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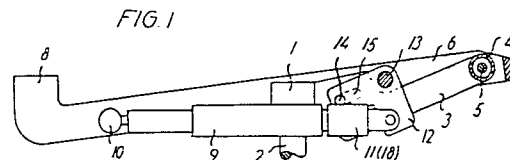
71 Applicant: LABOFA A/S
 No.11 Smidstrupvej
 DK-4230 Skaelskor(DK)

72 Inventor: Jensen, Jacob
 Heilskov
 DK-7840 Hojslev(DK)

74 Representative: Carpmael, John William Maurice et al,
 CARPMAELS & RANSFORD 43 Bloomsbury Square
 London, WC1A 2RA(GB)

54 Chair with adjustable seat mechanism.

57 In a chair comprising a seat frame (6) supported by a frame (2) the seat frame is adjustable as to inclination to occupy a basic position by means of an adjustable pressurized pneumatic spring device (9) to which a pneumatic or hydraulic damper mechanism is connected, said mechanism (11) causing the seat, when occupied, to move slowly away from its basic position, and causing the seat to return quickly to its basic position when the loading ceases or changes considerably. The purpose is to make sitting on the chair less fatiguing.



"CHAIR WITH ADJUSTABLE SEAT MECHANISM"FIELD OF THE INVENTION

This invention relates to a chair, in particular an office chair or a stool, comprising a seat which by the weight, when occupied, is movable
5 away from a basic position by tilting on a horizontal transverse shaft against the resistance of a spring which returns the seat, when unloaded, into its basic position.

BACKGROUND OF THE INVENTION

10 In known chairs of this kind the spring serves on the whole solely as a return spring for the seat, but it offers also a certain, although usually very slight, resistance to the tipping or tilting of the seat when the load thereon changes,
15 that is when the user changes his posture.

According to more recent understanding such a chair seat does not in all cases afford an optimum support, because endeavours to maintain the most comfortable working posture might imply muscular
20 exertion that is generally unnoticed at short sight, but in the long run may cause back-ache and pains across the loins and in the legs. Accordingly, a steady seat is actually preferred provided it has a correct height and inclination which, however, in
25 practice must be adjustable according to individual wishes and in consideration of the desired working posture. On the other hand a steady seat might also cause inconveniences because the sitting pressure is too narrowly located to certain points or areas
30 and may then inter alia impede blood circulation.

SUMMARY OF THE INVENTION

The chair according to the invention differs from the known designs in that the return spring is combined with a hydraulic or pneumatic damping
5 mechanism which is operative solely when the seat is moved away from its basic position.

The invention is based on the understanding that a given basic position, viz. in reality a steady seat as mentioned above, is in principle preferred
10 and that the said drawbacks of such a seat can be counteracted by the fact that the seat when permanently loaded slowly moves away from its basic position while, on the other hand, the seat quickly returns to its basic position when loading ceases or changes
15 so as to permit such a return. The damping may appropriately be adapted so that the maximum movement away from the basic position by constant loading requires 5 to 10 minutes and thus takes place almost unnoticeably. However, the loading is actually seldom constant
20 for such a long period, and it can therefore be taken for granted that the chair seat is in continuous movement when occupied, viz. moves very slowly away from the basic position and then quickly in the opposite direction. Even though the user hardly notices
25 such small movements of the position of the seat they are in many cases important to the comfort.

When the basic position of the seat, viz. its inclination in relation to the horizontal, is adjustable in a known manner by means of a pressurized pneumatic
30 spring device inserted between the seat and the frame of the chair, the above mentioned damping effect may suitably be attained in the way that one end of the housing of the spring device cooperates telescopically with a closed cylinder member and comprises, firstly
35 an end wall firmly secured to the housing and defining

a first pressure fluid chamber at the bottom of the cylinder member and, secondly a plunger which by the return spring is urged towards the end wall and together therewith defines a second chamber
5 that is in communication with the first chamber through a throttle passage in the end wall which is further provided with a non-return valve that opens onto the first chamber. When the damper mechanism is so combined with the pressurized
10 pneumatic spring device it practically does not occupy extra space and only insignificantly complicates and increases the cost of the structure. The effect is due to the fact that the flow of pressure fluid from the first chamber to the
15 second chamber can solely be effected through the throttle passage, viz. under a considerable restraint, and therefore the movement of the housing of the pneumatic spring device inwards into the cylinder member is impeded accordingly,
20 while the non-return valve provides for an oppositely directed flow (and consequently an oppositely directed displacement of the housing in relation to the cylinder member) practically without resistance.

25 BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1 and 2 illustrate in side elevation and partially in section a part of the main frame of a preferred embodiment of the chair together with its seat frame shown in two different
30 basic positions, and

Fig. 3 is a section of the particular embodiment of the damper mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In Figs. 1 and 2 of the drawings 1 is a bushing mounted on the top of a support pillar 2 forming part of the frame, and to which a forward directed web plate 3 is secured carrying at its foremost end a transverse bearing tube 4 with a through-going shaft 5 associated with the seat frame 6 of the chair. This seat frame can consequently tip or tilt about a transverse axis near the front edge 7 of the seat frame. The seat frame comprises, in addition, two side rails of which only one is visible in the drawings and which at their rearmost end are provided with fittings 8 for a chair back, not illustrated.

A pressurized pneumatic spring device 9 serves to adjust the inclination, said spring device being at the one end connected with the seat frame 6 in a hinge 10 and being at its other end connected with a first arm of a two-armed lever 12 through a damper mechanism 11 that will be more specifically explained in the following. Said lever 12 is pivotally mounted on the frame 6 by means of a pin 13, and its second arm carries a pin 14 that engages an inclined elongate aperture 15 in the web plate 3.

When the pneumatic spring device 9 by operation of an adjusting handle, not shown, is lengthened from the position in Fig. 1, the lever 12 will rotate counter-clockwise about the pin 13 and consequently about the pin 14 which at the same time is being displaced forwards in the elongate aperture 15, whereby the spring device lengthening is converted to a tilting motion of the seat frame towards the position in Fig. 2. Said movement may be interrupted when the seat occupies the desired position, viz. when the

seat is in its above mentioned basic position.

According to Fig. 3 the housing 9 of the pneumatic spring device is extended by a cylindrical bushing 16 inserted into an interior recess in the housing and secured by means of a pair of locking rings 17 so as to actually form part of the housing 9 but, nevertheless, being separable therefrom. In the opposite direction the bushing 16 extends telescopically into a closed cylinder member 18 and comprises a firmly secured end wall 19 that defines a pressure fluid chamber 20 at the bottom of the cylinder member. A second chamber 21 is defined between the end wall 19 and a plunger 22 that fits tightly with the bushing 16, said plunger being urged towards the end wall by means of a disc spring 23 supported at its opposite side by an abutment 24 fixedly secured in the bushing. The two chambers 20 and 21 communicate with each other through a narrow throttle passage 25 as well as through a wider channel 26 comprising a non-return valve 27 that opens in the direction towards the chamber 20.

When the seat is being occupied subsequent to its being adjusted in the desired basic position, the bushing 16 together with the end wall 19 will be moved inwards into the cylinder member 18, but this movement is strongly impeded by the pressure fluid in chamber 20, because it can only slowly escape through the throttle passage 25 to the chamber 21 in which the plunger 22 is pressed backwards against the effect of the spring 23. The passage 25 may be adapted so that the maximum movement causing the end wall 19 to abut the bottom of the cylinder member 18 takes 5 to 10 minutes. If the loading on the seat ceases or is considerably lightened during this period the frame 6 will quickly return to its basic position

because the spring urged plunger 22 presses the pressure fluid back from the chamber 21 to the chamber 20, viz. through the channel 26 and the non-return valve 27.

5 The said period may be extended or shortened according to desire by adjustment of the throttle passage 25. For this purpose an adjusting screw 28 is mounted at the abutment 24, said screw being capable of longitudinally adjusting a needle 30 in the passage
10 25 through an axial mandrel 29 passing through the spring 23 and the plunger 22.

PATENT CLAIMS

1. A chair comprising a seat which by the weight, when occupied, is movable away from a basic position by tilting on a horizontal transverse shaft against the
5 resistance of a spring which returns the seat, when unloaded, into its basic position, characterised in that the return spring (23) is combined with a hydraulic or pneumatic damping mechanism (11) which is operative solely when the seat moves away from its basic position.
- 10 2. A chair as claimed in claim 1, and in which the basic position of the seat is adjustable by means of a pressurized pneumatic spring device (9) inserted between the seat and the frame of the chair, characterised in that one end of the housing of the spring device
15 cooperates telescopically with a closed cylinder member (18) and comprises, firstly, an end wall (19) firmly secured to the housing and defining a first pressure fluid chamber (20) at the bottom of the cylinder member and, secondly, a plunger (22) that by the return spring
20 (23) is urged towards the end wall and together therewith defines a second chamber (21) communicating with the first chamber through a throttle passage (25) in the end wall which further comprises a non-return valve (27) opening into the first chamber.
- 25 3. A chair as claimed in claim 2, characterised in that the throttle passage (25) is adjustable by means of a longitudinally adjustable needle (30).

FIG. 1

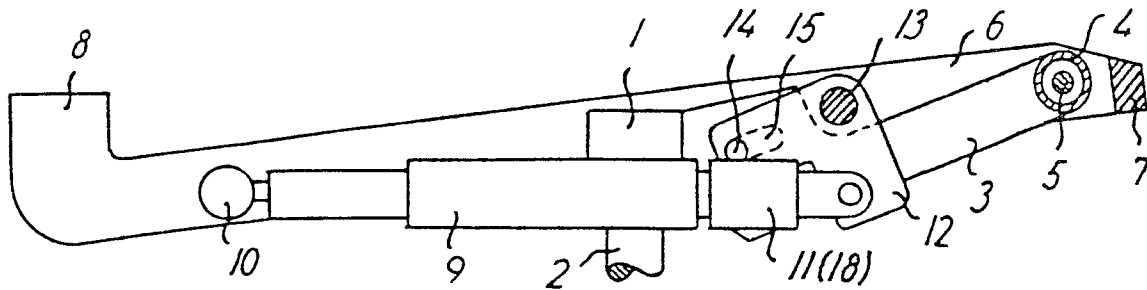


FIG. 2

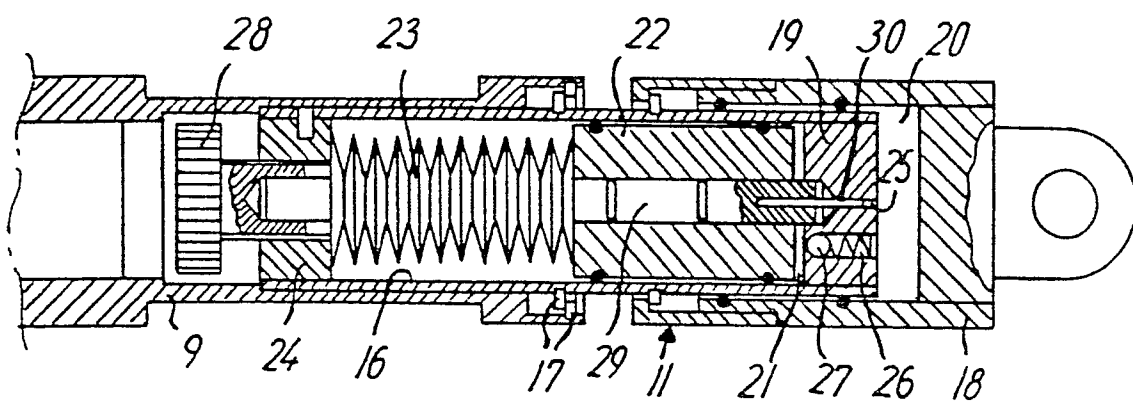
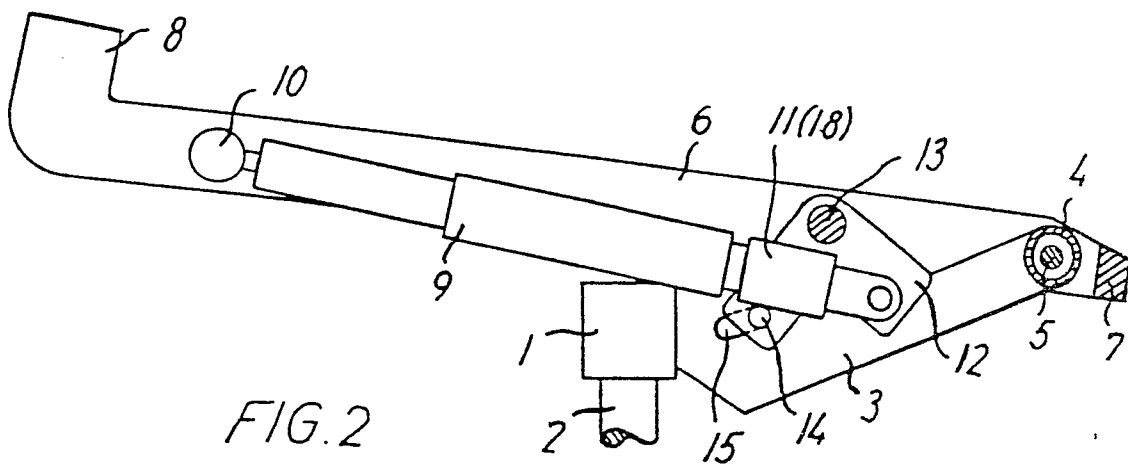


FIG. 3