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CHAIR CONSTRUCTION

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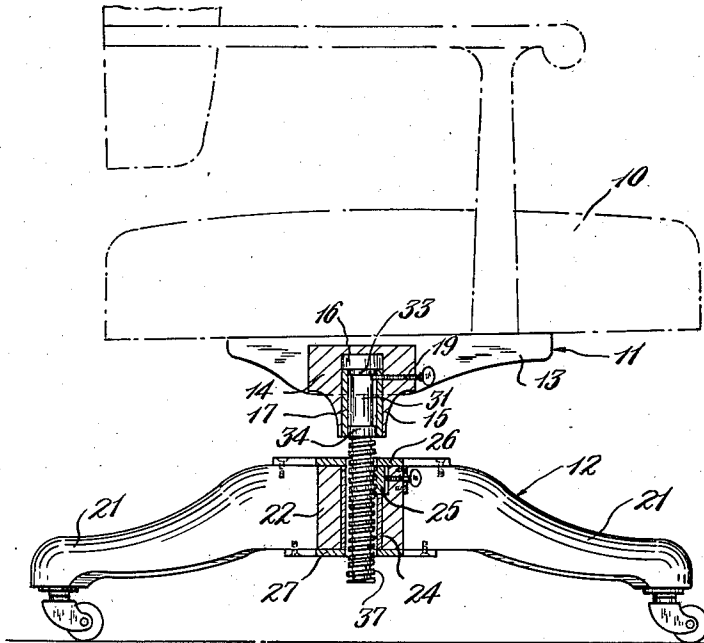


FIG. 1

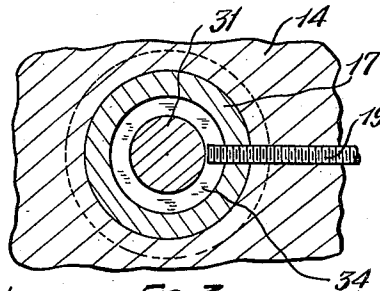


FIG. 3

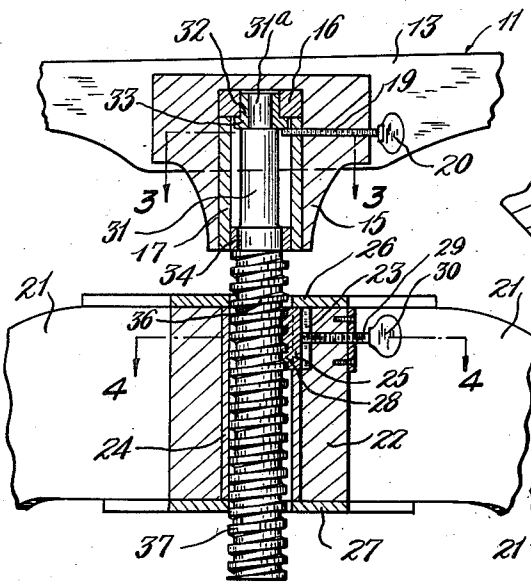


FIG. 2

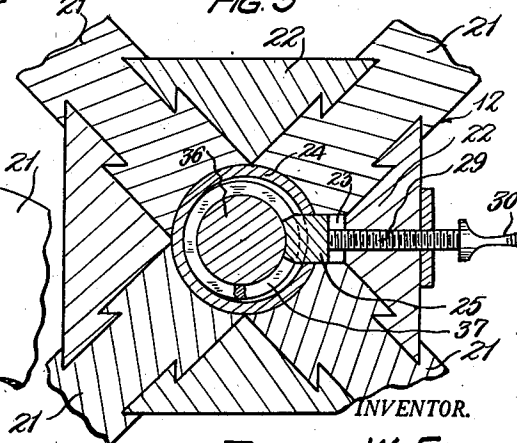


FIG. 4

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CHAIR CONSTRUCTION

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3 Claims. (Cl. 155—95)

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This invention relates to a chair construction and more particularly to that type of chair construction known as a swivel chair.

An object of the invention is to provide a swivel chair construction which is simple, possesses stability and provides for ready adjustment over a wide range.

Another object is to provide in a chair construction improved means for adjusting the chair seat relative to the chair base.

A further object is to provide in a swivel chair construction improved supporting means for the spider which carries the chair seat and which means permits free rotation of the spider and chair seat with a minimum amount of friction between the spider and its support and including provision for adequately taking both the end and lateral thrusts exerted by the spider on its support.

Another object is to provide in a chair construction improved means for adjusting the shaft which connects the base of the chair with the spider that carries the chair seat and which means enables the shaft to be locked in adjusted position and firmly held against lateral movements with respect to the chair base, thus imparting stability to the chair.

Another object is to provide a swivel chair construction which enables the chair to be built substantially entirely from materials other than metals such, for example, as wood or plastic materials and which construction is so designed that any expansion or contraction taking place in the adjustable or relative movable parts of the construction will not interfere with the proper adjustment and movements of the chair.

A further object is to provide a swivel chair construction wherein the chair spider which carries the seat can be adjusted relative to the chair base over a wide range of very fine adjustments and which construction requires a minimum amount of machining and other finishing operations in its manufacture.

Further and additional objects and advantages not hereinbefore specified will become apparent during the detailed description which is to follow of an embodiment of the invention. Referring to the accompanying drawing illustrating said embodiment of the invention.

Fig. 1 is a view, partly in elevation and partly in section, of a swivel chair with the base and spider of the chair shown in full lines and the chair seat supported by the spider indicated by dash lines; the sectional portions of this view illustrating the relationship of the parts when the adjusting and supporting shaft is free to be rotated for adjustment purposes, while the spider is locked to the shaft against rotation relative thereto.

Fig. 2 is a fragmentary sectional view showing

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those portions of the chair construction which are shown in section in Fig. 1 but on a larger scale and illustrates the relationship of the parts when the adjusting and supporting shaft is locked against all movements and the spider is free to rotate on the shaft.

Fig. 3 is a fragmentary sectional view taken substantially on line 3—3 of Fig. 2, looking in the direction of the arrows, and

Fig. 4 is a fragmentary sectional view taken substantially on line 4—4 of Fig. 2, looking in the direction of the arrows.

The swivel chair construction illustrated in the drawing comprises a chair seat and back 10, indicated in Fig. 1 by dash lines, and which seat is attached by means of securing screws or other suitable means (not shown) to the arms of the spider 11. The spider 11 may be constructed to provide tilting movement of the chair seat relative to the chair base, or it may be constructed so that the chair seat has no tilting movement as will be well understood in the art. The spider 11 is adjustably and operatively connected with the base 12 by means of an adjustable raising and lowering supporting shaft later to be referred to. The three main portions or sub-assemblies of the swivel chair construction as just referred to are usually employed in chairs of this type and broadly are well understood in the art.

The spider 11 shown herein comprises a pair of supporting arms 13 (only one of such arms being shown in the drawing) and which arms are connected intermediate their ends by a transversely extending connecting member 14 which on its lower side is provided with a downwardly projecting boss 15 illustrated herein as being of substantially conical configuration and integral with the member 14, although it will be understood that said boss, if desired, could be separate from said member 14 and secured thereto. The spider 11 may be constructed of any desired material, that is, it could be constructed of metal, if such material were desired and available, or it could be formed of wood or some suitable plastic material. In this connection if the spider were formed of plastic material it would lend itself readily to being produced by molding operations and would thus eliminate the necessity of machining and finishing the spider thereby materially reducing the cost of its manufacture.

The connecting member 14 and the boss 15 of the spider are provided with a cylindrical centrally disposed and upwardly extending bore in the base or upper end of which is mounted a ring 16 (shown in elevation in Fig. 1 and in section in Fig. 2) which may be formed of any suitable material, although a hard fiber ring can be advantageously employed in this relationship. A sleeve bushing 17 is mounted and suitably secured

in the bore with a tight engagement therein and extends from the lower end of the boss 15 upwardly into contact with the ring 16, and holds the latter in place. The sleeve bushing 17 may be formed of any suitable desirable and available material, but like the ring 16, fiber material may advantageously be used to form the bushing. A locking screw 19 is threadedly mounted in the connecting member 14 and passes through the sleeve bushing 17 into the recess and perpendicularly to the longitudinal axis of the latter and said screw at its outer end is provided with an operating head 20 so that it can be readily adjusted to various positions.

The base 12 of the chair construction includes the usual legs 21 which converge at their inner ends and are interconnected by suitable interlocking mortised and tenoned connections forming no part of the present invention. The central portion of the base where the convergent legs are interconnected may be termed a table portion 22 and through which portion extends the adjusting and supporting shaft, later to be referred to. The table portion 22 of the base is provided with a cylindrical bore extending vertically and centrally therethrough. The table portion also adjacent the upper end of the bore is provided with a longitudinally extending recess 23 communicating with the bore and reaching from the top of the table 22 vertically downwardly a short distance. A smooth sleeve bushing 24 is mounted in the bore in the table 22 and has a close fit therein and adjacent its upper end is provided with a slot which registers with the recess 23 for a purpose later to be explained. The sleeve bushing 24 may be formed of any desired and available material, although a fiber bushing can be advantageously used for this purpose. The bushing is not threaded interiorly and has a smooth interior bore.

A block 25 is mounted in the recess 23 and extends through the slot in the sleeve bushing 24 and into the bore of the latter. The block 25 can move in the recess 23 and in the slot in the bushing 24 laterally and perpendicularly to the longitudinal axis of the bushing for a purpose which will soon become apparent. The block 25 is held against movement in a direction longitudinally of the bushing 24 by its engagement with the lower end of the recess 23 and the lower end of the slot in the bushing 24 and by a plate 26 secured to the upper side of the table 22 of the base and provided with a central opening coinciding with the bore through the bushing 24 and of the same diameter. The block 25 is also held against sidewise movement by the side walls of the recess.

The block 25 is assembled in the chair base before the plate 26 is secured in position by merely inserting the block downwardly into the recess 23 and the slot formed in the bushing 24. A plate 27 similar to the plate 26 is secured to the underside of the table 22 of the chair base, as clearly indicated in Figs. 1 and 2, and although said plates 26 and 27 may be of any suitable material they can advantageously be formed of fiber, composition or plastic material.

The inner end of the block 25 within the bushing 24 is arcuate in shape, with the curvature thereof having the same radius as the root circle of the threaded portion of the adjusting and supporting shaft later to be referred to. This inner end of the block 25 is provided with a number of screw threads 28 of the same lead and pitch as are the screw threads of the threaded portion of

the adjusting and supporting shaft later to be referred to. The block 25 may be moved or adjusted within the recess 23 and the slot in the bushing 24 and perpendicularly with respect to the axis of the latter by means of an adjusting and holding screw 29 which is threadedly carried by the table 22 and has its inner end projecting into the recess 23 and engaging the outer flat side of the block 25, as clearly indicated in Figs. 1, 2 and 4. The block 25 may be formed of various suitable and available materials but hard fiber material can be advantageously employed for this purpose. The outer end of the adjusting screw 29 is provided with an operating head 30 to facilitate the turning of the screw.

The adjusting and connecting shaft which operatively interconnects the chair base 12 and the spider 11 and supports the latter comprises an upper end portion 31 which is smooth and projects into the sleeve bushing 17 carried by the connecting member 14 and boss 15 of the spider. The smooth portion 31 of the shaft is of less diameter than the internal diameter of the bushing 17 in order to provide substantial clearance between the shaft and bushing.

The shaft at its upper end beyond the smooth portion 31 is provided with a reduced portion 31a. A bushing 32 is secured on the reduced portion 31a and has at its lower end a radial flange 33 which bears against the shoulder formed by the end of the portion 31. The bushing 32 and flange 33 may be formed integral with each other or they may be formed with the flange 33 in the nature of a ring separate from the bushing. The bushing 32 and flange 33 may be formed of any suitable and available material but preferably they can be formed of hard fiber. The bushing 32 rotatably interfits the ring 16 while the flange 33 engages the lower end of said ring, for a purpose which will become apparent later. The smooth portion 31 of the shaft has tightly fixed thereon at the lower end of said portion a relatively short bushing 34 which rotatably interfits the interior of the lower end of the sleeve bushing 17. This bushing 34 is shown in the drawing as a member separate from the shaft, but it will be understood that the shaft could be so shaped as to have a portion equivalent to the bushing and formed integral with the shaft. The bushing 34 may be formed of the same material as the shaft or it can be formed of any suitable and available material as, for example, it can be formed of fiber.

From the description thus far set forth it will be seen that the spider is supported on the portion 31 of the shaft by the engagement of the bushing 32 and flange 33 with the ring bushing 16 and that such engagement constitutes a bearing support for the spider on the shaft and which bearing support takes both the end and lateral thrusts exerted by the spider on the shaft. It will also be noted that the bushing 34 which rotatably interfits the lower end of the sleeve bushing 17 prevents lateral movement of the spider with respect to the shaft.

It will also be noted that the spider can freely rotate relative to the shaft with a minimum amount of friction since only the bushing 32 and flange 33 and the bushing 34 contact the ring 16 and bushing 17. That is the shaft and spider have only a minimum area contact.

The inner end of the screw 19 underlies the flange 33. The screw 19 may be screwed inwardly to tightly engage the shaft with a clamp-

ing action and lock the spider and shaft against relative rotation, as indicated in Fig. 1.

The screw 19 may be backed off slightly from the clamping engagement of its inner end with the shaft and at such time the spider can freely rotate relative to the shaft but is held against endwise movement relative thereto by the flange 33 engaging the ring 16 and the screw 19.

The adjusting and supporting shaft below the smooth portion 31 and the bushing 34 has a portion 36 that is provided with screw threads 37 and which threads, as already stated, have the same lead and pitch as the threads 28 of the block 25, while the root circles of the threads 28 and the threads 37 are of the same radii. The external diameter of the portion 36, including the threads 37, is less than the internal diameter of the sleeve bushing 24, wherefore there is clearance between the threaded portion of the shaft and said bushing.

In assembling the chair, the lower end of the threaded portion of the shaft is passed through the opening in the plate 26 and the shaft then rotated to cause the threads 37 to screw into the threads 28 of the block 25 until the shaft extends sufficiently far into the bushing 24. The shaft can be locked against both rotative and lateral movement in the bushing 24 by tightening the screw 29 to force the block 25 tightly against the shaft and wedge or push the latter tightly against the wall of the bushing, as indicated in Figs. 2 and 4. When the block 25 is thus tightly engaged with the shaft the teeth of the block wedgingly interlock with the teeth of the shaft to hold the shaft against rotation, and since the shaft at one side is pressed firmly against the bushing 24 said shaft cannot move laterally with respect to the bushing and therefore stability is imparted to the chair.

The adjusting and supporting shaft may be formed of any suitable material, but since the shaft has only a limited area contact with the bushing 17 and the spider and there is a clearance between the threaded portion of the shaft and the bushing 24 said shaft can be formed of wood, if desired, since expansion and contraction of the shaft because of humidity and temperature changes would be immaterial and would not cause any binding of the shaft in the parts into which it extends.

The shaft shown herein for purposes of illustration is a wooden shaft which may be impregnated with oil or otherwise treated.

In Fig. 1 the screw 19 has been turned into clamping engagement with the adjusting and supporting shaft to lock the spider 11 against rotation relative to the shaft. Also in Fig. 1 the screw 29 has been backed off so that the shaft is not clamped against the bushing 24 and is free to rotate therein. This is the arrangement that is effected when it is desired to adjust the vertical height of the chair seat 10. At this time the user of the chair by revolving the chair seat can rotate the spider 11 and the supporting shaft which is locked thereto, with the result that the threaded portion of the shaft screws downwardly or upwardly in the bushing 24 of the chair base with the threaded block 25 acting as a fixed nut for this purpose.

Inasmuch as the block 25 is located at the upper end of the bushing 24 the adjustment of the shaft with respect to the bushing 24 may

be over a wide range. This adjustment since it is brought about by the action of the threaded portion of the shaft with respect to the block 25 is a fine adjustment, as distinguished from the course adjustments obtainable in chairs of this type employing a shaft having spaced holes and a pin to engage selectively in one or another of said holes.

When the user has adjusted the height of the chair seat to that desired the screw 29 is turned from the position shown in Fig. 1 to that shown in Fig. 2 to push the block 25 inwardly and force the threaded portion of the shaft against the bushing 24, as indicated in Figs. 2 and 4. When this has been done the shaft is locked against rotation and against lateral movement, wherefore wobbling of the chair seat relative to the base is eliminated. The user now backs off the screw 19 from the position shown in Fig. 1 to that shown in Fig. 2 to release the locking engagement of the screw with the shaft, whereupon the chair seat 10 and spider 11 can rotate freely and with a minimum of friction relative to the shaft but are held against relative endwise movement by the flange 33 engaging the ring 16 and the screw 19.

From the foregoing description it will have been seen that the present invention provides a chair construction which is simple, efficient and can be readily assembled. Furthermore, the parts are so constructed and interrelated that they need not be formed of metal but can be constructed of plastics or of wood, since sufficient clearance is provided between the operative parts to prevent locking or binding thereof if such parts should expand because of atmospheric conditions.

Although a preferred embodiment of the invention has been illustrated and described herein, it should be understood that the invention is susceptible of various modifications and adaptations within the scope of the appended claims.

Having thus described my invention, I claim:

1. In a chair construction, a spider having a portion for supporting a seat and a portion provided with a downwardly facing cylindrical bore therein, a ring bushing secured in the upper end of said bore, a sleeve bushing secured in said bore with its upper end in contact with said ring bushing, a shaft extending into said sleeve bushing and of less diameter than the interior of the latter, a reduced portion extending from the upper end of said shaft, and a bushing secured on said reduced portion and rotatably engaging within said ring bushing and provided at its lower end with a radially extending flange engaging the lower side of said ring bushing.

2. A chair construction as defined in claim 1 and wherein said second named portion of said spider is provided with adjustable means extending into said bore and cooperating with said flange and adapted to prevent at all times relative axial movement between said shaft and said spider, said adjustable means also acting upon adjustment to tightly engage said shaft to lock said spider and said shaft together against any relative movement.

3. A chair construction as defined in claim 1 and wherein said shaft is provided remote from its upper end with means rotatably interfitted over a limited area the interior of said sleeve bushing.

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