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(54) Beam scaffold connector.

(57) A connector is described for connecting two or more beams together having at least two surfaces each of which is engagable by an end plate of a beam and wherein at least one said surface has wedge clamping means associated therewith. In a preferred embodiment the connector is a six-way soldier connector having opposed upper and lower bolting surfaces 10, 12 and four side wedge clamping surfaces 18. Each surface 18 is provided on a vertical spacer 16 and includes upper and lower pairs of limbs 20-22 and 24-26 with abutments 28 defining a space between each abutment and a surface 18 for receiving a wedge 30. When inserted, the wedge 30 effects pressure clamping engagement of the end plate of each horizontal soldier to the surface 18.

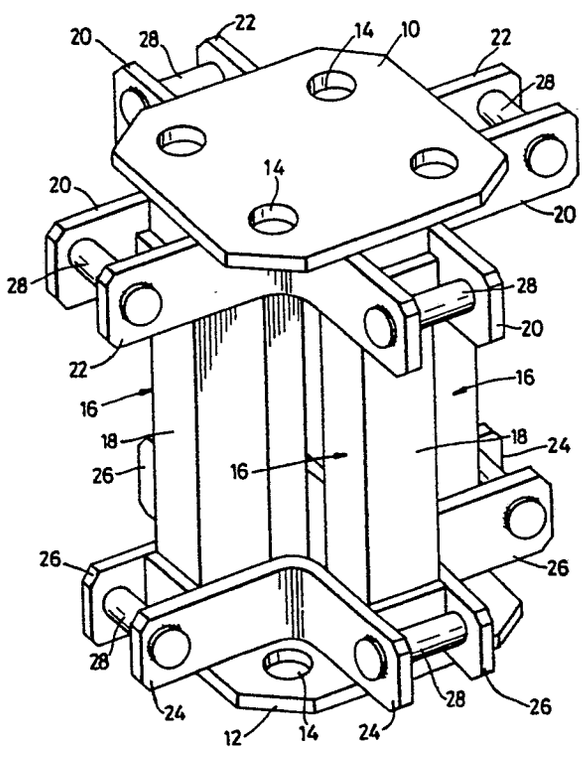

Fig.1

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BEAM SCAFFOLD CONNECTOR

This invention relates to a scaffold structure made up of a plurality of beams, as opposed to the usual tubular scaffold structure, wherein the structure has sufficient strength to resist or carry loads greatly in excess of those which could be met by an equivalent tubular scaffold structure.

Such a beam scaffold structure has been proposed wherein the beams comprise what are referred to in the art as soldiers each of which may be in the form of a single elongate steel member of square or rectangular cross-sectional form or in the form of a pair of spaced parallel elongate steel members secured together by connector plates at their ends and also secured together intermediate of their ends. One such known form of soldier comprises a pair of spaced channel section elongate steel members secured together in parallel back-to-back relation with rectangular end connector plates welded to the ends of the channel members. A series of longitudinally spaced aligned apertures is provided along the length of the channel members for reducing the overall weight of the soldier and also for providing attachment locations for other scaffold elements.

To use such soldiers in a two-dimensional or three-dimensional scaffold structure it has been proposed to provide a connector at an end of, for example, a vertically disposed soldier to which can be bolted the respective end connector plates of horizontally disposed soldiers and a further vertically disposed soldier. Such a connector has been proposed generally in the form of a cube having six planar surfaces comprising mounting plates to which can be bolted the end connector plates of up to six vertically and horizontally disposed soldiers i.e. two vertically disposed soldiers one above and one below the connector and up to four horizontally disposed soldiers. It will be appreciated that, if such a connector is utilised to connect six soldiers together as described above, it will be a time consuming exercise to achieve all of the bolted connections between the soldier end connecting plates and the respective mounting plates of the connector.

It is an object of the present invention to provide an improved connector for use in connecting together two or more beams wherein the connection between the beams and the connector obviates the requirement for extensive bolting.

In accordance with the broadest aspect of the invention there is provided a connector for connecting two or more beams together comprising at least two surfaces each of which is engageable by a respective end plate of a said beam; a pair of limbs projecting outwardly of at least one said surface for receiving a beam therebetween, each said limb having an aperture therein and an end abutment spaced from the said surface, the abutment on one limb being spaced further away from the said surface than the abutment on the other said limb, a wedge clamping member insertable through the apertures in said limbs and through the beam to engage that side of the end plate thereof remote from the connector and to engage the said abutments to effect pressure engagement of the end plate against the said surface of the connector.

Said at least two surfaces of the connector may be perpendicular to one another whereby two beams may be connected to one another in mutually perpendicular relation or said at least two surfaces of the connector may be co-extensive and parallel to one another whereby two beams may be connected to one another in co-axially aligned relation.

Preferably the connector includes at least one surface adapted for bolting connection to an end plate of a beam. The connector conveniently comprises at least one surface adapted for bolting connection to an end plate of a beam and a plurality of further surfaces extending co-extensively and perpendicular to said at least one surface, each of said further surfaces including a pair of limbs projecting outwardly thereof for receiving a beam therebetween, each said limb having an aperture therein and an end abutment spaced from said further surface, the abutment on one limb being spaced further away from said further surface than the abutment on the other said limb, a wedge clamping member insertable through the apertures in said limbs and through the beam to engage that side of the end plate thereof remote from the connector and to engage said abutments to effect pressure engagement of the end plate against the said further surface of the connector.

The connector may comprise a pair of spaced apart parallel surfaces each of which is adapted for bolting connection to an end plate of a beam and wherein said further surfaces as described in the preceding paragraph extend between said pair of parallel surfaces. The connector conveniently comprises four said further surfaces arranged in two opposed pairs, each of which pair is perpendicular to the other pair.

Other features of the invention will become apparent from the following description given herein solely by way of example with reference to the accompanying drawings wherein:-

Figure 1 is an isometric view of one embodiment of a connector constructed in accordance with the invention but not showing the wedge

clamping members;

Figure 2 is a cross-sectional side view of the connector of Figure 1 showing one beam bolted to a surface of the connector and a further beam connected to the connector by one of the wedge clamping members; and

Figure 3 is a top cross-sectional view of the connector and one beam of Figure 2.

In one embodiment of the invention as illustrated in the drawings the connector is configured to permit the joining together of up to six soldiers whereby a plurality of such connectors may be utilised to construct a three-dimensional scaffolding made up of a plurality of vertically and horizontally disposed soldiers.

As will be clearly seen from Figure 1 of the drawings, the connector comprises a pair of spaced apart parallel generally square mounting plates 10 and 12 each of which is provided with four apertures 14. In use, the plates 10 and 12 will be disposed in a horizontal plane and are conveniently referred to hereafter as the upper mounting plate 10 and the lower mounting plate 12. Said plates are spaced apart by four symmetrically disposed square cross-section tubular spacer elements 16 welded at their top and bottom ends respectively to the undersurface of the upper plate 10 and the upper surface of the lower plate 12. Such spacers 16 are of equal length, whereby the upper and lower mounting plates 10 and 12 are secured parallel to one another, and are located such that the radially outermost surface 18 of each spacer 16 is parallel to a respective edge of the upper and lower plates. There are therefore provided six outer surfaces to the connector comprising the upper surface of the upper mounting plate 10, the lower surface of the lower mounting plate 12, and the four radially outermost surfaces 18 of the spacers 16; said outermost surfaces 18 being arranged in two opposed pairs each of which pair is perpendicular to the other pair.

Each spacer 16 is provided with a pair of limbs 20-22 and 24-26 respectively projecting outwardly thereof at both its upper and lower ends immediately adjacent respectively the under surface of the upper mounting plate 10 and the upper surface of the lower mounting plate 12. As will be clearly seen from Figure 1 of the drawings, each said pair of limbs 20-22 and 24-26 is constituted by the outer ends of two right-angled members welded between adjacent spacers 16 and also welded to the respective lower surface of the upper mounting plate 10 and the upper surface of the lower mounting plate 12. Thus four such right-angle members are provided at each of the upper and lower ends of the spacers 16 to provide two said pairs of limbs each of which comprises a pair of parallel planar elements spaced apart by the width of the spacer 16. In use, each upper pair of limbs 20-22 extends further radially outwardly of the outermost surface 18 of its associated spacer 16 than the associated lower pair of limbs 24-26. Each pair of limbs is provided adjacent their outer ends with an abutment 28 in the form of a cylindrical member welded between the limbs through aligned circular apertures therein such that the abutments 28 between upper pairs of limbs 20-22 are spaced further away from the respective surfaces 18 than the corresponding abutments between lower pairs of limbs 24-26.

Referring to Figures 2 and 3 of the drawings, the connector also includes a wedge clamping member 30 associated with each spacer 16 and being insertable through the apertures defined between the abutment 28 on each pair of limbs 20-22, 24-26 and the adjacent outer surface 18 of the associated spacer 16. As shown in Figures 2 and 3, a horizontally disposed soldier 32 may be located between the pairs of limbs so that the end plate 34 of the soldier engages the outer surface 18 of the associated spacer 16 and is secured to the connector by the wedge 30 which effects pressure engagement of the soldier end plate 34 against the said outer surface 18 of the spacer. A vertically disposed soldier 36 may be secured to the upper mounting plate 10 as illustrated in Figure 2 by means of suitable bolts (not shown) passing through aligned apertures in the end plate 38 of the soldier 36 and the apertures 14 in the mounting plate 10.

Thus the connector illustrated herein is capable of joining together up to six soldiers i.e. two vertically disposed soldiers each of which is secured by bolting to a respective upper and lower mounting plate 10-12 of the connector, and up to four horizontally disposed soldiers each of which is secured to the connector by the wedge clamping member 30 effecting pressure engagement of the respective soldier end plate against the respective outer surface 18 of a spacer 16. Thus connectors of the type described and illustrated herein may be utilised to build up a three-dimensional scaffold structure wherein each connector acts as a node between up to six soldiers.

However, it should be appreciated that the invention is not to be limited to the specific embodiment described above. In its broadest sense, the invention contemplates a connector for connecting two or more soldiers together wherein the connector comprises at least two surfaces each of which is engageable by a respective end plate of a said soldier and wherein at least one of said surfaces includes a pair of limbs and a wedge clamping member of the general type hereinbefore described. Thus for example, a connector in accordance with the invention may comprise only two

surfaces for connecting two soldiers together, the two surfaces being perpendicular to one another, and one or both of said surfaces including a said pair of limbs and being provided with a wedge clamping member for securing a said soldier to a said surface. In one embodiment of such a twin surface connector, one of said surfaces may comprise a mounting plate for bolting connection to a soldier end plate and the other surface may include the said limbs and wedge clamping member.

It will be appreciated that various combinations of securing means i.e. by bolting or by wedge clamping may be provided on a plurality of surfaces of a connector constructed in accordance with the invention.

Claims

1. A connector for connecting two or more beams together comprising at least two surfaces each of which is engageable by a respective end plate (34) of a beam (32) characterised in that a pair of limbs (20 - 22 and 24 - 26) project outwardly of at least one surface (18) for receiving a beam therebetween, each said limb having an aperture therein and an end abutment (28) spaced from the said surface, the abutment on one limb (20 - 22) being spaced further away from the said surface than the abutment on the other said limb (24 - 26), a wedge clamping member (30) being insertable through the apertures in said limbs and through the beam to engage that side of the end plate thereof remote from the connector and to engage the said abutments to effect pressure engagement of the end plate (34) against the surface (18) of the connector.

2. A connector as claimed in Claim 1 further characterised in that at least two surfaces thereof are perpendicular to one another whereby two beams may be connected to one another in mutually perpendicular relation.

3. A connector as claimed in Claim 1 further characterised in that at least two surfaces (10 - 12 or 18 - 18) thereof are co-extensive and parallel to one another whereby two beams may be connected to one another in co-axial aligned relation.

4. A connector as claimed in any one of Claims 1 to 3 further characterised in that at least one surface (10 or 12) is adapted for bolting connection to an end plate of a beam.

5. A connector as claimed in any one of Claims 1 to 4 further characterised in that at least one surface (10 or 12) is adapted for bolting connection to an end plate of a beam and a plurality of further surfaces (18) extend co-extensively and perpendicular to said at least one surface, each of said further surfaces including a pair of limbs projecting outwardly thereof for receiving a beam therebetween, each said limb having an aperture therein and an end abutment spaced from said further surface, the abutment on one limb being spaced further away from said further surface than the abutment on the other said limb, a wedge clamping member insertable through the apertures in said limbs and through the beam to engage that side of the end plate thereof remote from the connector and to engage said abutments to effect pressure engagement of the end plate against the said further surface of the connector.

6. A connector as claimed in Claim 5 further characterised in that a pair of spaced apart parallel surfaces (10 and 12) are provided each of which is adapted for bolting connection to an end plate of a beam and wherein said further surfaces (18) extend between said pair of parallel surfaces.

7. A connector as claimed in either one of Claims 5 or 6 further characterised in that four said further surfaces (18) are arranged in two opposed pairs, each of which pairs is perpendicular to the other pair.

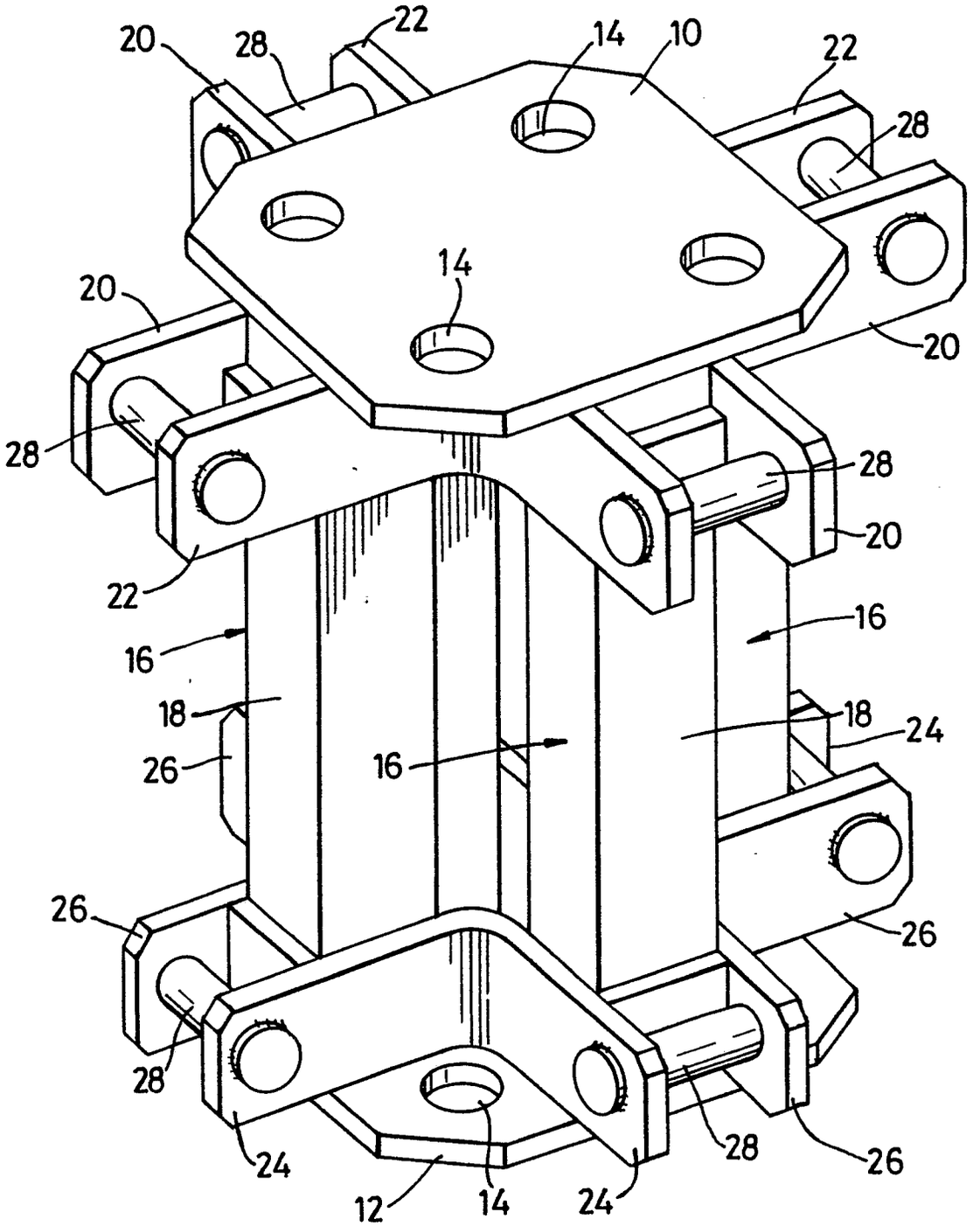
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Fig. 1

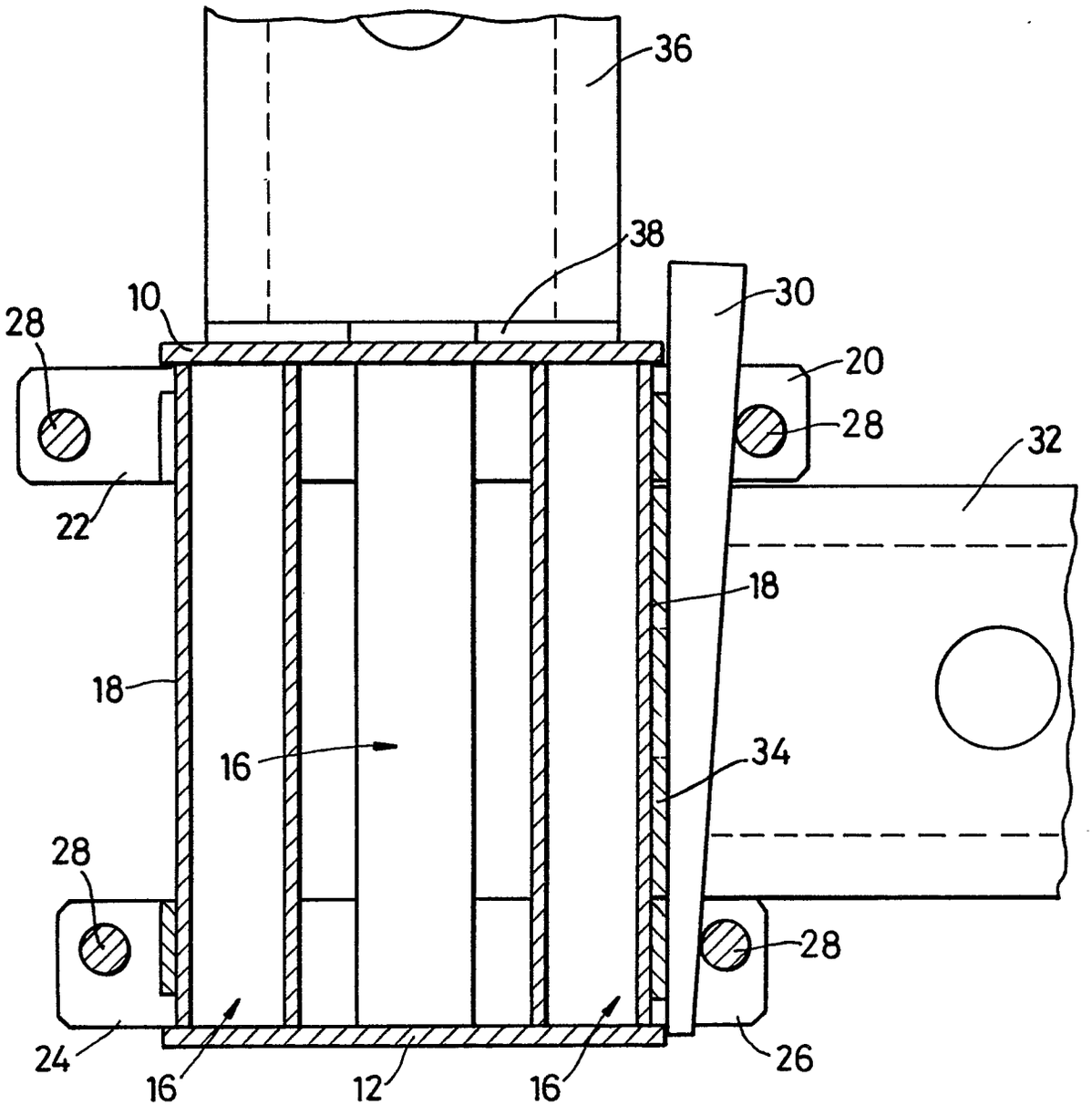

Fig. 2

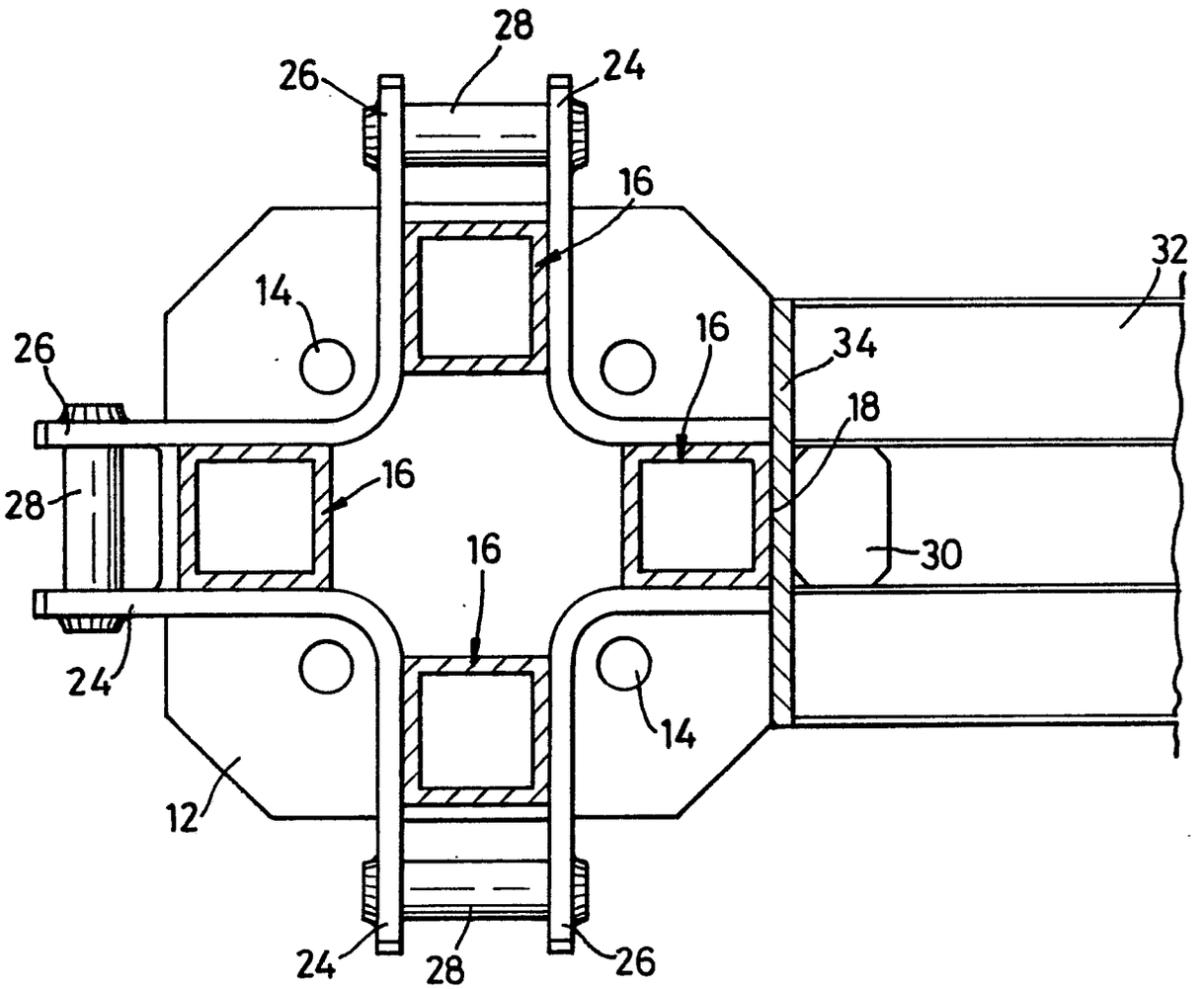

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number

EP 90 30 1254

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-A-2 261 076 (GERKE) * Pages 5,6; figures 1-3 *	1	E 04 G 7/22
A	US-A-3 300 236 (SAULS) * Column 2, lines 53-72; column 3, lines 1-54; figures 1-8 *	1	
A	EP-A-0 187 100 (BRULLMANN)		
A	FR-A-2 526 890 (ETS. ERNEST PANTZ PARIS)		
A	GB-A-1 338 252 (KWIKFORM LTD)		
A	GB-A-2 093 942 (FORM-SCAFF HOLDINGS)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E 04 G
E 04 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17-05-1990	VIJVERMAN W.C.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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