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(54) **Control barrier**

Kontrollschranke

Barrière de contrôle

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Description

[0001] This invention relates to a control barrier, and more specifically to a control barrier that offers improved safety to passing pedestrians.

BACKGROUND

[0002] Control barriers are well known in the art and are typically used for directing the flow of traffic or pedestrians. Examples of their uses include directing traffic and/or pedestrians around road works, or simply to fence off and prevent access to hazardous working areas.

[0003] A typical barrier is described in US-A-2002014619 (Off the Wall Products, LLC) that comprises a barrier wall that is supported by one or two support assemblies. The support assemblies each comprise a leg extending vertically downwards from the barrier wall and a foot that extends perpendicularly both forwardly and rearwardly from the leg with respect to the barrier wall. Each barrier has a set of projecting arms having either pins or ports to allow a series of barriers to be connected together by engagement of a pin of one barrier and a port of another.

[0004] A further example of such a control barrier comprising inclined surfaces and a top rail is disclosed in the American Patent US 7 234 275 B1.

[0005] Another example of a barrier is given in the French Patent FR2682136 (Babled, Raymond) which relates to a mobile security barrier that may be used to line a road during sporting or ceremonial events and define spectator areas. Like the barrier described in US-A-2002014619, the Babled barrier comprises a barrier wall supported on feet. Specifically, the barrier wall of the Babled barrier is shaped to minimize two specific hazards. Firstly, the barrier wall comprises a recessed portion sized to allow a person to stand therein so that they are completely behind the general plane of the barrier. This feature is aimed at providing security personnel or stewards a safe position to stand whilst performing their duties during a ceremony or sporting event (e.g. a cycle race). Secondly, the general plane of the barrier wall is tilted so that the top of the barrier wall is further away from the road or track where the event is taking place than the bottom of the barrier wall. The purpose of the second feature is to reduce the risk of event participants (e.g. cyclists) from colliding with the barrier.

[0006] In common with many prior art barriers, both barriers described above comprise support elements (feet) that extend from the barrier along the ground. Supports that extend perpendicularly from a barrier wall present a tripping hazard to passing pedestrians. When such barriers are used around construction sites or roadworks, they are often used to define a safe path for pedestrians. In many situations, the path defined is narrow and is often curved to circumvent the working area. Therefore, the risk of pedestrians tripping over the barrier supports is increased.

[0007] It is an object of the present invention to provide a control barrier that minimises the tripping hazard associated with barrier supports, that is stable under normal use and is capable of performing the normal functions required of a control barrier.

BRIEF SUMMARY OF THE DISCLOSURE

[0008] In accordance with the present invention there is provided a control barrier for improving the safety of passing pedestrians, the control barrier comprising:

a barrier wall; and
at least one ground engaging support element connected to said barrier wall; wherein said barrier wall has
a first section extending substantially vertically when the ground engaging support element is disposed on substantially flat ground;
a second section extending at an inclined angle from a top edge of said first section forming an overhang over the ground when the ground engaging support element is disposed on substantially flat ground; and
a continuous rail extending from a first side edge of said barrier wall to a second side edge of said barrier wall wherein said rail is disposed on said barrier wall in a plane of the barrier wall that is furthest away from the plane of said first section in a direction that is perpendicular to the plane of said first section.

[0009] When the barrier is arranged so that the at least one ground engaging portion is disposed on substantially flat ground, the continuous rail overhangs the ground and spaces passing pedestrians from the first section of the barrier wall and at least part of the ground engaging support element. This is particularly important in the preferable embodiment wherein said at least one ground engaging support element extends in a direction that is perpendicular to the plane of said first section of said barrier wall.

[0010] In a preferable embodiment, the barrier wall further comprises a third section that extends at an inclined angle from the second section and the first section is preferably parallel to the third section. In one preferable embodiment, the third section forms the continuous rail and restricts how close the pedestrians can walk to the first section and the ground engaging support element. Indeed, the continuous rail may preferably be planar or tubular. In alternative preferable embodiments, the barrier wall further comprises one or more additional sections where one of the additional sections extends from the third section at an inclined angle. Indeed, the skilled person will envisage many different arrangements of barrier wall comprising any number of sections that are within the scope of the present invention.

[0011] The height of the continuous rail above the ground when the ground engaging support element is disposed on substantially flat ground is a relevant factor

when considering its effect on passing pedestrians. The rail may, for example, be arranged on the barrier wall so that it is approximately waist height, or knee height. If the rail is at waist height, it is likely that a person will walk so that their waist and arms are spaced from the rail. Since a person's feet are normally disposed under their hips when walking, their feet will be spaced perpendicularly from the continuous rail. It is preferable therefore, that the continuous rail is arranged on the barrier wall so that a pedestrians feet will be spaced a safe distance away from the protruding support elements when walking past the barrier normally, thereby mitigating the risk of tripping. In one preferable embodiment, the continuous rail is disposed between 0.3 and 0.7 m above the ground when the ground engaging support element is disposed on substantially flat ground. In this embodiment, the rail will approximately be at knee height. In an alternative preferable embodiment, the continuous rail is disposed between 0.7 and 1.1 m above the ground when the ground engaging support element is disposed on substantially flat ground.- In this embodiment, the rail will be at approximately waist height and passing pedestrians will tend to walk next to the barrier so that neither their waist or hands or arms touch the rail. In these embodiments, the passing pedestrians will be spaced from the entire barrier wall.

[0012] Of course, the extent of the overhang formed by the second section and continuous rail in relation to the ground engaging support element is also an important factor to consider. In one particularly preferable embodiment, the continuous rail is perpendicularly spaced from the plane of the first section by an amount that is at least 50% of the distance that said ground engaging support element extends from the plane of said first section in a direction towards the plane of the continuous rail. Further preferably, the continuous rail is perpendicularly spaced from the plane of the first section by an amount that is at least 75% of the distance that said ground engaging support element extends from the plane of said first section in a direction towards the plane of the continuous rail.

[0013] In an alternative preferable embodiment, the continuous rail is perpendicularly spaced from the plane of the first section by an amount that is substantially equal to the distance that said ground engaging support element extends from the plane of said first section. In another alternative preferable embodiment, the continuous rail is perpendicularly spaced from the plane of the first section by an amount that is greater than the distance that said ground engaging support element extends from the plane of said first section. In the latter two alternative preferable embodiments, the continuous rail should completely prevent the risk of a passing pedestrian tripping over the support element. In these cases, the person would need to walk at an inclined angle in order to trip over the support element, which is unlikely.

[0014] In a further alternative preferable embodiment, the barrier wall further comprises one or more bridging panels extending at an inclined angle from said first and second sections between the plane of said rail and the plane of said first section. The presence of the bridging panels means that when multiple barriers are adjoined side-by-side to one another, there will not be any large gaps between adjacent barriers. Thus, the risk of children or trespassers, for example, passing through the line of barriers into the hazardous or restricted area is reduced.

[0015] In a preferable embodiment, said barrier wall further comprises a side wall at each of said first and second side edges, where each side wall extends substantially vertically in the plane of said rail when the at least one ground engaging support element is disposed on substantially flat ground. Whether in addition to or in place of the bridging panels, the side walls also serve to minimise gaps between adjacent barriers when multiple barriers are connection to one another. Additionally, the side walls present a surface to the passing pedestrians that is particularly difficult to climb on or over making the hazardous or restricted area more secure to trespassers.

[0016] The barrier wall preferably comprises wind holes for allowing the passage of wind therethrough to minimize the risk of the barrier being blown over.

[0017] Preferably, the barrier wall is formed from mouldable plastics and is further preferably hollow. In one particularly preferable embodiment, the barrier wall is formed by blow moulding. Preferably, the barrier wall is a hollow plastic structure that be produced relatively inexpensively and be light enough for inexpensive transport. Further preferably, the barrier wall contains ballast to keep the barrier balanced and to reduce the risk of it falling over. In a particularly preferable embodiment, the ballast comprises a liquid that may be introduced and released from the hollow barrier wall as required. A particularly preferable liquid ballast is water. Alternatively preferably, the ballast may be sand and may similarly be introduced and released as required.

[0018] The barrier may preferably comprise connecting means at each of a first and second side edge of said barrier wall for connecting to a further control barrier. Alternatively, each of a first and second side edge of said barrier wall preferably comprises at least one support arm adapted to receive a clamp for connecting said control barrier to a further control barrier. In these preferable embodiments, several barriers can be linked together to form a continuous barrier wall for defining a path or restricting access to a hazardous or working area.

[0019] In one embodiment, the at least one ground engaging support element preferably has a thickness that is less than or equal to the thickness of the first section of said barrier wall where the at least one ground engaging support element is rotatable to a position where all of said at least one ground engaging support element is disposed in the plane of said first section. In this preferable embodiment, the ground engaging element may be rotated so that no part of the ground engaging element extends from the plane of the first section. This may be useful when storing the control barrier, or any other situation when the ground engaging support is not required

to be in an operating position. Further preferably, the control barrier comprises two ground engaging support elements.

[0020] In another preferable embodiment, the barrier wall is shaped so that said barrier wall is complimentary to a second identical barrier wall and said barrier wall may receive and be stacked against said second barrier wall. In this embodiment, many control barriers can be stacked against, or on top of one another, with each barrier wall conforming to the shape of the adjacent barrier wall with little, or no, space between adjacent barrier walls.

[0021] In any embodiment, the barrier wall has a vertical section and an overhanging portion (formed by at least the second section and the continuous guide rail). The vertical section is important in maintaining balance in the structure, whilst the overhanging portion serves to guide passing pedestrians away from the potential tripping hazard of the ground engaging support element.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Embodiments of the invention are further described hereinafter with reference to the accompanying drawings, in which:

Figures 1 to 3 show a control barrier according to a first embodiment of the present invention;

Figure 4A shows a cross sectional view of a control barrier according to a second embodiment of the present invention taken along section A-A of Figure 4B;

Figure 4B shows a front view of the control barrier of Figure 4A ;

Figure 5 shows a cross sectional view of a control barrier according to a third embodiment of the present invention; and

Figures 6A shows a perspective view of a control barrier according to a fourth embodiment of the present invention, and Figure 6B shows an side-end view of the control barrier of Figure 6A.

DETAILED DESCRIPTION

[0023] A control barrier 10 according to a first embodiment of the invention is shown in Figures 1 to 3. The control barrier 10 comprises a barrier wall 12 and two grou nd engaging support elements 14 that are adapted to support the control barrier 10 on the ground. The particular barrier wall 12 shown in Figures 1 to 3 comprises a first section 12a, a second section 12b and a third section 12c, although the skilled person will realise that, in alternative embodiments, the barrier wall 12 may comprise a different number of sections. The first section 12a of the barrier wall 12 is arranged so that when the ground engaging support elements 14 are disposed on substantially flat ground, the first section 12a is orientated substantially vertically with respect to the ground. The barrier wall 12 further comprises a plurality of wind holes 16 to allow the passage of wind and minimize the risk of the control barrier 10 being blown over. For convenience, hereinafter, terms such as "horizontal", "vertical", "up", "down", "over", "under", "top", "bottom" and the like are to be interpreted in relation to substantially flat ground when the ground engaging support elements 14 of the control barrier 10 are disposed thereon. The same conventions are used hereinafter in respect of all described and/or claimed embodiments.

[0024] The ground engaging support elements 14 are elongate and extend perpendicularly in both directions from the plane of the first section 12a of the barrier wall 12. The ground engaging support elements 14 have a first portion 14a extending perpendicularly in one direction from the plane of the first section 12a, a second portion 14b extending perpendicularly in the other direction from the plane of the first section 12a. In the embodiment shown in Figures 1 to 3, the first portion 14a is longer than the second portion 14b when measured from the plane of the first section 12a of the barrier wall 12. The ground engaging elements 14 are pivotable about a vertical axis that is parallel to the plane of the first section 12a from an operating position where the ground engaging support elements 14 extend perpendicularly from the plane of the first section 12a to a stored position where the ground engaging support elements 14 do not extend from the plane of the first section 12a. Each ground engaging support element 14 has a thickness that is equal to or less than the thickness of the first section 12a so that the entire ground engaging support element is disposed within the plane of the first section 12a when in its stored position.

[0025] The second section 12b of the barrier wall 12 extends at an inclined angle from a top edge of the first section 12a and creates an overhang over the ground. The second section 12b extends vertically and outwardly from the first section 12a, terminating at a point that is perpendicularly spaced from the plane of the first section 12a. The third section 12c extends vertically from a top edge of the second section 12b so that the plane of the third section 12c is parallel to the plane of the first section 12a.

[0026] As shown in Figure 2, the overhang created by the second section 12b and third section 12c extends perpendicularly from the plane of the first section 12a to a vertical overhang axis 20. When the ground engaging support elements 14 are in the ir operating positions, the overhang axis 20 is horizontally spaced from the ground engaging support elements 14 by a distance D. In the embodiments shown in Figures 1 to 3, the second portion 14b of each ground engaging support element extends underneath the overhang created by the second and third sections 12b, 12bc, in the operating position, while the first portio n 14a of each ground engaging support element 14 extends from the plane of the first section 12a of the barrier wall 12 in the opposite direction. The actual orientation of the ground engaging support elements 14

may vary in alternative embodiments to sat isfy the support needs of the specific control barrier 10. Of course, the ground engaging support elements 14 should be arranged so that they are capable of maintaining the control barrier 10 in an upright, stable position on the ground. This is especially important since the control barrier of the present invention incorporates an overhanging portion (defined by the second and third sections 12b, 12c) which shifts the control barrier's centre of gravity away from the plane of the first section 12a.

[0027] In the embodiment shown in Figures 1 to 3, the third section 12c of the barrier wall 12 forms a continuous rail that extends substantially horizontally across the entire face of the barrier wall 12 from a first edge 13a to a second edge 13b of the barrier wall 12. In particular, the third section 12c is the furthest point on the barrier wall 12 away from the plane of the first section 12a in a direction that is perpendicular to the plane of the first section 12a. In the embodiment shown in the Figures, the overhanging third section 12c is spaced perpendicularly from the plane of the first section 12a by a distance that is greater than the length of the second portion 14b of the ground engaging support elements 14. The second portion 14b of each ground engaging support element 14 is therefore completely shielded vertically by the second and third sections 12b, 12c. In alternative embodiments, the overhanging second and third sections 12b, 12c may be spaced perpendicularly from the plane of the first section 12a by an amount less than or equal to the length of the first or second portions 14a,b of the ground engaging portions 14 to reduce the tripping risk. This arrangement may be preferable in embodiments where the control barrier 10 would be unbalanced if the second and third sections 12b, 12c extended any further perpendicularly with respect to the plane of the first section 12a.

[0028] A passing pedestrian walking parallel to the control barrier 10 would be guided by the third section 12c so that their feet do not g et any closer to the plane of the first section 12a than the third section 12c. If the third section 12c is located at waist height, a passing pedestrian would likely walk with their hands, arms or waist spaced from the third section of the barrier 10. Therefore, since a person usually walks with their feet under their hips, they would be unlikely to contact a ground engaging support element 14 that is vertically shielded by the second and third sections 12b, 12c. In an alternative embodiment, the contin uous rail (analogous to the third section 12c in the embodiment above) may be located at knee height, which again encourages passing pedestrians to walk spaced from the rail and therefore spaced from the ground engaging support elements.

[0029] Side edges 13a,b of the barrier wall 12 comprise connection arms 18 that are configured to receive a clamp or other connection device for connecting the side edges 13 of the barrier wall 12 to additional control barriers 10 to form a chain of control barriers. In alternative embodiments, the control barrier 10 may comprise alternative connection means for connecting the barrier wall 12 to further control barriers. Many such connection means are well known in the art.

[0030] Figures 4A and 4B show an alternative embodiment of a co ntrol barrier 100 according to the present invention. Like the embodiment described above, the control barrier 100 comprises two ground engaging support elements 114 each having a first portion 114a and a second portion 114b. The control barrier 100 furt her comprises a barrier wall 112 having a first section 112a extending substantially vertically from the ground engaging support elements 114, and a second section 112b extending from a top edge of the first section 112a at an inclined angle with respect to the plane of the first section 112a. Extending from the second section 112b is a third section 112c that forms a rail that is continuous across the whole face of the barrier wall 112, extending substantially horizontally from a first side edge 113a to a second side edge 113b of the barrier wall 112. In this embodiment, the thirds section 112c is a narrow (possibly tubular) rail in contrast to the panel- or planar-like third section 12c (rail) of the control barrier 10 described above. Indeed, it is within the scope of the present invention to have a planar continuous rail or a tubular continuous rail depending on the design of the control barrier.

[0031] The second and third sections 112b, 112c create an overhang over the ground which extends perpendicularly from the plane of the first section 112a to a vertical overhang axis 120. When the ground engaging support elements 114 are in the operating position, the overhang axis 120 is horizontally spaced from the ground engaging support elements 114 by a distance D'. The control barrier 100 can therefore perform the same functions as the control barrier 10 described above.

[0032] In addition, the control barrier 100 shown in Figures 4A and 4B further comprises a fourth section 112d extending at an inclined angle from the third section 112c in a direction towards the plane of the first section 112a. A fifth section 112e extends substantially vertically from a top edge of the fourth section 112d and is parallel to and vertically aligned with the first section 112a. The co ntrol barrier 100 also has wind holes 116 and connection elements 118 disposed at side edges 113a,b of the barrier wall 112.

[0033] Whilst many different forms of barrier wall are within the scope of the invention, the embodiment shown in Figures 4A and 4B is a particularly preferable arrangement whose centre of gravity is not significantly distanced from the plane of the first and fifth sections 112a,e thereby increasing the control barrier's 100 stability. The third section 112c may be arranged so that it is located around the average knee height of passing pedestrians so that the tripping hazard is minimized.

[0034] A further alternative embodiment 200 of a control barrier according to the present invention is shown in Figure 5. The control barrier 200 is very similar to the control barrier 100 of Figures 4A and 4B. Indeed, the control barrier 200 of Figure 5 can be viewed as a mod-

ified version of the control barrier 100 of Figures 4A and 4B where the second 112b, third 112c and fourth 112d sections have been formed into one continuous curved middle (second) section 212c. The second section 212c extends from a top edge of a first section 212a of the barrier wall 212 and forms a rail 212d at its furthest point from the first section 212a in a direction perpendicular to the plane of the first section 212a. The first section 212a is attached to a plurality of ground engaging support elements 214 that each hav e a first portion 214a and a second portion 214b. The second section 212 c forms an overhang over the ground engaging support elements such that the rail 212d is perpendicularly spaced from the second portion 214b of the ground engaging support element 214 by a distance D". Above the rail 212d, the second section 212c curves back to join a third section 212b that extends upwards in substantially the same plane as the first section 212a.

[0035] A further em bodiment 300 of a control barrier according to the present invention is shown in Figures 6A and 6B. The control barrier 300 comprises a barrier wall 312 and two ground engaging support elements 314 that are adapted to support the control barrier 300 on the ground. The barrier wall 312 comprises a first section 312a, a second section 312b and a third section 312c. The first section 312a of the barrier wall 312 is arrange d so that when the ground engaging support elements 314 are disposed on substantially flat ground, the first section 312a is orientated in a plane substantially vertical relative to the ground. The second section 312b of the barrier wall 312 extends at an inclined angle from a top edge of the first section 312a and creates an overhang over the ground. The second section 312b extends vertically and outwardly from the first section 312a, terminating at a point that is perpendicularly spaced from the plane of the first section 312a. The third section 312c extends vertically from a top edge of the second section 312b so that the plane of the third sections 312c is parallel to the plane of the first section 312a. The overhang created by the second section 312 b and the third section 312c extends perpendicularly from the plane of the first section 312a to a vertical overhang axis 320 (see Figure 6B).

[0036] Extending vertically from the third section 312c, parallel to overhang axis 320, are two side walls 321. Each of the side walls 321 is disposed at one of the edges 313a,b of the control barrier 300. The side walls 321 are planar structures that are effectively vertical extensions of the third section 312c. Each side wall 321 comprises connection arms 318 that are configured to receive a clamp or other connection device for connecting the side edges 313a,b of the barrier wall 312 to additional control barriers 300 to form a chain of control barriers. In alternative embodiments, the control barrier 300 may comprise alternative connection means for connecting the barrier wall 312 to further control barriers. Many such connection means are well known in the art. The control barrier 300 further comprises vertical legs 324 that extend vertically from the side walls 321 towards the ground, so that substantially no part of the vertical legs 324 protrude perpendicularly from a plane of the side walls 321. In alternative embodiments, the side walls 321 may extend further vertically downwardly so that they themselves are capable of engaging the ground. In these embodiments, the vertical legs 324 are not needed.

[0037] The control barrier 300 further comprises two bridging panels 322 that extend at an inclined angle from the first and second sections 312a,b between the plane of the third section 312c and the plane of the first section 312a , each bridging panel 322 being joined to one of the side walls 321, the first section 312a and the second section 312b.

[0038] The inclusion of the side walls 321 and the bridging panels 322 in the control barrier 300 provide additional rigidity and stability and also ensure that there are no large gaps between adjacent control barriers 300 when one or more are joined together. Ensuring that there are no large gaps prevents people (such as children, for example) from being able to pass through a string of connected barriers thereby reducing the risk of people entering potentially hazardous areas.

[0039] Each of the ground engaging support elements 314 are elongate and has a first portion 314a that extends perpendicularly from the plane of the first section 312a in a direction away from the plane of the third section 312c. In alternative embodiments, the ground engaging support elements may extend in a direction towards the plane of the third section 312c, or both directions that are perpendicular to the plane of the first section 312a. The chosen arrangement will depend on the configuration of the rest of the control barrier 300 and will ensure a stable structure that is unlikely to fall over easily. The ground engaging support elements 314 are disposed in slots 315 in the barrier wall 312 and in some embodiments may be removable therefrom. In alternative embodiments, the ground engaging supports elements 314 may be pivotally mounted to the barrier wall 312 so that they may be rotated between an operating position where they extend perpendicularly from the plane of the first section 312a to a stored position where the ground engaging supports 314 do not extend from the plane of the first section 312a. In this embodiment, each ground engaging support element 314 has a thickness that is equal to or less than the thickness of the first section 312a so that the entire ground support element 314 is disposed within the plane of the first section 312a when in its stored position.

[0040] In an intended use of the control barrier 300 of Figures 6A and 6B, one or more of the barriers 300 are arranged so that the first section 312a relative to the third section 312c, is positioned closest to the hazardous or restricted area. In t his arrangement, passing pedestrians will walk along side of the third section 312c and side walls so that no parts of the control barrier 300 protrude into the path of the passing pedestrians. When a string of barriers 300 are connected to one another, the side wall 321 of one barrier 300 will be in close proximity to

the side wall of an adjacent barrier 300. As noted above, in this arrangement substantially no large gaps are present between barriers which thereby making the hazardous or restricted area more secure to trespassers. Additionally, since the third section 312c and side walls 321 are substantially vertical and mostly flat, there are a distinct lack of foot -holds present in the face of the barrier 300 presented to passing pedestrians. Therefore, when arranged in this manner, the form of the third section 312c, side walls 321 and vertical legs 324 makes climbing on or over the barrier 300 difficult.

[0041] A comparison of the control barriers 10,100,200,300 demonstrates that many variations of control barrier exist that are within the scope of the present invention.

[0042] The skilled person will appreciate that the control barriers 10, 100, 200 described above may be modified within the scope of the invention to suit particular applications. In preferable embodiments of the invention, the profile of the barrier wall 12, 112 , 212 is shaped so as to allow a plurality of such walls to be stacked against one another without wasted space in between. The pivotable ground engaging support elements 14, 114 , 214 may be rotated so as to not interfere in the stacking process. The barrier walls 12, 112, 214 may be formed by blow moulding techniques that are well known in the art and are particularly suitable for making strong, light, hollow plastics structures. Indeed, in preferable embodiments, the barrier wall 12, 112, 214 is hollow so that ballast (such as water or sand) may be introduced into the cavity to improve the barrier's balance.

[0043] The skilled reader will also appreciate that non-mutually exclusive features of the embodiments described above may be combined with one another whilst remaining within the scope of the present invention.

[0044] Throughout the description and claims of this specification, the words "comprise" and "contain" and variations of them mean "including but not limited to", and they are not intended to (and do not) exclude other moieties, additives, components, integers or steps. Throughout the description and claims of this specification, the singular encompasses the plural unless the context otherwise requires. In particular, where the indefinite article is used, the specification is to be understood as contemplating plurality as well as singularity, unless the context requires otherwise.

[0045] Features, integers, characteristics, compounds, chemical moieties or groups described in conjunction with a particular aspect, embodiment or example of the invention are to be understood to be applicable to any other aspect, embodiment or example described herein unless incompatible therewith. All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. The invention is not restricted to the details of any foregoing embodiments. The invention extends to all combinations of features disclosed in this specification (including any accompanying claims, abstract and drawings), or to all combinations, of the steps of any method or process so disclosed.

Claims

1. A control barrier (10,100,200,300) for improving the safety of passing pedestrians, the control barrier comprising:

   a barrier wall (12,112,212,312); and
   at least one ground engaging support element (14,114,214,314) connected to said barrier wall (12,112,212,312);
   wherein said barrier wall (12,112,212,312) has a first section (12a,112a,212a,312a) extending substantially vertically when the ground engaging support element (14,114,214,314) is disposed on substantially flat ground;
   a second section (12b,112b,212c,312b) extending at an inclined angle from a top edge of said first section (12a,112a,212a,312a) forming an overhang over the ground when the ground engaging support element (14,114,214,314) is disposed on substantially flat ground; and
   a continuous rail (12c,112c,212d,312c) extending from a first side edge (13a,113a,313a) of said barrier wall (12,112,212,312) to a second side edge (13b,113b,313b) of said barrier wall (12,112,212,312) wherein said rail (12c,112c,212d,312c) is disposed on said barrier wall (12,112,212,312) in a plane of the barrier wall (12,112,212,312) that is furthest away from the plane of said first section (12a,112a,212a,312a) in a direction that is perpendicular to the plane of said first section (12a,112a,212a,312a).

2. A control barrier (10,100,200,300) according to claim 1, wherein said barrier wall (12,112,212,312) further comprises a third section (12c,112c,212b,312c) that extends at an inclined angle from said second section (12b,112b,212c,312b).

3. A control barrier (10,100,200,300) according to claim 2, wherein said first section (12a,112a,212a,312a) is parallel to said third section (12c,112c,212b,312c).

4. A control barrier (10,100,300) according to claim 2 or 3, wherein said third section (12c,112c,312c) forms said continuous rail.

5. A control barrier (10,100,200,300) according to claim 2, wherein said barrier wall (12,112,212,312) further comprises one or more additional sections and one

of said one or more additional sections extends at an inclined angle from said third section (12c,112c,212b,312c).

6. A control barrier (10,100,200,300) according to any preceding claim, wherein said at least one ground engaging support element (14,114,214,314) extends in a direction that is perpendicular to the plane of said first section (12a,112a,212a,312a) of said barrier wall (12,112,212,312).

7. A control barrier (10,100,200,300) according to claim 6, wherein the continuous rail (12c,112c,212d,312c) is perpendicularly spaced from the plane of the first section (12a,112a,212a,312a) by an amount that is at least 50% of the distance that said ground engaging support element (14,114,214,314) extends from the plane of said first section (12a,112a,212a,312a) in a direction towards the plane of the continuous rail (12c,112c,212d,312c).

8. A control barrier (10,100,200,300) according to claim 7, wherein the continuous rail (12c,112c,212d,312c) is perpendicularly spaced from the plane of the first section (12a,112a,212a,312a) by an amount that is at least 75%, and preferably 100% or more, of the distance that said ground engaging support element (14,114,214,314) extends from the plane of said first section (12a,112a,212a,312a) in a direction towards the plane of the continuous rail (12c,112c,212d,312c).

9. A control barrier (10,100,200,300) according to any preceding claim, wherein each of said first side edge (13a,113a,313a) and second side edge (13b,113b,313b) of said barrier wall (12,112,212,312) comprises connecting means for connecting to a further control barrier.

10. A control barrier (10,100,200,300) according to any of claims 1 to 8, wherein each of a first and second side edge (13a,113a,313a,13b,113b,313b) of said barrier wall (12,112,212,312) comprises at least one support arm (18,118,318) adapted to receive a clamp for connecting said control barrier (10,100,200,300) to a further control barrier.

11. A control barrier (10,100,200,300) according to any preceding claim, wherein the at least one ground engaging support element (14,114,214,314) has a thickness that is less than or equal to the thickness of the first section (12a,112a,212a,312a) of said barrier wall (12,112,212,312);
said at least one ground engaging support element (14,114,214,314) being rotatable to a position where all of said at least one ground engaging support element (14,114,214,314) is disposed in the plane of said first section (12a,112a,212a,312a).

12. A control barrier (10,100,200,300) according to any preceding claim, wherein said continuous rail (12c,112c,212d,312c) is disposed between 0.3 and 0.7 m or between 0.7 and 1.1 m above the ground when the ground engaging support element (14,114,214,314) is disposed on substantially flat ground.

13. A control barrier (300) according to any preceding claim, wherein said barrier wall (312) further comprises one or more bridging panels (322) extending at an inclined angle from said first (312a) and second (312b) sections between the plane of said rail (312c) and the plane of said first section (312a).

14. A control barrier (300) according to any preceding claim, wherein said barrier wall (312) further comprises a side wall (321) at each of said first (313a) and second (313b) side edges, where each side wall (321) extends substantially vertically in the plane of said rail (312c) when the at least one ground engaging support element (314) is disposed on substantially flat ground.

15. A control barrier (10,100,200,300) according to any preceding claim, wherein said barrier wall (12,112,212,312) is formed from mouldable plastics, and is preferably formed by blow moulding.

Patentansprüche

1. Sicherheitsschranke (10, 100, 200, 300) zur Verbesserung der Sicherheit passierender Fußgänger, wobei die Sicherheitsschranke umfasst:

eine Schrankenwand (12, 112, 212, 312); und
mindestens ein im Boden eingerastetes Stützelement (14, 114, 214, 314), das mit der Schrankenwand (12, 112, 212, 312) verbunden ist;
wobei die Schrankenwand (12, 112, 212, 312) über folgendes verfügt:
einen ersten Abschnitt (12a, 112a, 212a, 312a), der sich im Wesentlichen senkrecht erstreckt, wenn das im Boden eingerastete Stützelement (14, 114, 214, 314) auf einem im Wesentlichen ebenen Boden angeordnet ist;
einen zweiten Abschnitt (12b, 112b, 212c, 312b), der sich in einem schrägen Winkel von einer Oberkante des ersten Abschnitts (12a, 112a, 212a, 312a) erstreckt und einen Überhang über dem Boden bildet, wenn das am Boden eingerastete Stützelement (14, 114, 214, 314) auf einem im Wesentlichen ebenen Boden angeordnet ist; und
eine durchlaufende Schiene (12c, 112c, 212d, 312c), die sich von einer ersten Seitenkante (13a, 113a, 313a) der Schrankenwand (12, 112,

212, 312) bis zu einer zweiten Seitenkante (13b, 113b, 313b) der Schrankenwand (12, 112, 212, 312) erstreckt, wobei die Schiene (12c, 112c, 212d, 312c) auf der Schrankenwand (12, 112, 212, 312) in einer Ebene der Schrankenwand (12, 112, 212, 312) angeordnet ist, die von der Ebene des ersten Abschnitts (12a, 112a, 212a, 312a) in einer Richtung, die zu der Ebene des ersten Abschnitts (12a, 112a, 212a, 312a) senkrecht ist, am weitesten entfernt ist.

2. Sicherheitsschranke (10, 100, 200, 300) gemäß Anspruch 1, wobei die Schrankenwand (12, 112, 212, 312) weiterhin einen dritten Abschnitt (12c, 112c, 212b, 312c) umfasst, der sich in einem schrägen Winkel von dem zweiten Abschnitt (12b, 112b, 212c, 312b) erstreckt.

3. Sicherheitsschranke (10, 100, 200, 300) gemäß Anspruch 2, wobei der erste Abschnitt (12a, 112a, 212a, 312a) parallel zu dem dritten Abschnitt (12c, 112c, 212b, 312c) angeordnet ist.

4. Sicherheitsschranke (10, 100, 300) gemäß Anspruch 2 oder 3, wobei der dritte Abschnitt (12c, 112c, 312c) die durchlaufende Schiene bildet.

5. Sicherheitsschranke (10, 100, 200, 300) gemäß Anspruch 2, wobei die Schrankenwand (12, 112, 212, 312) weiterhin einen oder mehrere zusätzliche Abschnitte umfasst und eine des einen oder der mehreren zusätzlichen Abschnitte sich in einem schrägen Winkel von dem dritten Abschnitt (12c, 112c, 212b, 312c) erstreckt.

6. Sicherheitsschranke (10, 100, 200, 300) gemäß einem der vorangehenden Ansprüche, wobei sich das mindestens eine im Boden eingerastete Stützelement (14, 114, 214, 314) in eine Richtung erstreckt, die senkrecht zu der Ebne des ersten Abschnitts (12a, 112a, 212a, 312a) der Schrankenwand (12, 112, 212, 312) angeordnet ist.

7. Sicherheitsschranke (10, 100, 200, 300) gemäß Anspruch 6, wobei die durchlaufende Schiene (12c, 112c, 212d, 312c) von der Ebene des ersten Abschnitts (12a, 112a, 212a, 312a) senkrecht versetzt angeordnet ist, um einen Abstand, der mindestens 50 % der Entfernung ausmacht, um die sich das im Boden eingerastete Stützelement (14, 114, 214, 314) von der Ebene des ersten Abschnitts (12a, 112a, 212a, 312a) in eine Richtung zu der Ebene der durchlaufenden Schiene (12c, 112c, 212d, 312c) hin erstreckt.

8. Sicherheitsschranke (10, 100, 200, 300) gemäß Anspruch 7, wobei die durchlaufende Schiene (12c, 112c, 212d, 312c) von der Ebene des ersten Abschnitts (12a, 112a, 212a, 312a) senkrecht versetzt angeordnet ist, um einen Abstand, der mindestens 75 %, und vorzugsweise 100 % oder mehr, der Entfernung ausmacht, um die sich das im Boden eingerastete Stützelement (14, 114, 214, 314) von der Ebene des ersten Abschnitts (12a, 112a, 212a, 312a) in eine Richtung zu der Ebene der durchlaufenden Schiene (12c, 112c, 212d, 312c) hin erstreckt.

9. Sicherheitsschranke (10, 100, 200, 300) gemäß einem der vorangehenden Ansprüche, wobei sowohl die erste Seitenkante (13a, 113a, 313a) als auch die zweite Seitenkante (13b, 113b, 313b) der Schrankenwand (12, 112, 212, 312) über Verbindungsmittel zum Verbinden mit einer weiteren Sicherheitsschranke verfügen.

10. Sicherheitsschranke (10, 100, 200, 300) gemäß einem der Ansprüche 1 bis 8, wobei sowohl eine erste als auch eine zweite Seitenkante (13a, 113a, 313a, 13b, 113b, 313b) der Sicherheitsschranke (12, 112, 212, 312) mindestens einen Stützarm (18, 118, 318) umfassen, der geeignet ist, um eine Klemme zum Verbinden der Sicherheitsschranke (10, 100, 200, 300) mit einer weiteren Sicherheitsschranke zu empfangen.

11. Sicherheitsschranke (10, 100, 200, 300) gemäß einem der vorangehenden Ansprüche, wobei das mindestens eine im Boden eingerastete Stützelement (14, 114, 214, 314) über eine Dicke verfügt, die kleiner gleich der Dicke des ersten Abschnitts (12a, 112a, 212a, 312a) der Schrankenwand (12, 112, 212, 312) ist;
wobei das mindestens eine im Boden eingerastete Stützelement (14, 114, 214, 314) in eine Position drehbar ist, in der alle von den mindestens einem im Boden eingerasteten Stützelement (14, 114, 214, 314) in der Ebene des ersten Abschnitts (12a, 112a, 212a, 312a) angeordnet sind.

12. Sicherheitsschranke (10, 100, 200, 300) gemäß einem der vorangehenden Ansprüche, wobei die durchlaufende Schiene (12c, 112c, 212d, 312c) zwischen 0,3 und 0,7 m oder zwischen 0,7 und 1,1 m über dem Boden angeordnet ist, wenn das im Boden eingerastete Stützelement (14, 114, 214, 314) auf einem im Wesentlichen ebenen Boden angeordnet ist.

13. Sicherheitsschranke (300) gemäß einem der vorangehenden Ansprüche, wobei die Schrankenwand (312) weiterhin ein oder mehrere Überbrückungspaneele (322) umfasst, die sich in einem schrägen Winkel von dem ersten (312a) und zweiten (312b) Abschnitt zwischen der Ebene der Schiene (312c) und der Ebne des ersten Abschnitts (312a) erstrecken.

14. Sicherheitsschranke (300) gemäß einem der vorangehenden Ansprüche, wobei die Schrankenwand (312) weiterhin eine Seitenwand (321) sowohl an der ersten (313a) als auch an der zweiten (313b) Seitenkante umfasst, wobei sich jede Seitenwand (321) im Wesentlichen senkrecht in die Ebene der Schiene (312c) erstreckt, wenn das mindestens eine im Boden eingerastete Stützelement (314) auf einem im Wesentlichen ebenen Boden angeordnet ist.

15. Sicherheitsschranke (10, 100, 200, 300) gemäß einem der vorangehenden Ansprüche, wobei die Schrankenwand (12, 112, 212, 312) aus einem formbaren Plastik und vorzugsweise durch Blasformen gebildet wird.

Revendications

1. Barrière de contrôle (10, 100, 200, 300) pour améliorer la sécurité des piétons, la barrière de contrôle comprenant :

une paroi de barrière (12, 112, 212, 312) ; et
au moins un élément de support de mise en prise de sol (14, 114, 214, 314) raccordé à ladite paroi de barrière (12, 112, 212, 312) ;
dans laquelle ladite paroi de barrière (12, 112, 212, 312) a :

une première section (12a, 112a, 212a, 312a) s'étendant sensiblement verticalement lorsque l'élément de support de mise en prise de sol (14, 114, 214, 314) est disposé sur un sol sensiblement plat ;
une deuxième section (12b, 112b, 212c, 312b) s'étendant selon un angle incliné par rapport à un bord supérieur de ladite première section (12a, 112a, 212a, 312a) formant une saillie sur le sol lorsque l'élément de support de mise en prise de sol (14, 114, 214, 314) est disposé sur un sol sensiblement plat ; et
un rail continu (12c, 112c, 212d, 312c) s'étendant à partir d'un premier bord latéral (13a, 113a, 313a) de ladite paroi de barrière (12, 112, 212, 312) jusqu'à un second bord latéral (13b, 113b, 313b) de ladite paroi de barrière (12, 112, 212, 312), dans laquelle ledit rail (12c, 112c, 212d, 312c) est disposé sur ladite paroi de barrière (12, 112, 212, 312) dans un plan de la paroi de barrière (12, 112, 212, 312) qui est le plus éloigné du plan de ladite première section (12a, 112a, 212a, 312a) dans une direction qui est perpendiculaire au plan de ladite première section (12a, 112a, 212a, 312a).

2. Barrière de contrôle (10, 100, 200, 300) selon la revendication 1, dans laquelle ladite paroi de barrière (12, 112, 212, 312) comprend en outre une troisième section (12c, 112c, 212b, 312c) qui s'étend selon un angle incliné par rapport à ladite deuxième section (12b, 112b, 212c, 312b).

3. Barrière de contrôle (10, 100, 200, 300) selon la revendication 2, dans laquelle ladite première section (12a, 112a, 212a, 312a) est parallèle à ladite troisième section (12c, 112c, 212b, 312c).

4. Barrière de contrôle (10, 100, 300) selon la revendication 2 ou 3, dans laquelle ladite troisième section (12c, 112c, 312c) forme ledit rail continu.

5. Barrière de contrôle (10, 100, 200, 300) selon la revendication 2, dans laquelle ladite paroi de barrière (12, 112, 212, 312) comprend en outre une ou plusieurs sections supplémentaires et l'une desdites une ou plusieurs sections supplémentaires s'étend selon un angle incliné par rapport à ladite troisième section (12c, 112c, 212b, 312c).

6. Barrière de contrôle (10, 100, 200, 300) selon l'une quelconque des revendications précédentes, dans laquelle ledit au moins un élément de support de mise en prise de sol (14, 114, 214, 314) s'étend dans une direction qui est perpendiculaire au plan de ladite première section (12a, 112a, 212a, 312a) de ladite paroi de barrière (12, 112, 212, 312).

7. Barrière de contrôle (10, 100, 200, 300) selon la revendication 6, dans laquelle le rail continu (12c, 112c, 212d, 312c) est espacé de manière perpendiculaire par rapport au plan de la première section (12a, 112a, 212a, 312a) selon une quantité qui représente au moins 50 % de la distance sur laquelle ledit élément de support de mise en prise de sol (14, 114, 214, 314) s'étend à partir du plan de ladite première section (12a, 112a, 212a, 312a) dans une direction allant vers la plan du rail continu (12c, 112c, 212d, 312c).

8. Barrière de contrôle (10, 100, 200, 300) selon la revendication 7, dans laquelle le rail continu (12c, 112c, 212d, 312c) est espacé de manière perpendiculaire du plan de la première section (12a, 112a, 212a, 312a) selon une quantité qui représente au moins 75 %, et de préférence 100 % ou plus, de la distance sur laquelle ledit élément de support de mise en prise de sol (14, 114, 214, 314) s'étend par rapport au plan de ladite première section (12a, 112a, 212a, 312a) dans une direction allant vers le plan du rail continu (12c, 112c, 212d, 312c).

9. Barrière de contrôle (10, 100, 200, 300) selon l'une quelconque des revendications précédentes, dans

laquelle chacun parmi ledit premier bord latéral (13a, 113a, 313a) et ledit second bord latéral (13b, 113b, 313b) de ladite paroi de barrière (12, 112, 212, 312) comprend des moyens de raccordement pour le raccordement à une autre barrière de contrôle.

10. Barrière de contrôle (10, 100, 200, 300) selon l'une quelconque des revendications 1 à 8, dans laquelle chacun parmi un premier et un second bord latéral (13a, 113a, 313a, 13b, 113b, 313b) de ladite paroi de barrière (12, 112, 212, 312) comprend au moins un bras de support (18, 118, 318) adapté pour recevoir un dispositif de serrage pour raccorder ladite barrière de contrôle (10, 100, 200, 300) à une autre barrière de contrôle.

11. Barrière de contrôle (10, 100, 200, 300) selon l'une quelconque des revendications précédentes, dans laquelle le au moins un élément de support de mise en prise de sol (14, 114, 214, 314) a une épaisseur qui est inférieure ou égale à l'épaisseur de la première section (12a, 112a, 212a, 312a) de ladite paroi de barrière (12, 112, 212, 312) ;
ledit au moins un élément de support de mise en prise de sol (14, 114, 214, 314) pouvant tourner dans une position dans laquelle la totalité dudit au moins un élément de support de mise en prise de sol (14, 114, 214, 314) est disposée dans le plan de ladite première section (12a, 112a, 212a, 312a).

12. Barrière de contrôle (10, 100, 200, 300) selon l'une quelconque des revendications précédentes, dans laquelle ledit rail continu (12c, 112c, 212d, 312c) est disposé entre 0,3 et 0,7 m ou entre 0,7 et 1,1 m au-dessus du sol lorsque l'élément de support de mise en prise de sol (14, 114, 214, 314) est disposé sur un sol sensiblement plat.

13. Barrière de contrôle (300) selon l'une quelconque des revendications précédentes, dans laquelle ladite paroi de barrière (312) comprend en outre un ou plusieurs panneaux de pont (322) s'étendant selon un angle incliné à partir desdites première (312a) et deuxième (312b) sections entre le plan dudit rail (312c) et le plan de ladite première section (312a).

14. Barrière de contrôle (300) selon l'une quelconque des revendications précédentes, dans laquelle ladite paroi de barrière (312) comprend en outre une paroi latérale (321) au niveau de chacun desdits premier (313a) et second (313b) bords latéraux, dans laquelle chaque paroi latérale (321) s'étend sensiblement verticalement dans le plan dudit rail (312c) lorsque le au moins élément de support de mise en prise de sol (314) est disposé sur un sol sensiblement plat.

15. Barrière de contrôle (10, 100, 200, 300) selon l'une quelconque des revendications précédentes, dans laquelle ladite paroi de barrière (12, 112, 212, 312) est formée à partir de plastique moulable, et est de préférence formée par moulage par extrusion - soufflage.

* * *

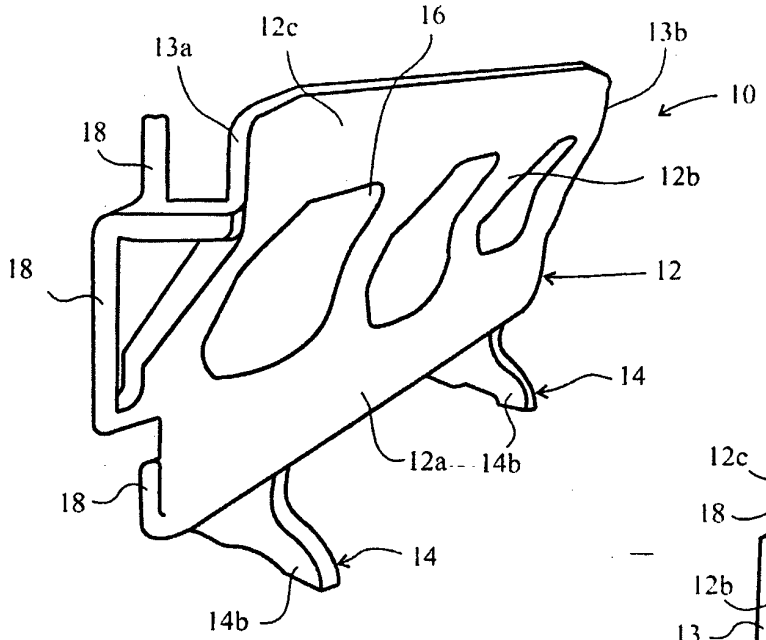


Fig. 1

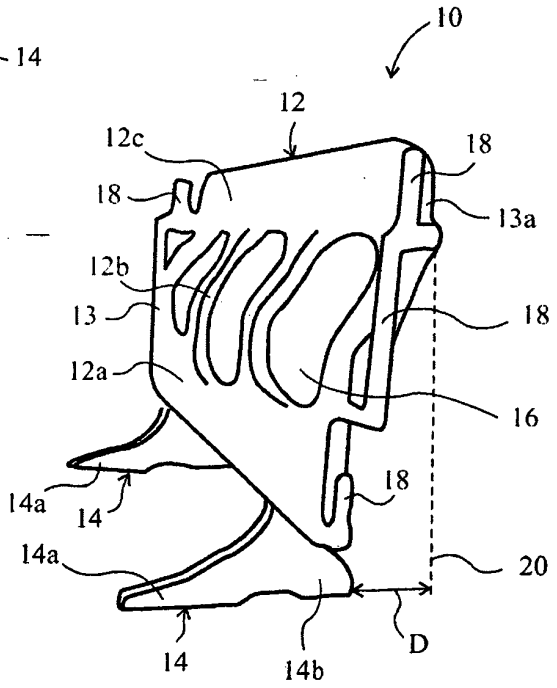


Fig. 2

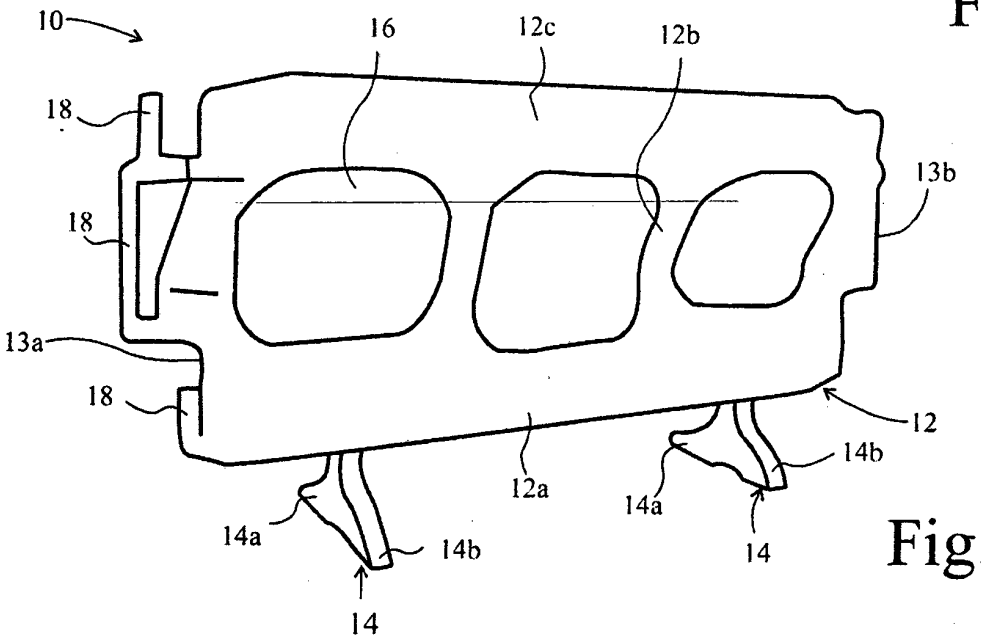


Fig. 3

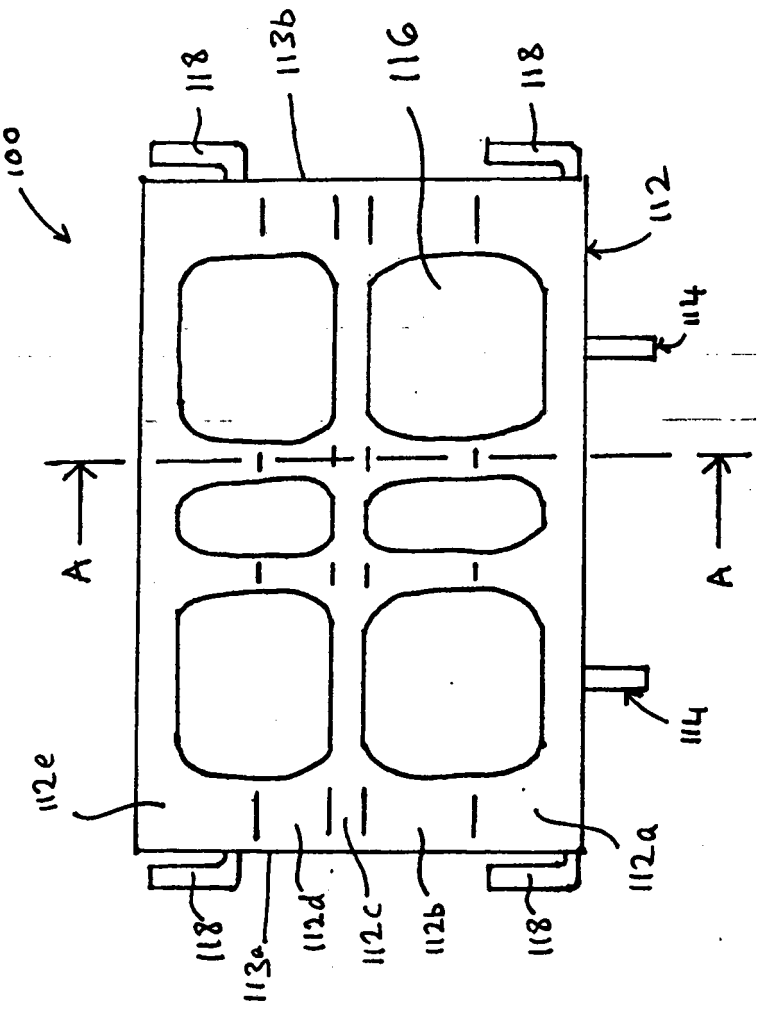


FIGURE 4B

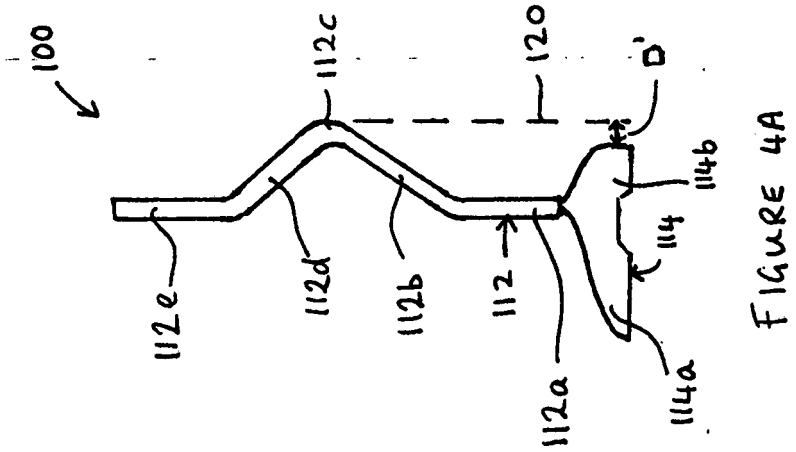


FIGURE 4A

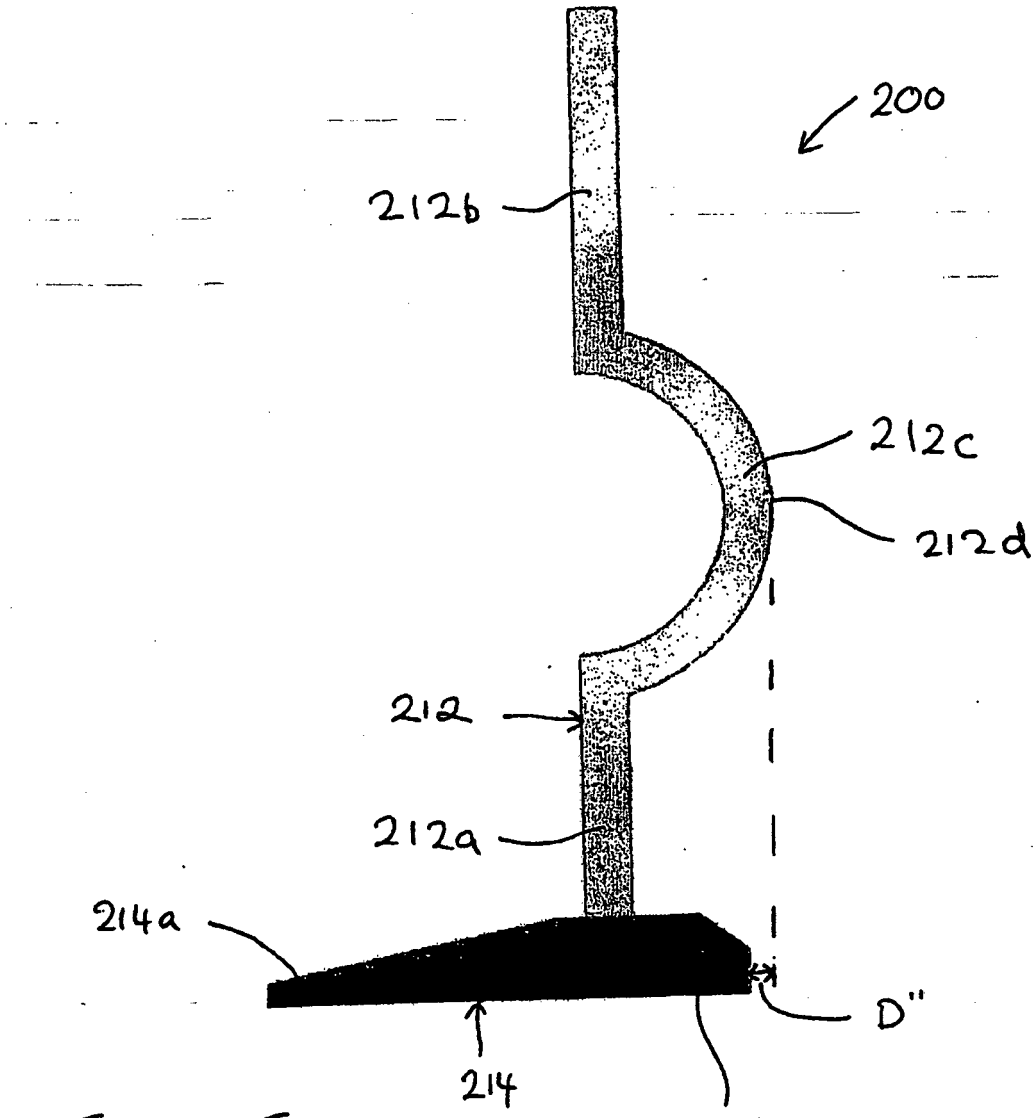


FIGURE 5

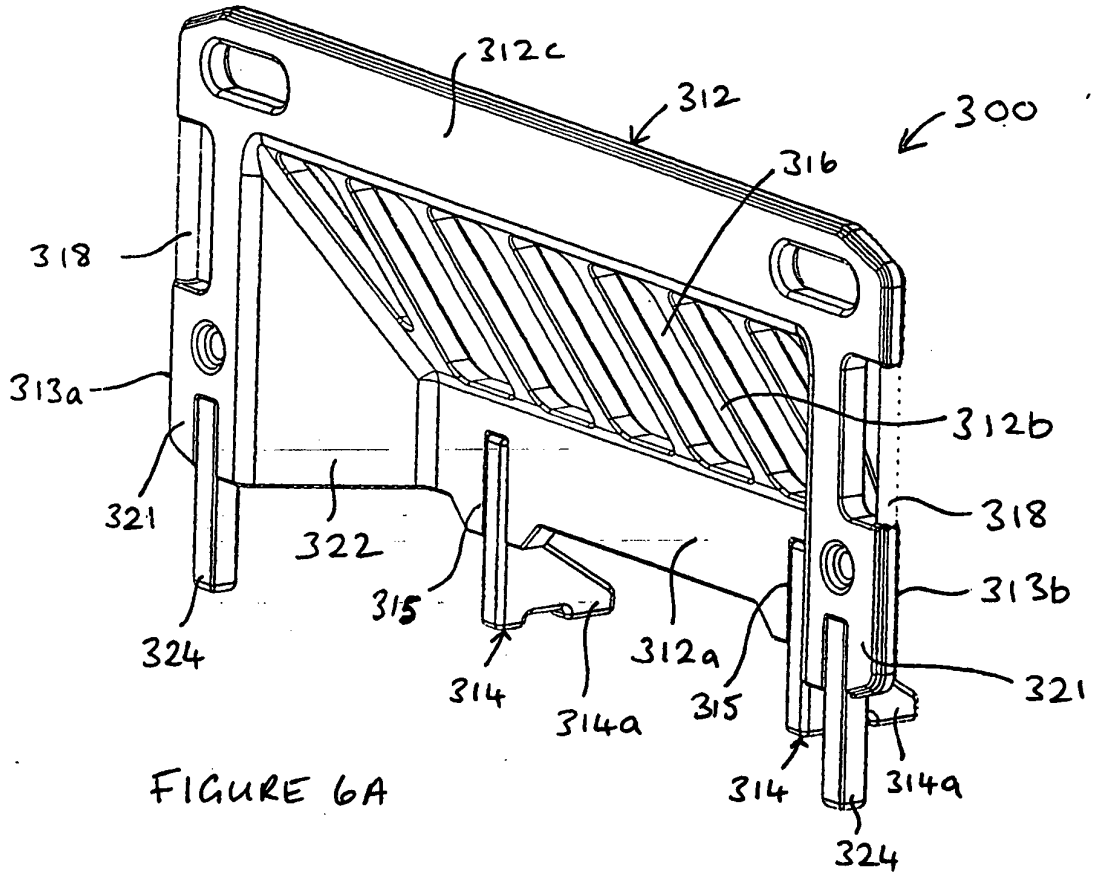


FIGURE 6A

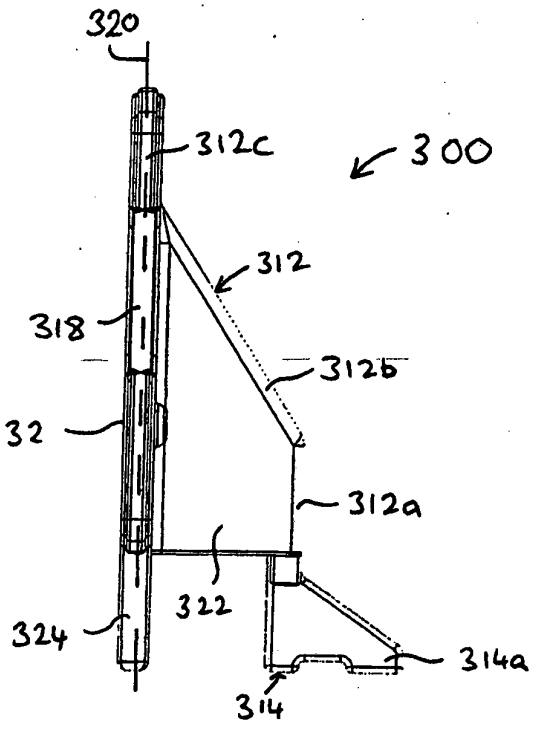


FIGURE 6B

REFERENCES CITED IN THE DESCRIPTION

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- US 7234275 B1 **[0004]**
- FR 2682136 **[0005]**