



US 20190118054A1

(19) **United States**

(12) **Patent Application Publication**

**Crosby**

(10) **Pub. No.: US 2019/0118054 A1**

(43) **Pub. Date: Apr. 25, 2019**

(54) **CROSSBAR CONNECTOR FOR A SPORTS GOAL**

**Publication Classification**

(71) Applicant: **Quick Play Sport Ltd.**, Sheffield Yorkshire (GB)

(51) **Int. Cl.**  
*A63B 63/00* (2006.01)

(72) Inventor: **Steven Crosby**, Sheffield Yorkshire (GB)

(52) **U.S. Cl.**  
CPC ..... *A63B 63/00* (2013.01); *A63B 2210/50* (2013.01)

(21) Appl. No.: **16/302,695**

(57) **ABSTRACT**

(22) PCT Filed: **May 15, 2017**

A crossbar connector for a sports goal comprising at least two crossbar elements, wherein the crossbar connector comprises a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than 170° and less than 180°. The invention also extends to a corner connector for a sports goal, disassemblable sports goal kit and a sports goal.

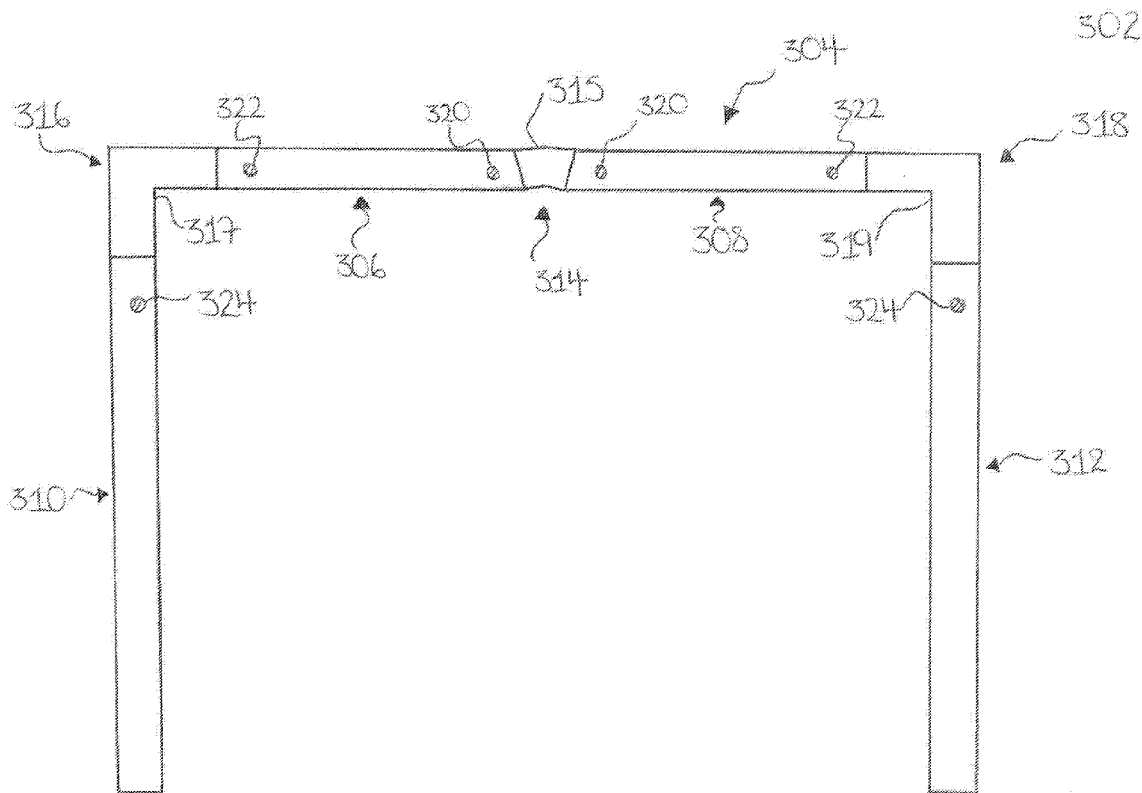
(86) PCT No.: **PCT/GB2017/051356**

§ 371 (c)(1),

(2) Date: **Nov. 19, 2018**

(30) **Foreign Application Priority Data**

May 17, 2016 (GB) ..... 1608680.3



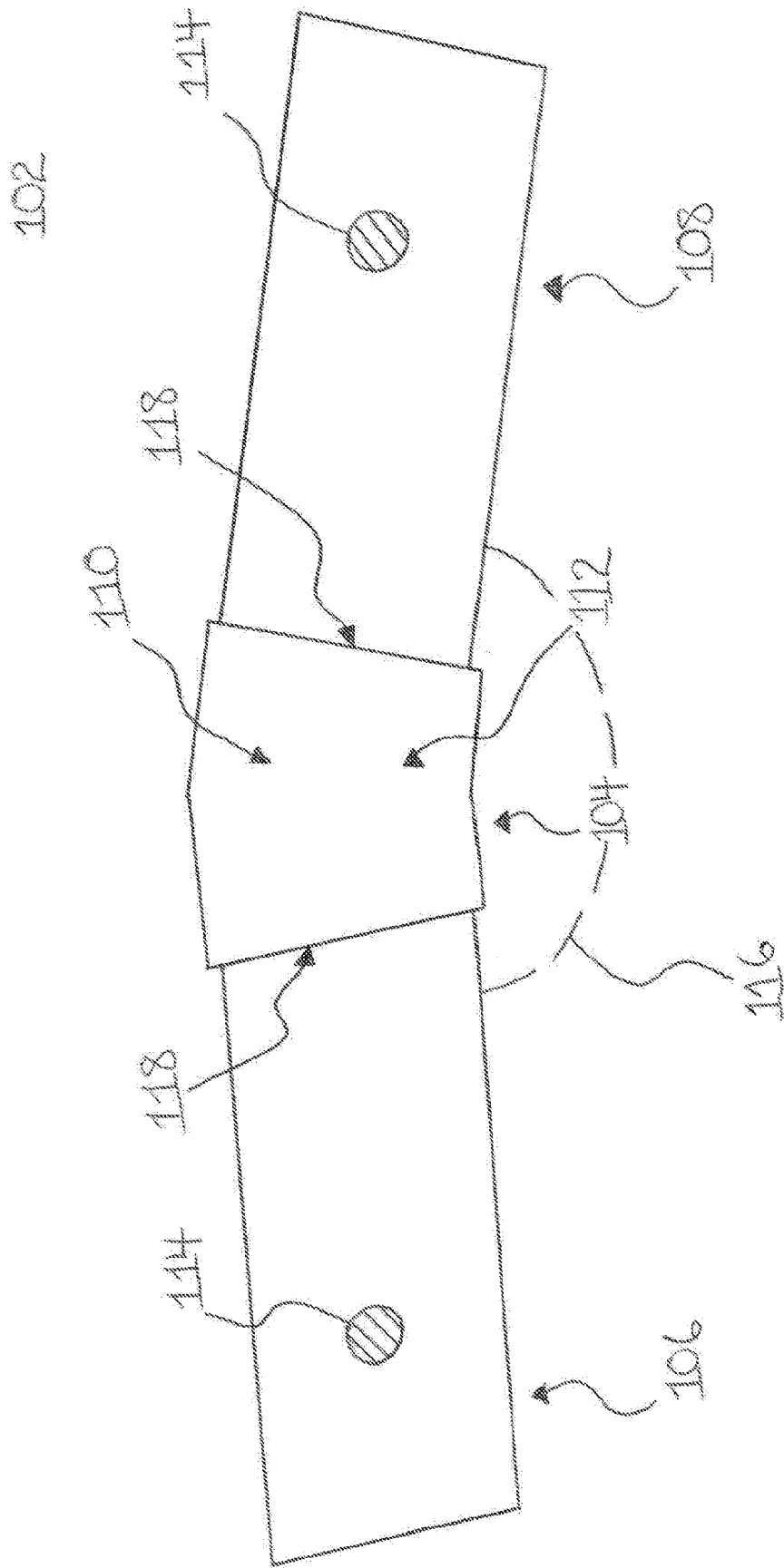


Fig. 1

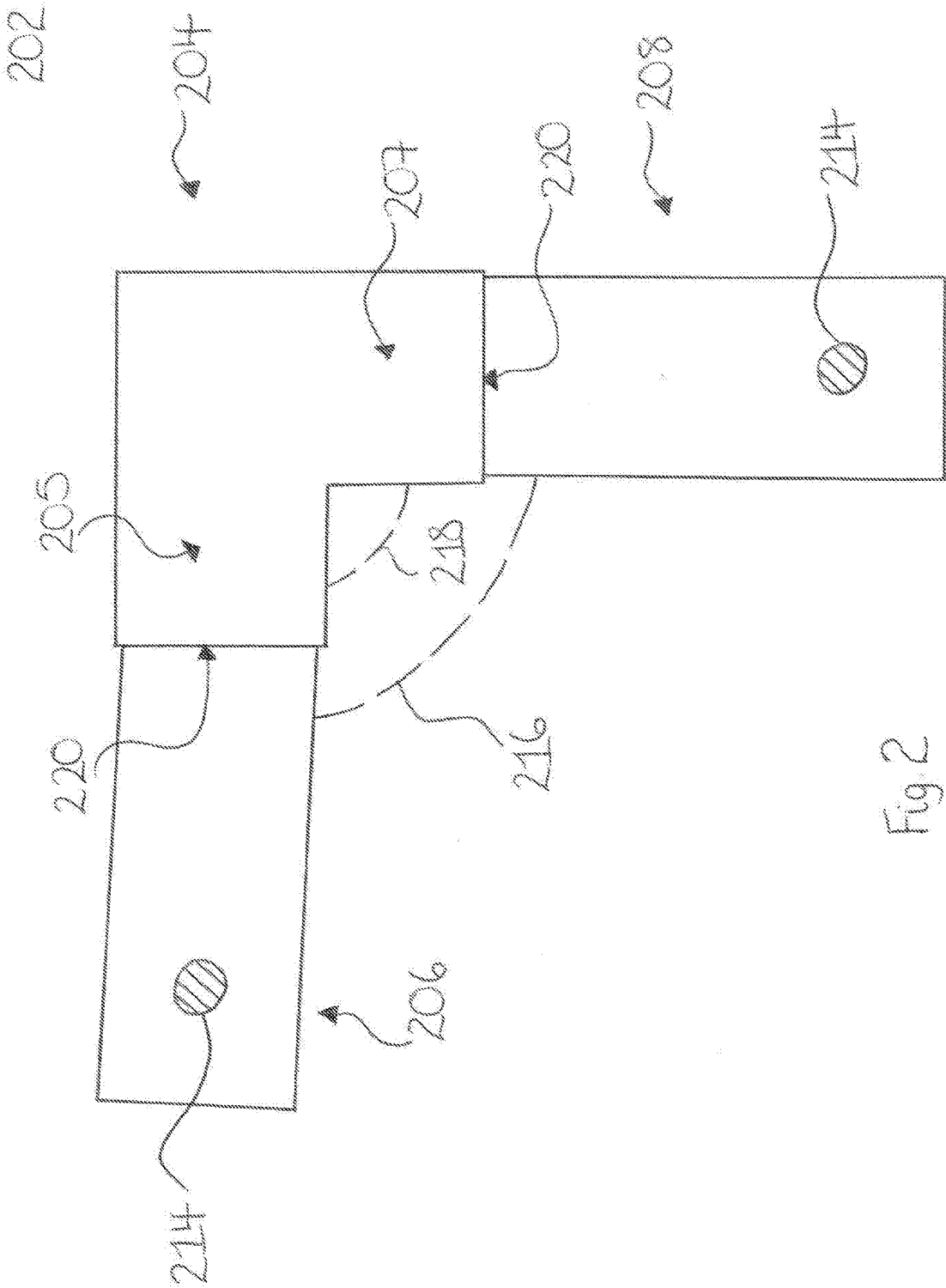


Fig. 2

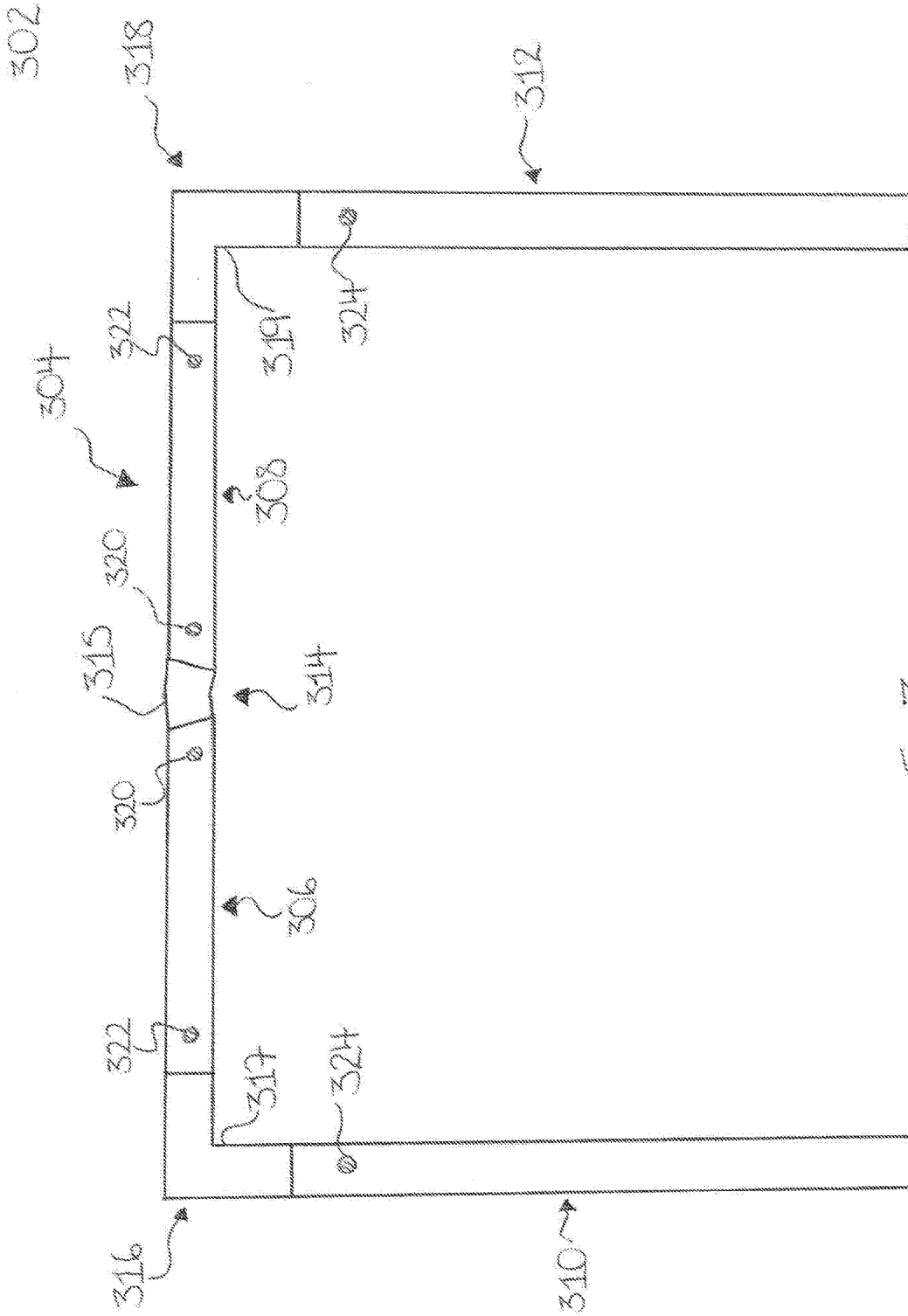


Fig. 3

### CROSSBAR CONNECTOR FOR A SPORTS GOAL

**[0001]** The present invention relates to a crossbar connector, in particular to a crossbar connector for a crossbar of a sports goal.

**[0002]** Collapsible sports goals are known in the art. They differ from static, usually permanent or semi permanent fixtures made from heavy materials in that they are designed to be at least substantially portable, lightweight and are useful to provide temporary goal fixtures that may be assembled on site prior to use and disassembled once usage has ceased, such that the location of the goal need not be permanent. Collapsible goals find particular use in training scenarios. Such goals need to have certain properties such as ease of assembly and disassembly, reduced bulk and weight for carrying and storage and a stable structure defining an opening, once assembled.

**[0003]** Problems with such collapsible goals known in the prior art exist in that the crossbar experiences mechanical sagging on account of the length of the crossbar and the materials from which it is constructed, such that the crossbar bows downward towards the ground. The opening defined by the crossbar and the parallel vertical posts of the goal is reduced and therefore this sagging represents a significant problem with regard to the use of such structures as sports goals.

**[0004]** It is an object of aspects of the present invention to provide a solution to the above mentioned or other problems.

**[0005]** According to a first aspect of the present invention, there is provided a crossbar connector for a sports goal comprising at least two crossbar elements, wherein the crossbar connector comprises a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $170^\circ$  and less than  $180^\circ$ .

**[0006]** Preferably, the crossbar connector comprises a central portion and preferably, an outwardly extending first connecting portion and an outwardly extending second connecting portion. Preferably, the central portion is integrally formed with the first and second connecting portions so as to generally form a conjoined shape.

**[0007]** Preferably, the central portion is generally shorter in length than the first and second connecting portions.

**[0008]** Preferably, the central portion comprises an internal channel.

**[0009]** Preferably, the central portion comprises an upper region and preferably a lower region.

**[0010]** Preferably, the length of the upper region is generally wider than that of the lower region.

**[0011]** Preferably, the central portion comprises a taper towards the lower region.

**[0012]** Preferably, the central portion is generally of greater thickness than the first and second connecting portions.

**[0013]** Preferably, the first and second connecting portions are generally elongate. Preferably, the first and second connecting portions comprise a longitudinal axis along their length. The first and second connecting portions may have any suitable cross sectional shape perpendicular to the longitudinal axis. Preferably, the first and second connecting portions are circular or part circular in cross section perpen-

dicular to the longitudinal axis. Preferably, the first and second connecting portions are generally cylindrical.

**[0014]** The first and second connecting portions may be generally hollow, preferably comprising an internal channel.

**[0015]** Preferably, the first and second connecting portions are arranged such that the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $170^\circ$  and less than  $180^\circ$ . Preferably, the first and second connecting portions are arranged at an angle of greater than  $172^\circ$  and less than  $179^\circ$  and most preferably, at an angle of greater than  $175^\circ$  and less than  $178^\circ$ .

**[0016]** It will be appreciated that the angle between the longitudinal axes of the first and second connecting portions may be required to be different depending on the length and weight of the cross bar elements. On a larger goal, such as a goal having a width of about 5 to 6 metres (and 18.5 foot wide goal, for example), the first and second connecting portions may be arranged at an angle of greater than  $176^\circ$  and less than  $177^\circ$ , such as at an angle of about  $176.5^\circ$ . On a smaller goal, such as a goal having a width of between 3 and 4 metres (a 12 foot wide goal, for example), the first and second connecting portions may be arranged at an angle of greater than  $178^\circ$  and less than  $179^\circ$ , such as at an angle of about  $178.5^\circ$ .

**[0017]** The crossbar connector may be formed from any suitable malleable material. Examples of suitable materials include plastic materials formed from polymers and/or copolymers, such as poly vinyl chloride (PVC); polypropylene (PP); acrylonitrile butadiene styrene (ABS), polyethylene (PE) or combinations thereof and metal materials such as steel; aluminium or combinations thereof. Preferably, the crossbar connector is formed from a plastic material.

**[0018]** Preferably, the at least two crossbar elements are generally elongate. Preferably, the at least two crossbar elements comprise a longitudinal axis along their length. The at least two crossbar elements may have any suitable cross sectional shape perpendicular to the longitudinal axis. Preferably, the at least two crossbar elements are circular or part circular in cross section perpendicular to the longitudinal axis. Preferably, the at least two crossbar elements are generally cylindrical.

**[0019]** The at least two crossbar elements may be generally hollow, preferably comprising an internal channel.

**[0020]** Preferably, the at least two crossbar elements are formed from a malleable material similar to that from which the crossbar connector is formed.

**[0021]** Preferably, the at least two crossbar elements are operable to connect with the crossbar connector. Preferably, the at least two crossbar elements are operable to connect with the first and second connecting portions of the crossbar connector. Preferably, the at least two crossbar elements are operable to connect with the first and second connecting portions via a friction fit. Preferably, the dimensions of the at least two crossbar elements correspond generally to the dimensions of the first and second connecting portions of the crossbar connector. Preferably, the first and second connecting portions are narrower than the width, or diameter if cylindrical, of the at least two crossbar elements.

**[0022]** Preferably, the crossbar connector further comprises one or more securing means operable to secure the crossbar connector to the at least two crossbar elements. Preferably, the one or more securing means is operable to secure the first and second connecting portions of the crossbar connector to the at least two crossbar elements.

**[0023]** Preferably, the one or more securing means is arranged on the crossbar connector so as to be operable to form a detachable attachment to the at least two crossbar elements. Preferably, the one or more securing means is situated on the extended first and second connecting portions of the crossbar connector towards the middle of the length of the portions. Suitable securing means include spring clips and spring locks.

**[0024]** Preferably, the at least two crossbar elements further comprise one or more securing means operable to secure the at least two crossbar elements to the crossbar connector. Preferably, the one or more securing means is operable to secure the at least two crossbar elements to the first and second connecting portions of the crossbar connector.

**[0025]** Preferably, the one or more securing means is arranged on the at least two crossbar elements so as to be operable to form a detachable attachment to the first and second connecting portions of the crossbar connector. Preferably, the one or more securing means is situated towards the ends of the at least two crossbar elements. Suitable securing means include apertures in the material of the at least two crossbar elements.

**[0026]** Preferably, the position of the one or more securing means on the crossbar connector generally correspond to the position of the one or more securing means on the at least two crossbar elements.

**[0027]** In one embodiment, the first and second connecting portions of the crossbar connector may not be integrally formed with the central portion to form a generally conjoined shape. In such an embodiment, the angle between the longitudinal axes of the first and second connecting portions may be variable from the point of attachment of the central portion and the first and second connecting portions between greater than  $170^\circ$  and less than  $180^\circ$ . In such an embodiment, the length of the upper region of the central portion is generally the same as that of the lower region, such that there is no taper towards the lower region.

**[0028]** According to a second aspect of the present invention, there is provided a corner connector for a sports goal comprising at least one crossbar element and at least one post element, wherein the corner connector comprises a first connecting portion operable to connect with the at least one crossbar element or at least one post element and a second connecting portion operable to connect with the at least one post element or at least one crossbar element when the first connecting portion connects to the other of the at least one crossbar element or at least one post element, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $100^\circ$ .

**[0029]** Preferably, the corner connector comprises a central portion and preferably, an outwardly extending first connecting portion and an outwardly extending second connecting portion.

**[0030]** Preferably, the central portion is integrally formed with the first and second connecting portions so as to generally form a conjoined shape.

**[0031]** Preferably, the central portion of the corner connector comprises a first corner portion and preferably a second corner portion. Preferably, the first and second corner portions are integrally formed so as to generally form a conjoined shape. Preferably, the first and second corner portions are generally arranged so as to be perpendicular to

each other. Preferably, the first and second corner portions comprise a longitudinal axis along their length. The first and second corner portions may have any suitable cross sectional shape perpendicular to the longitudinal axis. Preferably, the first and second corner portions are circular or part circular in cross section perpendicular to the longitudinal axis.

**[0032]** Preferably, the central portion comprises an internal channel.

**[0033]** Preferably, the central portion is generally shorter in length than the first and second connecting portions of the corner connector.

**[0034]** Preferably, the central portion is generally of greater thickness than the first and second connecting portions.

**[0035]** Preferably, the first and second connecting portions are generally elongate. Preferably, the first and second connecting portions comprise a longitudinal axis along their length. The first and second connecting portions may have any suitable cross sectional shape perpendicular to the longitudinal axis. Preferably, the first and second connecting portions are circular or part circular in cross section perpendicular to the longitudinal axis. Preferably, the first and second connecting portions are generally cylindrical.

**[0036]** The first and second connecting portions may be generally hollow, preferably comprising an internal channel.

**[0037]** Preferably, the first and second connecting portions are arranged such that the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $100^\circ$ . Preferably, the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $96^\circ$  and most preferably, at an angle of greater than  $91^\circ$  and less than  $94^\circ$ .

**[0038]** The corner connector may be formed from any suitable malleable material. Examples of suitable materials include plastic materials formed from polymers and/or copolymers, such as poly vinyl chloride (PVC); polypropylene (PP); acrylonitrile butadiene styrene (ABS), polyethylene (PE) or combinations thereof and metal materials such as steel; aluminium or combinations thereof. Preferably, the corner connector is formed from a plastic material.

**[0039]** In one embodiment, the first and second connecting portions of the corner connector may not be integrally formed with the central portion to form a generally conjoined shape. In such an embodiment, the angle between the longitudinal axes of the first and second connecting portions may be variable from the point of attachment of the central portion and the first and second connecting portions between greater than  $170^\circ$  and less than  $180^\circ$ .

**[0040]** In one embodiment, the first and second corner portions may be arranged such that the longitudinal axes of the first and second corner portions are arranged at an angle greater than  $90^\circ$  and less than  $100^\circ$ . The first and second corner portions may be arranged at an angle of greater than  $90^\circ$  and less than  $96^\circ$ , such as at an angle of greater than  $91^\circ$  and less than  $94^\circ$ . In such an embodiment, the first and second connecting portions may be arranged such that the longitudinal axes of the first and second connecting portions of the corner connector are longitudinally aligned with the longitudinal axes of the first and second corner portions.

**[0041]** Preferably, the at least one crossbar element is generally elongate. Preferably, the at least one crossbar element comprises a longitudinal axis along its length. The at least one crossbar element may have any suitable cross sectional shape perpendicular to the longitudinal axis. Pref-

erably, the at least one crossbar element is circular or part circular in cross section perpendicular to the longitudinal axis. Preferably, the at least one crossbar element is generally cylindrical.

**[0042]** The at least one crossbar element may be generally hollow, comprising an internal channel.

**[0043]** Preferably, the at least one crossbar element is formed from a malleable material similar to that from which the corner connector is formed.

**[0044]** Preferably, the at least one post element is generally elongate. Preferably, the at least one post element comprises a longitudinal axis along its length. The at least one post element may have any suitable cross sectional shape perpendicular to the longitudinal axis. Preferably, the at least one post element is circular or part circular in cross section perpendicular to the longitudinal axis. Preferably, the at least one post element is generally cylindrical.

**[0045]** The at least one post element may be generally hollow, preferably comprising an internal channel.

**[0046]** Preferably, the at least one post element is formed from a malleable material similar to that from which the corner connector is formed.

**[0047]** Preferably, the at least one crossbar element is operable to connect with the corner connector. Preferably, the at least one crossbar element is operable to connect with the first or second connecting portion of the corner connector when the at least one post element connects with the other of the first or second connecting portion. Preferably, the at least one crossbar element is operable to connect with the first or second connecting portions via a friction fit. Preferably, the dimensions of the at least one crossbar element correspond generally to the dimensions of the first or second connecting portions of the corner connector. Preferably, the first or second connecting portion is narrower than the width, or diameter if cylindrical, of the at least one crossbar element.

**[0048]** Preferably, the at least one post element is operable to connect with the corner connector. Preferably, the at least one post element is operable to connect with the first or second connecting portion of the corner connector when the at least one crossbar element connects with the other of the first or second connecting portion. Preferably, the at least one post element is operable to connect with the first or second connecting portions via a friction fit. Preferably, the dimensions of the at least one post element correspond generally to the dimensions of the first or second connecting portions of the corner connector. Preferably, the first or second connecting portion is narrower than the width, or diameter if cylindrical, of the at least one post element.

**[0049]** Preferably, the corner connector further comprises one or more securing means operable to secure the corner connector to the at least one crossbar element and at least one post element. Preferably, the one or more securing means is operable to secure the first and second connecting portions of the corner connector to the at least one crossbar element and at least one post element.

**[0050]** Preferably, the one or more securing means is arranged on the corner connector so as to be operable to form a detachable attachment to the at least one crossbar element and at least one post element. Preferably, the one or more securing means is situated on the extended first and second connecting portions of the corner connector towards the middle of the length of the portions. Suitable securing means include spring clips and spring locks.

**[0051]** Preferably, the at least one crossbar element further comprises one or more securing means operable to secure the at least one crossbar element to the corner connector. Preferably, the one or more securing means is operable to secure the at least one crossbar element to the first or second connecting portion of the corner connector when the at least one post element is secured to the other of the first or second connecting portions.

**[0052]** Preferably, the one or more securing means is arranged on the at least one crossbar element so as to be operable to form a detachable attachment to the first or second connecting portion of the corner connector. Preferably, the one or more securing means is situated towards the ends of the at least one crossbar element. Suitable securing means include apertures in the material of the at least one crossbar element.

**[0053]** Preferably, the one or more securing means on the corner connector generally correspond to the position of the one or more securing means on the at least one crossbar element. Preferably, the at least one post element further comprises one or more securing means operable to secure the at least one post element to the corner connector. Preferably, the one or more securing means is operable to secure the at least one post element to the first or second connecting portion of the corner connector when the at least one crossbar element is secured to the other of the first or second connecting portions.

**[0054]** Preferably, the one or more securing means is arranged on the at least one post element so as to be operable to form a detachable attachment to the first or second connecting portions of the corner connector. Preferably, the one or more securing means is situated towards the ends of the at least one post element. Suitable securing means include apertures in the material of the at least one post element.

**[0055]** Preferably, the one or more securing means on the corner connector generally correspond to the position of the one or more securing means on the at least one post element.

**[0056]** According to a third aspect of the present invention, there is provided a disassemblable sports goal kit, the kit comprising a crossbar connector and at least two crossbar elements, wherein the crossbar connector comprises a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than 170° and less than 180°.

**[0057]** According to a fourth aspect of the present invention, there is provided a disassemblable sports goal kit, the kit comprising at least one corner connector, at least one crossbar element and at least one post element, wherein the corner connector comprises a first connecting portion operable to connect with the at least one crossbar element or at least one post element and a second connecting portion operable to connect with the at least one post element or at least one crossbar element when the first connecting portion connects to the other of the at least one crossbar element or at least one post element, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than 90° and less than 100°.

**[0058]** According to a further aspect of the present invention, there is provided a sports goal comprising a crossbar having at least two crossbar elements, wherein the crossbar

comprises a crossbar connector comprising a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $170^\circ$  and less than  $180^\circ$ .

**[0059]** Advantageously, the crossbar connector is operable to arrange the at least two crossbar elements at an angle, which is offset from the longitudinally aligned, such that, when assembled, the mechanical sag of the at least two crossbar elements, in combination with the longitudinal offset angle of the crossbar connector causes the crossbar to be arranged substantially horizontally along its length.

**[0060]** Preferably, the goal has a first assembled configuration and a second disassembled configuration. Preferably, the goal defines an opening in the assembled configuration. Preferably, the opening is generally rectangular.

**[0061]** Preferably, in the assembled configuration, the goal further comprises at least two post elements. Preferably, the assembled crossbar of the sports goal is operable to be supported by the at least two post elements in generally parallel upright configuration. Preferably, the crossbar and the at least two post elements define an opening in the assembled configuration, into which a projectile may be fired.

**[0062]** Preferably, in the assembled configuration, the crossbar connector or a portion thereof and the at least two crossbar elements or a portion thereof are linked together by linking means. Preferably, the linking means extend internally through the crossbar connector or a portion thereof and the at least two crossbar elements or a portion thereof. The linking means may comprise an elongated flexible member. Suitable linking means include cord or line which may be elastically and further, may be extendible.

**[0063]** In the assembled configuration, the same linking means that extends through the crossbar connector or a portion thereof and the at least two crossbar elements or a portion thereof may also extend through at least a portion of the at least two elongate post elements so as to link together at least a portion of the assembled crossbar and the at least two elongate post elements.

**[0064]** In one embodiment, the crossbar may comprise three or more elongate crossbar elements.

**[0065]** According to a further aspect of the present invention, there is provided a sports goal, the goal comprising at least one crossbar element and at least one post element, wherein the goal comprises at least one corner connector comprising a first connecting portion operable to connect with the at least one crossbar element and a second connecting portion operable to connect with the at least one post element, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $100^\circ$ .

**[0066]** Advantageously, the corner connector is operable to arrange the at least one crossbar element and the at least one post element at an angle, which is offset from the perpendicular, such that, when assembled, the mechanical sag of the crossbar of the goal, in combination with the perpendicular offset angle of the corner connector causes the crossbar to be arranged substantially horizontally along its length.

**[0067]** Preferably, the goal has a first assembled configuration and a second disassembled configuration. Preferably,

the goal defines an opening in the assembled configuration. Preferably, the opening is generally rectangular.

**[0068]** Preferably, in the assembled configuration, the goal comprises a crossbar comprising at least two crossbar elements, preferably at least two post elements and preferably at least two corner connectors. Preferably, in the assembled configuration, the at least two post elements are arranged in generally parallel upright configuration to support the crossbar of the sports goal. Preferably, the crossbar and the at least two post elements define an opening in the assembled configuration, into which a projectile may be fired.

**[0069]** Preferably, in the assembled configuration, the at least one corner connector or a portion thereof, the at least one crossbar element or a portion thereof and the at least one post element or a portion thereof are linked together by linking means. Preferably, the linking means may extend internally through the at least one corner connector or a portion thereof, the at least one crossbar element or a portion thereof and the at least one post element or a portion thereof. The linking means may comprise an elongated flexible member. Suitable linking means include cord or line which may be elastically and further, may be extendible.

**[0070]** In the assembled configuration, the same linking means that extends through the at least one corner connector or a portion thereof, the at least one crossbar element or a portion thereof and the at least one post element or a portion thereof, may also extend through at least a portion of the assembled crossbar so as to link together at least a portion of the assembled crossbar and the at least two post elements.

**[0071]** In one embodiment, in the assembled configuration, the goal comprises a crossbar formed from at least two crossbar elements and a crossbar connector, wherein the crossbar connector comprises a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $170^\circ$  and less than  $180^\circ$ .

**[0072]** All references herein to angles “between greater than  $170^\circ$  and less than  $180^\circ$ ” should be understood as all angles between (but not including)  $170^\circ$  and  $180^\circ$ . In some embodiments, such angles may be greater than  $172^\circ$  and less than  $179^\circ$ ; or such angles may be greater than  $175^\circ$  and less than  $178^\circ$ , or such angles may be greater than  $176^\circ$  and less than  $177^\circ$ . For example, such an angle may be about  $176.5^\circ$ .

**[0073]** All references herein to angles “between greater than  $90^\circ$  and less than  $100^\circ$ ” should be understood as all angles between (but not including)  $90^\circ$  and  $100^\circ$ . In some embodiments, such angles may be greater than  $90^\circ$  and less than  $96^\circ$ ; or such angles may be greater than  $91^\circ$  and less than  $95^\circ$ , or such angles may be greater than  $92^\circ$  and less than  $94^\circ$ . For example, such an angle may be about  $93.5^\circ$ .

**[0074]** As used herein, the singular includes the plural and plural encompasses singular, unless specifically stated otherwise. For example, the use of the singular, i.e. “a” or “an”, includes “one or more”. In addition, as used herein, the use of “or” means “and/or” unless specifically stated otherwise, even though “and/or” may be explicitly used in certain instances.

**[0075]** All of the features contained herein may be combined with any of the above aspects and in any combination.

**[0076]** For a better understanding of the invention, and to show how embodiments of the same may be carried into



effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings in which:

[0077] FIG. 1 shows a perspective view of a crossbar connector according to the present invention.

[0078] FIG. 2 shows a perspective view of a corner connector according to the present invention.

[0079] FIG. 3 shows a perspective view of a sports goal according to the present invention, in the assembled configuration.

[0080] Referring to FIG. 1, there is provided a crossbar connector 102 having a central portion 104, an outwardly extending first connecting portion 106 and an outwardly extending second connecting portion 108. The central portion 104 is integrally formed with the first connecting portion 106 and the second connecting portion 108 to form a conjoined shape. The central portion 104 is shorter in length than the first connecting portion 106 and second connecting portion 108. The central portion 104 comprises an upper region 110 and a lower region 112. The length of upper region 110 is wider than the lower region 112 such that the central portion 104 is tapered towards the lower region 112. The central portion 104 comprises an internal channel (not shown). The central portion is thicker than the first connecting portion 106 and the second connecting portion 108.

[0081] The first connecting portion 106 and the second connecting portion 108 of the crossbar connector 102 are elongate and extend from the central portion 104. The first connecting portion 106 and second connecting portion 108 have a longitudinal axis along their length and are circular in cross section (not shown) perpendicular to the longitudinal axis. The first connecting portion 106 and second connecting portion 108 are cylindrical and hollow (not shown).

[0082] The first connecting portion 106 and the second connecting portion 108 of the crossbar connector 102 connect with two crossbar elements (not shown) via a friction fit. The dimensions of the first connecting portion 106 and the second connecting portion 108 of the crossbar connector 102 correspond to the dimensions of the two crossbar elements (not shown).

[0083] Securing means 114, in the form of spring clips are situated along the length of the first connecting portion 106 and the second connecting portion 108 of the crossbar connector 102. The securing means 114 form a detachable attachment to secure the first connecting portion 106 and the second connecting portion 108 to two crossbar elements (not shown). The position of the securing means 114 on the crossbar connector 102 corresponds to the position of the securing means on the two crossbar elements (not shown).

[0084] The first connecting portion 106 and second connecting portion 108 of the crossbar connector 102 are arranged such that the longitudinal axes of the first connecting portion 106 and the second connecting portion 108 are arranged at an angle 116 of greater than 170° and less than 180° (in this embodiment, about 176.5°).

[0085] The crossbar connector 102 is formed from a plastic material. It will be apparent to a skilled person that the crossbar connector 102 may be formed from any suitable malleable material.

[0086] In one embodiment, the first connecting portion 106 and the second connecting portion 108 of the crossbar connector 102 are not integrally formed with the central portion 104 to form a conjoined shape. The angle 116 between the longitudinal axes of the first connecting portion

106 and the second connecting portion 108 is variable from the point of attachment 118 of the central portion 104 and the first connecting portion 106 and the second connecting portions 108 between greater than 170° and less than 180°. In such an embodiment, it will be appreciated by a skilled person that the length of the upper region of the central portion is generally the same as that of the lower region, such that there is no taper towards the lower region.

[0087] Referring to FIG. 2, there is provided a corner connector 202 having a central portion 204 comprising a first corner portion 205 and a second corner portion 207, an outwardly extending first connecting portion 206 and an outwardly extending second connecting portion 208. The central portion 204 is integrally formed with the first connecting portion 206 and the second connecting portion 208 to form a conjoined shape.

[0088] The central portion 204 comprises a first corner portion 205 and second corner portion 207. The first corner portion 205 and the second corner portion 207 are arranged so as to be perpendicular to each other. The first corner portion 205 and the second corner portion 207 have a longitudinal axis along their length. The first corner portion 205 and the second corner portion 207 are circular in cross section (not shown) perpendicular to their longitudinal axis. The first corner portion 205 and the second corner portion 207 have an internal channel (not shown).

[0089] The first corner portion 205 and the second corner portion 207 are shorter in length than the first connecting portion 206 and the second connecting portion 208. The central portion 204 is thicker than the first connecting portion 206 and the second connecting portion 208.

[0090] The first connecting portion 206 and the second connecting portion 208 of the corner connector 202 are elongate and extend from the central portion 204. The first connecting portion 206 and the second connecting portion 208 have longitudinal axis along their length and are circular in cross section (not shown) perpendicular to the longitudinal axis. The first connecting portion 206 and the second connecting portion 208 are cylindrical and hollow (not shown).

[0091] The first connecting portion 206 of the corner connector 202 connects with either a crossbar element (not shown) or a post element (not shown) and the second connecting portion 208 connects with the other of a post element (not shown) or a crossbar element (not shown) via friction fit. The dimensions of the first connecting portion 206 and the second connecting portion 208 of the corner connector 202 correspond to the dimensions of the crossbar element (not shown) and the post element (not shown).

[0092] Securing means 214, in the form of spring clips are situated along the length of the first connecting portion 206 and the second connecting portion 208 of the corner connector 202. The securing means 214 form a detachable attachment to secure the first connecting portion 206 to either a crossbar element (not shown) or a post element (not shown) and the second connecting portion 208 to the other of the post element (not shown) or the crossbar element (not shown). The position of the securing means 214 on the corner connector 202 correspond to the position of the securing means on the crossbar element (not shown) and the post element (not shown).

[0093] The first connecting portion 206 and second connecting portion 208 of the corner connector 202 are arranged such that the longitudinal axes of the first connecting portion

**206** and the second connecting portion **208** are arranged at an angle **216** of greater than  $90^\circ$  and less than  $100^\circ$  (in this embodiment, about  $93.5^\circ$ )

[0094] The corner connector **202** is formed from a plastic material. It will be apparent to a skilled person that the corner connector **202** may be formed from any suitable malleable material.

[0095] In one embodiment, the first corner portion **205** and the second corner portion **207** are arranged such that the longitudinal axes of the first corner portion **205** and the second corner portion **207** are arranged at an angle **218** of greater than  $90^\circ$  and less than  $100^\circ$ . In such an embodiment, the longitudinal axes of the first connecting portion **206** and the second connecting portion **208** are longitudinally aligned with the longitudinal axes of the first corner portion **205** and the second corner portion **207** respectively.

[0096] In another embodiment, the first connecting portion **206** and the second connecting portion **208** of the corner connector **202** are not integrally formed with the central portion **204** to form a conjoined shape. The angle **216** between the longitudinal axes of the first connecting portion **206** and the second connecting portion **208** is variable from the point of attachment **220** of the central portion **204** and the first connecting portion **206** and the second connecting portions **208** between greater than  $170^\circ$  and less than  $180^\circ$ .

[0097] Referring to FIG. 3, there is provided an assembled sports goal **302** comprising a crossbar **304** having a first crossbar element **306** and a second crossbar element **308** and a first post element **310** and a second post element **312**. The goal **302** also comprises a crossbar connector **314**, a first corner connector **316** and a second corner connector **318**.

[0098] The first crossbar element **306** and the second crossbar element **308** are elongate. The first crossbar element **306** and the second crossbar element **308** have a longitudinal axis along their length and are circular in cross section (not shown) perpendicular to the longitudinal axis. The first crossbar element **306** and the second crossbar element **308** are cylindrical and hollow (not shown). The first crossbar element **306** and the second crossbar element **308** are formed from a plastic material. It will be apparent to a skilled person that the first crossbar element **306** and the second crossbar element **308** may be formed from any suitable malleable material.

[0099] The first crossbar element **306** and the second crossbar element **308** connect with the crossbar connector **314**, as detailed in FIG. 1. The first crossbar element **306** and the second crossbar element **308** connect with the first and second connecting portions respectively (not shown) of the crossbar connector **314**, via a friction fit. The central portion **315** of the crossbar connector **314** is visible when the first crossbar element **306** and the second crossbar element **308** connect with the first and second connecting portions (not shown) of the crossbar connector **314** as the central portion **315** is of greater thickness than the first and second connecting portions of the crossbar connector **314**. The dimensions of the first crossbar element **306** and the second crossbar element **308** correspond to the dimensions of the first and second connecting portions (not shown) of the crossbar connector **314**. The first and second connecting portions (not shown) are narrower in diameter than the first crossbar element **306** and the second crossbar element **308**. The crossbar connector **314** is formed from a plastic mate-

rial. It will be apparent to a skilled person that the crossbar connector **314** may be formed from any suitable malleable material.

[0100] Securing means **320**, in the form of spring clips, are situated on the first crossbar element **306** and the second crossbar element **308** to secure the first crossbar element **306** and the second crossbar element **308** to the first and second connecting portions respectively (not shown) of the crossbar connector **314**, towards the ends of the first crossbar element **306** and the second crossbar element **308**. The securing means **320** are arranged to correspond to the position of the securing means on the first and second connecting portions (not shown) of the crossbar connector **314**, as detailed in FIG. 1.

[0101] The first post element **310** and the second post element **312** are elongate. The first post element **310** and the second post element **312** have a longitudinal axis along their length and are circular in cross section (not shown) perpendicular to the longitudinal axis. The first post element **310** and the second post element **312** are cylindrical and hollow (not shown). The first post element **310** and the second post element **312** are formed from a plastic material. It will be apparent to a skilled person that the first post element **310** and the second post element **312** may be formed from any suitable malleable material.

[0102] The first crossbar element **306** and the first post element **310** connect with the first corner connector **316**, as detailed in FIG. 2. The first crossbar element **306** connects to either the first or second connecting portion (not shown) of the first corner connector **316** when the first post element **310** connects with the other of the first or second connecting portions (not shown), via a friction fit. The central portion **317** of the first corner connector **316** is visible when the first crossbar element **306** and the first post element **310** connect with the first or second connecting portions (not shown) of the first corner connector **316** as the central portion **317** is of greater thickness than the first and second connecting portions (not shown) of the first corner connector **316**. The dimensions of the first crossbar element **306** and the first post element **310** correspond to the dimensions of the first and second connecting portions (not shown) of the first corner connector **316**. The first and second connecting portions (not shown) of the crossbar connector **314** are narrower in diameter than the first crossbar element **306** and the first post element **310**. The first corner connector **316** is formed from a plastic material. It will be apparent to a skilled person that the first corner connector **316** may be formed from any suitable malleable material.

[0103] Securing means **322** and **324**, in the form of apertures in the material of the first crossbar element **306** and first post element **310** respectively, are situated on the first crossbar element **306** and the first post element **310**, to secure the first crossbar element **306** to either the first or second connecting portions (not shown) and the first post element **310** to the other of the first or second connecting portions (not shown) of the first corner connector **316**, towards the ends of the first crossbar element **306** and the first post element **310**. The securing means **322** and **324** are arranged to correspond to the position of the securing means (spring clips) on the first and second connecting portions (not shown) of the first corner connector **316**, as detailed in FIG. 2.

[0104] The second crossbar element **308** and the second post element **312** connect with the second corner connector

**318**, as detailed in FIG. 2. The second crossbar element **308** connects to either the first or second connecting portion (not shown) of the second corner connector **318** when the second post element **312** connects with the other of the first or second connecting portions (not shown), via a friction fit. The central portion **319** of the second corner connector **318** is visible when the second crossbar element **308** and the second post element **312** connect with the first or second connecting portions (not shown) of the second corner connector **318** as the central portion **319** is of greater thickness than the first and second connecting portions (not shown) of the second corner connector **318**. The dimensions of the second crossbar element **308** and the second post element **312** correspond to the dimensions of the first and second connecting portions (not shown) of the second corner connector **318**. The first and second connecting portions (not shown) are narrower in diameter than the second crossbar element **308** and the second post element **312**. The second corner connector **318** is formed from a plastic material. It will be apparent to a skilled person that the second corner connector **318** may be formed from any suitable malleable material.

[0105] Securing means **322** and **324**, in the form of apertures in the material of the second crossbar element **308** and the second post element **312** respectively, are situated on the second crossbar element **308** and the second post element **312**, to secure the second crossbar element **308** to either the first or second connecting portions (not shown) and the second post element **312** to the other of the first or second connecting portions (not shown) of the second corner connector **318**, towards the ends of the second crossbar element **308** and the second post element **312**. The securing means **322** and **324** are apertures in the material of the second crossbar element **308** and the second post element **312**. The securing means **326** and **328** are arranged to correspond to the position of the securing means (spring clips) on the first and second connecting portions (not shown) of the second corner connector **318**, as detailed in FIG. 2.

[0106] The goal **302** comprises a linking means (not shown) in the form of an elasticated line to extend internally through and link together the first post element **310**, the first corner connector **316**, the first crossbar element **306**, the crossbar connector **314**, the second crossbar element **308**, the second corner connector **318** and the second post element **312**.

[0107] In one embodiment, the crossbar connector **314** is operable to arrange the first crossbar element **306** and the second crossbar element **308** at an angle, which is offset from the longitudinally aligned, such that, when assembled, mechanical sag of the first crossbar element **306** and the second crossbar element **308**, in combination with the longitudinal offset angle of the crossbar connector **314**, causes the crossbar **304** of the assembled goal **302** to be arranged substantially horizontally along its length.

[0108] In another embodiment, the first corner connector **316** and the second corner connector **318** are operable to arrange the first crossbar element **306** and the first post element **310** and the second crossbar element **308** and the second post element **312** at an angle, which is offset from the perpendicular, such that, when assembled, mechanical sag of the first crossbar element **306** and the second crossbar element **308**, in combination with the perpendicular offset angle of the

first corner connector **316** and the second corner connector **318**, causes the crossbar **304** of the assembled goal **302** to be arranged substantially horizontally along its length.

[0109] In another embodiment, the crossbar connector **314** is operable to arrange the first crossbar element **306** and the second crossbar element **308** at an angle, which is offset from the longitudinally aligned and the first corner connector **316** and the second corner connector **318** are operable to arrange the first crossbar element **306** and the first post element **310** and the second crossbar element **308** and the second post element **312** at an angle, which is offset from the perpendicular, such that, when assembled, mechanical sag of the first crossbar element **306** and the second crossbar element **308**, in combination with the longitudinal offset angle of the crossbar connector **314** and the perpendicular offset angle of the first corner connector **316** and the second corner connector **318**, causes the crossbar **304** of the assembled goal **302** to be arranged substantially horizontally along its length.

[0110] Attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to the public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0111] 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.

[0112] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0113] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract or drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

1. A crossbar connector for a sports goal comprising at least two crossbar elements, wherein the crossbar connector comprises a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axis of the first and second connecting portions are arranged at an angle of greater than 170° and less than 180°.

2. The crossbar connector according to claim 1, wherein the crossbar connector further comprises a central portion which is integrally formed with the first and second connecting portions to form a conjoined shape.

3. The crossbar connector according to claim 2, wherein the central portion comprises an upper region and a lower region, wherein the length of the upper region is wider than that of the lower region.

4. The crossbar connector according to claim 2, wherein the central portion is of greater thickness than the first and second connecting portions.

5. The crossbar connector according to claim 2, wherein the central portion comprises an internal channel.

6. The crossbar connector according to claim 1, wherein the first and second connecting portions are hollow.

7. The crossbar connector according to claim 1, wherein the crossbar connector is operable to connect to the at least two crossbar elements via a friction fit.

8. The crossbar connector according to claim 1, wherein the crossbar connector comprises one or more securing means operable to secure the crossbar connector to the at least two crossbar elements.

9. The crossbar connector according to claim 1, wherein the longitudinal axis of the first and second connecting portions are arranged at an angle of greater than  $172^\circ$  and less than  $179^\circ$ .

10. A corner connector for a sports goal comprises at least one crossbar element and at least one post element, wherein the corner connector comprises a first connecting portion operable to connect with the at least one crossbar element or at least one post element and a second connecting portion operable to connect with the at least one post element or at least one crossbar element when the first connecting portion connects to the other of the at least one crossbar element or at least one post element, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $100^\circ$ .

11. The corner connector according to claim 10, wherein the corner connector further comprises a central portion which is integrally formed with the first and second connecting portions to form a conjoined shape.

12. The corner connector according to claim 11, wherein the central portion comprises a first corner portion and a second corner portion, wherein the first and second corner portions are integrally formed to form a conjoined shape.

13. The corner connector according to claim 11, wherein the central portion comprises a first corner portion and a second corner portion, wherein first and second corner portions are arranged so as to be perpendicular to each other.

14. The corner connector according to claim 11, wherein the central portion is of greater thickness than the first and second connecting portions.

15. The corner connector according to claim 11, wherein the central portion comprises an internal channel.

16. The corner connector according to claim 10, wherein the first and second connecting portions are hollow.

17. The corner connector according to claim 10, wherein the corner connector is operable to connect with the at least one crossbar element and the at least one post element via a friction fit.

18. The corner connector according to claim 10, wherein the corner connector comprises one or more securing means

operable to connect the corner connector to the at least one crossbar element and the at least one post element.

19. The corner connector according to claim 10, wherein the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $96^\circ$ .

20. A disassemblable sports goal kit, the kit comprising a crossbar connector and at least two crossbar elements, wherein the crossbar connector comprises a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $170^\circ$  and less than  $180^\circ$ .

21. A disassemblable sports goal kit, the kit comprising at least one corner connector, at least one crossbar element and at least one post element, wherein the corner connector comprises a first connecting portion operable to connect with the at least one crossbar element or at least one post element and a second connecting portion operable to connect with the at least one post element or at least one crossbar element when the first connecting portion connects to the other of the at least one crossbar element or at least one post element, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $100^\circ$ .

22. A sports goal comprising a crossbar having at least two crossbar elements, wherein the crossbar comprises a crossbar connector comprising a first connecting portion operable to connect with a first of the at least two crossbar elements and a second connecting portion operable to connect with a second of the at least two crossbar elements, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $170^\circ$  and less than  $180^\circ$ .

23. The goal according to claim 22, wherein the crossbar connector or a portion thereof and the at least two crossbar elements or a portion thereof are linked together by linking means.

24. A sports goal, the goal comprising at least one crossbar element and at least one post element, wherein the goal comprises at least one corner connector comprising a first connecting portion operable to connect with the at least one crossbar element and a second connecting portion operable to connect with the at least one post element, wherein the longitudinal axes of the first and second connecting portions are arranged at an angle of greater than  $90^\circ$  and less than  $100^\circ$ .

25. The goal according to claim 24, wherein the at least one corner connector or a portion thereof, the at least one crossbar element or a portion thereof and the at least one post element or a portion thereof are linked together by linking means.

\* \* \* \* \*