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SWIVEL CHAIR STRUCTURE

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This invention relates to swivel chair structures, and more particularly to those of the type in which a screw post for supporting the chair seat is adapted to be raised and lowered by the rotation of a nut supported from beneath in or on the chair base.

One of the objects of my invention is to improve a height-adjusting mechanism of this type.

Another object is to furnish improved means by which the nut can be manipulated in adjusting the height of the chair seat.

It is also aimed to provide a construction by which the appearance of the height-adjusting mechanism and of the chair is considerably enhanced.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawing:

Fig. 1 is a side elevation of a portion of a swivel chair embodying my improvements;

Fig. 2 is a vertical sectional view on a larger scale of certain parts shown in Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 2, and Fig. 4 is a view similar to Fig. 2 illustrating a modified form.

My improvements are applicable to swivel chairs such as office chairs, in which the height of the chair seat can be adjusted by means of a nut supported from beneath in or on a suitable base structure, said nut by its rotation being adapted to lift or lower a screw post. To the upper end of the screw post the chair seat is suitably connected, usually by means providing for the tilting of the seat under the control of a suitable counter-balancing means. The part of the chair base in which the screw post is mounted may be in the form of a metal hub or other structure receiving the lower end of the screw post, and providing for the support, in a fixed horizontal plane, of the nut by means of which the screw post is adjusted.

In the drawing the chair seat is shown at 5, the chair base at 6, and the screw post at 7. At 8 I have shown a metal hub structure in which the lower end portion of the screw post is received. The hub structure 8 may be of any suitable material and form, but in the present instance it is shown as comprising a tubular portion 9 adapted to be received within a suitable socket in the chair base. The screw post 7 is provided at its upper end with a suitable support or frame member 10 by means of which the chair seat 5 is supported, usually for tilting movement about a horizontal axis, controlled by a suitable

counter-balancing means. I have not considered it necessary to illustrate in detail the means connecting the member 10 with the chair seat, but it may be said that preferably the chair seat will be adapted to tilt about an axis such as that indicated at 11 in Fig. 1.

For adjusting the height of the chair seat a suitable nut, such as shown at 12 in Fig. 2, is employed, this nut being provided with interior screw threads engaging the threads of the screw post. This nut is supported from beneath by the hub 8. Adjacent its upper end the hub 8 is provided with an outstanding flange 13, and the hub is provided with a bore 14 in which the screw post is adapted to slide vertically. Adjacent the mouth of the bore 14 the hub is counter-bored to provide a recess 15 in which is received an anti-friction bearing 16 having anti-friction balls or members 17. Supported on the balls 17 is a washer 18 partially received within a recess 19 in the lower face of nut 12. The washer 18 has the usual keyed engagement, as indicated at 20, with the key-way or groove 21 of the screw post, and it also has the usual non-rotative engagement with the nut 12.

Adjacent the upper end of nut 12 the same is provided with a groove or rabbet 22 in which is received the lower inturned end of a sheet metal shell 23 providing an upwardly extending tubular member by means of which the nut can be readily manipulated from the exterior of the mechanism. This tubular member 23 is open at the top, as shown at 24, and is of considerably greater diameter than the screw post 7, and preferably is of sufficient diameter for receiving in certain adjustments of the chair mechanism a substantial portion of the frame member or support 10 on which the chair seat is mounted.

For preventing relative rotation between the nut and the tubular nut-manipulating member 23, suitable means are provided. In the case illustrated this means comprises small notches or recesses 25 formed in the edge of the opening 26 provided at the lower end of the tubular member 23. By a suitable swaging operation the material of nut 12 is forced into these notches, as shown at 27 in Fig. 3, and it will therefore be understood that it will be impossible to rotate the tube or shell 23 without causing rotation of the nut.

At the lower part of member 23 a bell-shaped sheet metal member 28 may be connected as by brazing, as indicated at 29. This bell-shaped member encloses the nut and also the usual lock screw 30. The bell-shaped member has a lower

edge portion closely adjacent and facing the rim of flange portion 13 of the hub.

The open upper end of the tubular member 23 may be entered not only by a portion of member 10 but also by a member 31 carried by the screw post adjacent its upper end. The member 31 is preferably in the form of an inverted cup of sheet metal having a diameter only slightly less than that of member 23, so that the part 31 is adapted to telescope with the part 23. The cup-shaped part 31 may be secured in place by providing the upper wall of the cup-shaped member with an aperture 32 fitting a smooth portion 33 on the screw post at a point immediately below the round base 34 provided on member 10, the construction preferably being such that member 31 is secured in place by being clamped between member 10 and the threaded portion of the post in the manner shown.

In the operation of the height-adjusting mechanism of the chair, the nut 12, which has the usual functions, is turned by manipulation of the upwardly extending member 23, which in the preferred form is of tubular character. The member 23 provides a relatively large area for grasping by the hand, so that the rotation of the nut can be very readily effected. The tubular manipulating member also has the advantage that it adds considerably to the attractiveness of the chair from the standpoint of appearance. It serves as a masking means for such rather unsightly parts of the mechanism as the screw-threaded portion of the screw post. Being of a considerably larger diameter than the usual screw post, it gives the impression of very strong and substantial support for the chair seat, and has a tendency to prevent any apprehension of insecurity or weakness in the chair mounting which might otherwise exist in the mind of the person viewing the chair.

It will also be noted that in some positions of the chair a substantial portion of the seat-supporting frame will be masked. The screw post will have to be adjusted upwardly to a considerable distance before the frame member 10 is moved completely out of the member 23. It will also be observed that as the member 10 is moved upwardly and becomes completely visible at its lower portion, the smaller telescoping member 31 will come into play in that it will be presented to view adjacent the upper portion of member 23 in order that the masking of the screw post may be continued. The masking effect will be complete until after the lower edge of the downturned member 31 has been exposed, and upward adjustment of the screw post to this extent will not take place in any ordinary use of the chair. For all practical purposes, therefore, the masking of the screw post itself is complete.

It will be understood that in the operation of the mechanism the nut in all positions will be in the same horizontal plane, and that the bell-shaped member 28 connected to the nut will not be moved upwardly or downwardly to any noticeable degree. It will also be apparent that in this form the bell-shaped member may be used as a manipulating means for the nut. Either the member 23 or the member 28, or both, may be engaged or grasped for turning the nut, and while I have shown both of these members as having side walls which are substantially imperforate, it will be understood that variations may be made in this respect among others, and it will be understood that the shapes and surface configura-

tions of these members may be varied as conditions require.

In the modified form shown in Fig. 4, the construction is quite similar to that previously described, but in this case the tubular member 23', instead of being attached to a depending rotatable bell, is operable within a fixed bell-shaped member 28'. This member 28' is attached at its lower edge portion to the rim of flange 13', and at its upper part, member 28' is provided with a round opening 35 of slightly larger diameter than tubular member 23'. This permits member 23' to extend partially into member 28' in the normal position of the parts, as shown in Fig. 4. In this case member 23' serves as the sole manipulating member for the nut, and member 28' serves principally as a finishing member enclosing the nut and the lock screw.

The improved structure herein described is quite simple and can be manufactured at relatively low cost. The new height-adjusting mechanism can be readily manipulated in effecting adjustment of the chair seat, and as it embodies means for masking the more unsightly mechanical parts, and has an attractive external appearance, it is admirably adapted for use with modern office chairs and similar equipment. It will be understood also that the appearance of the structure is such as to impart to the observer an impression of strength and stability in the chair seat support.

A further advantage of the new construction arises from the fact that the upper inner member of the telescopic masking device serves to support and reinforce interiorly the outer member in certain portions of the parts, the diameters of said members being so chosen as to achieve this result. With this in view, the clearance between said members may be that shown in the drawing.

While I have shown two embodiments of the invention, it will be understood that the invention is susceptible of many other embodiments, and that various changes in the organization of parts and in the details of the construction may be made without departing from the principles of the invention or the scope of the claims.

What I claim is:

1. In a swivel chair structure, the combination of a chair seat, a chair base, a screw post connected to the chair seat and having a portion operating in said base, a nut supported from the base and manipulable for rotation for raising and lowering the screw post, said screw post being movable upwardly through the base by said nut, and means comprising a tubular member carried by the nut for masking a portion of the screw post located above said nut.

2. In a swivel chair structure, the combination of a chair seat, a chair base, a screw post having a portion projecting into the base, a nut rotatably supported from the base turnable by hand for raising and lowering the screw post with respect to the base, and masking means associated with the nut for concealing portions of the screw post disposed above the nut.

3. In a swivel chair structure, the combination of a chair seat, a chair base, a screw post having a portion projecting into the base, a manually manipulable nut supported from the base for turning to thereby cause raising and lowering of the screw post with respect to the base, and masking means associated with the nut for concealing portions of the screw post disposed above

the nut, said masking means comprising a member fixed to the nut and projecting upwardly therefrom around the screw post.

4. In a swivel chair structure, the combination of a chair seat, a chair base, a screw post having a portion operating in the base, a frame member carried by the screw post at its upper end and by means of which the screw post is connected to the seat, a manually manipulable nut supported rotatably from the base for turning to thereby cause raising and lowering of the screw post with respect to the base, and masking means adapted to mask portions of the screw post above the nut and also adapted to mask portions of said frame member.

5. In a swivel chair structure, the combination of a chair seat, a chair base, a screw post having a portion operating in the base, a frame member carried by the screw post at its upper end and by means of which the screw post is connected to the seat, a nut supported rotatably from the base for turning to thereby cause raising and lowering of the screw post with respect to the base, and masking means attached to the nut adapted to mask portions of the screw post above the nut and also adapted to mask portions of said frame member, said masking means comprising an upwardly extending shell structure having an open upper end and adapted for manual grasping to turn the nut.

6. In a swivel chair structure, the combination of a chair seat, a chair base, a screw post having a portion operating in the base, a frame member carried by the screw post at its upper end and by means of which the screw post is connected to the seat, a nut supported from the base for raising and lowering the screw post with respect to the base, and masking means adapted to mask portions of the screw post above the nut and also adapted to mask portions of said frame member, said masking means comprising an upwardly extending shell structure having an open upper end, and the lower end of said shell structure being rigidly attached to the nut.

7. In a swivel chair structure, the combination of a chair seat, a chair base, a screw post having a portion extending into and operating within the chair base, a frame member attached to the upper end of said screw post and itself connected to the chair seat, a nut supported from beneath by the base having internal screw threads engaging the threads of said screw post for raising and lowering the screw post with respect to the base, and manipulating means for said nut comprising an upwardly extending tubular member having an open upper end in which in certain adjustments of the chair a portion of said frame member is disposed.

8. In a swivel chair structure, a screw post, a hub receiving the lower end portion of the screw post, a nut supported from the hub and through which the screw post extends, said nut being adapted to be rotated for raising and lowering the screw post with respect to the hub, a frame member carried by the upper end portion of the screw post and adapted to be connected to a chair seat, and a masking member for the screw post carried by the screw post above the nut and having the form of an inverted cup.

9. In a swivel chair structure, a chair base hub, a screw post having a portion received with clearance within said hub, a rotatably supported nut for raising and lowering the screw post by turning of the nut in threaded engagement with the

screw post and from which the upper portion of the screw post projects vertically, and an upwardly extending tubular manipulating member for the nut surrounding and shrouding the screw post in its upwardly projecting part and presenting the appearance of a round chair seat support of considerable diameter.

10. In a swivel chair structure, the combination of a screw post, a rotary height-adjusting nut through which said screw post extends, and a manipulating structure attached to and carried by the nut and comprising an upstanding tubular portion above the nut body and an outwardly and downwardly extending bell portion.

11. In a swivel chair structure, the combination of a screw post, a rotary height-adjusting nut through which the screw post extends, a base structure receiving the lower portion of the screw post and rotatably supporting the nut, an upstanding tubular member attached at its lower end to the nut and masking portions of the screw post above the nut, and a finishing member attached to the base structure and enclosing the lower portion of said upstanding member.

12. In a swivel chair structure, the combination of a hub adapted to be located in a chair base, a screw post having a portion entering said hub but with clearance therein, a manually manipulable rotatably supported nut for raising and lowering the screw post by turning of the nut in threaded engagement with said screw post supported on and by the hub, a chair seat supporting frame attached to the upper end of the screw post, and masking means comprising telescoping members located in the space between the hub and said frame, one of said members being an upstanding tubular member attached at its lower end to the nut and having an open upper end, and the other member being an inverted cup-shaped member of smaller diameter attached to the upper end portion of the screw post adjacent the lower part of said frame.

13. In a swivel chair structure, the combination of a screw post, a chair seat attaching frame secured to the upper end of the screw post, a hub member receiving with clearance the lower end portion of the screw post, a rotary height-adjusting nut through which said screw post extends, a tubular sheet metal member attached at its lower end to said nut and extending upwardly therefrom in masking relation to a portion of the screw post and having an open upper end, an outstanding bell portion attached to and moving with said tubular member, and a masking member adapted to telescope with said tubular member attached to the upper end portion of the screw post.

14. In a swivel chair structure, the combination of a screw post, a chair seat attaching frame secured to the upper end portion of the screw post, a hub receiving with clearance the lower end portion of the screw post, a rotary height-adjusting nut supported on and by the hub and through which said screw post extends with engagement between the threads of the screw post and the threads of the nut, a tubular member of sheet metal attached at its lower end to the nut and in masking relation to a portion of the screw post and having an open upper end, a fixed finishing member in association with said hub enclosing the lower portion of said tubular member and within which the same is adapted to rotate, and a masking member of inverted cup form in telescopic relation to said tubular mem-

ber and attached to the upper end portion of the screw post beneath said frame.

15. In a swivel chair structure, the combination of a hub adapted to be located in a chair base, a screw post having a portion entering said hub, a manually manipulable nut for raising and lowering the screw post by turning of its threads while they are in engagement with those of the screw post to raise and lower the screw post with respect to the hub, a chair seat supported from the upper end of the screw post, and masking means comprising telescopic cup members one inverted with respect to the other supported around the post between the hub and the chair seat.

16. In a swivel chair structure, the combination of a hub adapted to be located in a chair base, a screw post having a portion entering said hub, a manually manipulable rotatably supported nut for raising and lowering the screw post with respect to the hub, a chair seat supported from the upper end of the screw post, and masking means comprising telescopic members located in the space between the hub and the chair seat, one of said members being attached to the nut and another member being attached to the screw post.

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