Nov. 21, 1950 J. TURNER 2,530,924

RECLINING CHAIR

Filed Feb. 27, 1945

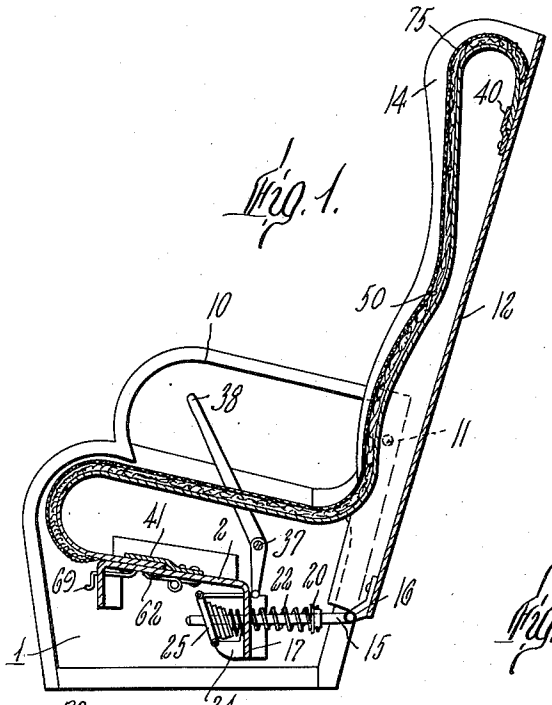


Fig. 1.

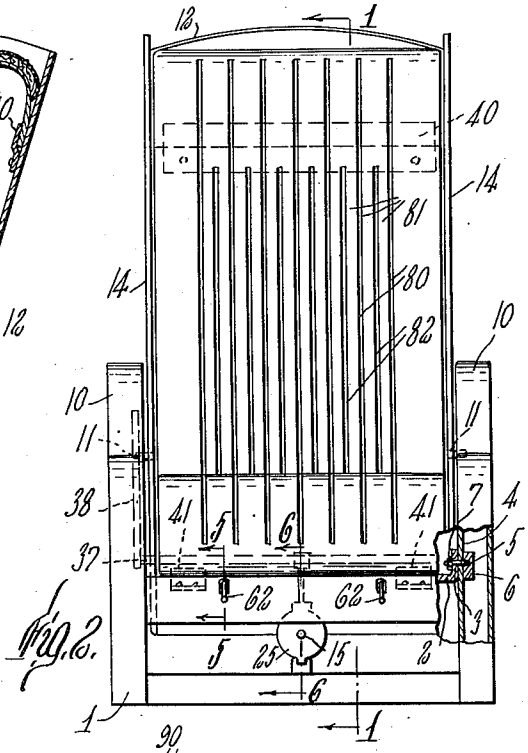


Fig. 2.

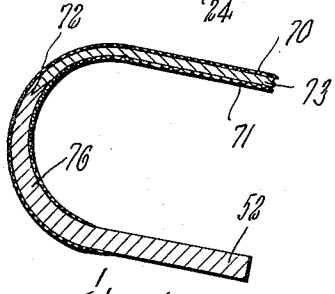


Fig. 4.



Fig. 3.

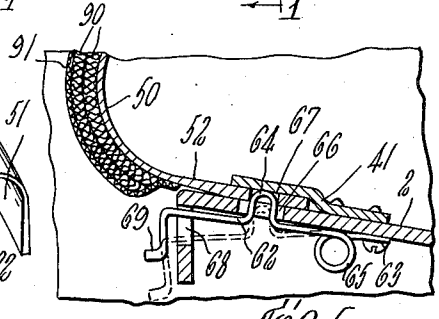


Fig. 5.

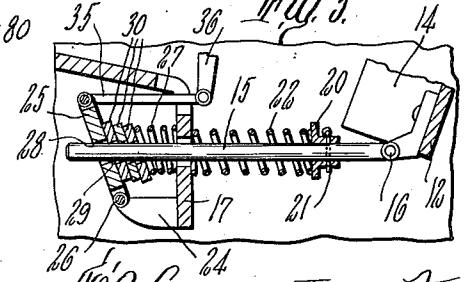


Fig. 6.

Inventor
John Turner
by
Wright Brown Quinby & Ulla
Attys.

Patented Nov. 21, 1950 2,530,924

# UNITED STATES PATENT OFFICE

2,530,924

## RECLINING CHAIR

John Turner, Boston, Mass.

Application February 27, 1945, Serial No. 579,970

3 Claims. (Cl. 155—116)

1

This invention relates to chairs and has for an object to provide a chair of very light and inexpensive but very comfortable construction. While not limited thereto, such a chair is particularly useful, because of its extremely light weight, for use in passenger aircraft.

A further object is to provide an improved light weight pre-molded body supporting unit so constructed as to have marked resiliency and strength and which may, if desired, be faced with cushioning and upholstery material.

A further object is to provide a chair in which the body support is readily removable from the frame as a unit, thus to permit units to be substituted one for another in the same frame. Thus when aircraft, for example, is to make a trip to tropical countries, units presenting light cool material particularly suitable for passenger comfort may be chosen, while if the trip is to be made to cold countries, units having plush or similar warm upholstery material may be employed, and without removal of the seat frames which may be firmly and permanently fixed.

A further object is to provide an improved locking means by which the inclination of the body supporting portion may be fixed as desired, or which may be unlocked to permit adjustment of such inclination to suit the occupant.

For a complete understanding of the invention, reference may be had to the accompanying drawings in which

Figure 1 is a vertical sectional view of a chair embodying the invention, the section being taken on line 1—1 of Figure 2.

Figure 2 is a front elevation of the chair, the upholstery and cushioning material being omitted.

Figure 3 is a perspective view of the body supporting unit detached.

Figure 4 is a fragmentary longitudinal cross section through the forward part of the seat portion of the unit shown in Figure 3 and drawn to a larger scale.

Figures 5 and 6 are detail sectional views to a larger scale on lines 5—5 and 6—6, respectively, of Figure 2.

Referring to the drawings, the chair comprises a frame composed of a pair of spaced base members 1, spaced apart by suitable cross frame members including a member 2 positioned above the lower edges of the base frame members and having upwardly turned end flanges 3 secured to the inner walls 4 of the base members. These base members are shown as hollow and may well be formed of plywood sheets impregnated with

2

a set plastic material of any suitable form molded to shape before the plastic sets, this forming a very light weight but strong and rigid construction. Each flange 3 may be secured in position by the use of any suitable means such as studs 5, the inner portions of which are formed as wood lag screws which extend through the inner wall member 4 of the adjacent side frame and into a reinforcing block 6 on its inner side. Nuts 7 threaded on the inner ends of these studs and inwardly of the flanges 3 may be used to secure the flanges of the cross member 2 in position. Above each base member 1 may be an arm 10 preferably formed of wood plies impregnated with plastic and secured in any suitable manner to the base members 1 and preferably spaced therefrom intermediate to their ends.

Between the base members 1 there is shown pivoted on the horizontal axis 11 a back frame member 12. This may be formed of material similar to the side base members and may have a centrally rearwardly bowed mid-portion terminating on opposite sides in the forwardly directed flanges 14. This back frame member is arranged to be adjustable angularly, and for this purpose a link 15 is shown as pivoted at 16 to a bracket preferably positioned centrally of the width of the back frame, this link passing through an opening in a downwardly directed flange 17 of the cross member 2. This link 15 may have a collar 20 adjustably secured thereto as by a pin 21 extending through mating holes in the collar 20 and the link and a coil spring 22 surrounding the link 15 may engage on opposite ends against the collar 20, and the frame piece 17, this spring then acting to push the rod 15 rearwardly with the back frame in a substantially vertical position.

The forward end portion of the link 15 may be provided with means for releasably locking the link 15 in any desired axial position. As shown this comprises a member 25 fulcrumed at 26 to a bracket 24 on the forward face of the flange 17, this link 25 being normally held in a canted locking position shown in Figure 6, as by a coil spring 27, reacting between it and the forward face of the member 17, so as to bring opposite edge portions 28 and 29 into clamping engagement with the link 15. Preferably, also, one or more washers or disks 30 also having holes therethrough somewhat larger in diameter than the link 15, are placed between the member 25 and the spring 27, each of these when in the canted position of Figure 6, engaging opposite edges of its central hole against

the sides of the link 15 to grip it and hold it against motion. The member 25 and the locking disks 30 may be pulled into a position nearer to the vertical sufficiently to release the link 15 by pulling rearwardly the upper end portion of the member 25, as, for example, through a link 35 pivoted to an arm 36, this arm being carried by a rock shaft 37 to which is secured an actuating handle 38 within one of the base side frames. This handle extends up through a slot in the top face of the side frame and into the space beneath the corresponding arm 10 where it may be grasped by the occupant of the chair and manipulated as desired to release the link 15 for adjustment of the angularity of the back frame 12 to suit the requirements of the occupant of the chair, or to permit locking of the link against axial motion.

The upper forward face of the back frame member 12 is shown as provided with an upwardly open socket formed by the member 12 and a Z bar 40 extending across the width of the back frame 12. Similarly the top face of the cross member 2 has secured thereto a Z member 41 which with the cross member forms a socket facing forwardly. These sockets are for the purpose of receiving the ends of a body-supporting member shown detached in Figure 3. This member comprises an integral seat and back spring member 50, the back portion having the reverse curvature shown beneath its top portion, the top portion being turned rearwardly and downwardly to form an end flange 51. The seat portion extends forwardly from the back portion and its extreme forward end is turned downwardly and rearwardly to form an end flange 52. The top end flange 51 may be engaged in the socket formed by the Z bar 40 and the forward face of the back frame member 12, while the portion 52 may be engaged in the socket formed by the Z bar 41 and the frame member 2.

Means may be provided for releasably securing the member 50 in position, and as shown in Figure 5, this may comprise one or more spring latch members 62 secured at one end as at 63 to the under face of the cross member 2 and having an intermediate upwardly looped latch 64 adapted to be projected by the coil spring portion 65 through a slot 66 in the member 2 and into a recess 67 in the body supporting member. The forward end of the member 62 may extend through a slot 68 through the forward wall of the cross member 2 and have a downward and forwardly turned end portion 69 which may be grasped in order to spring the latch downwardly into the releasing position shown in dotted lines in Figure 5 to permit the removal of the flange portion 52. On removal of this flange portion, the body support may be lifted bodily out from back of the Z bar 40.

This body support 50 is a laminated structure and comprises, as shown best in Figure 4, a pair of layers of fabric 70 and 71 which may be of canvas or fiber glass, or other suitable material, which from a line 72 at the front curved extremity of the seat portion to a similar place at the top of the seat back, are spaced apart as by a wood lamination 73 of, say, ⅛ inch thick, the whole being impregnated with a suitable plastic set in situ therein. The layers of fabric preferably terminate back from the extremities of the unit which they engage in this supporting socket. From the point 72 to about the point 75 at the upper portion of the body support considerable resilience is desired, but the other portions through to the ends of the end flanges 51 and 52 are desirably of much greater stiffness. At these end portions the fabric layer 70 and 71 may be spaced by a compacted fibrous mass 76 of sisal or similar material which is also impregnated with the plastic material such as a phenolic filler, and which is of greater thickness than the intermediate portion of the seat and back of the body support. This intermediate portion is preferably cut by kerfs 80 into a plurality of slat portions 81 arranged side by side, though if desired the slat portions may extend from end to end of the unit, and all except the outer edge slats 81 are further provided with shorter kerfs 82 which extend from the upper portions of the back to the points 83 adjacent to the juncture between the back and seat portions. This provides for an increased flexibility of these portions by reason of the narrowing of the individual elements. Thus the lower portions of the back of the body-supporting structure are much more yieldable than the upper portions of the back or the seat, this adding materially to the comfort of the occupant while at the same time the seat portion is sufficiently stiff to properly support the occupant.



The springy characteristic of the structure is produced mainly by the spacing by the intermediate ply of the relatively unstretchable fabric layers 70 and 71 in their condition of impregnation by the plastic material. Many plastic materials suitable for the purpose are now well known in the art such as phenol-formaldehyde resins, or when glass fabric is employed, allylalkyd resins, the several parts assembled together being saturated with the plastic in unset condition and then molded to the desired contour under sufficient heat and pressure to set the parts to the desired contour and to cure or set the plastic into infusible condition. The structure thus formed is inherently rigid laterally, but is very flexible across the thickness of the material but with permanent set to furnish a suitably contoured support for the body of the occupant.

When an upholstered chair is desired, one or more layers of a suitable cushioning material as at 90 are cemented to the forward and outer face of the member 50 and a suitable upholstering cover material 91 is cemented thereto. A highly desirable cushioning material for this purpose is the product shown and described in the Heldenbrand Patent No. 1,988,843, this being particularly suitable because of its extreme lightness and high resilience.

Due to the fact that the body support, together with the upholstering material, may be applied to or removed from the frame portions very easily, being attached in position only by the latch mechanism shown in Figure 5, it is a simple and easy matter to substitute one supporting unit for another having different upholstery faces in view of the service to which it is desired to put the chair at any time, units presenting surfaces suitable for warm or cold climates being substituted readily one for another.

From the foregoing description of one embodiment of this invention, it will be evident to those skilled in the art that various changes and modifications may be made without departing from the spirit or scope of this invention.

I claim:

1. A body supporting unit comprising a main portion molded to continuous seat and back con-

tours and comprising layers of fabric spaced apart by fibrous material, the whole being impregnated with plastic material set therein, and stiffer end portions secured to said main portion for attachment to front seat and top back frame members, said main portion being formed in independent strips arranged side by side throughout the width of said main portion, each of said strips inwardly of the outside strips being composed of a plurality of narrow separate strip portions for a portion only of its length, said outside strips being of full width.

2. A body supporting unit comprising a main portion molded to continuous seat and back contours and comprising layers of fabric spaced apart by fibrous material, the whole being impregnated with plastic material set therein, and stiffer end portions secured to said main portion for attachment to front seat and top back frame members, the front seat end portion being curved downwardly and rearwardly toward its extremity, and the top back end portion being curved rearwardly and downwardly toward its extremity.

3. A body supporting unit comprising a main portion molded to continuous seat and back contour and comprising outer layers of fabric spaced apart by a wood lamination and stiffer and thicker end portions by which said unit may be supported and comprising said fabric layers with fibrous material interposed therebetween, the whole being impregnated with set plastic material.

JOHN TURNER.




## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 36,026 | Pratt | July 29, 1862 |
| 132,431 | Bjorkman et al. | Oct. 22, 1872 |
| 190,388 | Tostevin | May 1, 1877 |
| 190,967 | Hess | May 22, 1877 |
| 941,919 | Greilick | Nov. 30, 1909 |
| 1,228,771 | Hanger | June 5, 1917 |
| 1,580,522 | Murray | Apr. 13, 1926 |
| 1,902,586 | Santos | May 21, 1933 |
| 2,085,475 | Saives | June 29, 1937 |
| 2,097,541 | Turner | Nov. 2, 1937 |
| 2,135,586 | Lorenz et al. | Nov. 8, 1938 |
| 2,215,540 | Brewer | Sept. 24, 1940 |
| 2,234,677 | Larsen | Mar. 11, 1941 |
| 2,264,143 | Scott et al. | Nov. 25, 1941 |
| 2,281,341 | Turner | Apr. 28, 1942 |
| 2,283,755 | Mies | May 19, 1942 |
| 2,292,831 | Gilkison | Aug. 11, 1942 |
| 2,324,318 | Niedringhaus | July 13, 1943 |

FOREIGN PATENTS

| Number | Country | Date |
|---|---|---|
| 91,958 | Sweden | Apr. 8, 1938 |
| 474,027 | Great Britain | Oct. 20, 1937 |