

July 4, 1939.

M. W. HARD

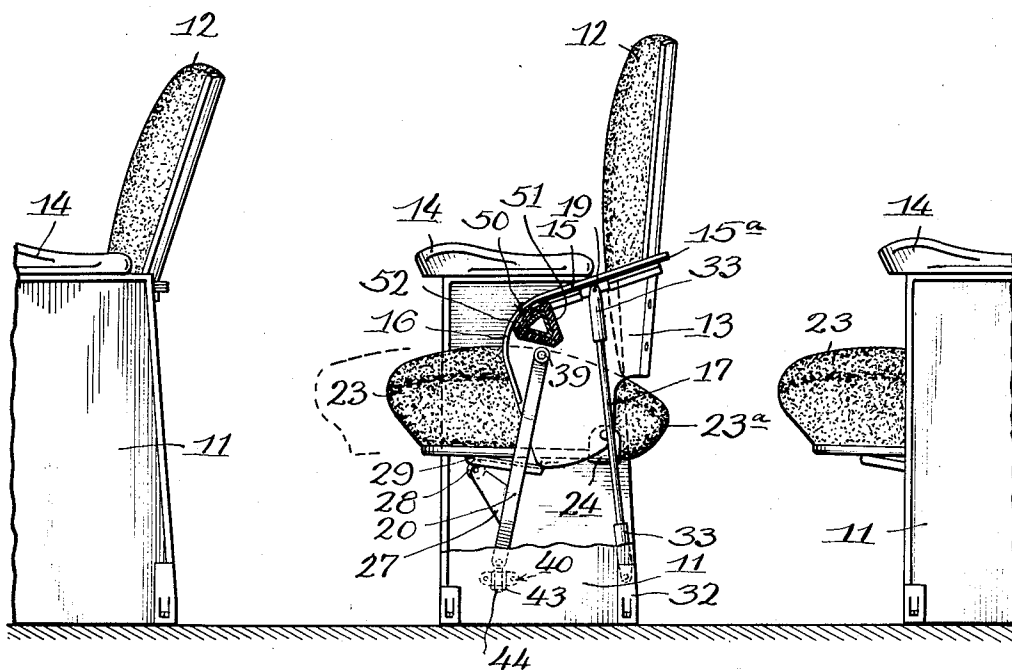
2,164,918

THEATER CHAIR

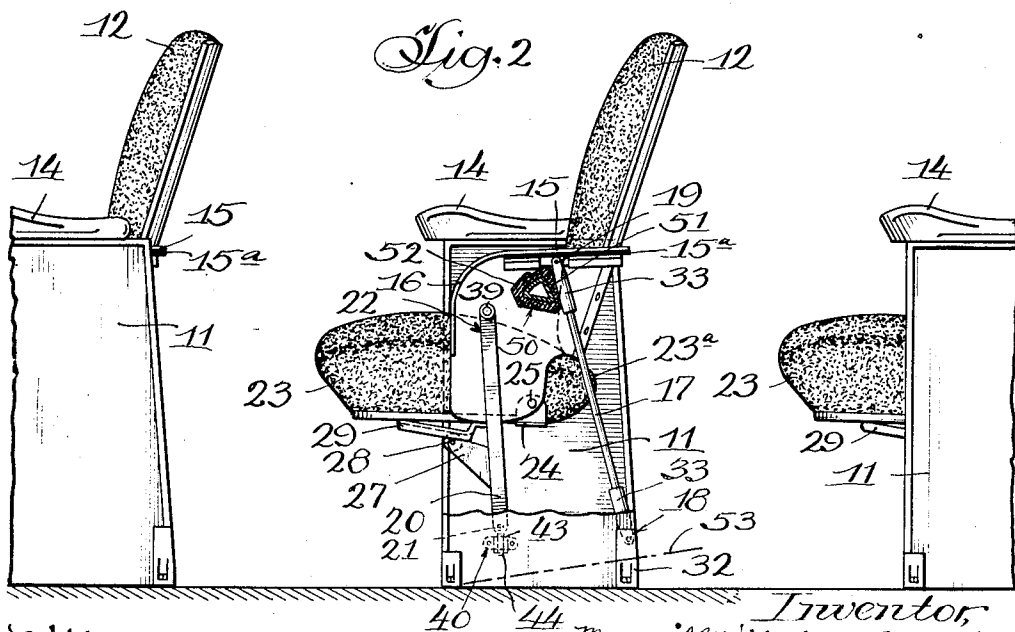
Filed June 9, 1937

3 Sheets-Sheet 1

Fig. 1



Lig. 2



Witness:
Chas. E. Housh.

44 Inventor,
Merrill Wilkins Hard
Official Meklhope Kent & Poole Attys.

July 4, 1939.

M. W. HARD

2,164,918

THEATER CHAIR

Filed June 9, 1937

3 Sheets-Sheet 2

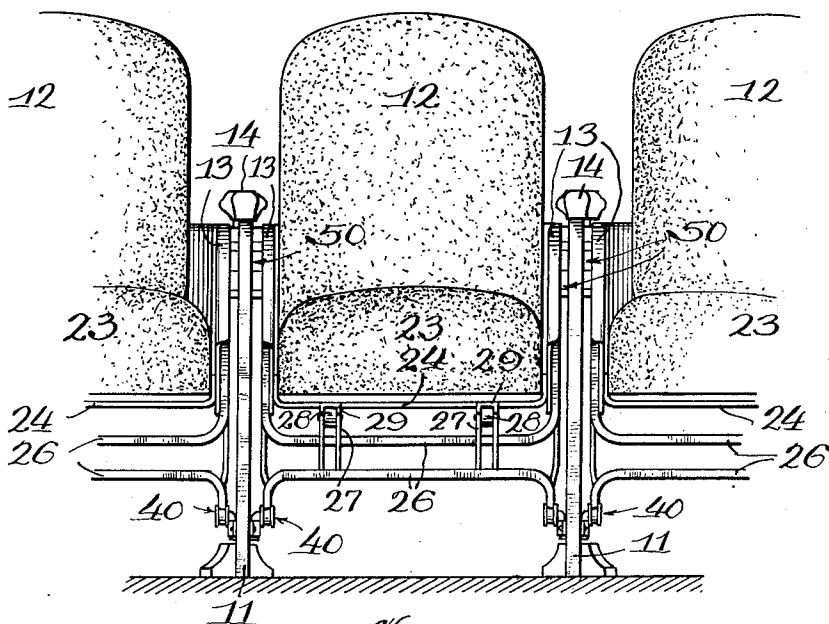


Fig. 3

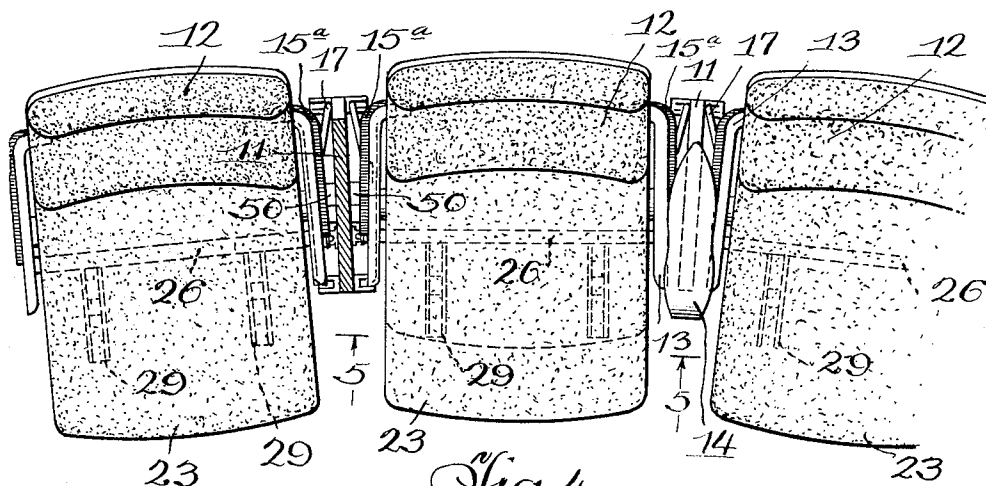


Fig. 4

Witness:
Chas. L. Housh

Inventor,
 Merrill Wilkins Hard,
Office Melkhope Scott & Poole Attys.

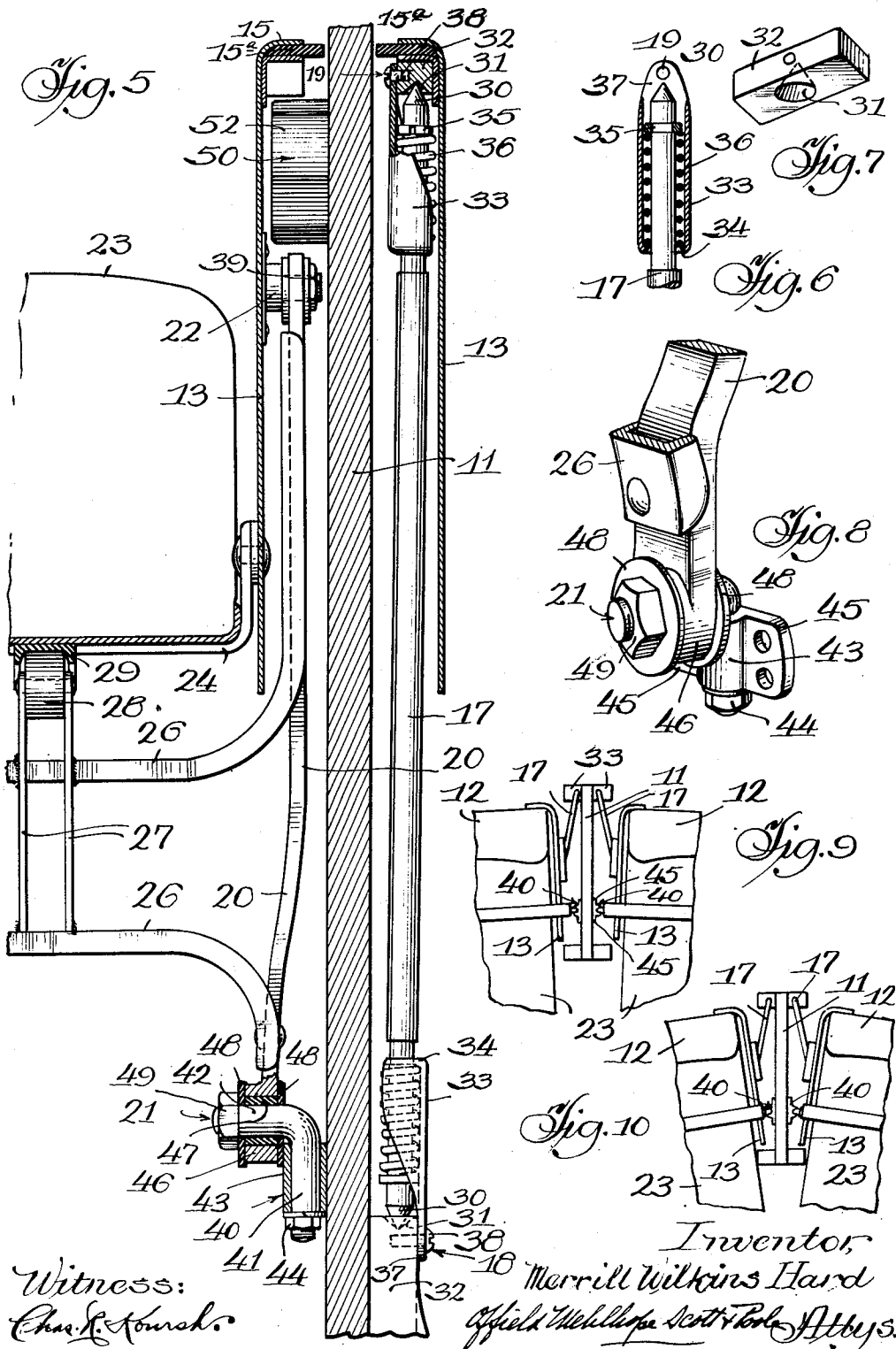
July 4, 1939.

M. W. HARD
THEATER CHAIR

2,164,918

Filed June 9, 1937

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,164,918

THEATER CHAIR

Merrill Wilkins Hard, Los Angeles, Calif.

Application June 9, 1937, Serial No. 147,291

10 Claims. (Cl. 155—36)

This invention relates to chairs of the kind employed in theaters, auditoriums and the like, where the chairs are set in a series of spaced rows and where the rows are generally disposed in the form of an arc of a circle.

The invention relates particularly to improvements in the chair disclosed and claimed in an application, Serial No. 32,899, filed by me on July 24, 1935 (on which later issued November 9, 1937 Patent No. 2,098,623). The object of the invention is to perfect and improve the chairs of said application, and the advantages of the improvements contained herein will appear as I proceed with my specification.

In the drawings:

Figure 1 is a view showing in side elevation and partly in vertical section the chairs in three spaced rows of chairs.

Figure 2 is a similar view with one of the chairs shown in different position.

Figure 3 is a front view of several chairs of a row of chairs.

Figure 4 is a top plan view of the chairs shown in Figure 3.

Figure 5 is a partial vertical transverse section on an enlarged scale of one of the chairs in a plane indicated by the line 5—5 of Figure 3.

Figure 6 is a detail sectional view of an end of one of the chair supporting standards.

Figure 7 is a perspective view of a bearing block in which such standard has bearing.

Figure 8 is a detail enlarged perspective view of an adjustable pivotal mounting for the lower end of one of the supporting links of a chair.

Figure 9 and 10 are fragmentary diagrammatic views showing chairs disposed at different arcs in the rows in which they stand.

Referring now to that embodiment of the invention illustrated in the drawings: 11 indicates the side pedestals upon which a chair is mounted. Two of such pedestals are required for each chair; but when arranged in a row a single pedestal between adjacent chairs serves for both. A pedestal 11 may be of any suitable construction, as a hollow shell or a solid panel. 12 indicates a chair back. Said chair back has rigidly connected to it side plates or members 13 which project forwardly in association with and below fixed arm rests 14 at the top of the pedestals 11. Each side member has a top horizontal flange 15 which projects forwardly from the back 12 and is continued downwardly preferably in a curve at the forward end of the side member by a vertical web 16. 17, 17 indicate vertical standards each of which is pivotally mounted at its

bottom end at 18 on an associated pedestal 11, and at its upper end is pivotally mounted at 19 below the flange 15 on the associated side plate or member 13 of the chair back 12. 20, 20 indicate links each of which is pivoted at its bottom end at 21 on the adjacent side pedestal 11 and at its top end at 22 on the adjacent side member or plate 13.

23 indicates the seat. Said seat is pivotally suspended from the side members 13 by means of a hanger 24 fixed transversely to the bottom of the seat and pivoted at 25 to said side members. The pivoted hanger 24 is located near the rear end of the seat 23 and in the normal position of the seat it is located between the standards 17 and the links 20, as shown in Figure 2. The links 20 are rigidly connected and braced so as to be held in parallel relation by a frame comprising spaced, parallel horizontal bars 26, 26. (See Figs. 3 and 5.) Said frame includes forwardly projecting, laterally spaced arms 27, 27 which carry at their front ends bearing rolls, 28, 28 engaged in upwardly and forwardly inclined channels or tracks 29 secured to the bottom of the seat 23 as shown in Figs. 2, 3 and 5.

The standards 17 and the links 20 and their points of pivotal connection to the pedestals and to the side members of the chair back are so designed and correlated that when the chair and seat are in normal forward position as shown in Fig. 2, the upper ends of the links 20 are slightly forward of the dead center above their bottom pivotal points 21; the bearing rollers 28 are well forward of such dead center; and the upper ends of the standards 17 are well forward of dead center above the pivotal points at their lower ends. When the seat is retracted to its rearmost position the top ends of the links 20 pass rearwardly of their said dead center; the bearing rollers 28 are arrested short of such dead center and the standards 17 are arrested short of their said dead center, as shown in Fig. 1. Thus there is a slight rising movement of the top pivotal ends of the links 20, in a short flat arc, as they pass from forward position to rearward position, and a sharper rise of the top pivotal ends of the standards 17 as they approach their rearward limit of movement. As a result, the seat 23 travels in a substantially horizontal plane as shown by the position of the seat in dotted lines in Fig. 1, and by its position as shown in full lines in retracted position.

The construction thus far described, except for the duplex support for the seat at its forward end, is in substance the same as that described and il-

lustrated in my aforesaid application, Serial No. 32,899, and needs no further description.

Each standard 17 has conically pointed ends 30, 30 (see Fig. 5) which engage in conical bearings 31, 31 formed in blocks 32, 32,—the bottom block 32 being attached to the associated pedestal 11 and the top block 32 being attached to the associated side member 13 of the chair back 12. 33, 33 indicate sleeves at the ends of the standards 17 of greater diameter than that of the standards, and each having an inturned flange 34 at its end remote from the end of the standard adapted to slidably engage said standard. Near the end of the standard is a shoulder 35 formed as shown by a split ring set in an annular recess in the standard. 36 indicates an expanding coiled spring mounted within the sleeve 33 on the standard 17 and bearing at one end against the inturned flange 34 of the sleeve 33 and at the other end against the shoulder 35. The sleeve projects by a tongue 37 beyond the end of the standard 17 and is there secured by screw 38 to the side of the associated bearing block 32. This construction provides a retaining member which acts to hold the point 30 of the standard in its conical bearing 31.

The upper ends of the links 20 are pivotally mounted on studs 39 which are attached to the side member 13 of the chair back. (See Figs. 1, 3 and 5.) The axes of these studs are horizontal and extend at right angles to the said side members and are never required to be changed. Such is not the case with the pivotal axes of the devices providing the pivotal connection of the bottom ends of the links 20 to the pedestals 11, which must have a common axis as otherwise there will be binding. The angle of this pivotal axis with reference to the associated pedestals depends upon the angle at which the pedestals are disposed to each other in each row in which the chairs are arranged and this depends upon the radius of the circle including the arc in which each row is disposed. Thus in an arc of long radius, as shown in Fig. 9, said pedestals will be disposed at a small angle, whereas in cases of arcs of shorter radius as shown in Fig. 10, the angle between said pedestals will be greater. Thus the axis of said pivotal connections at the bottom ends of the links to each of the pedestals 11 must be capable of variation when the chairs are installed to accommodate the different angles between the pedestals in each case. To provide for such adjustment of said axis, I prefer the following construction.

40 indicates a pivotal bearing member (see Figs. 5 and 8) having branches 41 and 42,—the first, vertical, the second, horizontal,—disposed at right angles to each other. 43 indicates a vertically disposed bearing sleeve fixed to an associated pedestal 11 and adapted to receive the vertical branch 41 of the pivotal bearing member 40 and supported therein by a nut and washer 44. The sleeve 43 has lateral wings 45 by means of which it is rigidly attached to said pedestal 11. The link 20 has a circular loop 46 at its bottom end engaged by the horizontal branch 42 of the pivotal bearing member 40, with an anti-friction sleeve 47 interposed between. It is held on the said horizontal branch 42 between anti-friction washers 48, 48, the one of which is engaged against the front of the vertical sleeve 43, and the other by a nut 49 threaded onto the end of said horizontal branch.

After the pedestals have been disposed in the designed arc on the floor in which the chairs are

to be assembled, the chairs, each including its back, side members, pivoted seat and links 20, which have been connected to the side members, are mounted on the associated pedestals 11. In this mounting the standards 17 are brought to engagement at top and bottom with their pointed ends 30 in their conical bearings 31, and the sleeves 33 are attached by means of their projecting ends 37 to the blocks 32 by the screws 38.

Each assembly of loop 46, pivotal bearing member 40 and the bearing sleeve 43 at the bottom of each link 20, is then attached by means of the ears 45 to the adjacent pedestal. The horizontal branches 42 of the bearing members 40 for the links of each chair are then swung to adjust them to a common axis, and the nuts and washers 44 are then tightened to secure the branches 42 in said relation.

The use of the sleeve or bushing 47 and of the washers 48, 48 which are preferably made of fiber, is of importance. They provide both a circular bearing for the loop at the bottom end of the link 20 on the horizontal branch 42 of the bearing member 40, and also bearings at the sides of said loop so that the movement of the link on its bearings shall be approximately noiseless. And the advantage of such noiseless movement will be obvious to those familiar with the art.

The pointed bearing ends 30, 30 of the standards 17, 17 and their conical bearings 31, 31 in which they engage, provide a universal pivotal movement for the adjustment of said standards to any angle required by the angle between the pedestals as determined by the radius of the arc of the row in which the pedestals are disposed. And the fact that the bearings are pointed and are retained engaged in their conical sockets by expanding coil springs 36, insures substantially noiseless movement of said standards when the seat is moved forwardly or backwardly.

The bearing rollers 23, 23 being spaced substantially apart and being carried on the rigid frame attached to the links 20, prevent the seat from sidewise movement or sway towards one or the other pedestals, and being made of fibre or like material, they are substantially noiseless in operation.

On each pedestal intermediate the back and front of the side members 13 is fixed a bumper 50. Said bumper is made of resilient material as of rubber or the like. The bumper is made of such size and so formed that its rear edge 51 will be struck by the top end of the standard 17 when said standard is in its forwardmost position and its front edge 52 will be engaged by the rounded front part of the flange 15 when the seat is in its rearmost position. This bumper serves to arrest the chair side members at both limits of their movement without jar or noise.

Preferably a soft upholstered roll 23^a is provided at the back of the seat to avoid any discomfort to an occupant in the seat behind, in case the seat ahead is being pushed backward and impinges on the knees of the occupant of the seat behind.

It is preferable to dispose the pivotal supports and connections for the bottom ends of the standards and links on the pedestals some distance above the bottom of the pedestal. This leaves room for cutting off the pedestals to provide an inclined bottom as indicated by the dotted line 53 (see Fig. 2) where necessary and as determined by the inclination of the floor on which the pedestals are installed.

The flanges 15 on the side members 13 are as-

sociated with the arm rests 14 on the top of the pedestal in the normal position of the seat. The edges of said flanges, when the seat is retracted or brought forward, move closely in the neighborhood of the proximate faces of the pedestals. To more nearly close this space and prevent the fingers being caught in this space in the movement of the chair, a rubber strip 15^a is secured below and projects beyond the flange 15.

The many advantages of the improvement hereinbefore described have been pointed out and will be obvious to those skilled in the art. While in describing the invention I have referred to various details of construction and arrangement of parts, it is to be understood that the invention is not limited thereto except as pointed out in the appended claims.

I claim as my invention:

1. In a chair comprising a pair of pedestals, a pair of upright standards pivotally mounted at their lower ends on said pedestals, a chair back having rigid side members pivotally supported on the upper ends of said standards, a seat pivotally connected to said side members, a pair of upright links forward of said standards pivotally connected at their upper ends to said side members, and means for pivotally connecting the lower ends of said links to said pedestals including adjustable axial members secured to said pedestals by means whereby said members are capable of being brought into and fixed in common horizontal alignment.

2. In a chair comprising a pair of pedestals, a pair of upright standards mounted for universal pivotal movement at their lower ends on said pedestals, a chair back having rigid side members mounted for universal pivotal movement on the upper ends of said standards, a seat pivotally connected to said side members, a pair of upright links forward of said standards pivotally connected at their upper ends to said side members, and means for pivotally connecting the lower ends of said links to said pedestals including adjustable axial members secured to said pedestals by means whereby said members are capable of being brought into and fixed in common horizontal alignment.

3. In a chair comprising a pair of pedestals, a pair of upright standards pivotally mounted at their lower ends on said pedestals, a chair back having rigid side members pivotally supported on the upper ends of said standards, a seat pivotally connected to said side members, a pair of upright links forward of said standards pivotally connected at their upper ends to said side members, pivotal bearing members to which the bottom ends of said links are connected, fibre bushings and washers interposed in said connection between said links and said bearing members, and means for mounting said bearings on said pedestals permitting their adjustment to a common horizontal axis.

4. In a chair comprising a pair of pedestals, a pair of upright standards mounted for universal pivotal movement at their lower ends on said pedestals, a chair back having rigid side members mounted for universal pivotal movement on the upper ends of said standards, a seat pivotally connected to said side members, a pair of upright links forward of said standards pivotally connected at their upper ends to said side members, pivotal bearing members to which the bottom ends of said links are connected, fibre bushings and washers interposed in said connection between said links and said bearing members, and

means for mounting said bearings on said pedestals permitting their adjustment to a common horizontal axis.

5. In a chair comprising a pair of pedestals, a pair of upright standards mounted for universal pivotal movement at their lower ends on said pedestals, a chair back having rigid side members mounted for universal pivotal movement on the upper ends of said standards, a seat pivotally connected to said side members, a pair of upright links forward of said standards pivotally connected at their upper ends to said side members, pivotal bearing members each comprising a horizontal branch and a vertical branch, means for rotatively mounting said vertical branch near the bottom of said pedestal, the links having loops engaged with said horizontal branches, fibre washers mounted on said horizontal branch at the sides of said loop and a fibre bushing providing the bearing for said loop on said horizontal branch, and means for locking said vertical branches in fixed relation to said pedestal after said horizontal branches have been brought into common horizontal alignment.

6. In a chair including a pair of pedestals, a pair of upright standards mounted at their lower ends on said pedestals, a chair back having rigid side members mounted on the upper ends of said standards, said standards having pointed bearing ends, fixed conical bearings mounted respectively on said pedestals and side members in which said pointed bearing ends engage, retaining members mounted slidably on said standards near their ends and pivotally connected to said bearings, and expansion coiled springs on said standards, said springs being engaged at one end by shoulders on said retaining members and at the other end by shoulders on said standards near said bearings.

7. In a chair including a pair of pedestals, a pair of upright standards mounted at their lower ends on said pedestals, a chair back having rigid side members mounted on the upper ends of said standards, said standards having pointed bearing ends, fixed conical bearings mounted respectively on said pedestals and side members in which said pointed bearing ends engage, sleeves mounted slidably on said standards near their ends and pivotally connected to said bearings, and expansion coiled springs mounted on said standards within said sleeves, each spring acting endwise between a shoulder on said sleeve and a shoulder on said standard to retain its pointed bearing end in the associated bearing.

8. In a chair comprising a pair of pedestals, a pair of upright standards pivotally mounted at their lower ends on said pedestals, a chair back having rigid side members pivotally supported on the upper ends of said standards, a pair of upright links forward of said standards pivotally connected at their lower ends to said pedestals and at their upper ends to said side members, said side members having flanges at their forward ends, and bumpers, one for each side member fixed to the proximate pedestal, said bumpers being disposed to arrest the forward movement of said chair back when engaged by said standards, and the rearward movement of said side members when engaged by said flanges.

9. A chair comprising a pair of pedestals, a pair of upright standards mounted for pivotal movement at their lower ends on said pedestals, a chair back having rigid side members mounted for pivotal movement at the upper ends of said standards, a seat pivotally connected to said side

members, a pair of upright links forward of said standards pivotally connected at their lower ends to said pedestals and at their upper ends to said side members, a rigid frame connecting said links and maintaining them in parallel relation, said frame including vertically spaced parallel horizontal bars curved respectively upwardly and downwardly at their ends into the planes of said links to which they are secured and laterally spaced forwardly projecting arms rigidly secured to said bars, rollers carried by said arms, and laterally spaced channels on the bottom of said seat engaged by said rollers.

10. A chair comprising a pair of pedestals, said pedestals having arm rests, a pair of upright standards pivotally mounted at their lower ends

on said pedestals, a chair back having rigid side members pivotally supported on the upper ends of said standards, said side members having flanges associated with said arm rests when said chair back is in normal position, supplemental elastic flanges fixed to and projecting beyond said first named flanges into close proximity to the proximate pedestal, a seat pivotally connected to said side members, a pair of upright links forward of said standards pivotally connected at their lower ends to said pedestals and at their upper ends to said side members and means carried by said links for movably supporting said seat forwardly of said links.

MERRILL WILKINS HARD.