

March 31, 1936.

W. McARTHUR, JR

2,035,489

FURNITURE

Filed March 5, 1934

2 Sheets-Sheet 1

Fig. 1.

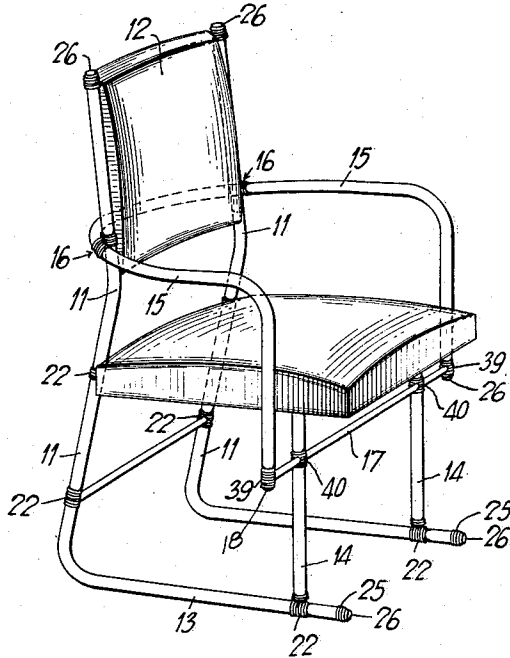


Fig. 2.

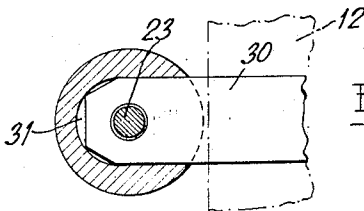
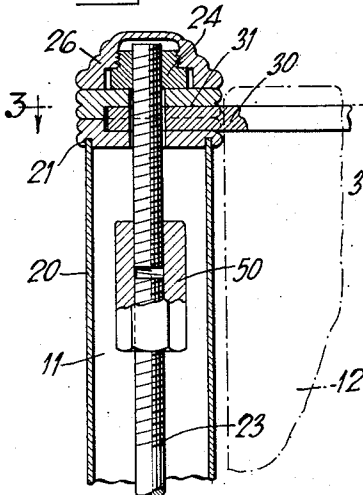


Fig. 4.

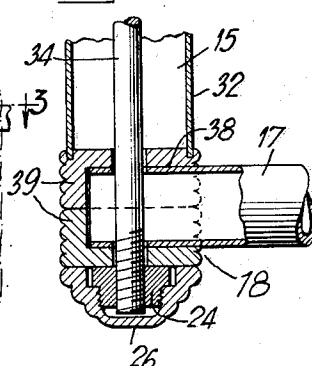


Fig. 6.

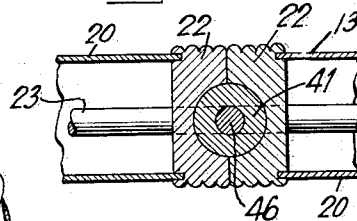
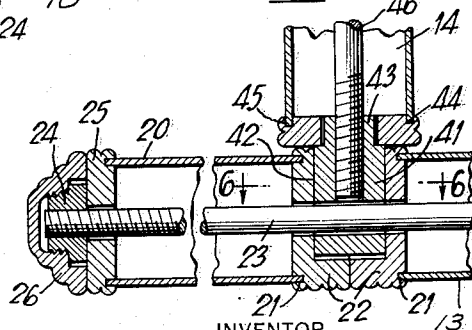


Fig. 5.



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2 Sheets-Sheet 2

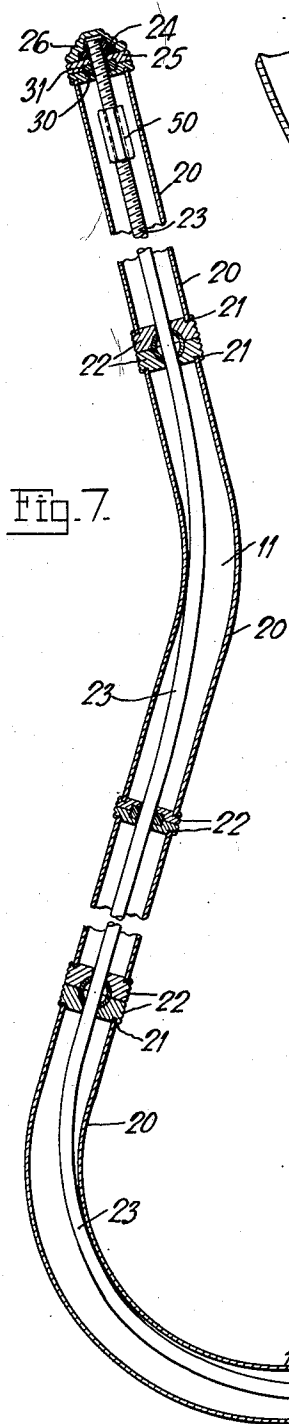


Fig. 7.

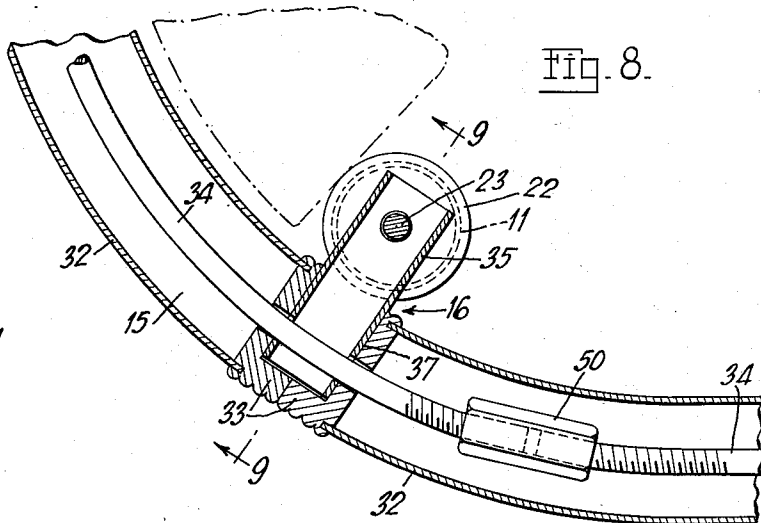


Fig. 8.

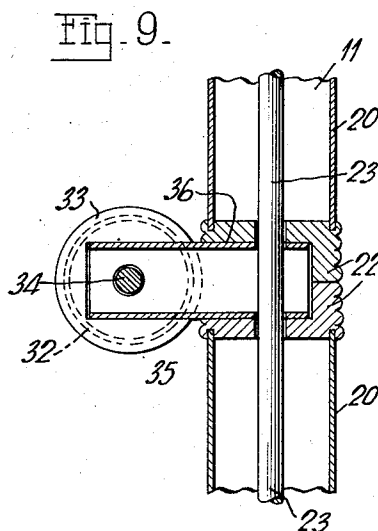
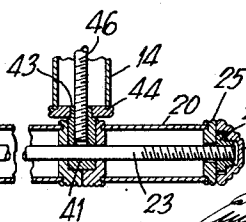


Fig. 9.



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2,035,489

FURNITURE

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Application March 5, 1934, Serial No. 713,960

9 Claims. (Cl. 155—194)

This invention relates to metal furniture and an object is to provide furniture of this type of such construction and arrangement as will permit the use of standard parts in the manufacture thereof to produce pieces having substantially any desired design or shape without requiring the use of any special dies, tools or the like.

A further object is to provide a frame member for metal furniture of such construction as to permit the use of such material as tubular aluminum to form frame members of sufficient strength.

These and other objects which will be apparent to those skilled in this particular art are accomplished by the invention hereinafter described and illustrated in the accompanying drawings in which,

Fig. 1 is a perspective view of a chair illustrative of one embodiment of this invention. It will, however, be apparent from the following description that the invention is equally adapted to other articles of furniture and to other forms of chairs.

Fig. 2 is a sectional view of a frame member illustrating one form of connection between such member and a solid cross member.

Fig. 3 is a sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view showing one form of connection between a tubular frame member and a hollow cross member.

Fig. 5 is a transverse sectional view of a joint between intersecting tubular frame members of substantially the same diameter and each of which is provided with inner strengthening rods.

Fig. 6 is a sectional view on the line 6—6 of Fig. 5.

Fig. 7 is a sectional view, partially broken away, of a curved tubular frame member showing the cooperative relationship between the tubular member and the inner strengthening and supporting rod.

Fig. 8 is a sectional view illustrating a joint between non-intersecting tubular frame members which cross each other, and

Fig. 9 is a sectional view on the line 9—9 of Fig. 8.

The embodiment of the invention shown in the drawings is a typical illustration of my development of curved frame members formed of tubular material such, for example, as aluminum, which alone would be unsuitable for such use, particularly in curved members, but which, when combined with inner strengthening and supporting members, such as inner rods, arranged in the

manner hereinafter set forth, forms a rugged, durable article. The invention also comprises the joining of such frame members together and to other frame and cross members.

The chair illustrated comprises a pair of elongated tubular frame members 11 which are shaped to form uprights for supporting the back 12 of the chair. They also extend downwardly and form the rear legs of the chair and are then curved forwardly to form horizontal sections 13 which support the entire chair and are connected to the front legs 14 by joints of the type hereinafter described.

A second frame member 15 is curved to form arms which extend around the back of the seat, being connected to the upright frame members 11 by joints 16 as hereinafter described, and connected adjacent each end to a front rung 17 by joints 18, the rung itself intersecting the legs 14. Each frame member whether curved as in the case of members 11 and 15 or straight as in the case of front legs 14 is composed of a plurality of tubular sections or elements having intermediate washers between their adjacent ends for holding such ends in alignment. The washers and elements are strung upon a supporting rod on which they are clamped under considerable pressure so that the inner rod is placed under tension and the assembly is held rigidly together.

For example, the frame member 11 comprises a plurality of tubular sections or elements 20 which are held in alignment by having their ends located in annular grooves 21 formed in pairs of intermediate washers 22. The washers and elements are strung on an inner supporting and clamping rod 23, the apertures in the washer through which the rod extends being of a size to snugly fit thereon. The ends of the rods are threaded and clamping nuts 24 which bear against end washers 25 are drawn up so tightly as to place the tubular elements and intermediate washers under compression and the inner rod 23 under considerable tension. Preferably, the clamping nuts are covered with suitable ornamental cups 26 threaded thereon, though, obviously, the ends may be finished off in any desired manner. By placing the inner rod 23 under considerable tension it is drawn into contact with the inner faces of the tubular members 20 at the points of curvature with a supporting pressure, as best shown in Fig. 7. This results in greatly increasing the rigidity and strength of the assembly and permits the use of relatively weak tubing material, such as aluminum, in making curved frame members which

are called upon to resist considerable stress. At the points between adjacent tubular members where the rod passes through the intermediate washers, the rod is centered in the tubular elements. The grooves 21 in the washers not only conceal any rough ends on the tubular elements but also hold the tubing against any tendency to be sprung out of place and deformed by the clamping force.

While the tubular section can be arranged in any desired manner and the intermediate washers located wherever desired, it will be found most advantageous to locate the washers wherever a joint occurs between, for example, the frame member 11 and associated frame members or the like. In the illustrated embodiment, a solid cross member 30 connects the upper ends of the frame members 11 and forms a support for the back 12. The washers at the upper ends of the frame members are so shaped as to provide a recess 31 for receiving the ends of the cross member 30 and the latter is pierced by the end of the inner rod 23. The parts are dimensioned so as to result in a close fit and it will be apparent that when assembled a rigid joint is formed between the frame member 11 and solid cross member 30.

The joint 16, best shown in Fig. 8, illustrates the connection between pairs of hollow frame members each having inner strengthening rods, when such members cross without actually intersecting. The frame member 15 is made up of an assembly of tubular sections 32, intermediate washers 33 and inner rod 34 similar to the elements in the member 11. In this joint the frame members are connected together by directly uniting the inner strengthening rods 23 and 34. This is done by a hollow connector tube 35 which has one end located in a recess 36 formed between intermediate washers 22 on the frame member 11, wherein it is pierced by the inner strengthening rod 23, and the other end located in a similar recess 37 in the intermediate washers 36, which end is pierced by the inner rod 34. The parts are so proportioned as to provide a snug fit. The connector 35 may be solid if desired.

The type of connection between a hollow frame member with an inner rod and a hollow cross member is shown in joint 18 illustrated in Fig. 4, which shows the manner of connecting the end of the rung 17 to the lower end of the frame member 15. In this case, the end of the rung is located in a recess 38 formed in the adjacent faces of washers 39 and the end is pierced by the inner rod 34 of the frame member 15. The joint between the front leg 14 and the rung 17 is similar to the joint shown in Fig. 4 except that the rung 17 runs entirely through the associated washers 40.

Still another type of joint, in this case one between tubular frame members which intersect, and each of which has an inner strengthening rod, such as occurs in the joint between the lower ends of the front legs 14 and the supporting forwardly projecting sections 13, is illustrated in Fig. 5. In a joint of this type a connector 41 is located in a pocket or recess 42 formed between the washers 22 on one of the frame members. The connector is pierced by the inner rod 23. The projecting end 43 of the connector is illustrated as reduced in diameter and adapted to receive an end washer 44 having a groove 45 for receiving the lower end of the tubular leg 14. The inner strengthening rod 46 of the leg 14

is threaded to the connector 41 and the parts are drawn up tightly to form a rigid joint. In this way the inner rods of the frame members are connected directly together and a strong rigid assembly is provided.

The inner strengthening rods may be formed in any convenient manner. They may be formed in one piece or they may be made up in different sections the adjacent ends of which are threaded and connected by a threaded connector 50, as shown in Figs. 2, 7 and 8.

It will be apparent that the present invention provides a construction permitting the use of standard parts to manufacture a piece of furniture having substantially any desired design or shape without requiring any special dies, tools or the like, merely by mechanically shaping and arranging the frame members in the desired manner. The invention may, of course, be variously adapted and modified within the scope of the appended claims.

I claim:

1. The combination with a rigid curved hollow frame member of an inner reinforcing member, smaller than the inside of the frame member, and means for tensioning said reinforcing member so as to clamp it against the inner face of said frame member with a supporting pressure at the place of curvature.

2. The combination with a curved hollow frame member of an inner reinforcing member, smaller than the inside of the frame member, formed of a plurality of separate sections, connectors uniting said sections to form a continuous reinforcing member, and means for tensioning said reinforcing member within said frame member so as to draw said reinforcing member into engagement with the inner face of said frame member with a supporting pressure at the place of curvature.

3. An article of manufacture comprising a hollow curved frame member formed by a plurality of tubular elements placed in alignment and including a curved tubular element, an inner rod of smaller diameter than the inside of said frame member extending through said elements, means for clamping said elements together on said rod with sufficient force to draw said rod against the inner face of said curved element with a supporting pressure at the places of curvature, and means located between adjacent tubular elements for centering said rod within said frame member at the joints between adjacent elements.

4. The combination in an article of furniture of a rigid hollow curved frame member formed by a plurality of tubular elements placed in alignment, a strengthening rod of smaller diameter than the inside of said frame member extending substantially throughout the length of said frame member, means for pressing said tubular elements together and for tensioning said rod therein so as to draw said rod into contact with the inner face of said frame member with a supporting pressure at the point of curvature.

5. An article of manufacture comprising in combination, a curved hollow frame member including separate tubular elements, intermediate washers located between said elements, a curved inner rod of smaller diameter than the inside of said frame member extending through substantially the entire length of said frame member and through said washers, means for clamping said elements and said washers together on said rod and for placing said rod under tension so as to

draw said rod against the inner face of said curved member with a supporting pressure, and means on said washers for holding the ends of said elements against lateral displacement.

5 6. The combination in an article of furniture of separate hollow frame members having intersecting axes and formed of separate tubular sections secured together in alinement, a strengthening rod within each of said frame members and of less diameter than the inside of said
10 members extending substantially throughout the length thereof, and means for connecting the rods of said separate members together comprising a connector extending into and pierced by the
15 rod in one of said tubular members, and threaded to the rod in the intersecting tubular member, and means for supporting the adjacent end of said intersecting tubular member for holding it in position.

20 7. The combination in an article of furniture of separate hollow frame members having their axes arranged on intersecting lines, each member being formed of separate tubular sections placed in alinement, intermediate washers positioned between adjacent sections of one of said
25 members and formed to hold said sections in position and to provide a lateral recess in said member, a strengthening rod in each of said members, one of said rods extending through said recess and a connector located in said recess,
30 pierced by the rod extending through said recess, and a threaded connection between said

connector and the rod in said intersecting member.

8. The combination is an article of furniture provided with separate hollow frame members having axes arranged on intersecting lines, each
5 member being formed of separate tubular sections placed in alinement, of intermediate washers positioned between adjacent sections of one of said members and formed to provide a lateral recess
10 therebetween, an inner rod in each of said members, a connector located in said recess, pierced by the rod extending through said recess and having a threaded connection with the rod in said
15 intersecting member, and means supporting the end of said intersecting tubular member for holding it in position.

9. The combination in an article of furniture provided with separate hollow frame members having axes arranged on intersecting lines, each
20 member being formed of separate tubular sections placed in alinement, of intermediate washers positioned between adjacent sections of one of said members and formed to provide a lateral recess
25 therebetween, an inner rod in each of said members, a connector located in said recess, pierced by the rod extending through said recess and having a threaded connection with the rod
30 in said intersecting member, and means mounted on said connector and supporting the end of said intersecting tubular member for holding it in position.

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