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(54) **Variable-angle connection means for protection bars or handrails**

(57) The angular connection means (10) for tubular protection bars (12.1, 12.2) or handrails, comprises: two elements (14.1, 14.2) each comprising an expandable part (13.1, 13.2) insertable, before expansion, into the open end of a relative bar (12.1, 12.2), the expandable element (14.1, 14.2) remaining locked within the bar (12.1, 12.2) following expansion, each expandable element (14.1, 14.2) also comprising a part (22.1, 22.2) intended to project from the end of the relative bar (12.1, 12.2) and comprising a coaxial head; an angular connection element (24) comprising two superposable angular half-elements (24s, 24i), each provided with corresponding half-seats (34.1, 34.2) adapted to receive the head (20.1, 20.2) of each of the two expandable elements (14.1, 14.2) to establish a connection between these latter when the two half-elements (24s, 24i) are superposed and joined together by connection means (26, 28). The head (22.1, 22.2) of each of the two expandable elements (14.1, 14.2) is a spherical head, the half-seats (34.1, 34.2) having a spherical surface shape (34.1, 34.2) mateable with the spherical surface of the relative spherical head (22.1, 22.2) to form a ball joint.

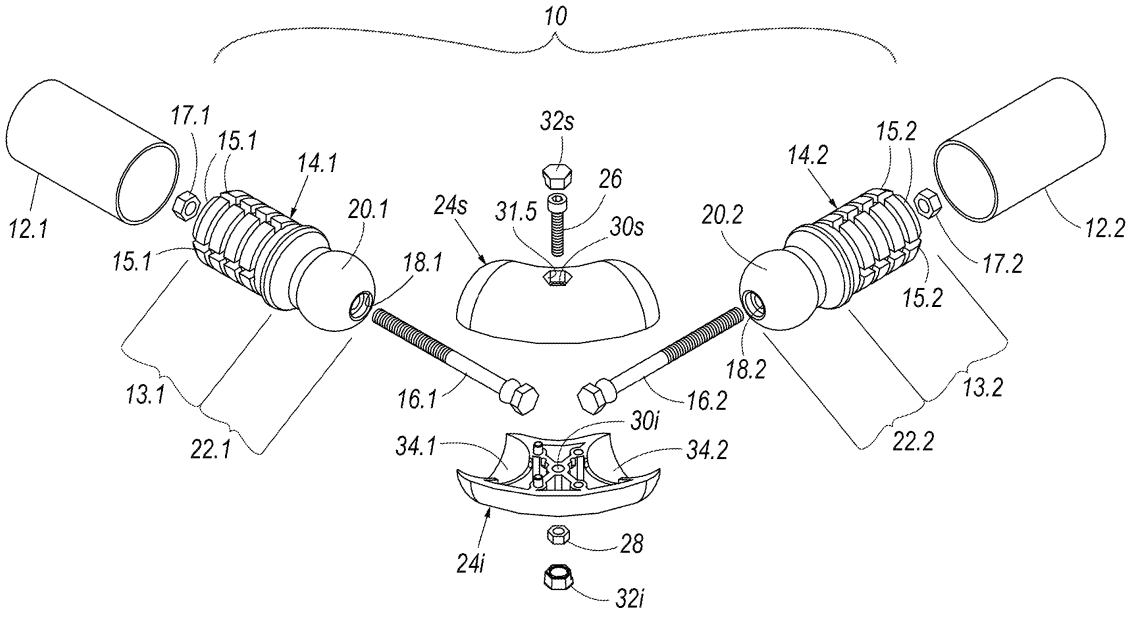


Fig. 2

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Description

[0001] The present invention relates to tubular bar devices for protecting sales counters or walls, and also to tubular bar devices acting as handrails, and more particularly to the angle connection means for these bars.

[0002] FR-A-2750588 describes a protection bar device of circular cross-section for sales counters or similar applications, comprising a horizontal bar carried by vertical feet fixed to the ground in front of the counter to be protected. The bar is connected to the feet by snap-coupling within corresponding elastically deformable C-shaped arched jaws fixed to the top of the relative feet. These protection bar devices are used in particular in supermarkets to protect counters against impacts caused by the trolleys used by customers or by authorized personnel when stocking the counters.

[0003] FR-A-2750588 does not describe how any angles which may be present in the protection bar are formed, this problem arising when, for example, this bar is required to protect not only the front of a sales counter but also the two adjacent sides.

[0004] An angular connection means for forming a 90° angle between consecutive bars is however commercially available, this means being used in particular with the protection bar device of FR-A-2750588. This angular connection means is essentially formed from two equal elements each comprising an expandable part which before expansion can be inserted into the open end of one of the two tubular bars converging into the angle, the expandable element remaining locked within the relative bar following expansion. Each expandable element also comprises a part intended to project from the relative bar and comprising a coaxial flange-shaped annular head. The expandable part is roughly cylindrical in shape and is divided longitudinally into sectors connected at one of their ends to the rest of the expandable element and free at the other end. The expandable element presents a coaxial through hole centered on said flanged head, and flared along the portion distant from the flange. Into this flared portion, bounded by said sectors, a nut can be inserted into which a screw insertable into the through hole from the flanged head end can be screwed, this screwing causing said sectors to diverge radially (in the manner of an expansion plug) to hence lock the expandable element into the relative bar.

[0005] This known angular connection means also comprises an element for angularly connecting the two projecting parts of each expandable element such as to form an angle of 90° between the intersecting axes of the two bars, this angular element itself comprising two superposable angular half-elements, each provided with half-seats able to matingly receive one half of said flanged head of each of the two expandable elements to form a rigid connection between these latter when the two half-elements, which are identical, are opposingly superposed and joined together by screws.

[0006] In fitting out shops and supermarkets the prevailing thought is that the available space could be best utilized, and also a better functional result achieved, if a sales counter (when viewed in plan) has its front corners different from 90°.

[0007] It is however currently impossible to commercially obtain relative protection bar devices having angles in the horizontal plane which are different from 90°. In particular, angular connection means might be conceivable substantially equal to those (as aforedescribed) providing 90° angles, but with the angular connection element extending through a determined angle (for example 70°). However this would require the provision of as many angular elements as the number of required angles, at considerable cost.

[0008] The object of the present invention is to provide an angular connection means for tubular protection bars and handrails which enables this problem to be easily solved.

[0009] This object is attained by the angular connection means of the present invention, comprising:

- two elements each comprising an expandable part insertable, before expansion, into the open end of a relative bar, the expandable element remaining locked within the bar following expansion, each expandable element also comprising a part intended to project from the end of the relative bar and comprising a coaxial head;
- an angular connection element comprising two superposable angular half-elements, each provided with corresponding half-seats adapted to receive the head of each of the two expandable elements to establish a connection between these latter when the two half-elements are superposed and joined together by connection means;
- **characterised in that** said head of each of the two expandable elements is a spherical head, and in that said half-seats provided in the two angular half-elements have a spherical surface shape mateable with the spherical surface of the relative spherical head to form a ball joint.

[0010] It should be noted that the proposed solution not only enables protection bar or handrail devices to be formed with angles in the horizontal plane having any practically applicable opening, but even enables a certain angulation of one of the two bars in the vertical plane, which can be useful in the case of chutes adjacent to the counter to be protected or at the wall adjacent to which the handrail is to be provided.

[0011] The invention will be more apparent from the ensuing description of one embodiment thereof given by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a variable angle connection means of the present invention, in the mounted condition;

Figure 2 is an exploded perspective view of the connection means of Figure 1.

[0012] As can be seen from the figures, the variable angle connection means 10 for tubular protection bars or handrails (the adjacent ends of two consecutive bars, indicated respectively by 12.1 and 12.2, being visible in Figure 2) comprises two elements 14.1 and 14.2, a part 13.1 and 13.2 of which is expandable. The expandable elements 14.1 and 14.2 are of a suitable elastic material, in particular a plastic material such as nylon 6.6. The expandable part 13.1, 13.2 of the elements 14.1 and 14.2 is roughly cylindrical in shape and is divided longitudinally into sectors, 15.1 and 15.2 respectively, connected at one end to the rest of the expandable element 14.1, 14.2 and free at their other end, so that they are able to diverge radially outwards when a coaxial screw, 16.1 and 16.2 respectively, is inserted into a coaxial through hole 18.1 and 18.2 and screwed into a relative nut 17.1 and 17.2 insertable into a corresponding outwardly flared coaxial seat (not visible in the figures) which forms that portion of the through hole 18.1 and 18.2 surrounded by said sectors 15.1 and 15.2 and having a cross-section such as to receive said nut and prevent its rotation. Consequently each of the two expandable elements 14.1 and 14.2 behaves as an expansion plug, so that once the expandable part 13.1 and 13.2 has been inserted into the corresponding tubular bar 12.1 and 12.2, if the screw 16.1 and 16.2 is screwed into the relative nut 17.1 and 17.2 inserted into said flared seat, the sectors 15.1 and 15.2 are caused to diverge radially, so locking the expandable element 14.1 and 14.2 in position within the relative bar 12.1 and 12.2.

[0013] From Figure 2 it can also be seen that the expandable elements 14.1 and 14.2 comprise, at that end distant from the relative bar 12.1 and 12.2, a part 22.1 and 22.2 intended to project from the relative bar and comprising a coaxial spherical head 20.1 and 20.2.

[0014] From the same figure it can be seen that the connection means 10 also comprises an angular connection means 24 comprising two superposable angular half-elements 24s and 24i connectable together by a screw 26 insertable into relative through holes 30s and 30i, a nut 28 being screwable onto said screw. Neither the nut 28 nor the head of the screw 26 projects from the angular element 24 once mounted, because of the fact that relative seats are provided (in Figure 2, only that which receives the screw head, indicated by 31s, can be seen) closed by hexagonal plugs 32s and 32i respectively.

[0015] From Figure 2 it can be seen that each angular half-element 24s and 24i presents, at the relative two ends, relative spherical half-seats having a radius of curvature equal to that of the relative spherical heads 20.1 and 20.2. Of these half-seats, only those of the lower angular half-element 24i can be seen in Figure 2, indicated by 34.1 and 34.2. In any event, as the two half-elements 24i and 24s are identical, it is clear how the half-element 24s is formed. It is consequently apparent that the spherical heads 22.1 and 22.2 can be received by the relative half-seats 34.1 and 34.2 when the two half-elements 24s and 24i are superposed and joined together by the screw 26 and the nut 28, the two spherical heads remaining retained within the angular element 24 to hence form two respective ball joints.

[0016] In the illustrated embodiment, an angle of 90° is formed by the axes of the two spherical seats obtained at the two ends of the angular element 24 (formed respectively by the spherical half-seats 34.1 and 34.2 in the half-element 24i and by the similar identical spherical half-seats of the half-element 24s).

[0017] With reference now to the angular connection means 10 in its mounted condition of Figure 1, it is clear that besides enabling two protection bars or handrails 12.1 and 12.2 to be connected together such that their axes form an angle of 90° in the horizontal plane, this means also enables any other angle required in practice to be formed between the two bars 12.1 and 12.2, in particular an angle between 70° and 135°.

[0018] It is also apparent that if one of the bars connected by the means 10 lies in a horizontal plane, the other bar can be inclined in the vertical plane, to form any angle to the horizontal lying within a determined range, in particular between +45° and -45°, to hence abundantly cover all those angles in the vertical plane which can be required in practice.

[0019] The two angular half-elements 24s and 24i can be formed of the same material as the expandable elements 14.1 and 14.2, for example nylon 6.6, and in particular can be of identical shape, as in the example of Figure 2.

[0020] It should be noted that the tubular bars used could also be of other than circular cross-section, for example of square or octagonal cross-section, and more generally in the form of a regular polygon with more than four sides, provided that the expandable part of the expandable elements can be inserted, before expansion, into the end of the relative bar, to lock the expandable element therein once expanded.

Claims

1. An angular connection means (10) for tubular protection bars (12.1, 12.2) or handrails, comprising:

   - two elements (14.1, 14.2) each comprising an expandable part (13.1, 13.2) insertable, before expansion, into the open end of a relative bar (12.1, 12.2), the expandable element (14.1, 14.2) remaining locked within the bar (12.1, 12.2) following expansion, each expandable element (14.1, 14.2) also comprising a part (22.1, 22.2) intended to project from the end of the relative bar (12.1, 12.2) and comprising a coaxial head (20.1, 20.2);

- an angular connection element (24) comprising two superposable angular half-elements (24s, 24i), each provided with corresponding half-seats (34.1, 34.2) adapted to receive the head (20.1, 20.2) of each of the two expandable elements (14.1, 14.2) to establish a connection between these latter when the two half-elements (24s, 24i) are superposed and maintained joined together by connection means (26, 28);

characterised in that said head (22.1, 22.2) of each of the two expandable elements (14.1, 14.2) is a spherical head, and **in that** said half-seats (34.1, 34.2) provided in the two angular half-elements (24s, 24i) have a spherical surface shape (34.1, 34.2) mateable with the spherical surface of the relative spherical head (22.1, 22.2) to form a ball joint.

2. An angular connection means (10) as claimed in claim 1, wherein the expandable part (13.1, 13.2) of the two expandable elements (14.1, 14.2) is roughly cylindrical in shape and is divided longitudinally into sectors, (15.1, 15.2), connected at one end to the rest of the expandable element (14.1, 14.2) and free at their other end, the expandable element (14.1, 14.2) presenting a coaxial through hole (18.1, 18.2) into which a screw (16.1, 16,2) is inserted to receive, by being screwed thereon, a nut (17.1, 17.2) insertable into an outwardly flared coaxial seat forming that portion of the through hole (18.1, 18.2) surrounded by said sectors (15.1, 15.2) and having a cross-section adapted to receive the relative nut (17.1, 17.2) and prevent its rotation, this screwing of the screw (16.1, 16.2) into the nut (17.1, 17.2) causing the relative sectors (15.1, 15.2) to diverge radially to lock the expandable element (14.1, 14.2) into the relative bar (12.1, 12.2).

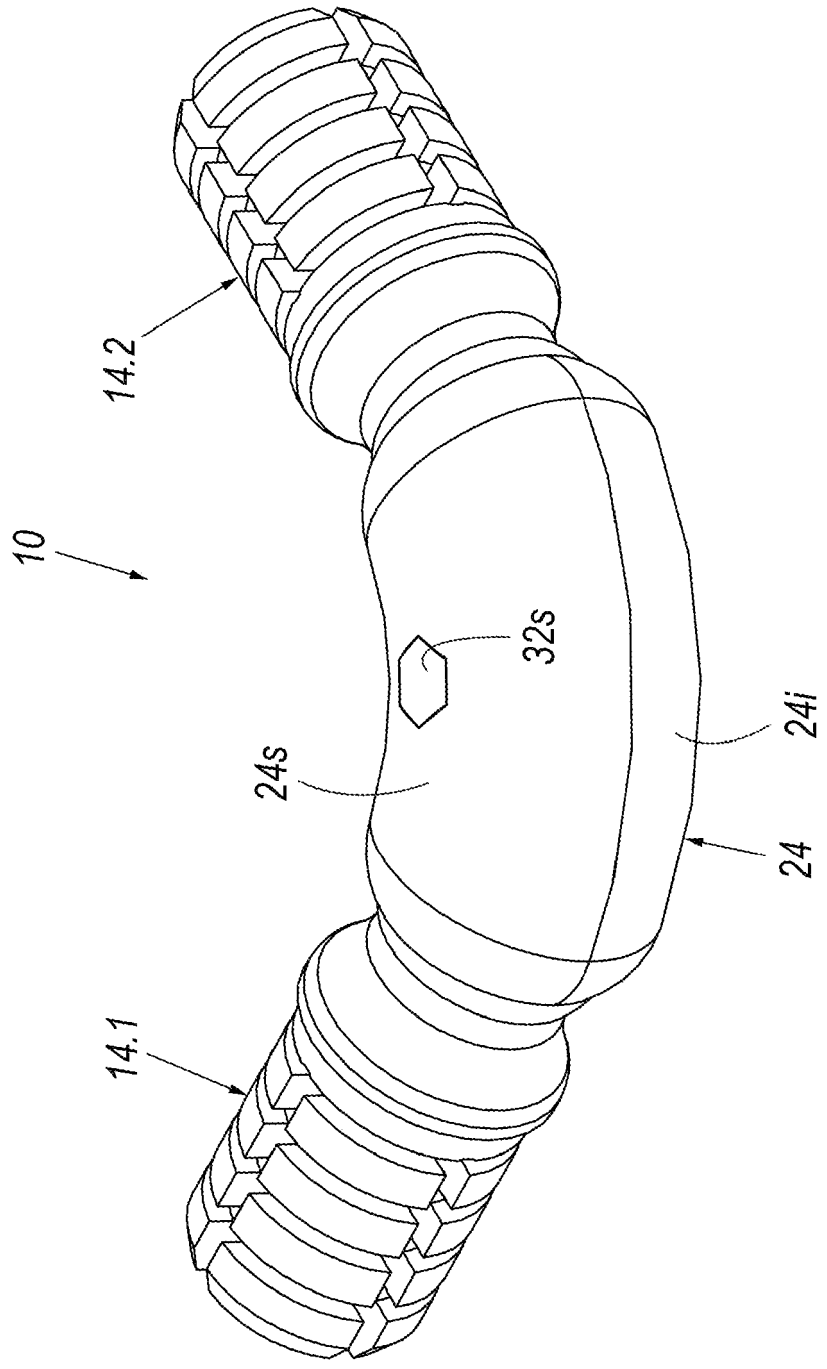


Fig. 1

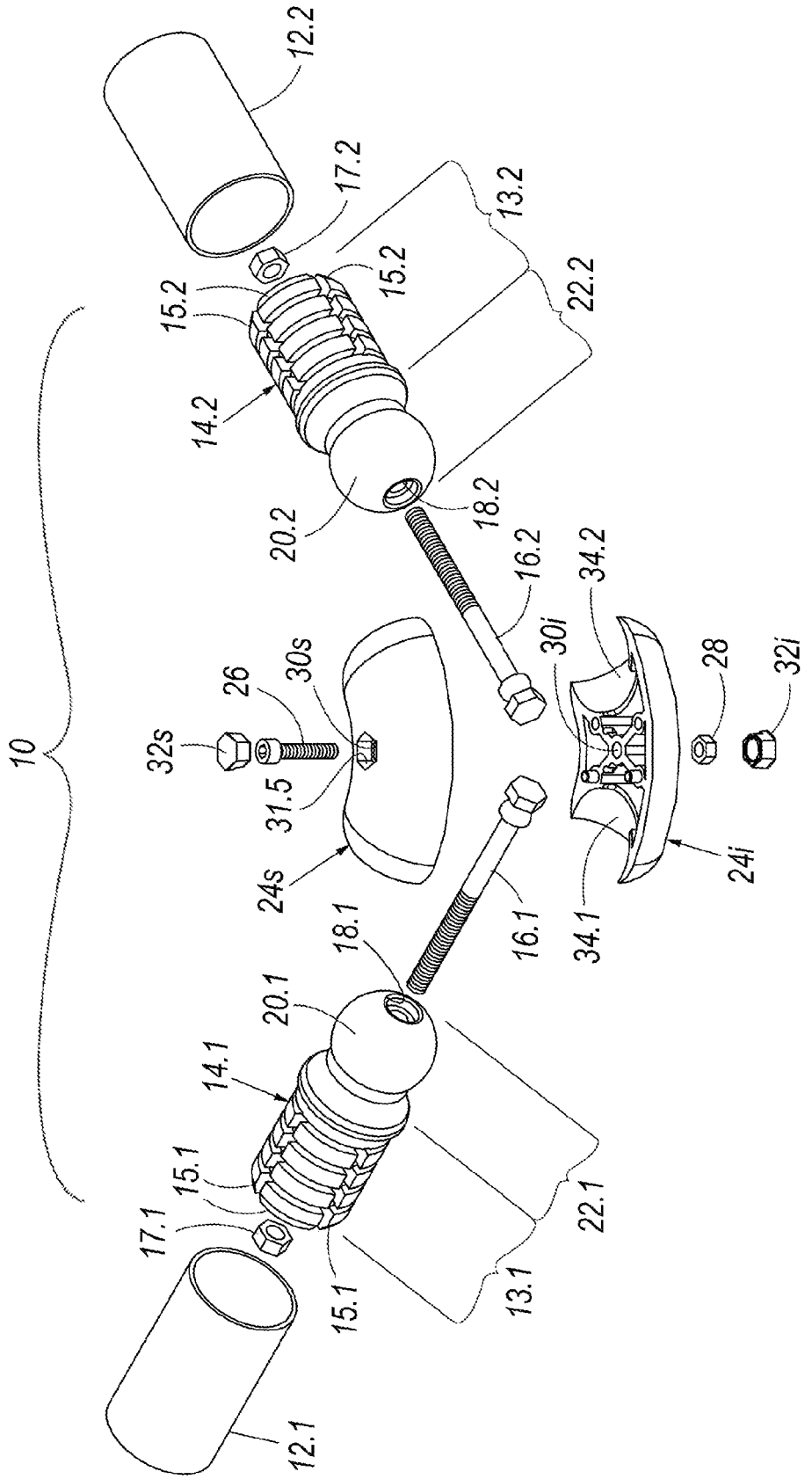

10
12.2
17.2
13.2
15.2
15.2
22.2
14.2
20.2
18.2
16.2
34.2
30i
28
32i
26
30s
32s
31.5
24s
16.1
34.1
24i
18.1
20.1
14.1
15.1
17.1
15.1
22.1
13.1
12.1

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 10 15 1094

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TECHNICAL FIELDS SEARCHED (IPC)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 April 2010	MacCormick, Duncan

CATEGORY OF CITED DOCUMENTS

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26-04-2010

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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