(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 183 960 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.03.2002 Bulletin 2002/10

(51) Int Cl.[7]: **A47B 13/02**

(21) Application number: **01307382.0**

(22) Date of filing: **30.08.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **01.09.2000 GB 0021462**

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(54) Furniture support system

(57) The invention provides a furniture support system and items of furniture which offer a low profile convenient for storage and transport when collapsed, but provide a sturdy support when erected. The furniture support system includes a first elongate element and at least one further elongate element, at least one of the further elongate elements being pivotally mounted on the first elongate element by a mounting, at least one of the further elongate elements including a first element portion and a second element portion, the first and second element portions defining an angle between themselves of other than 180°, the support system having a first state in which the second element portion is received within the mounting, and a second state in which the second element portion is removed from the mounting, the support system further including at least two upright elements attached to the support system.

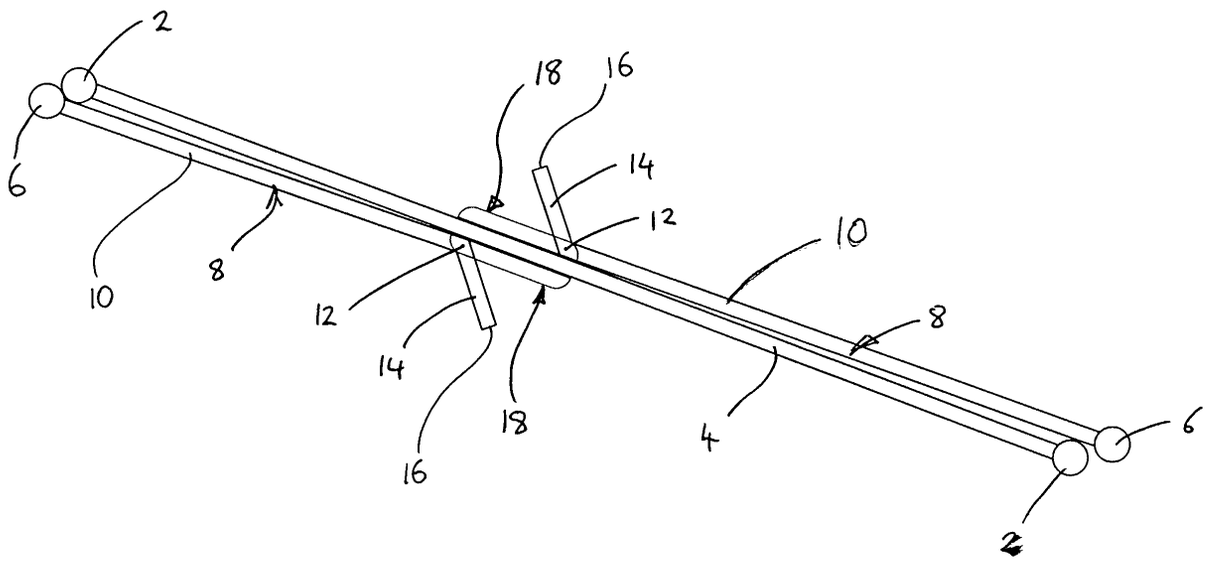

Fig 2

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Description

[0001] The present invention concerns improvements in and relating to furniture, particularly, but not exclusively, support frames for furniture and in particular for tables.

[0002] Modern furniture, particularly when aimed at the office and business market, needs to be versatile and capable of satisfying a variety of needs and uses. It must also be aesthetically pleasing. In particular, it is desirable to be able to offer a variety of configurations of table using support structures which can readily be reduced to a low profile to assist storage and / or transportation.

[0003] The present invention aims to provide a versatile furniture system.

[0004] According to a first aspect of the invention we provide a furniture support system, the support system including a first elongate element and at least one further elongate element, at least one of the further elongate elements being pivotally mounted on the first elongate element by a mounting, at least one of the further elongate elements including a first element portion and a second element portion, the first and second element portions defining an angle between themselves of other than 180°, the support system having a first state in which the second element portion is received within the mounting, and a second state in which the second element portion is removed from the mounting, the support system further including at least two upright elements attached to the support system.

[0005] The first elongate element may be linear. In one particular alternative embodiment, the first elongate element may include a first element portion and second element portion which are parallel to one another but not on a common axis, the first and second element portions being linked by a third element portion, the third element portion defining an angle between itself and the first element portion and / or the second element portion other than 180°.

[0006] The first elongate element may be provided with one or more upright elements. Preferably the upright elements are provided towards the end or ends of the first elongate element, ideally at the end or ends of the first elongate element. The upright elements may be tubular, for instance circular cross section.

[0007] The first elongate element may be tubular, for instance of square or rectilinear cross section. Preferably a substantially horizontal upper surface for the first elongate element is provided in the first state.

[0008] The first elongate element may be of variable length.

[0009] The one or more further elongate elements may be linear. In one particular alternative embodiment, one or more of the further elongate elements may be provided with a portion which is substantially parallel to the first element portion of the first elongate element in the second state and / or a second element portion which is substantially parallel to the second element portion of the first elongate element in the first state.

[0010] Preferably the support system includes at least two further elongate elements. Preferably one or more of the further elongate elements is provided on one side of the first elongate element and one or more of the second further elongate element is provided on the other side of the first elongate element. Two or more pairs of further elongate elements may be provided, one of the pair being provided on one side of the first elongate element, the other being provided on the other side of the first elongate element.

[0011] The further elongate elements may be of equivalent configuration to one another. The further elongate elements may be mirror images of one another. The further elongate elements may be different from one another.

[0012] One or more of the further elongate elements is preferably provided with an upright element. Preferably the upright element is provided towards the end of the further elongate element away from the mounting in the first state, ideally at the end of the further elongate element. The upright element may be tubular, for instance of circular cross section.

[0013] One or more of the further elongate elements may be tubular, for instance of square or rectilinear cross section. Preferably a substantially horizontal upper surface for the one or more further elongate elements is provided in the first state.

[0014] Preferably the first element portion of the one or more further elongate elements are of equivalent lengths to one another, and ideally of equivalent shape. The first element portion of the one or more further elongate elements may be of a different length to one another. The length of the first element portion may be adjustable.

[0015] Preferably the cross sectional area of the first element portion is greater than the cross sectional area of the second element portion. An equivalent shape but reduced dimension cross section for the second element portion relative to the first element portion is preferred.

[0016] Preferably the second element portion of the one or more further elongate elements are of equivalent lengths to one another and ideally of equivalent shape. The second element portions of the one or more further elongate elements may be of a different length to one another. The length of the second element portions may be adjustable.

[0017] The length of the first elongate element may be adjustable.

[0018] Preferably a minimum angle of between 90 and 160 ° is provided between the first element portion and second element portions of one or more of the further elongate elements. The angle defined may more preferably be between 100 and 150° and still more preferably be between 120 and 140°. Preferably the angle is measured in the plane of pivotal mounting and / or a

plane parallel to the work surface being supported.

[0019] The angles defined between the first element portion and the second element portion of the further elongate elements may be the same or different between different further elongate elements.

[0020] Preferably the mounting is provided by a bracket. The bracket may be of U-shaped cross section. The mounting may be provided by a first component, preferably planar, a second component preferably planar and ideally parallel to the first component, and a third component, preferably planar, preferably linking the first and second components and ideally perpendicular to the first and second components. The surface of the first component of the mounting opposing the second component of the mounting may be planar and / or the surface of the second component opposing the first component may be planar. Preferably both opposing surfaces are planar and / or parallel to one another. Preferably the separation of the first and second components is greater than the profile of the second element portion presented to it. Preferably the difference is air clearance tolerance, for instance less than 1mm.

[0021] Preferably the second element portion is received between the first and second components of the mounting in the first state. Preferably the second element portion is not between the first and second components of the mounting in the second state. The received and removed references may refer to an intermediate portion of the second element portion, between the pivotal mounting and end of the second element portion, for instance the mid 20% of the second element portion.

[0022] Preferably the pivotal mounting is provided by a pin. Preferably the pivotal mounting passes through the mounting and further elongate element. The pivotal mounting for the further elongate element may be provided at the junction between the first element portion and second element portion.

[0023] A separate mounting may be provided for each further elongate element. The mounting for one or more elongate elements may be attached to the mounting for one or more other further elongate elements, for instance the further elongate element on the other side of the first elongate element. Attachments may be provided by means of an element linking the first and second mountings under the first elongate element. A sliding engagement between the pair of mountings and first elongate element may be provided.

[0024] The position of the mounting or mountings on the first elongate element may be variable. It is particularly preferred that the mounting can be slid along the first elongate element. The mounting may be positioned on the first elongate element by means of a releaseable fastener, such as a bolt.

[0025] The second element portion may be retained within the mounting in the first state by means of a releaseable fastener, such as a bolt. The releaseable fastener may engage one or more second element portions, preferably a pair of second element portions on opposing sides of the first elongate element.

[0026] According to a second aspect of the invention we provide an item of furniture, the item of furniture comprising a furniture support system provided according to the first aspect of the invention and one or more work surfaces.

[0027] Preferably one or more of the work surfaces is a table surface. Ideally, the work surfaces are releasably fastened to the furniture support system. Preferably, the one or more work surfaces are reversible.

[0028] Preferably the lower surface of the work surface engages with the upper surface of the first elongate element and / or further elongate element or elements. A non-slip material may be provided between the work surface and the first elongate element / further elongate elements.

[0029] Various embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:-

Figure 1 illustrates a plan view from below of a table support structure and table top profile;
Figure 2 illustrates the support system of Figure 1 in a state suited for transportation and / or storage;
Figure 3a illustrates a side view of the pivot brackets of Figure 1 and Figure 2;
Figure 3b illustrates a plan view of the pivot bracket of Figure 3a;
Figure 4 illustrates an alternative pivot bracket according to the present invention; and
Figure 5 illustrates a plan view of a support structure according to the invention illustrating a variety of possible features.

[0030] As illustrated in Figure 1, the invention provides a new manner for achieving a work surface support system. The support system consists of an upright 2 provided at each end of an elongate element 4. The uprights are of tubular form. A further upright 6 is provided at each end of the pivotally mounted elements 8. Again, the upright 6 is of tubular form. The elements 8 include a first elongate portion 10 which links the uprights 6 to a pivot location 12 and a second elongate portion 14 extending from the pivot location 12 to the end 16 of the elongate element 8 which is distal to the uprights 6. The whole of the element 14 is received within pivotal brackets 18 on each side of the elongate element 4, as described in more detail below.

[0031] In the supporting state, first state, illustrated in Figure 1, the support system provides good support for the work surface 20 by contact between the lower surface 22 of the work surface 20 and the upper surface of the elongate elements 4 and 8.

[0032] To facilitate storage and / or transportation of the furniture, the work surface 20 is readily de-mountable and the support system can be folded to a storage state, second state, as illustrated in Figure 2.

[0033] To achieve the transition from the support state to the storage state, releaseable fastenings attaching the elements 14 to the bracket 18 and / or element 4 are released. This allows the elements 10 to be swung towards the elements 4, whilst the elements 14 swing outward away from element 4, in both cases about the pivot locations 12. The net result is a support frame which assumes a low profile and volume in its storage state, but which provides effective support in its support state. Additionally this is achieved using pivoting locations which are hidden from the user and whilst employing a single leg at each of the more visible locations to the user.

[0034] As illustrated in Figures 3a and 3b, the pivotal bracket 18 is formed of a U-shaped cross section with planar and parallel upper and lower parts 30, 32 and perpendicular joining part 34. The element 14 of elongate element 8 is configured to be a very snug fit within the U-shaped channel, as illustrated by the dotted profile 36 in Figure 3a.

[0035] To restrain the element 14 in position in the bracket 18, a releaseable fastening, such as a bolt is passed through the element 14 and engages aperture 38 in the bracket 18 and / or a location in the elongate element 4. A common bolt or other releaseable fastening system could be used to fix both of two opposing elements 14 on the different elongate elements 8.

[0036] The pivotal mounting for the elongate element 8 on the bracket is provided by apertures 40 in the upper surface 30 and lower surface 32 of the bracket. These apertures cooperate with a pin or other suitable pivot which passes through and engages with the element 8.

[0037] As well as the style of bracket illustrated in Figures 3a and 3b, with one such bracket being provided on each side of the elongate element 4, other bracket configurations are possible. Thus, as illustrated in Figure 4, it is possible to provide a bracket 50 on each side of the elongate element 4 with those two brackets 50 being joined by a linking plate 52 which passes underneath the element 4. Apertures 40, define the hinges in the same way as described above, and aperture 38 provides a location to receive the fastener or the elongate element 8 and / or to fix the position of the pair of brackets 50 on the elongate element 4.

[0038] As illustrated in Figure 5 a variety of different extents for the elongate element 8 can be provided by varying the length of element 10 (10a is longer than 10b, for instance) and / or by varying the angle α separating the element 10 from element 14 of elongate element 8. Thus, an angle α of 120° may apply to elongate element 8b whereas an angle α of approximately 150 ° applies to elongate element 8c.

[0039] As illustrated in Figure 5, the brackets may provide hinge locations 12, as described above, together with locations 60 which receive the releaseable fasteners for fastening the elongate elements 8 to the brackets 18.

[0040] This embodiment of the invention also illustrates that the elongate element 4 need not be provided with uprights itself, all of the uprights potentially being provided on pivotally mounted elongate elements 8.

[0041] To provide increased flexibility the position of the pairs of brackets 18 on the elongate element 4 can potentially be varied by sliding the bracket assembly along the length of elongate element 4. Thus moving the pair of arms 8a and 8d towards the left hand side of Figure 5 would enable significantly longer work surface 20 to be supported.

[0042] The furniture system and support system described above provides a very versatile and very easily stored / transported system. Additionally, the system provides for the use of reversible work surfaces.

Claims

1. A furniture support system, the support system including a first elongate element and at least one further elongate element, at least one of the further elongate elements being pivotally mounted on the first elongate element by a mounting, at least one of the further elongate elements including a first element portion and a second element portion, the first and second element portions defining an angle between themselves of other than 180°, the support system having a first state in which the second element portion is received within the mounting, and a second state in which the second element portion is removed from the mounting, the support system further including at least two upright elements attached to the support system.

2. A furniture support system according to claim 1 in which one or more of the further elongate elements are provided with a portion which is substantially parallel to the first element portion of the first elongate element in the second state and a second element portion which is substantially parallel to the second element portion of the first elongate element in the first state.

3. A furniture support system according to claim 1 or claim 2 in which the support system includes at least two further elongate elements, one or more of the further elongate elements being provided on one side of the first elongate element and one or more of the second further elongate element being provided on the other side of the first elongate element.

4. A furniture support system according to any preceding claim in which the first element portion of the one or more further elongate elements are of a different length to one another.

5. A furniture support system according to any preceding claim in which a minimum angle of between 90 and 160° is provided between the first element por-

tion and second element portions of one or more of the further elongate elements.

6. A furniture support system according to any preceding claim in which the mounting is provided by a first planar component and a second planar component which is parallel to the first component, a third planar component linking the first and second components.

7. A furniture support system according to claim 6 in which the second element portion is received between the first and second components of the mounting in the first state, with the second element portion not between the first and second components of the mounting in the second state.

8. A furniture support system according to any preceding claim in which the mounting for one or more elongate elements is attached to the mounting for one or more other further elongate elements on the other side of the first elongate element.

9. A furniture support system according to any preceding claim in which the position of the mounting or mountings on the first elongate element is variable.

10. A furniture support system according to any preceding claim in which the mounting can be slid along the first elongate element.

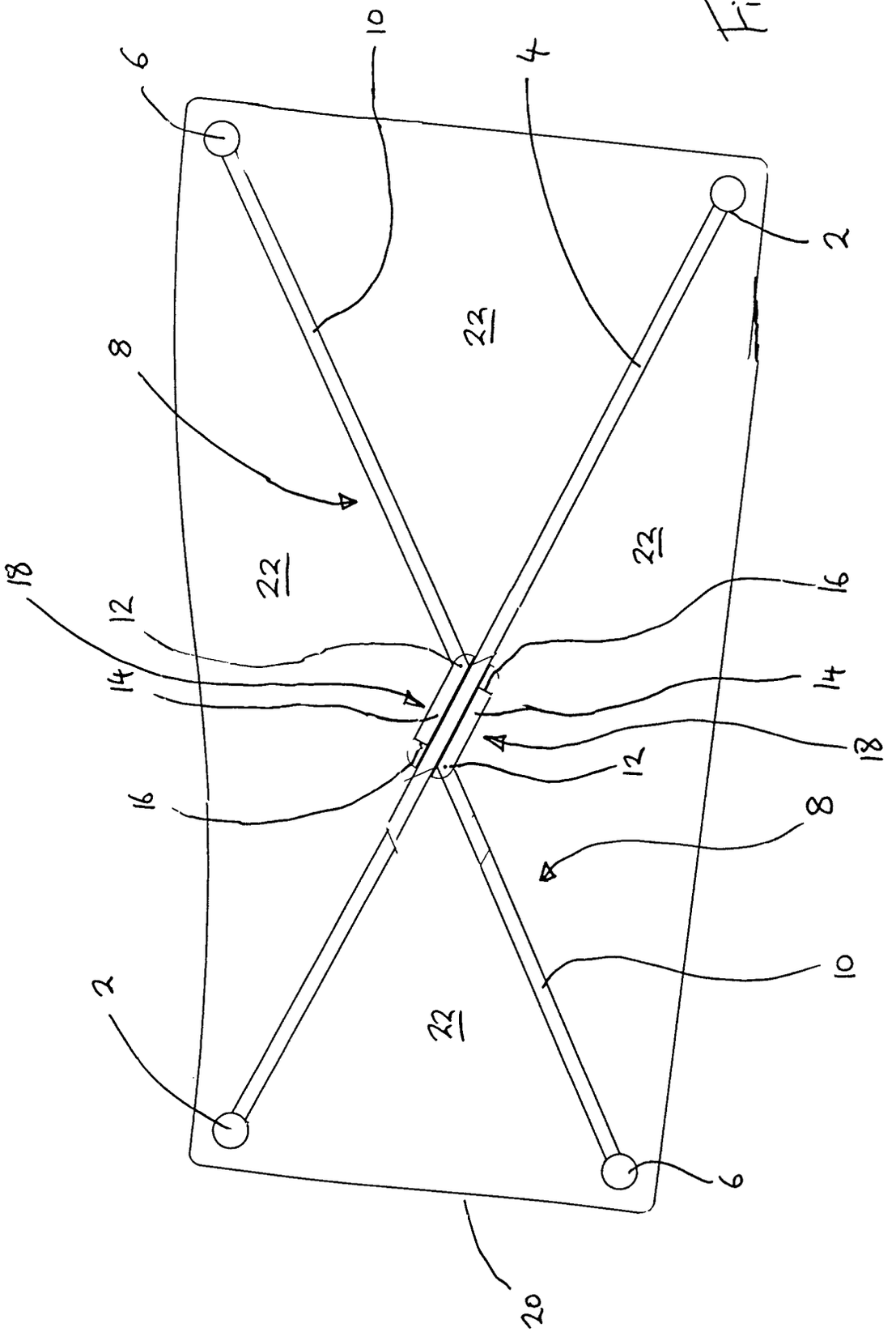
11. A furniture support system according to any preceding claim in which the mounting is positioned on the first elongate element by means of a releaseable fastener, such as a bolt.

12. A furniture support system according to any preceding claim in which the second element portion is retained within the mounting in the first state by means of a releaseable fastener, such as a bolt.

13. A furniture support system according to claim 12 in which the releaseable fastener engages one or more second element portions, preferably a pair of second element portions on opposing sides of the first elongate element.

14. An item of furniture, the item of furniture comprising a furniture support system provided according to any of claims 1 to 13 and one or more work surfaces.

Fig 1



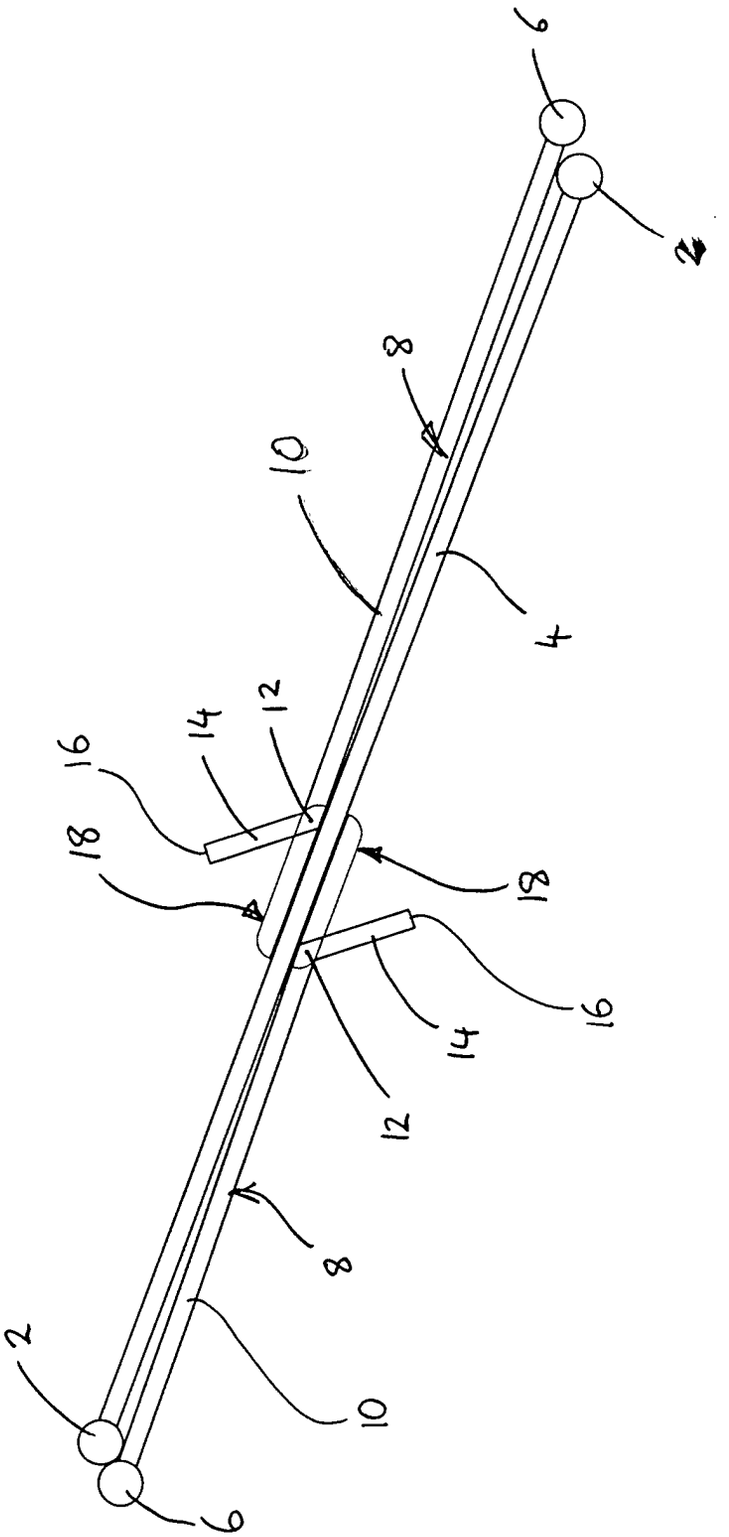


Fig 2

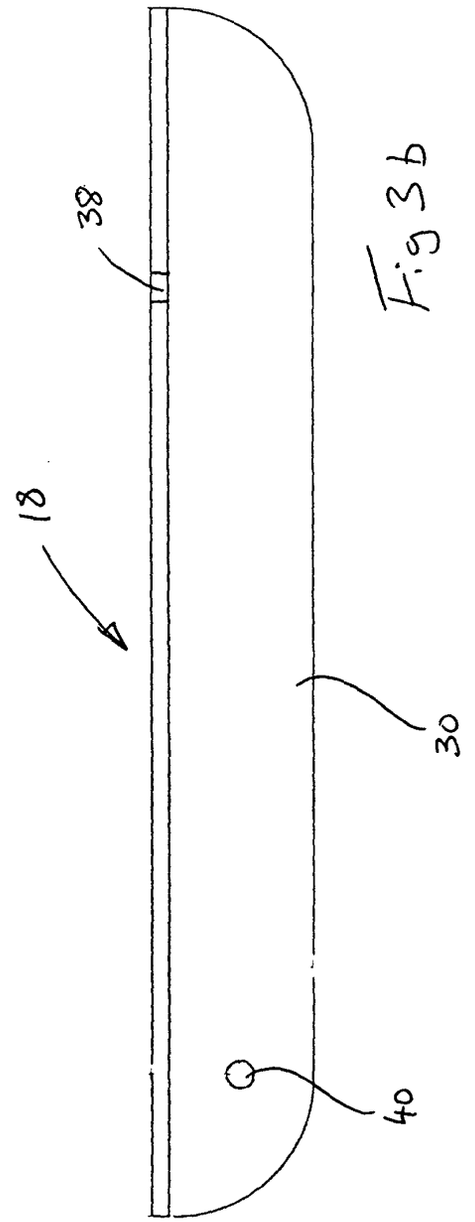


Fig 3b

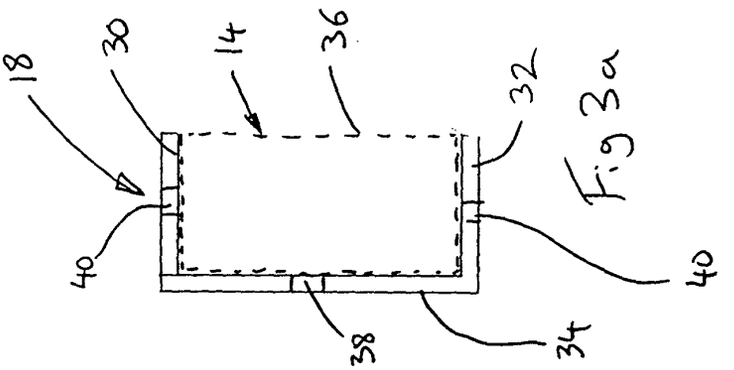


Fig 3a

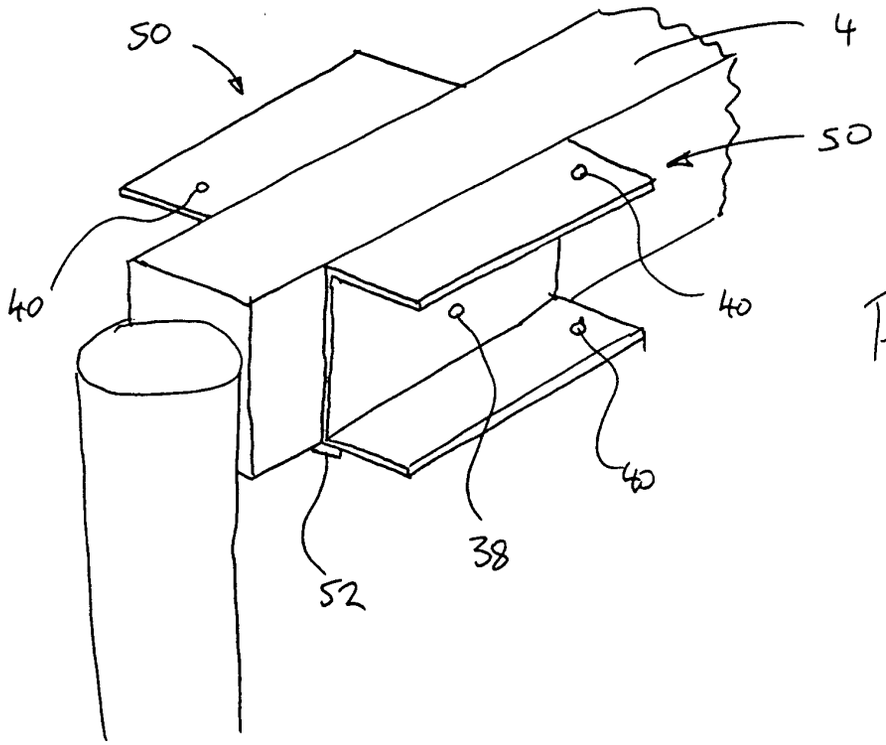

50
4
50
40
40
40
38
52

Fig 4

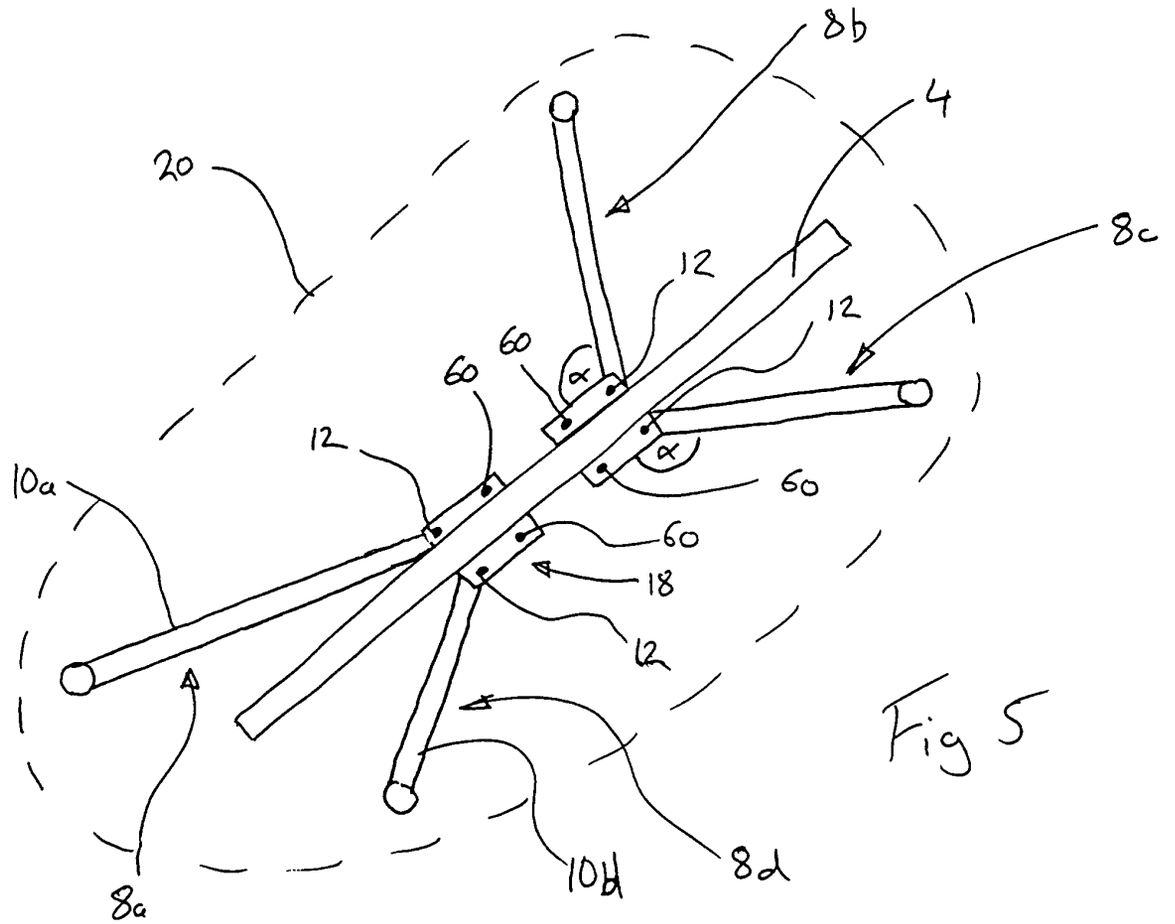

8b
4
20
8c
12
12
60
60
α
12
α
10a
60
60
18
12
8a
10b
8d

Fig 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 7382

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.7)
X	DE 299 22 626 U (REISS BUEROMOEBEL GMBH) 23 March 2000 (2000-03-23) * page 7, line 28 - page 8, line 2 * * page 11, paragraph 3 - page 12, paragraph 1; figures 5,7,8 *	1,3-7,9, 11-14	A47B13/02
Y		2,8,10	
Y	EP 0 815 770 A (FRAY DESIGN LIMITED) 7 January 1998 (1998-01-07) * column 6, line 22 - line 31 * * column 6, line 57 - column 7, line 11 * * column 7, line 23 - line 28; figures 1,6,9 *	2,8,10	
A	EP 0 847 715 A (LEONARDO SRL) 17 June 1998 (1998-06-17) * column 3, line 8 - line 14 * * column 3, line 55 - column 4, line 3 * * column 4, line 11 - line 23; figure 10 *	8,10	
A	US 5 947 037 A (GRIEPENTROG DENNIS G ET AL) 7 September 1999 (1999-09-07) * column 11, line 16 - line 63; figure 2 *	1,14	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47B
X	DE 91 00 304 U (KNAUER ROLAND) 4 April 1991 (1991-04-04) * page 3, paragraph 4 * * page 7, paragraph 4 * * page 10, paragraph 3; figures 1,4 *	1,14	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	5 November 2001	Papadimitriou, S

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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05-11-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29922626 U	23-03-2000	DE 29922626 U1	23-03-2000
EP 0815770 A	07-01-1998	EP 0815770 A2	07-01-1998
EP 0847715 A	17-06-1998	IT MI962460 A1 EP 0847715 A1	26-05-1998 17-06-1998
US 5947037 A	07-09-1999	NONE	
DE 9100304 U	04-04-1991	DE 9100304 U1 DE 9200238 U1	04-04-1991 26-03-1992

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