discharge, district heating, drinking water pipes, electric and data-carrying installations.

[0006] Due to the configuration of the device, the effect is obtained that they will tilt over upon collision with a motor vehicle, and the tilting protection will be tilted up as described below. Hereby the motor vehicle will be halted, but the damage on the motor vehicle will be far less comprehensive than in the case of collision with solid concrete blocks, stones or embedded bollards, which will not move in the event of collision, and the damage resulting from unintentional collisions, e.g. in connection with traffic accidents, will be less pronounced.

[0007] Finally, the invention offers the possibility of having the terrorism protection devices be integrated in elements in the general urban landscape, such as benches, bicycle racks and waste bins.

[0008] The top of the upper part is therefore preferably suitable to extend in the range of 50 to 150 cm, preferably in the range of 70 to 125 cm up above the road surfacing, while the largest extent of the tilting protection in the horizontal plane is preferably suitable to be located between 5 and 50 cm below the upper face of the road surfacing, preferably between 10 and 30 cm, so that the top of the upper part extends between 55 and 200 cm above the largest horizontal extent of the tilting protection.

[0009] Preferably, the upper part of the device comprises at least one of a bollard, a bench, a bicycle rack, a waste bin and a plant bowl, so that another useful effect of the layout than terrorism protection is possible, and the layout at the same time is included in the general urban landscape and thus does not convey the impression that the risk of terrorism dominates everyday life and the urban layout.

[0010] The tilting protection can advantageously comprise a steel sheet, which has a largest extent in the horizontal plane in the range of 60 to 250 cm, preferably in the range of 75 to 200, such as in the range of 85 to 150 cm, wherein this steel sheet preferably has a thickness of between 10 and 30 mm, preferably between 15 and 25 mm. The steel sheet gives the tilting protection a suitable mass and strength, but alternatively e.g. a cast concrete slab or a grating of steel bars can be used.

[0011] The lower part of the device can in some embodiments comprise several tilting protections, which are interconnected by one or more flexible connection devices, which are suitable for extending below the road surfacing and which preferably comprise steel wire, chains and/or kevlar-holding rope.

[0012] In other embodiments, the lower part consists of one tilting protection, which is rigidly connected with the upper part of the device and extends horizontally in one plane in parallel with the road surfacing and has a largest extent in this horizontal plane in the range of 60 to 250 cm, preferably in the range of 75 to 200, such as in the range of 85 to 150 cm, and wherein the tilting protection is not connected with other tilting protections. Such embodiments are advantageous, as it has turned out that devices with only one tilting protection that is not connected with other tilting protections, neither with rigid connections or with flexible connection devices, are usually sufficient to stop passenger cars up to a weight of at least 1600 kg. In such embodiments, the upper part is preferably constituted by a bollard. With such a device, a single upper part, preferably a bollard, is obtained, which offers sufficient protection at least against passenger cars, and which is not dependent on having to be installed in connection with other such devices, but can function on its own.

[0013] The present invention furthermore relates to a protection arrangement, comprising a plurality of devices according to the invention, wherein the devices are interconnected with one or more connection devices that are suitable for extending below the road surfacing. Such connection devices are preferably flexible and preferably

comprise steel wire, chains and/or kevlar-holding rope.

[0014] The invention furthermore relates to a device or a protection arrangement according to the invention, installed on a road, a square or the like with a road surfacing, wherein the largest extent of the tilting protection or the tilting protections in the horizontal plane is located between 5 and 50 cm below the upper face of the road surfacing, preferably between 10 and 30 cm.

[0015] Finally, the present invention relates to the use of a device or a protection arrangement according to the invention for terrorism protection of a road, a square or the like with a road surfacing, wherein the tilting protection or the tilting protections are located below the road surfacing in a depth between 5 and 50 cm below the upper face of the road surfacing, preferably between 10 and 30 cm, so that the device or the devices in the event of collision with a motor vehicle can tilt, whereby the tilting protection or the tilting protections will tilt up above the upper surface of the road surfacing.

Brief description of figures

[0016] Various examples of how to execute the present invention are shown in the accompanying drawing, of which

Figure 1 shows a first example of a device according to the invention, wherein the upper part of the device comprises a bicycle rack,

Figure 2 shows details of a vertical post as shown in Figure 1,

Figure 3 shows another example of a device according to the invention, wherein the upper part of the device comprises a bollard, and wherein a plurality of such devices are connected with a protection arrangement according to the invention,

Figure 4 shows details of a bollard as shown in Figure 3, and

Figures 5 to 7 show representations in perspective of urban environments, comprising several devices and protection arrangements according to the invention.

Detailed description of the examples

[0017] Figure 1 shows a device 1 according to the invention, wherein two vertical posts 2 carry a bicycle rack 3 between them. Each of the posts 2 project 80 cm up above the road surfacing 4 upper surface 5 and about 15 cm below it, wherein the post's 2 lower end 6, by means of four flanges 7 welded onto it, is attached to a square steel sheet 8 with a side length of 100 cm, which extend substantially horizontally and substantially in parallel with the road surfacing's 4 upper surface 5. Together

the flanges 7 and the square steel sheet 8 constitute a tilting protection. The two tilting protections 7, 8, are attached to each vertical post 2 and are interconnected by a steel wire 9 with a length of almost 2 meter and a diameter of 16 mm. Moreover, the two posts 2 are interconnected by a steel wire 10 with a diameter of 14 mm, which passes through the upper pipe 11 of the bicycle rack.

[0018] If a motor vehicle collides with the device 1 shown in Figure 1, so that it hits a post 2, this will tilt over, and the steel sheet 8 will be raised towards a more vertical position, whereby parts of the steel sheet 8 will come into contact with parts of the motor vehicle, for instance the undercarriage, wheel housings, drive shafts etc. and possibly ruin these parts, but will most likely also be dragged along by the vehicle, thus halting its advance. The second tilting protection 7, 8, with which the first tilting protection is connected via the steel wire 9, will also be dragged along and will, together with the road surfacing 4, act as a load on the vehicle in such a manner that resembles the effect of a drag anchor. If more devices according to the invention are connected with the device according to Figure 1 to a protection arrangement according to the invention, the motion of the vehicle will be further slowed down.

[0019] Figure 3 shows another example of a device 11 according to the invention, wherein the upper part of the device 11 comprises a bollard 12, wherein a plurality of such devices 11 with bollards 12, wherein the tilting protections 17, 18 of the individual devices 11 are connected with flexible means in the form of steel wires 19 to a protection arrangement 20 according to the invention. Each of the bollards 12 project 80 cm up above the road surfacing's 4 upper surface 5 and about 15 cm below it, wherein the bollard's 12 lower end 16, by means of four flanges 17 welded onto it, is attached to a square steel sheet 18 with a side length of 100 cm, which extend substantially horizontally and substantially in parallel with the road surfacing's 4 upper surface 5. Together the flanges 17 and the square steel sheet 18 constitute a tilting protection. Each of the three bollards' 12 tilting protections 17, 18 are interconnected by a steel wire 19 with a length of almost 67 cm and a diameter of 16 mm.

[0020] Figure 4 shows a device 11, wherein the upper part is constituted by a bollard 12, which is rigidly connected with a tilting protection 17, 18 in the form of a steel sheet 18 and four flanges 17 welded onto it. This device 11 can either be included in a protection arrangement 20 as e.g. shown in Figure 3, or it can advantageously be used as a single device, wherein the tilting protection 17, 18 is not connected with other tilting protections.

[0021] The bollard typically 12 has a diameter of between 115 and 170 mm.

[0022] Corresponding to Figure 1, a motor vehicle that collides with a bollard 12, as shown in Figures 3 or 4, this will tilt over, and the steel sheet 18 will be raised towards a more vertical position, whereby parts of the steel sheet 18 will come into contact with parts of the motor vehicle,

for instance the undercarriage, wheel housings, drive shafts etc. and possibly ruin these parts, but will most likely also be dragged along by the vehicle, thus halting its advance. The second tilting protections 17, 18, of the second devices 11 shown in Figure 3 as part of the protection arrangement according to an embodiment of the invention, and with which the first tilting protection is connected via the steel wire 19, will also be dragged along and will, together with the road surfacing 4, act as a load on the vehicle in such a manner that resembles the effect of a drag anchor. If more devices 1, 11 according to the invention are connected with a protection arrangement according to Figure 1, the motion of the vehicle will be further slowed down.

[0023] Figures 5 to 7 show representations in perspective of urban environments, comprising several devices and protection arrangements according to the invention. The devices comprise bicycle racks as shown in Figure 1, benches, wherein each of the vertical side members of the benches are connected with a tilting protection and a waste bin, which also at its lower end below the road surfacing is connected with a tilting protection, and wherein these tilting protections below the road surfacing are interconnected by steel wire or the like, such as chains for protection arrangements.

[0024] The devices and protection arrangements shown are examples of how the present invention can be executed and are not to be perceived as limiting to the scope of the invention. The tilting protection needs not extend purely horizontally, as is the case of the steel sheet 8, 18 shown, but can as an alternative to the square steel sheet e.g. have three or more legs, extending at least with a horizontal component, and e.g. are interconnected with a frame, or the tilting protection can comprise a mesh of pieces of round steel bars welded together, e.g. in a diameter of 8 mm or 10 mm. As another alternative, the tilting protection can comprise one or more arched legs, extending in an upward arch like the lower arms of an anchor, and which, when the device is tilted over, will be guided upwards and penetrate parts of the motor vehicle.

Reference numerals

[0025]

- | | | |
|----|--|--|
| 1 | Device for terrorism protection | |
| 2 | Post for bicycle rack | |
| 3 | Bicycle rack | |
| 4 | Road surfacing | |
| 5 | Upper surface of the road surfacing | |
| 6 | Lower part of post | |
| 7 | Flanges | |
| 8 | Steel sheet | |
| 9 | Steel wire for connection of tilting protections | |
| 10 | Steel wire for connection of posts | |
| 11 | Other example of device for terrorism protection | |
| 12 | Bollard | |

- | | |
|----|--|
| 16 | Lower part of bollard |
| 17 | Flange |
| 18 | Steel sheet |
| 19 | Steel wire for connection of tilting protections |

Claims

1. A device (1, 11) for terrorism protection of roads, squares and the like with a road surfacing (4), which device comprises an upper part (2, 12), which is arranged to project above the road surfacing, and a lower part that is suitable to extend below the road surfacing, wherein the lower part comprises one or more tilting protections (7, 8, 17, 18) that are rigidly connected with the upper part of the device and extend horizontally in one plane in parallel with the road surfacing and has a largest extent in this horizontal plane in the range of 60 to 250 cm, preferably in the range of 75 to 200, such as in the range of 85 to 150 cm.
2. A device according to claim 1, wherein the top of the upper part is suitable to extend in the range of 50 to 150 cm, preferably in the range of 70 to 125 cm up above the road surfacing, while the largest extent of the tilting protection in the horizontal plane is suitable to be located between 5 and 50 cm below the upper face (5) of the road surfacing, preferably between 10 and 30 cm, so that the top of the upper part extends between 55 and 200 cm above the largest horizontal extent of the tilting protection.
3. A device according to claim 1 or 2, wherein the upper part comprises at least one of a bollard (12), a bench, a bicycle rack (3), a waste bin and a plant bowl.
4. A device according to any one of the preceding claims, wherein the tilting protection comprises a steel sheet, which has a largest extent in the horizontal plane in the range of 60 to 250 cm, preferably in the range of 75 to 200, such as in the range of 85 to 150 cm.
5. A device according to claim 4, wherein the steel sheet has a thickness of between 10 and 30 mm, preferably between 15 and 25 mm.
6. A device according to any one of claims 1 to 5, wherein the lower part comprises several tilting protections, which are interconnected by one or more flexible connection devices (9, 19), which are suitable for extending below the road surfacing and which preferably comprise steel wire, chains and/or kevlar-holding rope.
7. A device according to any one of claims 1 to 5, wherein the lower part consists of one tilting protection,

which is rigidly connected with the upper part of the device and extends horizontally in one plane in parallel with the road surfacing and has a largest extent in this horizontal plane in the range of 60 to 250 cm, preferably in the range of 75 to 200, such as in the range of 85 to 150 cm, and wherein the tilting protection is not connected with other tilting protections. 5

8. A protection arrangement (20), comprising a plurality of devices according to any one of claims 1 to 6, wherein the devices are interconnected by one or more connection devices that are suitable for extending below the road surfacing. 10
9. A protection arrangement according to claim 8, wherein the connection device is flexible and preferably comprises steel wire, chains and/or kevlar-holding rope. 15
10. A device or a protection arrangement according to any one of the preceding claims, installed on a road, a square or the like with a road surfacing, wherein the largest extent of the tilting protection or the tilting protections in the horizontal plane is located between 5 and 50 cm below the upper face of the road surfacing, preferably between 10 and 30 cm. 20 25
11. The use of a device or a protection arrangement according to any one of the preceding claims for terrorism protection of a road, a square or the like, with a road surfacing, wherein the tilting protection or the tilting protections are located below the road surfacing in a depth between 5 and 50 cm below the upper face of the road surfacing, preferably between 10 and 30 cm, so that the device or the devices in the event of collision with a motor vehicle can tilt, whereby the tilting protection or the tilting protections will tilt up above the upper surface of the road surfacing. 30 35

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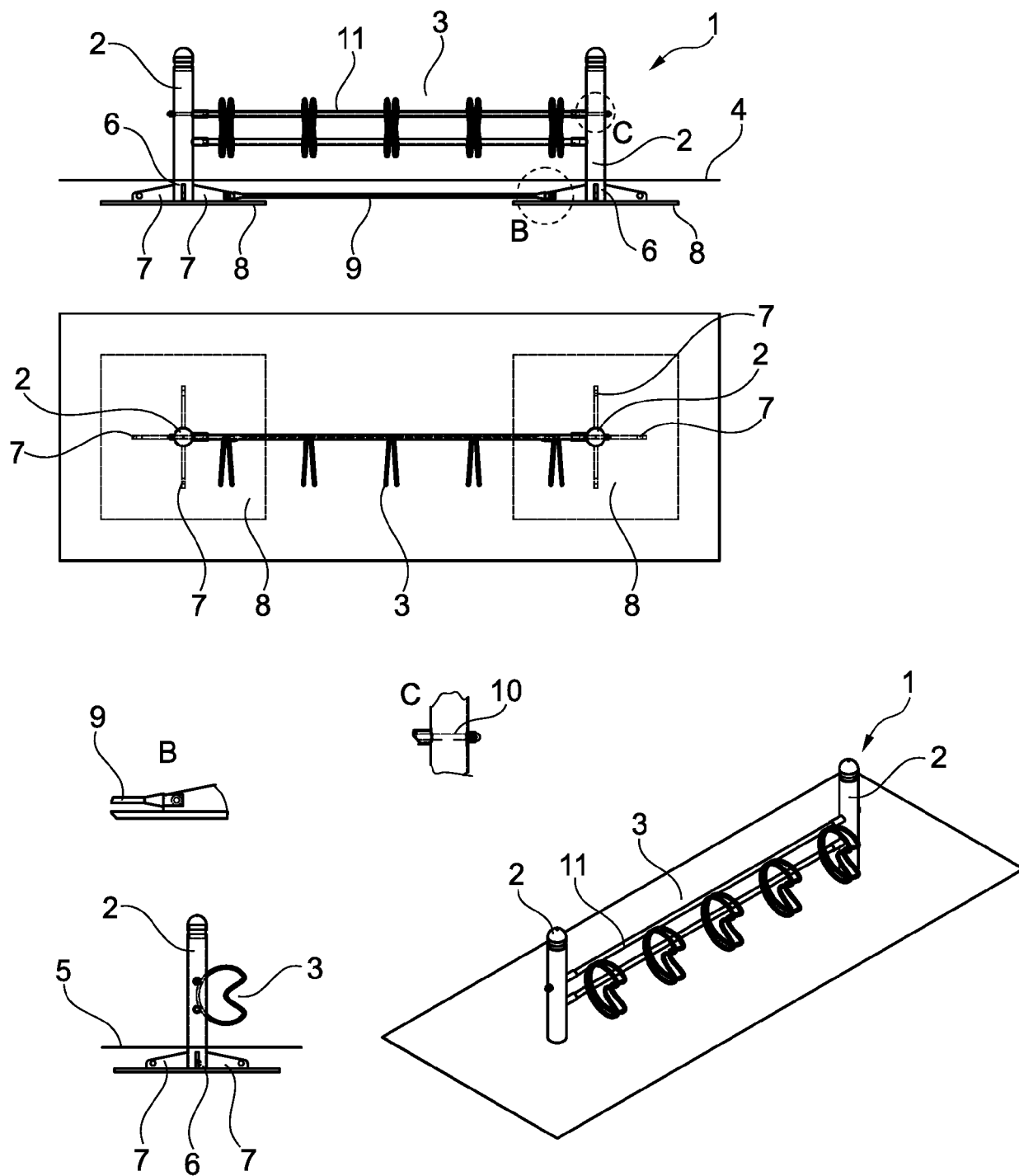


Fig. 1

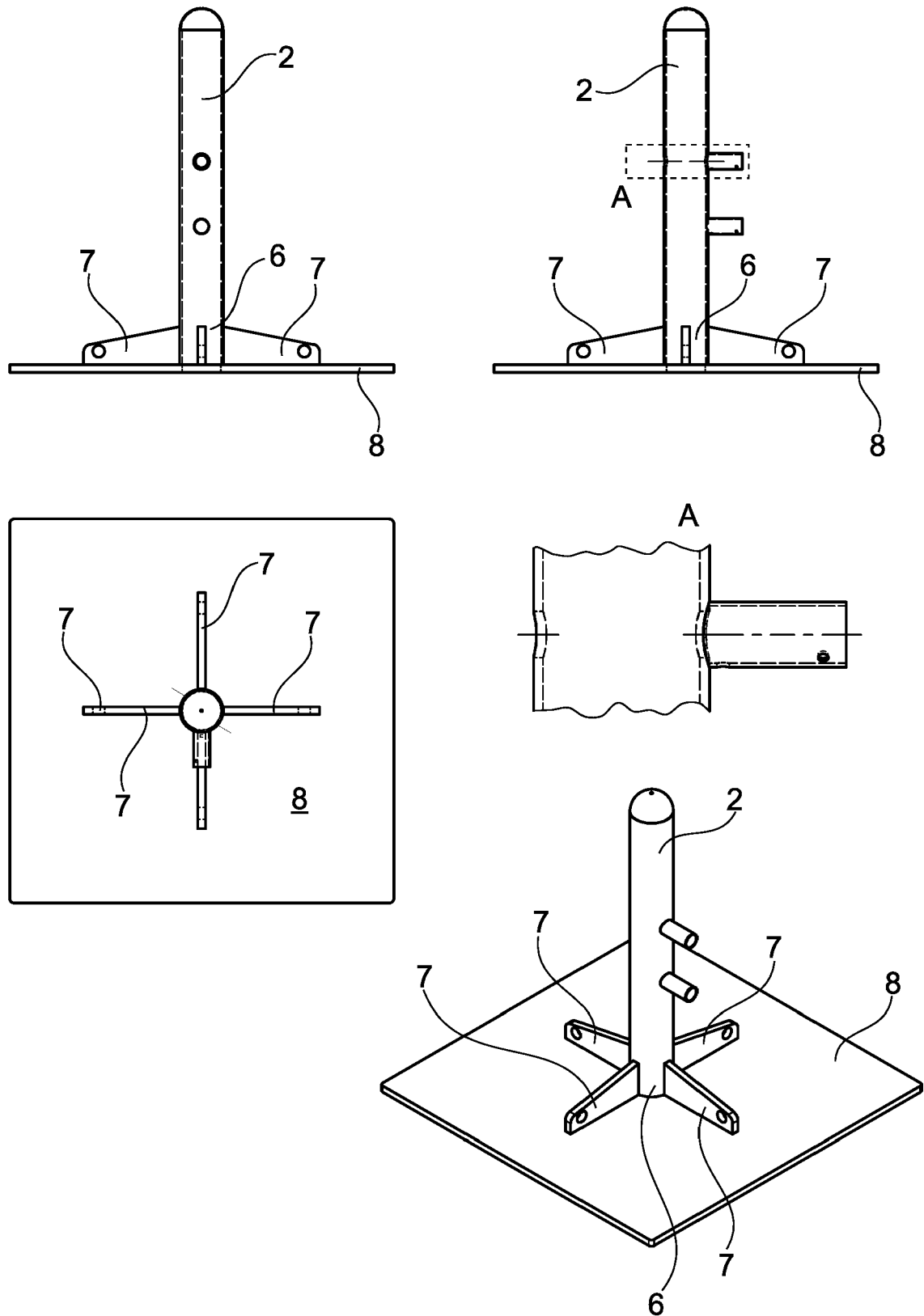


Fig. 2

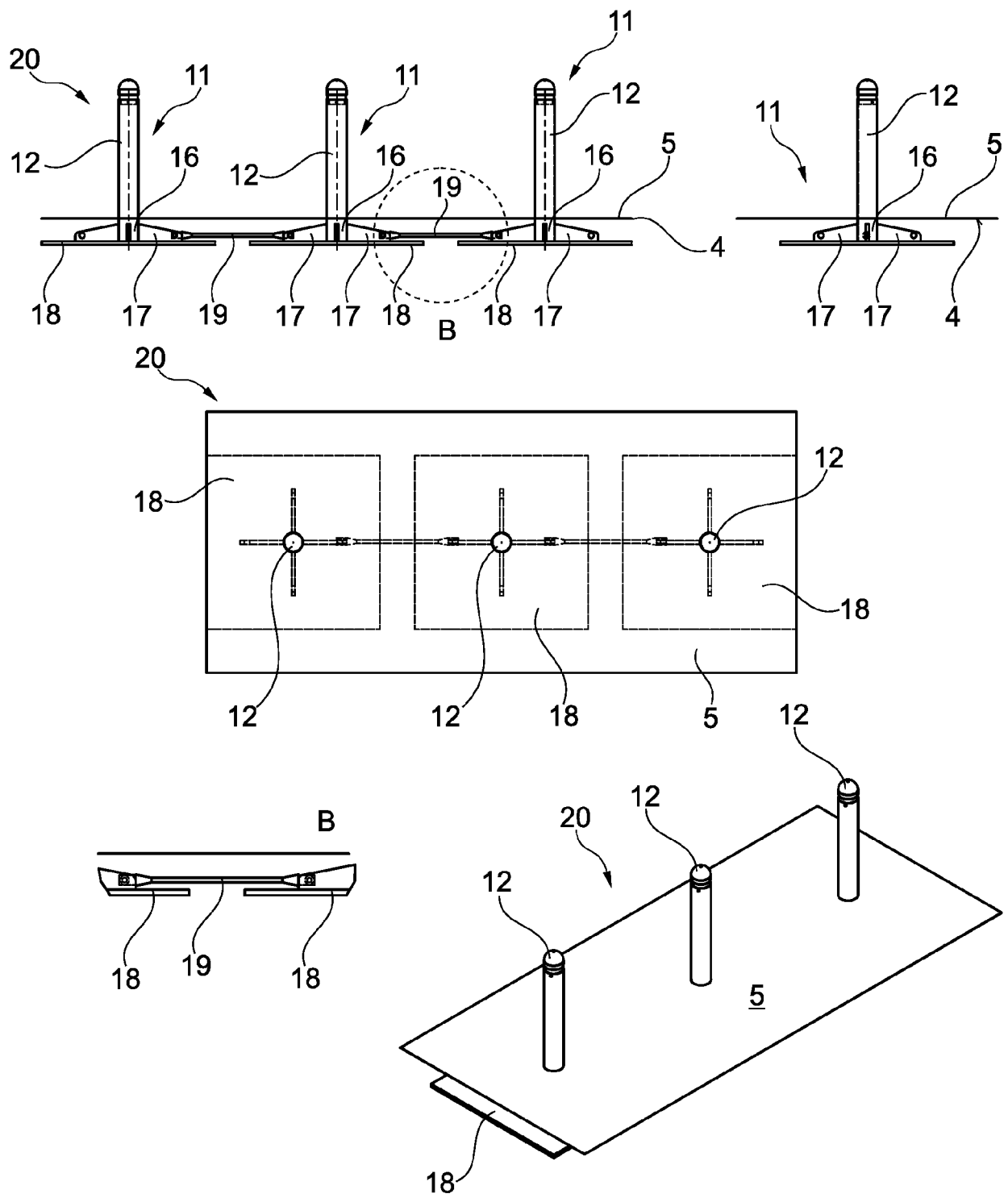


Fig. 3

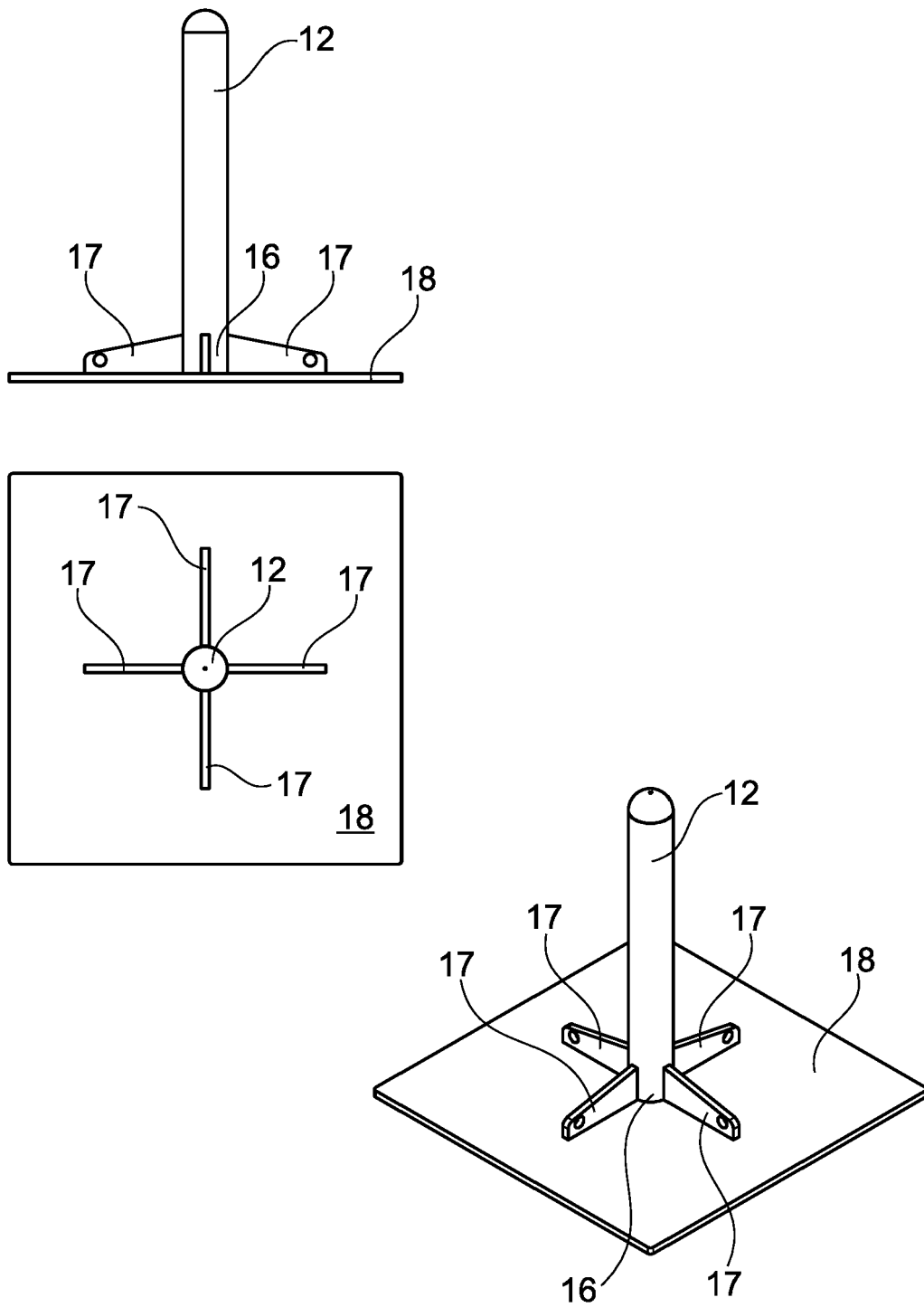


Fig. 4

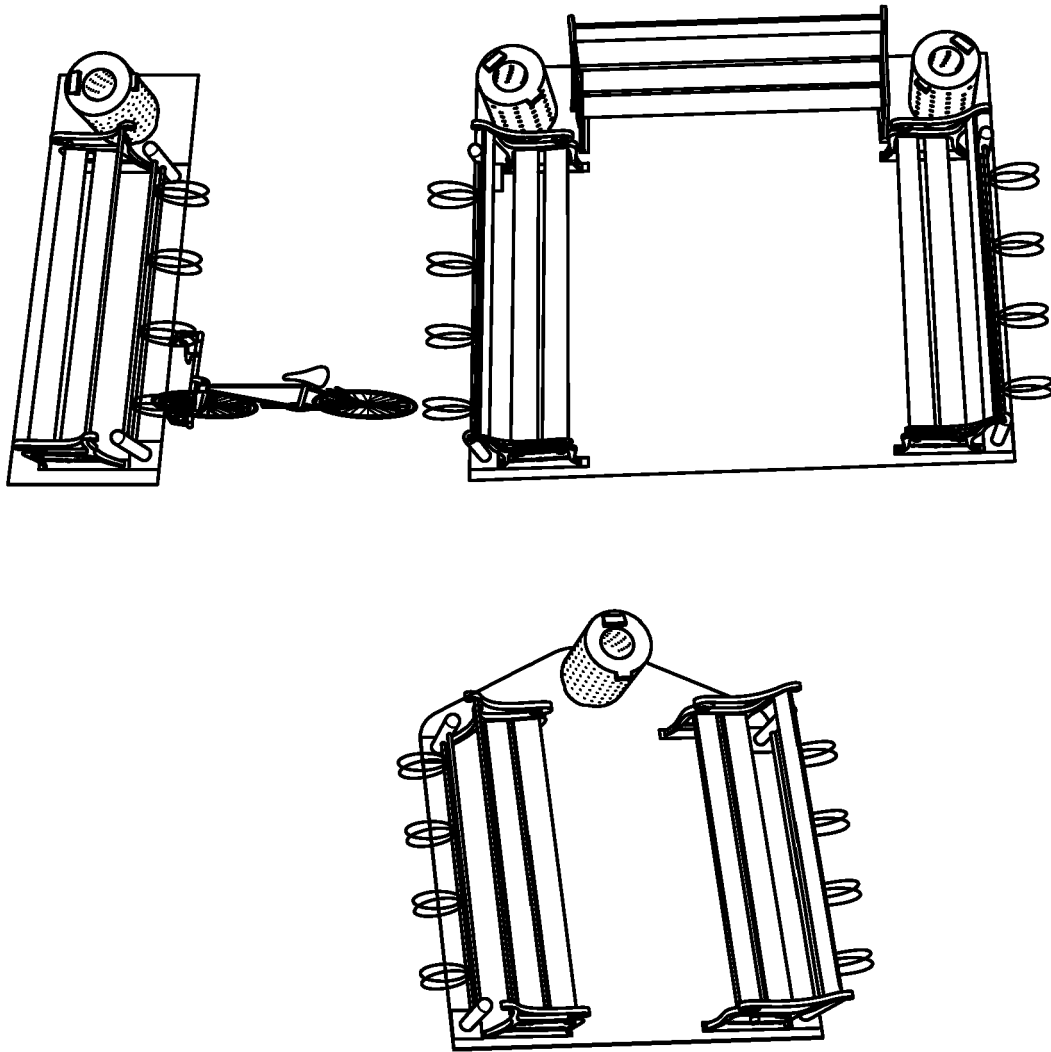


Fig. 5

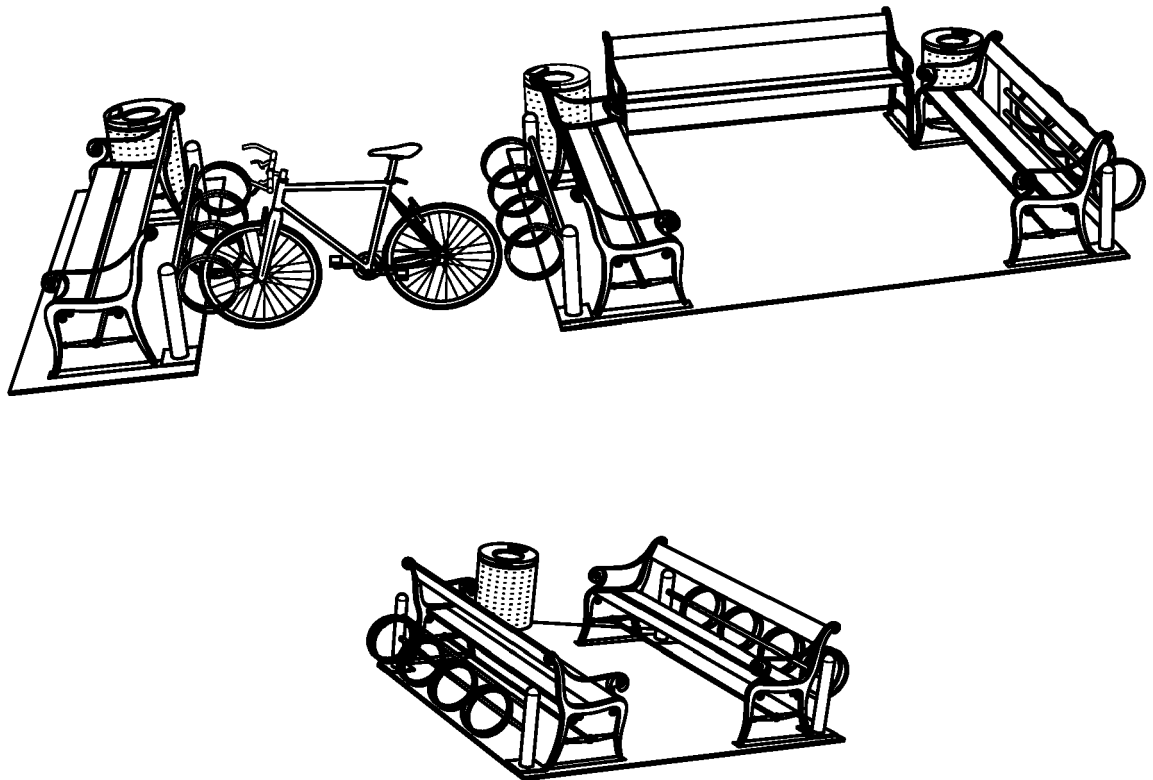


Fig. 6

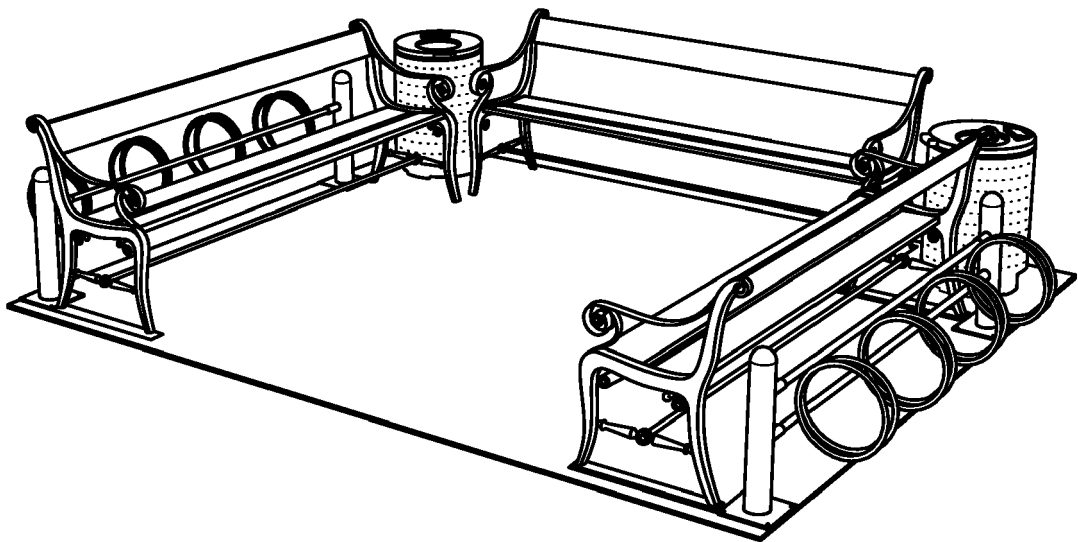


Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 19 19 7019

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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	US 2009/028638 A1 (CRAWFORD JOHN EDWIN [US] ET AL) 29 January 2009 (2009-01-29) * abstract * * paragraph [0029] * * paragraph [0030] * * paragraph [0032] * * paragraph [0034] * * paragraph [0040] - paragraph [0043] * * figures *	1-8	INV. E01F9/685 E01F13/12
X	US 2012/308302 A1 (ADLER RICHARD S [US] ET AL) 6 December 2012 (2012-12-06) * abstract * * paragraph [0009] * * paragraph [0010] * * paragraph [0078] - paragraph [0081] * * figures * * also cited in Danish procedure *	1-11	
X	GB 2 485 278 A (MARSHALLS MONO LTD [GB]) 9 May 2012 (2012-05-09) * abstract * * figures *	1-8	TECHNICAL FIELDS SEARCHED (IPC) E01F
X	US 2009/250674 A1 (DARCY DANIEL T [US]) 8 October 2009 (2009-10-08) * abstract * * paragraph [0037] * * figures 10-12 * * Park bench, fence, bus shelter, lighting, trash cans, chairs etc. *	1,3	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 December 2019	Examiner Vermander, Wim
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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EUROPEAN SEARCH REPORT

Application Number
EP 19 19 7019

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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	Informatiebord.nl: "Amsterdammertje Ø162x750mm met grondstuk - RAL3007", 1 March 1980 (1980-03-01), XP002796363, Retrieved from the Internet: URL:https://www.informatiebord.nl/p/3839/t errein-en-weginrichting/trottoirpalen/amst erdammertje-162x750mm-met-grondstuk-ral300 7/ [retrieved on 2019-12-10]	1-5,10, 11	
A	* the whole document * * "Amsterdammertjes" have been introduced in this form since 1980 both in Amsterdam and The Hague. *	6-9	
X	WO 2012/101451 A1 (ATG ACCESS LTD [GB]; BALL ROBERT NICHOLAS [GB]) 2 August 2012 (2012-08-02) * abstract * * page 3, line 3 - line 33 * * figures *	1-8	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search		Date of completion of the search	Examiner
The Hague		10 December 2019	Vermander, Wim
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 19 19 7019

5 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
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10-12-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009028638 A1	29-01-2009	US 2009028638 A1	29-01-2009
		WO 2007091977 A1	16-08-2007
US 2012308302 A1	06-12-2012	US 2009208285 A1	20-08-2009
		US 2010166498 A1	01-07-2010
		US 2012308302 A1	06-12-2012
		WO 2007001326 A2	04-01-2007
GB 2485278 A	09-05-2012	GB 2485278 A	09-05-2012
		GB 2498161 A	03-07-2013
		WO 2012059766 A1	10-05-2012
US 2009250674 A1	08-10-2009	US 2009250674 A1	08-10-2009
		US 2010322707 A1	23-12-2010
WO 2012101451 A1	02-08-2012	DK 2668338 T3	27-02-2017
		EP 2668338 A1	04-12-2013
		SG 192084 A1	30-08-2013
		US 2014010591 A1	09-01-2014
		WO 2012101451 A1	02-08-2012