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(11) **EP 1 447 028 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:

18.08.2004 Bulletin 2004/34

(51) Int Cl.7: **A47C 3/026, A47C 7/44**

(21) Application number: **04002772.4**

(22) Date of filing: **09.02.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LT LV MK

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(30) Priority: **11.02.2003 IT MI20030238**

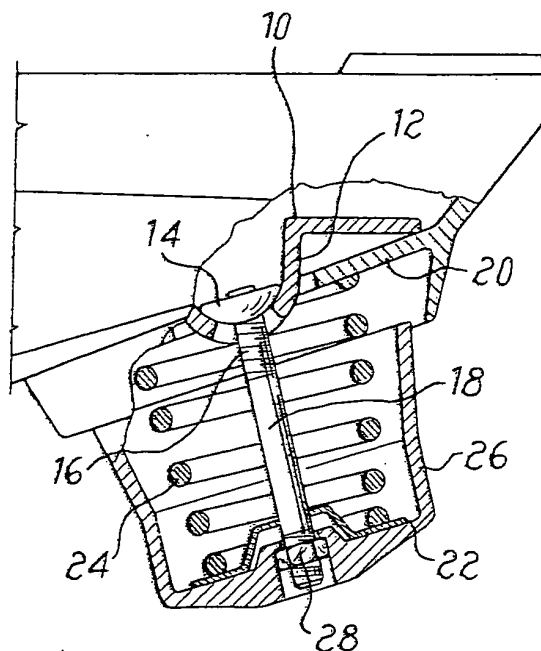
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(54) **Mechanism for office seats and chairs and method for making the same**

(57) A method for controlling adjustment of the initial stiffness of the helical spring (24) for countering the inclination of the backrest and/or of the seat in a mechanism for a chair or armchair for office use, by means of controlled rotations of a threaded pin (18) set coaxial with respect to the spring (24), which engages an internal thread (14) for displacing in the two directions one of the ends of the spring (24). The method envisages the application, at the free end of the pin (18), alternatively:

- a) of a manual-control means (26) set coaxial with respect to the pin (18); or else
- b) of a gear (30), which is set coaxial with respect to the pin (18) and can be actuated by a worm-screw (32) supported crosswise (34,36) with respect to the pin (18) by one or more supports, applied to a mechanical component adjacent to the free end of the pin (18).

Fig. 1



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Description

[0001] The present invention relates to a method and a mechanism for making chairs or armchairs for office use, more precisely a method and a mechanism for controlling adjustment of the stiffness of the helical spring which counters the inclination of the backrest and/or of the seat, in a mechanism for a chair or armchair for office use, by means of controlled rotations of a threaded pin set coaxial with respect to the spring, said pin engaging an internal thread for displacing one of the ends of the spring in the two directions.

[0002] There are known mechanisms for armchairs or chairs for office use, in which a pre-loaded spring counters the movements of inclination of the backrest. This spring, which is generally helical and often set according to a vertical or sub-vertical orientation underneath the seat, can be adjusted in its initial stiffness by axial displacement of one of its ends, either by approach to or by recession from the other end. This adjustment is made by acting on a threaded pin, which, in various ways, engages an internal thread for controlling the aforesaid axial displacement.

[0003] The action on the threaded pin is traditionally carried out manually through a handwheel or knob constrained coaxially to the pin and rotatable therewith.

[0004] More recently it has been found that this manual adjustment may prove inconvenient and/or difficult for the person sitting on the chair or armchair, especially in the case where the said chair or armchair is to be occupied by a number of different operators for short periods of time, each one of whom wishes to carry out an adjustment in conformance with his or her particular requirements.

[0005] There have thus appeared mechanisms in which adjustment of the stiffness of the spring is carried out via a side handle, which, by means of a series of transmissions, always operates on the spring. This has, however, led to a different design of at least part of the mechanism and the need, in the production stage, of having two different lines for production of said mechanism - and this right from the start -, one for a handwheel or knob control and one for a handle control, given that chairs or armchairs with traditional knob control continue to be requested.

[0006] This having been said, the purpose of the present invention is to propose a method and a mechanism that will enable, at the end of the production line for producing the mechanisms, the choice, case by case, of the alternative application of one of the control systems, without any need to make changes of any sort in the production line upstream.

[0007] Another purpose is to provide a method and means that will enable, if so desired, conversion of a chair or armchair for office use of the current type, modifying the manual control of the stiffness of the spring thereof in order to pass from the handwheel system to the handle system.

[0008] The above is obtained by means of a method according to Claim 1 or Claim 7 and of a mechanism according to Claim 8 or Claim 10.

[0009] The invention will now be described in greater detail with reference to embodiments thereof, provided exclusively by way of example and illustrated in the annexed drawings, in which:

- Figure 1 is a partial and partially sectioned view of a first embodiment, in the traditional version, with handwheel control;
- Figure 2 is a view corresponding to that of Figure 1 and illustrating the version with handle control;
- Figure 3 is a view in the axial direction with respect to the pin of the version with handle control according to Figure 2;
- Figure 4 is a partial and partially sectioned view of a variant of the version with handle control;
- Figure 5 illustrates, in cross section, another embodiment with handwheel control; and
- Figure 6 illustrates the embodiment of Figure 5, in the variant with handle control.

[0010] In the embodiment of Figures 1, 2 and 3, a support 10 set on a fixed body 20 has a hollow-shaped configuration 12, in which there is housed and rotationally fixed an internal thread 14, with which the threaded end 16 of a pin 18 engages. At the end of the pin 18 is fixed, in a way not represented in detail, a spring-holder plate 22, on which there rests an end of a helical spring 24, the other end of which bears upon the fixed body 20.

[0011] In the traditional variant with handwheel control, represented in Figure 1, there is a handwheel 26, housed coaxially with respect to the spring 24 and to the pin 18 and fixed to the latter, for example, by means of a nut 28. By rotation of the handwheel 26, the axial displacements, in the one and in the other direction, of the pin 18 in engagement with the internal thread 14 and hence of the plate 22 that compresses or distends the spring 14 are controlled, so adjusting the stiffness.

[0012] To pass on now to the version with handle (Figures 2 and 3), the handwheel 26 is replaced by a gear 30, for example again fixed by the nut 28, the said gear 30 being designed to be engaged by a worm-screw 32 set tangential thereto and supported by a pair of supports 34 and 36 applied to a structural component or, as in the case illustrated, to the spring-holder plate 22 itself. The worm-screw 32 can be actuated in both directions via a handle control 38, in itself well known.

[0013] In the embodiment of Figure 4, the assembly made up of handle 38, the supports 34 and 46, and the worm-screw 32 is mounted on the fixed body 20, and the handwheel 26 is provided with an outer surface having a grooved or slitted area in the form of toothing, to enable its engagement with the worm-screw 32.

[0014] Consequently, passing from the traditional version with handwheel to the version with handle, in this case it is sufficient to add to the mechanism the ensem-

ble made up of the handle, supports, and worm-screw, without replacing the handwheel.

[0015] Figures 5 and 6 represent another embodiment, respectively in the two versions. In this case, a supporting assembly is envisaged for providing oscillating sitting positions, which basically comprises a stationary body 40, an oscillating support 42, and an elastic contrast device 44. The oscillating support 42 is applied to the stationary body 40 via an oscillation shaft 46 and carries the seating elements, namely the seat and the backrest. The elastic contrast device 44 is set and pre-loaded between the stationary body 40 and the oscillating support 42. More in particular, said device 44 comprises a helical spring 48 set in a housing 50 defined by a cup-like portion 52 integral with the stationary body 40. On the bottom of said housing 50, an annular projection 54 is provided, on which there is centred an element 56 shaped like a drinking glass set upside down, said element having a peripheral flange 58. The spring 48 is mounted and pre-loaded between said flange 58, at the bottom, and a plate 60, at the top, resting and oscillating on a contrast pin 62, fixed on the oscillating support 42 of the seat. The aforesaid glass-shaped element 56, however, can be displaced according to the axis of the spring 48 in order to vary the pre-loading, i. e., the stiffness of the latter.

[0016] To obtain said displacement of the glass-shaped element 56, there is provided (Figure 5) an adjusting handwheel 64 set on the outside of and concentric to the cup-like portion 52 of the stationary body 40. The handwheel 64 is fixed to the head of a threaded pin 66, which extends into the housing 50 passing freely through the bottom of said housing and the bottom of the glass-shaped element 56, in a direction concentric to the guide projection 54 of the latter.

[0017] The threaded pin 66 is supported in rotation by a bearing 68, set in the annular projection 54 and axially fixed there by means of a locknut 70, screwed on the pin 66. On this pin 66 there is finally screwed a second nut 72, connected and fixed to the glass-shaped element 56, in the cavity of the latter near to its bottom.

[0018] In practice, with the rotation of the handwheel 64 and of the threaded pin 66 therewith, there is obtained an axial translation of the second nut 72 and, therewith, of the element 56 shaped like a glass set upside down, to vary pre-loading of the spring and hence adjustment of operation of the oscillating assembly.

[0019] Passing now to the version with handle illustrated in Figure 6, also in this case the handwheel 64 is replaced with a gear 74, and there are applied, at the end of the cup-like part 52, two supports 76 and 78, which support rotationally a worm-screw 80 that can be actuated by a handle assembly 82. Also in this case, as in that of Figure 4, it is possible to avoid replacement of the handwheel by providing a handwheel with an outer surface that can be engaged, for rotation, by the worm-screw 80.

Claims

1. A method for controlling adjustment of the initial stiffness of the helical spring for countering the inclination of the backrest and/or of the seat in a mechanism for a chair or armchair for office use, by means of controlled rotations of a threaded pin set coaxial with respect to the spring, which engages an internal thread for displacing, in the two directions, one of the ends of the spring, said method being **characterized in that** it envisages the alternative application, at the free end of the pin:

- a) of a manual-control means set coaxial with respect to the pin; or else
- b) of a gear, which is coaxial to the pin and can be actuated by a worm-screw supported cross-wise with respect to the pin by one or more supports applied to a mechanical component adjacent to the free end of the pin.

2. The method according to Claim 1, **characterized in that** a manual-control means is applied in the form of a rotating handwheel or knob.

3. The method according to Claim 1 or Claim 2, **characterized in that** it envisages a handle for controlling manually the rotations of the worm-screw.

4. The method according to Claim 1, or Claim 2, or Claim 3, **characterized in that** the supports of the worm-screw are applied to a fixed structural component.

5. The method according to Claim 1, or Claim 2, or Claim 3, **characterized in that** the supports of the worm-screw are applied to a plate or cup for providing a resting and contrast surface for the spring.

6. The method according to Claims 1 and Claim 2, **characterized in that** a handwheel is applied, which has an outer surface providing said gear, and **in that** said worm-screw and the corresponding supports are applied or not.

7. A method for converting the means designed to control adjustment of the initial stiffness of the helical spring for countering the inclination of the backrest and/or of the seat in a mechanism for a chair or armchair for office use, via controlled rotations of a threaded pin set coaxial with respect to the spring, said pin engaging an internal thread for displacing in the two directions one of the ends of the spring, transforming them from coaxial-control means into transverse-control means with respect to the axis of the pin, said method being **characterized in that**:

- the coaxial-control means are removed;

- a worm-screw engaged to the gear and provided with an actuating handle is applied, in a direction transverse to the gear itself; and
- one or more supports for the worm-screw are applied to the structure of the mechanism, in the proximity of the gear. 5

8. A mechanism for a chair or armchair for office use, of the type comprising a helical spring for countering the inclinations of the backrest and/or of the seat, and a means for adjustment of the initial stiffness of the spring, which acts by axial displacement of one of the ends of the spring via mutual engagement in the one or in the other direction of a threaded pin set coaxial with respect to the spring and of an internal thread, said mechanism being **characterized in that** it comprises, at the free end of the pin, a means for the application, in a position coaxial to the pin, alternatively of a manual control handwheel or knob or else of a gear and of one or more supports designed to support a worm-screw with handle, which co-operates with the gear. 10 15 20

9. The mechanism according to Claim 8, **characterized in that** the supports for the worm-screw are applied to a fixed structural component of the mechanism. 25

10. The mechanism according to Claim 8, **characterized in that** the supports for the worm-screw are applied to a plate or a cup for providing a resting and contrast surface for the spring. 30

11. A mechanism for a chair or armchair for office use, of the type comprising a helical spring for countering the inclinations of the backrest and/or of the seat and a means for adjustment of the initial stiffness of the spring, said means acting by axial displacement of one of the ends of the spring through the mutual engagement of a threaded pin and of an internal thread, following upon controlled rotations of the pin in the one or in the other direction, said mechanism **characterized in that** it comprises, at the free end of the pin, a means for the application of a control handwheel or knob, set coaxial with respect to the pin and provided on the outside with a succession of grooves or slits or the like, designed to be engaged by a worm-screw, as well as means for the possible application of one or more supports designed to support a worm-screw with handle, which engages with the grooves or the like of the handwheel or knob. 35 40 45 50

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Fig. 1

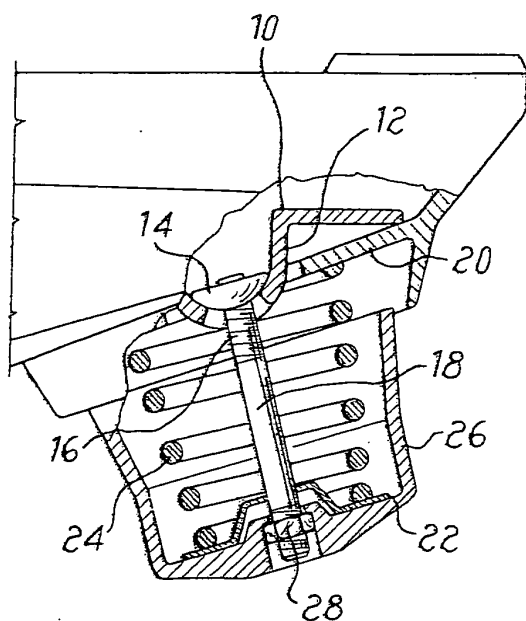


Fig. 2

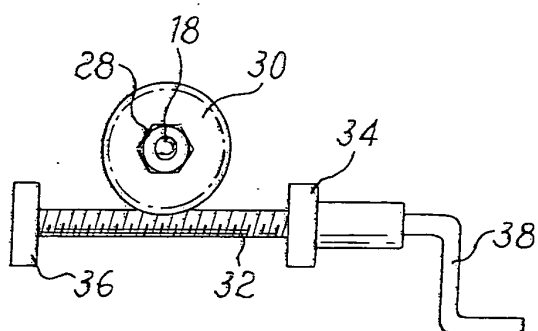
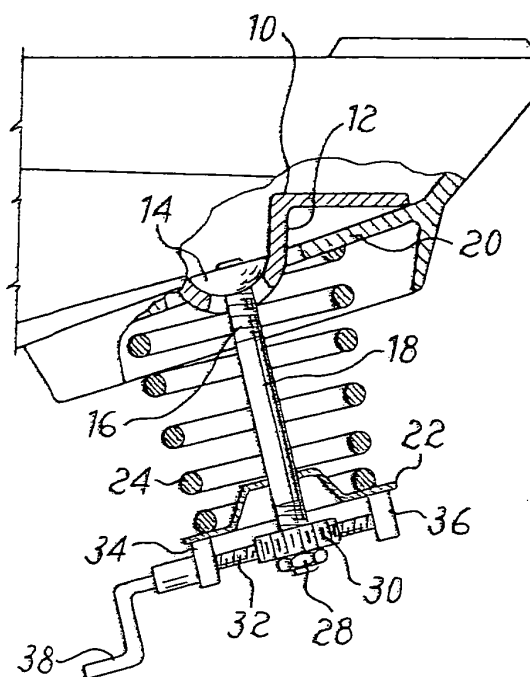
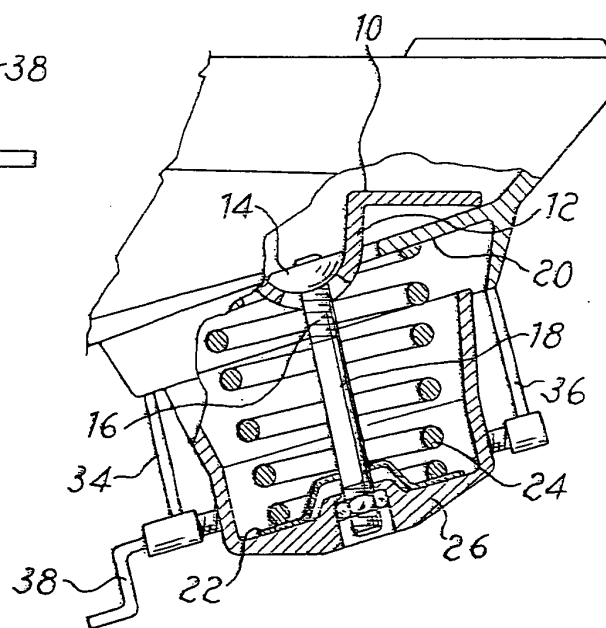
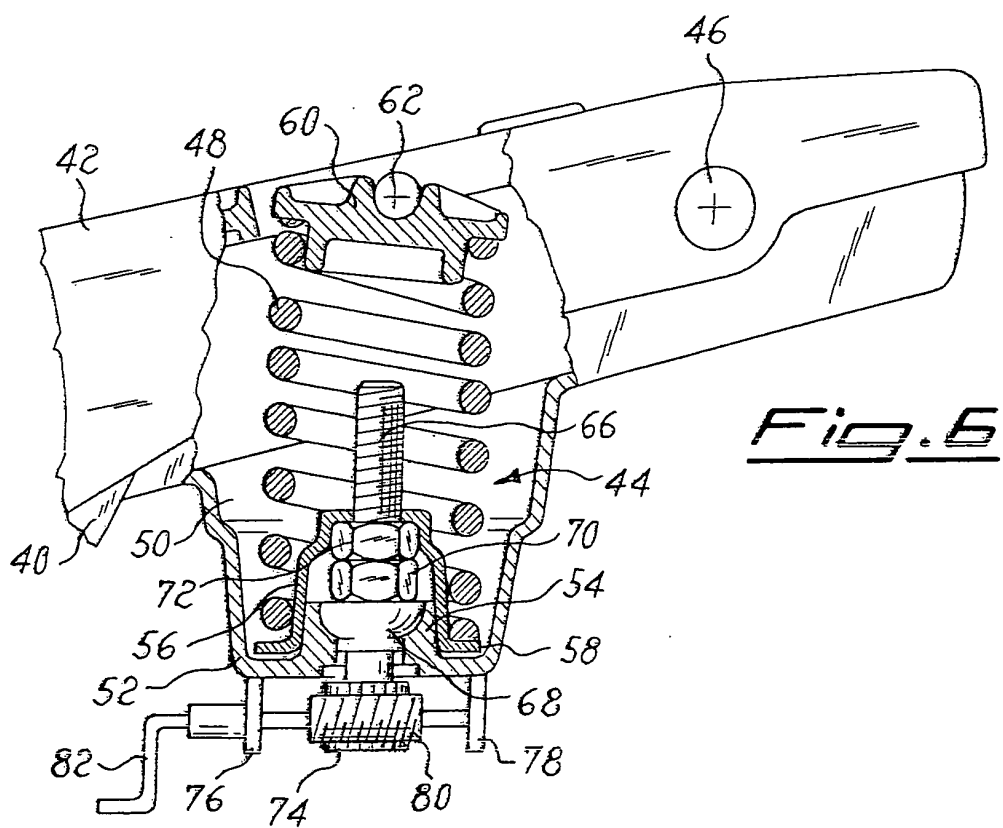
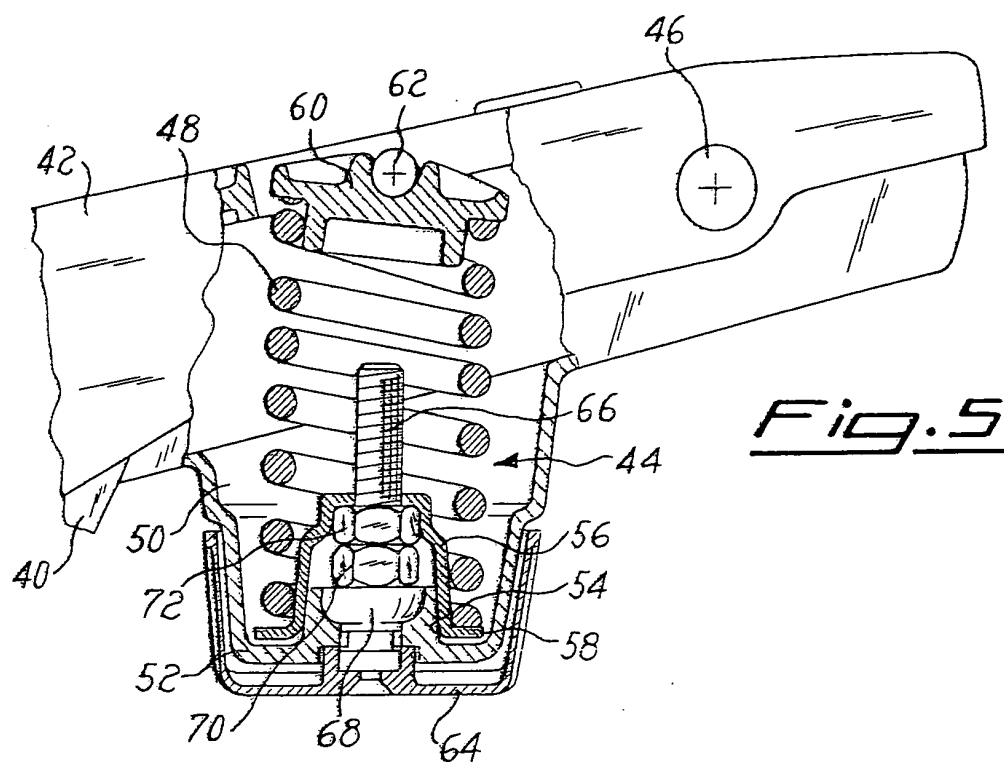


Fig. 3

Fig. 4







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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 2772

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 May 2004	Examiner Kus, S
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