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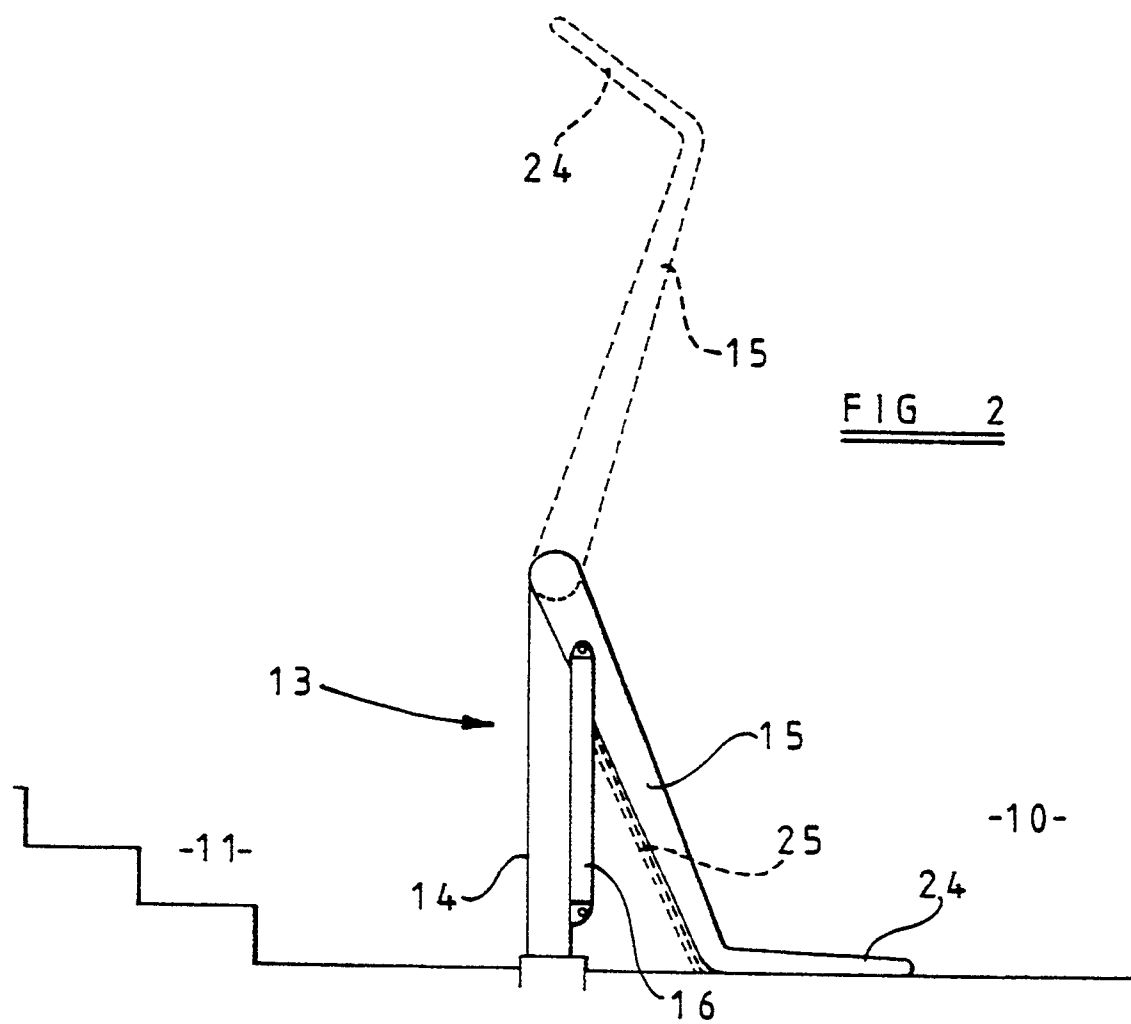
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Barrier.

A barrier comprises a relatively fixed lower section (14), and an upper section (15) which is movable between relatively raised and lowered positions.

The upper section (15) is preferably pivotable between its relatively raised and lowered positions, and the upper section (15) or a substantial part thereof is preferably made of see-through material, such as a mesh or transparent plate.

In use, the upper section (15) may normally occupy its relatively lowered position and means (16) is provided for moving the upper section (15) to its relatively raised position.



This invention relates to a barrier, such as is used for crowd control purposes, eg in sports stadia.

According to the present invention, there is provided a barrier comprising a relatively fixed lower section, and an upper section which is movable between relatively raised and lowered positions.

The barrier according to the invention is advantageous *inter alia* in that it provides effective control of a crowd at, for example, a sports match yet enables spectators to enjoy an unimpeded view. The upper section may, for example, be kept in the relatively lowered position and raised only in the event of a disturbance amongst the crowd. Alternatively, the upper section may normally be in its raised position but be lowered in the event of an emergency.

Preferably, the upper section is pivotable between its relatively raised and lowered positions.

Conveniently, the upper section normally occupies its relatively lowered position and means is provided for moving the upper section to its relatively raised position.

Advantageously, the upper section or a substantial part thereof is made of see-through material, such as a mesh or transparent plate.

Desirably, the upper section is inclined to the vertical when in its relatively raised position.

Preferably, the upper section is provided with anti-climbing means. The anti-climbing means may comprise a portion which is angled relative to the upper section, the angled portion desirably being substantially horizontal when the upper section is in its relatively lowered position.

Typically, the lower section is approximately one metre high, and the lower section and the upper section when in its raised position have a combined height of approximately two metres.

Advantageously, the upper section is moved between its relatively raised and lowered positions by means of a fluid-operated device (eg an hydraulic ram) which is preferably single-acting.

Also, according to the present invention, there is provided an area whose perimeter is provided with a plurality of barriers, each barrier being as defined above.

Preferably, the upper section of each barrier when in its relatively lowered position lies inwardly of said area in relation to the respective lower section.

Conveniently, means for moving the upper sections of the barriers is disposed inwardly of said area in relation to the respective lower sections.

The invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a sports stadium provided with perimeter fencing including a plurality of barriers according to the present invention;

Figure 2 is a side view of one of the barriers;

Figure 3 is a front view of part of the perimeter fencing;

Figure 4 is an enlarged view of a connection between adjacent barriers; and

Figure 5 is a partial end view of one of the barriers.

Referring first to Figure 1, there is shown a sports stadium wherein a central area (in this case a pitch 10) is cordoned off from surrounding spectator enclosures 11 by means of perimeter fencing 12. Each run of fencing is composed of a series of barriers 13 arranged in end-to-end relation. As can be seen to advantage in Figures 2 and 3, each barrier 13 comprises a fixed lower section 14 and an upper section 15 which is pivotally connected to the top of the lower section 14. A series of hydraulic rams 16 or other fluid-operated devices are provided at intervals along each run of fencing, and can be operated to move the upper sections 15 between lowered and raised positions as depicted in solid and broken lines respectively in Figure 2.

For the sake of simplicity, only one such ram 16 is actually shown.

Each lower section 14 comprises a pair of spaced-apart upright posts 17 which are securely fixed into the ground, eg by concreting. A panel 18 extends between the posts 17 and is rigidly secured thereto. The panel 18 is preferably of relatively solid construction, but can alternatively be made of a mesh material. The posts 17 and panel 18 can be made of any suitable material capable of withstanding heavy loads, such as metal or concrete. Although each lower section 14 is described as having a pair of posts 17, in fact each post 17 is common to the sections 14 on either side thereof.

Each upper section 15 comprises a framework 19 having a pair of arms 20 at its ends respectively, the arms 20 being interconnected by a bar 21 of circular cross-section which extends along the pivot axes of the section 15. Within the framework 19 is provided a panel 22 of see-through material, such as a metal mesh (as illustrated) or a fracture-resistant transparent plastics (such as polycarbonate). A fish plate 23 connects adjacent sections 15 together so that the sections are raised and lowered in unison.

At its outer end (ie the end remote from the pivot) each section 15 is preferably provided with an anti-climbing device. In the illustrated embodiment, this device is formed by a portion 24 which is angled relative to the section in a general direction towards the spectator enclosures 11. However, the anti-climbing device may take other forms, such as a series of spikes on the section 15. In some circumstances, however, such as use in football stadia, it may be contrary to regulations for spikes or other anti-climbing devices to be fitted. In these cases the portion 24 may be omitted.

As illustrated in Figure 2, the section 15 when

raised can itself be inclined to the vertical to further resist any attempts at climbing. In its lowered position, each section 15 is again inclined to the vertical, and the portion 24 is so angled relative to the section 15 that it is generally horizontal and lies against the ground.

As can be seen from Figure 2, the rams 16 are positioned on the pitch side of the lower sections 14, which is also the case for the hydraulic connections to the rams. This serves to shield these parts from spectators in the enclosures 11, thereby resisting any attempts at vandalism.

When lowered, the upper sections 15 are also disposed on the pitch side of the sections 14. If desired, hoardings 25 bearing advertisements and the like can be positioned behind the sections 15 when lowered. These hoardings will normally be visible through the see-through panels 22, and serve an additional purpose of shielding the rams 16 and their connections from possible damage. One such hoarding 25 is shown in broken line in Figure 2.

As can be seen to advantage in Figures 4 and 5, the arms 20 of the upper sections 15 each terminate in a plate-like element 26 which is welded to the respective end of the bar 21. The element 26 is radiused to match the curvature of the bar, and the bars 21 of adjacent sections 15 terminate closely adjacent to the post 17 between the associated lower sections 14. The pivotal connections themselves are formed by rods 27 extending between adjacent ends of the bars 21. This construction serves to minimise the chances of items (such as clothing or fingers) becoming trapped as the sections 15 are raised or lowered.

The rams 16 are preferably single-acting, such that the sections 15 are raised by the pumping of hydraulic fluid into the rams and are lowered under gravity. This ensures a fail-safe condition whereby the section 15 can always be lowered in the event of loss of hydraulic power. Also, the arrangement ensures that lowering of the sections 15 will be arrested in the event of an obstruction being encountered, eg in the event of an object being trapped beneath the lowering sections 15. As can be seen in Figure 5, a piston 28 of each ram 16 is pivotally attached to the arm 20 of one of the sections 15.

In operation, the upper sections 15 throughout the perimeter fencing 12 are normally kept in a lowered position. Under this condition, the lower sections 14 act as simple barriers of approximately one metre in height. Thus, in the event of there being a danger of spectators becoming injured, eg due to crushing or fire hazard, the spectators can readily escape onto the pitch 10 by climbing over or vaulting the relatively lower obstacle presented by the barriers at this time.

In the event of possible crowd disturbance or the risk of a pitch invasion, however, the sections 15 are raised to increase the height of the barriers to approximately two metres and thereby resist attempts

of spectators to reach the pitch 10. The sections can all be raised in unison throughout the perimeter fencing so that the pitch is totally enclosed: this can have the subsidiary effect of trapping any invaders already on the pitch for subsequent rounding up by police or other authorities. Alternatively, where a disturbance occurs in only one spectator enclosure, the barriers in the relevant run of fencing can be raised while those elsewhere remain lowered. Such raising and lowering of the barriers will normally be controlled from a central command post, for example a police control room.

When the barriers are in their raised conditions, the see-through panels 22 in the upper sections 15 do not obstruct the spectators' view of the pitch, and likewise do not obstruct the police's view of the spectator enclosures. Moreover, because the barriers are normally lowered and are only raised in the event of a disturbance, the perimeter fencing is relatively non-confrontational and the spectators do not get the impression of being penned in.

Although the barriers have been described as being normally lowered and being raised in the event of a disturbance, the invention can also operate with the barriers being normally raised but being lowered in the event of danger to life. Moreover, the barriers have a much more general applicability than to the specific situation described above, and can be used in any location where crowd control is needed, not just at sports stadia.

Claims

1. A barrier comprising a relatively fixed lower section (14), and an upper section (15) which is movable between relatively raised and lowered positions.
2. A barrier according to Claim 1, wherein the upper section (15) is pivotable between its relatively raised and lowered positions.
3. A barrier according to Claim 1 or Claim 2, wherein the upper section (15) normally occupies its relatively lowered position and means (16) is provided for moving the upper section to its relatively raised position.
4. A barrier according to any one of the preceding claims, wherein the upper section (15) or a substantial part thereof is made of see-through material, such as a mesh or transparent plate.
5. A barrier according to any one of the preceding claims, wherein the upper section (15) is inclined to the vertical when in its relatively raised position.

6. A barrier according to any one of the preceding claims, wherein the upper section (15) is provided with anti-climbing means (24).
7. A barrier according to Claim 6, wherein the anti-climbing means (24) comprises a portion which is angled relative to the upper section (15). 5
8. A barrier according to Claim 7, wherein the angled portion (24) is substantially horizontal when the upper section (15) is in its relatively lowered position. 10
9. A barrier according to any one of the preceding claims, wherein the upper section (15) is moved between its relatively raised and lowered positions by means of a fluid-operated device (16). 15
10. An area (10) whose perimeter is provided with a plurality of barriers (13), each barrier (13) being as defined in any one of the preceding claims. 20
11. An area according to Claim 10, wherein the upper section of each barrier (13) when in its relatively lowered position lies inwardly of said area (10) in relation to the respective lower section (14). 25
12. An area according to Claim 10 or Claim 11, wherein means (16) for moving the upper sections (15) of the barriers (13) is disposed inwardly of said area (10) in relation to the respective lower sections (14). 30
13. A sports stadium wherein the playing surface (10) is separated from surrounding spectator enclosures (11) by a plurality of barriers (13) according to any one of Claims 1 to 10. 35

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