Obstruction for use with Security Bulwarks, Perimeter Protection System and Method of Protecting a Perimeter

The present invention concerns an obstruction for use with security bulwarks mounted outside a perimeter railing of a vessel or marine installation. Such security bulwarks are used for protecting the perimeter of vessels, such as merchant and naval ships, and marine installations, such as oil rigs and other marine platforms, against unauthorized potential boarders, such as pirates, stowaways and activists. The present invention also concerns a perimeter protection system comprising such an obstruction, and a method of protecting a perimeter of a vessel or marine installation using such an obstruction.

GB-A-2 531 232, also in the name of the present applicant and the contents of which is incorporated herein by reference, describes a security bulwark for mounting outside a perimeter railing of a vessel or marine installation. The bulwark has a front face comprising a projecting mound. By a front face of the security bulwark is meant a face of the security bulwark which, if the security bulwark is mounted outside a perimeter railing of a vessel or marine installation, faces out to sea. The mound has an underside providing the bulwark with an overhang and the mound is convex in a direction of the breadth of the bulwark. Since the mound is convex in a direction of the breadth of the bulwark, the bulwark has a greater depth in a seaward to inboard direction where the mound is located on the front face of the security bulwark than it does at or near to an edge of the security bulwark where the mound is not located. Accordingly, if a pair of such security bulwarks is mounted adjacent to each other outside a perimeter railing of a vessel or marine installation, a recess is formed between the adjacent pair of security bulwarks. This recess is bounded on each side by the respective mounds on the front face of each of the adjacent pair of security bulwarks.

If the respective mounds are sufficiently far apart from each other, there is a risk that an unauthorized potential boarder may try to squeeze into the recess between the two mounds and climb over the top of the adjacent pair of security bulwarks by establishing a

handhold on top of them at or near to a location where the two security bulwarks are closest to each other and where the depth of the security bulwarks in a seaward to inboard direction is therefore less than where the mounds are located on the front face of each of the two security bulwarks.

The present invention aims to address this and other problems with known types of security bulwark. It also aims to provide an obstruction for use with such a security bulwark, an improved perimeter protection system for a vessel or marine installation, and an improved method of protecting a perimeter of a vessel or marine installation.

Accordingly, in a first aspect, the present invention provides an obstruction for positioning in a recess between an adjacent pair of security bulwarks mounted outside a perimeter railing of a vessel or marine installation, wherein the perimeter railing comprises a handrail. The obstruction comprises a rear end for positioning towards the perimeter railing, a front end for positioning away from the perimeter railing, a top side, an underside, a pair of side faces each for abutting a corresponding side face of a respective one of the adjacent pair of security bulwarks and a pair of opposing lateral cheeks separating the front end from a respective one of the pair of side faces. In addition, the obstruction comprises a connection facility for connecting the obstruction to at least one of the perimeter railing and the adjacent pair of security bulwarks. The top side of the obstruction slopes downwardly from the rear end towards the front end during use of the obstruction between an adjacent pair of security bulwarks. The breadth of the obstruction is substantially less than the depth of the obstruction from the front end to the rear end. The obstruction further comprises a shoulder facing the rear end, located between one of the opposing lateral cheeks and the respective one of the side faces, for abutting a feature of a respective one of the adjacent pair of security bulwarks.

Since the obstruction occupies the recess between the adjacent pair of security bulwarks, it prevents or significantly hinders an unauthorized potential boarder from squeezing into the recess. In addition, the separation between the rear end and the front end of the obstruction increases the overall depth of the adjacent pair of security bulwarks and of the obstruction in a seaward to inboard direction at the location where the two security

bulwarks are closest to each other. This makes it harder or impossible for an unauthorized potential boarder to establish a handhold on top of the two security bulwarks in this location. The connection facility allows the obstruction to be connected either to at least one of the adjacent pair of security bulwarks or to the perimeter railing or both. On the other hand, the fact that the top side of the obstruction slopes downwardly from the rear end towards the front end of the obstruction prevents or significantly hinders an unauthorized potential boarder from being able to grab hold of the obstruction itself and use it as a handhold.

Preferably, the angle of downward slope of the top side of the obstruction from the rear end towards the front end thereof is at least about 30 degrees to the horizontal when the obstruction is in use on a vessel or marine installation, more preferably greater than about 40 degrees, even more preferably greater than about 45 degrees, and most preferably more than about 50 degrees to the horizontal. An angle of downward slope of at least about 30 degrees significantly increases the probability that a hand of an unauthorized potential boarder placed on the top side of the obstruction will slide off it in a seaward direction, and this probability increases as the angle of downward slope is increased further.

Preferably, the separation of the front end from the rear end of the obstruction is at least about 500 mm, more preferably greater than 600 mm and most preferably greater than 700 mm. A separation greater than about 500 mm is generally greater than the length of a forearm of an unauthorized potential boarder, thereby preventing the potential boarder from reaching round the obstruction to gain a handhold on top of one of the adjacent pair of security bulwarks.

Preferably, the obstruction has a maximum height from the top side to the underside thereof which is approximately equal to that of the adjacent pair of security bulwarks. This is preferably between 500 mm and 1000 mm. More preferably still, the maximum height of the obstruction is between 500 mm and 750 mm.

Each side face of the obstruction allows the obstruction to be positioned side-by-side with the respective one of the adjacent pair of security bulwarks and thus interposed between

the adjacent pair of security bulwarks, rather than being positioned in front, that is to say, on a seaward-facing side, of the respective one of the adjacent pair of security bulwarks. This helps to protect the obstruction from removal by an unauthorized potential boarder and enables it to be integrated with the adjacent pair of security bulwarks.

In one preferred embodiment, the side face is substantially parallel to a sagittal plane of the obstruction. By a sagittal plane of the obstruction is meant a vertical plane which divides the obstruction into substantially symmetrical left and right halves. If the aforementioned side face is substantially parallel to this sagittal plane, this has the advantage of causing the obstruction to point in a seaward direction centrally between the adjacent pair of security bulwarks if the respective one of the adjacent pair of security bulwarks is located along a substantially straight run of the perimeter railing.

In another preferred embodiment, the side face subtends an angle, α, substantially equal to 22.5 degrees to a sagittal plane of the obstruction. This has the advantage of causing the obstruction to point in a seaward direction centrally between the adjacent pair of security bulwarks if the respective one of the adjacent pair of security bulwarks is located at a corner of the perimeter railing.

The obstruction may have just one side face which is substantially parallel to the sagittal plane of the obstruction or a pair of such side faces opposing each other, just one side face which subtends an angle, α, substantially equal to 22.5 degrees to the sagittal plane of the obstruction or a pair of such side faces opposing each other, or one side face which is substantially parallel to the sagittal plane of the obstruction and one side face which subtends an angle, α, substantially equal to 22.5 degrees to the sagittal plane of the obstruction. These various different combinations allow for the obstruction to be positioned in various different locations along a perimeter railing of a vessel or marine installation.

The connection facility is preferably located on the side face. This allows the connection facility to be hidden from view from the seaward side of the obstruction and therefore to be inaccessible by an unauthorized potential boarder.

The connection facility may be part of a plug and socket system, for example with a plug formed on the side face of the obstruction, and a socket formed on the corresponding side face of the respective one of the adjacent pair of security bulwarks. Preferably, however, the connection facility comprises a through-hole through the obstruction substantially perpendicular to the sagittal plane of the obstruction. If so, the obstruction may be quickly and easily connected to the respective one of the adjacent pair of security bulwarks and the security bulwark and the obstruction may be secured to each other by inserting a connector, such as a bolt, through the through-hole. Preferably, the connection facility comprises a through-hole for receiving a rod, located in a corner between the rear end and the top side of the obstruction. This allows a rod to be passed through the through-hole, so that the obstruction can be mounted outside the perimeter railing by being suspended from the rod.

Preferably, the rear end of the obstruction comprises a bay to accommodate the handrail of the perimeter railing. The bay should preferably be located near to the aforementioned corner between the rear end and the top side of the obstruction.

As stated above, the obstruction further comprises a shoulder facing the rear end, for abutting a feature on a respective one of the adjacent pair of security bulwarks. The feature may, for example, be a front face or a part of a mound on the front face of a respective one of the adjacent pair of security bulwarks. Thus, the shoulder may be oriented perpendicular to the sagittal plane of the obstruction, so that it faces the rear end of the obstruction, in order to abut the front face of the security bulwark, or it may be inclined at an oblique angle to the sagittal plane of the obstruction, wherein the oblique angle is chosen to match the orientation of the feature on the respective one of the adjacent pair of security bulwarks which the shoulder is intended to abut, such as a part of the mound on the front face of the security bulwark.

This shoulder, by abutting a feature on the respective one of the adjacent pair of security bulwarks, has the advantage of preventing or severely hindering an unauthorized potential boarder from pushing the obstruction out of their way in a lateral direction, that is to say, in a direction towards the mound on the front face of the respective one of the adjacent pair

of security bulwarks. Preferably the obstruction comprises a pair of such shoulders, one on each side of the sagittal plane of the obstruction, so that the obstruction is harder to push out of the way in either of the directions towards the respective mounds on the front face of each of the adjacent pair of security bulwarks.

Preferably, the lateral cheeks of the obstruction are both substantially flat. This prevents or significantly hinders an unauthorized potential boarder from being able to find a hand- or foothold on either of the opposing cheeks.

Preferably, the separation between the pair of opposing lateral cheeks tapers from the rear end towards the front end of the obstruction. This has the advantage of shifting the centre of mass of the obstruction towards the rear end, which decreases the moment of force the weight of the obstruction applies to the connection facility.

Preferably, the obstruction comprises a rounded corner between the top side and the front end and between the front end and the underside. This has the advantage of denying an unauthorized potential boarder a hand- or foothold on either of these two corners, which a sharp corner might otherwise offer.

In a second aspect, the present invention also provides a perimeter protection system comprising a plurality of security bulwarks arranged side-by-side and adjacent to each other along a perimeter railing of a vessel or marine installation, and an obstruction according to the first aspect of the invention positioned in a recess between an adjacent pair of the plurality of security bulwarks. In comparison to a known perimeter protection system for a vessel or marine installation having such a recess, a perimeter protection system with such an obstruction is significantly harder for unauthorized potential boarders to gain access to the vessel or marine installation.

Preferably, the plurality of security bulwarks comprises a security bulwark having a side face, which security bulwark is located along a substantially straight run of the perimeter railing. If so, the obstruction should also have a side face which is substantially parallel to a sagittal plane of the obstruction and be positioned with its side face abutting the side face

of the security bulwark which is located along the substantially straight run of the perimeter railing.

In one possible embodiment, the plurality of security bulwarks may comprise a security bulwark having a side face, which security bulwark is located at a corner of the perimeter railing. If so, the obstruction should also have a side face which subtends an angle, α, substantially equal to 22.5 degrees to a sagittal plane of the obstruction and be positioned with its side face abutting the side face of the security bulwark located at the corner of the perimeter railing.

The perimeter protection system may comprise any combination of security bulwarks located along one or more substantially straight runs of the perimeter railing, security bulwarks located at one or more corners of the perimeter railing, obstructions with a side face which is substantially parallel to a sagittal plane of the obstruction, and obstructions with a side face which subtends an angle, α, substantially equal to 22.5 degrees to a sagittal plane of the obstruction, all positioned as appropriate to accommodate the overall configuration of the perimeter railing of the vessel or marine installation.

In a third aspect, the present invention also provides a method of protecting a perimeter of a vessel or marine installation. The method comprises positioning a plurality of security bulwarks side-by-side and adjacent to each other along a perimeter railing of the vessel or marine installation, providing an obstruction according to the first aspect of the invention, and positioning the obstruction in a recess between an adjacent pair of the plurality of security bulwarks.

Preferably, the method further comprises providing a first one of the plurality of security bulwarks with a side face and locating the first one of the plurality of security bulwarks along a substantially straight run of the perimeter railing. If so, the method should also comprise providing the obstruction with a side face which is substantially parallel to a sagittal plane of the obstruction and positioning the obstruction with its side face abutting the side face of the first one of the plurality of security bulwarks.

Preferably, the method further comprises providing a second one of the plurality of security bulwarks with a side face and locating the second one of the plurality of security bulwarks at a corner of the perimeter railing. If so, the method should also comprise providing the obstruction with a side face which subtends an angle, α, substantially equal to 22.5 degrees to a sagittal plane of the obstruction and positioning the obstruction with its side face abutting the side face of the second one of the plurality of security bulwarks.

Further features and advantages of the present invention will become apparent from the following detailed description, which is given by way of example and in association with the accompanying drawings, in which:

Fig. 1 is a perspective view from an outside or seaward side of a part of a perimeter railing of a vessel or marine installation;

Fig. 2 is a perspective view from an inside or deck side of the part of the perimeter railing shown in Fig. 1;

Fig. 3 is a perspective view from the outside or seaward side of a first plurality of security bulwarks mounted on the part of the perimeter railing shown in Figs. 1 and 2;

Fig. 4 is a perspective view from the inside or deck side of the same plurality of security bulwarks as shown in Fig. 3 mounted on the part of the perimeter railing shown in Figs. 1 and 2;

Fig. 5 is a first perspective view from above and one side of a first embodiment of an obstruction for positioning between an adjacent pair of the plurality of security bulwarks shown in Figs. 3 and 4;

Fig. 6 is a second perspective view from below and behind of the obstruction shown in Fig. 5;

Fig. 7 is a top plan view of the obstruction shown in Figs. 5 and 6;

Fig. 8 is a top plan exploded view of part of a first embodiment of a perimeter protection system comprising the obstruction shown in Figs. 5 to 7 positioned between an adjacent pair of the plurality of security bulwarks shown in Figs. 3 and 4;

Fig. 9 is a perspective view from an outside or seaward side of a second plurality of security bulwarks mounted on a part of a perimeter railing at a corner of a vessel or marine installation;

Fig. 10 is a perspective view from an inside or deck side of the same plurality of security bulwarks as shown in Fig. 9 mounted on the same part of the perimeter railing at a corner of a vessel or marine installation as shown in Fig. 9;

Fig. 11 is a first perspective view from above and one side of an obstruction for positioning between an adjacent pair of the plurality of security bulwarks shown in Figs. 9 and 10;

Fig. 12 is a second perspective view from below and behind of the obstruction shown in Fig. 11;

Fig. 13 is a rear view of the obstruction shown in Figs. 11 and 12;

Fig. 14 is a top plan view of the obstruction shown in Figs. 11 to 13;

Fig. 15 is a top plan exploded view of part of a perimeter protection system comprising the obstruction shown in Figs. 11 to 14 positioned between an adjacent pair of the plurality of security bulwarks shown in Figs. 9 and 10;

Fig. 16 is a perspective view from the outside or seaward side of a representative part of a second embodiment of a perimeter protection system for mounting along a perimeter railing of a vessel or marine installation;

Fig. 17 is a perspective view from the inside or deck side of the part of the perimeter protection system shown in Fig. 16;

Fig. 18 is a first perspective view of a security bulwark in the perimeter protection system shown in Figs. 16 and 17;

Fig. 19 is a second perspective view of the security bulwark shown in Fig. 18;

Fig. 20 is a first perspective view from above and one side of a third embodiment of an obstruction for positioning between an adjacent pair of the security bulwarks shown in Figs. 18 and 19;

Fig. 21 is a second perspective view from below and behind of the obstruction shown in Fig. 20;

Fig. 22 is a top plan view of the obstruction shown in Figs. 20 and 21;

Fig. 23 is a top plan view of the part of the perimeter protection system shown in Figs. 16 and 17;

Fig. 24 is a perspective view from the outside or seaward side of a representative part of another perimeter protection system for mounting along a perimeter railing of a vessel or marine installation;

Fig. 25 is a first perspective view from the inside or deck side of the part of the perimeter protection system shown in Fig. 24;

Fig. 26 is a second perspective view from the inside or deck side of the part of the perimeter protection system shown in Figs. 24 and 25;

Fig. 27 is a first perspective view from above and one side of another obstruction for positioning between an adjacent pair of the security bulwarks shown in Figs. Figs. 18 and 19;

Fig. 28 is a second perspective view from below and behind of the obstruction shown in Fig. 27;

Fig. 29 is a rear view of the obstruction shown in Figs. 27 and 28;

Fig. 30 is a top plan view of the obstruction shown in Figs. 27 to 29; and

Fig. 31 is a top plan view of the part of the perimeter protection system shown in Figs. 24 to 26.

Figs. 1 and 2 respectively show views from an outside or seaward side and from an inside or deck side of a representative part of a perimeter railing 20 of a vessel or marine installation. Part of a side of the vessel or marine installation can be seen labelled with reference numeral 52. The perimeter railing 20 comprises a plurality of courses of rails, which include a topmost handrail 201, a middle course of rails 202 and a lowest course of rails 203. At regular intervals along the perimeter railing 20 are a plurality of vertical stanchions 204. The perimeter railing 20 is mounted on a deck 51 of the vessel or marine installation. The overall height, g, of the railing 20 from the deck 51 to the topmost handrail 201 is required by regulations to be at least 1 metre. The separation, f, of the lowest course of rails 203 from the deck 51 is also required by regulations to be no more than 230 mm. The middle course of rails 202 is positioned approximately equidistant between the topmost handrail 201 and the lowest course of rails 203. Thus a gap between the topmost handrail 201 and the middle course of rails 202 or between the middle course of rails 202 and the lowest course of rails 203 is given by (g – f)/2, from which must also be subtracted the thickness of the courses of rails themselves. Each gap is therefore usually not more than 500 mm in height, and, in practice, is considerably less than this. Outside the railing 20 at the edge of the deck 51 is a vertical lip called a fishplate 53, the height of which depends upon the type of vessel or marine installation on which the railing 20 is mounted, but which, in general, is between about 90 and about 400 mm in height.

Figs. 3 and 4 respectively show views from the outside or seaward side and from the inside or deck side of the same perimeter railing 20 as is shown in Figs. 1 and 2, on which a plurality of security bulwarks 1a, 1b, 1c have been mounted side-by-side adjacent to each other. Each of the plurality of security bulwarks 1a, 1b, 1c has a front face 2 comprising a pair of projecting mounds 3 separated from each other by a valley 7. Each of the plurality of security bulwarks 1a, 1b, 1c also has respective left and right side faces 16. The side faces 16 are provided with connection facilities, whereby the plurality of security bulwarks 1a, 1b, 1c may be connected to each other. The mounds 3 each have an underside providing the bulwarks 1a, 1b, 1c with an overhang and the mounds 3 are convex in a direction of the breadth of the bulwarks, that is to say, in a direction substantially parallel to the perimeter railing 20.

Whereas a depth, d, of the bulwarks 1a, 1b, 1c in a seaward to inboard direction (for which, see Fig. 8) is generally greater than the length of a forearm of an unauthorized potential boarder in a region of the valley 7, in a region where the adjacent security bulwarks are closest to each other, the depth of the security bulwarks in a seaward to inboard direction may be less than the length of a forearm of an unauthorized potential boarder. There is therefore a risk that an unauthorized potential boarder may try to squeeze into the recess bounded by the mounds 3 on an adjacent pair of the plurality of security bulwarks 1a, 1b, 1c and climb over the top of the bulwarks by establishing a handhold on top of the adjacent security bulwarks in the region where the adjacent security bulwarks are closest to each other.

Figs. 5 to 7 show a first embodiment of an obstruction 80A for positioning between an adjacent pair of the plurality of security bulwarks shown in Figs. 3 and 4, in order to mitigate this risk. The obstruction 80A comprises a rear end 81 for positioning towards the perimeter railing 20 and a front end 83 for positioning away from the perimeter railing 20. The rear end 81 and the front end 83 are separated from each other by a top side 82, an underside 84 and a pair of opposing lateral cheeks 85a, 85b. The obstruction 80A further comprises a connection facility 87, 88 for connecting the obstruction 80A to the adjacent pair of security bulwarks. When the obstruction 80A is mounted between an adjacent pair of security bulwarks, the top side 82 of the obstruction 80A slopes downwardly from the

rear end 81 towards the front end 83, so that a hand of an unauthorized potential boarder placed on the top side 82 will tend to slide off it in a seaward direction.

In this embodiment, the angle of downward slope from the rear end 81 towards the front end 83 is approximately 45 degrees to the horizontal when the obstruction 80A is in use on a vessel or marine installation. The separation of the front end 83 from the rear end 81 of the obstruction 80A is approximately 600 mm, which is generally greater than the length of a forearm of an unauthorized potential boarder. The obstruction 80A has a maximum height from the top side 82 to the underside 84 which is approximately 700 mm near to the rear end 81. This height is therefore sufficient to completely cover the gap between the topmost handrail 201 and the middle course of rails 202 and to at least partially cover the gap between the middle course of rails 202 and the lowest course of rails 203, as described above in relation to Figs. 1 and 2. On the other hand, the part of the gap between the middle course of rails 202 and the lowest course of rails 203 which remains uncovered by the obstruction 80A is generally too narrow for an unauthorized potential boarder to be able to squeeze through.

In this embodiment, the obstruction 80A further comprises a pair of opposing side faces 86a, 86b for abutting the corresponding side faces 16 of the adjacent pair of security bulwarks. The side faces 86a, 86b are both substantially parallel to a sagittal plane X-X' of the obstruction 80A. By a sagittal plane of the obstruction 80A is meant a vertical plane which divides the obstruction into substantially symmetrical left and right halves. The connection facility 87, 88 is located on the side faces 86a, 86b and comprises a through-hole 88 for receiving a rod, which is located in a corner 812 between the rear end 81 and the top side 82 of the obstruction 80A. The rear end 81 also comprises a bay 89 to accommodate the handrail 201 of the perimeter railing 20. On either side of the obstruction 80A, proximal its rear end 81, is a shoulder 810a, 810b for abutting the front face 2 of a respective one of the adjacent pair of security bulwarks. In this embodiment, the shoulder 810a, 810b is perpendicular to the sagittal plane X-X' of the obstruction 80A, so that it faces the rear end 81 of the obstruction. However, in other possible embodiments, the shoulder could alternatively be inclined at an oblique angle to the sagittal plane of the obstruction, in order

to abut a side of the mound 3 on the front face 2 of the respective one of the adjacent pair of security bulwarks, for example.

The lateral cheeks 85a, 85b of the obstruction 80A are both substantially flat, so that they offer no hand- or foothold to an unauthorized potential boarder. The separation between the pair of opposing lateral cheeks 85a, 85b tapers from the rear end 81 towards the front end 83 of the obstruction 80A, so that the centre of mass of the obstruction 80A is significantly closer to the rear end 81 than to the front end 83. The obstruction 80A also has rounded corners 823, 834 between the top side 82 and the front end 83, as well as between the front end 83 and the underside 84, to deny an unauthorized potential boarder a hand- or foothold on either of these two corners.

Fig. 8 shows a representative part of a first embodiment of a perimeter protection system 800A for mounting along a perimeter railing 20 of a vessel or marine installation. The perimeter protection system 800A comprises a plurality of security bulwarks 1a, 1b arranged side-by-side and adjacent to each, as well as an obstruction 80A as described above in relation to Figs. 5 to 7. The obstruction 80A is positioned in a recess 90 between the adjacent pair of security bulwarks 1a, 1b. The security bulwarks 1a, 1b each have respective left and right side faces 16 and can be located along a substantially straight run of the perimeter railing 20. The obstruction 80A is positioned with its side faces 86a, 86b abutting the corresponding side faces 16 of the security bulwarks 1a, 1b. The connection facility 87, 88 on the side faces 86a, 86b of the obstruction 80A is aligned with a corresponding connection facility on the side faces 16 of the security bulwarks 1a, 1b, so that the security bulwarks 1a, 1b and the obstruction 80A may be connected together by means of rods, bolts or other connectors to make a rigid and integrated whole. Since the side faces 86a, 86b of the obstruction 80A are substantially parallel to the sagittal plane X-X' of the obstruction 80A, the obstruction 80A points in a seaward direction centrally between the adjacent pair of security bulwarks 1a, 1b. By occupying the recess 90 in this manner, the obstruction 80A prevents or significantly hinders an unauthorized potential boarder from squeezing into the recess 90.

Figs. 9 and 10 respectively show views from the outside or seaward side and from the inside or deck side of a part of a perimeter railing 20 located at a corner 21 of a vessel or marine installation, on which two security bulwarks 1a, 1b as described above in relation to Figs. 3 and 4 have been mounted, together with a second type of security bulwark 30 positioned therebetween, mounted at the corner 21. Like the two security bulwarks 1a, 1b, the security bulwark 30 comprises a projecting mound 33 having an underside providing the bulwark 30 with an overhang. The mound 33 is also convex in a direction of the breadth of the bulwark 30, that is to say, in a direction from security bulwark 1a to security bulwark 1b. The security bulwark 30 also has respective left and right side faces 16, which are provided with connection facilities, whereby the plurality of security bulwarks 1a, 1b, 30 may be connected to each other.

As may be seen in Fig. 9, in a region where the adjacent security bulwarks 1a, 1b, 30 are closest to each other, the depth of the security bulwarks in a seaward to inboard direction may be less than the length of a forearm of an unauthorized potential boarder. There is therefore a risk that an unauthorized potential boarder may try to squeeze into the recess bounded by the mounds on an adjacent pair of the plurality of security bulwarks 1a, 30 or 30, 1b and climb over the top of the bulwarks by establishing a handhold on top of the adjacent security bulwarks in the region where the adjacent security bulwarks are closest to each other.

Figs. 11 to 14 show an obstruction 80B for positioning between an adjacent pair of the plurality of security bulwarks shown in Figs. 9 and 10, in order to mitigate this risk. The obstruction 80B comprises a rear end 81 for positioning towards the perimeter railing 20 and a front end 83 for positioning away from the perimeter railing 20. The rear end 81 and the front end 83 are separated from each other by a top side 82, an underside 84 and a pair of opposing lateral cheeks 85a, 85b. The obstruction 80B further comprises a connection facility 87, 88 for connecting the obstruction 80B to the adjacent pair of security bulwarks. When the obstruction 80B is mounted between an adjacent pair of security bulwarks, the top side 82 of the obstruction 80B slopes downwardly from the rear end 81 towards the front end 83, so that a hand of an unauthorized potential boarder placed on the top side 82 will tend to slide off it in a seaward direction.

In this embodiment, the angle of downward slope from the rear end 81 towards the front end 83 is approximately 35 degrees to the horizontal when the obstruction 80B is in use on a vessel or marine installation. The separation of the front end 83 from the rear end 81 of the obstruction 80B is approximately 800 mm, which is generally greater than the length of a forearm of an unauthorized potential boarder. The obstruction 80B has a maximum height from the top side 82 to the underside 84 which is approximately 700 mm near to the rear end 81. This height is therefore sufficient to completely cover the gap between the topmost handrail 201 and the middle course of rails 202 and to at least partially cover the gap between the middle course of rails 202 and the lowest course of rails 203, as described above in relation to Figs. 1 and 2. On the other hand, the part of the gap between the middle course of rails 202 and the lowest course of rails 203 which remains uncovered by the obstruction 80B is generally too narrow for an unauthorized potential boarder to be able to squeeze through.

The obstruction 80B further comprises a pair of side faces 86a, 86b for abutting the corresponding side faces 16 of the adjacent pair of security bulwarks. The side faces 86a, 86b both subtend an angle, α, of approximately 22.5 degrees to a sagittal plane X-X' of the obstruction 80B. By a sagittal plane of the obstruction 80B is meant a vertical plane which divides the obstruction into substantially symmetrical left and right halves. The connection facility 87, 88 is located on the side faces 86a, 86b and comprises a through-hole 88 for receiving a rod, which is located in a corner 812 between the rear end 81 and the top side 82 of the obstruction 80B. The rear end 81 also comprises a bay 89 to accommodate the handrail 201 of the perimeter railing 20.

The lateral cheeks 85a, 85b of the obstruction 80B are both substantially flat, so that they offer no hand- or foothold to an unauthorized potential boarder. The separation between the pair of opposing lateral cheeks 85a, 85b tapers from the rear end 81 towards the front end 83 of the obstruction 80B, so that the centre of mass of the obstruction 80B is significantly closer to the rear end 81 than to the front end 83. The obstruction 80B also has rounded corners 823, 834 between the top side 82 and the front end 83, as well as between

the front end 83 and the underside 84, to deny an unauthorized potential boarder a hand- or foothold on either of these two corners.

Fig. 15 shows a representative part of a perimeter protection system 800B for mounting along a perimeter railing 20 of a vessel or marine installation. The perimeter protection system 800B comprises a plurality of security bulwarks 1a, 1b, 30 as described above in relation to Figs. 9 and 10, which are arranged side-by-side and adjacent to each, as well as two obstructions 80B as described above in relation to Figs. 11 to 14. The security bulwark 30 is for location at a corner 21 of the perimeter railing 20 between the two security bulwarks 1a, 1b, which can each be located along substantially straight runs of the perimeter railing 20 on either side of the corner 21. The obstructions 80B are positioned in recesses 90 between the adjacent pairs of security bulwarks 1a, 30 and 30, 1b. The security bulwarks 1a, 1b, 30 each have respective left and right side faces 16. The obstructions 80B are positioned with their respective side faces 86a, 86b abutting the corresponding side faces 16 of the security bulwarks 1a, 1b, 30. The connection facilities 87, 88 on the side faces 86a, 86b of the obstructions 80B are aligned with corresponding connection facilities on the side faces 16 of the security bulwarks 1a, 1b, 30, so that the security bulwarks 1a, 1b, 30 and the obstructions 80B may be connected together by means of rods, bolts or other connectors to make a rigid and integrated whole. Since the side faces 86a, 86b of the obstructions 80B each subtend an angle, α, of approximately 22.5 degrees to the sagittal plane X-X' of each respective obstruction, the obstructions 80B each point in a seaward direction centrally between the adjacent pairs of security bulwarks 1a, 30 and 30, 1b. By occupying the recesses 90 in this manner, the obstructions 80B prevent or significantly hinder an unauthorized potential boarder from squeezing into the recesses 90.

Figs. 16 and 17 respectively show views from an outside or seaward side and from an inside or deck side of a representative part of a second embodiment of a perimeter protection system 800C for mounting along a perimeter railing 20 of a vessel or marine installation. The perimeter protection system 800C comprises a plurality of security bulwarks 119a, 119b, 119c arranged side-by-side and adjacent to each, as well as two obstructions 80C positioned between each adjacent pair of the security bulwarks 119a, 119b, 119c.

An example of the plurality of security bulwarks 119a, 119b, 119c is shown in more detail in Figs. 18 and 19, labelled 119. The security bulwark 119 is similar to the security bulwark 30 described above in relation to Figs. 9 and 10, except that it further comprises a rear panel 113 on the back thereof for mounting inside a perimeter railing of a vessel or marine installation. Thus, the security bulwark 119 has a front face comprising a projecting mound 133 having an underside 134 providing the bulwark 119 with an overhang. The mound 133 is convex in a direction of the breadth A-A' of the bulwark 119. The security bulwark 119 also has respective left and right side faces 116, which are provided with connection facilities 117, whereby the plurality of security bulwarks 119a, 119b, 119c may be connected to each other. The bulwark 119 further comprises a borehole 111, which runs in the direction A-A' of the breadth of the bulwark 119, alongside an uppermost edge 112 of the bulwark 119. This borehole 111 is able to receive a rod therein in the direction A-A', so that the rear panel 113 can be hinged relative to the front face of the bulwark 119 substantially parallel to an uppermost edge 112 of the bulwark 119 by rotation about the rod. Moreover, the rod is removable from the borehole 111, so that the rear panel 113 can be detached from the rest of the bulwark 119.

As may best be seen in Fig. 19, however, even when the rear panel 113 is attached to the rest of the bulwark 119 via the rod, the shape of the rear panel 113 is such that the rear panel 113 can adopt a position in which it is parallel to but spaced apart from the front face of the security bulwark 119. The separation of the rear panel 113 from the front face in this position is sufficiently great to accommodate the thickness of any perimeter railing generally found on a vessel or marine installation. Thus the rear panel 113 can be hinged apart from the front face of the bulwark 119, and the bulwark 119 can be mounted over a perimeter railing, with the front face thereof disposed on the outside or seaward side of the railing and the rear panel 113 on the inside or deck side of the railing. The rear panel 113 and the rest of the bulwark 119 can then be hinged back together until the rear panel 113 is parallel to but spaced apart from the front face of the security bulwark 119 once again. In this position, a lowermost edge 62 of the rear panel 113 aligns with the lowermost part of the front face of the security bulwark 119.

As can be seen in Fig. 18, the security bulwark 119 also has a pair of eyelets 8 formed through the front face of the bulwark 119, and as can be seen in Fig. 19, the rear panel 113 comprises a pair of connection sites 38, for connecting the rear panel 113 to the front face of the security bulwark 119. The connection sites 38 each comprise a through-hole formed in the rear panel 113 which is able to receive a connector, such as a bolt. The locations of the connection sites 38 on the rear panel 113 correspond to the locations of the eyelets 8 on the front face of the security bulwark 119. Thus once the bulwark 119 has been mounted over a perimeter railing, a connector, such as a bolt, can be inserted into a through-hole at one of the connection sites 38 on the rear panel 113 and through the corresponding one of the eyelets 8 on the front face, in a direction perpendicular to the perimeter railing over which the bulwark 119 has been mounted. The bolt can then be fitted with a nut, for example, and both can be tightened together until the rear panel 113 and the front face are secured together, thereby preventing the security bulwark 119 from being removed from the perimeter railing to which it has been mounted without firstly undoing the connector.

Figs. 20 to 22 show an example of one of the obstructions 80C in the perimeter protection system 800C of Figs. 16 and 17 in greater detail. The obstruction 80C comprises a rear end 81 for positioning towards the perimeter railing 20 of a vessel or marine installation and a front end 83 for positioning away from the perimeter railing 20. The rear end 81 and the front end 83 are separated from each other by a top side 82, an underside 84 and a pair of opposing lateral cheeks 85a, 85b. The obstruction 80C further comprises a connection facility 87, 88 for connecting the obstruction 80C to an adjacent pair of the security bulwarks 119a, 119b, 119c. When the obstruction 80C is mounted between an adjacent pair of the security bulwarks 119a, 119b, 119c, the top side 82 of the obstruction 80C slopes downwardly from the rear end 81 towards the front end 83, so that a hand of an unauthorized potential boarder placed on the top side 82 will tend to slide off it in a seaward direction.

In this embodiment of the obstruction, the angle of downward slope from the rear end 81 towards the front end 83 is approximately 45 degrees to the horizontal when the obstruction 80C is in use on a vessel or marine installation. The separation of the front end

83 from the rear end 81 of the obstruction 80C is approximately 700 mm, which is generally greater than the length of a forearm of an unauthorized potential boarder. The obstruction 80C has a maximum height from the top side 82 to the underside 84 which is approximately 700 mm near to the rear end 81. This height is therefore sufficient to completely cover the gap between the topmost handrail 201 and the middle course of rails 202 of a perimeter railing 20 and to at least partially cover the gap between the middle course of rails 202 and the lowest course of rails 203, as described above in relation to Figs. 1 and 2. On the other hand, the part of the gap between the middle course of rails 202 and the lowest course of rails 203 which remains uncovered by the obstruction 80C is generally too narrow for an unauthorized potential boarder to be able to squeeze through.

In this embodiment, the obstruction 80C further comprises a pair of opposing side faces 86a, 86b for abutting the corresponding side faces 116 of the adjacent pair of security bulwarks 119a, 119b, 119c. The side faces 86a, 86b are both substantially parallel to a sagittal plane X-X' of the obstruction 80C. By a sagittal plane of the obstruction 80C is meant a vertical plane which divides the obstruction into substantially symmetrical left and right halves. The connection facility 87, 88 is located on the side faces 86a, 86b and comprises a through-hole 88 for receiving a rod, as well as a plurality of smaller through-holes 87, all of which pass through the obstruction 80C from one of the side faces 86a to the other side face 86b. The through-hole 88 for receiving a rod is located in a corner 812 of the obstruction 80C between the rear end 81 and the top side 82 thereof, and aligns, in use of the obstruction 80C in the manner shown in Figs. 16 and 17, with the boreholes 111 in the adjacent pair of security bulwarks 119a, 119b, 119c. The smaller through-holes 87 instead align, in use of the obstruction 80C in the manner shown in Figs. 16 and 17, with the connection facilities 117 of the adjacent pair of security bulwarks 119a, 119b, 119c. The adjacent pair of security bulwarks 119a, 119b, 119c may therefore be connected together via the through-holes 87, and a rod passed into the boreholes 111 in the adjacent pair of security bulwarks 119a, 119b, 119c may also pass through the through-hole 88. As may be seen in Figs. 20 and 21, the rear end 81 of the obstruction 80C also comprises a bay 89 to accommodate the handrail 201 of the perimeter railing 20.

On either side of the obstruction 80C, proximal its rear end 81, is a shoulder 810a, 810b for abutting a side surface 5h of the projecting mound 133 on the front face of a respective one of the adjacent pair of security bulwarks 119a, 119b, 119c (for which, see Figs. 18 and 19). In this embodiment, the shoulders 810a, 810b are inclined at an oblique angle to the sagittal plane X-X' of the obstruction 80C, so that the separation between the shoulders 810a, 810b tapers from the front end 83 towards the rear end 81 of the obstruction 80C. These shoulders, by abutting the side surface 5h of the mound 133 on the front face of a respective one of the adjacent pair of security bulwarks 119a, 119b, 119c, prevent or severely hinder an unauthorized potential boarder from pushing the obstruction 80C out of their way in a lateral direction, that is to say, in a direction towards the side surface 5h of the projecting mound 133.

The lateral cheeks 85a, 85b of the obstruction 80C are both substantially flat, so that they offer no hand- or foothold to an unauthorized potential boarder. The separation between the pair of opposing lateral cheeks 85a, 85b tapers from the rear end 81 towards the front end 83 of the obstruction 80C, so that the centre of mass of the obstruction 80C is significantly closer to the rear end 81 than to the front end 83. The obstruction 80C also has rounded corners 823, 834 between the top side 82 and the front end 83, as well as between the front end 83 and the underside 84, to deny an unauthorized potential boarder a hand- or foothold on either of these two corners.

Fig. 23 is a top plan view of the part of the perimeter protection system 800C shown in Figs. 16 and 17, demonstrating how the obstructions 80C are positioned in recesses 90 between the adjacent pairs of security bulwarks 119a, 119b and 119b, 119c. By occupying the recesses 90 in this manner, the obstructions 80C prevent or significantly hinder an unauthorized potential boarder from squeezing into one of the recesses 90.

Figs. 24 to 26 respectively show one view from an outside or seaward side and two views from an inside or deck side of a representative part of another perimeter protection system 800D for mounting along a perimeter railing 20 of a vessel or marine installation. The perimeter protection system 800D comprises a plurality of security bulwarks 119d, 119e,

119f arranged side-by-side and adjacent to each, as well as two obstructions 80D positioned between each adjacent pair of the security bulwarks 119d, 119e, 119f.

The plurality of security bulwarks 119d, 119e, 119f are of the type shown and described above in relation to Figs. 18 and 19. The central one 119e of this plurality of security bulwarks is for location at a corner 21 of a perimeter railing 20 of a vessel or marine installation, between the two security bulwarks 119d, 119f, which can each be located along substantially straight runs of the perimeter railing 20 on either side of the corner 21. In order for the perimeter protection system 800D to be mounted at the corner 21, the rear panel 113 of the central security bulwark 119e can be removed, as shown in Fig. 25. This exposes a recess 136 in the back of central security bulwark 119e, which is formed by an interior surface of the projecting mound 133 on the front of the central security bulwark 119e. The mound 133 further comprises a raised crest 144, as shown in Figs. 18 and 19, which adapts the recess 136 to receive the corner 21 of the perimeter railing 20. The corner 21 of the perimeter railing 20 can therefore be inserted into the recess 136, after which the rear panel 113 of the central security bulwark 119e can be replaced, as shown in Fig. 26.

Figs. 27 to 30 show an example of one of the obstructions 80D in the perimeter protection system 800D of Figs. 24 to 26 in greater detail. The obstruction 80D comprises a rear end 81 for positioning towards the perimeter railing 20 and a front end 83 for positioning away from the perimeter railing 20. The rear end 81 and the front end 83 are separated from each other by a top side 82, an underside 84 and a pair of opposing lateral cheeks 85a, 85b. The obstruction 80D further comprises a connection facility 87, 88 for connecting the obstruction 80D to an adjacent pair of the security bulwarks 119d, 119e, 119f. When the obstruction 80D is mounted between an adjacent pair of the security bulwarks 119d, 119e, 119f, the top side 82 of the obstruction 80D slopes downwardly from the rear end 81 towards the front end 83, so that a hand of an unauthorized potential boarder placed on the top side 82 will tend to slide off it in a seaward direction.

In this obstruction, the angle of downward slope from the rear end 81 towards the front end 83 is approximately 45 degrees to the horizontal when the obstruction 80D is in use on a vessel or marine installation. The separation of the front end 83 from the rear end 81 of the

obstruction 80D is approximately 700 mm, which is generally greater than the length of a forearm of an unauthorized potential boarder. The obstruction 80D has a maximum height from the top side 82 to the underside 84 which is approximately 700 mm near to the rear end 81. This height is therefore sufficient to completely cover the gap between the topmost handrail 201 and the middle course of rails 202 of a perimeter railing 20 and to at least partially cover the gap between the middle course of rails 202 and the lowest course of rails 203, as described above in relation to Figs. 1 and 2. On the other hand, the part of the gap between the middle course of rails 202 and the lowest course of rails 203 which remains uncovered by the obstruction 80D is generally too narrow for an unauthorized potential boarder to be able to squeeze through.

The obstruction 80D further comprises a pair of side faces 86a, 86b for abutting the corresponding side faces 116 of the adjacent pair of security bulwarks 119d, 119e, 119f. The side faces 86a, 86b both subtend an angle, α, of approximately 22.5 degrees to a sagittal plane X-X' of the obstruction 80D. By a sagittal plane of the obstruction 80D is meant a vertical plane which divides the obstruction into substantially symmetrical left and right halves. The connection facility 87, 88 is located on the side faces 86a, 86b and comprises a through-hole 88 for receiving a rod, as well as a plurality of smaller through-holes 87, all of which pass through the obstruction 80D from one of the side faces 86a to the other side face 86b. The through-hole 88 for receiving a rod is located in a corner 812 of the obstruction 80D between the rear end 81 and the top side 82 thereof, and aligns, in use of the obstruction 80D in the manner shown in Figs. 24 to 26, with the boreholes 111 in the adjacent pair of security bulwarks 119d, 119e, 119f. The smaller through-holes 87 instead align, in use of the obstruction 80D in the manner shown in Figs. 24 to 26, with the connection facilities 117 of the adjacent pair of security bulwarks 119d, 119e, 119f. The adjacent pair of security bulwarks 119d, 119e, 119f may therefore be connected together via the through-holes 87, and a rod passed into the borehole 111 in one of the adjacent pair of security bulwarks 119d, 119e, 119f may also enter into one side of the through-hole 88. As may be seen in Figs. 27 to 29, the rear end 81 of the obstruction 80D also comprises a bay 89 to accommodate the handrail 201 of the perimeter railing 20.

The lateral cheeks 85a, 85b of the obstruction 80D are both substantially flat, so that they offer no hand- or foothold to an unauthorized potential boarder. The separation between the pair of opposing lateral cheeks 85a, 85b tapers from the rear end 81 towards the front end 83 of the obstruction 80D, so that the centre of mass of the obstruction 80D is significantly closer to the rear end 81 than to the front end 83. The obstruction 80D also has rounded corners 823, 834 between the top side 82 and the front end 83, as well as between the front end 83 and the underside 84, to deny an unauthorized potential boarder a hand- or foothold on either of these two corners.

Fig. 31 is a top plan view of the part of the perimeter protection system 800D shown in Figs. 24 to 26, demonstrating how the obstructions 80D are positioned between the adjacent pairs of security bulwarks 119d, 119e and 119e, 119f. Since the side faces 86a, 86b of the obstructions 80D each subtend an angle, α, of approximately 22.5 degrees to the sagittal plane X-X' of each respective obstruction, the obstructions 80D each point in a seaward direction centrally between the adjacent pairs of security bulwarks 119d, 119e and 119e, 119f. By occupying the spaces between the adjacent pairs of security bulwarks 119d, 119e and 119e, 119f in this manner, the obstructions 80D significantly reduce the risk of an unauthorized potential boarder squeezing between one of the adjacent pairs of security bulwarks 119d, 119e and 119e, 119f.

Whereas the perimeter protection system 800D has been described above as comprising a plurality of security bulwarks 119d, 119e, 119f of the type shown in Figs. 18 and 19 and obstructions 80D only of the type shown and described above in relation to Figs. 27 to 30, it could additionally comprise one or more obstructions 80C of the type shown and described above in relation to Figs. 20 to 22. In particular, an obstruction 80C of the type shown in Figs. 20 to 22 could be positioned in one of the recesses 91 shown in Fig. 31 between one of the plurality of security bulwarks 119d, 119e, 119f on the one hand and an adjacent one of the obstructions 80D on the other, thereby preventing or significantly hindering an unauthorized potential boarder from squeezing into one of the recesses 91. Further alternative possible combinations of one or more of the obstructions 80C with one or more of the obstructions 80D can also be used to adapt the perimeter protection system 800D to fit round corners with angles other than 90 degrees, whilst also ensuring that the spaces

between the adjacent pairs of security bulwarks 119d, 119e and 119e, 119f remain fully occupied by one or more of the obstructions 80C, 80D.

Alternatively or additionally, one or more obstructions 80C of the type shown in Figs. 20 to 22 could be positioned in the same perimeter protection system between an adjacent pair of security bulwarks 119 of the type shown in Figs. 18 and 19, in the manner shown and described above in relation to Figs. 16, 17 and 23, thereby combining the perimeter protection system 800C of Figs. 16, 17 and 23 with the perimeter protection system 800D of Figs. 24 to 26 and 31. In other words, the present invention envisages perimeter protection systems comprising any possible combination of the type of security bulwark 119 shown in Figs. 18 and 19 with the two different types of obstruction 80C and 80D described herein, in order to adapt the perimeter protection system to suit any type or length of perimeter railing 20 of a vessel or marine installation, incorporating any number of corners 21 and straight runs of railing 20 of different lengths.

Moreover, whereas the perimeter protection systems 800C, 800D are shown in Figs. 16, 17 and 23 on the one hand and in Figs. 24 to 26 and 31 on the other to comprise security bulwarks 119 only of the type shown in Figs. 18 and 19, any one of these security bulwarks 119 can be substituted by a similarly sized security bulwark 30 of the type shown in Figs. 9, 10 and 15, which lacks a rear panel. In such a manner, an obstacle in the way of a perimeter railing located on the deck side or inside of the railing, such as an accommodation ladder, a cleat or bitt, can be accommodated by the perimeter protection system, by positioning a security bulwark 30 of the type shown in Figs. 9, 10 and 15 at the location of the obstacle. In other words, the present invention envisages perimeter protection systems comprising any possible combination of the different types of security bulwarks 30, 119 and obstructions 80C, 80D described herein.

Claims

1. An obstruction (80A, 80C) for positioning in a recess (90) between an adjacent pair of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f) mounted outside a perimeter railing (20) of a vessel or marine installation, wherein the perimeter railing (20) comprises a handrail (201), the obstruction comprising:

a rear end (81) for positioning towards the perimeter railing;

a front end (83) for positioning away from the perimeter railing;

a top side (82);

an underside (84);

a pair of side faces (86a, 86b) each for abutting a corresponding side face (16, 116) of a respective one of the adjacent pair of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f);

a pair of opposing lateral cheeks (85a, 85b) separating the front end (83) from a respective one of the pair of side faces (86a, 86b);

a connection facility (87, 88) for connecting the obstruction to at least one of the perimeter railing and the adjacent pair of security bulwarks; and

a shoulder (810a, 810b) facing the rear end (81), located between one of the opposing lateral cheeks (85a, 85b) and the respective one of the side faces (86a, 86b), for abutting a feature (2, 3, 5h, 133) of a respective one of the adjacent pair of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f);

wherein the top side (82) slopes downwardly from the rear end towards the front end during use of the obstruction between an adjacent pair of security bulwarks;

the breadth of the obstruction being substantially less than the depth of the obstruction from the front end (83) to the rear end (81).

2. An obstruction according to claim 1, wherein the side face (86a, 86b) is substantially parallel to a sagittal plane (X-X') of the obstruction.

3. An obstruction according to claim 1, wherein the side face (86a, 86b) subtends an angle (α) substantially equal to 22.5 degrees to a sagittal plane (X-X') of the obstruction.

4. An obstruction according to any one of claims 1 to 3, wherein the connection facility (87, 88) is located on the side face (86a, 86b).

5. An obstruction according to any one of the preceding claims, wherein the connection facility (87, 88) comprises a through-hole (88) for receiving a rod, located in a corner (812) between the rear end (81) and the top side (82).

6. An obstruction according to any one of the preceding claims, wherein the rear end (81) comprises a bay (89) to accommodate the handrail (201) of the perimeter railing (20).

7. An obstruction according to any one of the preceding claims, wherein the lateral cheeks (85a, 85b) are both substantially flat.

8. An obstruction according to any one of the preceding claims, wherein the separation between the pair of opposing lateral cheeks (85a, 85b) tapers from the rear end (81) towards the front end (83).

9. An obstruction according to any one of the preceding claims, comprising a rounded corner (823, 834) between the top side (82) and the front end (83) and between the front end (83) and the underside (84).

10. A perimeter protection system (800A, 800B, 800C, 800D) comprising:

a plurality of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f) arranged side-by-side and adjacent to each other along a perimeter railing (20) of a vessel or marine installation; and

an obstruction (80A, 80C) according to any one of the preceding claims positioned in a recess (90) between an adjacent pair of the plurality of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f).

11. A perimeter protection system (800A, 800C) according to claim 10, wherein the plurality of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f) comprises a security bulwark (1a, 1b, 119a, 119b, 119c) having a side face (16, 116), which security

bulwark (1a, 1b, 119a, 119b, 119c) is located along a substantially straight run of the perimeter railing (20), and wherein the obstruction (80A, 80C) is according to claim 2 or any one of claims 4 to 9 as dependent on claim 2 and is positioned with its side face (86a, 86b) abutting the side face (16, 116) of the security bulwark (1a, 1b, 119a, 119b, 119c) located along the substantially straight run of the perimeter railing (20).

12. A perimeter protection system (800B, 800D) according to claim 10 or claim 11, wherein the plurality of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f) comprises a security bulwark (30, 119e) having a side face (16, 116), which security bulwark (30, 119e) is located at a corner (21) of the perimeter railing (20), and wherein the obstruction is according to claim 3 or any one of claims 4 to 9 as dependent on claim 3 and is positioned with its side face (86a, 86b) abutting the side face (16, 116) of the security bulwark (30, 119e) located at the corner (21) of the perimeter railing (20).

13. A method of protecting a perimeter of a vessel or marine installation, the method comprising:

positioning a plurality of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f) side-by-side and adjacent to each other along a perimeter railing (20) of the vessel or marine installation;

providing an obstruction (80A, 80C) according to any one of claims 1 to 9; and

positioning the obstruction in a recess (90) between an adjacent pair of the plurality of security bulwarks (1a, 1b, 1c, 30, 119a, 119b, 119c, 119d, 119e, 119f).

14. A method according to claim 13, further comprising:

providing a first one (1a, 1b, 119a, 119b, 119c) of the plurality of security bulwarks with a side face (16, 116);

locating the first one (1a, 1b, 119a, 119b, 119c) of the plurality of security bulwarks along a substantially straight run of the perimeter railing (20);

providing the obstruction (80A, 80C) according to claim 2 or any one of claims 4 to 9 as dependent on claim 2; and

positioning the obstruction (80A, 80C) with its side face (86a, 86b) abutting the side face (16, 116) of the first one (1a, 1b, 119a, 119b, 119c) of the plurality of security bulwarks.

15. A method according to claim 13 or claim 14, further comprising:

providing a second one (30, 119e) of the plurality of security bulwarks with a side face (16, 116);

locating the second one (30, 119e) of the plurality of security bulwarks at a corner (21) of the perimeter railing (20);

providing the obstruction according to claim 3 or any one of claims 4 to 9 as dependent on claim 3; and

positioning the obstruction with its side face (86a, 86b) abutting the side face (16, 116) of the second one (30, 119e) of the plurality of security bulwarks.