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(54) **Security facility**

(57) The present invention relates to a security facility for controlled vehicle access. The facility comprises a gate (20) that can move between, on the one hand, a closed position in which an access passage is closed off by the gate and, on the other hand, an open position in which the access passage is open for allowing access by a vehicle. The security facility further comprises a crash barrier. The crash barrier comprises a beam (2) which extends along the passage over the entire width

of the passage and which can move up and down in the vertical direction between a clear position freeing the passage and a barring position situated in the passage. The crash barrier further comprises two vertical columns (3) between which the beam (2) extends. The vertical columns are provided with drive means (5) and vertical guides (4) for moving the beam up and down.

EP 1 748 106 A1

Description

[0001] The present invention relates to a security facility for controlled vehicle access, comprising:

- a gate that can move between, on the one hand, a closed position in which the access passage is closed off by the gate and, on the other hand, an open position in which the access passage is open for allowing access by a vehicle.

[0002] Here, according to the invention, by a gate provision is made in the broad sense for a railing or door with which an access passage for vehicles can be completely closed off, or conversely, can be opened if the vehicle is permitted to pass through the access passage.

[0003] Such security facilities are found at many properties requiring guarding, such as bank buildings, embassies, airports, prisons, government buildings, etc. Such properties are often secured against attacks or forcible entry from outside. A large part of this security is aimed at being able to control the access of people and vehicles to such a property. For this purpose the property is often enclosed by a wall, fencing, etc. A property can also be a building, such as a warehouse for goods, wherein the wall of the building forms the enclosure. At certain locations the enclosure is provided with a gate. Such a gate has an outer side located on the outside of the enclosure and an inner side located on the inside of the enclosure. With such a gate a so-called approach direction can furthermore be distinguished. Here, according to the invention, an approach direction is understood to be the direction in which a vehicle approaches the property (from outside the enclosure), that is to say this approach direction can be represented by means of an arrow provided on the outside of the enclosure that is oriented towards the gate.

[0004] Such security facilities are known per se. For many years the Applicant has already been marketing so-called Speedgates amongst other things. These are gates with grated railing sections or solid leaf doors. The gate is built up of a number of railing leaves or solid door leaves that are pivotably joined to one another about vertical hinge axes in order to be able to move from an extended position in the extension of one another, in which the gate is closed, to a harmonica-like folded position, in which latter position the railing leaves or door leaves are situated on the opposing sides of the gate essentially parallel to the access direction. Such gates can close and open rapidly, one can imagine, for example, in about 4 sec.

[0005] Such gates, with which an access passage can essentially be closed off completely, have the disadvantage, in particular with access passages with a relatively large surface area, that they are relatively vulnerable to collisions from vehicles. Although the gate can be made sturdy and robust, some limitations are associated with this, in particular in the sense of the bulk, the weight and

the size of the construction. All this means that the moving parts of the gate still constitute a potentially weaker part of the gate that is sensitive to collisions.

[0006] In order to deter collisions, barriers that more closely regulate traffic passing through the gate could be installed in front of or behind the gates. The traffic is then held at a distance by the barrier as long as the gate is closed. It's true that such a barrier is suitable for preserving a gate from unintentional collisions, but it is not suitable for preserving a gate from intentional ramming (such as in the case of terrorism, burglary or vandalism). After all a vehicle that is approaching at some speed will go straight through the barrier.

[0007] In order to overcome the abovementioned problem of vulnerability of a gate to intentional ramming, one could even consider additionally providing one or more so-called road blockers in the approach route to the gate. The Applicant has been marketing such road blockers for some years. Such road blockers are available in two versions. The first is the so-called spike barrier, where a row of spikes pointing in the opposite direction to the approach direction can be swung about a horizontal axis between a position that allows access with the spikes sunk in the road surface and a position pointing upwards from the road surface into the approach direction for holding back vehicles. The other version is somewhat friendlier and consists of a construction that has a triangular cross-sectional shape viewed in the direction allowing access, which shape can be swung about a horizontal axis situated in the road surface between a position completely sunk into the road surface and a position projecting upwards from the road surface. However, the disadvantage of such road blockers is that these have to be provided at some distance in front of the gate, that they require the necessary installation depth and space in the ground, usually consisting of a road surface, and that the construction is relatively complex in the sense that in the event of a collision against such road blockers there is a relatively large amount of mechanical damage to the road blocker and it takes a relatively large amount of time to be able to restore the access through the gate.

[0008] The aim of the present invention is to provide a security facility comprising a so-called gate which to a large degree is resistant to intentional ramming.

[0009] According to the invention this aim is achieved by providing a security facility for controlled vehicle access, comprising:

- a gate that can move between, on the one hand, a closed position in which an access passage is closed off by the gate and, on the other hand, an open position in which the access passage is open for allowing access by a vehicle;

wherein the security passage furthermore includes a crash barrier comprising:

- a beam which extends across the passage over the

entire width of the passage and which can move up and down in the vertical direction between a clear position freeing the passage and a barring position situated in the passage; and

- two vertical columns between which the beam extends and in which drive means and vertical guides are provided for moving the beam up and down.

[0010] Because the beam of the crash barrier moves up and down in the vertical direction along two vertical columns, this crash barrier, viewed in a direction perpendicular to the gate, can be made slim, that is to say taking up a small amount of space. The beam as well as the columns can furthermore be made very robust with relatively small dimensions. In the case of the beam it is possible, for example, to consider an I- or an H-section of, in the sense of load-bearing capacity, very heavy quality. Moreover, the crash barrier is capable of being installed very close to the gate. In this context, close is understood to mean in particular a distance of at most 1.5 metre from the gate.

[0011] Moreover the drive for the beam is capable of being implemented in a mechanically simple manner. For example, it is possible to consider a threaded spindle provided in each column that extends through threaded passages provided in the ends of the beam. By turning the threaded spindle the beam will then be raised. However, more preferentially, it is also possible to consider hydraulic rams, where the beam can be moved over a certain vertical distance by powering a hydraulic cylinder/piston unit with a hydraulic fluid. The great advantage of such hydraulic drive means is, moreover, that very large forces can be produced by these, which makes it possible to use a very robust beam. Furthermore, such hydraulic drives, in particular in the case of very robust constructions, are less susceptible to wear than mechanical drives.

[0012] In order to increase the resistance of the crash barrier to an impact in the event of intentional ramming, it is advantageous according to the invention if each column is provided with an inclined prop, which is installed on the side of the respective column facing away from the approach side and which is anchored to the respective column at its upper end and is anchored in the ground at its opposing lower end.

[0013] It is furthermore advantageous according to the invention if the beam is at least partially sunk in the ground in the clear position. In the situation where vehicles are restrained, the ideal height of the beam for the purpose of the barring position will be closer to the ground than to the top of the access passage of the gate. Thus the distance over which the beam has to be moved in order to move this back and forth between the clear position and the barring position is then the least.

[0014] With the aim of reliably restraining motor driven vehicles in particular, it is advantageous according to the invention if the beam in the barring position is 40 to 120 cm above the ground, in particular 50 to 80 cm above

the ground. At 50 to 80 cm it is possible to ensure that lorries as well as cars are reliably restrained. According to the invention the beam in the barring position will preferably be about 70 cm above the ground.

[0015] Where in the invention ground is mentioned, the road surface is meant in particular.

[0016] It is furthermore in particular advantageous according to the invention if the crash barrier is provided behind the gate, viewed from the approach direction. According to the invention "provided behind the gate" is understood to mean in particular that the crash barrier, in particular the beam thereof, is situated at most 1.5 metre behind the gate, that is to say the plane that is closed off in the closed position of the gate. Preferably this distance will be at most 1 metre.

[0017] What is achieved by providing the crash barrier relatively close behind the gate is that should the gate be rammed by a vehicle the gate itself functions as the first arresting net and then the crash beam fully restrains the vehicle. With this arrangement, providing the crash barrier close behind the gate has the additional advantage that the crash beam will also restrain the closing sections of the gate. The crash beam thus prevents full opening of the gate in the event this should be rammed. If the crash barrier is situated less than 1 metre behind the gate, the passage through the gate possibly arising from sections of the gate giving way will still be sufficiently small to make it extremely difficult for people to make a forced entry.

[0018] It is advantageous according to the invention if the gate is the type with at least one leaf that can swing about a vertical hinge. In particular it is advantageous according to the invention if the gate is the so-called harmonica type with leaves hinged to one another about vertical hinge axes. Such a type of gate has the great advantage that this can open and shut in a relatively short time. A further important advantage of a gate of this type is that this requires relatively little installation space to the side of the gate. With a gate where a railing is slid away to the side, at least the same amount of space is required on both sides of the gate as the width of the access passage through the gate. The disadvantage of a gate of the type with at least one swinging leaf is that the hinges constitute a weakening in the gate construction, from which, from the mechanical point of view, a greater vulnerability inherently results. In the event of a violent crash it is precisely to be expected that, as a result of these hinged joints, forced opening of the gate can occur. What is achieved by now providing the crash barrier close behind the gate is that this forced opening is limited by the beam of the crash barrier.

[0019] With a gate with at least one leaf that can swing about a vertical hinge it is in particular advantageous according to the invention if the at least one leaf, viewed perpendicular to the hinge axis, has a leaf width and if the at least one leaf swings towards the crash barrier when the gate is opened and if the distance from the crash barrier to the closed gate is less than the leaf width.

In particular the distance from the crash barrier to the closed gate will be at most 75 % of the leaf width. It is in particular advantageous if this distance is at most 60 % or even at most 50 % of the leaf width. The distance can even be made less than 30%.

[0020] With a security facility according to the invention where the crash barrier is provided behind the gate, it is furthermore advantageous according to the invention if the security facility has control means that are equipped:

- when opening the facility, to bring the beam to the clear position first and then to open the gate; and
- when closing the facility, to close the gate first and then to bring the beam to the barring position.

[0021] Thus what is achieved in particular is that with a gate of the harmonica type the crash barrier can be installed very close behind the gate without the crash barrier preventing opening of the harmonica-like hinged leaf sections.

[0022] According to another embodiment the invention provides that the crash barrier is provided in front of the gate, viewed from the approach direction. This gives the advantage that during the opening of the gate, when this is more vulnerable to a collision than when this is completely closed, intentional ramming of the gate is prevented. With such an embodiment it is furthermore advantageous according to the invention if the security facility has control means equipped:

- when opening the facility, to open the gate first and then to bring the beam to the clear position; and
- when closing the facility, to bring the beam to the barring position first and then or at the same time to close the gate.

[0023] According to a further embodiment of the invention the gate and the crash barrier constitute an integrated entity. In particular this is understood to mean that the vertical columns of the crash barrier are built onto the frame of the gate.

[0024] Furthermore, the invention provides an embodiment of the security facility comprising two said crash barriers, one crash barrier provided on the one side of the gate and one crash barrier provided on the other side of the gate. In this way the protection of the gate against collisions can be further improved.

[0025] According to a further aspect the invention relates to a crash barrier.

[0026] The present invention will be explained in more detail below with reference to a few illustrative embodiments shown diagrammatically in the drawing. In the drawing:

Figure 1 shows diagrammatically in perspective a crash barrier according to the invention for a security facility according to the invention.

Figure 2a shows a security facility according to the invention with the gate in the closed position and the crash barrier in the barring position.

5 Figure 2b shows a corresponding diagrammatic view in perspective as in Figure 2a, however with the crash barrier in the clear position;

10 Figure 3 shows a diagrammatic view in perspective of a variant embodiment of the security facility according to the invention, with the gate in the closed position and the crash barrier in the clear position;

15 Figure 4 shows a diagrammatic view in perspective of a security facility according to the invention with the gate in the closed position and the crash barrier in the barring position.

[0027] Figure 1 shows a crash barrier for a security facility according to the invention. The crash barrier 1 comprises a beam 2 provided between two vertically erected columns 3. The columns 3 constitute vertical guides for moving the beam 2 up and down. The columns 3 in this example extend through the guide passages 4 at the ends of the beam 2. Guiding can also be implemented in another way. The columns, preferably both columns 3, are furthermore provided with drive means 5 to move the beam 2 in the vertical direction up and down. In the case of Figure 1 the drive means 5 are indicated highly diagrammatically as comprising a ram 5, which is sunk into the ground 6. The upper surface of the ground constitutes the pavement.

[0028] The drive means 5 thus comprise in this case a hydraulically operated cylinder 6 with a piston 7 therein that is connected to the beam 2 via a rod 8. By now pumping the hydraulic fluid to the one side of the piston 7 or to the other side of the piston 7 in the cylinder 6, the beam 2 is capable of being moved up or, alternatively, down, as is known to a person skilled in the art.

40 **[0029]** Figure 1 shows the beam in the so-called barring position. In the barring position the beam 2 is situated in this case at a height H of about 70 cm above the road surface.

[0030] The so-called approach direction is indicated diagrammatically by means of arrow A. A vehicle to be restrained will be driven up from the approach direction A. On the side facing away from the approach direction the columns 3 are each additionally braced against the ground by means of a prop 9. Each prop 9 is anchored at its top end to the column 3 and at its bottom end to the road surface 6. The props 9 in this example are at an angle of about 45°.

55 **[0031]** Figure 1 furthermore shows that a recess 10 has been made between the columns 3 in the road surface 6. This recess 10 is intended to partially or completely accommodate the beam 2 in the clear position. If the beam 2 is completely accommodated in the recess 10 in the clear position, this will amount to the situation

where the top surface of the beam 2 is precisely flush with the road surface 6. However, the top surface of the beam 2 can also protrude somewhat above the road surface 6. In that case it will be advantageous if upward sloping surfaces are provided on both opposing longitudinal sides of the beam 2 or on both opposing longitudinal sides of the recess 10, so that the beam 2 constitutes a hump than can be negotiated smoothly.

[0032] Figure 2 shows a security facility according to the invention where the gate and the crash barrier constitute an integrated entity. The crash barrier is indicated in Figure 2 by 11. This crash barrier 11 differs from the crash barrier 1 in Figure 1 essentially solely in that the columns 3 have been extended in the vertical direction up to the top of the gate 20. With the exception of the general indication for the crash barrier 11, the same reference numerals have otherwise been used for the crash barrier 11 as in Figure 1. The extension of the column 3 up to the top of the gate makes it possible to move the beam 2 in the upward direction to a clear position. The beam 2 could be raised, as it were, above the gate 20 so that the vehicle is able to drive under it. However, as can be seen from Figure 2b, it is advantageous to sink the beam in the clear position into a recess 10 made in the road surface.

[0033] The gate 20 is essentially built up of a portal frame with two vertical uprights 21 that are joined to one another at the top by a beam construction 22. Between the vertical uprights 21, there is a two-part entrance gate with a left and right railing section. The left and right railing sections each consist of two leaves 24 and 25 that are joined to one another by means of a vertical hinge 23.

[0034] In each case the outer leaf 25 is attached to uprights 21 by means of a hinge 26 so as to be able to swing open through 90° according to arrow 30. At the same time the inner leaf 24 can then swing about hinge 23 according to arrow 31 in each case. In the final open position the leaves 24 and 25 are then situated directly against one another and they extend parallel to arrow A.

[0035] It should be noted that with the gate 20 shown in Figure 2 the number of leaf sections per gate section will be dependent on the width to be spanned. The left and right gate sections can each comprise one leaf section, in which case the harmonica principle essentially does not apply, can comprise two leaf sections as shown, but can also comprise more leaf sections, such as three or four. It is also conceivable to work with only one harmonica-like gate section that can fold on itself instead of a left and right gate section such as shown in Figure 2.

[0036] Figure 3 shows diagrammatically in perspective a security facility according to a further embodiment. Here a crash barrier 1 according to Figure 1 is installed behind a gate 20, viewed in the approach direction, which is implemented in an essentially corresponding manner to the gate 20 described with reference to Figure 2. Here, the crash barrier 1 and the gate 20 constitute two separate components. It can clearly be seen that the crash barrier 1, in accordance with Figure 2, is installed at a

distance D behind the gate 20, which approximately corresponds to 50 % of the width W of the respective leaf sections 24, 25.

[0037] It can be seen in Figure 3 that the width W of each leaf section is greater than the distance D between a leaf section in the closed position and the beam 2. The distance D here amounts to about 50 % of the width W. It will be clear that in the event a vehicle rams into the leaves 24, 25 from the approach direction A, these leaves, in the event that they give way, will be arrested by the beam 2.

[0038] Figure 4 shows a further variant of a security facility according to the invention. The variant according to Figure 4 differs from that according to Figure 3 essentially solely in that the crash barrier 1 is installed in front of the gates 20, viewed in the approach direction A. This is particularly so that the gate 20 can be protected from intentional ramming during opening and closing, in which intermediate position the gate 20 is relatively somewhat more vulnerable than in the completely closed position.

[0039] It will be clear that the embodiments according to Figures 3 and 4 can also be combined in the sense that a crash barrier 1 is provided both in front of and behind the gates 20. It will also be clear that in the embodiment according to Figure 2a an additional crash barrier can even be provided in front of the gate in accordance with Figure 4.

30 Claims

1. Security facility for controlled vehicle access, comprising:

- a gate that can move between, on the one hand, a closed position in which an access passage is closed off by the gate and, on the other hand, an open position in which the access passage is open for allowing access by a vehicle,

characterised in that the security passage further includes a crash barrier comprising:

- a beam which extends across the passage over the entire width of the passage and which can move up and down in the vertical direction between a clear position freeing the passage and a barring position situated in the passage; and
- two vertical columns between which the beam extends and these are provided with drive means and vertical guides for moving the beam up and down.

2. Security facility according to Claim 1, wherein each column is provided with an inclined prop, which is installed on the side of the respective column facing away from the approach side and which is anchored to the respective column at its upper end and is an-

chored in the ground at its opposing lower end.

3. Security facility according to one of the preceding claims, wherein the beam is at least partially sunk in the ground in the clear position. 5
4. Security facility according to one of the preceding claims, wherein the beam in the barring position is 40 to 120 cm above the ground, in particular 50 to 80 cm above the ground. 10
5. Security facility according to one of the preceding claims, wherein the crash barrier is provided behind the gate, viewed from the approach direction, preferably at most 1 metre behind the gate. 15
6. Security facility according to Claim 5, wherein the gate is of the harmonica type with at least one leaf hinged about a vertical hinge axis, such as of the harmonica type with a multiplicity of leaves that are joined to one another by leaves hinged about vertical hinge axes. 20
7. Security facility according to Claim 6, wherein the at least one leaf, viewed perpendicular to the hinge axis, has a leaf width, wherein the at least one leaf swings towards the crash barrier when the gate is opened and wherein the distance from the crash barrier to the closed gate is less than the leaf width, in particular is at most 75 % of the leaf width. 25
30
8. Security facility according to one of Claim 5 - 7, further comprising control means equipped:
 - when opening the facility, to bring the beam to the clear position first and then to open the gate; and 35
 - when closing the facility, to close the gate first and then to bring the beam to the barring position. 40
9. Security facility according to one of Claims 1 - 4, wherein the crash barrier is provided in front of the gate, viewed from the approach direction. 45
10. Security facility according to Claim 9, further comprising control means equipped:
 - when opening the facility, to open the gate first and then to bring the beam to the clear position; and 50
 - when closing the facility, to bring the beam to the barring position first and then or at the same time to close the gate. 55
11. Security facility according to one of the preceding claims, wherein the gate and the crash barrier constitute an integrated entity.

12. Security facility according to one of the preceding claims, comprising two said crash barriers, one crash barrier provided on the one side of the gate and one crash barrier provided on the other side of the gate.

13. Crash barrier intended for a security facility according to one of the preceding claims.

Fig 1

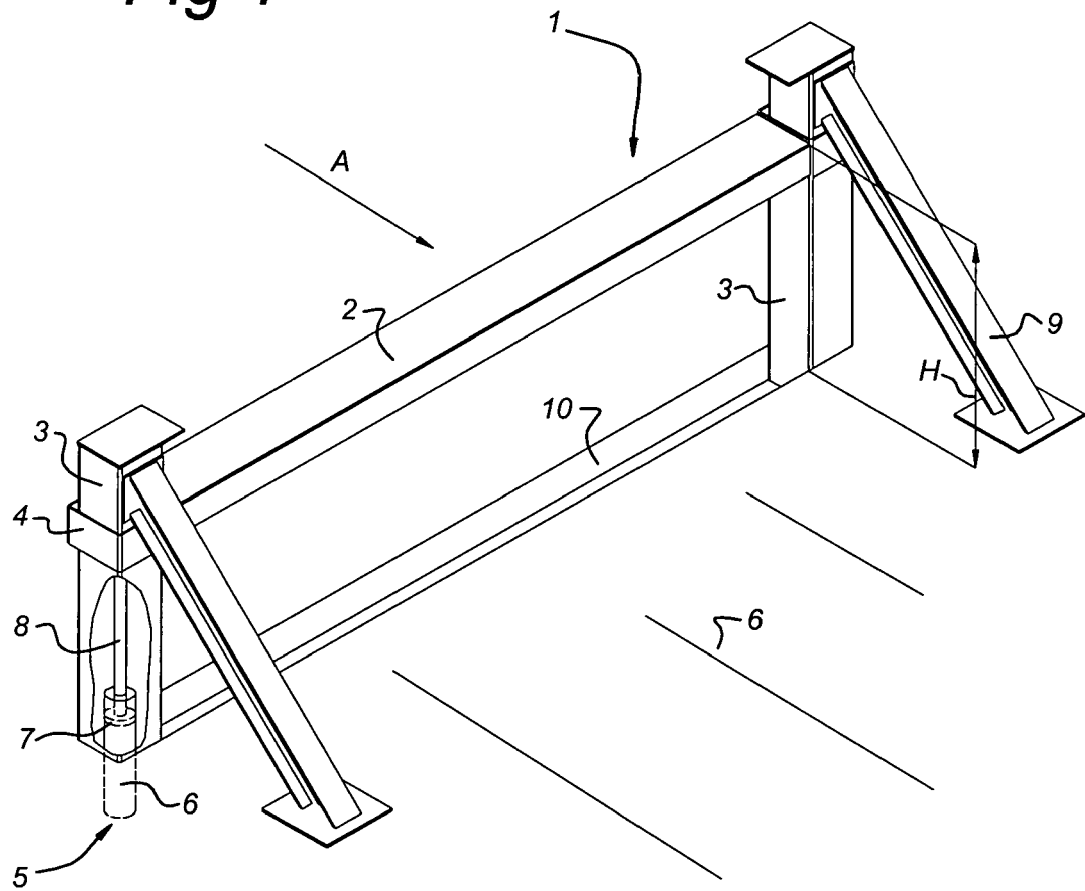


Fig 2a

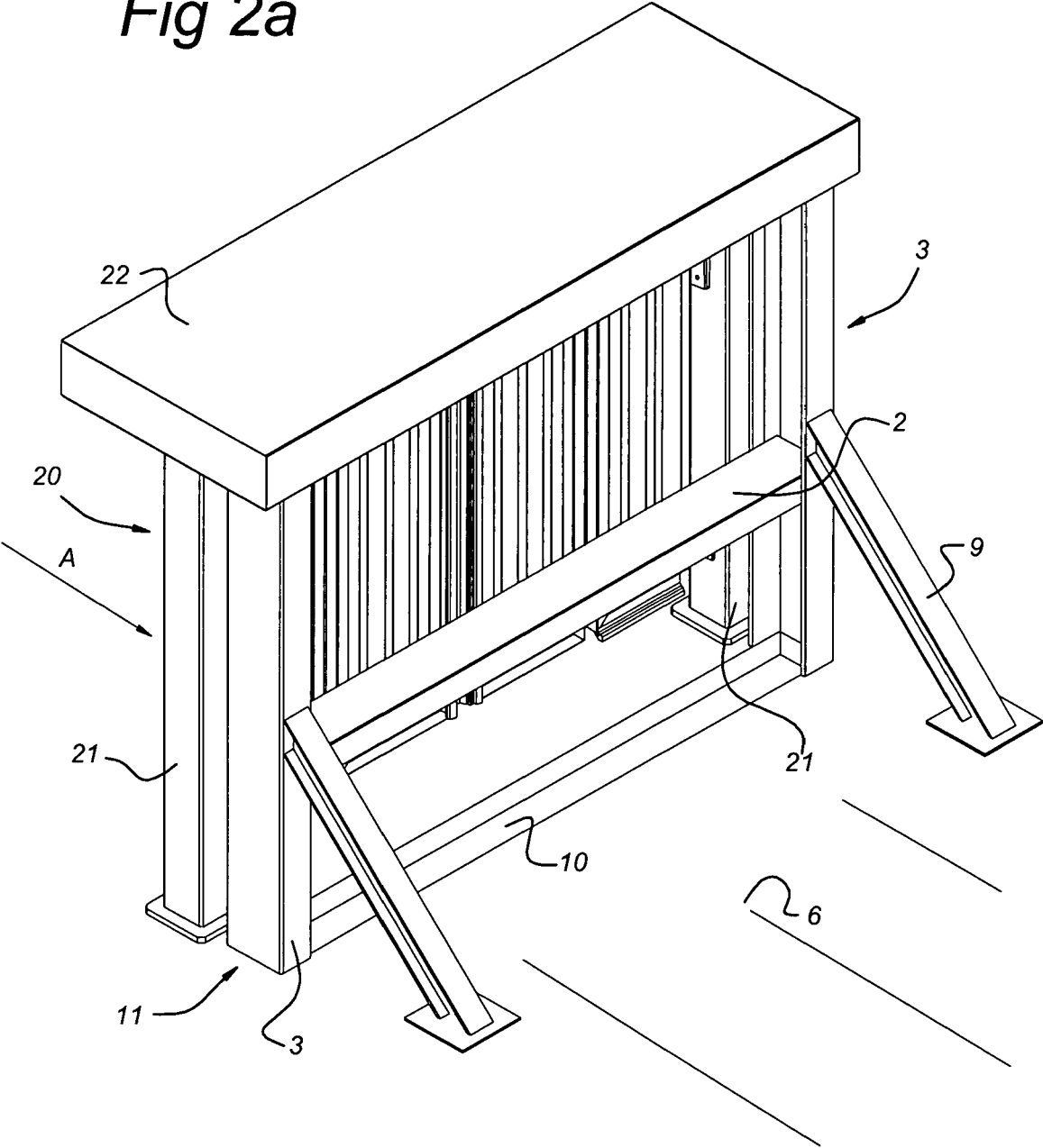


Fig 2b

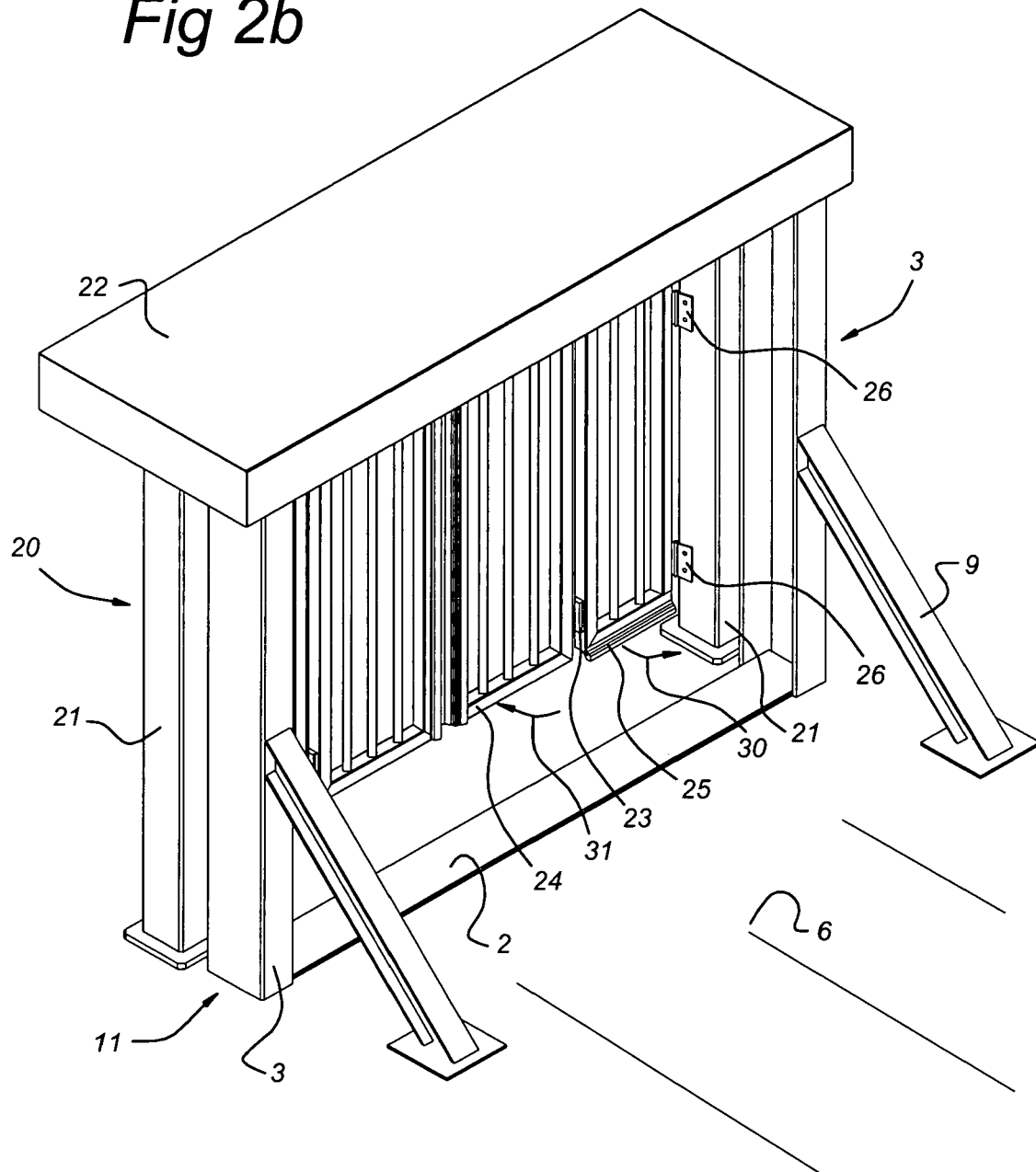


Fig 3

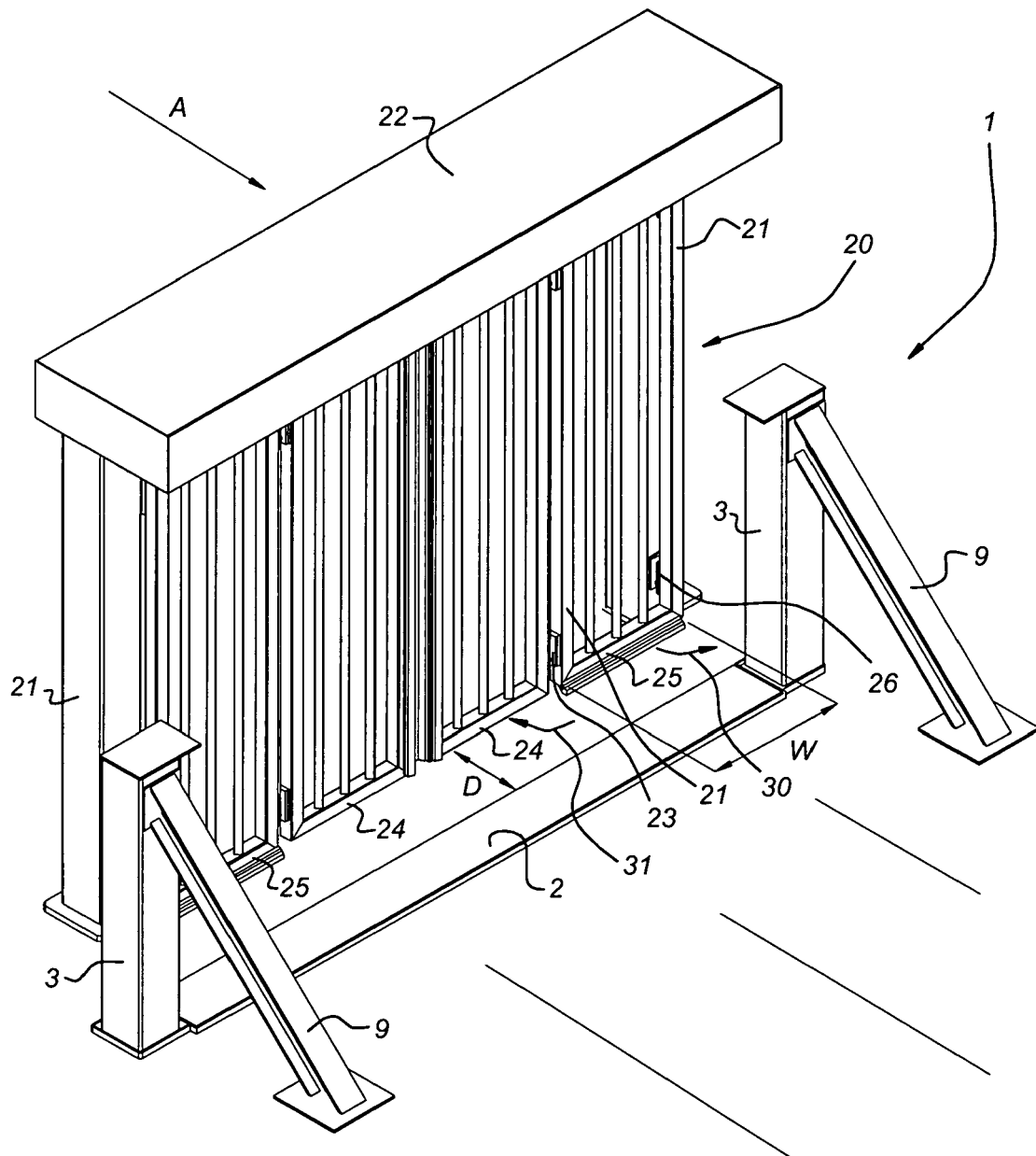
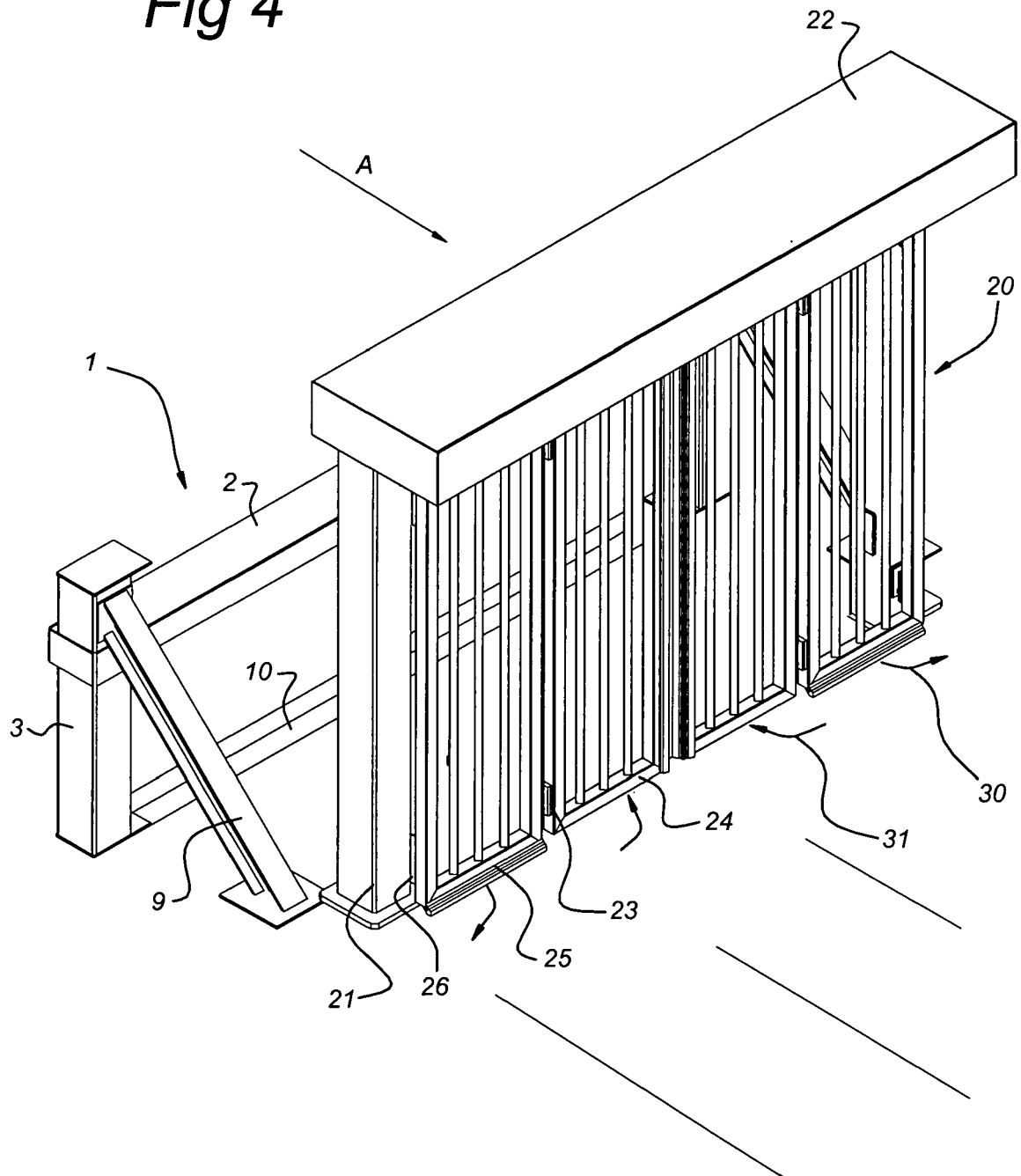


Fig 4





European Patent
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PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention EP 06 10 1532 shall be considered, for the purposes of subsequent proceedings, as the European search report

DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
			E01F E06B
INCOMPLETE SEARCH The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims. Claims searched completely : Claims searched incompletely : Claims not searched : Reason for the limitation of the search: see sheet C			
Place of search		Date of completion of the search	Examiner
The Hague		3 October 2006	Geivaerts, Dirk
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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EPO FORM 1503 03/02 (P04C07)



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Application Number
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A	WO 99/61707 A (PRIMEX TECHNOLOGIES, INC; OUSTERHOUT, JOHN, N; MARCOTULLIO, JOHN, P; E) 2 December 1999 (1999-12-02) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)



European Patent
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INCOMPLETE SEARCH
SHEET C

Application Number
EP 06 10 1532

Claim(s) searched completely:
1-12

Claim(s) not searched:
13

Reason for the limitation of the search:

The subject matter of claim 13 is a crash barrier, but no technical features of this barrier are present in this claim. As such claim 13 is indefinite in scope and does not satisfy the requirements of Article 84 EPC.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 10 1532

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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03-10-2006

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