Dec. 15, 1942. M. W. HARD ET AL 2,305,077

THEATER CHAIR

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FIG. 1.

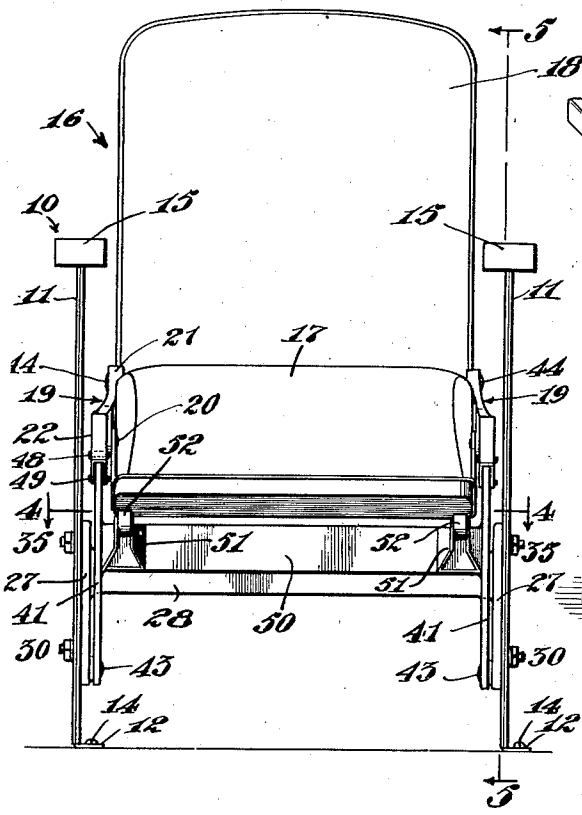


FIG. 2.

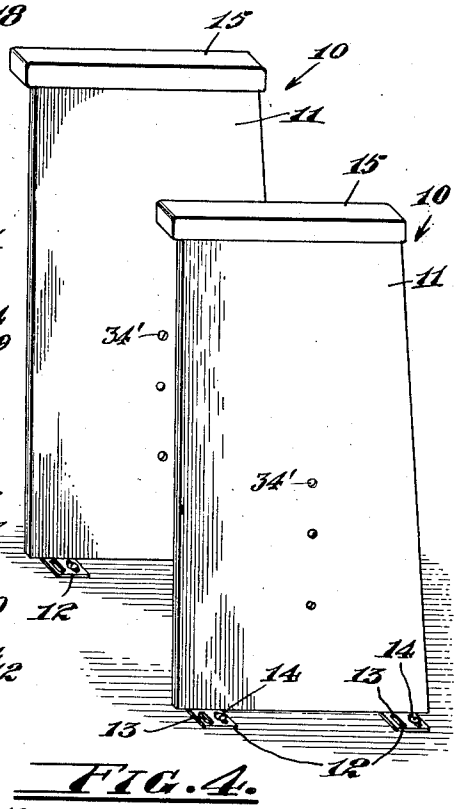


FIG. 3.

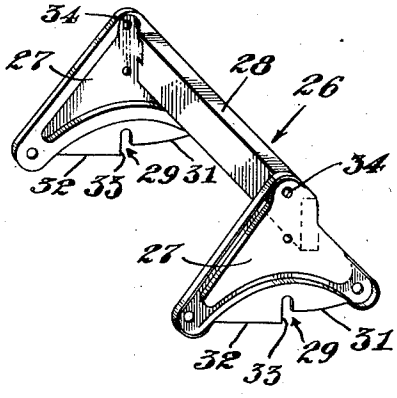
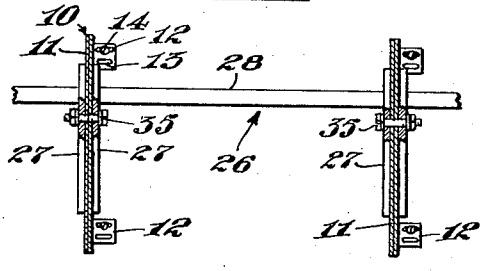


FIG. 4.



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FIG. 6.

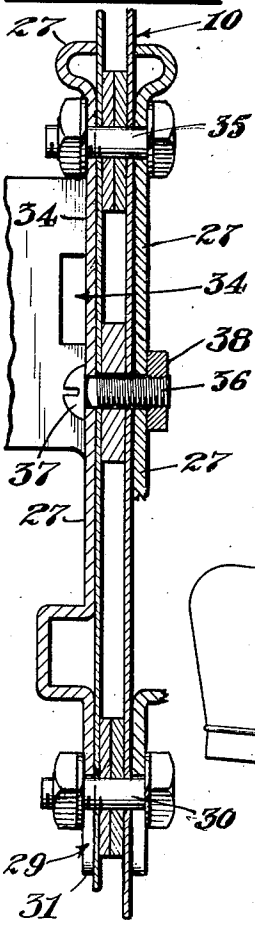


FIG. 5.

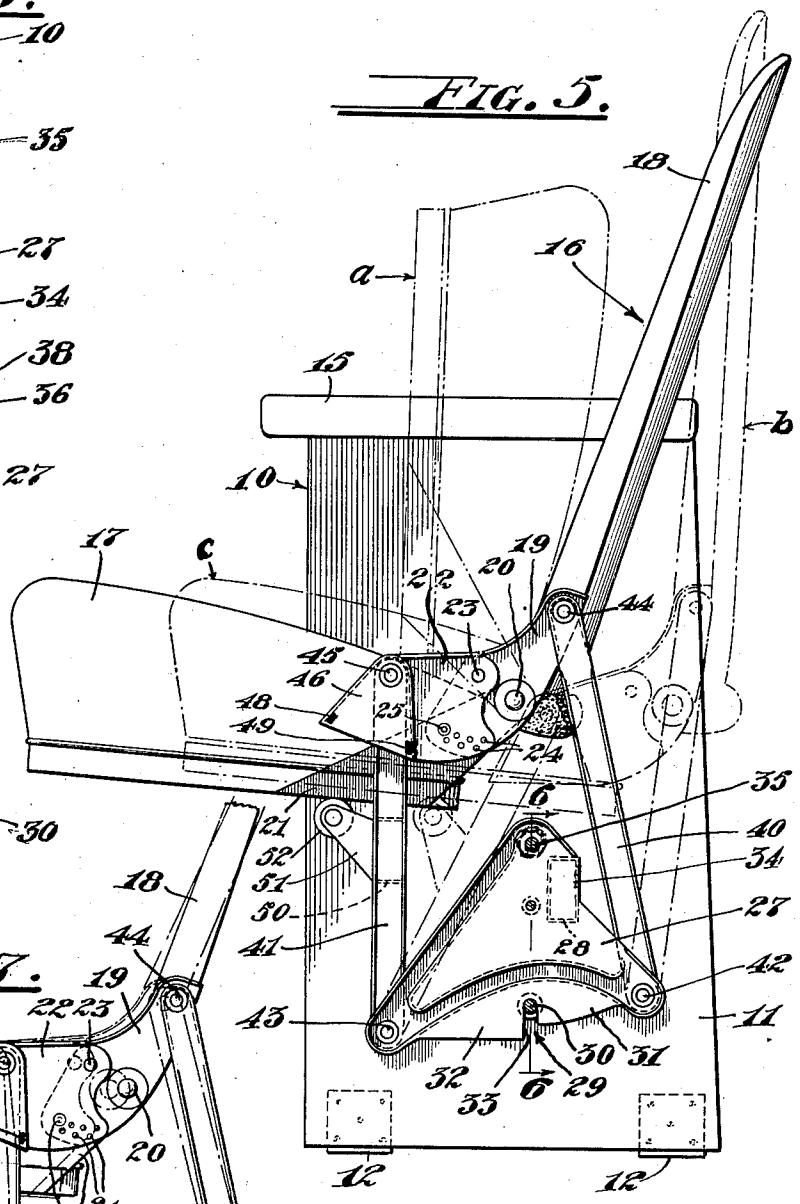
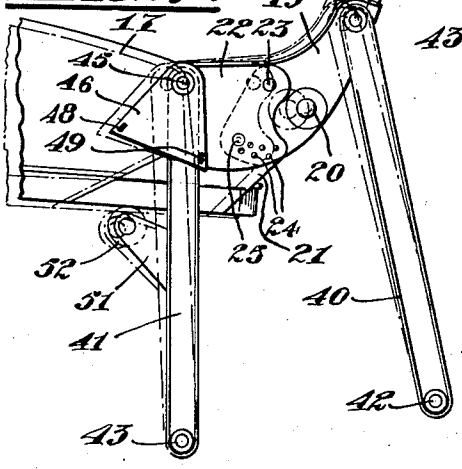


FIG. 7.



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THEATER CHAIR

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Application September 28, 1940, Serial No. 358,906

9 Claims. (Cl. 155—116)

This invention relates to a chair and pertains especially to the type of chair employed in auditoriums of theaters and the like wherein the chairs are arranged in rows that are sometimes straight and sometimes curved.

An object of the invention is to provide a chair embodying a back pivoted to swing horizontally together with a seat pivotally connected to the lower end portion of the back for vertical swinging movement relative thereto, whereby the seat may be disposed in either a horizontally extended operative position or be arranged in an upwardly extended folded position, in which means are provided whereby the occupant of the chair may effect oscillation of the chair back and impart a substantially rectilinear movement of the seat while the latter is occupied and in its horizontally extended operative position, and whereby the knees of the chair's occupant may be retracted by retraction of the seat to afford such clearance between the occupant's knees and the back of a chair in front of the occupant as to facilitate the passage of a person between the frontal chair and the knees of a person occupying the retracted seat.

A particular object of the invention is to provide a mounting for the chair seat which will permit considerable retractive movement of the seat and in which the angular relation of the seat and its back during such movement will range from an obtuse angle when the seat is in its forwardmost position, to an acute angle when the seat is in its retracted position whereby, when the seat is in its forwardmost position, the occupant of the chair when seated and resting against the chair back will occupy a comfortable position for an upwardly directed line of sight, yet when the seat is in its retracted position the occupant will be caused to assume such forwardly bent posture as to be uncomfortable while looking upwardly, such as to discourage the occupant from retaining the seat in its retracted position for a prolonged period, and whereby the chair's occupant will be inclined to normally maintain the seat in its forwardmost position.

Another object is to provide a chair seat and back assembly of the above character adapted to be interposed between a pair of standards and in which the operative parts are so mounted and arranged as to be independent of the standards whereby the seat and back assembly may be applied to and removed from the standards as a unit without disturbing the mountings of the seat and back.

Another object is to provide a means for effecting ready attachment of the seat and back assembly to the standards and its removal therefrom and which is adapted to permit positioning of the standards either in parallel or radial relation to each other whereby the seat and back assembly may be positioned between the standards of chairs arranged in either straight or curved rows.

A further object is to provide a construction in the mounting of the chair seat and back whereby the normal angular relation of the seat and back may be varied as may be required in adapting the assembly to various floor pitches and to varying lines of sight.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention is carried into effect as illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a front elevational view of the chair, showing the parts in their normal position;

Fig. 2 is a perspective view with portions broken away of a pair of standards with the chair seat and back assembly removed;

Fig. 3 is a perspective view of detachable mounting of the chair seat and back assembly showing it as detached and with the seat and back assembly removed;

Fig. 4 is a view in horizontal section taken on the line 4—4 of Fig. 1;

Fig. 5 is a view in vertical section and elevation taken on the line 5—5 of Fig. 1;

Fig. 6 is an enlarged vertical section taken on the line 6—6 of Fig. 5; and

Fig. 7 is a detail in side elevation of the chair seat and back connections and their mountings as detached.

Referring to the drawings more specifically, 10 indicates a chair standard which may be of any suitable construction but which is here shown as embodying a vertically extending panel 11 adapted to be rigidly affixed to a floor or other suitable support; the lower end of the standard being here shown as equipped with a pair of shoes 12 formed with slots 13 to receive screws 14 by which the standard may be secured to a supporting surface. The upper end of the standard 10 is fitted with an arm rest 15.

Between a pair of the standards 10 is detachably mounted a chair seat and back assembly 16 embodying a seat 17 and a back 18 pivotally interconnected and mounted for collective near horizontal movement back and forth between the standards 10.

The connection between the seat 17 and back 18 comprises a pair of side plates 19 affixed to the lower side portions of the back 18, to each of which side plates the seat 17 is pivotally connected by a pivot 20 connecting with an upwardly and rearwardly extending bracket 21 on each side of the seat 17.

Each of the side plates 19 is fitted with an adjustable forward extension 22 which is connected at an upper rearward portion thereof to the plate 19 by a pivot 23 for vertical swinging adjustment around the pivot. On the extension 22 being adjusted to the desired position around the pivot 23 it is securely fastened against movement relative to the side plate 19 by engaging any one of a series of holes 24 in the extension 22 with a rivet 25 engaging the side plate 19.

The seat and back assembly above described is movably and removably supported between a pair of the standards 10, for which purpose a mounting 26, shown in Fig. 3, is provided, which mounting embodies a pair of end plates 27 carried on and connected by a crossbar 28. The end plates 27 are designed to be detachably secured to the panels 11 of a pair of the standards 10, and for which purpose the lower margin of each of the end plates 27 is formed with a notch 29 adapted to be positioned astride the shank of a locating bolt 30 projecting from and carried by the panel 11; the rear portion 31 of the lower margin of the plate 27 being offset upwardly from the front portion 32 thereof on the opposite side of the notch 29 so that one side wall 33 of the latter will project downwardly below the marginal portion 31 to serve as an abutment for the locating bolt 30 and facilitate introducing the bolt 30 into the notch 29. The upper marginal portion of each of the end plates 27 is formed with an opening 34 which is engageable with a bolt 35 carried on and projecting from the panel 11 in vertically spaced relation to the bolt 30.

As a further means of attachment between the end plates 27 and the standards 10 stove bolts 36 are passed through the standards and through the plates 27 as shown in Fig. 6 after effecting engagement between the end plates 27 and the bolts 30 and 35; the stove bolts 36 being equipped with the usual head 37 and nut 38 arranged to clamp the plate 27 engaged thereby against the side of the panel.

A pair of upstanding links 40 and 41 are pivotally connected at their lower ends to each of the plates 27 by pivot pins 42 and 43 and the upper ends of which are connected respectively to the side plates 19 and their extensions 22 by pivot pins 44 and 45. The upper end portion of the link 40 overlies the outer face of the plate 19 and pivotally connects with the latter at a point spaced upwardly and rearwardly from the pivotal connection 20 between the seat 17 and back 18. The upper end portion of the link 41 underlies an outwardly off set portion 46 on the forward end of the side plate extension 22, which off-set portion is formed with downwardly diverging side walls extending on opposite sides of the edges of the link 41 and which walls carry resilient bumpers 48 and 49 arranged to serve as stops to limit swinging movement of the seat and back assembly on the support afforded by the links 40 and 41.

The forward links 41 are connected together by a cross bar 50 which carries forwardly projecting brackets 51 on which are mounted rollers 52 on which the underside of the seat 17 is adapted to abut when the seat is in its lowered position; the rollers 52 being arranged to abut the underside of the seat 17 at points spaced forward from the vertical plane of the axis of the pivot 45 of the link 41. The pivot 45 is spaced forwardly of the pivot 20 and on a plane below the pivot 19.

The forward links 41 are shorter than the rearward links 40 and the pivots 43 at their lower ends are on a plane spaced slightly below the plane of the axis of the pivot 42 which arrangement of the links and their pivotal connections will cause the seat and back assembly to travel on a slight upwardly inclined path during the collective rearward movement of the seat and back and conversely to cause the seat and back to travel on a downward inclined path on forward movement thereof.

In the application and operation of the invention a plurality of the standards 10 are arranged in either a straight or curved row and secured to a floor in an upright position with adjacent pairs of the standards spaced apart either in parallel or slightly radial relation to each other a distance substantially corresponding to the distance between the outer faces of the plates 27 on the support 26 and such that the notches 29 may be engaged with the locating bolts 30 and the bolts 35 engaged in the openings 34. In thus spacing adjacent standards 10 they are spotted on the floor according to a measurement taken between points on the floor in vertical alignment with the axes of the aligned bolts 30 and 35, whereby the panels 11 of an adjacent pair of the standards may be disposed either in parallel or slightly angular relation to each other without placing the bolts 30—35 out of proper position for engagement with the plates 27.

In effecting engagement of the bolts 30 and 35 with the plates 27 the latter are initially positioned with the rear marginal portions 31 thereof on the bolts 30, then positioned to extend through the standards and then advancing the plates 27 until the openings 34 thereof are opposite openings 34' in the standards and until the notches 29 are positioned above the bolts 30 whereupon the plates 27 will drop downwardly relative to the bolts 30 until such bolts are seated in the upper ends of the notches 29 thus locating the plates 27 in position to receive the bolts 35 and 36 which are then put in place to fasten the assembly between the standards. In this fashion any suitable number of the standards may be mounted and adjusted to their proper relative positions before assembling the seats thereon. Manifestly this mode of mounting the seats on the standards affords a means of readily permitting removal and replacement of the seat and back assembly without disturbing the standards.

By reason of the relative arrangement of the links 40 and 41 and their pivotal connections, the seat and back assembly will normally assume its operative position as shown in full lines in Fig. 5, in which position the seat 17 will be disposed in its forwardmost position assumed when the stop 49 abuts one edge of the link 41. The forward end portion of the seat 17 will then protrude into the aisle or space forward of the standards. When it is desired to dispose the seat clear of such space it may be swung upwardly on the pivots 20 into the vertically extended position indicated by the broken lines *a* in Fig. 5.

When it is desired to retract the seat 17, as when occupied, such may be accomplished by the

occupant exerting a rearward thrust on the seat through the lower limbs which is ordinarily effected by drawing the feet rearwardly and shoving against the floor. This action causes the seat and back assembly to move rearwardly on the supporting links **40** and **41** with the seat retracting slightly on the rollers **62** and moving a short distance upwardly. At the same time the back **18** will advance slightly at its upper end and will move rearwardly at its lower end as indicated by the broken line *b* in Fig. 5.

This rearward movement of the seat will be limited by the stops **48** striking the forward edges of the links **41**. The forward edge of the seat will then be considerably retracted relative to its normal advanced position as indicated by the broken lines *c* in Fig. 5.

The seat and back assembly will be retained in its retracted position under the urge of its occupant and on cessation of the thrust of the occupant's lower limbs will gravitate back to its normal advanced position where it comes to rest with the stops **49** abutting the links **41**.

It will be seen from the foregoing that the operating parts of the chair, including the stops, are each and all completely independent of the standards **10**, and are thus embodied in a unit which may be applied to and removed from the standards in toto.

Previous to mounting the seat assembly between the standards, the proper angular relation of the seat and back is determined according to the line of sight leading from the optical centers of a normal person of average height to a center point on a screen or stage, and the extensions **22** on the side plates **19** are adjusted on the pivots **23** to the desired position and then fixed in such position by the rivets **25**.

We claim:

1. In a chair, opposed standards, a seat and back assembly in which the seat and back are pivotally connected for relative movement, links pivotally connected at their upper ends to and depending from the seat and back assembly, mounting plates to which the lower ends of the links are pivoted, stop means for limiting the movement of said links to positions in which the seat is extended and retracted respectively relative to the standards, and means for securing said plates to said standards.

2. In a chair, opposed standards, a seat and back assembly in which the seat and back are pivotally connected for relative movement, links pivotally connected at their upper ends to and depending from the seat and back assembly, mounting plates to which the lower ends of the links are pivoted, stop means for limiting the movement of said links to positions in which the seat is extended and retracted respectively relative to the standards, and means for securing said plates to said standards including members fixed on said standards, said plate having slots therein for detachably receiving said members.

3. In a chair, opposed standards, a seat and back assembly in which the seat and back are pivotally connected for relative movement, links pivotally connected at their upper ends to and depending from the seat and back assembly, mounting plates to which the lower ends of the links are pivoted, stop means for limiting the movement of said links to positions in which the seat is extended and retracted respectively relative to the standards, and means for securing said plates to said standards, and a rigid cross bar carried by and joining said plates.

4. In a chair, opposed standards, a seat and back assembly in which the seat and back are pivotally connected for relative movement, links pivotally connected at their upper ends to and depending from the seat and back assembly, mounting plates to which the lower ends of the links are pivoted, stop means for limiting the movement of said links to positions in which the seat is extended and retracted respectively relative to the standards, and means for securing said plates to said standards, said links being arranged in front and rear pairs, the links of the rear pair having their pivotal connections with said assembly located above and rearwardly of the pivotal connection of the seat and back, the links of the front pair having their pivotal connections with the assembly located forwardly of said pivotal connection of the seat and back and below the plane of the upper ends of the links of the rear pair.

5. In a chair, opposed standards therefor, a seat, a back, side plates fixed to the back, pivotal connections between said plates and said seat, extensions having pivotal connections with said plates, front and rear links pivoted at their upper ends to the said extensions and plates respectively, mounting plates to which the lower ends of the front and rear links are pivoted, means for securing said mounting plates to said standards, setting means for fixing the side plates and said extensions against relative movement on the pivot connections therebetween, to set the seat and back in predetermined positions of adjustment.

6. In a chair, opposed standards therefor, a seat, a back, side plates fixed to the back, pivotal connections between said plates and said seat, extensions having pivotal connections with said plates, front and rear links pivoted at their upper ends to the said extensions and plates respectively, mounting plates to which the lower ends of the front and rear links are pivoted, means for securing said mounting plates to said standards, setting means for fixing the side plates and said extensions against relative movement on the pivot connections therebetween, to set the seat and back in predetermined positions of adjustment, and stop members mounted on said extensions for limiting the movement of said links, the adjustment of said side plates and extensions before said affixation thereof providing for changing the positions of said links whereby to change the position set of seat and back as aforesaid.

7. In a chair, opposed standards therefor, a seat, a back, side plates fixed to the back, pivotal connections between said plates and said seat, extensions having pivotal connections with said plates, front and rear links pivoted at their upper ends to the said extensions and plates respectively, mounting plates to which the lower ends of the front and rear links are pivoted, means for securing said mounting plates to said standards, setting means for fixing the side plates and said extensions against relative movement on the pivot connections therebetween, to set the seat and back in predetermined positions of adjustment, and stop members mounted on said extensions for limiting the movement of said links, the adjustment of said side plates and extensions before said affixation thereof providing for changing the positions of said links whereby to change the position set of seat and back as aforesaid, a rigid cross bar joining and carried by said mounting plates, and anti-friction seat supporting rollers mounted on the front links and engaging the

under side of said seat forwardly of the major axes of said front links.

8. In a chair, opposed fixed standards, a seat and back assembly, plates on the sides of said assembly, front and rear pairs of links having their upper ends pivoted to said plates at vertically spaced points forwardly and rearwardly of the juncture of the seat and back elements of said assembly, a pair of mounting plates to which the lower ends of the front and rear links are pivoted so that said links are disposed in upright position and are movable to permit the seat and back assembly to be extended and retracted in a substantially horizontal plane by an occupant of the seat when the mounting plates are attached to said standards, and means for anchoring said mounting plates to the standards.

9. In a chair, opposed fixed standards, a seat and back assembly, plates on the sides of said assembly, front and rear pairs of links having their upper ends pivoted to said plates at vertically spaced points forwardly and rearwardly of the juncture of the seat and back elements of said assembly, a pair of mounting plates to which the lower ends of the front and rear links are pivoted so that said links are disposed in upright position and are movable to permit the seat and back assembly to be extended and retracted in a substantially horizontal plane by an occupant of the seat when the mounting plates are attached to said standards, and means for anchoring said mounting plates to the standards including locating members projecting from opposed faces of the standards, said mounting plates having openings therein for receiving the locating members so that when said plates are in certain positions they may be anchored to the standards and when moved to other positions may be detached from said locating members.

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