Jan. 1, 1952 N. R. UNDERHILL 2,580,707

CHAIR OF KNOCKDOWN TYPE

Filed Sept. 16, 1949

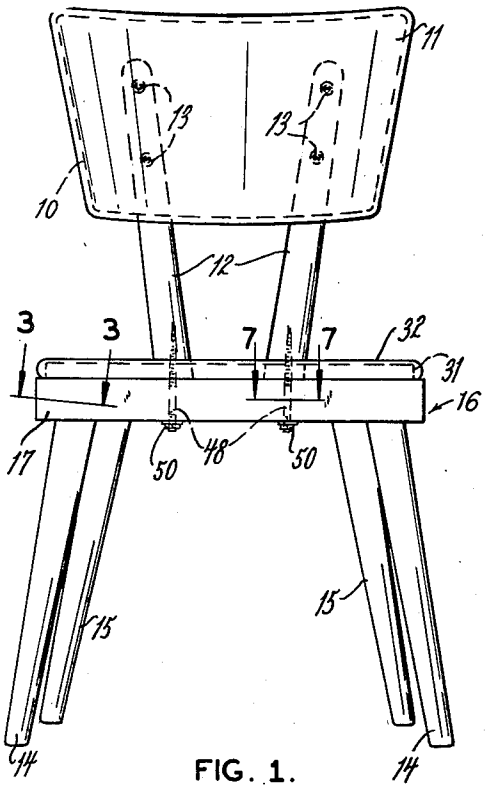


FIG. 1.

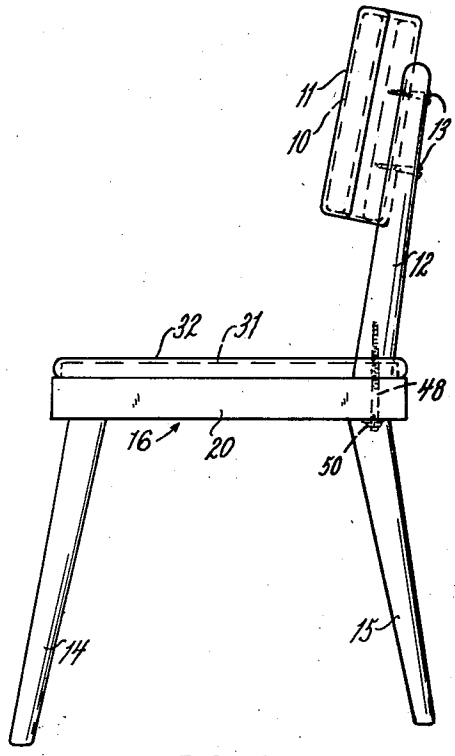


FIG. 2.

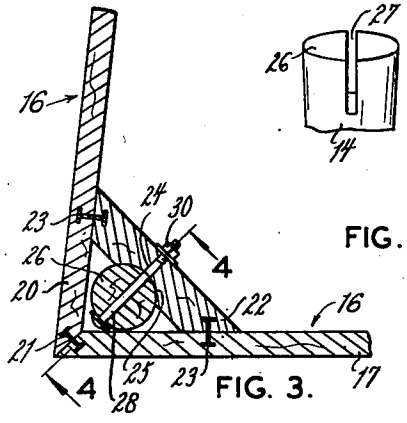


FIG. 3.

FIG. 9.

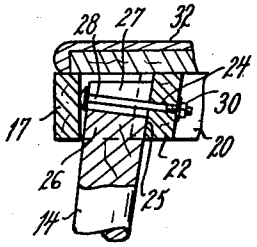


FIG. 4.

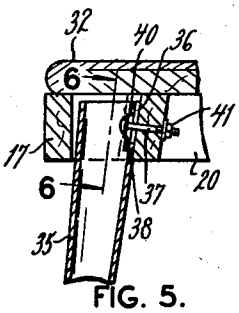


FIG. 5.

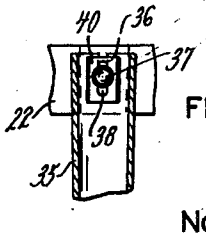


FIG. 6.

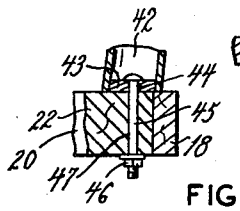


FIG. 8.

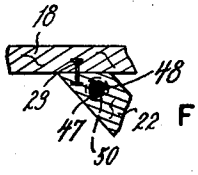


FIG. 7.

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Patented Jan. 1, 1952

2,580,707

UNITED STATES PATENT OFFICE

2,580,707

CHAIR OF KNOCKDOWN TYPE

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Application September 16, 1949, Serial No. 116,103

9 Claims. (Cl. 155—196)

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This invention relates to improvements in chairs of knock-down type, and more particularly to an improved grouping of the elements of various chair subassemblies, together with improved fastening and assembly provisions of marked utility in chairs of knock-down construction, such as conduce to savings in packing, storage and shipment, and which in assembly, make for a chair of unusually rigid and rugged construction.

A number of attempts have heretofore been made toward the design of knock-down furniture units, such as chairs, but in most if not all such cases, such earlier designs have failed to result in fully satisfactory chairs of knock-down type, particularly in the field of dining, dinette and like chairs for interior usage. The earlier provisions for realizing a satisfactory knock-down chair have been realized only at a sacrifice of best appearance, requisite rigidity, or both, and in some cases require an inordinate period of time and degree of skill for erection and disassembly. It is accordingly a principal object of the present improvements to realize a chair of knock-down construction which possesses in an optimum degree, the characteristics of rigidity, good appearance, which may be upholstered as desired, and exhibits all other characteristics of chairs of types which are permanently assembled at the time and place of original production.

The present invention may be summarized by making general reference to a presently preferred embodiment as comprising a back panel including a back proper and supporting or mounting posts as a part thereof; a seat panel comprised of a generally rectangular frame with internal bracing elements, together with a seat element, preferably upholstered and carried by the frame, and forming a part of the seat panel as a whole, together with the chair legs, usually four in number. The assembly very importantly includes a novel arrangement of assembly hardware items through which the aforesaid subassemblies may be quickly and easily, and without especial skill, be assembled and disassembled. The certainty of erection and assembly expedients is such that the average domestic purchaser-user, is enabled, in a few minutes time, to erect the chair by attachment of the subassemblies to each other in a manner to result in a chair of a rigidity at least equal and comparable to factory-produced chairs of conventional, permanently assembled types.

A further and important objective is realized in a knock-down chair construction comprising a back panel and a seat panel together with the legs, and in which the seat and back panels may

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be upholstered as desired, and yet may be assembled after purchase and without disturbing the upholstery, entirely by easily manipulable elements introduced beneath the seat panel in such manner as not to interfere with the upholstery of the major subassemblies.

The foregoing and many objects and advantages will more clearly appear from the following detailed description of certain alternate embodiments, particularly when considered in connection with the accompanying drawing, in which:

Fig. 1 is a front elevational view of a chair embodying the present improvements;

Fig. 2 is a side elevational view of the chair of Fig. 1;

Fig. 3 is a fragmentary view in a substantially horizontal plane, somewhat enlarged, of a corner portion of the seat frame, particularly as viewed along line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view in a vertical plane, as taken along line 4—4 of Fig. 3;

Fig. 5 is a sectional view showing an alternate form of leg-seat connection, this view corresponding in location to Fig. 4;

Fig. 6 is a fragmentary sectional view taken along line 6—6 of Fig. 5;

Fig. 7 is a fragmentary horizontal sectional view taken along line 7—7 of Fig. 1;

Fig. 8 is a fragmentary sectional view in a vertical plane, showing a somewhat modified form of attachment of the chair back posts to the seat panel, and

Fig. 9 is a fragmentary elevational view showing a slotted construction of the upper end of a chair leg of solid form.

Proceeding now to describe the elements and assembly thereof going to make up the several minor assemblies of the chair prior to erection, it is first noted that the back proper of the chair consists of a curved back rest element 10 which is conveniently formed of wood, plywood or other reasonably rigid material susceptible of being shaped as by imparting thereto by conventional or other methods, a curvature best shown by Fig. 2, which is seen to be concave on the forward face of the back, and similarly convex on the rearmost face of the back. The base element 10 of the back is upholstered in any suitable manner, for example, by a tacked or otherwise applied covering 11. The back proper is attached to the substantially vertical posts or back supports 12, a pair of which are shown, which may be supplied in any desired number according to the styling of the chair and other requirements. The two posts 12 may be formed of turned, tapered wood

elements, and suitably secured as by screws 13 extending through the posts 12, into the rigid back element 10. The manner of assembly of the back panel in the chair, such panel being regarded as comprising the back proper and the posts 12, will be hereinafter described.

The legs of the chair in the form shown by Fig. 1 consist, but without limitation as to materials, of turned lengths of a clear grain wood, the front legs of the chair being indicated at 14 and the two rear legs indicated at 15. The legs collectively may be considered as one of the subassemblies, although individually attached to the seat panel as will later herein appear.

The seat panel, generally indicated at 16, is preferably formed of a somewhat rectangular frame comprising a front rail member 17, a rear rail 18 and a pair of side elements each indicated at 20. The corners of the four frame pieces last referred to are carefully mitered, and are secured together at their mitered corners as by clamp nails 21.

Preferably spaced somewhat inwardly of the true corners of the substantially rectangular frame of the chair, and yet located in the corner regions, is a series of corner braces 22 each of which is disposed at about a right angle to a diagonal of the seat frame, each of the corner braces 22 being carefully miter cut so as to bridge the corner region at an angle of about 45 degrees, each of the ends of each such corner brace being assembled to the side and front or rear rails as the case may be, as by clamp nails 23 which are or may be identical with those utilized for corner attachment. The arrangement of corner braces 22 is, as shown, such as to leave a small triangular opening between each brace and the mating ends of the rails of the chair frame, in each corner region.

Intermediate the length of each of the braces 22 is a horizontal bore or bolt passage, these openings being indicated at 24. These openings, assuming only for purposes of present discussion that the frame of the chair panel be substantially rectangular, lie along diagonals of the frame. As will appear, each of the bores 24 serves for the reception of one of the leg attachment bolts to be described. At the outermost end of each of the bores 24 is a concave recess 25 forming a seat for snug lateral abutment by a side portion of the upper end of one of the chair legs, as will appear.

Referring further to certain of the features of construction of the chair legs, and assuming for the present, but without limitation that these be formed of wood, each of the legs, such as 14 for example, is or may be turned so as to present a unit of circular transverse section, but of an increasing diameter from its lower toward its upper end. The uppermost end portion of each of the solid legs such as 14 is of a cross section conforming to the recess 25, the head or top of the leg being indicated at 26. Diametrally or transversely of the portion 26 is a transverse top-open slot 27 of substantial depth for the reception of an attachment bolt 28, which bolt as will now clearly appear, extends at substantially a right angle to the axis of the leg and transversely of the corner brace by which it is carried. As will now appear, each bolt is of a diameter so as to extend snugly through the bore of the corner brace and the slot, and is of a length fully to traverse the corner brace and to project therefrom to an extent somewhat greater than the length of the adjacent slot 24 in the leg, whereby to permit the application to the end of the bolt, of a nut 30.

It will now have appeared that the described construction of seat panel and hardware items for assembly thereof to the legs of the chair, permits full factory upholstery of the seat panel. Overlying the substantially restangular frame of the seat panel, is a seat proper indicated at 31, which may be overlain with a desired depth of a resilient batting or other cushioning material over which is applied and suitably secured the upholstery fabric as shown at 32. The upholstery finishing material 32 may be confined to the rigid seat element per se, or if desired, may as is usually preferred, extend over the rails of the substantially rectangular seat frame, and be attached to the lower face or edge areas of the rail members. It will now have appeared that so long as the bottom of the chair panel is left open or in any event is easy of access, the legs 14 or 15 together with the bolts 28 may be readily removed from and as readily reapplied to the seat panel incident to erection or dismantling of the chair.

Certain minor modifications of the structure as described in reference to the use of a solid material such as wood for the back supports or posts, and the chair legs, consists in the alternative usage of a metal tubing which may for example, be chrome plated or otherwise finished as desired, one suitable form of metal tubular chair leg being generally indicated at 35 and consisting of a swaged tubing of steel or a suitable nonferrous metal such as aluminum tubing, and which, by preference for appearance and strength, is of circular section and of smaller diameter at its lower end, increasing in diameter toward its uppermost end.

Extended downwardly from the upper end of the metal leg 35, the wall of the tubing is apertured or slotted in one side as indicated at 36 for the reception of an attachment bolt 37, the head portion of which extends through a slot 38 formed in a concavo-convex washer 40 on the inside of the leg and adjacent the bolt opening 36. The washer 40 is preferably of a resilient or spring stock and thus serves as a locking element resisting frictionally any unthreading rotation of the attachment bolt 37. A nut 41 coacts with each of the attachment bolts 37 for securement of the metal legs in the same manner as the wood or other solid legs hereinabove described.

It is preferred in case of use of the metal legs, to match same with swaged tubing elements constituting the back supports or posts, in this case indicated by Fig. 8, the metal posts being indicated at 42. By preference the posts 42 are closed at their uppermost ends as by flattening, alternately by the use of suitable closure elements such as plugs (not shown) or otherwise as desired. The lower end of each of the posts 42, which are of tapered diameter similar to that of the metal legs, is provided with a plug or closure of metal and indicated at 43, centrally apertured as at 44, each of the plugs 43 being welded, for example by spot welding, to the end portion of the adjacent wall of the tubular post 42. The central aperture 44 in each of the plugs 43 is fitted prior to welding in the plug, with an axially extended attachment bolt 45 provided with a nut 46.

Rather than to secure the sub-assembly consisting of the back proper and the posts to the rearmost rail of the seat frame, it is preferred

to provide each of the rear corner braces 22 with a depthwise opening 47 located about as shown by Fig. 8, close to the rear rail of the seat frame. In the case of the use of the metal post 42 the bolts 45 extend through the openings 47 and the nuts 46 serve to retain the posts and hence the back assembly, rigidly in position on the seat panel. It is preferred of course to utilize washers, which may be of conventional form, behind the nuts 46.

In the case of wood or similar back posts, attachment is similarly effected as by the use of relatively long lag screws indicated at 48, and which extend upwardly through the openings 47 in a generally axial direction into the wood posts of the construction first described. A nut 50 with an intervening washer, may be removed or reapplied to the outer thread shank of each of the lag screws, incident to erection and disassembly of the chair, when applying to, or removing the back assembly from the seat assembly.

The manner of assembling the legs to the seat panel, and of assembling the back assembly to the seat panel, is all thought to have become apparent from the foregoing description of parts of the chair together with the hardware and assembly elements used therewith, but it may be briefly noted for completeness that it is usually a matter of preference, first to assemble the legs to the chair seat panel, assuming that the chair has been received, as in shipment, in knock down condition and in flat package form. On this assumption, the leg bolts such as 28 for example, will be extended through the bores therefor in the corner braces, with the head of the bolt positioned in a countersunk recess at one side of the head 26 of the leg. The nut 30 may either be removed, or just started upon the outer end of the threaded shank of the bolt such as 28, following which the head of the leg is positioned in the space between the adjacent corner brace 22, and the corner of the frame. The proper location of the upper end of each of the chair legs includes the seating of that portion of the head 26, which is opposite the bolt head, snugly within the concave notch or recess 25. Incident to this disposition of the upper chair leg end, the chair leg is bodily moved upwardly with the slotted opening or furcate region of the leg embracing the bolt. The bolt is now ready for either the initial reception of nut 30, or threading up of the nut, so as to tighten the leg securely, drawing the head of the leg into the seat 25 therefor. The same procedure is carried out in each of the remaining corners of the chair frame wherein is disposed one of the legs. It may be noted that the depth of seating of the bolts in the leg slots in the two rearmost legs, is by preference somewhat greater than that of the corresponding parts in the forepart of the chair, from which fact results a facility for control of the pitch of the chair seat. It will usually be a preference to provide by this means, a height of the forepart of the chair about one-half inch greater than that of the rear portion, thus imparting a desirable back-pitch to the chair.

It will be noted that the application of either the tubular or solid back supports or posts, in the normal position for assembly, involves only the extension of the bolts such as 45 or 48 through the openings 47 of the rearmost corner braces of the seat frame. Thus, now obviously, upon application of the washers and the nuts such as 46 and 50, assembly is effected when the nuts are threaded to tightness, and the chair is now ready for use.

The manner of application of the metal legs to the seat frame, will have become obvious from their analogy to the assembly of the solid legs. With the leg bolts in place in the bores of the corner braces, the vertical slotted openings of the upper metal leg wall and the adjacent slotted spring washer, enable an application of the leg to the bolt, with seating of the bolt head or nut against the inside surface of the spring washer. The metal leg is brought into nesting lateral abutment with the recess in the corner brace, and assembly completed as earlier described, by threading up the nut.

Further knock-down operations, as for storage or subsequent shipment will, now obviously, consist of a reverse order of the assembly steps, as above described. Although the subassemblies consist respectively of the chair seat structure, the back panel with posts, and the legs, a convenient arrangement of these elements for packaging, as for storage or shipment, consists in superposing the assembly of back panel and post on the seat panel, and arranging the four chair legs above and parallel to the back panel. As will appear from the drawing, the length of leg is such that they may be disposed lengthwise of and above the seat panel, either above or below the back assembly, without substantial projection, if any, beyond the confines of the seat frame. The parts thus in compact, knock-down condition may be wrapped, boxed or otherwise packaged in a manner to occupy but a minimum of space between periods of erection and use of the chair.

Although the invention has been described by making detailed reference to but a few of the many possible embodiments, the detail of description should be understood in an instructive, rather than in any limiting sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a chair of knock-down type, a seat panel including a substantially rectangular frame, a cover for said frame, and chair legs located inwardly of the corner of the frame, each said leg being provided in its upper end region with a transverse bolt slot, a bolt therein, a brace across each corner of the frame of the seat panel, the bolt serving the adjacent chair leg extending transversely through the corner brace adjacent thereto, a nut for each of said bolts, a back including a pair of supporting back posts, the rear corner braces of the seat panel frame being provided with depthwise apertures, and screw elements extending through said apertures and substantially axially engaging the back posts.

2. In a chair assembly of knock-down type, a sub-assembly comprised of a seat frame, a brace bridging each of the corners of the seat frame, an element overlying the seat frame, a second sub-assembly comprised of a back panel and a pair of vertical back posts, a threaded shank extending through the rear corner braces of the seat frame and into said back posts for assembly of the back assembly to the seat assembly, each of said corner braces being provided with a bolt passage formed transversely of the brace, a plurality of chair legs located inwardly of the corner of the frame, each said leg having an upwardly opening slot extending substantially transversely of the leg, a bolt positioned in said

passage and said slot, and a nut coacting with each of said bolts.

3. In a chair assembly of knock-down type, a sub-assembly constituting a chair seat and comprising a rectangular frame, a brace across each of the corners of said frame, tubular metal legs, a bolt extended laterally of the upper portion of each of said legs, each such portion having a bolt slot, a slotted washer within the leg through which the bolt extends, each of the corner braces of the seat frame having a bolt passage therethrough, extended substantially diagonally of such frame, the leg bolts each extending along one of said leg slots, and a nut engaging each of said bolts for securement of the bolt and leg to one of said corner braces.

4. In a chair of knock-down type, a sub-assembly including a seat portion, a seat constituted of a substantially rectangular frame, a brace bridging each corner region of said frame and legs secured to the corner braces, a second sub-assembly comprising a chair back and substantially vertical back posts formed of a metal tubing, a metal plug secured inwardly of the lower end of each of said back posts, a bolt extended through each of said plugs and one of the rear corner braces of the seat structure such braces being apertured to receive said bolts.

5. Means for connecting a substantially tubular leg and a back post of a chair with a substantially rectangular seat supporting frame comprising a substantially rectangular brace member having opposed ends and extending between two adjacent sides of said frame proximate a corner thereof, means connecting each end of said brace member with one of said sides, respectively, said brace member having a recess formed therein intermediate said opposed ends, said tubular leg having an upright slot formed in a side thereof and extending from one end toward the other end thereof, means disposed within said slot coacting with said brace member to secure said one end of said leg to said brace member within said recess, and means connecting one end of said back post to said brace member.

6. Means for connecting a leg and a post member of a chair with a substantially rectangular seat supporting frame comprising a brace member having opposed ends and extending between two adjacent sides of said frame adjacent a corner thereof, means connecting each end of said brace member wtih one of said sides, respectively, said brace member having a recess formed in a side thereof intermediate said ends, means securing one end of said leg to said brace member within said recess and within the space defined by said adjacent sides and said brace member, and means connecting one end of said post member with said brace member.

7. Means for connecting a leg and a post member of a chair with a substantially rectangular seat supporting frame comprising a substantially rectangular brace member having opposed ends and extending between two adjacent sides of said frame adjacent a corner thereof, means connecting each end of said brace member with one of said sides, respectively, said brace member having a recess formed in a side thereof intermediate said ends, said recess facing said corner, means connecting one end of said leg to said brace member within said recess and within the space defined by said adjacent sides and said brace member, and a screw extending transversely of said brace member and penetrating one end of said post member to secure said post member to said brace member.

8. Means for connecting a leg and substantially hollow tubular back post of a chair with a substantially rectangular seat supporting frame comprising a substantially rectangular brace member having opposed ends and extending between two adjacent sides of said frame adjacent a corner thereof, means connecting each end of said brace member with one of said sides, respectively, said brace member having a recess formed in a side thereof intermediate said ends, means securing one end of said leg to said brace member within said recess, a closure member extending across one end of said tubular post, and means cooperating with said closure member and said brace member for securing said tubular post to said brace member.

9. Means for connecting a leg and a back post member of a chair with a substantially rectangular seat supporting frame comprising a brace member having opposed ends and extending between two adjacent sides of said frame adjacent a corner thereof, means connecting each end of said brace member with one of said sides, respectively, said brace member having a recess formed in a side thereof intermediate said ends, said recess facing said corner, means connecting one end of said leg to said brace member within said recess and within the space defined by said adjacent sides and said brace member, and means extending transversely of said brace member and penetrating one end of said post member to secure said post member to said brace member.

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