

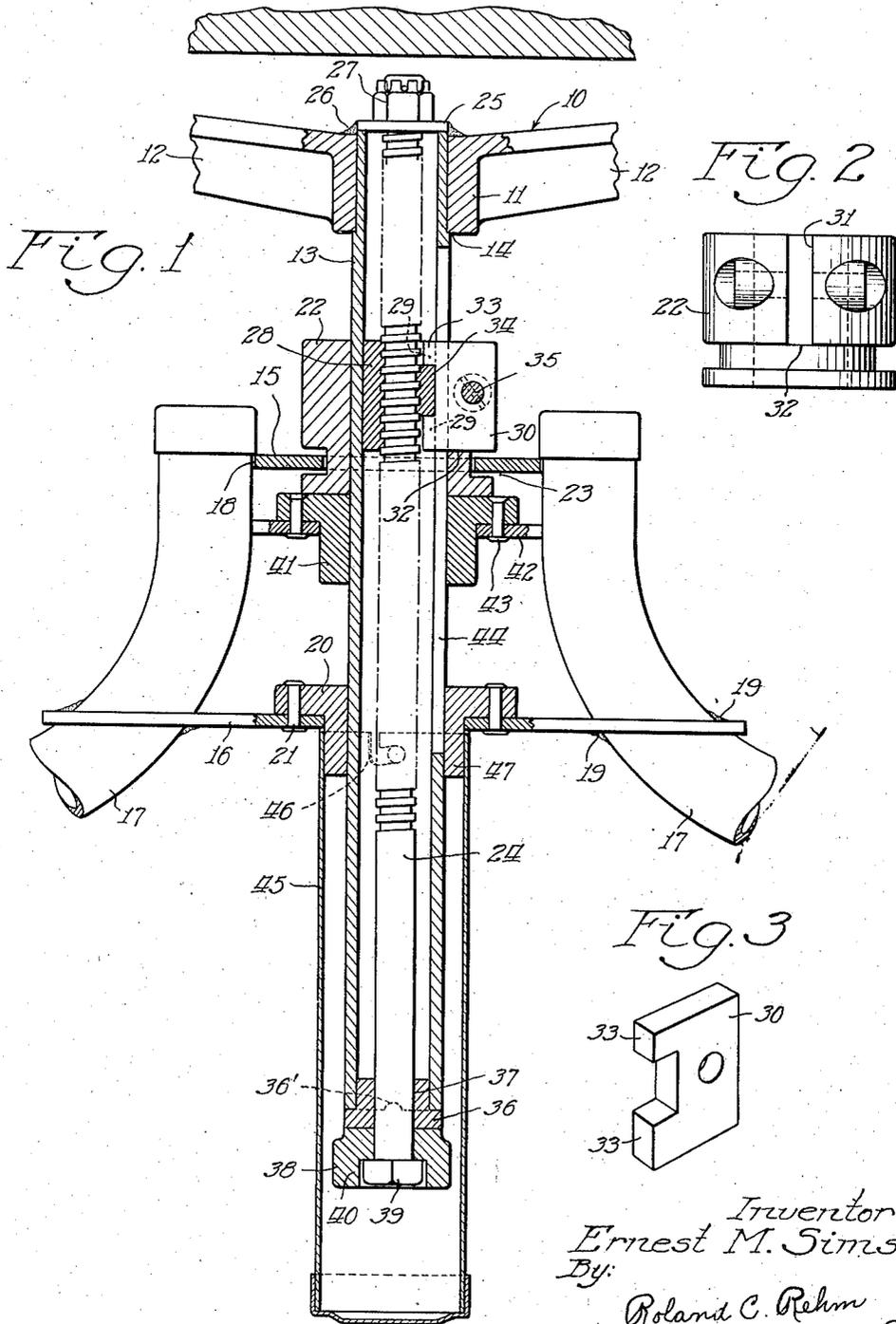
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CHAIR

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CHAIR

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5 Claims. (Cl. 155-93)

This invention relates to chairs, and among other objects aims to provide an improved seat post construction by which the chair seat is supported and vertically adjusted.

5 The nature of the invention may be readily understood by reference to one illustrative construction embodying the invention and shown in the accompanying drawing.

In said drawing:

10 Fig. 1 is a fragmentary vertical section through the seat post construction, the extremities of the chair seat and supporting base being broken away to permit illustration on a larger scale;

Fig. 2 is an elevation of the swivel collar; and

15 Fig. 3 is a supporting key associated with the swivel collar.

The invention is here shown embodied in a so-called office chair having a swivel seat, i. e., one which may be rotated on the chair base. The chair seat proper is shown supported upon a so-called spider 10, in this instance a cast iron structure having a central hub 11 from which radiate integral arms 12 extending to and supporting the corners of the chair seat in the well known manner. Supporting the seat and its spider is a spindle 13, in this instance a steel tube about one inch in diameter and having a one-eighth inch wall, which is shouldered at 14 to support the spider and passes through a central bore in the hub 11. The spindle extends downwardly through upper and lower base plates 15 and 16 of the chair base. The base plates are here shown carried by the chair base comprising in this case four tubular steel legs 17 appropriately curved and at their converging inner ends pass through appropriate openings or slots 18 in the respective base plates to which they are connected by welding or brazing as at 19 along their lines of contact. Substantial bearing surfaces for the spindle are provided by a bearing collar 20 passing through the lower base plate and having its flanges riveted thereto as at 21, and a swivel collar 22 passing through the upper bearing plate. The swivel collar is circumferentially grooved as at 23 to receive the upper base plate which is formed in halves to permit assembly. Both the swivel collar and the lower bearing collar fit the spindle snugly to prevent play, allowing a sliding fit for vertical adjustment.

50 Vertical adjustment is provided in this instance by an elongated screw 24 extending through the spindle and passing at its upper end through a washer 25 which together with the upper end of spindle tube 13 is welded or brazed as at 26 to the spider hub. A castle nut 27 is

applied to the upper extremity of the screw. The latter passes through a hard steel nut 28 having a sliding fit inside the spindle tube and recessed or slotted at 29 to receive the supporting key 30 which passes through an elongated slot in the tube. The key also passes through a slot 31 formed in the swivel collar and extending from the top to the surface 32 (which serves as a support for the key) just above the groove 23, and its projections 33 enter the slots 29 in the nut 10 and straddle the intermediate portion 34 thereof to serve as a support for the nut. A bolt 35 passes through registering holes in the swivel collar and key to hold the latter in place.

At its lower end the spindle tube is provided 15 with a bearing washer 36 resting against the end of the tube and having a central bore 37 through its hub (which fits inside the tube) to center the screw 24. The latter carries a hand wheel 38 bearing against washer 36, the washer providing a larger bearing surface than a direct bearing 20 against the end of the spindle tube. A semi-circular recess in the end of the tube which receives a correspondingly shaped lug 36' on the washer 36 holds the latter against rotation on the tube. 25 The hand wheel is non-rotatably connected to the screw in this instance by providing the latter with a square or other non-circular extremity 39 which fits in a correspondingly shaped recess 40 in the hand wheel. 30

The weight of the chair seat is thus received by the tubular spindle and transmitted to the screw at the lower end of the spindle. The screw in turn transmits the weight through the nut 28 and key 30 to the swivel collar which is here 35 shown supported on a bearing collar 41 carried by an intermediate base plate 42, similar to the other base plates and connected to the legs of the chair base in a similar manner. The bearing 41 is connected to the plate 42 by rivets 43 which 40 pass through its flange. As here shown, the bearing surface on bearing 41 for supporting swivel collar 22 (and the weight carried thereby) is made ample to minimize wear resulting from the swiveling of the chair seat. 45

The castle nut 27 is adjusted to remove substantially all play and thereby hold the parts in close operative relation even though the chair may be picked up by the seat. In the latter case the nut would carry the suspended weight 50 of the base by transmission thereof through the groove 23 in the swivel collar to the nut 28. The nut 27 is not however tightened so much as to interfere with free rotation of screw 24 for purposes presently described. 55

To adjust the vertical height of the chair seat it is necessary merely to rotate the screw 24 by its hand wheel 38 and move it relatively up or down inside nut 28 which is held in a fixed relation relative to the chair base. The screw and the spindle 13 therefore move up or down through the swivel collar depending upon the direction of rotation of hand wheel 38. The slot 44 formed in the spindle to permit the passage of key 30 is made long enough to accommodate the maximum desired amount of vertical adjustment. The screw 24 is here shown in the form of a one-half inch bolt with a shallow square thread of one-eighth inch pitch. As the chair seat swivels in use no change in adjustment of the seat height can occur since the entire spindle assembly, i. e., spindle 13, internal nut 28, bolt 24, upper and lower washers, hand wheel and swivel collar 22, rotate together.

It will be apparent from the foregoing that the adjusting screw and its nut 28 are not subjected to the substantial wear and consequent excess play resulting in other constructions from the play initially necessary therein for free movement of adjusting screws and their nuts, nor does such play result in a loose and wobbling chair spindle and seat. The close sliding fit which it is possible to secure between the smooth surfaced spindle 13 and swivel collar and bearings, prevents any substantial play of the seat or spindle, regardless of the amount of play in the screw and its nut, and such play in the latter it not seriously magnified through use.

To protect and conceal the lower end of the spindle, a tubular guard 45 may advantageously be provided. As here shown, the guard is provided with bayonet slots 46 at its upper end which engage pins or the like carried upon the sleeve 47 of the lower bearing collar. The spindle guard may therefore be readily removed and replaced for purposes of adjustment.

Obviously the invention is not limited to the details of the illustrative construction since these may be variously modified. Moreover it is not indispensable that all features of the invention be used conjointly since various features may be used to advantage in different combinations and sub-combinations.

Having described my invention I claim:

1. The combination in a chair of the character described of a chair seat having a smooth surfaced slotted hollow supporting spindle, a chair base, a pair of spaced bearing collars carried by said base and penetrated by said spindle and having a close sliding fit with the latter, an adjusting screw extending longitudinally inside said spindle and rotatably connected with the lower end thereof, a nut inside said spindle through which said screw passes, a supporting key passing through the slot in said spindle and engaging the nut to support the latter and to prevent its rotation relative to the spindle, a grooved swivel collar supporting said key and rotatably resting on an upper bearing surface on one of the said bearing collars, an adjusting hand wheel at the end of said screw, and a plate carried by said base and entering the groove in said swivel collar to prevent vertical movement of said collar relative to said base.
2. The combination in a chair of the character described of a chair seat having a smooth surfaced slotted hollow supporting spindle, a chair base, a pair of spaced bearing collars carried by said base and penetrated by said spindle and having a close sliding fit with the latter, an adjust-

ing screw extending longitudinally inside said spindle and rotatably connected with the lower end thereof, an adjusting hand wheel connected to the screw at its lower end, a nut inside said spindle through which said screw passes, a supporting key passing through the slot in said spindle and engaging the nut to support the latter and to prevent its rotation relative to the spindle, a grooved swivel collar supporting said key and rotatably resting on an upper bearing surface on one of said bearing collars, and a plate carried by said base and entering the groove in said swivel collar to prevent vertical movement of said collar relative to said base.

3. In a chair of the character described the combination comprising a chair base, a pair of spaced bearing collars carried by said base, a smooth surfaced slotted hollow seat supporting spindle circular in section and having a close sliding fit in said bearing collars, said spindle extending beyond said bearing collars an amount equivalent to its range of vertical adjustment, said spindle remaining in full bearing contact with said bearing collars at all positions of vertical adjustment, said spindle being rotatable in said collars to allow the seat to swivel, an adjusting screw extending longitudinally inside said spindle and rotatably connected with the lower end thereof, a nut inside said spindle through which said screw passes, a key supported by said base and passing through the slot in said spindle and supporting the nut to prevent its rotation relative to the spindle, and means for rotating said screw to adjust said spindle vertically.

4. In a chair of the character described the combination comprising a chair base, a pair of spaced bearing collars carried by said base, a smooth surfaced slotted hollow seat supporting spindle having a close sliding fit in said bearing collars, said spindle extending beyond said bearing collars a distance equivalent to its range of vertical adjustment, said spindle being in contact with the entire bearing surfaces of said bearing collars throughout the normal range of adjustment of said spindle, an adjusting screw extending longitudinally inside said spindle and rotatably connected with the lower end thereof, a nut inside said spindle through which said screw passes, a key carried by said base and passing through the slot in said spindle and connected with the nut to support the same and to prevent its rotation relative to the spindle, said nut being rotatable with said chair seat to prevent alteration of the chair seat height upon rotation of said seat, and means for rotating said screw to effect a vertical adjustment of said spindle.

5. In a chair of the character described the combination comprising a chair seat, a hollow, slotted seat supporting spindle having a smooth exterior and circular in section, a chair base carrying a spindle bearing having a close sliding fit with said spindle whereby the latter may rotate therein to swivel the seat and slide up or down to adjust the height of the chair seat without substantial lateral play, a nut inside said spindle and having supporting means extending through the slot in said spindle and engaging and being supported by said chair base, and a rotatable adjusting screw threaded through said nut and extending longitudinally inside said spindle, said screw having means engaging and supporting said spindle, which means allow the screw to rotate in said nut in adjusting the height of the chair seat.