

(19)



(11)

EP 1 790 254 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

30.05.2007 Bulletin 2007/22

(51) Int Cl.:

A47C 5/10 (2006.01)

(21) Application number: **05111168.0**

(22) Date of filing: **23.11.2005**

(84) Designated Contracting States:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

Designated Extension States:

AL BA HR MK YU

(72) Inventor: **Ferronato, Giovanni**

36060, Casoni di Mussolente (Vicenza) (IT)

(74) Representative: **Crippa, Paolo Ernesto et al**

Jacobacci & Partners S.p.A.

Via Berchet, 9

35131 Padova (IT)

(71) Applicant: **Armet S.p.A.**

36060 Casoni di Mussolente (VI) (IT)

(54) **Chair with tubular support frame**

(57) Chair with tubular support frame comprising a frame (10) and a seat (20) fixed thereto. The frame (10) has at least one first tubular portion (11) for resting on the ground, at least one second tubular portion (12) connected in a position remote from the first portion (11) by means of columns (13), one or more connecting rods (14) fixed between the first and the second tubular portions (11 and 12), and rod-shaped connecting means (50) able to connect the columns (13) to the abovementioned one or more connecting rods (14). The seat (20) is fixed to the frame (10) by means of the abovementioned rod-shaped connecting means (50).

The chair is characterized in that the frame (10) is divided into two frame structures which can be separated, i.e. a lower frame structure (100) and an upper frame structure (200) situated relative to a plane of disassembly (P) passing in the vicinity of the seat (20).

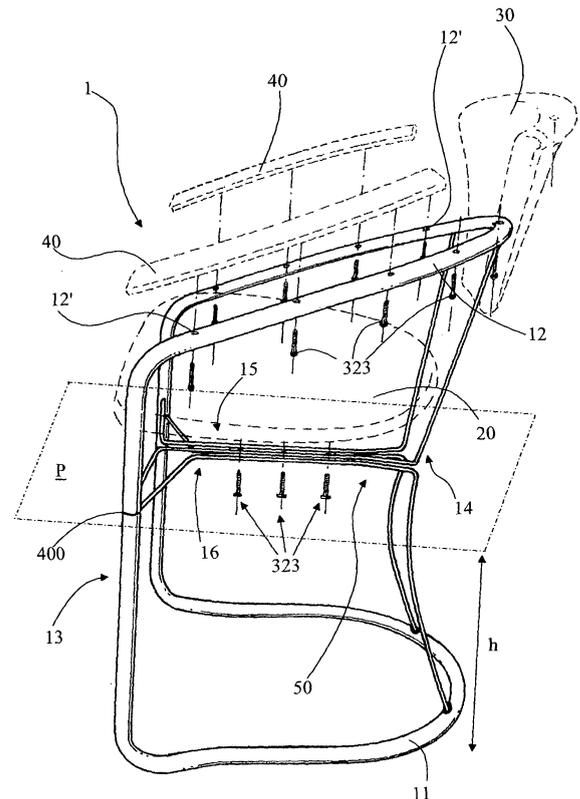


FIG. 1

EP 1 790 254 A1

Description

Technical field

[0001] The present invention relates to a chair with tubular support frame.

[0002] The chair in question falls within the furniture sector and in particular the office furnishings sector.

Background art

[0003] As is known to operators in the furniture and office furnishings sector, transportation costs constitute one of the items which most affect the final price of the products.

[0004] In many cases, when it is not possible to compete with rivals in terms of quality or design of the products, managing to reduce the transportation costs may determine the success or otherwise of the product on the market.

[0005] To this end it is therefore necessary to meet the increasingly growing requirement in the furniture sector to produce products which can be disassembled into several parts so that they may be packaged in a disassembled condition and have a smaller volume during transportation.

[0006] This requirement exists particularly not only in connection with large-size furniture, such as kitchen units, beds, tables, cabinets or divans, but also as regards furniture which is much smaller in size, such as chairs or armchairs.

[0007] A design of chair with tubular support frame, which has enjoyed a considerable degree of success commercially, is known on the market. An example of this chair is illustrated in Figures A and B.

[0008] Structurally speaking, this chair A has a frame T able to support a seat E, a backrest S and two armrests P. The frame T comprises a main structure T1, which is made by suitably shaping a tubular body, and a secondary reinforcing structure T2, which is made by welding together two pairs of thin rods D1 and D2. The two structures T1 and T2 are then connected together by means of welding so as to form the abovementioned frame T.

[0009] In greater detail, the main structure T1 comprises two tubular portions, generally in the form of a U, i.e. an upper portion B1 and a lower portion B2 which are made as one piece with two tubular columns H which join them together without interruption in a spaced position. The lower portion B2 acts as a base for supporting the chair A on the ground, while the upper portion B1 acts as a support for the backrest S and for the armrests P.

[0010] The secondary structure T2 consists of two first thin rods D1, which connect together the two portions B1 and B2 in an opposite position with respect to the two columns H, at the rear of the backrest S, and two second thin rods D2 which connect the first two rods D1 to the columns H, remaining substantially parallel to the lower portion B2. These second rods D2 are substantially hor-

izontal and act as a base for supporting and fixing the seat S.

[0011] At present, the frame T of this chair A is made as one piece and therefore cannot be disassembled. This makes it impossible to reduce the volume of the chair A at the time of packaging and therefore excludes the possibility of achieving a significant reduction in transportation costs.

[0012] Hitherto, in fact, in view of the particular structure and form of the chair A, it has not been possible to divide the frame T into several parts, without adversely affecting the strength of the chair or without radically changing its final aesthetic appearance. The only parts of the chair A which can be disassembled are the seat E, the backrest S and the armrests P, since they are connected to the frame T by means of normal fixing elements such as screws or bolts.

Disclosure of the invention

[0013] In this situation, therefore, the object of the present invention is to eliminate the drawbacks of the known art mentioned above, by providing a chair with tubular support frame which can be easily transported.

[0014] A further object of the present invention is to provide a chair with tubular support frame which is mechanically strong and operationally entirely safe and reliable.

[0015] A further object of the present invention is to provide a chair with tubular support frame which is aesthetically entirely similar to the chairs with tubular support frame currently available on the market.

Brief description of the drawings

[0016] The technical features of the invention, in accordance with the abovementioned objects, may be clearly understood from the contents of the claims provided below and the advantages therefore will emerge more clearly from the detailed description which follows, provided with reference to the accompanying drawings which show a purely exemplary and non-limiting example of embodiment thereof and where:

- Figure 1 shows an exploded side view of the chair with tubular support frame provided in accordance with a first embodiment of the invention;
- Figure 2 shows a front perspective view of a detail of the chair according to Figure 1, relating to a frame shown in the disassembled condition;
- Figure 3 shows a front perspective view of a chair with tubular support frame provided in accordance with a second embodiment of the invention, with some parts shown cut-away so that other parts may be seen more clearly;
- Figure 4 shows a front perspective view of a detail of the chair according to Figure 3, relating to a frame shown in the disassembled condition;

- Figure 5 shows an exploded side view of the chair with tubular support frame provided in accordance with a third embodiment of the invention;
- Figure 6 shows a front perspective view of a detail of the chair according to Fig. 5, relating to a frame shown in the disassembled condition;
- Figure 7 shows a view of a detail of the chair according to Fig. 3, relating to coupling means; and
- Figure 8 shows a view of a detail of the chair according to Fig. 5, relating to second joining means.

Detailed description

[0017] With reference to the attached drawings, 1 denotes in its entirety the chair with tubular support frame according to the invention.

[0018] All of the parts of this chair, including the frame, can be disassembled so that it may be transported more easily than similar chairs which are currently present on the market. In this way, it is therefore possible to reduce substantially the transportation costs, thus offering on the market a chair with tubular support frame at a price which is more competitive than that offered at present.

[0019] Advantageously, the chair 1 according to the invention has the same aesthetic appearance as those chairs designed with a frame which cannot be disassembled, while maintaining the same stability and mechanical robustness.

[0020] As can be seen in Figures 1, 2 and 5, the chair 1 comprises a tubular support frame 10 and a seat 20 which is fixed to the said frame. Preferably, the chair 1 also has a backrest 30 and with two armrests 40 which are directly fixed to the frame 9 using normal fixing means 323.

[0021] In greater detail, the frame 10 has at least one first tubular portion 11, by means of which it rests on the ground, and at least one second tubular portion 12 which is connected in a position remote from the first portion 11 by means of two tubular columns 13. The frame 10 also has two connecting rods 14 which are fixed between the first and second tubular portions 11 and 12 as well as rod-shaped connecting means 50 which connect the columns 13 to the two connecting rods 14.

[0022] The number of connecting rods 14 may vary depending on the constructional requirements and the aesthetic appearance which is to be imparted to the chair 1. Advantageously it is also possible to envisage a single connecting rod arranged along the plane of symmetry of the chair 1.

[0023] The seat 20 is fixed to the frame 10 by means of the abovementioned rod-shaped connecting means 50, while the backrest 30 and the two armrests 40 are fixed to the second tubular portion 12 by means of normal fixing elements 323, such as screws or bolts. In particular, the backrest 30 is supported on the connecting rods 14, thus allowing a better distribution of the weight over the whole frame 10.

[0024] Preferably, the two tubular portions 11 and 12

are shaped with curved forms, for example are U-shaped, but may advantageously also have other forms, for example square or polygonal forms, which vary depending on preferences and the aesthetic appearance which is to be imparted to the chair 1.

[0025] The second tubular portion 12 supports mechanically the backrest 30 and the two armrests 40 and for this purpose is provided with a series of through-holes 12' which are uniformly spaced along its linear extension and are able to receive the aforementioned fixing elements such as screws or bolts.

[0026] As can be seen in particular from Figures 1 and 5, the second tubular portion 12 is slightly inclined upwards with respect to the plane of lie of the first tubular portion 11. This inclination has the purpose of ensuring a more ergonomic arrangement of the two armrests 40, but is not indispensable. In fact, the second tubular portion 12 may also be arranged in other ways, for example horizontally, so as to be parallel with respect to the first tubular portion 11.

[0027] According to a first aspect of the invention, the frame 10 is divided into two frame structures which can be separated, i.e. a lower frame structure 100 and an upper frame structure 200 situated relative to a plane of disassembly P passing in the vicinity of the seat 20. Preferably, this plane of disassembly P is horizontal and passes between the two tubular portions 11 and 12 at a height h with respect to the first tubular portion 11 substantially coinciding with that of the seat 20.

[0028] Along this plane of disassembly P, each column 13 and each connecting rod 14 are divided into two elements, i.e. a lower element 13a and 14a, incorporated in the lower frame structure 100, and an upper element 13b and 14b, incorporated in the upper frame structure 200.

[0029] According to another aspect of the invention, the abovementioned rod-shaped connecting means 50 comprise a first and a second pair of horizontal rods 15 and 16. As will be explained more clearly below, the first pair of horizontal rods 15 is arranged above the aforementioned plane of disassembly P and forms part of the upper frame structure 200, while the second pair 16 is arranged underneath the plane of disassembly P and therefore forms part of the lower frame structure 100.

[0030] Therefore, the lower frame structure 100 comprises the abovementioned first tubular structure 11, the two lower elements 13a and 14a of the columns 13 and the connecting rods 14, and the second pair of horizontal rods 16, while the upper frame 200 comprises the abovementioned second tubular portion 12, the two lower elements 13b and 14b of the columns 13 and the connecting rods 14, and the first pair of horizontal rods 15.

[0031] From a structural point of view, the horizontal rods of the first pair 15 connect the upper elements 13b of the columns 13 to the upper elements 14b of the connecting rods 14, while the horizontal rods of the second pair 16 connect the lower elements 13a of the columns 13 to the lower elements 14a of the connecting rods 14.

[0032] As can be seen in Figures 2, 3 and 6, each

horizontal rod 15 or 16 is composed of at least two straight sections arranged at an angle with respect to each other. A first section 18 extends substantially in the direction of the depth of the chair 1, being connected to the connecting rods 14, while the second section 19 extends substantially in the direction of the width of the chair 1, being connected to the tubular columns 13. The first sections 18 of the rods of a same pair 15 or 16 may be parallel with each other and may also be angled relative to each other.

[0033] Preferably, in accordance with the embodiments shown in the accompanying figures, the connection between the horizontal rods 15 and 16 and the corresponding columns 16, and the connection between the connecting rods 14 and the corresponding tubular portions 11 and 12, is performed by means of welding so as to impart strength and solidity to the two frame structures 100 and 200 which can be separated.

[0034] Structurally speaking, in accordance with the two embodiments shown respectively in Figures 2 and 4, the upper elements 14b and the lower elements 14a of the connecting rods 14 are made as one piece with the horizontal rods of the first and second pair 15 and 16, respectively. Alternatively, in accordance with the embodiment shown in Figures 5, 6 and 8, the lower elements and the upper elements 14a and 14b of the connecting rods 14 are made separately from the horizontal rods 15 and 16 and are then mechanically connected to the latter by means of welding.

[0035] According to a further aspect of the invention, the frame 10 comprises first joining means 310 able to removably join together the lower elements and the upper elements 13a and 13b of the columns 13, as well as means 320 for coupling together the first and the second pair of horizontal rods 15 and 16.

[0036] As will become clear in the remainder of the description, these first joining means 310 and these coupling means allow the connection together of the lower frame structure 100 and the upper frame structure 20, thus ensuring the mechanical strength and solidity of the chair 1, without however modifying the overall aesthetic appearance thereof.

[0037] Advantageously, as can be seen in Figures 2, 4 and 6, the first means 310 for joining together the lower and upper elements 13a and 13b of the columns 13 are of the male/female engaging type and are provided at the free ends of these elements.

[0038] More particularly, in accordance with the embodiments shown in the accompanying figures, the joining means 310 comprise for each column a tubular lug 2 which extends longitudinally from the lower element 13a or from the upper element 13b for engagement, respectively, inside the corresponding upper or lower element. The lug 2 has an external cross-section which is slightly smaller than the internal cross-section of the column 13 and has dimensions such that the connection is without play and at the same time does not envisage forced engagement or deformation of the parts which

make contact such as to allow easy disassembly thereof.

[0039] From an aesthetic point of view, the abovementioned joining means 310 have dimensions such that the connection between the lower elements 13a and the upper elements 13b is continuous and only the line 400 of the disassembly plane is visible.

[0040] Advantageously, the means 320 for coupling together the first and the second pair of horizontal rods 15 and 16 comprise two or more plates 321 or elongated profiled members 324 which are connected to the abovementioned rods and are able to receive fixing elements such as screws or bolts.

[0041] In accordance with the preferred embodiment of the invention shown in Figures 1 and 2, the coupling means 320 comprise two plates 321 which are arranged in a position facing each other and one of which is fixed between the two rods of the first pair 15 above the aforementioned plane of disassembly P and the other of which is fixed between the two rods of the second pair 16 underneath the abovementioned plane P. Preferably, each plate 321 is connected to the first sections 18 of the associated horizontal rods. The plates are arranged so as to be substantially parallel to the plane of disassembly P and are provided with one or more aligned holes 322 able to receive fixing elements 323, such as screws or bolts. These fixing elements 323 join together the two plates 321 and the associated pairs of horizontal rods 15 and 16 and consequently connect rigidly together the two frame structures 100 and 200 which can be separated.

[0042] Preferably, these fixing elements 323 also engage in the seat 20 and may therefore be used to fix the latter to the first pair of horizontal rods 15, thus avoiding having to provide special fixing elements for the seat 20.

[0043] In accordance with an alternative embodiment of the invention shown in Figures 5 and 6, the coupling means 320 comprise four plates 321 facing each other in pairs, two of which are fixed between the two rods of the first pair 15 above the aforementioned plane of disassembly P and the other two of which are fixed between the two rods of the second pair 16 underneath the aforementioned plane P. In a similar manner to that envisaged for the embodiment shown in Figures 1 and 2, the four plates 321 are connected to the first sections 18 of the associated horizontal rods and are provided with aligned through-holes 322 able to receive fixing elements 323, such as screws or bolts.

[0044] In accordance with another embodiment of the invention shown in Figures 3 and 4, the coupling means 320 comprise two elongated profiled members 324 which are intended to be fixed onto the bottom of the seat 20 so as to retain both the pairs of horizontal rods 15 and 16 on the latter and fasten together the two frame structures 100 and 200 which can be separated. For this purpose, as can be seen in particular in Figure 7, each profiled member 324 is provided with two symmetrical seats 325 inside which the horizontal rods of the first and second pair 15 and 16, and in particular the first sections of the latter, are inserted.

[0045] In operational terms, a rod of the first pair 15 and a rod of the second pair 16 are housed in each seat 325. If this particular embodiment is adopted, it is necessary to shape the horizontal rods of the two pairs 15 and 16 in such a way that they are parallel in pairs and it is therefore possible to insert them together inside the said seats 325. In particular, the horizontal rods must be parallel to each other along the corresponding first sections 18.

[0046] Preferably, the two profiled members 324 are welded to the horizontal rods of the second pair 16 in the region of the abovementioned first sections 18, with the two rods 16 arranged on the bottom of the two seats 325. In operational terms, at the time of assembly of the chair 1, when the two frame structures 100 and 200 are connected together, the rods of the first pair 15 are inserted inside the symmetrical seats 325 and positioned in contact with the corresponding rods of the second pair 16. At this point the seat 20 is mounted and acts substantially as an element for closing the seats 325, preventing the horizontal rods 15 from coming out. Fixing of the seat 20 onto the profiled members 324 is performed using normal fixing elements 327 such as screws or bolts. For this purpose, each profiled member 324 is provided with a series of through-holes 326 which are spaced uniformly along the entire linear extension thereof.

[0047] Advantageously, the number of elongated profiled members 324 may vary depending on the constructional requirements. In particular, a single elongated element may also be envisaged, said element being arranged in a central position with respect to the seat. In this case, compared to the solution comprising several elongated elements, it is preferable to increase the surface area of the single elongated element and the number of fixing elements in order to ensure that the connection has an adequate mechanical rigidity.

[0048] Advantageously, the frame 10 may comprise second joining means 330 which are able to connect together the lower elements 14a and the upper elements 14b of the connecting rods 14 so as to impart further stability and strength to the frame 10.

[0049] In accordance with the embodiment shown in Figures 5, 6 and 8, these second joining means 330 are of the male/female engaging type and are provided on the lower and upper elements 14a and 14b of the connecting rods 14, in the vicinity of the zones where joining to the respective horizontal rods 15 or 16 occurs.

[0050] In greater detail, as can be seen in Figure 8, each upper element 14b of the connecting rods 14 is provided at its free end with a coaxial, hollow, tubular element 331 intended to receive inside it the free end of the corresponding lower element 14a. For this purpose, the internal section of this hollow element 331 corresponds to the external section of the connecting rods 14 and has suitable dimensions for preventing the presence of play between the connected parts and at the same time preventing jamming.

[0051] Preferably, these second joining means 330 are

provided in those embodiments of the invention which envisage a mechanical type connection between the horizontal rods 15 or 16 and the connecting rods 14, for example by means of welding. This solution is adopted essentially for reasons of constructional simplicity.

[0052] In fact, in these embodiments, it is possible to envisage without any constructional complication connecting the horizontal rods 15 or 16 to the lower or upper elements of the connecting rods 14, leaving on the latter a free end able to receive the abovementioned second joining means 330. This measure is also envisaged for example in the embodiment shown in Figure 8.

[0053] These second joining means 330 may, however, also be provided in those embodiments of the invention which envisage forming the horizontal rods 15 or 16 as one piece with the connecting rods 14, as shown for example in Figures 2 and 4. In this case, however, it is necessary to complicate slightly the production process, by welding a hollow tubular element and a corresponding rod section in the region of the rod folding zone, where the transition from the horizontal portion 15 or 16 to the connecting portion 14 occurs.

[0054] By way of conclusion, from an operational point of view, the division of the frame 1 into the two frame structures 100 and 200 as described above allows a substantial reduction in the volume of the chair 1. In fact, once the chair 1 has been disassembled into all its components (seat, backrest, armrests and frame), it is possible to fit together again the two disassembled frame structures 100 and 200, but this time arranging the upper frame structure 200 on the lower frame structure 100 so that it is overturned with respect to the normal assembled position and positioning the second tubular portion 12 in contact with the first portion 11. In this way the volume occupied by the chair 1 is reduced considerably, also considering that the height of the chair 1 is reduced to nearly half.

[0055] From an aesthetic point of view, the division of the frame 10 into the two frame structures 100 and 200 does not modify significantly the aesthetic appearance of the chair 1, since both the relative arrangement of the various parts of the frame (connecting rods 14, columns 13, tubular portions 11 and 12) and their proportions remain unchanged. Moreover, the use of two pairs of horizontal rods 15 and 16 does not affect in any way the appearance of the chair 1 since they are both arranged underneath the seat 20 and therefore are not visible.

[0056] The invention therefore achieves the predefined objects.

[0057] Obviously, it may also assume, in its practical embodiment forms and configurations different from that illustrated above, without thereby departing from the present scope of invention.

[0058] Moreover, all the details may be replaced by technically equivalent elements and the dimensions, the forms and the materials used may be of any nature according to requirements.

Claims

1. Chair with tubular support frame comprising:

- a frame (10) having at least one first tubular portion (11) resting on the ground, at least one second tubular portion (12) connected in a position remote from said first portion (11) by means of columns (13), one or more connecting rods (14) fixed between said first tubular portion (11) and said second tubular portion (12) and rod-shaped connecting means (50) able to connect said columns (13) to said one or more connecting rods (14);
- a seat (20) fixed to said frame (10) by means of said rod-shaped connecting means (50);

characterized in that said frame (10) is divided into two frame structures which can be separated, i.e. a lower frame structure (100) and an upper frame structure (200) situated relative to a plane of disassembly (P) passing in the vicinity of said seat (20), with each column (13) and each connecting rod (14) divided into two elements, a lower element (13a; 14a) and an upper element (13b; 14b) and **in that** said rod-shaped connecting means (50) comprise a first pair of horizontal bars (15) and a second pair of horizontal bars (16) which are arranged so as to connect together, respectively, the upper elements (13b) of said columns (13) and the upper elements (14b) of said connecting rods (14) and the lower elements (13a) of said columns (13) and the lower elements (14a) of said connecting rods (14), said frame (10) comprising first joining means (310) which are able to join together removably the lower elements (13a) and the upper elements (13b) of said columns (13) and at least means (320) for coupling together said first pair of horizontal rods (15) and said second pair of horizontal rods (16).

2. Chair according to Claim 1, comprising a backrest (30) fixed to the second tubular portion (12) of said frame (10).
3. Chair according to Claim 2, in which said backrest (30) is mechanically supported by said one or more connecting rods (14).
4. Chair according to Claim 1 or 2, comprising two armrests (40) fixed to the second tubular portion (12) of said frame (10).
5. Chair according to any one of the preceding claims, in which said joining means (310) are of the male/female engaging type and are arranged at the free ends of the lower and upper elements (13a;13b) of said columns (13).

6. Chair according to any one of the preceding claims, in which said horizontal bars (15;16) and said connecting rods (14) are connected by means of welding to the corresponding columns (13) and to the corresponding tubular portions (11;12), respectively.

7. Chair according to any one of the preceding claims, in which the lower elements (14a) and upper elements (14b) of said connecting rods (14) are mechanically connected to the horizontal rods of said first pair (15) and said second pair (16), respectively.

8. Chair according to any one of Claims 1 to 6, in which said frame (10) comprises two connecting rods (14) and in which the lower elements (14a) and the upper elements (14b) of said two connecting rods (14) are formed as one piece with the horizontal rods of said first pair (15) and said second pair (16), respectively.

9. Chair according to any one of the preceding claims, in which said coupling means (320) comprise at least two plates (321), one of which is fixed between the two rods of said first pair (15) and the other one of which is fixed between the two rods of said second pair (16) in a facing position, said plates (321) being provided with one or more aligned holes (322) able to receive fixing elements (323).

10. Chair according to Claim 9, in which said fixing elements (323) are able to fix said seat (20) to said first pair of horizontal rods (15).

11. Chair according to any one of Claims 1 to 8, in which said coupling means (320) comprise at least one elongated profiled member (324) provided with two symmetrical seats (325) inside which the horizontal rods of said first pair (15) and said second pair (16) are inserted and with a series of through-holes (326), said elongated profiled member (324) retaining said seat (20) on said horizontal rods (15;16) by means of fixing elements (327) inserted in said through-holes (326).

12. Chair according to any one of the preceding claims, in which said frame (10) comprises second joining means (330) able to connect together removably the lower elements (14a) and the upper elements (14b) of said connecting rods (14).

13. Chair according to Claim 12, in which said second joining means (330) are of the male/female engaging type and are provided on said lower elements (14a) and upper elements (14b) of said connecting rods (14) in the vicinity of the zones where joining to said horizontal rods (15;16) occurs.

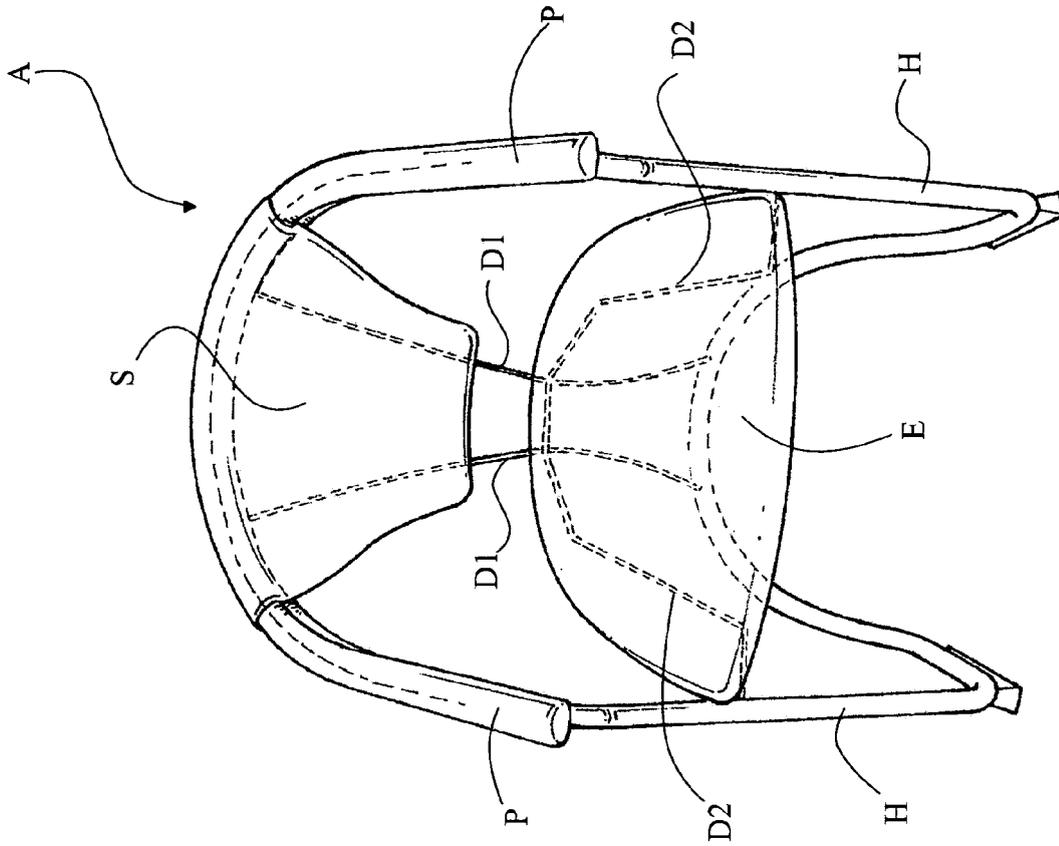


FIG. B

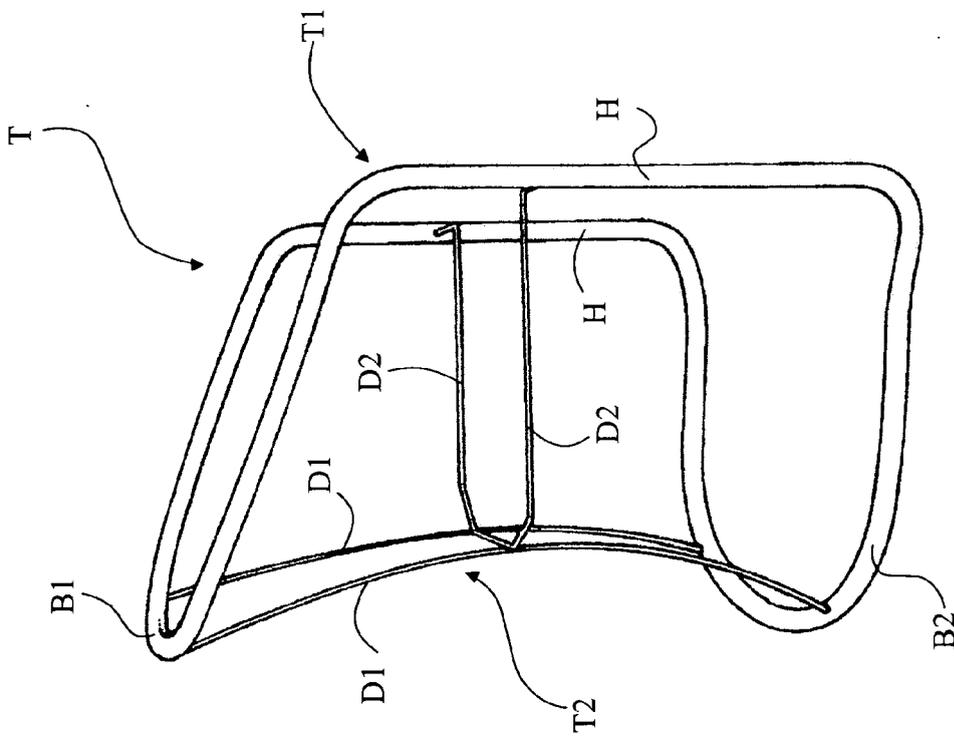


FIG. A

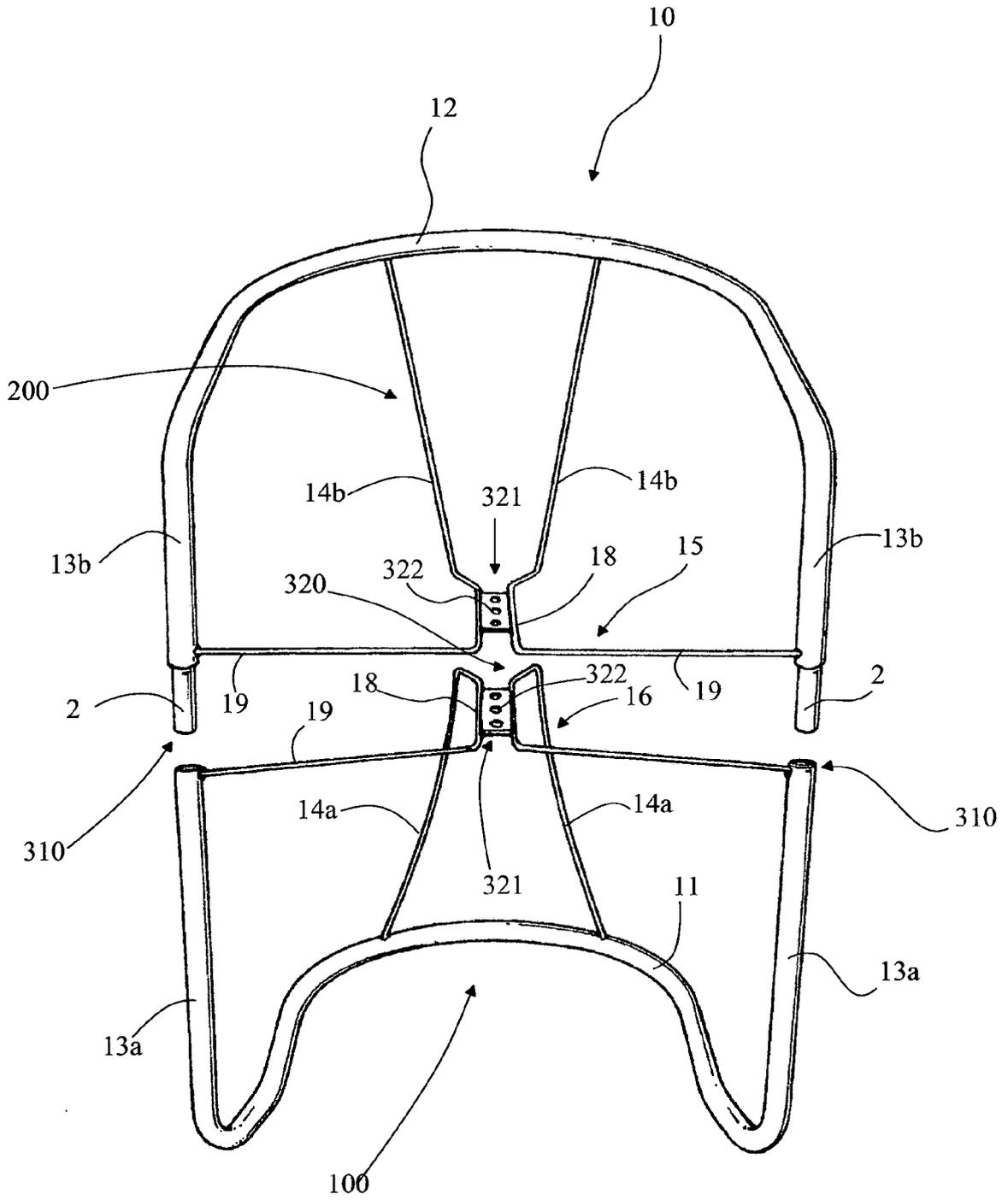


FIG. 2

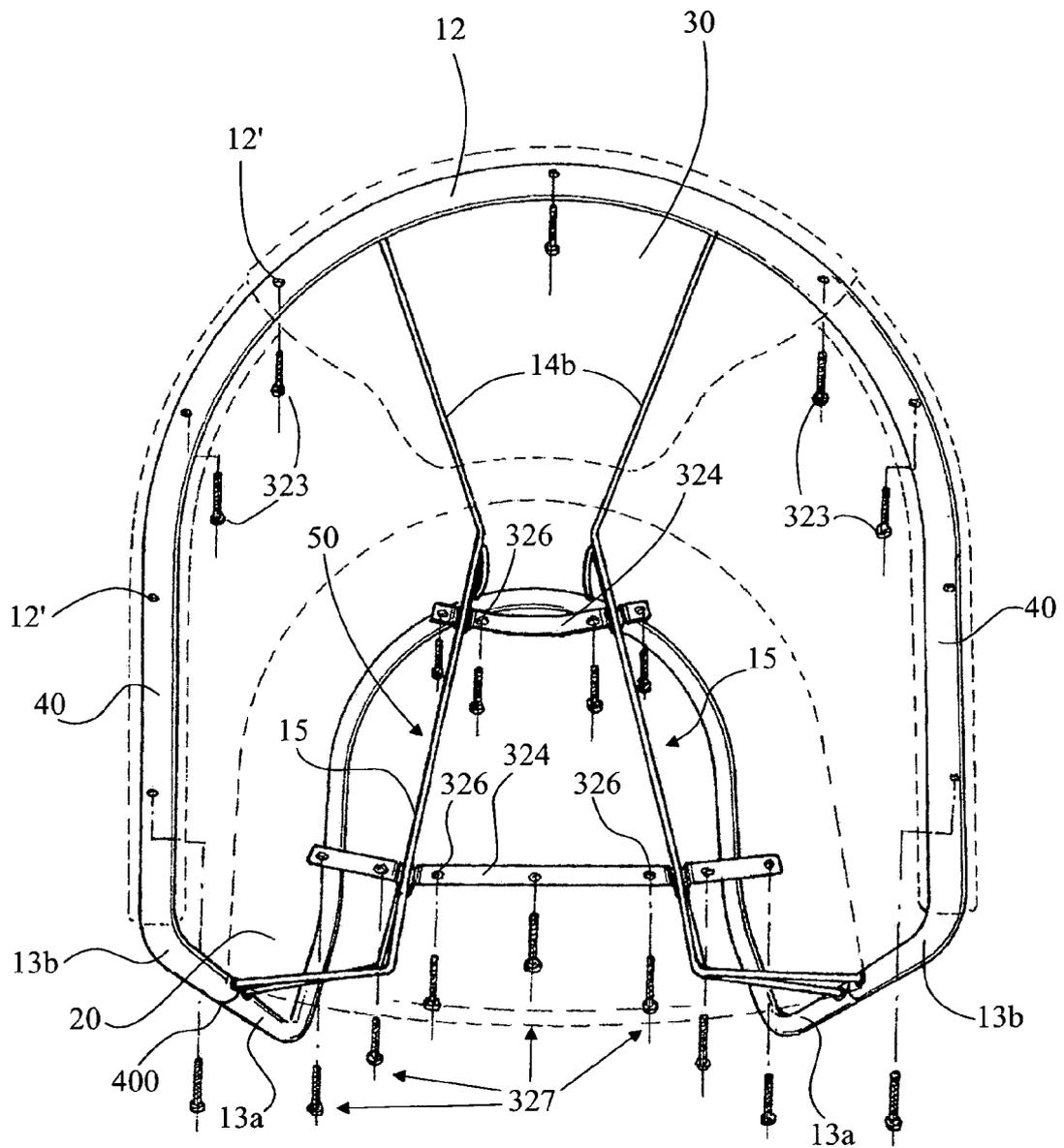


FIG. 3

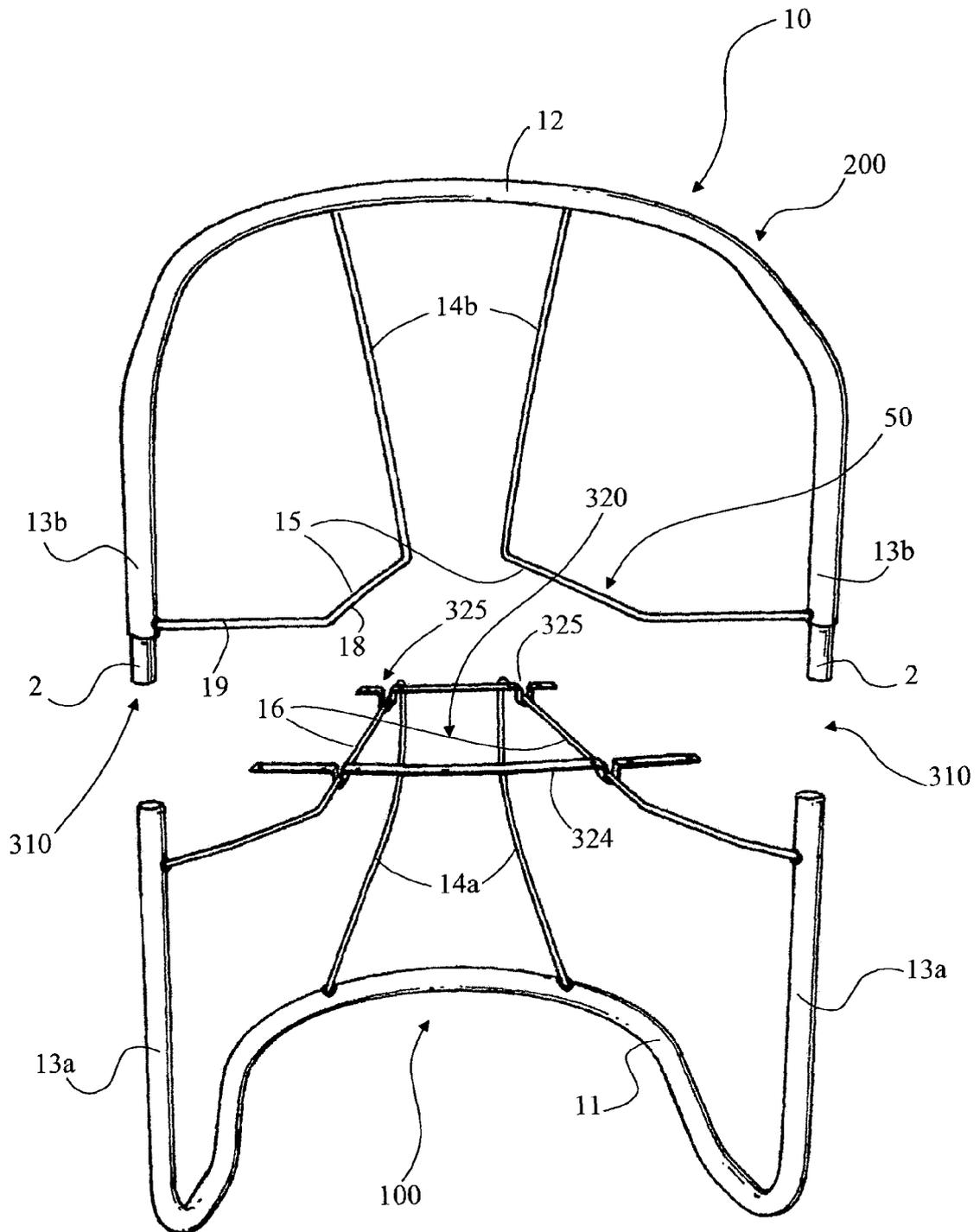


FIG. 4

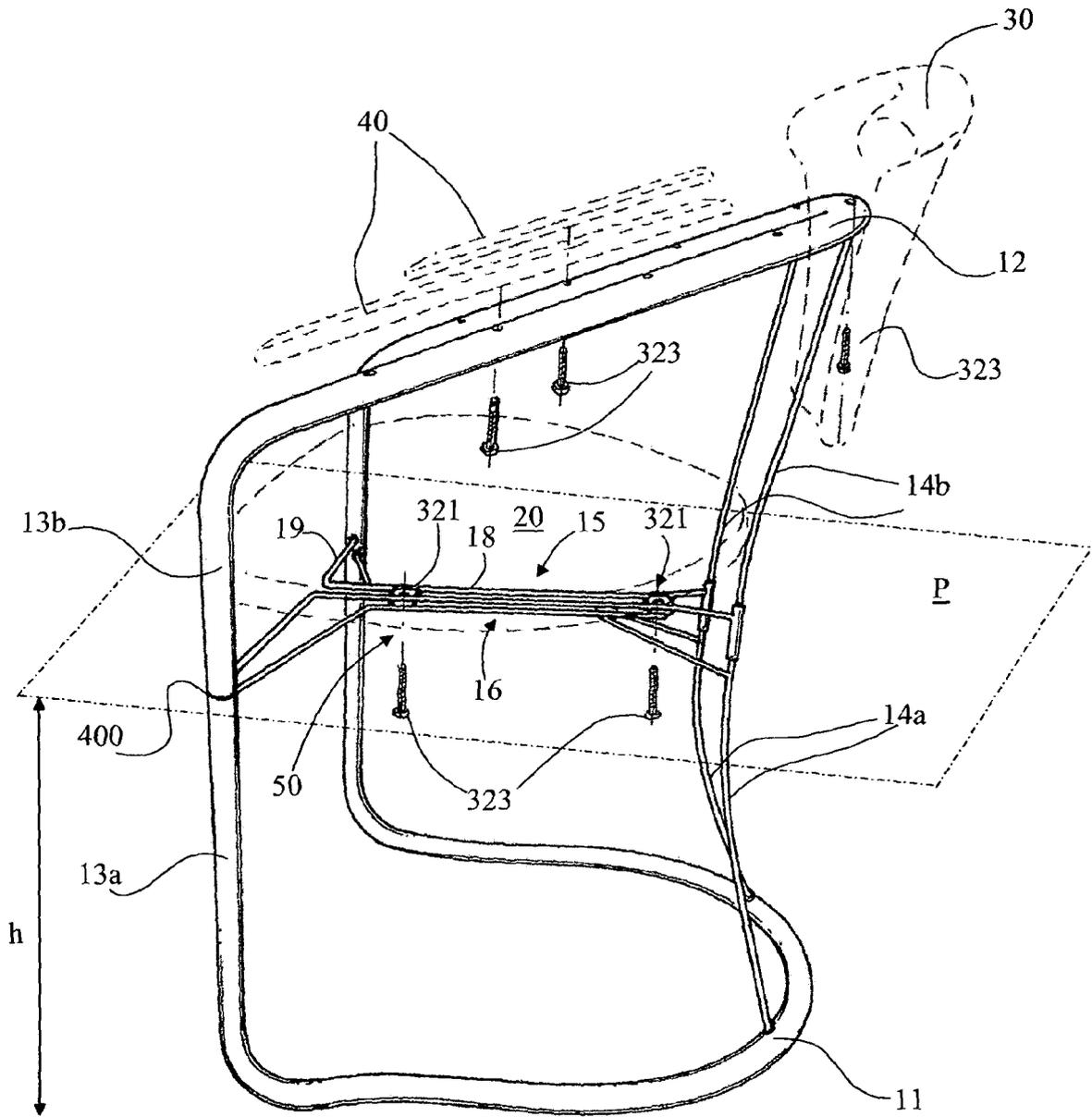


FIG. 5

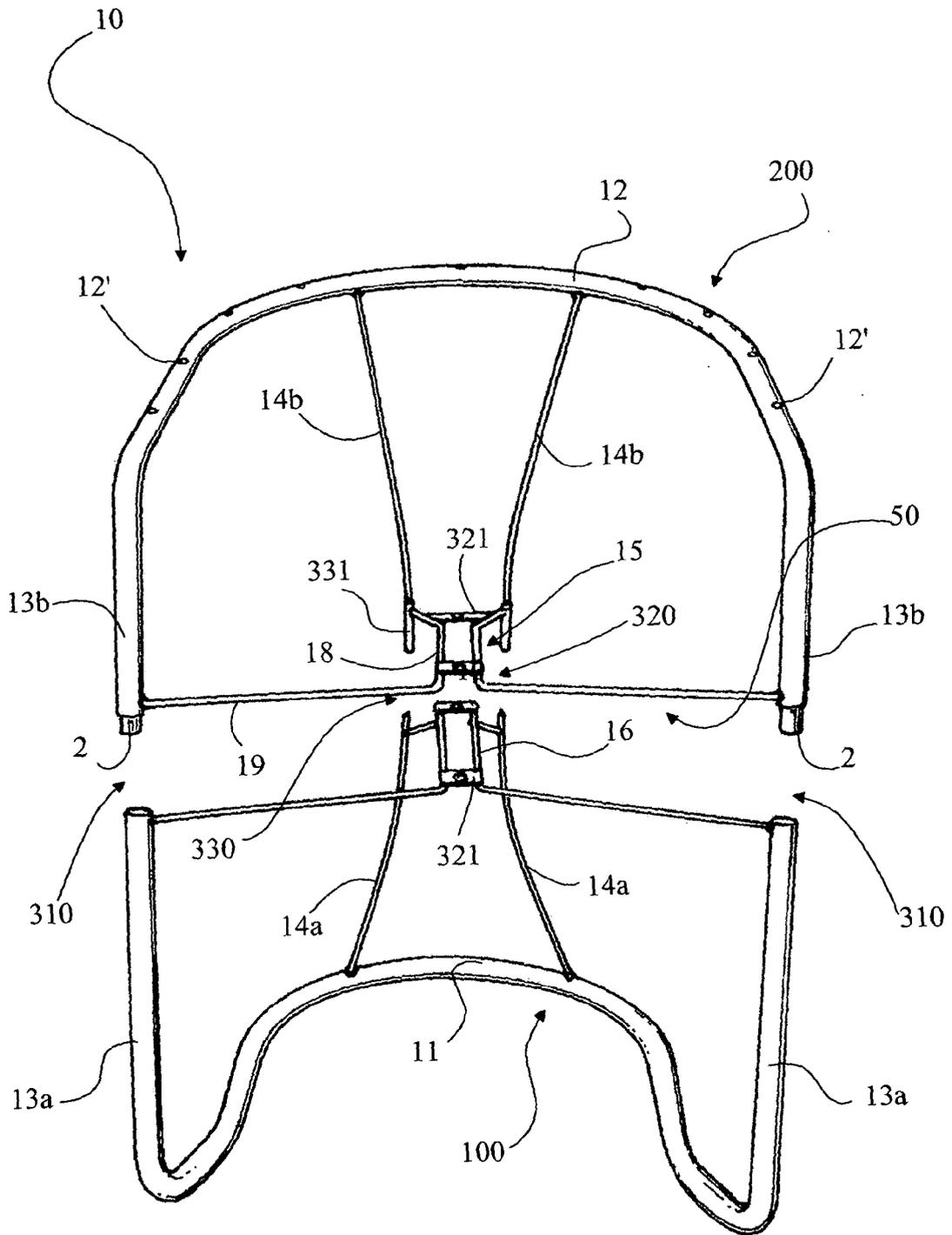


FIG. 6

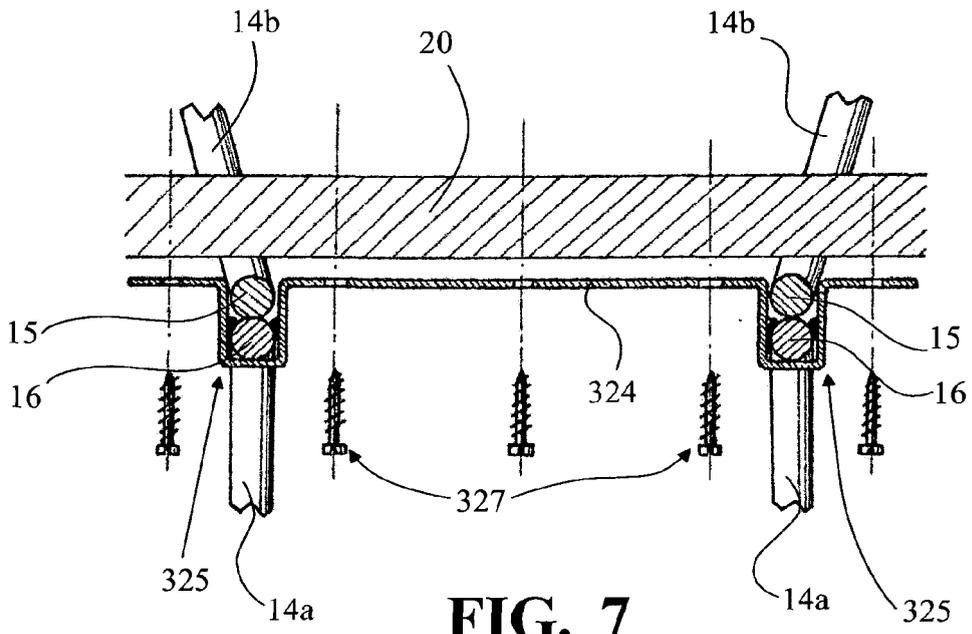


FIG. 7

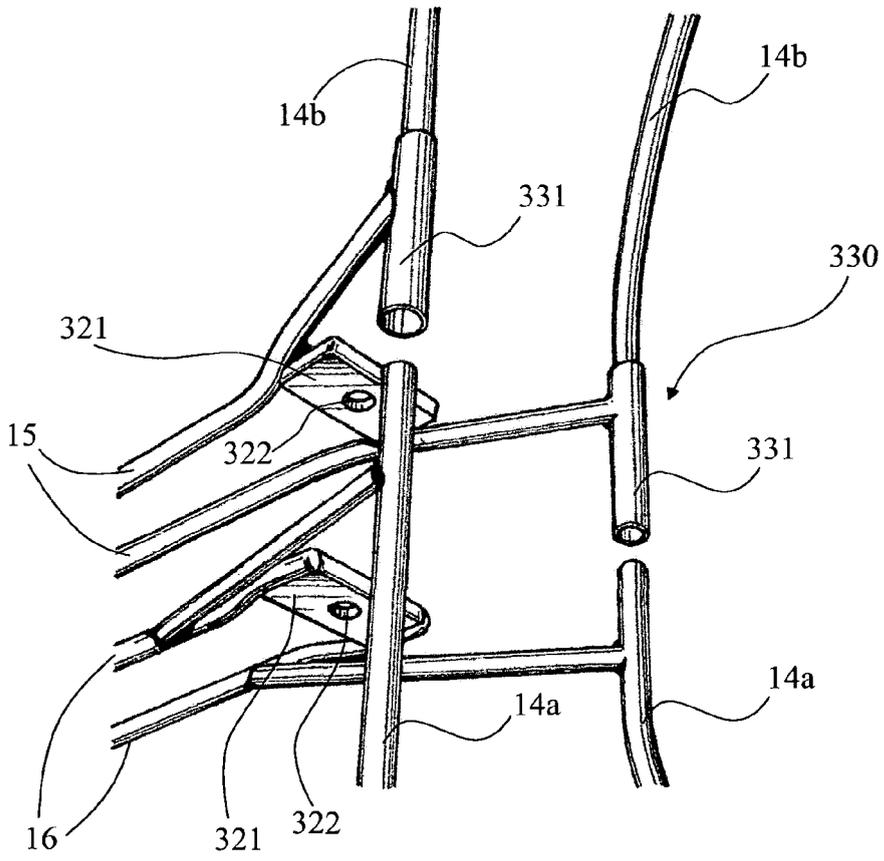


FIG. 8



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 5 649 742 A (LIU ET AL) 22 July 1997 (1997-07-22) * abstract; figures *	1-13	A47C5/10
A	EP 0 241 628 A (C.I.F.S.A. SRL) 21 October 1987 (1987-10-21) * abstract; figures *	1-13	
A	DE 20 2004 007750 U1 (LIN, CHEN-HSIUNG) 12 August 2004 (2004-08-12) * abstract; figures *	1-13	
A	FR 1 249 540 A (ALBELLA A) 30 December 1960 (1960-12-30) * figure 1 *	1-13	
A	US 3 730 584 A (UCHIDA S,JA) 1 May 1973 (1973-05-01) * abstract; figures *	1-13	
A	US 4 674 795 A (NELSON ET AL) 23 June 1987 (1987-06-23) * abstract; figures *	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		29 March 2006	MacCormick, D
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

2
EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 11 1168

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-03-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5649742	A	22-07-1997	NONE	
EP 0241628	A	21-10-1987	NONE	
DE 202004007750	U1	12-08-2004	NONE	
FR 1249540	A	30-12-1960	NONE	
US 3730584	A	01-05-1973	JP 50006825 B	18-03-1975
US 4674795	A	23-06-1987	NONE	

EPO FORM P0469

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