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(71) Applicant: **Brunner S.r.l.**
39100 Bolzano (IT)

(72) Inventor: **BRUNNER, Roland**
39100 Bolzano BZ (IT)

(74) Representative: **Perani & Partners S.p.A.**
Piazza Armando Diaz, 7
20123 Milano (IT)

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(54) **FOLDING CHAIR**

(57) The present invention relates to a folding chair (1) comprising a frame (2) switchable between a seat configuration, wherein said chair (1) is adapted to offer support to a user, and a transport configuration wherein said chair (1) takes a smaller space if compared to the seat configuration; said frame (2) comprising a plurality of pairs of rods (300), wherein:

- each rod (3) has a lower end portion (30), an upper end portion (31); and a central portion (32) arranged between the lower and upper end portions (30, 31);
- the rods (3) of each pair of rods (300) are constrained in rotation at the respective central portions (32) such that they can rotate one relative to the other to switch the frame (2) between the seat configuration and the transport configuration;
- the upper end portions (31) of rods (3) belonging to different pairs of rods (300) are mutually connected two by two at a plurality of seat-supporting points (S) lying on a same seat plane (S1);
- the lower end portions (30) of rods (3) belonging to different pairs of rods (300) are mutually connected two by two at a plurality of footholds (A) lying on a same standing plane (A1);
- in the open configuration the projection of the seat-supporting points (S) on the standing plane (A1) falls within an area defined by a polygon having the footholds (A) as vertices,
- the central portion (32) of each rod (3) extends mainly along a first direction (D1),
- the lower and upper end portions (30, 31) of each rod (3) extend respectively along a second (D2) and third (D3) direction transversal to the first direction (D1).



Fig. 1

Description*Technical Field*

[0001] The present invention relates to a chair, particularly of the folding type, according to the preamble of claim 1.

[0002] Such a folding chair is employed in the field of camping or home equipment.

State of the Art

[0003] In the state of the art, several folding chairs are known, i.e., seating devices that can be switched between an open and a closed configuration.

[0004] In the open configuration such folding chairs are configured to provide support to a user, while in the closed one they take a smaller space if compared to the previous one, so they can be easily transported or stored.

[0005] This type of chair is particularly convenient when it is necessary to continuously move the seating devices, such as during camping activities, or at car shows, or conference centres or similar facilities.

[0006] Typically, folding chairs are made of lightweight materials such as aluminium, plastic and canvas fabrics. This allows them to be easily moved or stored as required.

[0007] For example, document AU20123004252A1 discloses a chair of the type set forth above comprising a tubular frame switchable between an open configuration and a closed configuration.

[0008] In greater detail, said tubular frame comprises a plurality of mutually hinged rods to rotate one relative to the other in order to switch the tubular frame between the closed configuration and the open configuration.

[0009] The folding chair disclosed in WO2013029089 further comprises a backrest made by means of a rear support structure and a strip of canvas fabric adapted to support a user's back. In addition, such backrest is stiffened by a brace mechanism connected to the rear support structure.

[0010] However, the above-described chairs, particularly due to the shape of their folding structure, are unstable and therefore prone to tipping over if subjected to sudden movements.

[0011] Therefore, when seated, users must be particularly cautious in their movements and avoid movements that may generate poorly stable situations.

[0012] Such a potentially risky situation is greater when the chair is used by children/adolescents who are known to suffer from sitting in the same position for long periods.

[0013] It is thus clear that the folding chairs known in the state of the art are not recommended for children, as they are particularly dynamic in their movements due to their young age, and therefore might easily tip over.

Object of the invention

[0014] In this context, the technical task underlying the present invention is to propose a folding chair which overcomes the drawbacks of the prior art mentioned above.

[0015] In particular, it is an object of the present invention to make available a stable and safe folding chair, capable of meeting the requirements of European standards EN 581-1 and EN 581-2 on safety relating to outdoor furniture.

[0016] Therefore, it is an object of the present invention to make available a folding chair with a proper stability such that it can be safely used even by children.

15 **SUMMARY OF THE INVENTION**

[0017] The specified technical task and objects are substantially achieved by a folding chair according to what claimed in the following claim 1.

Advantages of the invention

[0018] Thanks to the present invention, it is possible to obtain a chair of the anti-tip folding type, i.e. with a high stability and capable of meeting the requirements of the European standards EN 581-1 and EN 581-2 on safety related to outdoor furniture.

[0019] In particular, the chair of the present invention includes a frame that is switchable between a seat and a transport configuration.

[0020] In the seat configuration the chair is configured to offer support to a user, while in the transport configuration it takes a smaller place if compared to the previous one, so as to be easily transported and stored.

[0021] The frame comprises a plurality of pairs of rods, wherein each rod defines a lower end portion, an upper end portion and a central portion arranged between said upper and lower end portions. The rods constituting each pair of rods are constrained in rotation at the respective central portions, and by rotating one relative to the other, they allow the frame to be switched between the seat and transport configurations.

[0022] The upper and lower end portions of rods belonging to different pairs of rods are mutually connected two by two. In detail, the upper end portions of pairs of different rods are connected at a plurality of seat-supporting points lying on a same seat plane, while the lower end portions of different pairs of rods are connected at a plurality of footholds lying on the same standing plane.

[0023] When the frame is in the seat configuration, the projection of the seat-supporting points onto the standing plane falls within an area defined by a polygon having the footholds as vertices.

[0024] Advantageously, this allows the centre of gravity of the user-chair system to fall within the area defined by the footholds even when the user makes dynamic movements, or the chair stands on inclined surfaces.

[0025] Therefore, the folding chair object of the present

invention is able to guarantee excellent mechanical performance in terms of stability, so that it can be safely used even by children.

LIST OF FIGURES

[0026] Further features and advantages of the present invention will become more apparent from the approximate and thus non-limiting description of a preferred, but non-exclusive, embodiment of a folding chair, as illustrated in the enclosed drawings, wherein:

- Figure 1 shows a front perspective view of a folding chair object of the present invention;
- Figure 2 shows a front perspective view the folding chair in Figure 1 with some components removed to better show others;
- Figure 3 shows a side perspective view of the folding chair in Figure 1 with some components removed to better show others;
- Figure 4 shows a perspective view of the folding chair in Figure 1 with some components removed to better show others;
- Figure 5 shows the front perspective view of the folding chair in Figure 2 with some details highlighted.

DETAILED DESCRIPTION

[0027] Even when not explicitly highlighted, the individual features described with reference to the specific embodiments must be considered as accessories and/or exchangeable with other features, described with reference to other embodiments.

[0028] The present invention relates to a chair, in particular of the folding type, referred to by 1 in the appended figures.

[0029] In the context of the present invention, a folding chair means any equipment for seating people that is adapted to be folded when not being used in order to be easily transported or stored.

[0030] As shown in Figure 1, the chair 1 object of the present invention comprises a frame 2 switchable between a seat configuration and a transport configuration.

[0031] When the frame 2 is in the seat configuration, the chair 1 is adapted to offer support to a user, i.e., it is configured to support, at least partially, the weight of a user sitting thereon.

[0032] In detail, when the frame 2 is in the seat configuration the chair 1 defines a seat plane S1 oriented substantially parallel to a surface standing area (not shown) on which the chair 1 stands. In use, the user seats on the seat plane S1 transferring, at least partially, his weight to the frame 2 of the chair 1.

[0033] Preferably, when the frame 2 is in the seat configuration the chair 1 is configured to offer support to the user's back as well.

[0034] In other words, preferably, when the frame 2 is in the seat configuration it defines a back-supporting sur-

face 5a arranged transversely relative to the seat plane S1. The back-supporting surface 5a is configured to offer a fastening response to the user's back supported thereon.

5 **[0035]** Even more preferably, when the frame 2 is in the seat configuration the chair 1 is configured to offer support to the user's arms as well.

[0036] As shown in Figure 1, preferably, the chair 1 comprises a pair of armrests 9 adapted to support the user's arms when the latter is sitting on the chair 1.

10 **[0037]** In detail, when the frame 2 is in the open configuration the armrests 9 define respective arm-supporting surfaces 9a oriented substantially parallel to the seat plane and arranged on opposite sides of the latter.

15 **[0038]** When the frame 2 is in the transport configuration the chair 1 takes a smaller place if compared to the seat configuration, so it can be easily transported or stored as appropriate.

[0039] It must be specified that space means the volume of space occupied by the chair.

20 **[0040]** As shown in Figures 2, 3, and 4, the frame 2 comprises a plurality of pairs of rods 300.

[0041] Preferably, as shown in Figure 4, a pair of rods 300 is arranged on a front portion F of the chair 1 pre-arranged for user access, a pair of rods 300 is arranged on a rear portion P opposite to the front portion F, and additional pairs of rods 300 are arranged on side portions L of the chair 1.

[0042] Preferably, the rods 3 of each pair of rods 300 are geometrically identical to each other.

30 **[0043]** Preferably, but not necessarily, each rod has a tubular shape, i.e., it has a hollow circular section.

[0044] It is worth noting that one skilled in the art is able to specifically design the section of the plurality of rods according to the capacity of the chair 1 (user maximum weight that the chair is able to bear). For example, in case of a child's chair, it will be possible to use rods with a smaller section than those used in adult chairs.

[0045] In detail, each rod 3 of each pair of rods 300 has a lower end portion 30, an upper end portion 31, and a central portion 32 arranged between the lower and upper end portions 30, 31 and connected thereto.

[0046] With reference to the appended figures, in particular Figure 4, the central portion 32 of each rod 3 extends mainly along a first direction D1. Preferably, the central portion 32 extends rectilinearly along the first direction D1 between the lower and upper end portions 30, 31.

[0047] Still with particular reference to Figure 4, the lower and upper end portions 30, 31 of each rod 3 extend respectively along a second direction D2 and a third direction D3 arranged transversely to the first direction D1. Preferably, the second and third directions D2, D3 are transversal to the first direction D1 and are transversal between each other.

55 **[0048]** Advantageously, the geometric shape of the rods 3 having the central portion 32 extending along the first direction D1 and the lower and upper end portions

30, 31 along the second and third directions D2, D3, allows to increase the stability of the chair 1 by increasing the stiffness of the frame 2. In this respect, it is worth noting that the above shape of the rods 3 is capable of reducing the bending strain of the rods 3 when the chair 1 is under a load, and thus of increasing the stiffness of the frame 2.

[0049] It is worth noting that the geometric shape allows to increase the stiffness of the frame 2. This is independent of the cross-section of the rods 3 and of their construction material.

[0050] In detail, each rod comprises connecting portions 33 configured to connect the central portion 32 to the lower and upper end portions 30, 31. In the embodiment shown in the attached figures, each connecting portion 33 is a bend in the rod 3.

[0051] Preferably, still referring to Figure 4, the connecting portions 33 are arranged between the seat plane S1 and the standing plane A1. In other words, preferably, the connecting portions 33 are located below the seat plane S1.

[0052] As shown in Figure 2, the rods 3 of each pair of rods 300 are constrained at the respective central portions 31.

[0053] Therefore, the rods 3 of each pair of rods 300 are free to mutually rotate one relative to the other about an axis of rotation R-R passing through the respective central portions 31.

[0054] In greater detail, the axis of rotation R-R of each pair of rods 300 is oriented perpendicular to a plane containing the first directions of the rods 3 of the considered pair 300.

[0055] The rods 3 of each pair 300, by mutually rotating one relative to the other, switch the frame 2 between the seat configuration and the transport configuration.

[0056] The different pairs of rods 300 are connected to each other. In particular, the upper end portions 31 of rods 3 belonging to different pairs of rods 300 are mutually connected two by two at a plurality of seat-supporting points S lying on a same seat plane S1.

[0057] Preferably, the chair 1 comprises a plurality of joint elements 8 arranged at a respective seat point S.

[0058] Each joint element 8 is connected to the upper ends 31 of two rods 3 belonging to different pairs of rods 300.

[0059] In other words, the upper end portions 31 belonging to different pairs of rods 3 are connected two by two to a respective joint element 8 arranged at a respective seat point S.

[0060] Preferably, the upper end portions 31 belonging to different pairs of rods 300 are hinged to the respective joint element 8 so that they can rotate relative to the latter and thus also relative to each other.

[0061] The upper end portions 31 rotate relative to the respective joint member 8 to switch the frame 2 between the seat and transport configuration.

[0062] Furthermore, as shown in Figures 1-5, the different pairs of rods 300 are connected to each other at

the lower end portions 30.

[0063] In detail, the lower end portions 30 of rods 3 belonging to different pairs of rods 300 are mutually connected two by two at a plurality of footholds A lying on a same standing plane A1.

[0064] Preferably, the chair 1 comprises a plurality of standing feet 7 adapted to be arranged on a surface standing area on which the chair 1 stands.

[0065] Each standing foot 7 is connected to the lower ends 30 of two rods 3 belonging to different pairs of rods 300.

[0066] In other words, the lower portions 30 belonging to different pairs of rods 3 are connected two by two to a respective standing foot 7 arranged at a foothold A.

[0067] Preferably, the lower end portions 30 belonging to different pairs of rods 300 are hinged to the respective standing foot 7 so as to be able to rotate relative to the latter and thus to each other. The lower end portions 30 rotate relative to the respective standing foot 7 to switch the frame 2 between the seat and transport configuration.

[0068] As shown in Figure 5, when frame 2 is in the seat configuration, the projection of the seat-supporting points S onto the standing plane A1 falls within an area defined by a polygon having the footholds A as vertices.

[0069] In other words, as shown in Figure 5, the lines perpendicular to the standing plane A1 passing through the seat-supporting points S intersect the standing plane A1 at a plurality of points Z arranged within the area defined by the polygon having footholds A as vertices.

[0070] Preferably, as shown in Figure 5, in the seat configuration the plurality of seat-supporting points S are arranged such to define vertices of a first rectangular parallelogram P1 in the seat plane S1.

[0071] In other words, the seat-supporting points S are four and, joining them two by two with first sides L1, defines the first rectangular parallelogram P1.

[0072] Furthermore, preferably, still with reference to Figure 5, in the seat configuration the plurality of footholds A are arranged such to define the vertices of a second rectangular parallelogram P2 in the standing plane A1.

[0073] Therefore, the footholds are four and, by joining them two by two with second sides L2, a second rectangular parallelogram P2 is defined.

[0074] From the foregoing, it can be inferred that when the frame 2 is in the seat configuration, the projection of the first parallelogram P1 onto the standing plane A1 is contained in the second parallelogram P2.

[0075] In a preferred embodiment, when the frame 2 is in the seat configuration, the second sides L2 of the second parallelogram P2 extend along a length of at least 15% greater than the length of the respective first sides L1 of the first parallelogram.

[0076] Therefore, the first and second parallelograms

$\frac{L2}{L1}$

PI, P2 are similar and the similarity ratio $\frac{L2}{L1}$ is greater than 1.15.

[0077] As shown in Figures 3 and 4, the chair 1 pref-

erably comprises a pair of pillars 4.

[0078] Each pillar 4 is connected to a respective foothold A and to a respective seat-supporting point S located at the rear part P of the chair 1.

[0079] It should be made explicit that each pillar 4 is therefore arranged in the part opposite to the front part F by means of which the user has access to the chair 1 for sitting.

[0080] Furthermore, each pillar 4 extends along a direction substantially perpendicular to the standing plane A1 from the respective foothold A to beyond the respective seat-supporting point S.

[0081] Each pillar 4 is therefore projecting from the seat plane S1 and preferably extends beyond the seat plane S1 by a length comparable to that of the user's trunk extension.

[0082] Preferably, the chair 1 object of the present invention comprises a backrest 5 adapted to support a user's back.

[0083] Even more preferably, the backrest 5 is made of textile material and is fixed to the pair of pillars 4 so as to define the back-supporting surface 5a as shown in Figure 1.

[0084] Such back-supporting surface 5a is arranged at the rear part P of the chair 1 and is substantially oriented transversally to the seat plane S1 when the frame 2 is in the seat configuration.

[0085] Preferably, the chair 1 comprises a seat 6 extending in the seat plane S and adapted to support a user. Such seat 6 being made of textile material and being fixed to the frame 2 at the plurality of seat-supporting points S, as shown in Figure 1.

[0086] Obviously, a person skilled in the art, for the purpose of satisfying contingent and specific requirements, can make several modifications and variants to the configurations described above, all therefore contained within the scope of protection as defined in the following claims.

Claims

1. Folding chair (1) comprising a frame (2) switchable between a seat configuration, wherein said chair (1) is adapted to offer support to a user, and a transport configuration wherein said chair (1) takes a smaller space if compared to the seat configuration; said frame (2) comprising a plurality of pairs of rods (300), wherein:

- each rod (3) has a lower end portion (30), an upper end portion (31); and a central portion (32) arranged between the lower and upper end portions (30, 31);
- the rods (3) of each pair of rods (300) are constrained in rotation at the respective central portions (32), the rods (3) of each pair of rods (300) by mutually rotating one relative to the other

switch the frame (2) between the seat configuration and the transport configuration;

- the upper end portions (31) of rods (3) belonging to different pairs of rods (300) are mutually connected two by two at a plurality of seat-supporting points (S) lying on a same seat plane (S1);

- the lower end portions (30) of rods (3) belonging to different pairs of rods (300) are mutually connected two by two at a plurality of footholds (A) lying on a same standing plane (A1);

- in the open configuration the projection of the seat-supporting points (S) on the standing plane (A1) falls within an area defined by a polygon having the footholds (A) as vertices **characterised in that:**

- the central portion (32) of each rod (3) extends mainly along a first direction (D1),

- the lower and upper end portions (30, 31) of each rod (3) extend respectively along a second (D2) and third direction (D3) transversal to the first direction (D1).

2. Chair (1) according to claim 1, wherein each rod (3) includes connecting portions (33) configured to connect the central portion (32) to the lower end portion (30) and the upper end portion (31).

3. Chair (1) according to claim 2, wherein the connecting portions (33) are arranged between the seat plane (S1) and the standing surface (A1).

4. Chair (1) according to any one of the preceding claims, wherein the second and third direction (D2, D3), along which the lower and upper end portions (30, 31) of each rod (3) extend, are transversal between each other.

5. Chair (1) according to any one of the preceding claims, wherein the rods (3) of each pair of rods (300) are geometrically identical to each other.

6. Chair (1) according to any one of the preceding claims, wherein when the frame (2) of the chair (1) is in the seat configuration:

- the plurality of seat-supporting points (S) are arranged so as to define the vertices of a first rectangular parallelogram (P1) in the seat plane (S1), the first parallelogram (P1) having first sides (L1);

- the plurality of footholds (A) are arranged so as to define the vertices of a second rectangular parallelogram (P2) in the standing plane (A1); the second parallelogram (P2) having second sides (L2).

7. Chair (1) according to the preceding claim, wherein when the frame (2) of the chair (1) is in the seat configuration the second sides (L2) of the second parallelogram (P2) extend for a length at least 15% greater than the length of the respective first sides (L1) of the first parallelogram (P1). 5
8. Chair (1) according to any one of the preceding claims, comprising a pair of pillars (4), wherein each pillar (4): 10
- is connected to a respective foothold (A) and to a respective seat-supporting point (S) placed in a rear part of the chair (1);
 - extends perpendicularly to the standing plane (A1) above the seat plane (S1). 15
9. Chair (1) according to the preceding claim, comprising a backrest (5) adapted to support a user's back, the backrest (5) being made of textile material and being fixed to the pair of pillars (4) so as to define a back-supporting surface (5a), said back-supporting surface (5a) being substantially oriented transversally to the seat plane (S1) when the frame (2) is in the seat configuration. 20
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10. Chair (1) according to any one of the preceding claims, comprising a seat (6) adapted to support a user, the seat (6) being made of a textile material and being fixed to the frame (2) at the plurality of seat-supporting points (S). 30
11. Chair (1) according to any one of the preceding claims, comprising a plurality of standing feet (7) adapted to be arranged on a surface standing area on which the chair (1) stands; each standing foot (7) being connected to the lower ends (30) of two rods (3) belonging to different pairs of rods (300) at a respective foothold (A). 35
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12. Chair (1) according to any one of the preceding claims, comprising a plurality of joint elements (8) each arranged at a respective seat-supporting point (S), each joint element (8) being connected to the upper ends (31) of two rods (3) belonging to different pairs of rods (300). 45

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Fig. 1

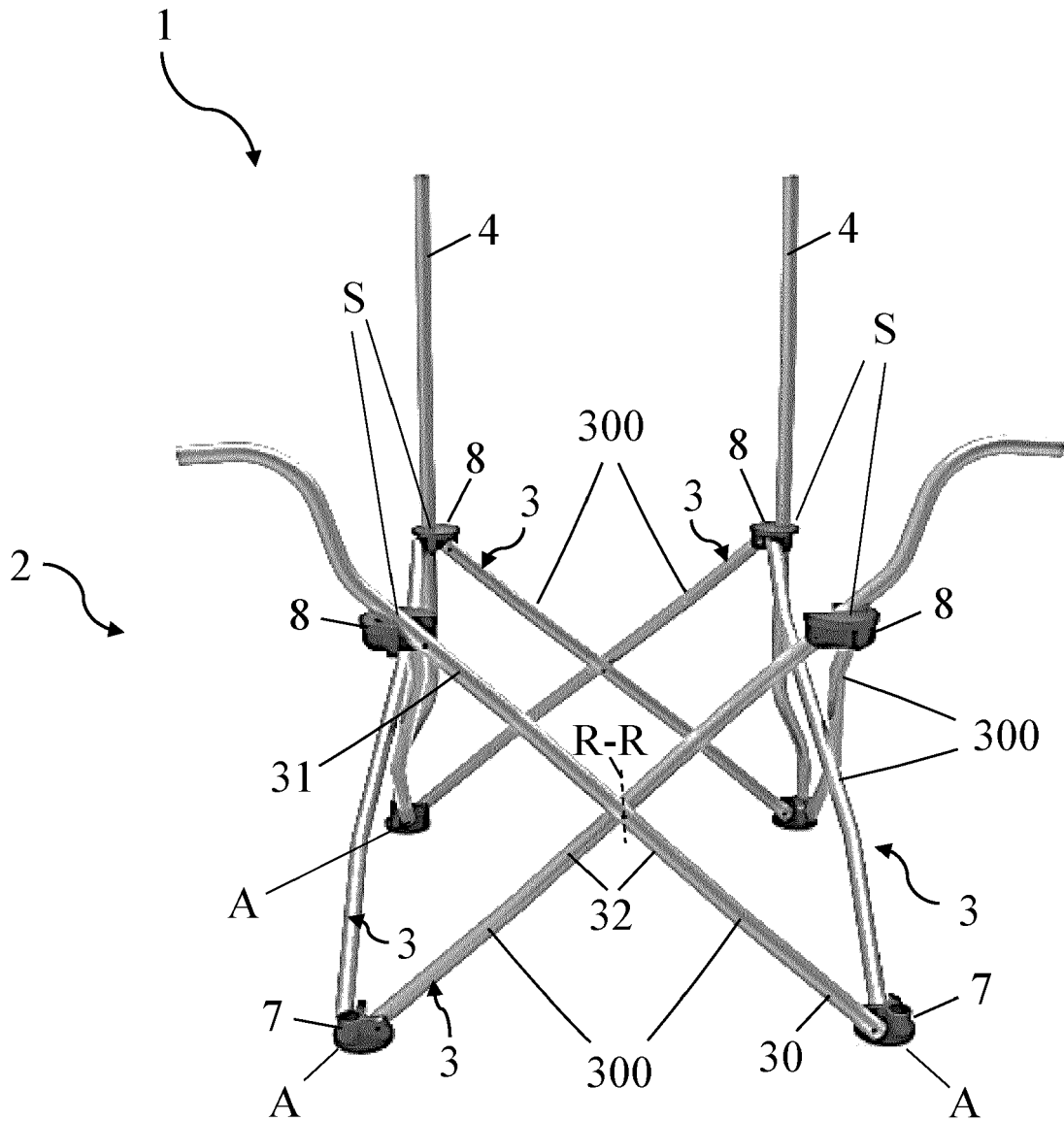


Fig. 2

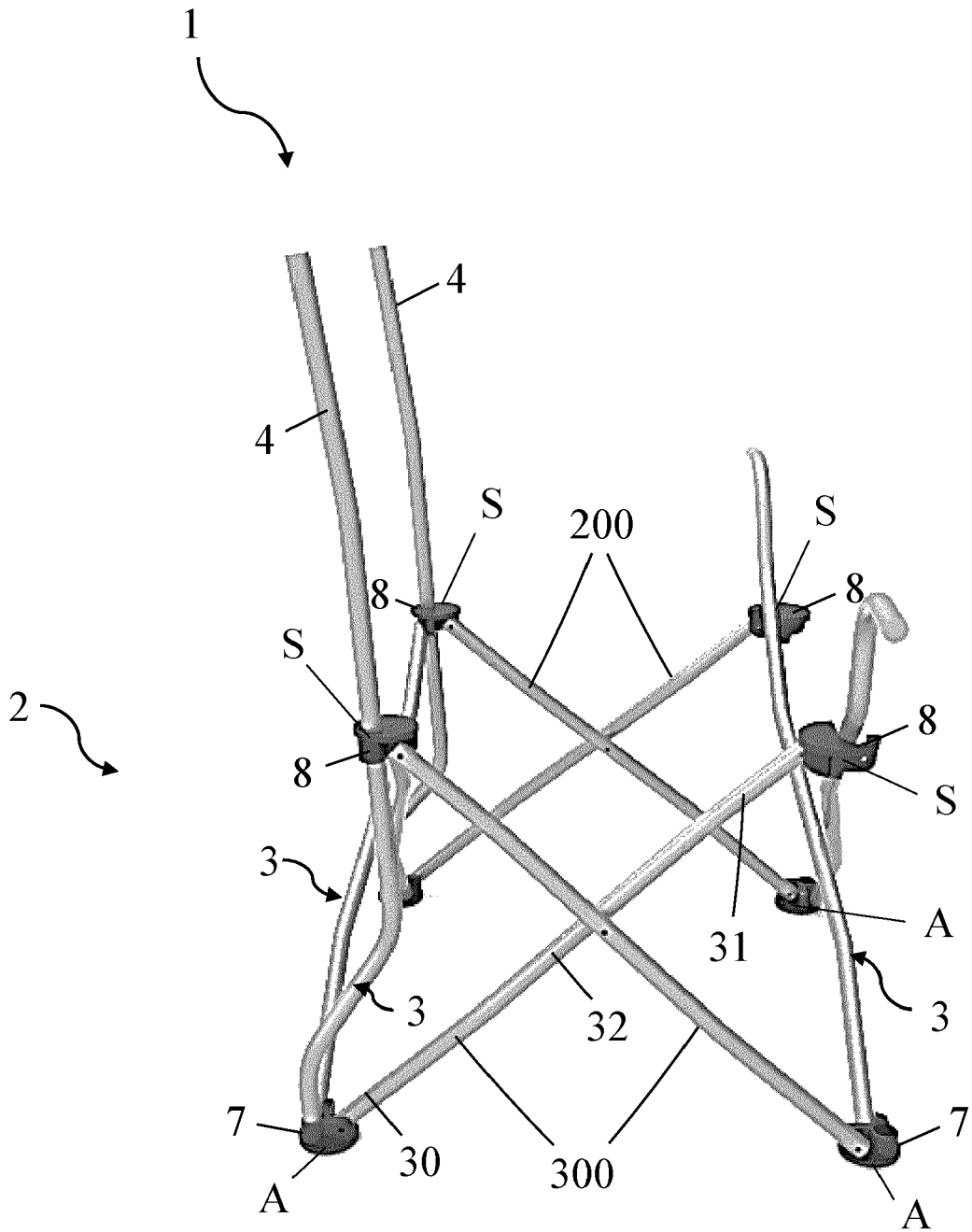


Fig. 3

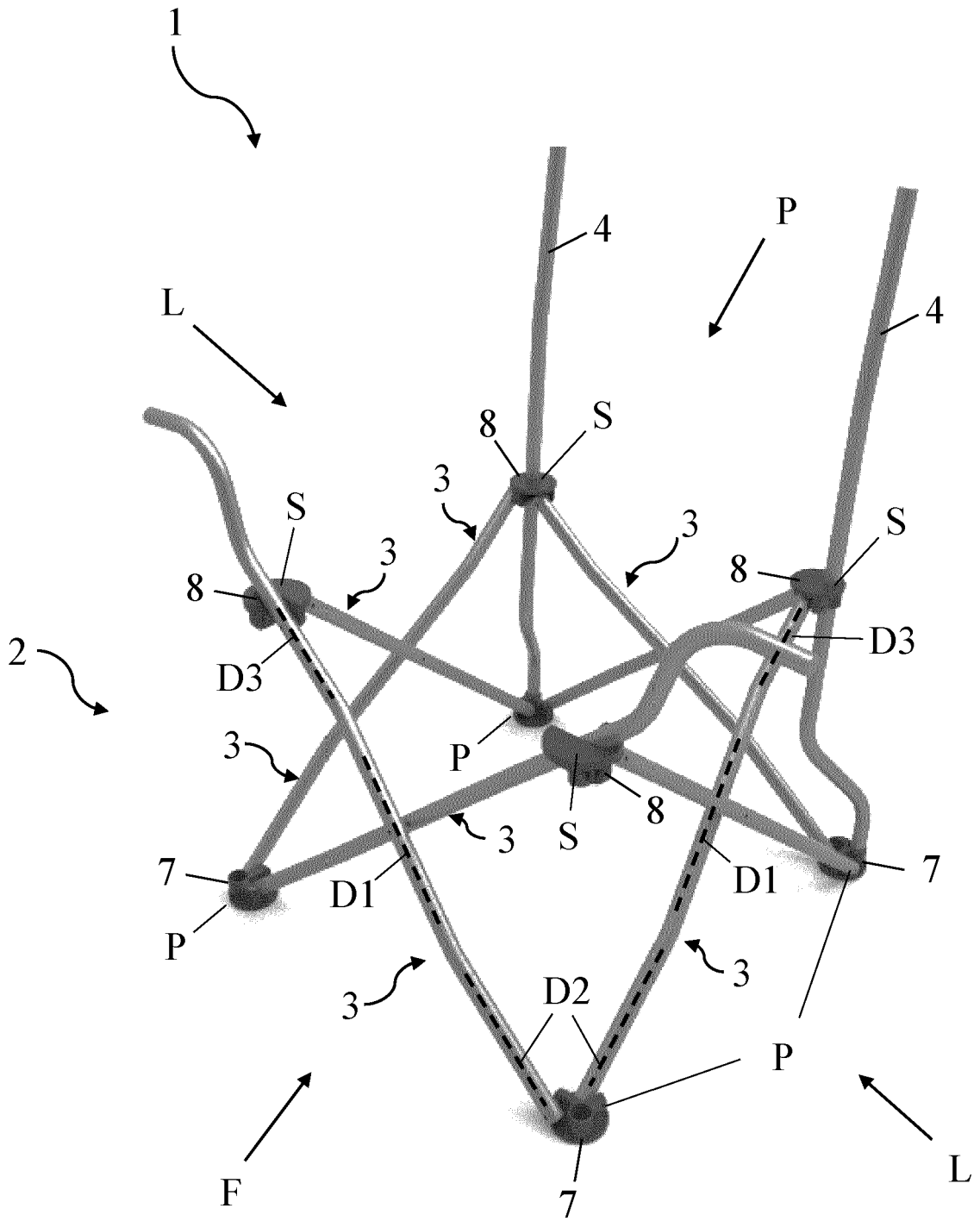


Fig. 4

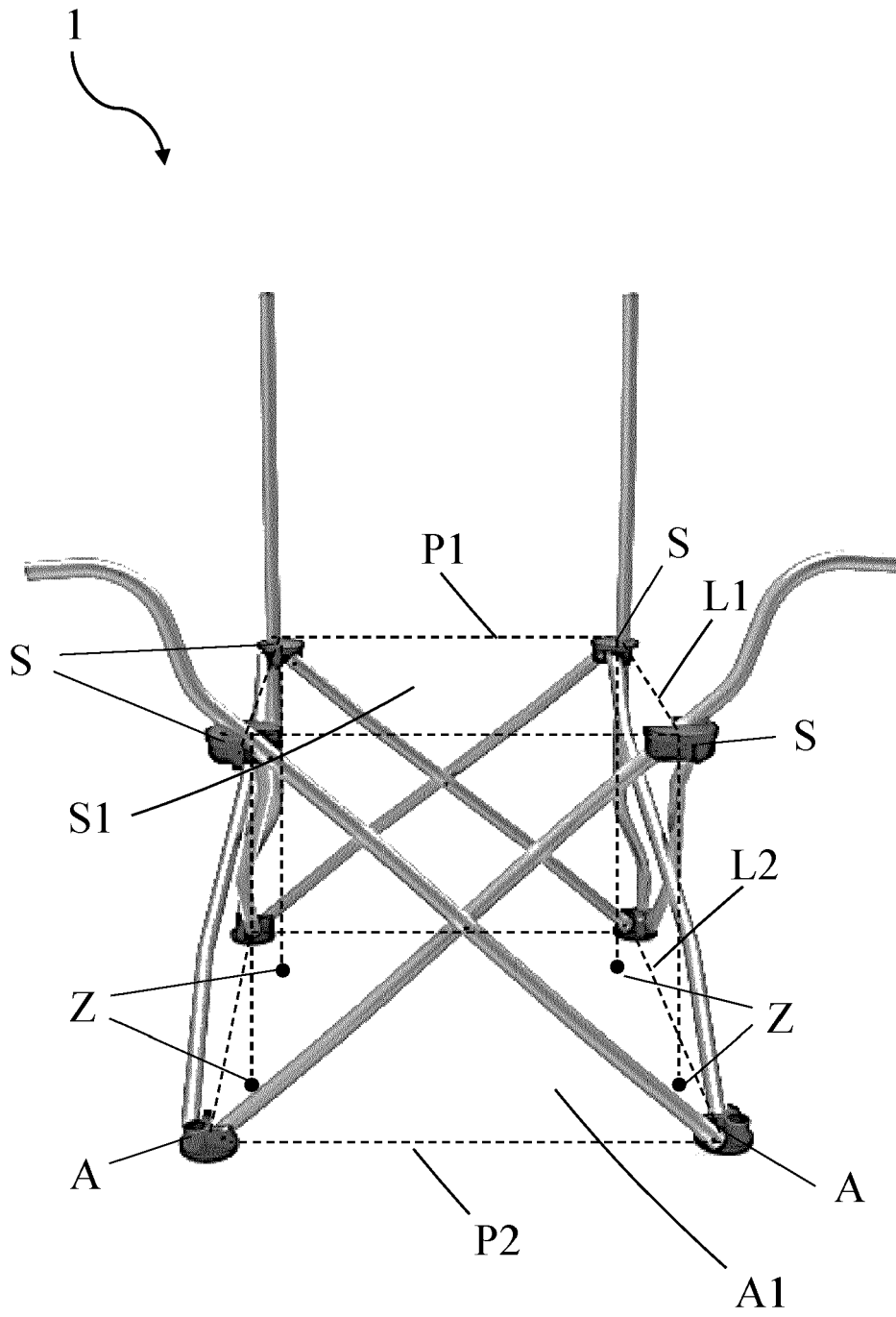


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 22 15 7473

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 8 303 032 B1 (PLATTA BRUCE K [US]) 6 November 2012 (2012-11-06) * column 2, paragraph 1; figures * -----	1-12	INV. A47C4/28
X,D	AU 2012 304 252 A1 (LEISURELIFE AUST PTY LTD) 17 April 2014 (2014-04-17) * figures * -----	1-12	
A	US 6 179 374 B1 (TANG LARRY [US]) 30 January 2001 (2001-01-30) * figures * -----	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 June 2022	Examiner Kis, Pál
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 22 15 7473

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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22-06-2022

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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REFERENCES CITED IN THE DESCRIPTION

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