Oct. 31, 1950

C. B. HOFFMAN, III
CHAIR HAVING FLEXIBLY SUPPORTED
SEAT AND BACK CUSHIONS

2,527,635

Filed April 3, 1947

3 Sheets-Sheet 1

Fig. 1

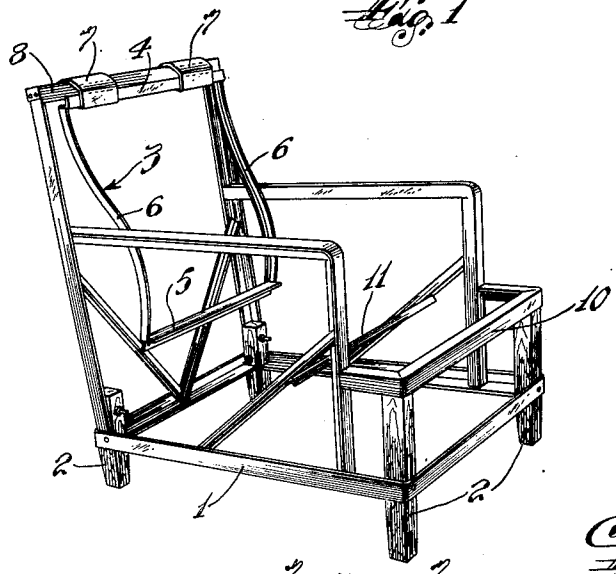


Fig. 2

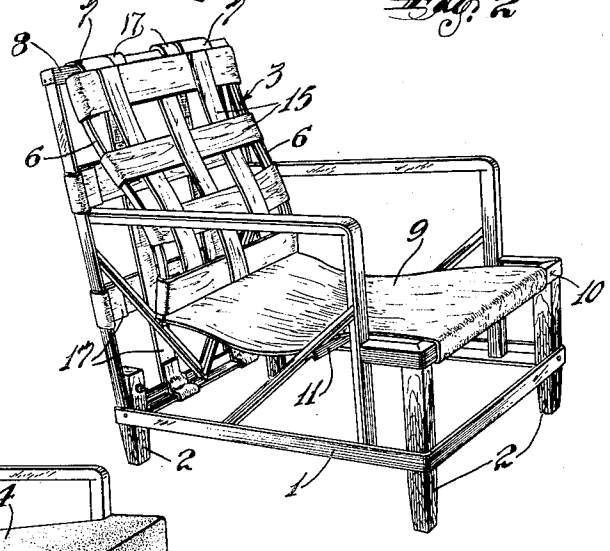
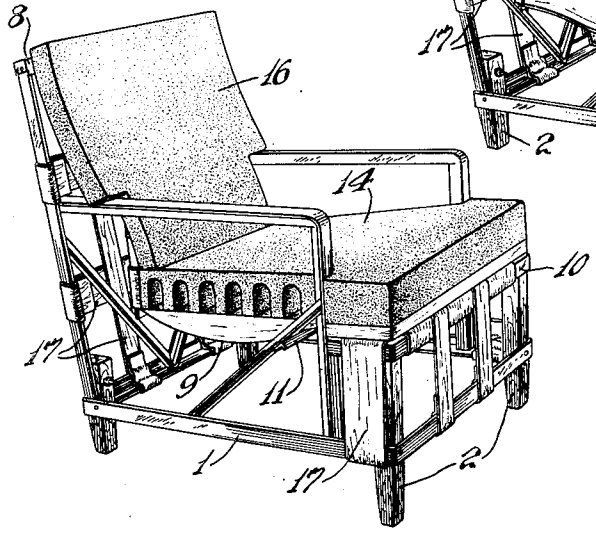


Fig. 3



INVENTOR.
Carroll B. Hoffman, III
BY
Chester Mueller
ATTORNEY

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Fig. 4

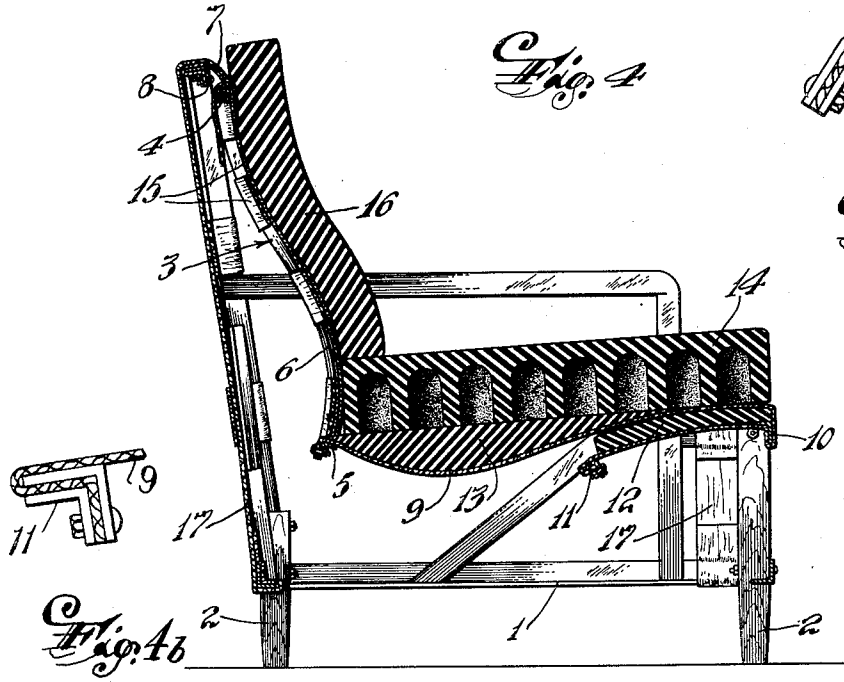


Fig. 4a

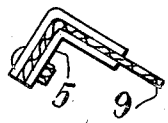


Fig. 4b

Fig. 5

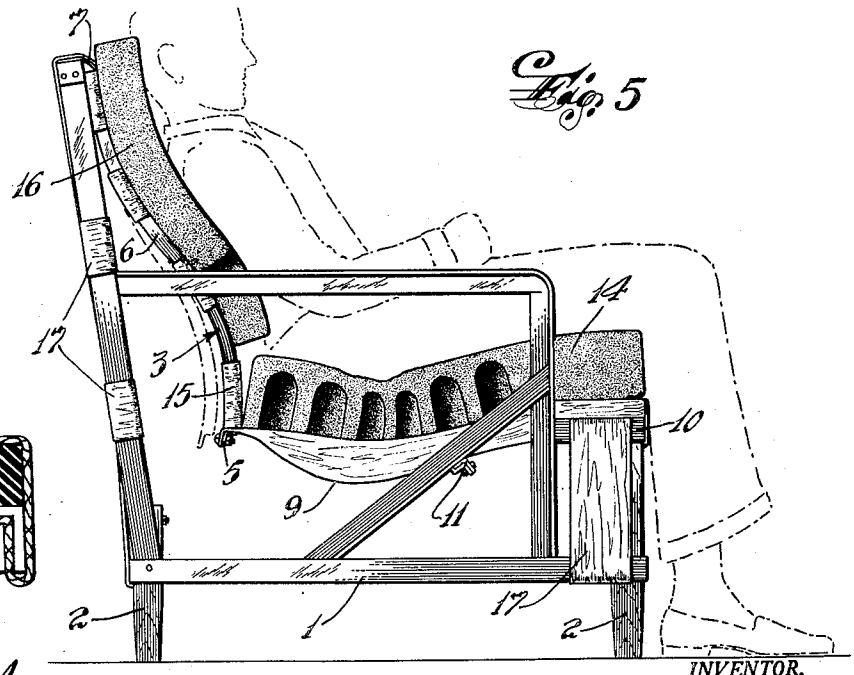
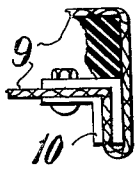


Fig. 4c



INVENTOR.
Carroll B. Hoffman, III
BY
Chester Mueller
ATTORNEY

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Fig. 6

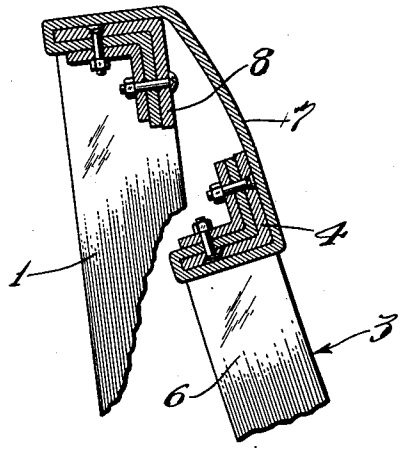
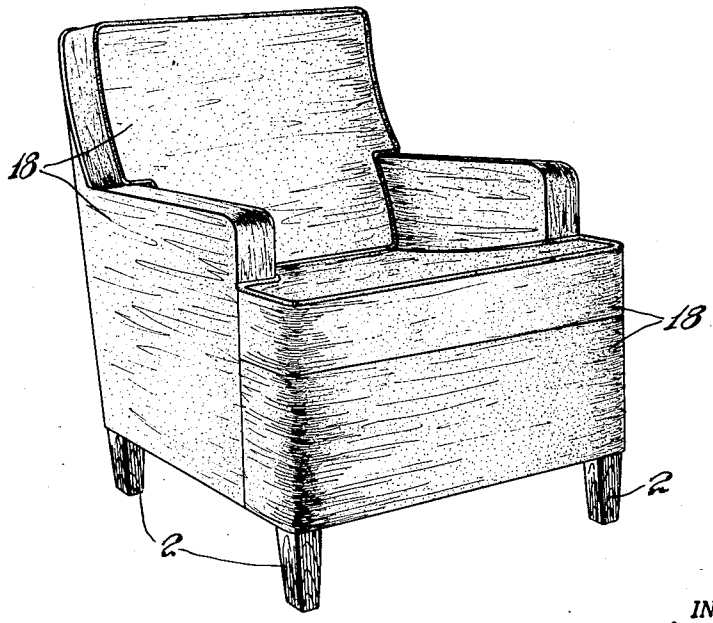


Fig. 7



INVENTOR.
Carroll B. Hoffman, III
BY Chester Mueller
ATTORNEY

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2,527,635

CHAIR HAVING FLEXIBLY SUPPORTED SEAT AND BACK CUSHIONS

Carroll B. Hoffman III, Baltimore, Md.

Application April 3, 1947, Serial No. 739,068

9 Claims. (Cl. 155—119)

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My invention relates to chairs and seats of the upholstered type, that is, to those which are padded and/or cushioned and generally covered with fabric or other suitable material.

One object of my invention is to provide a flexible seat and back rest that will accommodate itself to the various contours and positions of the occupant and yet provide proper support for the body.

Another object is to furnish a chair of simple yet rugged construction, economical to make and embodying sound principles of structural design with which modern materials may be employed.

Still another object is to facilitate the attachment and removal of chair and seat covers by inexperienced persons by making the frame of the chair or seat accessible for that purpose.

Further objects and advantages of my invention will be apparent from the detailed description which follows.

Heretofore, the conventional upholstered chair has consisted basically of the centuries old rigid seat and back frame covered with variously disposed soft and springy materials and cushions to provide comfort. With a rigid seat and back not conforming to the outline or posture of a seated person the cushion material alone cannot give proper orthopedic support. Such improvements as have been made from time to time have largely been in appearance and in the types of material employed and not in basic body-supporting design of general application.

My invention permits the use of modern materials and conventional designs without outwardly displaying the body supporting design. It provides curved support for the small of the back and uniform support for the full length of the thighs. It adapts the fit of the chair to the anatomy of, and the posture assumed by, the average individual and gives him full floating support from shoulders to knees.

In the accompanying drawings showing one embodiment of my invention and in which the same number refers to the same or similar part:

Figure 1 is a perspective view of the frame showing all rigid members assembled.

Figure 2 is the same as Figure 1 with the addition of the flexible seat base and certain flexible supporting members.

Figure 3 is the same as Figure 2 with the addition of back and seat cushions and certain cover supporting members.

Figure 4 is a cross section, in elevation, taken through the center of the chair in its semi-finished condition as shown in Figure 3.

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Figures 4a, 4b, and 4c are enlarged details of the connections of certain of the flexible and rigid members shown in Figure 4.

Figure 5 is a side elevational view of the chair in its semi-finished condition as shown in Figure 3 with a person seated therein with dotted outline showing the back rest position when the seat is unoccupied.

Figure 6 shows details of the hinge construction at the top of the back rest.

Figure 7 is the chair shown complete with covers in place.

The frame 1 of the chair, best shown in Figure 1, is formed of heat treated aluminum alloy angle members carried on legs 2 which are of wood. While any material may be used to construct frame 1, I find I secure strength, lightness and utility by the use of an aluminum alloy and can still maintain the conventional outward appearance by using wood for the exposed legs 2. Additional advantage is that the fabric members can, if desired be firmly anchored to the frame by clamping between angle members and nails and twine binding dispensed with. Attachment of webbing is also facilitated by the use of relatively slender and accessible metal members.

The curved rigid back rest 3 is a frame consisting of top bar 4 and lower bar 5 joined by curved side members 6. As with the chair frame, 4, 5, and 6 are heat treated aluminum alloy angle members. Top bar 4 is hinged by flexible hinges 7, formed of material such as industrial belting, to top rail 8 of frame 1 in spaced relationship, as best shown in Figure 6. Each hinge consists of a strip of such material anchored at each end in a like manner, namely, by passing the end over the outside surface of the angle member it is to hinge and against the inner surface, clamping it in permanent position flat against such inner surface by a second angle member bolted to the first one.

Referring to Figure 2, flexible seat base 9, of material such as heavy two ply industrial belting, is secured on its rear edge to lower bar 5 of back rest 3 and on its forward edge to cross brace 11 after passing over front rail 10 of frame 1. Seat base 9 is secured to the angles which constitute bar 5 and cross brace 11 by the same construction as hinges 7 are anchored, that is by clamping the ends flat against the inner surfaces of the angle members by second angle members bolted thereto. Thus the seat and back supporting elements of the chair are suspended

between two members of the chair frame 1, namely its top rail 8 and front rail 10.

Just rearward of the forward edge of flexible seat base 9 cross brace 11 of frame 1 is positioned for seats of certain types of chairs. This cross brace 11 is set back from the front of the chair as shown and so placed that it furnishes support to the portion of seat base 9 above and forward of it for approximately one third of the seat area. As best shown in Figure 4 it may be used to anchor the end of seat base 9 after the forward edge of the seat base is passed over and rigidly secured to front rail 10 and resilient front pad 12 is sandwiched between the two opposing surfaces of the material comprising seat 9. Front pad 12 as shown is of foam rubber and cemented in place. The use of cross brace 11 and front pad 12 gives resilient support to the front portion of seat base 9 and directs the major depressing effect of the weight of an occupant to the rear portion of seat 9. In addition, it has a dampening effect when the construction is exposed to vibration such as when used for train or motor vehicle seats. I may dispense with front pad 12 but I do find it important to retain a substantially unyielding support for the seat cushion between cross brace 11 and front rail 10 to direct the occupant's weight rearward.

An excess of the flexible material comprising it provides seat base 9 with a shallow depression between cross brace 11 and lower bar 5 as shown in Figure 2. Within this depression there is secured shaped resilient sub cushion 13 to furnish a thickened cushion section and to provide a better load distribution to seat 9 shown best in Figure 4. I find that by the use of cushion 13 the contour that occurs with the ordinary hammock type seat is avoided and the desired shape of flexible seat base 9 is maintained. Sub cushion 13 is shown formed of foam rubber and cemented to the surface of seat base 9. Seat cushion 14 is shown constructed of foam rubber and covers the entire seat area of the chair to the extent desired to give pleasing appearance as well as utility.

Horizontal webbings 15 secured to side members 6 of back rest 3 by looping their ends about them and stitching or stapling to the standing part afford elastic support for back cushion 16, which is also shown formed of foam rubber. Vertical webbings 15 are secured at their upper and lower ends by stitching or stapling to the upper and lower horizontal webbings respectively. Webbings 17 may be similarly attached to the front, back and sides, except that where the seat base covers front rail 10 the webbings 17 may be stitched or sewn directly to the seat base of frame 1. They provide a backing for the fabric seat covers 18 shown in Figure 7 although their use may be dispensed with. Seat covers 18 are prefabricated in sections, slipped over the appropriate portions of the chair frame and buttoned, sewn, snap fastened or zippered to each other.

The arms of the chair can be upholstered as desired and the chair equipped with covers 18 (Figure 7) leaving the back rest 3 and seat base 9 in free suspension.

The advantages of my construction are apparent when the reaction of the supporting members 3 and 9 under loading is considered. The weight of a seated person depresses seat 9, pivoting back rest 3 on its hinges 7 from the position shown in dotted outline in Figure 5 to that shown

in full lines. This action brings the curved back rest against the back of the sitter giving support to the small of the back. With the resilient cushions adapting themselves to the minor contours of the body and distributing the weight to their underlying supports 3 and 9, and seat base 9 flexing to average shaped and sized figures, not only will comfort be provided but necessary support given in a number of positions taken by the user.

It is obvious that many variations of my invention may be employed and many embodiments utilized without departing from its scope.

What I claim is:

1. A chair comprising a supporting frame; a rigid back rest frame; a cushion overlying the front of the back rest frame; a flexible seat base with its front edge secured to the front end of the supporting frame and its rear edge secured to the bottom of the back rest frame; a cushion overlying the top of the flexible seat base; and flexible means hingeably connected on its upper edge to the top of the supporting frame to the rear of and above the front end of the seat base and on its lower edge to the top of the back rest frame.

2. A chair comprising a supporting frame; a rigid back rest frame; a cushion overlying the front of the back rest frame; flexible means hingeably connected on its upper edge to the top of the supporting frame to the rear of and above the front end of the seat base and on its lower edge to the top of the back rest frame; a flexible seat base with a slack rear portion and with its front edge secured to the front end of the supporting frame and its rear edge secured to the bottom of the back rest frame; and a resilient seat base cushion of greater thickness over the slack portion of such seat base than over the remaining area.

3. A chair comprising a supporting frame; a rigid back rest frame; a cushion overlying the front of the back rest frame; flexible means hingeably connected on its upper edge to the top of the supporting frame to the rear of and above the front end of the seat base and on its lower edge to the top of the back rest frame; a flexible seat base with approximately two thirds of its rear portion slack and with its front edge secured to the front end of the supporting frame and its rear edge secured to the bottom of the back rest frame; means supporting the front one third of the seat base and a resilient seat base cushion of varying thickness from front to rear with its maximum thickness approximately two-thirds of the distance back from its front edge.

4. A chair comprising a supporting frame; a rigid back rest frame; a cushion overlying the front of the back rest frame; flexible means hingeably connected on its upper edge to the top of the supporting frame to the rear of and above the front end of the seat base and on its lower edge to the top of the back rest frame; a flexible seat base with its front edge secured to the front end of the supporting frame and its rear edge secured to the bottom of the back rest frame; a cushion overlying the top of the flexible seat base; a strip of material fixedly secured to the supporting frame beneath the front edge of the seat base and extending rearward and downward from such edge for a distance of approximately one-third of the front to rear dimension of the seat base.

5. A chair comprising in combination, a supporting frame having a front transverse rail

at its front end and a top rear transverse rail to the rear of and above the front transverse rail adapted to support a hanging back rest; a back rest frame including two side members joined at their ends by cross bars and freely suspended from such top rear transverse rail of the supporting frame by flexible means a cushion overlying the front of the back rest frame; a plurality of yielding members connecting the side members and the cross bars of the back rest frame; a flexible seat base with a slack rear portion secured on its front edge to such front transverse rail of the supporting frame and on its rear edge to the lower bar of the back rest frame; a strip of material fixedly secured to the front transverse rail and extending rearward and downward therefrom beneath the seat base for approximately one-third of the front to rear dimension of the seat base and secured at its rear end to the supporting frame; and a resilient cushion covering the seat base.

6. A chair comprising in combination, a supporting frame having a front transverse rail at its front end, and a top rear transverse rail to the rear of and above the front transverse rail adapted to support a hanging back rest; a back rest frame having two curved side members joined at their ends by cross bars; a plurality of yielding members connecting the side members and the cross bars of the back rest frame; said back rest frame suspended from such top rear transverse rail of the supporting frame by a flexible member hingeably connected thereto; a flexible seat base with approximately two thirds of its rear portion slack secured on its front edge to such front transverse rail of the supporting frame and on its rear edge to the lower bar of the back rest frame; a strip of inelastic material fixedly secured to the front transverse rail and extending rearward and downward therefrom beneath the seat base for approximately one-third of the front to rear dimension of the seat base and secured at its rear end to the supporting frame; a resilient cushion covering the seat base and thickened over the slack portion thereof to completely fill the depression formed by such slack; and a resilient cushion covering the back rest frame.

7. A chair comprising in combination, a supporting frame having a front transverse rail at its front end, and a top rear transverse rail at the rear of and above the front transverse rail adapted to support a hanging back rest; a back rest frame including two parallel curved side members joined at their ends by cross bars; a plurality of yielding members connecting the side members and the cross bars of the back rest frame; said back rest frame pivotably suspended from the top rear transverse rail of the supporting frame by a plurality of flexible members; a flexible seat base with approximately two-thirds of its rear portion slack secured on its front edge to such front transverse rail of the supporting frame and on its rear edge to the lower bar of the back rest frame; a resilient seat cushion covering the entire seat base but having a thickened portion covering approximately the rear two-thirds area of such seat base; and a resilient cushion covering the back rest frame.

8. A chair comprising in combination, a supporting frame having a front transverse rail at its front end, a cross brace below, parallel to and rearward of such front rail, and a top rear transverse rail at the rear of and above the front transverse rail adapted to support a hanging back rest; a back rest frame including two parallel curved side members joined at their ends by cross bars; a plurality of strips of yielding material connecting the side members and the cross bars of the back rest frame; said back rest frame suspended from the top rear transverse rail of the supporting frame by a pair of flexible members; a transverse strip of material fixedly secured to the front transverse rail and to the cross brace; a resilient pad overlying such strip of material; a flexible seat base with a rear slack portion secured on its front edge to such front transverse rail of the supporting frame and on its rear edge to the lower bar of the back rest frame and passing over the said resilient pad with its slack portion lying between such resilient pad and the lower bar of the back rest frame; a resilient undercushion completely filling such seat base slack portion; a resilient top cushion covering the entire base; and a resilient cushion covering the back rest frame.

9. A chair comprising in combination, a supporting frame of light-weight metal angle members mounted on wooden legs, having a front transverse rail at its front end, a cross brace below, parallel to and rearward of such front rail approximately one-third the front to rear seat dimension, and a top rear transverse rail at the rear of and above the front transverse rail adapted to support a hanging back rest; a rigid back rest frame including two parallel curved side members joined at their ends by cross bars; a plurality of spaced and crossed strips of yielding material connecting the side members and the cross bars of the back rest frame; said back rest frame suspended in spaced relationship from the top rear transverse rail of the supporting frame by strips of fabric; a transverse strip of material fixedly secured to the front transverse rail and to the cross brace; a resilient pad overlying such strip of material; a flexible seat base with a slack rear portion secured on its front edge to such front transverse rail of the supporting frame and on its rear edge to the lower bar of the back rest frame and passing over the said resilient pad with its slack portion lying between such resilient pad and the lower bar of the back rest frame; a resilient undercushion completely filling such seat base slack portion; a resilient top cushion covering the entire seat base; and a resilient cushion covering the back rest frame.

CARROLL B. HOFFMAN III.

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