**Title:** APPARATUS FOR DISPLAYING GRAPHICAL INFORMATION

**Abstract:** Apparatus (101) for displaying graphical information includes a football net (102) having two side parts (103A, 103B) and a back part (104) extending between the two side parts, as well as goalposts (105) at the front of the net, supporting a front edge of the net. The apparatus further comprises a first post (106A) and a second post (106B) that extend upward from the ground surface in a substantially vertical plane behind the net. A display part extends above the ground surface between the first post and the second post, and the display part (108) has a surface displaying graphical information (109). The first post and the second post are located such that the display part extends across the back part of the net and such that the display part is spaced from the back part by a gap (801) that is sufficiently small to allow a portion of the net to be moved and thereby brought into contact with the display part.
Apparatus for Displaying Graphical Information

CROSS REFERENCE TO RELATED APPLICATIONS
This application claims priority from United Kingdom Patent Application No. 11 10 028.6, filed 14 June 2011 the entire disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention
The present invention relates to apparatus for displaying graphical information, and a method of displaying graphical information.

2. Description of the Related Art
It is known to display information, such as for advertising, on boards or hoardings around football pitches, including behind the goals. A problem with such boards is that they are ineffective in displaying information to a camera that is used to capture close-up images of goalmouth action, such as those images obtained for video replay following a goal being scored.

A second problem with such boards is that they are separate to the sporting action and therefore they merely provide a backdrop, in front of which the game is played.

A solution to these problems was disclosed by the Applicant's earlier international patent application published as WO 2010/097565 A1. This document discloses attaching sheets, which display graphical information, to a football net by the use of detachable clips. One problem with this arrangement is that the attachment of extraneous equipment to a football net is currently not allowed by the Laws of the Game.
DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

Figure 1

Apparatus 101 for displaying graphical information is shown in Figure 1. The apparatus 101 comprises a football net 102 having two side parts 103A and 103B and a back part 104 extending between the two side parts. A front edge of the net 102 is attached to, and supported by, goalposts 105 at the front of the net. The goalposts 105 and net 102 are formed in a conventional manner, and the net may be further supported by stanchions, or cables or ropes fixed to posts behind the net, as is well known. (These additional supports are not shown.)

The apparatus differs from known arrangements in that it also includes a first post 106A and a second post 106B, which both extend upward from the ground surface 107 behind the net 102 in a substantially vertical plane. A display part 108 extends above the ground surface 107 between the first post 106A and the second post 106B, and the display part 108 has one or more surfaces displaying graphical information, such as graphical information 109. As shown in Figure 1, the first post 106A and the second post 106B are located such that said display part 108 extends across the back part 104 of the net 102. The first post 106A is separated from the second post 106B by a distance that is greater than the distance between the vertical posts of the goalposts 105, and positioned such that the whole of the back part 104 of the net 102 extends along a portion of the display part 108.

In the present example, a video camera 110 and a second camera 111, for taking still photographs, are located behind the net 102 to capture images of a portion of the back part 104 of the net 102 and one or more football players in front of the net. However, in alternative examples only one of these types of camera may be present.

In an alternative to the present embodiment, the post 106A is positioned such that it is in line with a first vertical goalpost 105 and the side part 103A of the net 102, and similarly the post 106B is positioned such that it is in line with a second vertical goalpost 105 and the side part 103B. By positioning the
posts 106A and 106B directly behind the goalposts (as viewed from the pitch) the posts are unlikely to be hazardous to players or interfere with the flight of the football in the event of a shot missing the goal.

**Figure 2**

An example of an image 201 displayed on a television set 200, produced by one of the cameras 110 located behind the net 102, is shown in Figure 2.

In the example image, a player 202 has scored a goal and the ball 203 has just struck the back of the net 102. Consequently, the goal is being replayed in slow motion using images from a camera 110 that provides a close-up, detailed view of the action. However, as well as providing detailed images of the player 202 and the ball 203, the camera also provides images of the graphical information 109 displayed on a surface 204 of the display part 108. In the present example, the graphical information 109 is a fictional logo and word mark, but, of course, this could be replaced by a logo, a word mark or both logo and word mark relating to a well-known brand. Thus, the graphical information may be used for advertising purposes.

As will be further described below with reference to Figures 8A and 8B, the display part 108 is positioned such that that the force of the ball 203 against the net 102 pushes the net against the display part. Consequently, the graphical information 109 is displayed as an object that moves in response to the action of the football 203, rather than merely as a motionless object that is separate to the sport.

**Figure 3**

The posts 106A and 106B and display part 108 are shown in Figure 3, without the goalposts 105 and the net 102. The display part 108 comprises a pair of elongate members 301A and 301B extending between the first post 106A and the second post 106B, and a plurality (in this example four) of similar sheets 302A, 302B, 302C and 302D extending between the pair of
elongate members. Each of the sheets has a surface, such as surface 204 of sheet 302A, displaying graphical information, such as graphical information 109.

Each of the elongate members 301A and 301B is formed of a single element of a translucent material, so that their visibility to spectators of a football match is minimized. In the present embodiment, the elongate members are formed of a resilient material, such as silicone rubber, so that they are able to stretch, as will be described below.

Figure 4

The post 106A and an end portion of the display part 108 are shown in Figure 4. The ground 401 below the ground surface 107 is shown in Figure 4 in cross-section, to illustrate the manner in which the posts, such as post 106A are supported in an upright orientation.

A lower portion of the post 106A is located within a socket 402 that is itself located within a hole formed in the ground 401, for example by an auger. In the present example, the socket 402 is formed of a cylindrical tube of metal having a closed bottom end. The end may be closed by any suitable means such as by a plug of material.

The elongate members 301A and 301B are attached to the posts, such as post 106A, by fastening to eyelets 403; the eyelets themselves being rigidly fixed to the posts. In the present embodiment, the posts 106A and 106B are formed of aluminium tubes, and, in an alternative embodiment, the eyelets are replaced by holes formed in the aluminium tubes. The elongate members 301A and 301B are then fixed into the holes, for example by forming a knot in end portions of the elongate members within the tubes, or by fastening the ends of the elongate members to a toggle located within the tubes.

In an alternative embodiment, the socket 402 is formed of the same type of tubular material as the posts 106A and 106B. In this case, a respective cylindrical rod (or tube) is rigidly fixed into each lower end of the posts 106A, 106B, so that an end portion of the rod extends from the end of the tubular
material forming the posts 106A, 106B. The posts are then fixed in their upright position, as shown in the Figures, by locating the end portion of the rods into the sockets 402.

It may be noted that in each embodiment, the posts 106A and 106B are simply located in their sockets by sliding a lower portion of the posts 106A and 106B into the sockets. Similarly the posts are removable from their sockets by sliding out. This allows the display part 108 to be assembled to the posts 106A and 106B before the posts are located in the sockets. That is, in one method of displaying the graphical information, the unified assembly comprising the posts 106A and 106B and display part 108 is located in position behind the net 102 and the posts are inserted into the sockets while the display part is attached. As a consequence, any maintenance to the posts or display part, or any change to graphical information 109, that is required may be performed at a different location, and the unified assembly then installed behind the net 102 when required, for example, just before a football match.

Figure 5

A portion of the display part 108 including the sheet 302A is shown in Figure 5. In the present embodiment, the sheet is attached to the elongate members 301A and 301B by respective detachable clipping devices 501A and 501B. The sheet 302A is formed of transparent material, and in the present embodiment is formed of silicone rubber.

A spacer element 502A has a respective end attached to each one of the pair of elongate members 301A, 302B, such that it extends substantially parallel to, and along one edge 503A of the sheet 302A. In the present case, a second similar spacer 502B also has a respective end attached to each one of the elongate members 301A, 302B, such that it extends along the opposite edge 503B of the sheet 302A. The spacer elements maintain the spacing between the elongate members, and thereby ensure that the sheet remains substantially flat so that the graphical information 109 is clearly presented.

Each of the spacer elements 502A and 502B are similarly configured
having a central cylindrical portion 504 with a loop 505 at each end. The loops are configured to be a good fit around the elongate members 301A and 301B such that they resist sliding along the elongate members.

**Figure 6**

The spacer element 502A is shown in a side view in Figure 6A, in a front view in Figure 6B and in an end view in Figure 6C. A detailed view of one end of the spacer element 502A is shown in Figure 6D.

The loops 505 at the ends of the spacer element 502A define an aperture 601 into which a spacer element 301A, 301B is locatable. The distance (602) between the two apertures 601 is chosen to correspond with the required dimensions of the sheet 302A. The loops 505 are not continuous because they are provided with a gap 603 to allow an elongate member 301A, 302B to be pulled into the aperture of the loop.

In the present embodiment, the central cylindrical portion 504 has a diameter that is similar in size to that of the elongate members 301A, 301B, and a length that is longer than the clipping devices 501A, 501B. Consequently, if required, the clipping devices 501A, 501B may be clipped onto the spacer elements 502A, 502B instead of the elongate members.

**Figure 7**

The clipping device 501A is shown disassembled in Figure 7. The clipping device is substantially as previously disclosed in the present applicant's international patent application that was published as WO 2010/097565 A1.

Thus, the clipping device 501A comprises a first jaw part 702, a second jaw part 703 and a retaining member 704. The jaw parts 702 and 703 each have a similar central portion having a planar clamping surface 705 and a rounded outer surface 706. The rounded outer surfaces 706 are configured such that when the clamping surfaces 705 are brought together the rounded surfaces 706 form a substantially cylindrical shape. Each of the rounded
surfaces 706 is provided with a groove 717 (shown in Figure 7 on jaw part 702) which extends the entire length of the central portion of the jaw parts. The first jaw part 702 has a first protruding element 707 located at a first of its ends, and a second protruding element 708 located at the other one of its ends. The protruding elements 707 and 708 extend forwards of the clamping surface 705 of the jaw member 702. The second jaw part 703 is correspondingly shaped, so that the protruding members 707 and 708 do not prevent the clamping surfaces 705 from being brought together. Thus, for example, the central portion of jaw part 703 has end faces 709 dimensioned to fit between the protruding elements 707 and 708.

Similarly, the second jaw part 703 has protruding elements 710 and 711 that extend forward of the clamping surface 705 of jaw part 703. The central portion of the first jaw part 702 has end faces 712 dimensioned to fit between the protruding elements 710 and 711 of the second jaw part 703.

Each of the jaw parts 702 and 703 is provided with a groove 720 that runs the entire length of the jaw part and across the clamping surface 705. The grooves 720 are cylindrically shaped, in that when the clamping surfaces 705 of the jaw parts are brought together the grooves 720 form a substantially cylindrical tube having a diameter configured to receive an elongate member 301A, 301B or a central cylindrical portion of a spacer element 502A, 502B.

The retaining member 704 has a substantially c-shaped cross section, having an inner surface 713 that extends partially around a cylinder having a diameter slightly larger than the cylinder formed by rounded surfaces 706. A ridge 714 extends inwardly from one end of the c-shape of the retaining member 704, while a second ridge 715 extends inwardly from the other end of the c-shape. The ridges 714 and 715 are dimensioned such that when the inner surface 713 of the retaining member 704 is located around the rounded surfaces 706 of jaw parts 702 and 703, the ridges 714 and 715 extend into grooves 717 formed in the jaw parts 702 and 703.

In use, the sheet 302A is sandwiched between the clamping surfaces 705 of the jaw parts 702 and 703, while an elongate member 301A, 301B is
located along the grooves 720. The retaining member 704 is clipped over the jaw parts such that the ridges 714 and 715 are located within a respective groove 717 to lock the three components 702, 703, 704 together and hold the sheet 302A on the elongate member 301A, 301B.

**Figure 8A**

A cross-sectional side view of the net 102, the post 106B, the display part 108 and the camera 110 is shown in Figure 8A. The first post 106A and the second post 106B are located such that the display part 108 extends across the back part 104 of the net 102, substantially parallel to the back part. However, the display part 108 is not in contact with the net 102 but instead the display part 108 is spaced from the back part 104 by a gap 801. The gap 801 is sufficiently small to allow the graphical information (109) on the display part 108 to be brought into focus by the camera 110 when the back part 104 of the net 102 is brought into focus.

Furthermore, the display part 108 is spaced from the back part 104 by a gap 801 that is sufficiently small to allow a portion of the net 102 to be moved and thereby brought into contact with the display part 108. The purpose of this will be described with respect to Figure 8B.

**Figure 8B**

A cross-sectional side view of the net 102, the post 106B, the display part 108 and the camera 110 is shown in Figure 8B at an instant when a football 802 hits the back part 104 of the net 102. The net 102 is generally loosely hung and consequently, when the football 802 hits the back part 104 of the net 102, the net 102 bulges out backwards and hits the display part 108, which is itself caused to move with the back part 104 of the net 102. As a result, the images produced by the camera 110 show the graphical information (109) on the display part 108 moving with the net 102.

As will be understood, because the elongate members of the display part 109 are elastic, when the display part 109 is struck in this way, it is able to
move without disturbing the posts 106A and 106B. Also, after such a strike, the display part 109 is able to return to its original configuration.

A mentioned above, with respect to Figure 8A, the gap 801 between the display part 108 and the undisturbed net 102 (as shown in Figure 8A) must be sufficient close to allow the net 102 to be moved and brought into contact with the display part 108. In one embodiment, the gap is approximately 1 millimeter such that the display part appears to be touching the net. However, in general a sufficiently large gap is provided between the net 102 and the display part 108 so that the display part and the posts 106A, 106B do not unduly interfere with the motion of the ball 802. The largest size that the gap 801 may be depends upon the tension that the net 102 is held under; if the net is only held loosely, so that it is free to move a large distance when hit by a ball, the gap may be made quite large, while a tightly tensioned net will require a relatively small maximum gap size.

Net fixing means, typically in the form of a frame 803 as is well known in the art, is provided at the bottom edge of the net 102 to hold the bottom edge in place against the ground, and the posts 106A and 106B are positioned in a plane behind the net a distance 804 from rear part 805 of the frame 803. In the present embodiment, the distance 804 is between 1 and 1000 millimeters, and is preferably between 100 and 900 millimeters and more preferably between 100 and 600 millimeters, with a typical value being 350 millimeters.

Figure 9

An alternative configuration of the display part 108 is illustrated in Figure 9. In this arrangement, the spacer elements 502A and 502B extend between the elongate members 301A and 301B as in the above described arrangement. However, each of the two clipping devices 501A and 501B are used to attach a respective end of a sheet 901 to a respective spacer elements 502A and 502B, such that the sheet 901 extends from one spacer element to the other one.
Figure 10

An alternative apparatus 1001 embodying the present invention is shown in Figure 10. The apparatus 1001 is substantially identical to the apparatus 101 of Figure 1 but differs in that it has additional components 1051A, 1051B attached to each of the two posts 106A and 106B, which extend alongside a respect side part 103A, 103B of the net 102. The additional components 1051A are similar to components 1051B and will be described with reference to Figures 11 to 14B.

Figure 11

The post 106A and additional components 1051A are shown in Figure 11, in which the goalposts 105 and net 102 are shown in dotted outline.

The additional components comprise a pair of arms 1101 and 1102 extending from the first post 106A in a substantially horizontal direction and substantially parallel to the side part 103A of the net 102. A first one 1101 of the arms extends from an upper part of the post 106A while the other one 1102 of the arms extends from the post along the ground surface 107.

The additional components also include a second display part 1103 extending between the pair of arms 1101, 1102. The second display part 1103 has a further surface 1104 displaying graphical information 1105. In the present embodiment, the second display part 1103 comprises four elongate elements 1106A, 1106B, 1106C and 1106D, each of which extends from the first arm 1101 to the other arm 1102. A sheet 1107A is attached to the elongate members 1106A and 1106B and provides the surface 1104 on which the graphical information is displayed.

In the present example, further similar sheets 1107C and 1107B are provided and suspended between elongate members 1106B and 1106C, and 1106C and 1106D respectively.

The structure of the elongate elements, sheets and means for attaching the sheets to the elongate elements are the same those in the first display part 108.
Figure 12

A portion of the display part 1103 including the sheet 1107A is shown in Figure 12. As illustrated, the sheet is supported in a similar manner to sheet 901 of Figure 9. Thus, two spacer elements 502 are clipped onto the elongate elements 1106A and 1106B, and the sheet 1107A is clipped onto the spacer elements 502 by clipping devices 501A and 501B.

Figures 13A and 13B

The lower arm 1102 is shown in a side view of Figure 13A and a plan view in Figure 13B.

The arm 1102 comprises a bent piece of metal that is provided with two holes 1301 located towards one end to allow the arm to be fixed to the post 106A by screws 1302. A series of four equally spaced holes 1303 are provided along the length of the arm 1102 to allow attachment of the elongate members 1106A, 1106B, 1106C, 1106D. A spike 1304 extends from the main part of the arm. In use the spike is pushed into the ground to provide the apparatus with greater stability.

Figures 14A and 14B

The upper arm 1101 is shown in a side view of Figure 14A and a plan view in Figure 14B.

Like arm 1102, the arm 1101 comprises a bent piece of metal that is provided with two holes 1401 located towards one end to allow the arm to be fixed to the post 106A by screws 1402. A series of four equally spaced holes 1403 are provided along the length of the arm 1101 to allow attachment of the elongate members 1106A, 1106B, 1106C, 1106D.

Figure 15

An alternative apparatus 1501 embodying the present invention is shown in Figure 15. The apparatus 1501 is similar to apparatus 101 but differs
in the form of the display part 1508 that extends between its posts 1506A and 1506B. The display part 1508 comprises a display net 1502 having a similar structure to the football net 102, having holes that are substantially the same shape and size as those of the football net 102. In the present embodiment, both the football net 102 and the display net 1502 have square shaped holes, however, the display net 1502 has a much smaller height than the football net, extending over a height of three holes. Sheets having a surface 1504 displaying graphical information 1509 are attached to the display net, for example using the clipping devices 501A, 501B described above, or alternative means, to securely attach the sheets to the net 1502.

As with the embodiment of Figure 1, video and still cameras 1510 and 1511 are positioned behind the net 102 to capture images of football players in front of the net, the net itself and the graphical information 1509.

Figure 16

An alternative apparatus 1601 embodying the present invention is shown in Figure 16. The apparatus 1601 is similar to apparatus 101 but differs in the form of the display part 1608 that extends between its posts 1606A and 1606B. The display part 1608 comprises a continuous sheet 1651 of transparent elastic polymeric material, which in the present embodiment is a type of silicone rubber.

The sheet 1651 has a surface 1604 displaying graphical information 1609 that has been printed onto said sheet.

In the present embodiment, the sheet 1651 is formed into a loop 1652 at each one of two opposite ends, and the sheet is supported by the posts 1606A and 1606B by passing the loops over the posts. The spacing between the posts 1606A and 1606B and the spacing between the loops 1652 are chosen such that the sheet is held in tension between posts.

As with the embodiment of Figure 1, video and still cameras 1610 and 1611 are positioned behind the net 102 to capture images of football players in front of the net, the net itself and the graphical information 1609.
Claims

1. Apparatus for displaying graphical information comprising:
a football net having two side parts and a back part extending between said two side parts;
goalposts at the front of said net, supporting a front edge of said net;
a first post and a second post, said first post and said second post extending upward from the ground surface in a substantially vertical plane behind said net;
a display part extending above the ground surface between said first post and said second post, said display part having a surface displaying graphical information;
wherein said first post and said second post are located such that said display part extends across said back part of said net and such that said display part is spaced from said back part by a gap that is sufficiently small to allow a portion of said net to be moved and thereby brought into contact with said display part.

2. Apparatus according to claim 1, wherein said display part comprises an elastic material extending between said first post and said second post such that said elastic material is able to stretch when said net is brought into contact with said display part by a football hitting the back of the net.

3. Apparatus according to claim 2, wherein said elastic material comprises silicone rubber.

4. Apparatus according to claim 2 or claim 3, wherein said elastic material is translucent.

5. Apparatus according to any one of claims 1 to 4, wherein said first post is separated from said second post by a distance that is greater than, or equal to, the distance between the vertical posts of said goalposts.
6. Apparatus according to any one of claims 1 to 5, wherein said display part comprises a pair of elongate members extending between said first post and said second post and a sheet having said surface displaying said graphical information, said sheet extending between said pair of elongate members.

7. Apparatus according to claim 6, wherein said sheet is fixed to each said elongate member by a respective detachable clip.

8. Apparatus according to claim 6 or claim 7, wherein said apparatus further comprises a spacer element having a respective end attached to each one of said pair of elongate members such that said spacer element maintains a spacing between said elongate members.

9. Apparatus according to any one of claims 1 to 5, wherein said display part comprises a display net extending between said first post and said second post and a sheet having said surface displaying said graphical information, said sheet extending between strands forming said net.

10. Apparatus according to claim 9, wherein said sheet is fixed to said display net by a pair of detachable clips.

11. Apparatus according to claim 9 or claim 10, wherein said display net defines a plurality of holes, and each said hole has substantially the same shape and size as the holes of said football net.

12. Apparatus according to any one of claims 1 to 5, wherein said display part comprises an elongate sheet of translucent material extending between said first post and said second post, such that said elongate sheet is held in tension by said posts.
13. Apparatus according to any one of claims 1 to 12, wherein said apparatus further comprises:

additional components attached to at least one of said posts, and said additional components include a further sheet of material supported above said ground surface in a plane substantially parallel to a side part of said net, and said further sheet having a further surface displaying additional graphical information.

14. Apparatus according to claim 13, wherein additional components comprise:

a pair of arms extending from said first post in a substantially horizontal direction and substantially parallel to a side part of said net; and

a second display part extending between said pair of arms, said second display part comprising said further sheet having said further surface displaying graphical information.

15. Apparatus according to any one of claims 1 to 14 further comprising a camera arranged to capture images of a portion of said back part of said net and one or more football players in front of said net, wherein said first post and said second post are located such that said display part is spaced from said back part by a gap that is sufficiently small to allow said graphical information to be brought into focus by said camera when said net is brought into focus.

16. Apparatus for displaying graphical information comprising:

a football net;

goalposts at the front of said net, supporting a front edge of said net;

a camera located behind said net and arranged to generate an image of a portion of said net and one or more football players;

a first post and a second post extending upward from the ground surface;
a display part extending above the ground surface between said first post and said second post, said display part having a surface displaying graphical information;
wherein said first post and said second post are arranged in a substantially vertical plane between said football net and said camera.

17. Apparatus for displaying graphical information comprising:
a football net having two side parts and a back part extending between said two side parts;
goalposts at the front of said net, supporting a front edge of said net;
a first post and a second post, said first post and said second post extending upward from the ground surface in a substantially vertical plane behind said net;
a display part extending above the ground surface between said first post and said second post, said display part having a surface displaying graphical information;
a camera arranged to capture images of a portion of said back part of said net and one or more football players in front of said net;
wherein said first post and said second post are located such that said display part extends across said back part of said net and such that said display part is spaced from said back part by a gap that is sufficiently small to allow said graphical information to be brought into focus by said camera when said net is brought into focus.

18. Apparatus according to claim 17, wherein gap is sufficiently small to allow a portion of said net to be moved and thereby brought into contact with said display part.

19. Apparatus according to claim 18, wherein said display part comprises a resilient material such that said resilient material is caused to stretch when said net is brought into contact with said display part by a football
hitting the back of the net.

20. A method of displaying an image of graphical information, comprising:

obtaining a sheet of material on which graphical information is provided;
suspending said sheet of material behind a football net such that said sheet is separated from said net by a gap;
locating a camera such that said graphical information is viewable by said camera, and configuring said camera to capture an image comprising an item relating to a game of said sport and said graphical information; and displaying said captured image.

21. A method of displaying an image of graphical information as claimed in claim 20, wherein said camera is a video camera and said method further comprises propelling a football into the football net such that a portion of said football net pushes against said sheet to cause said sheet to move with said portion of said football net.
Figure 11