This invention relates to a chair control for tilt chairs and in particular to a removable pressure plate for the tension spring, said pressure plate having replaceable thrust bearings.

Chair controls for tilting chairs presently in use comprise a base, a chair support post which is screwed threaded so as to provide for a vertical adjustment of the height of the chair seat, a fixed frame carried by the post, a second frame pivotally mounted on the fixed frame for limited pivotal movement about a horizontal axis relative to the fixed frame, said second frame having means for attaching it to a chair seat and biasing means yieldably interconnecting said frames and urging said second frame to a stop position relative to the fixed frame and yieldably resisting pivotal movement of the second frame away from said stop position under a force applied by an occupant of the chair, said biasing means comprising a substantially rigid tie-rod having one end fastened to the second frame and the opposite end extending beyond the fixed frame, a pressure plate permanently mounted on the fixed frame and having rotative movement about an axis parallel to the horizontal axis and a spring mounted on the connecting member and having one end seated on said pressure plate and the other end engaged by an adjusting handle which is threaded on to the free end of the tie-rod. A disadvantage of the foregoing construction was that the bearings for the pressure plate could not be replaced when they became worn and consequently the complete chair control because of its construction had to be discarded and replaced by a new chair control.

It is therefore an object of the present invention to provide a chair control for a tilting chair having an easily removable pressure plate so that when the bearings become worn the plate can be removed and the bearings replaced. Other and further advantages of the present invention will be apparent from the following description which is illustrated by the accompanying drawings in which:

FIGURE 1 is a perspective side elevation of a tilt chair embodying the invention which is the subject of the present application.

FIGURE 2 is a cross-section on the line 2—2 of FIGURE 1.

FIGURE 3 is a fragmentary view of the pivotal connection between the pressure plate and the pivotally mounted frame.

FIGURE 4 is an exploded view of the chair control illustrated in FIGURE 1.

FIGURE 5 is an exploded view of an alternative construction of the pressure plate shown in FIGURES 1 to 5.

FIGURE 6 is a fragmentary view, on an enlarged scale, to show the pivotal mounting for the pressure plate according to this alternative construction.

FIGURE 7 is a plan view, partly in cross-section of the chair control shown in FIGURE 5.

FIGURE 8 is a cross-section on the line 8—8 of FIGURE 7.

The invention will first be described with reference to the embodiment disclosed in FIGURES 1 to 4. The chair per se comprises a mobile base 10 which is provided with a conventional support post 11, the chair control device which is generally indicated by the letter A and having a fixed frame mounted on the top end of the post 11 and a pivotally mounted frame pivotally connected to the fixed frame which fixed frame is rigidly connected to the underside of the chair seat indicated by the numeral 12. The pivotally mounted frame is yieldably connected to the fixed frame by the components which will hereinafter be described in relation to the invention of the present application.

The fixed frame comprises a base plate 13 having a pair of spaced apart upright arms 14, 15 formed integrally therewith and to thereby form a substantially U-shaped frame. The base plate carries a second plate 16 in spatial relationship, the plate 16 being formed with a central opening 17 which registers with a corresponding opening (not shown) in the base plate 13. The upper end of the post 11 is fitted into the openings referred to with a press fit so that the fixed frame is rigidly and firmly supported on the top end of the post. The complete chair assembly can revolve about the vertical axis of the post 11.

The second frame member comprises a substantially U-shaped strap having a base plate 18 and outwardly extending arms 19 and 20, the second frame being so dimensioned that the arms 14, 15 of the fixed frame fit nicely therebetween with the base plate 18 being perpendicular to the base plate 13. The two frames are pivotally connected by means of the pivot rod 21 with the edge of the arms 14, 15 resting against the base plate 18 to provide a stop position for the second frame as hereinafter described whereby the chair is retained in position. The pivot 21 is located to permit downward movement of the second frame away from the stop position. The second frame which comprises the base plate 18 and the arms 19 and 20 is connected to the chair seat 12 through the medium of the attaching brackets 22 and 23 which are attached to the arms 19 and 20 respectively.

The biasing means for yieldably interconnecting the fixed frame and the second frame, comprises the following components namely a tie-rod 24 which is entered through a hole formed in the base 18 with its enlarged head 25 engaged against the outer surface of the base plate; a spring assembly mounted on the opposite end of the tie-rod, said assembly comprising a compression spring 26, a pressure plate 27, a collar 28 and an adjusting handle 29, the spring being captured between the pressure plate 27 and the collar 28. The pressure plate is provided with a pair of mounting arms 30 and 31, one at each end, each arm having an opposing end engaging a corresponding pivot pin 32, each pin carrying a replaceable nylon bearing 33. The contiguous edges of the arms 14 and 15 are formed with recesses or slots 35 and 36 respectively which are positioned and dimensioned to receive the nylon bearings 33.

The assembly and dismantling of the biasing means is quite simple and substantially self-explanatory from the drawings. FIGURE 1 illustrates the chair control completely assembled. The pressure plate of the present invention greatly simplifies the manufacturing procedures for the chair control and the assembly of the components into the complete unit. To replace the bearings 33 as and when they become worn, the first step is of course, to remove the adjusting handle 29 which permits the collar 28, the compression spring 26 and the pressure plate 27 to be removed. It is then possible to remove the nylon bearings and replace them and then reassemble the biasing means as illustrated.

The alternative structure shown in FIGURES 5, 6, 7 and 8 is essentially the same structure as shown in the preceding views and consequently the same reference numerals will be used in connection with the common components and parts. The only difference in the constructions resides in the mounting of the pressure plate 27 but the mounting is equivalent to the mounting of the
pressure plate shown and described with relation to FIGURES 1 to 4 inclusive. Referring now specifically to the pressure plate 27a shown in FIGURES 5 to 8 inclusive, it will be seen that the mounting arms 30a, 31a are provided with open end slots 37, 38 having the open ends facing the fixed frame previously described with the upright arms 14, 15 thereof being provided with pivots 32a on which are mounted nylon bearings 33a. The pivots 32a with the nylon bearings 33a mounted therein are received in the slots 37, 38 whereby the pressure plate 27a is pivotally mounted to the arms 14, 15 in such a manner as to be easily disconnected therefrom.

This structure which has been described with reference to FIGURES 5 to 8 is used in exactly the same manner as that previously described with reference to FIGURES 1 to 4.

What I claim is:

1. A chair control for a tilting chair having a base, a chair support member, a fixed frame carried by the member, a second frame pivotally mounted on the fixed frame for limited pivotal movement about a horizontal axis relative to the fixed frame, said second frame having means for attaching it to a chair seat, and biasing means yieldably connecting the fixed frame and the second frame and urging said second frame to a stop position relative to the fixed frame and yieldably resisting pivotal movement of the second frame away from said stop position under a force applied by an occupant of the chair, said biasing means comprising a substantially rigid connecting member disposed in a horizontal plane transverse to the horizontal axis and having one end fastened to one of said frame members and the opposite end extending beyond the other frame member, a pressure plate removably carried by said other frame and having rotative movement about an axis parallel to the horizontal axis and a spring mounted on the connecting member and having one end seated on said pressure plate and the other end connected to the said opposite end of the connecting member.

2. A chair control for a tilting chair according to claim 1 in which the chair support is a post; the fixed frame is a U-shaped upright member having upwardly extending arms and an apertured base for receiving said post and the second frame consists of a U-shaped strap with its base perpendicular to the apertured base and its arms overlapping the arms of the U-shaped upright member, and the pivotal mounting comprises a pivot pin connecting the arms for said pivotal movement.

3. A chair control for a tilting chair according to claim 1 in which the frames comprise a pair of U-shaped straps pivotally connected together for limited movement of the second U-shaped strap away from the stop position, the fixed U-shaped strap being located within the second strap and the pivotal connection comprises a pivot pin connecting the arms of the U-shaped straps.

4. A chair control for a tilting chair according to claim 2 in which the rigid connecting member is removable connected to the base of the U-shaped strap and the pressure plate engages against the upwardly extending arms.

5. A chair control for a tilting chair according to claim 2 in which the rigid connecting member is removably connected to the base of the second frame and the pressure plate is provided with outwardly projecting pivot pins and the upwardly extending arms are formed with outwardly opening pin receiving slots.

6. A chair control for a tilting chair according to claim 2 in which the rigid connecting member is removably connected to the base of the U-shaped strap and the upwardly extending arms are each provided with a pivot pin receivable in pin receiving slots formed in the pressure plate.

7. A chair control for a tilting chair according to claim 2 in which the rigid connecting member is removably connected to the base of the second frame by pin and slot means.

References Cited by the Examiner

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Inventor</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,093,319</td>
<td>9/1937</td>
<td>Herold</td>
<td>297—301 X</td>
</tr>
<tr>
<td>2,228,719</td>
<td>1/1941</td>
<td>Bolens</td>
<td>297—303 X</td>
</tr>
<tr>
<td>2,283,062</td>
<td>5/1942</td>
<td>Herold</td>
<td>297—303 X</td>
</tr>
<tr>
<td>2,545,950</td>
<td>3/1951</td>
<td>Fox</td>
<td>297—303 X</td>
</tr>
<tr>
<td>2,650,646</td>
<td>9/1953</td>
<td>Herold et al.</td>
<td>297—301</td>
</tr>
<tr>
<td>2,818,911</td>
<td>1/1958</td>
<td>Syak</td>
<td>297—303 X</td>
</tr>
<tr>
<td>2,845,922</td>
<td>8/1958</td>
<td>Cramer</td>
<td>297—303</td>
</tr>
</tbody>
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