April 1, 1958 R. T. HOWE ET AL 2,828,803

THEATER CHAIR WITH SELF-FOLDING SEAT

Filed Sept. 26, 1956

2 Sheets-Sheet 1

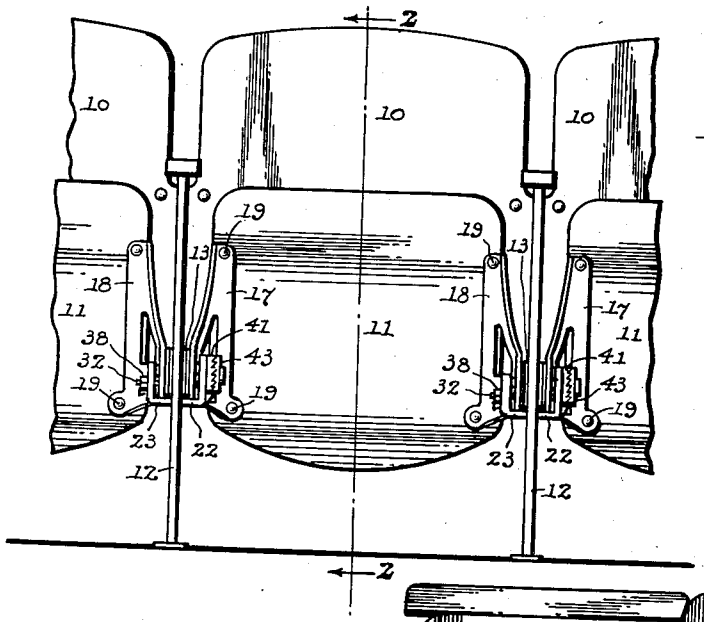


Fig. 1

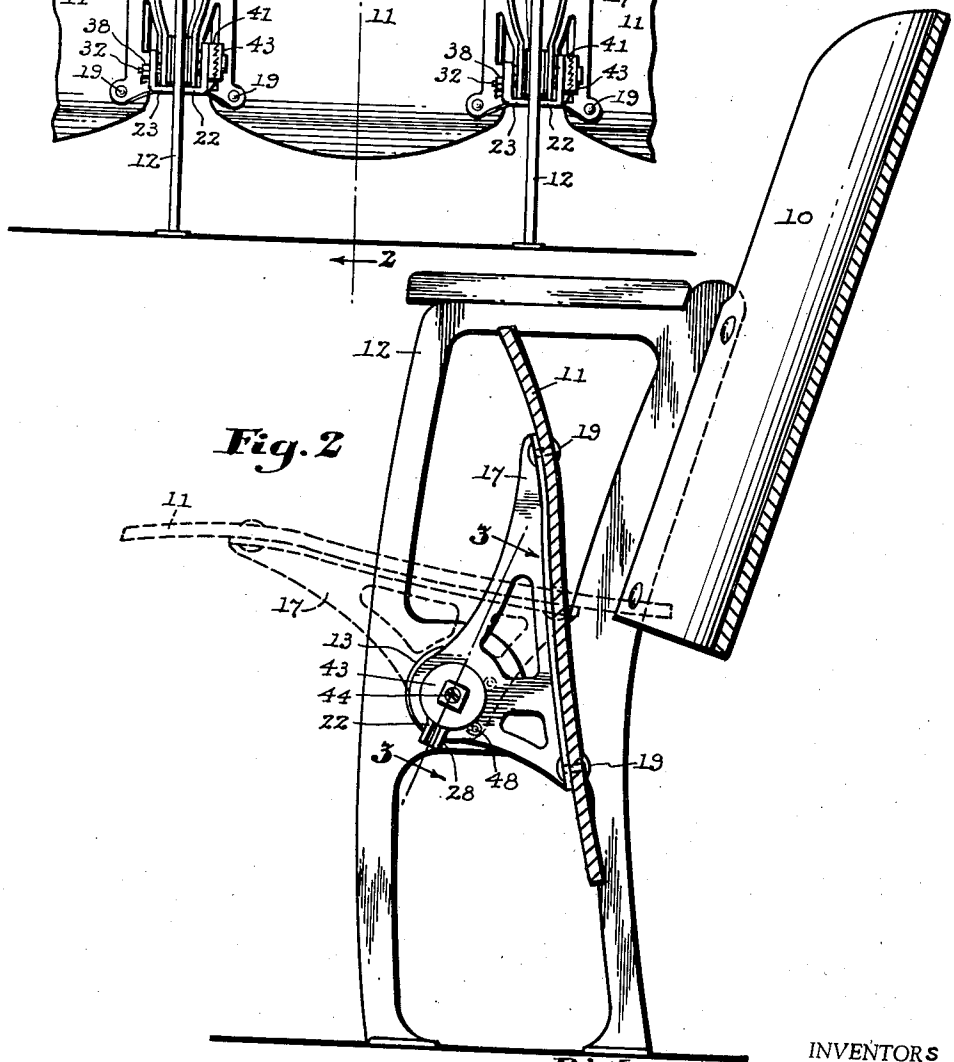


Fig. 2

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Fig. 3

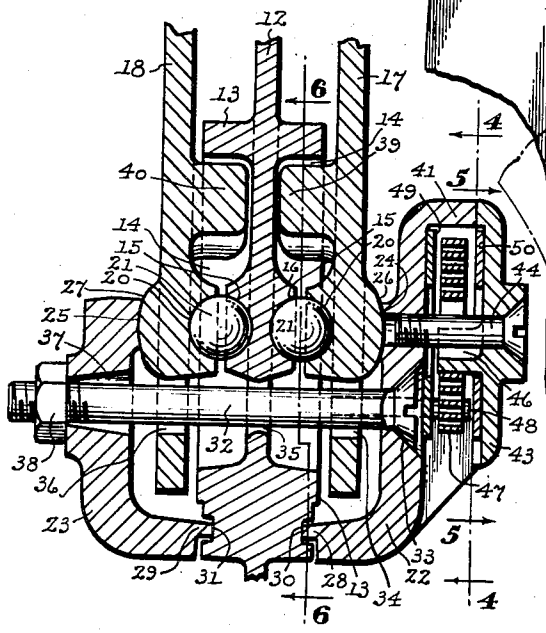


Fig. 4

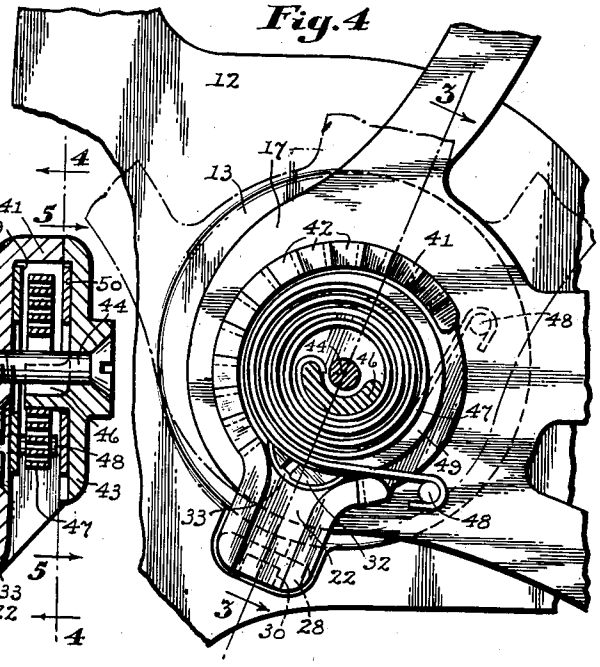


Fig. 5

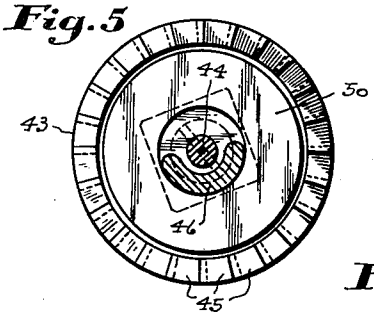


Fig. 6

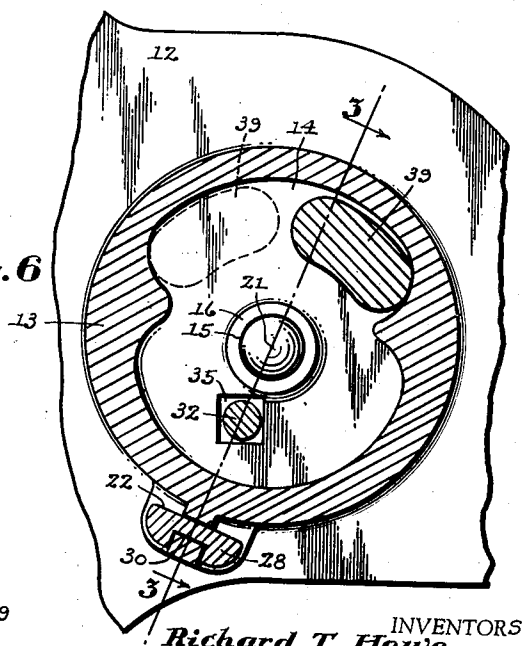
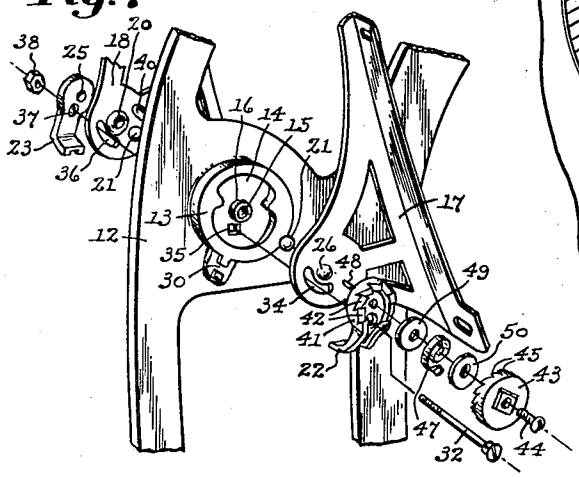


Fig. 7



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THEATER CHAIR WITH SELF-FOLDING SEAT

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Application September 26, 1956, Serial No. 612,186

3 Claims. (Cl. 155—85)

The present invention relates to chairs of the type installed in theaters, auditoriums and the like in rows of connected seating.

The primary objects of the invention are to provide a seat mounting hinge whereby chair seats of the plywood type mounted on exposed hinges may be made self-folding to raised non-use positions, thus to provide maximum space between rows of seats for the ingress and egress of patrons; to provide such an improved seat mounting hinge in which the self-folding mechanism is enclosed so that it cannot injure the chair occupants or damage their wearing apparel; to provide such a self-folding mechanism which is adjustable so that the force with which the seat is automatically raised to non-use position can be adjusted; and in general to provide such a mechanism which is quiet in operation, efficient in use, and reasonably economical in manufacture.

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

Figure 1 is a fragmentary front elevational view of a row of connected chairs with the vacant seats thereof automatically tilted to raised, non-use positions by the mechanisms of the present invention;

Figure 2 is an enlarged vertical sectional view of one of said chairs taken on line 2—2 of Figure 1;

Figure 3 is a greatly enlarged fragmentary sectional view of parts thereof taken on lines 3—3 of Figures 1, 4 and 6;

Figure 4 is a fragmentary vertical sectional view thereof taken on line 4—4 of Figure 3;

Figure 5 is a vertical sectional view of parts thereof taken on line 5—5 of Figure 3;

Figure 6 is a fragmentary vertical sectional view of other parts thereof taken on line 6—6 of Figure 3; and

Figure 7 is a fragmentary exploded view showing parts thereof in disassembled relation.

Referring now in detail to these drawings, connected seating of the type customarily installed in theaters and auditoriums is illustrated in Figure 1, wherein chairs comprising backs 10 and seats 11 are mounted on common supporting standards usually called "middle standards" 12. Each of the opposite faces of the middle standards 12 is provided with a generally circular emboss 13 having an upper raceway 14 therein, and with a hemi-spherical socket 15 formed in a smaller boss 16 at the approximate center of the circular emboss 13.

Each chair seat 11 is provided with a pair of seat arms 17, 18 secured to the bottom thereof at opposite sides of the seat as by means of rivets 19. Each of the seat arms 17, 18 has a hemi-spherical socket 20 complementary to the adjacent socket 15 in a standard 12, and steel balls 21 complete ball and socket connections between the seat arms 17, 18 and the standards 12. The seat arms 17, 18 and the adjacent balls 21 are secured in assembly with the standards 12 by means of clamping brackets 22, 23 respectively which have concave surfaces 24, 25 (see Figure 3) bearing against convex surfaces 26, 27 on the

inner surfaces of the seat arms 17, 18 and which also have tail parts 28, 29 engaged in keys 30, 31 on the standards 12 to prevent any turning movement of the clamping brackets relative to the standard. The clamping brackets 22, 23 on opposite sides of each standard 12 are secured to the standard by common fastening means comprising a bolt 32 which passes through a countersunk aperture 33 in the clamping bracket 22, through an arcuate clearance slot 34 in the seat arm 17, through an aperture 35 in the standard 12, through an arcuate clearance slot 36 in the seat arm 18, through an aperture 37 in the clamping bracket 23, and which is provided with a nut 38 threaded on the end thereof. By these means the seat arms 17, 18 have a limited lateral swinging adjustment relative to the standard to provide for curvature in a row of seating, and each seat is mounted on its supporting standards for independent swinging movement about a horizontal axis between a lowered use position indicated in dotted lines in Figures 2, 4 and 6 and a raised non-use position indicated in solid lines in these views. Lowering movement of the seat is limited to the seat's use position by the contact of stops 39, 40 on the seat arms 17, 18 with the forward ends of the raceways 14 on the standard, and raising movement of the seat is limited to the seat's non-use position by the contact of said stops 39, 40 with the rearward ends of said raceways 14.

One clamping bracket of each pair, as here shown the clamping bracket 22, is adapted to carry the mechanism whereby automatic self-folding of the seat 11 to its raised non-use position is effected. To this end, each clamping bracket 22 is specially cast with an integral, inwardly extending and cylindrically formed housing 41 having ratchet teeth 42 on its inner face. The housing 41 is provided with a cover plate 43 secured to the housing by means of a machine screw 44, said cover plate having ratchet teeth 45 thereon which are complementary to and which engage with the ratchet teeth 42 on the housing. An arcuate lug 46 formed on the cover plate 43 extends into the housing 41. A spiral spring 47 is disposed in the housing and has its inner end connected to the lug 46 and its outer end extended through an opening in the side of the housing and connected to a pin 48 projecting inwardly from the adjacent seat arm 17. This spiral spring 47 normally urges the seat arm 17 in the direction for swinging the chair seat toward its raised non-use position.

It will be seen that the spiral spring 47 associated with each chair seat can be adjusted with respect to the force it exerts in raising the seat, by loosening the machine screw 44 and setting the cover plate 43 at the desired adjusted position of ratchet-engagement with the housing 41, and then again tightening the machine screw 44. Thus each seat can be adjusted so that it is positively but quietly stopped at the limit of its raising movement, and all unoccupied seats in a row will automatically assume the same angle of upward tilt thus presenting a uniform appearance. Quiet operation of the mechanism is further insured by the interposition of a fiber washer 49 between the spiral spring 47 and the housing 41, and a similar fiber washer 50 between the spiral spring and the cover plate 43. If desired grease may be applied to the spring 47 to further insure quiet operation, with no danger of the grease smearing on the chair occupant's clothing because of the fact that the spring is enclosed within the housing and its cover.

It will thus be seen that the invention provides a quiet, efficient and economical self-folding seat hinge mechanism, and while but one specific embodiment of the invention has been herein shown and described it will be understood that numerous details of construction may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

We claim:

1. In a chair structure: spaced chair supporting standards; a chair seat having at its opposite sides seat arms pivotally mounted on the standards respectively whereby the seat is mounted for swinging movement about a horizontal axis between a lowered use position and a raised non-use position; a bracket fixedly secured to one of said standards and extending around the adjacent seat arm into juxtaposition with the inner face of said seat arm, said bracket having a cylindrical housing extending inwardly therefrom; a circular cover plate disposed against the inner face of the housing and having a lug extending into the housing; an inwardly extending pin on the adjacent seat arm; and a spiral spring within the housing having its inner end connected to said lug and having its outer end extending through an opening in the housing and connected to said pin for normally urging said seat arm in the direction for swinging the chair seat toward its raised non-use position.

2. A chair structure according to claim 1 characterized by having complementary ratchet teeth on the housing and on the cover plate whereby the cover plate may be engaged in adjusted position on the housing to adjust the torsional stress on the spiral spring.

3. In a chair structure: spaced chair supporting standards having opposed hemi-spherical sockets therein; a chair seat having at its opposite sides seat arms provided with hemi-spherical sockets disposed complementary to the sockets in said standards respectively; balls disposed in said complementary pairs of sockets; clamping brackets secured to the standards and having portions bearing against the inner surfaces of the seat arms to maintain the seat arms and the balls in assembly with the standards so that the seat is mounted on the standards for swinging movement about a horizontal axis between a lowered use position and a raised non-use position; a cylindrical housing extending inwardly from one of said clamping brackets; a circular cover plate disposed against the inner face of the housing and having a lug extending into the housing; an inwardly extending pin on the adjacent seat arm; a spiral spring within the housing having its inner end connected to said lug and having its outer end extending through an opening in the housing and connected to said pin for normally urging said seat arm in the direction for swinging the chair seat toward its raised non-use position; complementary ratchet teeth on the housing and on the cover plate whereby the cover plate may be engaged in adjusted position on the housing to adjust the torsional stress on the spiral spring; and fastening means passing through the cover plate and into the housing for securing the cover plate in adjusted position.

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