March 6, 1951 P. MONDY 2,543,924

ADJUSTABLE SEAT SUPPORT FOR CHAIRS

Original Filed April 5, 1947 3 Sheets-Sheet 1

Fig. 1.

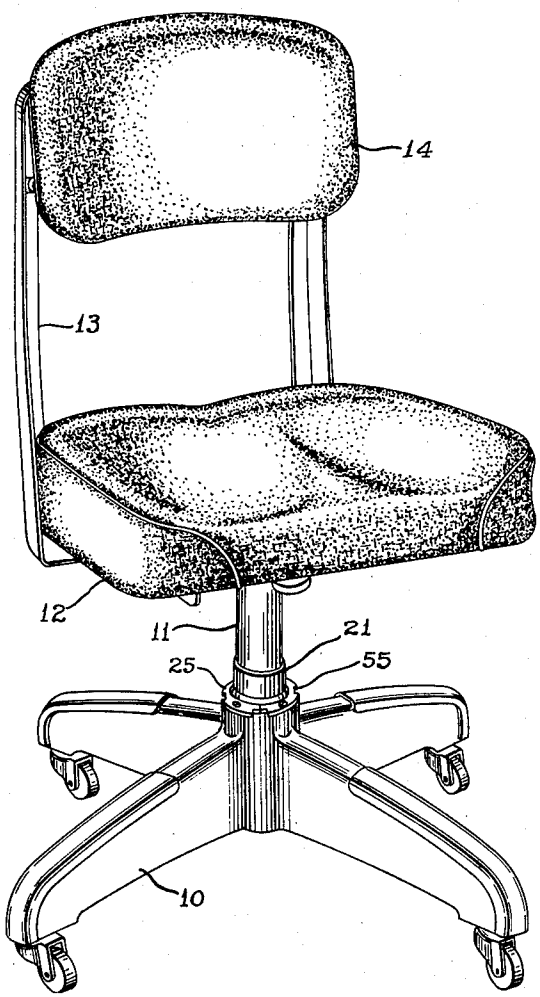

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Fig. 2.

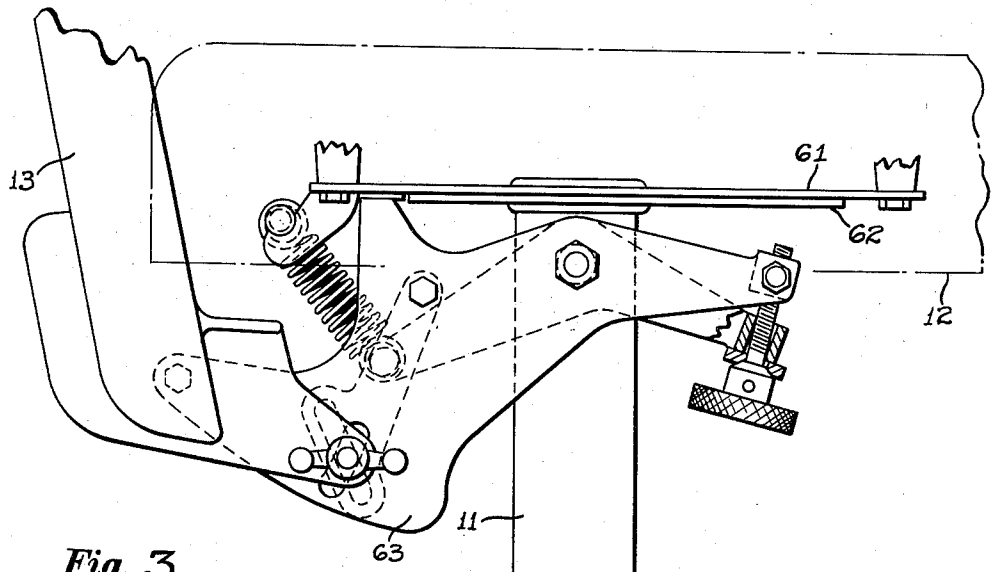
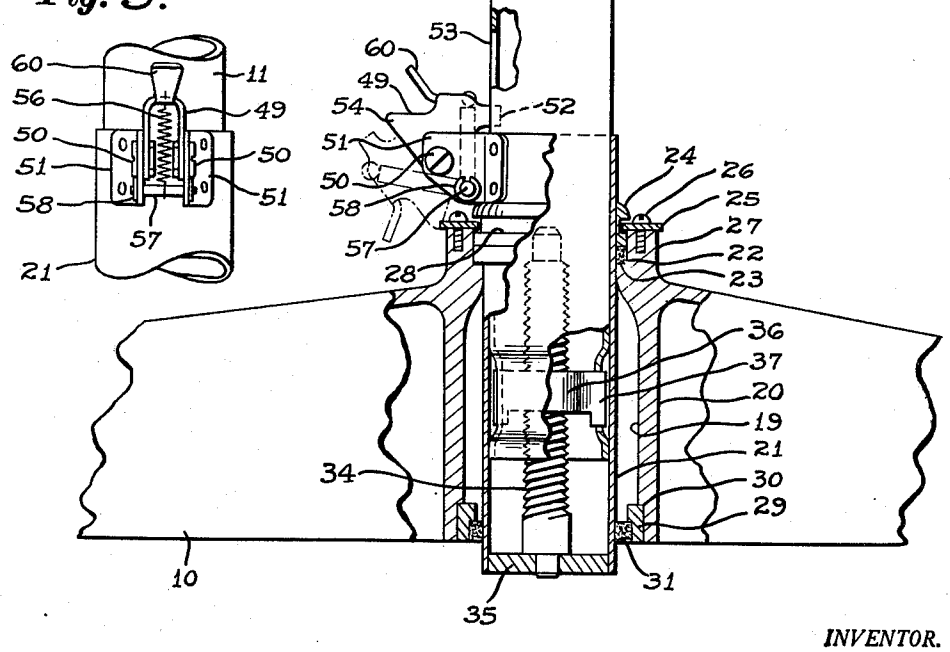


Fig. 3.



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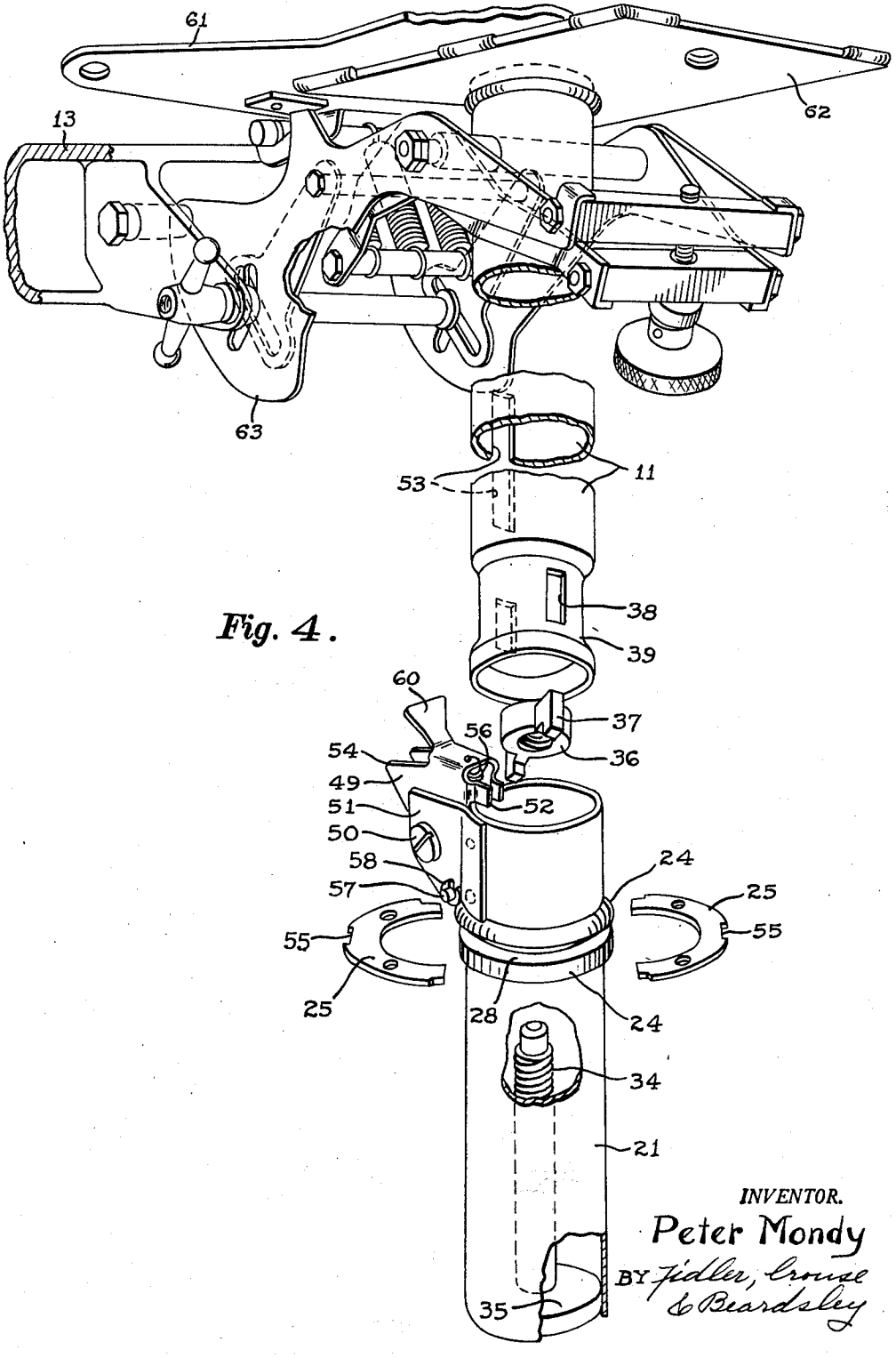

Fig. 4.

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ADJUSTABLE SEAT SUPPORT FOR CHAIRS

Peter Mondy, Detroit, Mich.

Original application April 5, 1947, Serial No. 739,553. Divided and this application October 2, 1948, Serial No. 52,504

8 Claims. (Cl. 155—93)

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My invention relates generally to chairs and has to do particularly with a chair base having a vertically adjustable spindle therein for rotatably supporting a chair seat at various convenient heights above the floor.

This application is a division of my co-pending application, Serial No. 739,553, filed April 5, 1947 for Adjustable Chair.

An object of my invention is to provide an improved chair base of the foregoing character.

Another object is to provide an adjustable chair which may be formed from a relatively small number of simple and inexpensive parts with a minimum of machined or close-fitting surfaces, and which may be assembled readily with a minimum of fitting or adjustment.

Still another object of the invention is to provide an improved height-adjusting mechanism for a chair of the type having a rotatable seat, which mechanism after a simple adjustment, may be actuated by simply rotating the chair seat to the desired height.

Another object is to provide a height-adjusting mechanism for a chair which is simple and rugged in construction, and easy to operate and which is substantially concealed within the chair base and seat supporting post and thus is protected again the entry of dirt and dust, presents a neat and attractive appearance and eliminates the likelihood of damage to the clothes of the user.

Further and specific objects of the invention are to provide an improved swivel bearing which is simple in construction and which firmly mounts the chair seat supporting post for rotation in the base in a stable upright position; to provide a seat supporting post which is substantially unencumbered by external adjusting mechanism; and to provide a height-adjusting mechanism which may be operated to adjust the chair seat to the desired height without soiling the hands or clothes.

Other objects and advantages of the invention will appear from the following description taken in connection with the appended drawings, wherein:

Figure 1 is a perspective view showing a chair constructed in accordance with my invention;

Fig. 2 is an enlarged fragmentary side elevational view of a portion of the chair shown in Fig. 1 with certain of the parts broken way and sectioned for a clearer understanding of the construction;

Fig. 3 is a fragmentary side elevational view of the latching device for the height-adjusting mechanism shown in Fig. 2; and

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Fig. 4 is an enlarged fragmentary, perspective and partially exploded view of a portion of the chair shown in Fig. 1 with certain of the parts broken away and in section for a clearer understanding of the construction.

A chair embodying the present invention is illustrated in Fig. 1 and comprises generally a base 10, a supporting post 11 rotatably mounted in the base 10 and adapted for vertical adjustment therein, a seat 12 mounted on the seat-supporting post 11, and a back rest support 13 extending upwardly at the rear of the seat 12 and carrying a back rest 14.

The base 10 may be formed in any suitable manner but preferably is formed by casting it from light metal such as aluminum. The base may have the usual four legs which preferably are of hollow form but which are not shown or described in detail as they may be of any suitable construction. For supporting the chair post 11 in the base 10 a generally cylindrical socket 19 is provided (Fig. 2) preferably by casting a hub 20 integrally with the base. The hub 20 is substantially housed and concealed within the hollow base 10 and is formed with open upper and lower ends.

A generally cylindrical spindle 21, which may be formed from a steel tube, is journaled in the hub 20 by combined thrust and side-bearing means which maintains the vertical position of the spindle 21 but permits free rotation thereof in the hub 20. The bearing means includes an upper thrust bearing 22 which preferably takes the form of an annular self-lubricating ring pressed into the upper end of the hub 20 and seated against a shoulder 23 therein. The spindle 21 is supported by a flange 24 which may be formed integrally with the tube from which the spindle 21 is formed but preferably is formed as a separate ring and welded to the spindle tube. The spindle 21 is retained in the hub 20 by a retaining ring 25 preferably formed in two sections (Fig. 4) and secured to the base 10 (Fig. 2) as by screws 26 which are threaded into an upstanding portion 27 of the hub 20 which surrounds the upper open end of the socket 19. The flange 24 is formed with a peripheral groove 28 adapted to receive the retaining rings 25 and provide therewith means for preventing dust or other small foreign objects from entering the bearing 22. The bearing means also includes a lower bearing 31 which takes the form of an annular self-lubricating ring mounted in the lower end of the hub 20 by an adapter or mounting ring 29 pressed into the lower end of the hub and seated against a shoulder 30. The lower

bearing 31 aids in maintaining the spindle in vertical position.

The spindle 21 supports a threaded height-adjusting element 34 which preferably is formed as a threaded stud secured rigidly in an end wall or floor 35 secured to or integral with the tubular spindle body.

The supporting stem or post 11 is received in the spindle 21 in telescoping relation therewith, the fit between these members being sufficiently snug so that the post 11 is supported firmly in a vertical position by the spindle 21 but is sufficiently free therein to permit both axial sliding and angular rotational movement of the post 11 in the spindle 21. The supporting stem or post 11 carries at its lower end a threaded adjusting member 36 adapted to be screwed on to the threaded stud 34 for adjustably mounting the supporting post 11 on the stud 34. The post 11 preferably is formed as a tubular member and receives therein the adjusting member 36 which preferably takes the form of a nut having laterally extending diametrically opposed ears 37 adapted to enter opposed slots 38 (Fig. 4) formed in the side walls of the supporting post 11 adjacent its lower end. The slots 38 are of sufficient length to receive the ears 37 when the nut 36 is tilted and inserted through the open lower end of the hollow post 11. The portion 39 of the post 11 in which the slots 38 are formed may be reduced in diameter to permit the ears 37 to be engaged by the lower edges of the slots inwardly of the ends of the ears sufficiently to insure that the ears will not slip out of the slots and at the same time permit the ears to be made of such lateral extent that they clear the inner wall of the spindle. The body of the nut 36 may be of lesser axial length than the ears 37 in order to permit the nut 36 to be inserted in the open end of the post 11 and locked into position to bring the ears into their slots 38 readily and without necessitating lengthening the slots substantially beyond the length of the ears to permit this manipulation of the nut.

After assembly of the nut 36 in its position (Fig. 2) in the end of the post 11 and with the ears 37 in their slots 38, the post 11 and spindle 21 are assembled by inserting the lower end of the post 11 in the upper open end of the spindle 21. The nut 36 is then screwed on to the stud 34 by rotating the post 11, the upper end of the stud being non-threaded and reduced in diameter to permit easy insertion of the stud end in the nut. It will be seen from the foregoing that since the spindle 21 is rotatably supported in the base 10 the spindle, together with the post 11, may be rotated together as a unit relative to the base, in which case the post 11 will remain in the same position of vertical adjustment with respect to the spindle and to the base 10. On the other hand, if the spindle is held against rotation in the base and the post 11 is rotated, the nut 36 will advance along the adjusting stud to displace the post axially with respect to the spindle 21 to raise or lower the post 11 according to the direction in which it is rotated.

Means are provided for selectively locking the spindle either to the post 11 for rotation therewith so that when the latter is rotated no height adjustment takes place or for locking the spindle 21 to the base 10 whereby, upon rotation of the post, vertical adjustment of the post is effected relative to the base. This means includes a two-position toggle latch mechanism secured to a portion of the spindle 21 which projects upwardly out of the socket 19 and preferably located in a position where it can be operated by the user while seated in the chair. The latch mechanism includes a latch element 49 pivotally mounted as by shoulder screws 50 secured in spaced brackets 51 attached to the spindle 21 as by welding. The latch element 49 preferably is formed of sheet material bent into the form of a yoke the sides of which have projecting portions 52 providing locking toes adapted to enter an elongated opening 53 in the post 11 when the latch element is in its upper position. The edges of the opening 53 serve as latching abutments for the latch element 49. The opening 53 is of such vertical length that it will receive the latch element 49 through the entire range of vertical adjustment of the post 11. Each of the sides of the latch element 49 has an extending heel portion 54 adapted to enter one of a plurality of latching notches 55 (Fig. 4) formed in the retaining ring 25 when the latch element is in its lower position. The edges of each notch 55 serve as latching abutments for the latch element 49. Preferably at least four such notches 55 are provided although, as will become apparent hereinafter, it is only necessary that one opening be provided in the post.

The latch element 49 is urged into either of its two positions by a spring 56 (Fig. 3) anchored at its lower end by a stud 57 extending through the brackets 51 and secured therein as by split washers 58 pressed into annular grooves near each end of the stud 57. The spring 56 is disposed substantially within the latch element 49 and the upper end is hooked through the top of the latch element 49. Thus, when the latch element is moved past dead center toward either its upper or lower position, it will be urged into such position by the spring 56 and held therein except when manually moved toward the opposite position. For convenience in manipulating the latch, the latch element 49 is provided with a handle 60 extending from the top thereof.

Normally, the latch element 49 is maintained in its upper position with the locking toes 52 entering the elongated opening 53 in the post 11, thereby locking the post 11 and spindle 21 positively together, thus permitting the chair post 11 and spindle to turn freely on the base 10 without vertical displacement. When it is desired to change the adjustment of the height of the chair seat relative to the base 10, the latch element is withdrawn from the opening 53 and rocked downwardly toward its lower position. Owing to the toggle action provided by the spring 56, the latch element 49 is urged into its lower position, as soon as it has been moved past dead center, and in its lower position bears against the periphery of the retaining ring 25. The chair seat 12 is then rotated in the appropriate direction to rotate the chair post 11 and effect the desired height adjustment. Upon rotation of the chair seat through not more than one-quarter of a revolution, the latch element 49 is brought into position to enter one of the notches 55 and thus lock the spindle 21 to the base 10. Further rotation of the chair seat effects rotation of the post relative to the spindle and the adjusting nut carried by the post therefore is advanced along the stud, thereby elevating or depressing the post and the seat according to the direction of rotation of the latter.

If, when the latch element is moved from its upper to its lower position, it should happen to enter one of the notches 55, rotation of the chair

seat would immediately initiate axial adjusting movement of the post 11. When the desired height of the seat has been obtained the latch element 49 is raised to its upper position and the chair seat rotated to a sufficeint angle (always less than one complete turn) to bring the toe 52 into position where it enters elongated opening 53. The spindle 21 is thereby locked to the post 11 and rotates therewith so that the adjusting nut and stud are rotated together and no vertical displacement of the post takes place; the chair seat 12 thus is free to rotate in the base at the same elevation. Due to the pitch of the threads on the adjusting stud 34 and adjusting nut 36, the seat 12 will only be elevated or depressed a very slight distance during the partial rotation of the seat required to bring the latch element 49 into position to engage in the post opening 53 and there is no noticeable height adjustment during this partial rotation.

The seat 12 (Fig. 1) which may be of any desired construction and preferably which takes the form of a cushion as is customary, is supported at the upper end of the post 11 by a seat support which preferably includes a mounting plate 61 (Fig. 2) and a reinforcing plate 62 secured to each other and to the chair post 11 preferably by welding. Any suitable means such as that shown generally at 63 may be used to provide support for the back rest support 13 on the chair post 11.

From the foregoing it will be seen that my invention provides a novel and improved chair base and vertically adjustable spindle which is of sturdy construction but which may be made light in weight, and which may be manufactured and assembled readily and relatively inexpensively. The construction involves a minimum of machined parts or parts requiring close tolerances. Many of the parts may be made by casting or stamping, or from bar, rod or tube stock by simple operations. The parts may be assembled readily with a minimum of fitting or adjusting.

The seat height-adjusting mechanism is simple but sturdy and may be operated conveniently. It is substantially housed and concealed and thus is well protected against dust and dirt; in addition the chair base and spindle present a neat and pleasing appearance. The swivel mounting requires no lubrication or other attention and is effective to maintain the chair post in stable upright position.

While I have shown and described herein one form of structure embodying my invention, it will be understood that changes in details and arrangements of parts may be resorted to without departing from the spirit of the invention.

I claim:

1. An adjustable chair comprising a base having a socket therein formed with an open upper end, a hollow spindle journaled in said socket and having an open upper end, a threaded height-adjusting stud disposed in said spindle and secured at its lower end to said spindle for rotation therewith, a chair post telescopingly received in said spindle through the upper end thereof for rotation and sliding axial movement in said spindle, a seat support mounted on said post, a threaded height-adjusting nut carried by said post and threaded onto said stud, said spindle and said post providing means for enclosing said stud and said nut, and means for connecting said spindle selectively to said base, whereby upon rotation of said seat support said nut travels along said stud to adjust the height of said seat support relative to said base, and for connecting said spindle to said post, whereby said seat support is rotatable at a fixed height relatively to said base.

2. An adjustable chair comprising a base having a socket therein formed with an open upper end, a hollow spindle journaled in said socket and having a portion projecting upwardly out of said socket, and formed with an open upper end, a threaded adjusting stud disposed in said spindle and secured at its lower end to said spindle for rotation therewith, a chair post telescopingly received in said spindle through the open upper end thereof for rotation and sliding axial movement in said spindle, a seat support mounted on said post, a threaded height-adjusting nut carried by said post and threaded onto said stud, said post and said spindle providing means for enclosing said stud and nut, and means carried on said projecting portion of said spindle for connecting said spindle selectively to said base whereby upon rotation of said seat support said nut advances along said stud to adjust the height of said seat support relative to said base, and for connecting said spindle to said post whereby said seat support is rotatable at a fixed height relatively to said base.

3. An adjustable chair comprising a base having a socket therein formed with an open upper end, a hollow spindle journaled in said socket and having an open upper end, a threaded adjusting stud disposed in said spindle and secured at its lower end to said spindle for rotation therewith, a hollow chair post telescopingly received in said spindle through the open upper end thereof for rotation and axial sliding movement in said spindle, a chair seat support mounted on said post, a threaded adjusting nut disposed within the lower end of said post and having extending projections seated in openings in the wall of said post for securing said nut in said post, said nut being threaded onto said stud, said spindle and said post providing means for concealing said stud and nut, and means for connecting said spindle selectively to said base, whereby upon rotation of said seat support said nut travels along said stud to adjust the height of said seat support relative to said base, or to said post, whereby said seat support is rotatable at a fixed height relatively to said base.

4. An adjustable chair comprising a chair base having a socket formed with an open upper end, a hollow spindle journaled in said socket and having a portion projecting upwardly out of said socket and a peripheral retaining flange in the upper end of said socket, a retaining ring surrounding the projecting end of said spindle and secured to said base in a position to engage said retaining flange for retaining said spindle in said socket, a latching notch in said retaining ring, a first threaded, height-adjusting element secured in said spindle for rotation therewith, a chair post telescopingly received in said spindle for rotation and for sliding axial movement therein and having a latching abutment thereon, a chair seat support mounted on said post, a second threaded height-adjusting element carried by said post and threadedly engaging said first height-adjusting element, and a latch element pivoted on said projecting portion of said spindle for movement between a position in the latching notch in said retaining ring and locking said spindle to said base, whereby upon rotation of said seat support said threaded adjusting elements advance relatively to adjust the height of

said seat support relatively to said base, and a position wherein said latching element engages said latching abutment on said post whereby said seat support is rotatable at a fixed height relative to said base.

5. An adjustable chair comprising a chair base having a socket formed with an open upper end and a latching abutment adjacent said upper end, a hollow spindle journaled in said socket, a threaded height-adjusting stud having its lower end secured in said spindle for rotation therewith, a chair post telescopingly received in said socket for rotation and sliding axial movement therein and having a latching opening therein, a chair seat support mounted on said post, a threaded height-adjusting nut carried at the lower end of said post and threaded onto said stud, said spindle and said post providing means for substantially enclosing said stud and nut, and a latch element pivotally mounted on said spindle for movement between a position engaging said latching abutment in said base and locking said spindle to said base, whereby upon rotation of said seat support, said nut travels along said stud to adjust the height of said seat support relative to said base and a position engaging said latching opening in said post whereby said spindle is locked to said post for rotation therewith and said seat support is rotatable at a fixed height relatively to said base.

6. An adjustable chair comprising a chair base having a socket formed with an open upper end and a latching notch adjacent said upper end of said socket, spaced bearings in said socket adjacent the top and bottom ends thereof, a hollow spindle journaled in said bearings, a threaded height-adjusting stud having its lower end secured in said spindle for rotation therewith, a chair post telescopingly received in said socket for rotation and sliding axial movement therein and having an elongated latching opening extending through its wall, a chair seat support mounted on said post, a threaded height-adjusting nut carried at the lower end of said post and threaded onto said stud, said spindle and said post providing means for substantially enclosing said stud and nut, and a latch element pivotally mounted on said spindle adjacent the upper end thereof for movement between a position engaging said latching notch in said base and locking said spindle to said base, whereby upon rotation of said seat support, said nut travels along said studs to adjust the height of said chair seat support relative to said base and a position engaging said latching opening in said post, whereby said spindle is locked to said post for rotation therewith, and said chair seat support is rotatable at a fixed height relatively to said base.

7. An adjustable chair comprising a chair base having a socket formed with an open upper end and bearings adjacent the upper and lower ends thereof, a hollow spindle journaled in said bearings and having a portion projecting upwardly out of said socket and a retaining flange in the upper end of said socket, a retaining ring surrounding the projecting end of said spindle and in a position to engage said retaining flange and retain said spindle in said socket, a latching notch in said retaining ring, a threaded height-adjusting stud secured at its lower end in said spindle for rotation therewith, a chair post telescopingly received in said spindle for rotation and sliding axial movement therein and having an elongated latching opening extending through its wall, a chair seat support mounted on said post, a threaded height-adjusting nut carried at the lower end of said post and threaded onto said stud, said spindle and said post providing means for substantially enclosing said stud and nut, and a latch element pivotally mounted on the projecting portion of said spindle for movement between a position engaging said latching notch in said retaining ring and locking said spindle to said base, whereby upon rotation of said seat support, said nut travels along said stud to adjust the height of said seat support relative to said base, and a position engaging said latching opening in said post, whereby said spindle is locked to said post for rotation therewith and said seat support is rotatable at a fixed height relative to said base.

8. An adjustable chair comprising a chair base having a socket having a latching abutment thereon, a hollow spindle journaled in said socket, a first threaded height-adjusting member secured in said socket, a tubular chair post telescopingly received in said socket for rotation and sliding axial movement therein, said post having an elongated latching slot in its side wall providing a latching abutment, a chair seat support mounted on said post, a second threaded height-adjusting element carried by said post and threadedly engaging said first adjusting member, said spindle and said post providing means for substantially enclosing said adjusting members, a latching element pivotally carried by said spindle for movement between a position engaging the latching abutment on said base and locking said spindle to said base, whereby upon rotation of said chair seat support relative movement of said adjusting members is effected in a direction axially of said post to adjust the height of said seat support, and a position engaging the latching abutment on said post, whereby said spindle is locked to said post and said seat support is rotatable at a fixed height.

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