

1,142,006.

Patented June 8, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

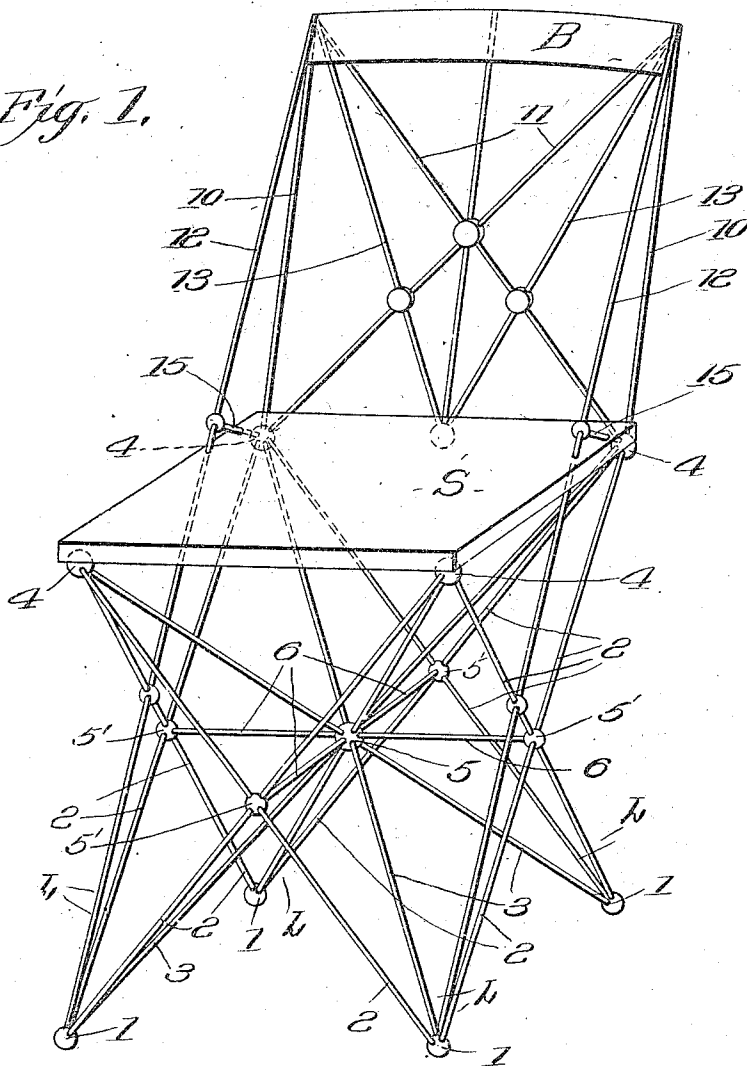
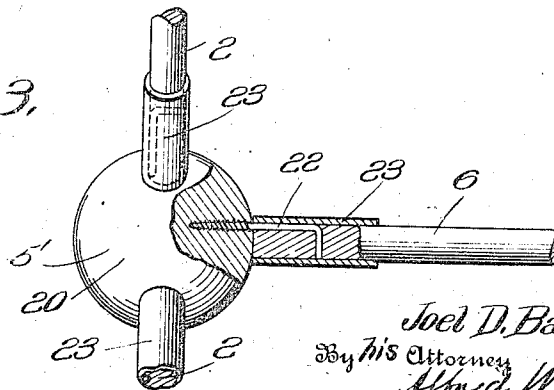


Fig. 3.

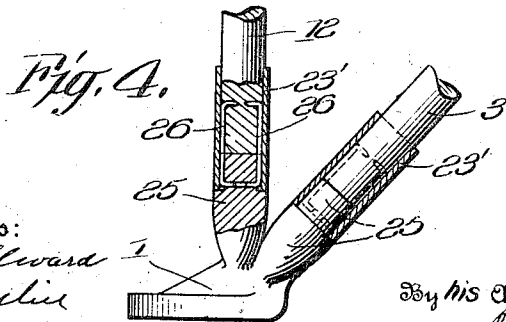
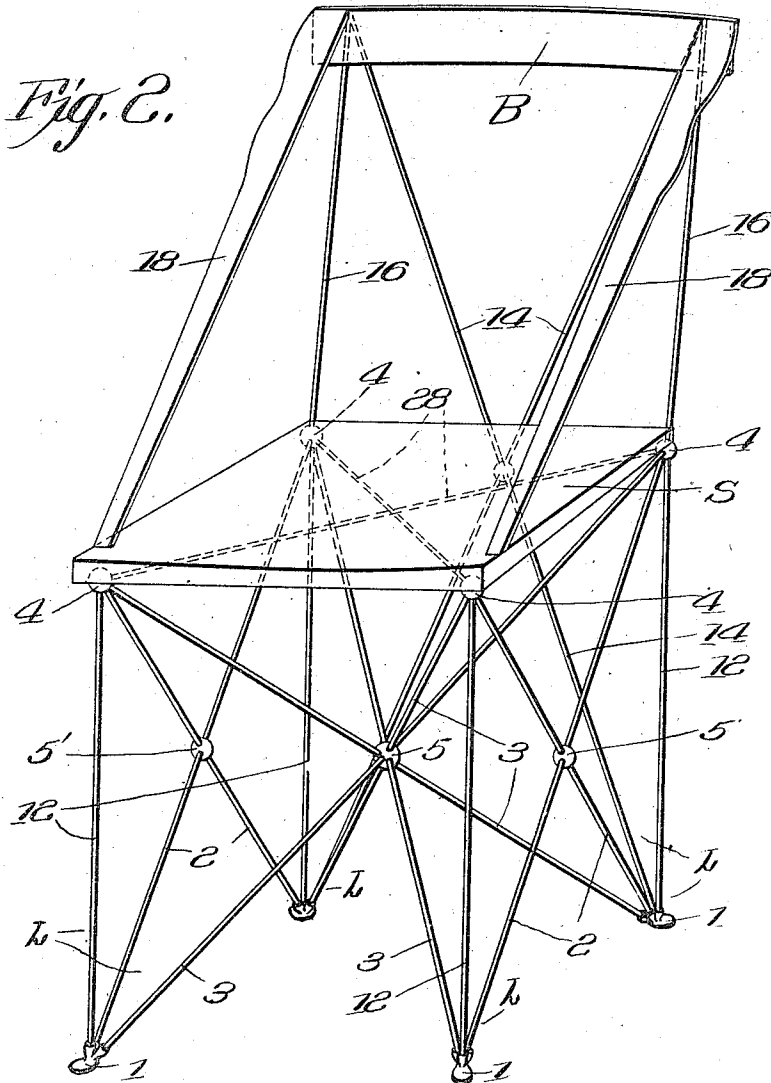


Witnesses:
 J. W. Millward
 M. L. Breslin

Inventor
 Joel D. Barber
 By his Attorney
 Alfred Wilkinson

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 2 SHEETS—SHEET 2.



Witnesses:
J. P. Millward
M. L. Brecht

Inventor
Joel D. Barber
 By his Attorney
Alfred Wilkinson

UNITED STATES PATENT OFFICE.

JOEL D. BARBER, OF NEW YORK, N. Y.

FURNITURE CONSTRUCTION.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOEL D. BARBER, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented new and useful Improvements in Furniture Construction, of which the following is a specification.

My invention relates to an improved construction for chairs and other articles of furniture wherein great strength and rigidity is obtained with the employment of the minimum amount of material. As a result there is most desirable lightness in the weight of the structure produced whereby the furniture so constructed may easily be moved from place to place as desired.

According to my invention the supporting legs are formed of a plurality of members arranged so that the stresses to which they are subjected are distributed throughout a number of the members and moreover the structure is such that the stresses are resisted by the members under longitudinal tension or compression. Thereby is insured maximum strength and rigidity.

In carrying out my improved construction I desirably form the supporting legs of three or more members converging at the bottom of the leg where they are attached to a suitable foot or bearing piece. The foot of the supporting leg is thus the apex of a skeleton frame of members converging from at least three different directions so that lateral thrusts as well as the downward thrust will be resisted by at least one of the members under tension or compression longitudinally or lengthwise of the member. Furthermore, in carrying out my improved principle of furniture construction I have arranged the members to intersect and be secured at different points to provide additional reinforcement and to coact with other of the members in forming additional supports, formed of members converging in the manner described.

In the accompanying drawing I have shown two of the possible embodiments of my invention wherein the reference characters of this description are applied to like parts in the several views.

Of the figures Figure 1 illustrates in perspective a chair constructed in accordance with my invention; Fig. 2 shows in perspective another chair construction typical of my invention; Fig. 3 illustrates, partially in section, a form of intersection of foot piece and

Fig. 4 illustrates partially in section a modified form of foot-piece and connecting member.

The supporting structure of furniture made in accordance with my invention may be of any suitable material such as wooden sticks or wire rods and of any desired cross-section. An approved material is rounded wooden sticks of about $\frac{3}{8}$ " diameter which I have found desirable for constructing chairs which are of very light weight and of ample strength.

The embodiment of my invention for chair construction shown in Fig. 1 comprises the usual seat S here shown of simple rectangular form resting upon the supporting structure of my invention. Primarily this supporting structure consists of the four supporting legs L terminating in the feet 1-1. These legs are here formed by the outer inclined member or sticks 2-2 which are crossed in a plane substantially parallel to the sides of the seat and the inwardly inclined sticks 3-3 extending in a vertical diagonal plane from each foot to the upper, most distant, corner of the seat. At the corners of the seat the sticks converge and are connected to spherical joint members 4 upon which the seat is directly supported. The inwardly inclined sticks 3-3 will be seen to cross centrally beneath the seat where they are connected by a suitable central joint, 5, desirably of the spherical type shown and later to be described. Thus each leg is formed of the oppositely inclined outer members or sticks 2-2 connected at diagonally opposite points of the seat and an inwardly inclined member 3 connected to the farther corner of the seat. So far considered, each leg virtually is formed of an inverted triangular pyramid with its apex as the foot. The supporting stresses are thus distributed through the several members of each leg and longitudinally thereof. This improved manner of support is carried still further by the crossing of the members so that they will likewise converge above (at the points 4) thereby to form upright pyramidal supports. The members thus are combined to produce double or reverse pyramidal supports intersecting one another. As here shown there are formed intersecting tetrahedral supports having their apexes both above and below and as their members are likewise intersected and connected there is an interaction between the tetrahedrons

whereby they brace each other. This inter-bracing is of great importance in obtaining the desired strength.

In the preferred embodiment of my invention as here disclosed I desirably arrange the points of support, both at the floor and at the top or seat, to be the apices of intersecting pyramids or tetrahedrons as here shown. Thus all of the feet are formed by the apices of skeleton tetrahedrons composed of three members extending diagonally upward from a common point on the floor to three points in the seat. One of the members of each leg, the member 3, is passed through a common center under the seat. In turn the points at the seat in this arrangement become the apices of other skeleton tetrahedrons with their members extending diagonally downward in a reverse manner to the lower points at the floor. Thus the members are combined to form a plurality of reversed tetrahedral supports one series having their apices in points at the floor with their bases in the seat and the second series having their apices in points at the seat with their base at the floor. An additional and important supporting strength is introduced by the intersection of the several members and their connection at the points of intersection. The intersection and connection of the inwardly inclined members 3 not only holds these members from deflective or bending movement but forms a double square base pyramidal skeleton support formed by the respective upper and lower halves of these members. The uppermost of the pyramids so formed is inverted with the seat S as its base and it is supported at its apex upon the apex of the lower pyramid. This arrangement affords a very strong support for the seat for the members forming these pyramids are of short length and consequently offer slight opportunity to deflection.

The ball joints 5' at the intersection of the outer leg members 2-2 may desirably be connected by the laterally arranged stays or trusses 6-6 to the central ball joint 5. Thereby these outer members 2-2 are held midway of their length against bending.

A further feature of the chair construction shown consists in the arrangement of the back B therefor. This back is formed of similar members to those of the legs and likewise, they are organized to support the back in a pyramidal manner. Thereby the members are arranged to resist the strains in the most effective manner.

As shown the back is formed by the vertical members 10 whose upper ends are at the apices of skeleton pyramids formed by the members 10 in conjunction with inclined back members 11 and forwardly inclined members 12 carried down as shown to the front feet of the chair. The members 12

will take in tension the main backwardly directed stresses produced by a person resting against the back so that there is no danger of deflection. Additional inclined non-crossing back-members 13 may also be provided for reinforcement and small stays 15 may be provided as shown.

A modified form of my invention wherein is retained the characteristic pyramidal manner of support is shown in Fig. 2. As there disclosed the central double pyramid support is present as in the arrangement of Fig. 1 but the supporting legs are somewhat differently formed. They are here composed of the crossed inclined members 2-2 at the two sides of the chair converging at the foot with the inwardly inclined members 3 and with the four vertical members 12 associated therewith to complete the pyramidal support. The rear legs thereof also comprise additional crossed back members 14. These last members extend upwardly for the support of the back B and coact with the vertical back-pieces 16 and the arm pieces 18 in providing the desired pyramid form of support therefor. The support thus provided will be effective properly to resist lateral pressure against the back from any direction.

Desirably similarly constructed joints are provided at the different points of intersection of the members. I have shown an efficient joint which is illustrated in Fig. 3. A suitable wooden block or ball 20 is employed as a connecting element and to it are attached the ends of the members or sticks and where intersected the sticks are desirably divided to form butt joints with the ball 20. The ends of the sticks are secured to the balls by means of the screws 22 having the ends of their shanks bent at right angles and fitted to apertures in the sticks. Desirably the screw-shanks are countersunk in the sticks and surrounding the sticks metallic ferrules or securing collars 23 are arranged to slide over the screw-shanks when properly inserted. The sticks and screws are thereby held in securing relation and an efficient joint is produced. In the illustration of Fig. 1 these ball connectors are likewise employed as the bearing feet 1.

In Fig. 4 is shown a modified form of foot piece 1 which may be a suitable casting of brass or other material. In the construction shown integral shoulders or protuberances 25 are formed thereon having reduced ends.

The sticks are secured in abutting relation to the reduced ends as shown by means of suitable clips 26. The clips are inserted in apertures in the shoulders and have their ends bent into clamping engagement with the sticks. Securing collars or ferrules 23' are fitted to the reduced ends of the shoulders 25 to inclose the end of the stick and

the clips whereby the clips are secured from withdrawal. The ferrule likewise provides lateral strength to the joint.

As here shown the seat S is rectangular and rigid so that it forms a connection between the upper ends of the various members whereby they are held rigid. As will readily be understood the joints 4 may be otherwise connected to accommodate for the employment of a flexible seat,—for instance connecting sticks may be provided to form a rectangular frame, or, as shown by dotted lines in Fig. 2, diagonally arranged connecting sticks 28 may be connected to the joints 4.

Having described my invention I claim,—

1. An article of furniture having its supports composed of a plurality of members associated to form skeleton structures of pyramidal form each having its vertex substantially at the base or foot of the support.

2. An article of furniture having a plurality of supports said supports comprising a plurality of members associated to form skeleton supporting structures of pyramidal form each with vertices both at the top and bottom of the structure.

3. An article of furniture having a plurality of supports each comprising a plurality of members associated to form skeleton supporting structures of pyramidal form, said pyramidal supports being in intersecting arrangement whereby they interact to brace each other.

4. An article of furniture having legs arranged each to comprise a plurality of members associated to form skeleton pyramidal supports, said members being in intersecting arrangement whereby they interact to brace each other against deflective movement.

5. An article of furniture having supports composed of a plurality of members associated to form a series of upright and reversed skeleton tetrahedrons in intersecting arrangement whereby they interact to brace each other.

6. An article of furniture having supports composed of a plurality of members associated to form a series of upright and reversed skeleton pyramids in intersecting

arrangement whereby they interact to brace each other.

7. An article of furniture having for its points of support both at the floor and at the seat the apices of intersecting pyramidal skeleton supports formed of members converging at said points of support.

8. In a chair, a suitable seat, leg supports therefor each comprising a plurality of members associated to form skeleton supporting structures of pyramidal form, said pyramidal supports being in intersecting arrangement whereby they interact to brace each other and a suitable back having its supporting members in pyramidal arrangement.

9. An article of furniture, comprising a seat or top, and a series of supporting members downwardly extending therefrom in a diagonal direction and bisecting each other at a point beneath the center of the top, the lower portions of said members being arranged to form the outline of a pyramid and the upper portions of an inverted pyramid.

10. A chair comprising a seat, a series of inclined supporting members in compression downwardly extending from the seat and bisecting each other at a point beneath the center of the seat, other inclined supporting members downwardly extending from the seat, in compression, and bisecting each other beneath the sides of the seat, and tension members extending between said compression members, the lower portions of said first series being arranged to form the outline of a pyramid and the upper portions of an inverted pyramid.

11. An article of furniture having its points of support both at the floor and at the top thereof the apices of pyramidal skeleton structures formed of members converging at said points of support.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOEL D. BARBER.

Witnesses:

J. R. MILLWARD,
M. L. BRESLIN.