Nov. 7, 1950 A. C. HOVEN ET AL 2,529,451

RETRACTING TYPE THEATER CHAIR

Filed Aug. 11, 1947 2 Sheets-Sheet 1

Fig. 1

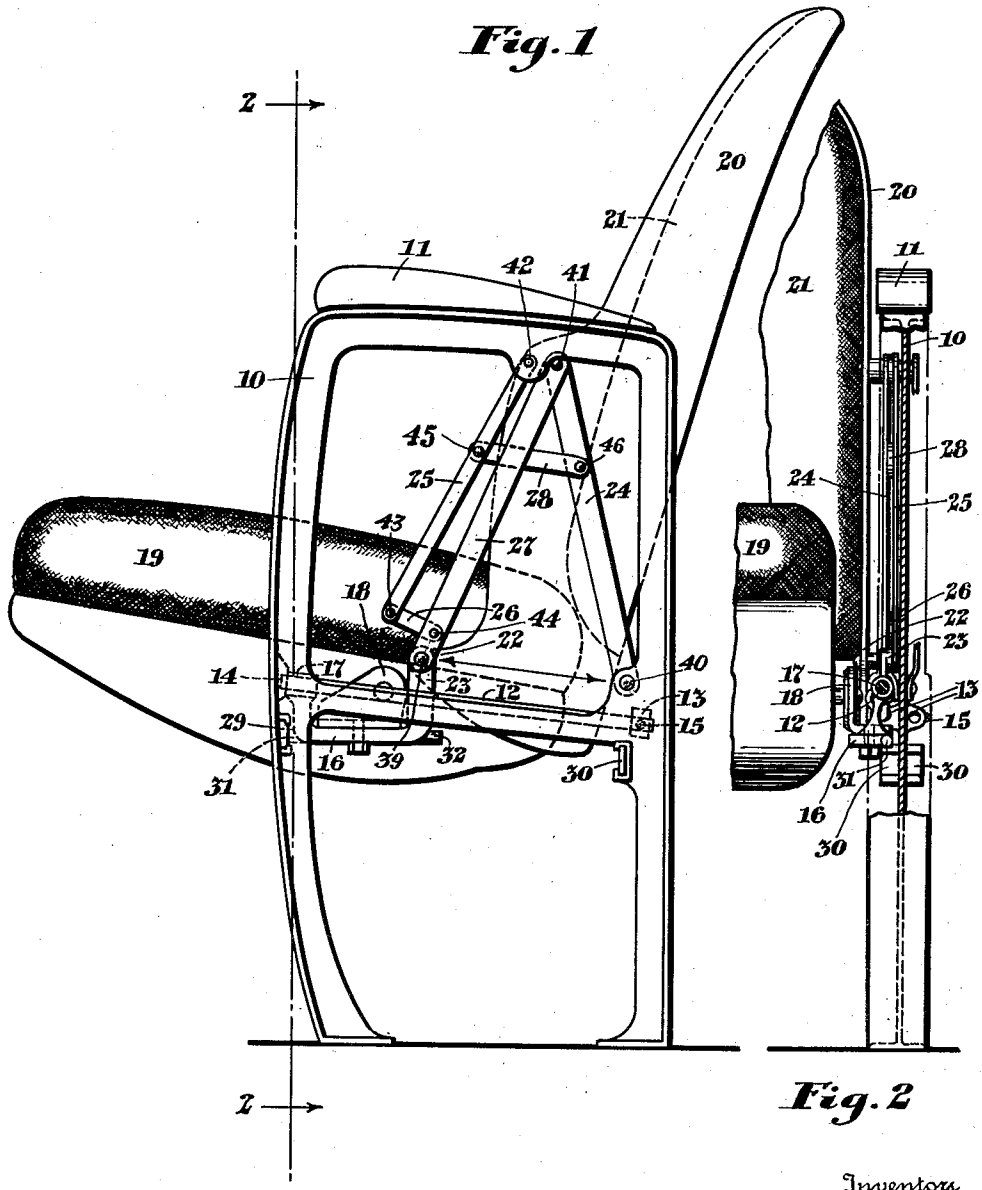


Fig. 2

Inventors

Alfred C. Hoven

Walter E. Nordmark

William S. Lindberg

By John S. Braddock

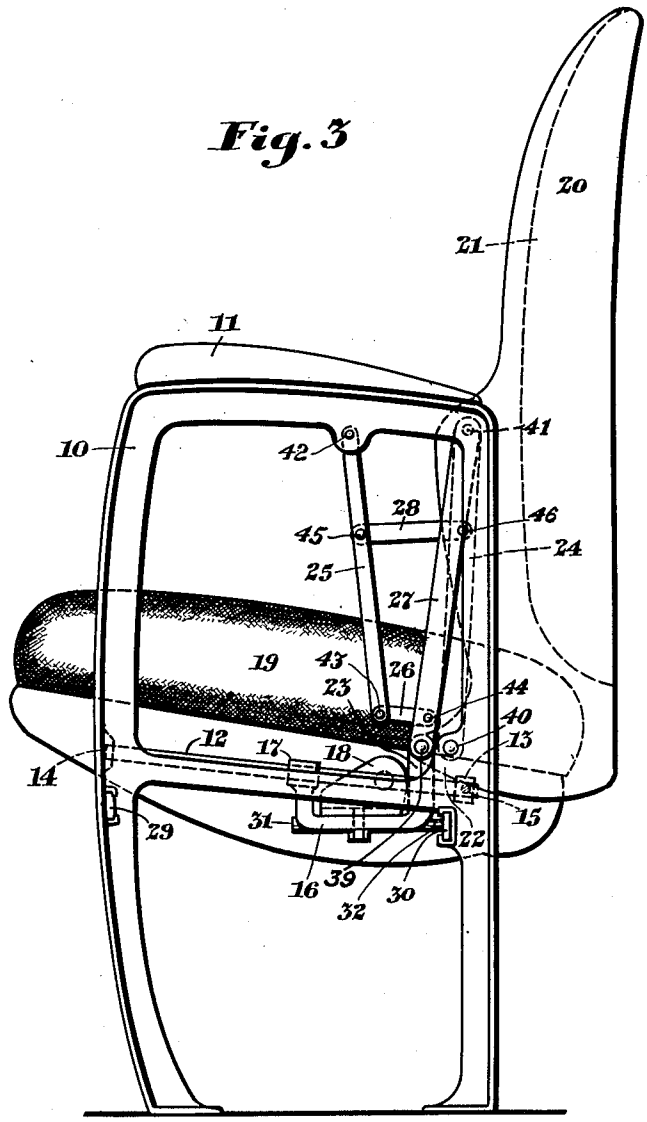
Attorney

Nov. 7, 1950 A. C. HOVEN ET AL 2,529,451

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Filed Aug. 11, 1947 2 Sheets-Sheet 2

Fig. 3



Inventors

Alfred C. Hoven

Walter E. Nordmark

William S. Lindberg

By *John S. Braddock*

Attorney

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RETRACTING TYPE THEATER CHAIR

Alfred C. Hoven, Walter E. Nordmark, and William S. Lindberg, Grand Rapids, Mich., assignors to American Seating Company, Grand Rapids, Mich., a corporation of New Jersey

Application August 11, 1947, Serial No. 767,992

3 Claims. (Cl. 155—116)

1

The present invention relates to chairs and more particularly to chairs of the retracting type for use in theaters, auditoriums and the like. Some of the subject-matter herein disclosed is claimed in our co-pending application Serial No. 784,182 filed November 5, 1947, which matured into Patent No. 2,506,151 on May 2, 1950; and other subject-matter herein disclosed is claimed in our co-pending application Serial No. 148,228 filed March 7, 1950.

The primary objects of the invention are to provide an improved chair of the retracting type wherein the occupant may move the seat rearwardly in order to permit others to pass in front of him without his having to rise from the seat; to provide such a retracting chair in which the space beneath the seat is entirely free of mechanism thus to facilitate cleaning of the floor beneath the seat and thus to eliminate any projecting parts which might detract from the comfort or safety of a patron in the rear of the chair; to provide such a retracting chair in which the seat is pivotally mounted on seat carriers so that the seat may be turned to a raised position of non-use thus to provide a maximum of space in front of the chair for the ingress and egress of patrons between the rows; to provide such a chair in which the seat carriers are mounted on the standards for quiet and smooth forward and rearward movements; and in general to provide such a retracting chair which is efficient in operation, reasonably economical in manufacture and attractive in appearance.

An illustrative embodiment of the invention is shown in the accompanying drawings, wherein:

Figure 1 is a side elevational view of the left hand side of the chair, the chair seat and back being shown in forward, unretracted positions;

Figure 2 is a fragmentary front elevational view of the same; and

Figure 3 is a side elevational view similar to Figure 1 and showing the various parts in their rearward or retracted position.

Referring now in detail to these drawings, the chair shown therein is mounted on a frame comprising spaced, upright, chair-supporting standards 10. The term "frame" as used herein and in the appended claims is intended to include spaced standards as shown and also a unitary structure having cross braces or other connections. The standards 10 are provided with conventional arm rests 11 on the upper ends thereof, and each standard may be so cast as to form a common support for the adjacent sides of chairs installed in a row.

2

On the inner face of each standard 10 is mounted a rearwardly-downwardly sloping guide rod 12, said rods being installed on the standards by passing them forwardly through lugs 13, seating the forward ends in sockets 14, and turning screws 15 in the lugs 13 into engagement with the rearward ends of the guide rods. It will be understood that the mechanisms at opposite sides of the chair are identical except as to right-hand and left-hand formation, although only the mechanism at the left-hand side of the chair is shown in the drawings.

Seat carriers 16 are provided with sleeves 17 slidably disposed on the guide rods 12 for forward and rearward movement on said rods. A bracket 18 is mounted on each seat carrier 16, and an upholstered chair seat 19 is pivotally mounted on the brackets 18 so that the seat is turnable about a horizontal axis to the lowered position of use shown or to a raised position of non-use (not shown), and the seat is also movable forwardly and rearwardly with the seat carriers 16 to forward and retracted positions.

The chair back comprises a sheet metal back plate 20 whose horizontal cross-section is generally of forwardly opening U-shape, and an upholstered back 21 secured within the back plate. The chair back is pivotally connected at its opposite sides to the rearward ends of the seat carriers 16, by means of extensions 22 at the lower forward corners of the back plate 20 which are pivotally connected at 39 to upwardly extending arms 23 at the rear of the seat carriers. Back-supporting links 24 have their lower ends pivotally connected at 40 to the standards 10 and their upper ends pivotally connected at 41 to the sides of the back plate 20 for suppporting the chair back for forward and rearward movements and for turning movement about a horizontal axis concentric with the pivotal connections 41 of the back plate 20 to the links 24.

In order that the sleeves 17 may travel freely along the guide rods 12 with no binding action, it is important that the rearward ends of the seat carriers travel in paths substantially parallel to the guide rods 12, as indicated by the double arrow in Figure 1. This is accomplished by means of control links 25 pivotally connected at 42 to the upper portions of the standards 10. Connecting links 26 are pivotally connected at 43 to the lower ends of the control links 25 and are pivotally connected at 44 to bracing members 27 rigidly secured to opposite sides of the back plate 20. Other connecting links 28 are pivotally connected at 45 to the medial portions of the control links

25 and are pivotally connected at 46 to the medial portions of the back-supporting links 24. It will be seen from a comparison of Figures 1 and 2 of the drawings, that when links 24 move rearwardly about their pivots 40, they carry with them the upper part of the chair back pivoted to said links at 41. The pivotal connections at 39 between the lower part of the back and the seat carriers 16 must move approximately twice as far as the connections at 41, and in substantially straight paths in order to maintain the seat at the same inclination and give it the required distance of travel, and also in order to turn the back to a near-vertical position. This movement of the connections 39 is effected by links 28, 25 and 26. Links 28 being connected at 46 to links 24 nearest the latters' free ends 41 and being connected to links 25 at 45 nearest their fixed ends 42, the free ends 43 of links 25 are caused to move faster and farther than the free ends 41 of links 24, and this movement of links 25 is transmitted to the lower part of the back and to the seat carrier through the short links 26. The seat carriers 16 are thus moved in substantially straight paths parallel to the guide rods 12 and there is therefore no binding action between the sleeves 17 and the guide rods 12. If desired a lubricant may be applied to the guide rods 12 to further reduce friction.

Forward and rearward movements of the seat carriers are limited by means of rubber cushion front stops 29 and similar rear stops 30 on the standards 10, which stops are contacted by front bumpers 31 and rear bumpers 32 respectively on the seat carriers.

It will be seen that as the seat is retracted by the occupant to increase the space in front of the chair, the back is moved rearwardly and also angularly turned to a near-vertical position so that a minimum of space to the rear of the chair is required for retraction.

While but one specific embodiment of the invention has been herein shown and described, it will be understood that numerous details may be altered or omitted without departing from the spirit of the invention as the same is defined by the following claims.

We claim:

1. In a chair, a frame having guide rods at opposite sides thereof, seat carriers having sleeves on their forward ends mounted on the guide rods for forward and rearward movement thereon, a chair seat mounted on the carriers, a chair back pivotally connected at its opposite sides to the rearward ends of the seat carriers, back-supporting links having their lower ends pivotally connected to the frame and their upper ends pivotally connected to opposite sides of the chair back, control links pivotally depending from the upper portions of the frame forwardly of the back-supporting links, connecting links associating the lower ends of the control links with the back and other connecting links associating the medial portions of the control links with the medial portions of the back-supporting links whereby the pivotal connections of the back to the seat carriers are caused to move in straight paths parallel to the guide rods, and stop means for limiting

the forward and rearward movements of the carriers.

2. In a chair, spaced, upright, chair-supporting standards having rearwardly-downwardly sloping parallel guide rods mounted on the inner faces thereof, seat carriers having sleeves on their forward ends mounted on the guide rods for forward and rearward movement thereon, a chair seat pivotally mounted on the carriers, a chair back pivotally connected at its opposite sides to the rearward ends of the seat carriers, back-supporting links having their lower ends pivotally connected to the standards and their upper ends pivotally connected to opposite sides of the chair back, control links pivotally depending from the upper portions of the standards forwardly of the back-supporting links, connecting links associating the lower ends of the control links with the back and other connecting links associating the medial portions of the control links with the medial portions of the back-supporting links whereby the pivotal connections of the back to the seat carriers are caused to move in straight paths parallel to the guide rods, cushion stops at the fronts and rears of said standards, and bumpers on the fronts and rears of said seat carriers adapted to contact said cushion stops for limiting the forward and rearward movements of the carriers.

3. In a chair, spaced, upright chair-supporting standards, back-supporting links having their lower ends pivotally connected to the standards, a chair back pivotally connected at its opposite sides to the upper ends of said back-supporting links for forward and rearward movement therewith and said back having extensions at its opposite sides depending below its pivotal connections to said links, seat-carriers having their rearward ends pivotally connected to said extensions for forward and rearward movement therewith and having their forward ends mounted on the standards for movement in substantially straight paths, a chair seat mounted on the seat carriers, control links pivotally depending from the upper portions of the standards forwardly of the back-supporting links, connecting links associating the lower ends of the control links with the back, other connecting links associating the medial portions of the control links with the medial portions of the back-supporting links, and stop means for limiting the forward and rearward movements of the seat carriers.

ALFRED C. HOVEN.
WALTER E. NORDMARK.
WILLIAM S. LINDBERG.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,877,769	Knapp	Sept. 20, 1932
2,365,570	Lee	Dec. 19, 1914

FOREIGN PATENTS

Number	Country	Date
568,702	Germany	Jan. 5, 1933