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(54) **Tip seat chair**

(57) A tip-seat chair having a seat frame and a seat squab (2), the seat squab (2) being pivotably connected to the frame and being biased in into a tipped up position

by means of a torsion spring (20). The torsion spring (20) passes through the seat squab (2) and is connected at one end to the seat squab (2) and at the other end to the seat frame.

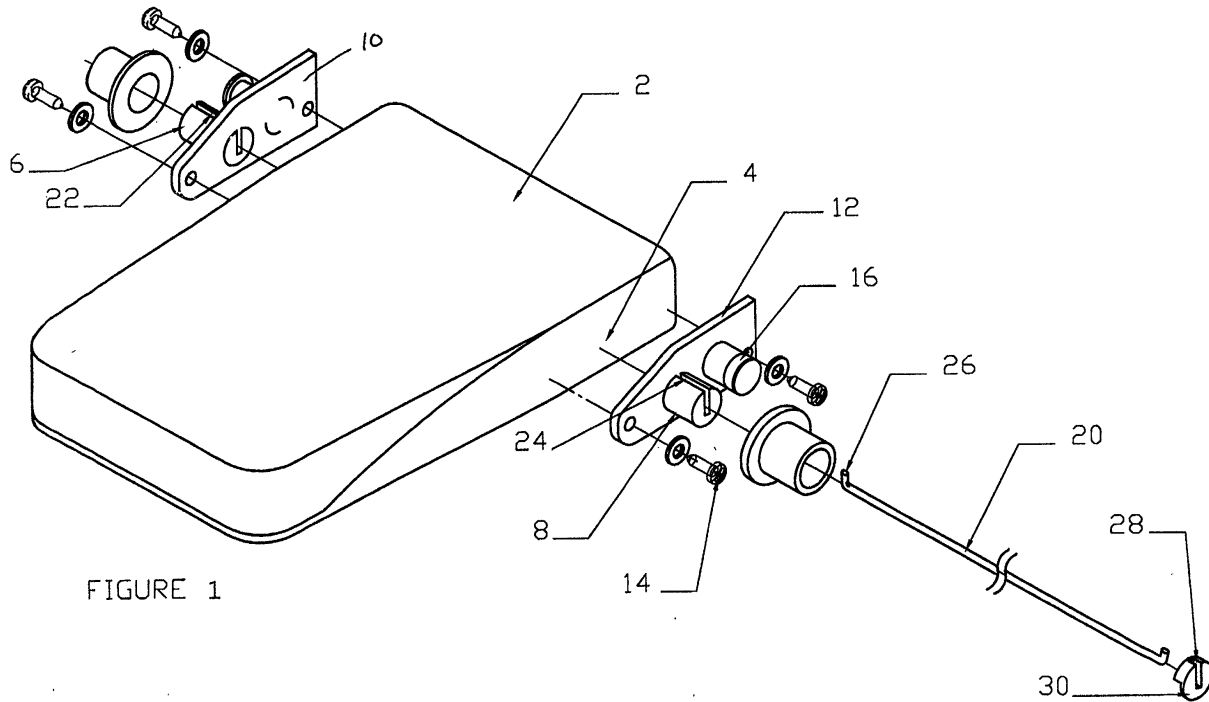


FIGURE 1

Description

[0001] This invention relates to tip-seat chairs, such as are used in auditoria to provide high capacity seating. When an individual tip-seat chair is not occupied the seat squab tips up automatically, thereby providing access to further chairs, without the need for a dedicated access aisle.

BACKGROUND TO THE INVENTION

[0002] In conventional tip-seat chairs, the seat squab is biased into the raised position by a counterweight system or a coil spring assembly.

[0003] Counterweight systems are unreliable because, in order to prevent the seat squab rising too quickly when the seat is vacated, the raising force applied by the counterweight must be only just sufficient to overcome the mass of the seat squab. Consequently, the seat squab can become stuck, particularly if the seat frame is misaligned or is distorted in use.

[0004] Furthermore, the counterweight system increases the weight of the tip-seat. This is undesirable both in terms of transport cost and in terms of the loading imposed by the seat on the auditorium floor.

[0005] The use of a coil spring assembly to bias the seat squab into the raised position overcomes some of the weight disadvantages of a counterweight system, but such assemblies tend to be bulky.

SUMMARY OF THE INVENTION

[0006] According to the present invention there is provided a tip-seat chair having a seat frame and a seat squab, the seat squab being pivotally connected to the frame and being biased into a tipped up position by means of a torsion spring.

[0007] Preferably the torsion spring is connected at one end to the seat squab and at the other end to the frame. Most preferably, the torsion spring passes through the seat squab.

[0008] The torsion spring preferably comprises a rod with cranked ends, one cranked end of the torsion spring being fixed to the seat squab and the other cranked end being fixed to the seat frame. Preferably one end of the torsion spring is fixed to the seat squab and the other end is fixed to the seat frame by means of respective crimped connections.

[0009] Preferably the said one end of the torsion spring is connected to a side of the seat squab and/or the said other end of the torsion spring is connected to a side of the seat frame. Preferably one end of the torsion spring is connected to a first bracket which is fixed to the seat squab and/or the other end of the torsion spring is connected to a mounting portion which is fixed to the seat frame.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] For a better understanding of the present invention and to show how the same may be carried into effect reference will now be made, by way of example, to the accompanying drawings, in which:-

Figure 1 is an exploded view of the various components making up a tipping seat squab of an auditorium chair;

Figure 2 is a partial side view of the torsion spring shown in Figure 1;

Figure 3 is an end view of the torsion spring viewed on arrow A in Figure 2; and

Figure 4 is an enlarged end view of a mounting element crimped to the torsion spring.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

[0011] Referring to the drawings, Figure 1 shows a seat squab 2 of a tip-seat auditorium chair. The seat squab 2 is pivotally connected to a seat frame (not shown) of the chair about a transverse pivot opening 4 which is formed through the seat squab 2. A pivotal connection between the seat squab 2 and the seat frame is provided by means of a pair of pivot pins 6, 8 formed on respective side brackets 10, 12. The brackets 10, 12 are screwed to respective sides of the seat squab 2 by means of screws or bolts 14.

[0012] The pivot pins 6, 8 are received in corresponding pivot openings (not shown) formed in the seat frame, so that the seat squab 2 can pivot about the pivot bushes 6, 8 relative to the seat frame.

[0013] Buffers 16 are provided on the respective side brackets (10, 12) to limit the motion of the seat squab 2 relative to the seat frame.

[0014] A torsion spring 20 passes through grooves 22, 24 formed in the pivot pins 6, 8 and through the opening 4 in the seat squab 2. A first end 26 of the torsion spring 20 is bent out at right angles to the longitudinal axis of the torsion spring 20 and is located in the groove 22 in pivot pin 6. The opposite end 28 of the torsion spring 20 is also bent out at right angles to the longitudinal axis of the torsion spring 20 and is crimped into a mounting portion 30. The mounting portion 30 is fixed to the seat frame by rivetting, welding or any other appropriate means.

[0015] When the seat squab 2 is in the raised position the torsion spring 20 is in a relaxed state, or is only slightly loaded to bias the seat squab gently into the raised position. When the seat squab is pulled down into the sitting position it will be appreciated that, because the second end 28 of the torsion spring 20 is fixed relative to the seat frame, and because the first end 26 of the torsion spring 20 is fixed relative to the seat squab 2, as the seat squab 2 is pulled down, the torsion spring is twisted or wound up and hence applies a progressive-

ly greater restoring force to the seat squab, tending to return it to the raised position.

Claims

- 5
1. A tip-seat chair having a seat frame and a seat squab, the seat squab being pivotably connected to the frame and being biased into a tipped up position by means of a torsion spring. 10
 2. A tip-seat chair as claimed in claim 1, in which the torsion spring is connected at one end to the seat squab and at the other end to the seat frame. 15
 3. A tip-seat chair as claimed in claim 2, in which the torsion spring comprises a rod with cranked ends, one cranked end of the torsion spring being fixed to the seat squab and the other cranked end being fixed to the seat frame. 20
 4. A tip-seat chair as claimed in claim 2 or 3, in which one end of the torsion spring is fixed to the seat squab and the other end is fixed to the seat frame by means of respective crimped connections. 25
 5. A tip-seat chair as claimed in any one of claims 2 to 4, in which the said one end of the torsion spring is connected to a side of the seat squab. 30
 6. A tip-seat chair as claimed in any one of claims 2 to 5, in which said one end of the torsion spring is connected to a first bracket which is fixed to the seat squab. 35
 7. A tip-seat chair as claimed in any one of claims 2 to 5, in which the said other end of the torsion spring is connected to a side of the seat frame. 40
 8. A tip-seat chair as claimed in any one of claims 2 to 7, in which the said other end of the torsion spring is connected to a mounting portion which is fixed to the seat frame. 45
 9. A tip-seat chair as claimed in any one of the preceding claims, in which the torsion spring passes through the seat squab. 50
 10. A tip-seat chair substantially as described herewith with reference to and as shown in, the accompanying drawings. 55

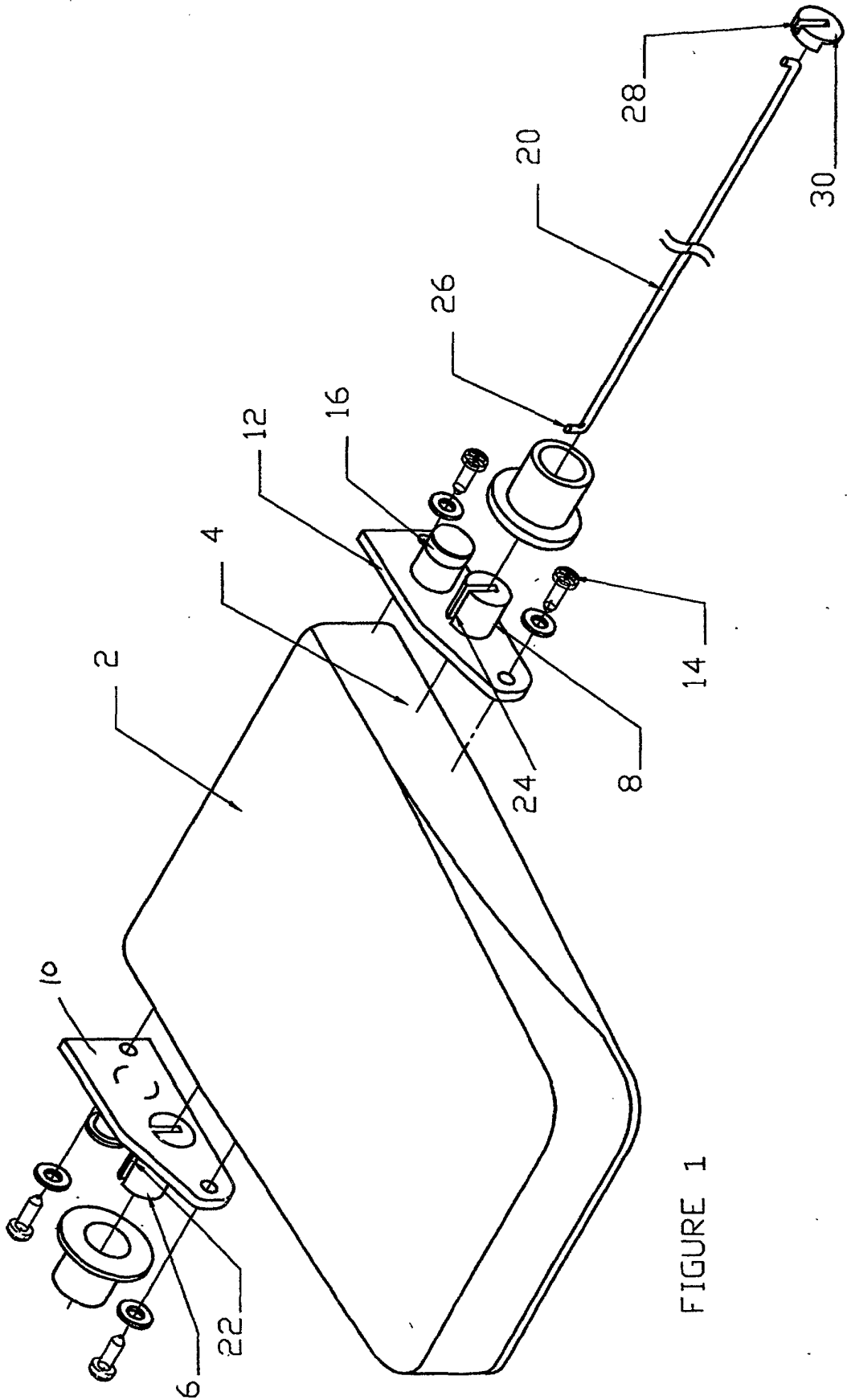


FIGURE 1

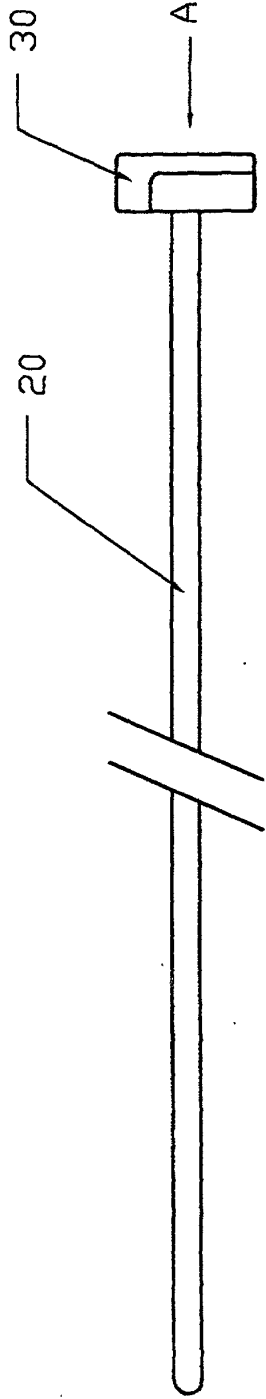


FIGURE 2

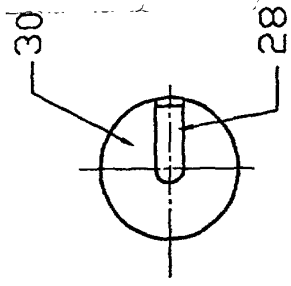


FIGURE 3

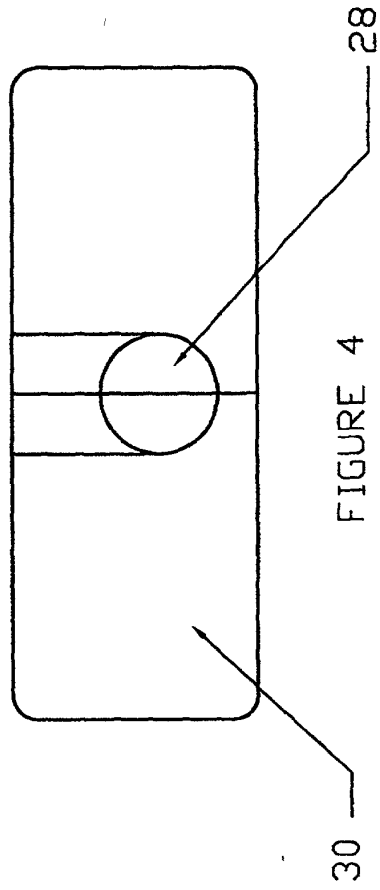


FIGURE 4



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 8624

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 2 717 026 A (HOVEN A C ET AL) 6 September 1955 (1955-09-06) * column 2, line 46 - line 56 * * figures 4 - 7, pos. 34-37 * ---	1-9	A47C1/121
X	US 3 567 281 A (BARECKI CHESTER J ET AL) 2 March 1971 (1971-03-02) * figures 5 - 8, pos. 36,40 * ---	1-9	
A	US 5 393 120 A (WOODS DAVID C ET AL) 28 February 1995 (1995-02-28) * figure 6 * * abstract - "torsion spring" * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47C
Place of search VIENNA		Date of completion of the search 28 November 2000	Examiner Bencze
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 30 8624

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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28-11-2000

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82