June 25, 1946. G. D. WOOD 2,402,934

CHAIR

Filed July 7, 1942

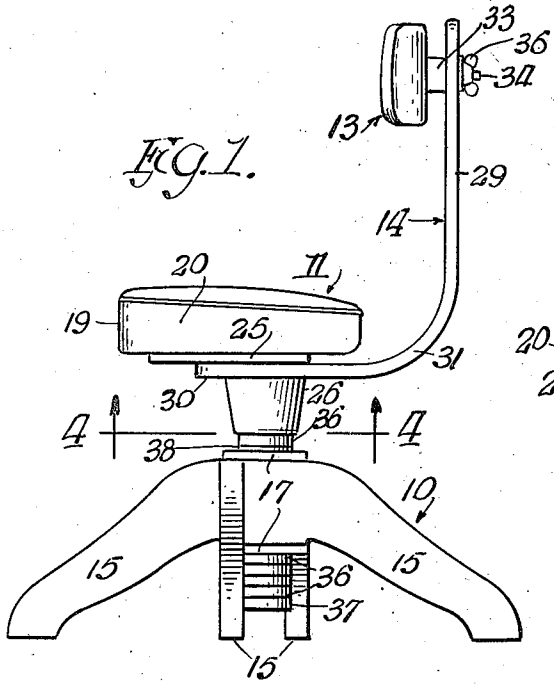



FIG. 1.

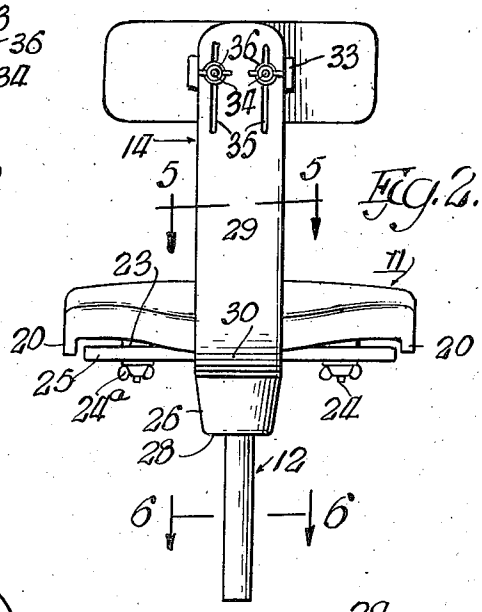



FIG. 2.




FIG. 5.

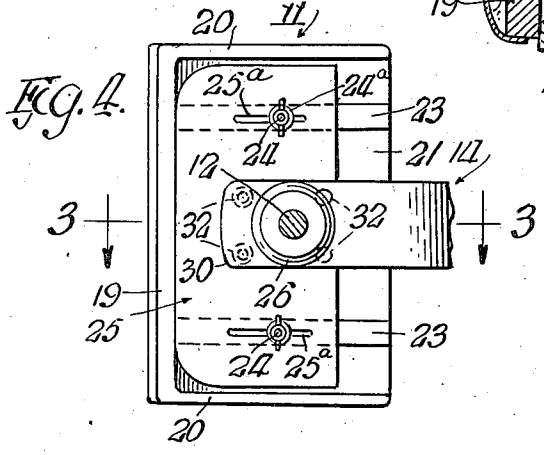



FIG. 4.

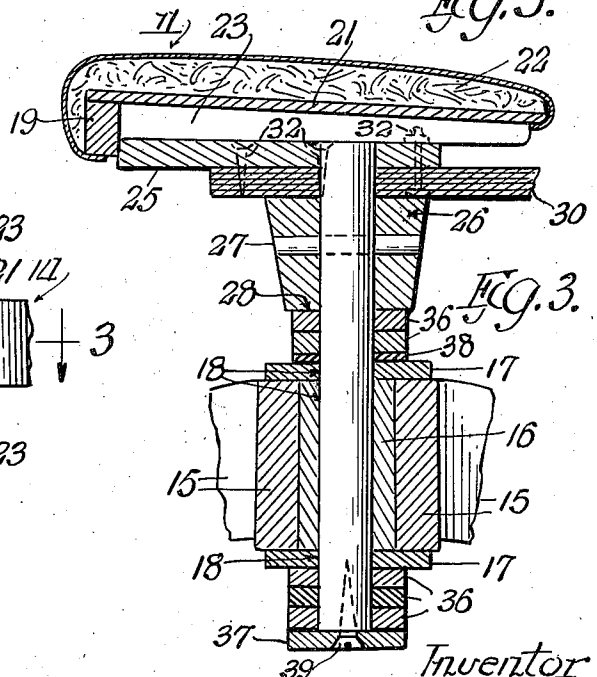



FIG. 3.

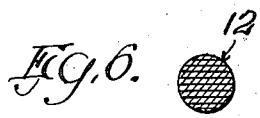



FIG. 6.

Inventor
Glenn D. Wood
by Arthur M. Nelson Atty.

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# UNITED STATES PATENT OFFICE

2,402,934

## CHAIR

Glenn D. Wood, Elkhart, Ind., assignor to Posture Research Corporation, Elkhart, Ind., a corporation of Indiana

Application July 7, 1942, Serial No. 450,003

7 Claims. (Cl. 155—94)

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This invention relates to improvements in chairs and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The present invention is more especially concerned with office and similar chairs wherein the seat is carried upon the upper end of a spindle so mounted in a base as to turn therein and to be vertically adjusted with respect to the base so as to dispose the seat at that elevation most convenient for the occupant. Chairs of the kind mentioned usually include a backrest mounted on a support that is operatively connected at one end to the spider whereby the seat is carried by the spindle.

In chairs of this kind, the spindle is usually made of metal and fits in a metal hub part of a base which in some instances is made of wood. The metal spindle is usually provided at the top end with a metal spider to which the seat is attached and generally the support for the back rest, which is also operatively connected to the metal spider, is also made of metal. In all, a considerable amount of metal is incorporated in a chair of this kind, so that the chair is relatively heavy and requires a considerable amount of machine work and labor in assembly, all of which is reflected in the ultimate price of the chair.

One of the objects of the present invention is to provide a chair of the kind mentioned wherein the parts are so formed and correlated that wood may be substituted for metal substantially throughout the entire chair, thus reducing the amount of metal parts necessary in the chair to a minimum and limited to a few conventional screws, bolts and the like.

Another object of the invention is to provide a construction for a chair of this kind, wherein it is practical to employ a wooden seat supporting spindle that is journalled in the wooden hub of a base, and with which is associated members made of wood and capable of being so disposed with respect to the spindle and hub of the base as to provide a vertical adjustment for the supported seat.

Again, it is an object of the present invention to provide a substantially all wood construction for a chair of the kind mentioned, wherein the seat supporting spider, the spindle and the back rest supporting member are so formed, disposed and connected together as to mutually coact in strengthening and bracing each other, so that although the metal parts in the construction are reduced to a minimum, a strong and rigid lightweight chair is produced.

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The above mentioned objects of the invention, as well as others, together with the advantages thereof will more fully appear as the specification proceeds.

In the drawing:

Fig. 1 is a view in side elevation of a chair embodying the preferred form of the invention.

Fig. 2 is a view in rear elevation of the seat and back rest assembly of the chair as when removed from the base thereof.

Fig. 3 is a vertical front to rear sectional view through the seat and base hub portion of the chair on an enlarged scale, as taken on the line 3—3 of Fig. 4.

Fig. 4 is a horizontal sectional view through a part of the chair as taken on the line 4—4 and on the same scale as Fig. 1.

Fig. 5 is a horizontal detail sectional view, on an enlarged scale through a part of the back rest supporting member as indicated by the line 5—5 of Fig. 2 and more particularly illustrates the laminated or plywood structure of said member.

Fig. 6 is a horizontal detail sectional view on an enlarged scale through the seat supporting spindle of the chair as taken on the line 6—6 of Fig. 2 and more particularly shows the laminated or plywood structure of said spindle.

Referring now in detail to that embodiment of the invention illustrated in the drawing, the chair therein shown includes a base 10, a seat 11 carried upon the upper end of a spindle 12 journalled in the hub of the base and a back rest 13 adjustably mounted on the upper end of a supporting member 14 as will later appear.

The base, which is made substantially entirely of wood, comprises a plurality of leg members 15—15 having their similar inner end portions grouped in encircling relation to provide a hub enclosing a wooden hub block 16, see Fig. 3. The said inner end portions of said legs are secured to each other and to the hub block and at the top and bottom of the hub are wooden end plates 17. Said end plates overlap the top and bottom edges of the said inner end portions of the legs and are fixed thereto in a manner assuring a good strong connection between said legs at the hub of the base. Said plates also securely confine the hub block in place and finish off the top and bottom portions of the hub. In the hub block 16 and end plates 17 are vertically disposed and aligned openings 18 that provide a spindle receiving bore for the base.

The seat 11 includes a rectangular wood body that comprises a front rail 19, side rails 20 and a

top panel 21 covered by suitable upholstery material 22. On the underside of the panel 21 is a pair of laterally spaced cleats 23 that extend from the front to the rear of said panel and anchored in each cleat is a bolt 24.

The spindle 12, which is of a diameter to fit in the receiving bore 18 in the base for a turning movement therein is cylindrical in cross section and is turned down from a piece of laminated or plywood, as appears from the transverse cross section through said spindle in Fig. 6. The top end of said spindle fits in a hole provided therefor in a seat supporting spider 25, fitting within the wooden body of the seat as best appears in Fig. 4. A part of the upper portion of the spindle extends through a cylindrical wooden block or pedestal 26 that is spaced below the spider. The block or pedestal 26 is secured to the spindle by a cross pin or dowel 27 (see Fig. 3) and the bottom of said block forms a downwardly directed thrust receiving face or shoulder 28.

The spider 25 is provided with slots 25*a* through which the bolts 24, before mentioned, extend and those parts of the bolts below said spider receive wing nuts and washers 24*a* whereby the seat is clamped to the spider. By loosening said wing nuts, the seat as a whole may be adjusted forwardly or rearwardly with respect to the back rest portions 29 within the limits permitted by the slots 25*a*. The structure just above mentioned, best appears in Fig. 4.

The back rest supporting member 14 is made from a piece of laminated or plywood bent into a substantially L shape to include an upright portion 29 and a horizontal portion 30 connected together by a curved knee or corner portion 31, as best appears in Fig. 1. The piece of laminated or plywood from which the said supporting member is made is wider than it is thick and the laminations or plies extend the width thereof as best appears in Fig. 5. The curved corner or knee 31 of said member is made on a substantial radius and is capable of some flexing to provide a limited back and forth yielding of the upright portion 29 of said member under proper pressure thereagainst by the occupant.

The forward portion of the horizontal part 30 of said back rest supporting member is disposed between the spider 25 and the block or pedestal 26 as best shown in Fig. 3 and a hole is provided in said part 30 for the passage of a part of the spindle 12 therethrough. The spider 25 and said part 30 of the back rest supporting member are secured together as by screws and bolts 32. As the upper end portion of the spindle extends through said part 30 and said spider, they are all secured together to form a rigid assembly.

The back rest 13 has a horizontal block 33 secured to its rear face and in this block are anchored laterally spaced bolts 34 that extend through associated vertical slots 35 in the top end part of the upright portion 29 of the back rest member. Suitable wing nuts and washers 36 are associated with those ends of the bolts extending through and beyond said slots and these nuts are disposed upon the rear side of said upright portion 29. By loosening said nuts, it is apparent that the back rest may be adjusted upwardly or downwardly within limits as provided by the slots 35. By tightening said nuts, the back rest is secured in the adjusted position.

Associated with that part of the spindle 12 below the block 26 is a plurality of annular members 36 and a locking disc 37, all having the same outside diameter. Each annular member 36 has



a center hole therein that snugly fits the spindle and therefore the members 36 are transferable from a position on the bottom portion of the spindle below the hub of the base to a position on the upper portion of the spindle between a thrust washer 38, preferably of fiber, on the top of the hub portion 16 and the shoulder 28 as formed by the bottom of the block 26. The disc 37 has a center screw 39 (see Fig. 3) secured therein and said screw is adapted to be threaded into the bottom end of the spindle as best shown in said Fig. 3.

In Figs. 1 and 3 I have shown five of the members 36 employed in connection with the spindle. In Fig. 1, I have shown one of the members 36 as disposed between the shoulder 28 and washer 38 and four of said members as disposed upon the bottom of the spindle between the bottom plate 17 and the disc 37. In this respect it is pointed out that that portion of the spindle between the shoulder 28 and its bottom extremity has a length substantially equal to the axial length of the hub block 16, plates 17 and the five members 36.

It is apparent from Fig. 1 that the member 36 engaged between the washer 38 and shoulder 28 spaces said shoulder above said washer a distance equal to the thickness of said member 36. Should it be desired to increase the height of the seat 11 above the floor upon which the chair is engaged, this can be done as follows: The disc 37 is unscrewed from the bottom end of the spindle and the members 36 above said disc are permitted to drop from the end of the spindle. The seat and back rest assembly as shown in Fig. 2 is now lifted upwardly until the bottom end of the spindle is completely withdrawn from and clears the hub of the base. One or more of the members 36 removed from the bottom end of the spindle is transferred to the upper portion of the spindle to engage the member 36 already thereon, after which the spindle is inserted down through the bore 18. In Fig. 3 I have shown the transfer of only one member to the upper portion of the spindle so that there are two of such members thereon. The remaining three of the members are slipped onto the bottom end of the spindle and the disc 37 is then reapplied. Thus the seat 11 of the chair has been elevated from the height shown in Fig. 1 to the height as shown in Fig. 3 and which is equal to the thickness of the member 36 added or transferred to the upper portion of the spindle.

The two members 36 on said upper portion of the spindle act not only as thrust washers but as spacing washers as is apparent when comparing Figs. 1 and 3. By reason of the disc 37, it is apparent that the same functions through the members 36 associated therewith to prevent the upward withdrawal of the seat and back rest assembly should an upward lift be imposed thereon when moving the chair from one place of use to another.

It is apparent from the foregoing that substantially all of the chair is made from wood, the only metal parts being a few inexpensive conventional screws, bolts and nuts. However, even though made substantially all of wood, the parts are so formed and correlated and secured together as to provide a rigid, but light weight chair that will give trouble free service over a long period of time. It is pointed out that that part of the spindle 12 below the shoulder 28 may either be impregnated or coated with a suitable lubricant whereby it may turn relatively easy in the bore 18 without squeaking. Being of lami-

nated plywood, the grain of the various wood plies is disposed so that the size and shape of the spindle is maintained within reasonable limits.

Also, with the structure described, the seat may be easily adjusted into the desired elevation without the aid of tools of any kind whatsoever.

While in describing the invention I have referred in detail to the form, construction and arrangement of parts embodied in the chair, the same is to be considered only in the illustrative sense so that I do not wish to be limited thereto except as may be specifically set forth in the appended claims.

I claim as my invention:

1. A chair embodying therein a base having a portion with a vertical bearing opening therein, a seat supporting spindle journalled in said opening for a turning movement, means providing an end thrust receiving face on the upper portion of the spindle above the base portion, and annular means adapted to receive the spindle and transferable from a position on the lower portion thereof to a position on the upper portion thereof between said face and said base portion, said annular means when in the last mentioned position operating as a spacing and thrust receiving element between said face and said base portion, and means carried by the bottom portion of the spindle for holding said annular means in place when in position upon the lower portion of the spindle and for preventing the upward withdrawal of the spindle from said opening.

2. A chair embodying therein a base having a portion with a vertical bearing opening therein, a seat supporting spindle journalled in said opening for a turning movement, means providing an end thrust receiving face on the upper portion of the spindle above the base portion, a plurality of annular members adapted to receive the spindle, one or more of said members being transferable from a position on the lower portion of the spindle to a position on the upper portion thereof between said face and said base portion, said one or more of said members when in said last mentioned position operating as a spacing and thrust receiving means between said face and said base portion, and means carried by the bottom portion of the spindle for holding one or more of said annular members in position thereon and for preventing the upward withdrawal of the spindle from said opening.

3. A chair seat, a pedestal extending downwardly therefrom having a reduced stem projecting from the lower end of the pedestal with a horizontal annular shoulder at the upper end of the stem and lower end of the pedestal, a supporting base including a hub having a central opening through which the stem passes, a plurality of collars through which the stem is adapted to pass, said collars in whole or in part being selectively located either above or below said hub and around the stem, the combined thickness of the collars plus the vertical height of the hub being substantially equal to the length of said stem, and means detachably connected to the lower end of the stem to bear against a lowermost collar or the lower end of said hub whereby the height of the seat may be varied in accordance with the location of collars with respect to said hub.

4. A seat, a pedestal connected to and extending downwardly therefrom, a stem of less cross sectional area than the pedestal extending from the lower end thereof with a shoulder at the upper end of the stem and lower end of the pedestal, a supporting base including a vertical hub through which the stem passes, and a plurality of members adapted to be mounted on the stem and in whole or in part disposed between said shoulder and the upper end of the hub or between the lower end of the hub and the lower end of said stem, the combined thickness of said members plus the height of the hub being substantially equal to the length of said stem, said members being changeable in position from below to above the hub and vice versa, and means releasably connected with the stem bearing against either the lower end of the hub or against a lowermost member on the stem whereby adjustment of the seat to different heights is obtained in accordance with the number of said members held on the stem above and below the hub.

5. A seat, a pedestal extending downwardly therefrom, a cylindrical stem extending from the lower end of the pedestal with a horizontal annular shoulder at the lower end of the pedestal and upper end of the stem, a hub through which the stem passes and in which it has a rotatable mounting to turn about a vertical axis, a plurality of collars each having a vertical opening therethrough, said collars being adapted to be mounted on the stem all above or all below, or part of them above and part of them below said hub, and releasable holding means connected with the stem to bear against a lowermost collar thereon or against the lower end of said hub, the combined vertical thickness of said collars plus the vertical dimension of the hub substantially equaling the length of said stem.

6. A chair comprising a seat, a vertical stem extending downwardly from the seat, an upper abutment on said stem, releasable holding means at the lower end of said stem, a base adapted to rest on a floor and having a hub through which said stem passes, a plurality of spacers each having an opening therethrough, said spacers either in whole or in part adapted to be located on said stem above or below said hub, the combined thickness of the spacers plus the height of the hub being substantially equal to the length of the stem between said upper abutment and said releasable holding means, and said hub being supported above said floor a sufficient distance to permit all of said spacers to be located on said stem below said hub.

7. A chair embodying therein a base having a hub portion with a vertical bearing opening therein, a seat supporting spindle journalled in said opening for a turning movement and having parts disposed above and below said hub portion, means on said spindle above the hub portion providing an enlargement having a bottom end thrust exerting face, a plurality of annular members adapted to receive said spindle, one or more of said annular members being transferable from a position on said part of the spindle below said hub portion to a position on said part of the spindle above said hub portion and under said end thrust exerting face, said one or more of said annular members when in said last mentioned position operating as a spacing and thrust receiving means between said end thrust exerting face and said hub portion, and means for detachably securing the bottommost annular member to the bottom end portion of the spindle.

GLENN D. WOOD.