United States Patent

[11] 3,589,762

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[54] **RETRACTING CHAIR**
8 Claims, 10 Drawing Figs.

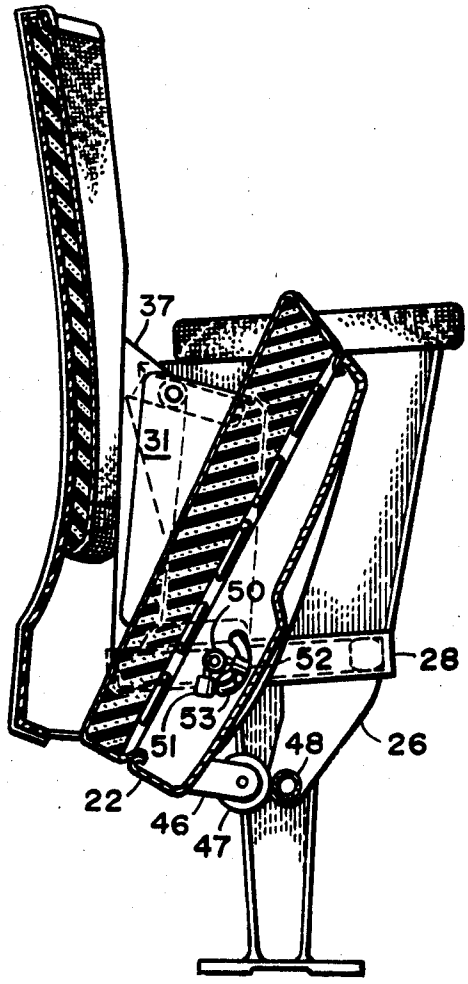
[52] **U.S. Cl.** **297/324**
[51] **Int. Cl.** **A47c 1/12**
[50] **Field of Search** 297/324, 318, 317, 331, 332, 333, 334, 336, 357

[56] **References Cited**
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Primary Examiner—Reinaldo P. Machado
Attorney—Dawson, Tilton, Fallon & Lungmus

ABSTRACT: A retracting auditorium chair is provided with a slidably and rotatably mounted seat which has a roller engaging a cross tube connecting the chair standards so that the roller rides upon the upper portion of the tube as the seat is lowered and engages the rear of the tube as the seat is raised. Connecting means between the seat and back cause the back to move to a vertical position as the seat is raised, and roller and track means supported by the standard guide the back in this movement.



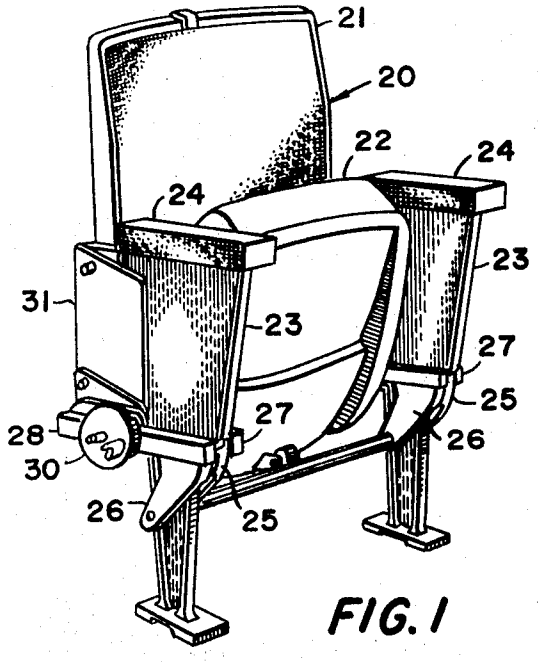


FIG. 1

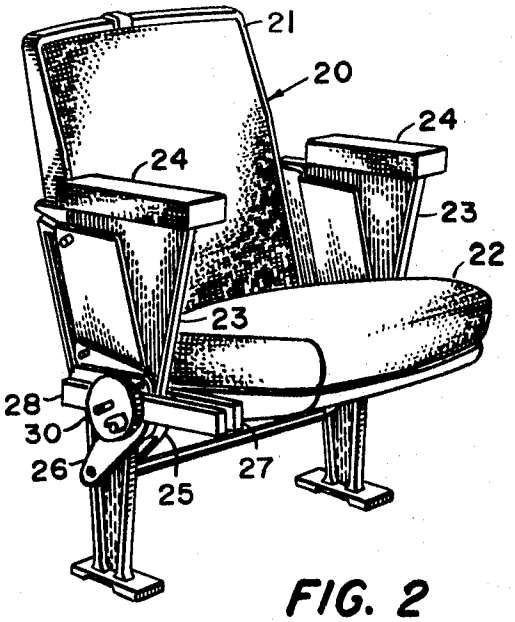


FIG. 2

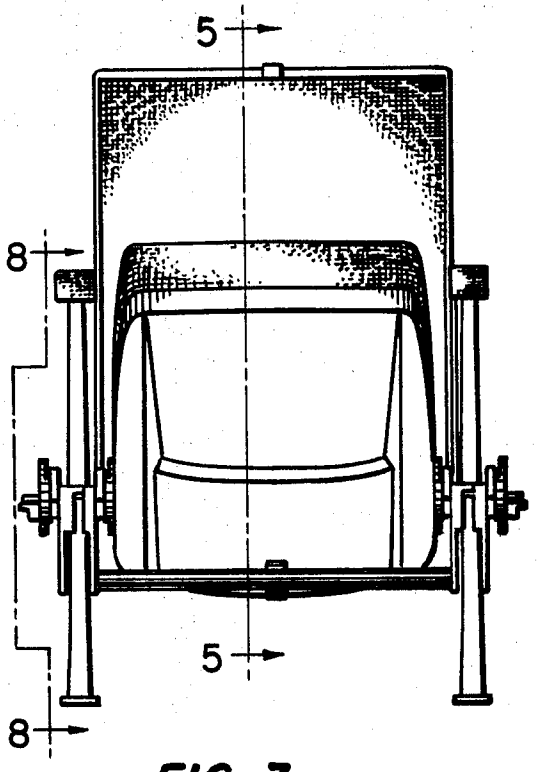


FIG. 3

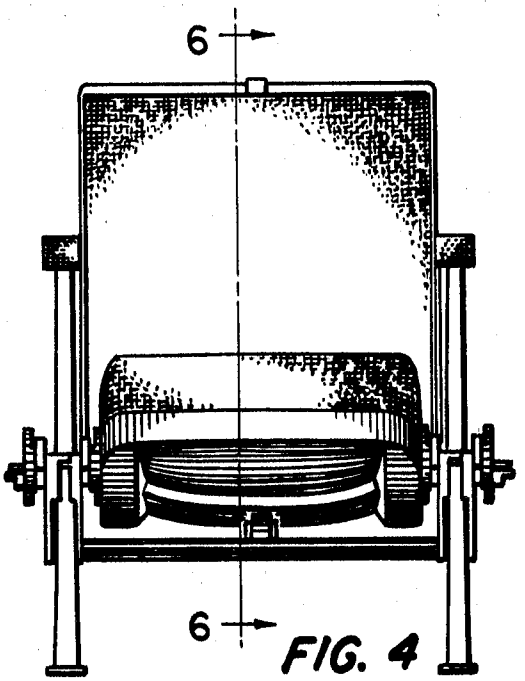


FIG. 4

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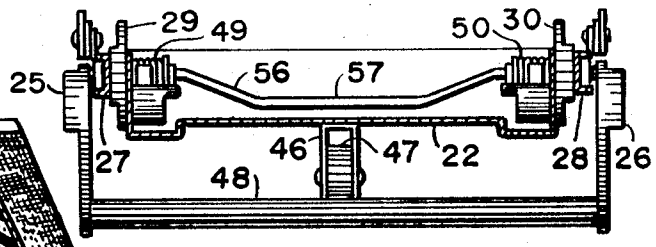


FIG. 7

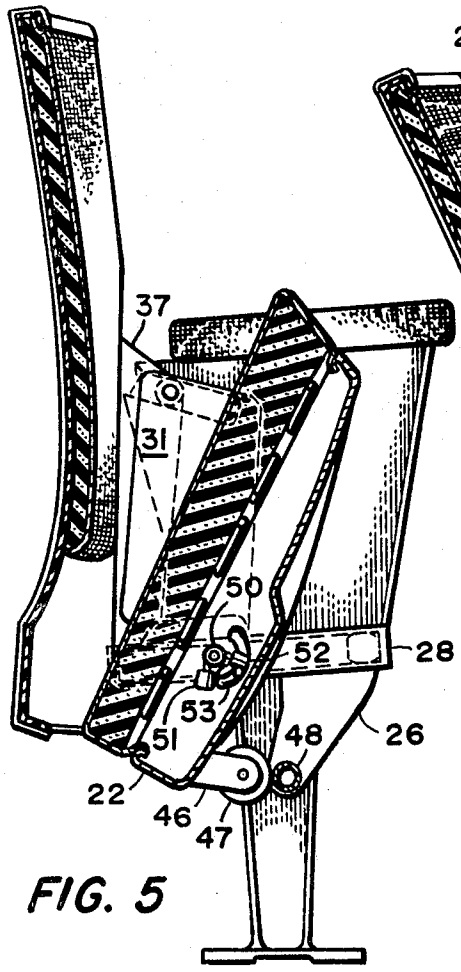


FIG. 5

FIG. 6

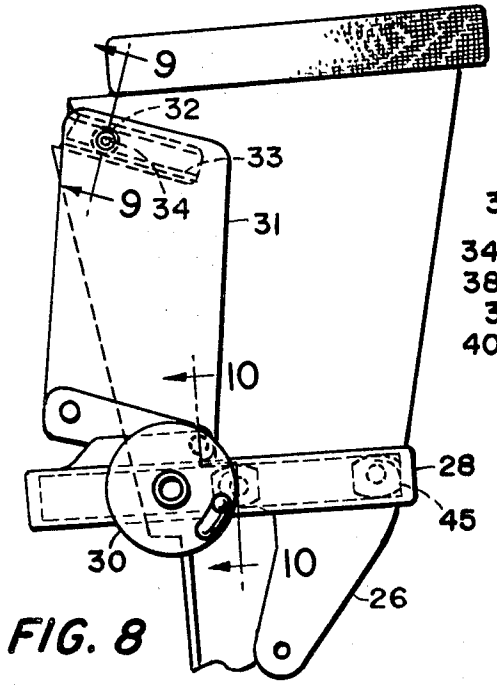


FIG. 8

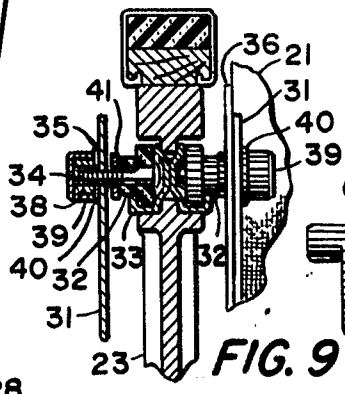


FIG. 9

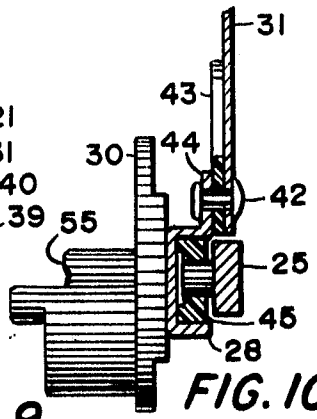


FIG. 10

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RETRACTING CHAIR

BACKGROUND AND SUMMARY

Retracting auditorium chairs have heretofore been provided in which means, including cables, are utilized in retracting the seat and also moving the back to a vertical position. Such structure, however, is complicated and expensive while also requiring greater maintenance costs and being subject to vandalism. I have discovered that a retracting chair structure can be provided with less parts and expense, requiring less maintenance and functioning with greater accuracy and with less noise, etc. A cross tube connecting the standards of the chair is utilized by mounting a roller upon the seat so that the roller travels up and down on the back side of the cross tube as the seat is lowered or raised. To prevent malfunctioning of the seat pivots of the chair, there is provided an alignment tube or rod between the seat pivots to keep them aligned at all times. To effect silent sliding of the seat during the raising and lowering operation, slides, such as nylon slides, are supported inside the hinge channel. Should clothing come into contact with the mechanism, the slides push the clothing out of the way so that no damage is caused. For supporting and guiding the seat back during operation, a flattened or D-shaped bolt is employed as a shaft for a roller carried by the back pivot, the bolt extending through a D-shaped opening in the back support so that the bolt remains in stationary position, preventing it from turning with the roller and loosening the nut carried by the bolt.

The foregoing and other structure which will be described in detail bring about a smooth and effective operation of the chair during raising and lowering of the seat and the movement of the back to rear and forward positions.

DRAWINGS

In the accompanying drawings,

FIG. 1 is a perspective view of the retracting chair in the retracted position so that the aisle is cleared for the passing of patrons;

FIG. 2, a perspective view of the chair in a position for occupancy;

FIG. 3, a front view of the chair in the retracted position;

FIG. 4, a similar front view of the chair in occupied position;

FIG. 5, a vertical sectional view of the chair taken at line 5–5 in FIG. 3 looking to the left (occupant's left);

FIG. 6, a similar vertical sectional view of the chair taken at line 6–6 in FIG. 4 looking to the left;

FIG. 7, a fragmentary sectional view of the seat pan taken at line 7–7 in FIG. 6 looking rearward and showing the seat pivot alignment rod and the roller behind the support tube;

FIG. 8 a side view of the right-hand standard taken at line 8–8 in FIG. 3 and showing the retracting mechanism in the retracted position;

FIG. 9, a fragmentary sectional view of the back pivot rollers in their tracks, the section being taken as indicated at line 9–9 in FIG. 8; and

FIG. 10, a fragmentary sectional view of the rear slide in the hinge channel, the section being taken as indicated at line 10–10 in FIG. 8

DETAILED DESCRIPTION

A retracting chair 20 comprises a back assembly 21 and a seat assembly 22 between two identical standards 23. The standards have arm rests 24, right-hand supports 25, and left-hand supports 26 (occupant's right and left). For one chair only one right and left supports are necessary, the second right and left supports being for adjoining chairs.

The retracting chair structure further comprises right-hand hinge channels 27, left-hand hinge channels 28, a right-hand seat pivot 29, a left-hand seat pivot 30, and a back support bracket 31 with its back pivot roller 32 riding back and forth in a track 33, as shown best in FIG. 9. The roller is attached by a flattened or D-shaped bolt 34 fitting into a D-shaped hole at

35 and attached to the back by a right-hand back wing 36 and a left-hand back wing 37. The nut 38 is concealed inside of a cap 39. There are washers 40 and 41 on the D-shaped bolt 34 to separate the back support bracket 31 from the nut 38 and the back wing 36 from the roller 32 respectively. At the hinge joint rivet 42, as shown best in FIG. 10, there is a spacer 43, preferably formed of nylon, between the back support bracket 31 and the flange 44 of the hinge channels 27 and 38 to prevent noise and scratching during the operation. The supports 25 and 26 have slides 45, which are also preferably formed of nylon, which ride inside of the hinge channels 27 and 28, as shown best in FIGS. 8 and 10.

On the bottom of the seat assembly 22, as shown best in FIGS. 5 and 6, there is a bracket 46 holding a roller 47 which rests and rides on the tube 48 held between the two supports 25 and 26.

When the seat is occupied, as in FIGS. 6 and 7, the roller 47 rides fairly high on the back side of the tube 48, but when the occupant stands, as illustrated in FIG. 5, the seat 22 rises automatically, lowering the roller 47 is that it travels downwardly to a position directly behind the tube 48. This action forces the hinge channels 27 and 28 back on the slides 45 into a retracted position, and raises the back 21 into a vertical position. Thus the retracted seat and the forwardly moved back, as shown best in FIG. 5, occupy a minimum of space and clear the aisles on both sides of the chair.

The chair may be operated manually and without the use of springs. However, I prefer to employ means for automatically raising the seat and moving the back to the vertical position, and for this purpose the two springs 49 and 50 are shown in FIGS. 5—8. When the seat is up, as shown in FIG. 5, the two rubber-covered ends 51 and 52 of the springs rest on the two ends of the up-and-down stop 53, but when the seat is in the occupied position, as in FIG. 6, one end of the spring 50 is forced away by a stationary projection 54 on the seat assembly. Such an action tensions the spring 50. The spring 50 rests on the center post 55 of the seat pivots 29 and 30.

To keep the pivots 29 and 30 accurately aligned at all times, I provide an alignment rod 56 which has its ends fitting into the hole of the center pin 55 of each seat pivot 29 and 30, the rod being dished or bent downwardly centrally at 57 so that it will not interfere with the depressing of the seat cushion.

In the operation of the above-described structure, as the seat is lowered for sitting, the chair automatically swings into the extended position, as seen in FIGS. 2 and 6, while as the occupant rises to let others pass, or as he leaves his seat, the seat retracts and the back moves forwardly so as to take up a minimum of space. In this operation, the roller travels up and down on the back side of the cross tube, lending great stability to the mechanism.

The stationary projection 54 on the seat normally is abutted by the spring ends when the seat is in raised position, as shown best in FIG. 5, but it is effective in moving away spring 51 as the seat is lowered while also tensioning the spring.

The flattened or D-shaped bolt serves as a shaft for the back pivot roller and by reason of the D-shaped hole in the back support bracket into which it fits, the bolt is held in a stationary position at all times and there is no danger of its turning with the roller and loosening the nut.

The nylon slides within the hinge channel stabilize the sliding operation of the seat while also providing a silent operation.

While in the foregoing specification I have set out a specific structure inconsiderable detail for the purpose of illustrating an embodiment of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In a retracting chair structure, spaced standards, a crossbar connecting said standards, means on said standards for slidably and rotatably supporting said seat, a bracket carried by said seat and extending therebelow toward said crossbar, and a roller carried by said bracket and engaging the rear por-

tion of said bar when said seat is in raised position and an upper portion of said bar when the seat is in lowered position.

2. The structure of claim 1 in which said bar is in the form of a tube.

3. The structure of claim 1 in which said standards are provided with slide supports, and said seat is provided with channels receiving said slide supports.

4. The structure of claim 3 in which said slides are nylon slides.

5. The structure of claim 1 in which said chair back is supported for movement to and from a vertical position, and connecting means between said seat and back are provided for moving said back to a vertical position when said seat is raised.

6. The structure of claim 3 in which pivots are carried by said channels and said pivots are connected by an alignment rod.

7. The structure of claim 6 in which said alignment rod has a depressed central portion.

8. In a retracting chair structure, spaced standards, a cross tube connecting said standards, a chair seat and chair back between said standards, means on said standards for slidably and rotatably supporting said seat, spring means for urging said seat to raised position, a bracket depending from said chair seat, a roller carried by said bracket and engaging said cross tube, and cooperating means between said back and seat operating means for moving said back forwardly as said seat is moved upwardly.

PO-1050
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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,589,762 Dated June 29, 1971

Inventor(s) Bror W. Henrikson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Under "References Cited", "Feick, III et al" should be -- Hoffmaster et al --.

Column 2, line 8, change "38" to -- 28 --.

Signed and sealed this 2nd day of November 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patents