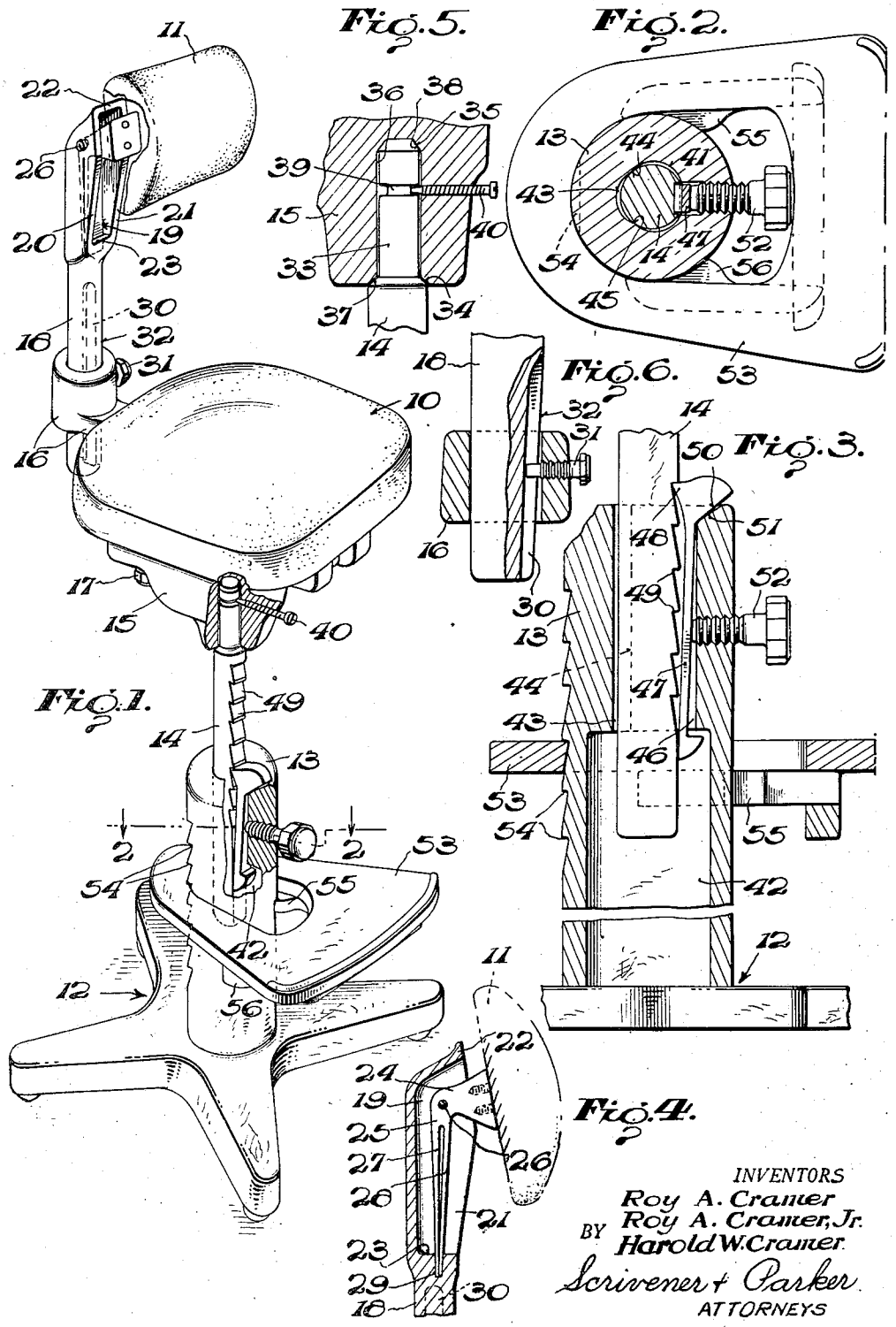
March 16, 1948. R. A. CRAMER ET AL 2,437,940

PIVOTED SPRING BACK REST

Filed March 16, 1944



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Patented Mar. 16, 1948 2,437,940

UNITED STATES PATENT OFFICE

2,437,940

PIVOTED SPRING BACK REST

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Application March 16, 1944, Serial No. 526,734

7 Claims. (Cl. 155—156)

1

This invention relates to chairs and more particularly to improvements in chairs of the posture type which include a tiltable back rest which may automatically adjust itself to the back of the user.

Posture chairs of the type to which this invention appertains have heretofore been provided with various types of adjustments in order that the heights of the seat and back rest may be readily and quickly accommodated to the particular user of the chair. This type of chair has been widely used in offices, factories and other places for seated workers, not only because of their ready adjustments but also because of their comfortable design in maintaining the body of the user in a posture-correct position.

For the most part, chairs of this type have heretofore been made of metal and close, precision machining methods have been employed. In constructing a chair of this character of wood, many problems are presented, one of the most serious of which is the problem of shrinking and swelling of the parts due to changes in temperature and moisture conditions. Shrinking causes looseness and wobble in the various parts, whereas swelling prevents the parts from moving freely with respect to each other. While the use of well-seasoned, selected hard woods tends to lessen these problems and difficulties, still they are present in some degree, and wooden posture chairs heretofore provided have not been entirely satisfactory.

It is accordingly one of the objects of the present invention to provide a posture chair which may be constructed of wood and which will avoid the above disadvantages.

Another object is to provide a chair which may be made entirely of metal and wherein the various parts are so constructed that precision machining thereof will be unnecessary.

Another object of the invention is to provide a novel chair construction wherein the parts are so constructed that they will efficiently cooperate with each other regardless of slight shrinking or swelling conditions due to changes in temperature and humidity.

Still another object is to provide a novel tiltable back rest for a chair of the above type, wherein the arrangement is such that the back rest may be automatically tilted in either direction, by the back of the user, to the most comfortable position.

Still another object is to provide a relatively simple but highly effective support for the chair seat, the construction being such that wobble and lost motion are entirely eliminated.

A further object resides in the novel base supporting structure whereby the chair spindle may be readily adjusted to vary the height of the seat and wherein the seat and spindle are supported in a substantial and rigid manner.

2

A still further object comprehends the provision of a novel and simplified chair structure which, while being of relatively low cost, is of sturdy and rigid construction and maintains proper cooperation of the parts thereof, regardless of their shrinking or swelling due to changes in atmospheric conditions.

Other objects and novel features of the invention will appear more fully hereinafter from a consideration of the following detailed description when taken in connection with the accompanying drawing wherein one embodiment of the invention is illustrated. It is to be expressly understood, however, that the drawing is employed for purposes of illustration only, and is not to be taken as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawing wherein similar reference characters refer to like parts throughout the several views,

Fig. 1 is a perspective view of a chair constructed in accordance with the present invention, certain parts being shown in section;

Fig. 2 is a transverse sectional view of the base construction taken along line 2—2 of Fig. 1 and looking in the direction of the arrows;

Fig. 3 is an axial sectional view of a portion of the base;

Fig. 4 is a partial sectional view illustrating the support for the back rest;

Fig. 5 is a fragmentary view partly in section of the seat support and spindle, and

Fig. 6 is a fragmentary view partly in section of the back rest supporting member.

Referring more particularly to Fig. 1, a chair constructed in accordance with the principles of the present invention is illustrated therein as comprising a seat 10, a back rest 11 and a support 12. As shown, the support 12 has secured thereto, in any suitable manner, an upwardly extending tubular base 13 in which a seat-supporting spindle 14 is adapted to be adjustably positioned for varying the height of the seat 10. The latter is secured to a spider 15 which cooperates with the spindle 14, in a manner which will appear more fully hereinafter, and which also adjustably receives a horizontal member 16 which supports the back rest. The member 16 may be moved toward and away from the seat 10 in order to properly adjust the position of the back rest with respect to the seat, and may be locked in its adjusted position by the thumb screw 17.

One of the important features of the present invention resides in the novel arrangement for supporting the back rest. As shown, the member 16 receives a supporting post or arm 18, the upper end of which is provided with a recess 19 defined by side walls 20 and 21, top wall 22, and bottom wall 23. An angle-shaped support preferably having integral arms 24 and 25 is pivot-

ally mounted adjacent its hub to the side walls 20 and 21, as by means of screws 26, the arm 24 extending outwardly beyond the edges of the said side walls and being connected with the back rest 11. The arm 25 is so formed as to provide a pair of spaced apart leaf springs 27 and 28 which extend downwardly and have their lower ends confined within a recess 29 in the bottom wall 23, see Fig. 4. With the described construction, the springs 27 and 28 normally serve to yieldingly maintain the back rest in the position illustrated in Figs. 1 and 4. However, the back rest may be yieldingly moved in either direction about its pivotal mounting, within the limits defined by the outer edges of the walls 20, 21 and 22, the leaf springs always acting to urge the back rest to the normal position illustrated.

In order that the back rest may be readily adjusted to a suitable height with respect to the seat 10, the arm 18 is adjustably mounted in member 16. As shown, Figs. 1 and 6, the arm 18 is provided with a slot 30 with which the end of a clamping screw 31, received by the member 16, cooperates, this construction providing for any height adjustment of the back rest, while preventing turning of the arm 18 relative to the member 16. Preferably the depth of the slot progressively increases from the top to the bottom thereof, so that if the clamping screw is not securely tightened, and the arm tends to drop downwardly, the bottom of the slot will tend to wedge against the end of the clamping screw. It will be observed from Fig. 6 that the surface of the arm 18 adjacent the slot 30 is cut away or beveled at 32, from the upper end of the slot to the lower end thereof. This construction insures a maximum amount of threaded engagement between the screw 31 and the member 16 regardless of the position of the arm 18.

Means are provided for removably mounting the seat-supporting spider 15 on the spindle 14 and preferably such means is so constituted that with the parts made of wood, no looseness or wobble will occur during any expansion or contraction of the parts. In the form shown, such means comprises a reduced end portion 33 having a lower beveled shoulder 34 and an upper beveled peripheral face or shoulder 35. The angularity of each of these beveled portions is preferably the same. The foregoing reduced end portion is adapted to be received within a socket 36, of slightly greater diameter than the portion 33, the said socket being provided with beveled shoulders or faces 37 and 38, having the same angularity as the shoulders 34 and 35 and adapted to cooperate with the latter, as illustrated. Adjacent the top, the portion 33 is provided with an annular groove 39 into which the end of a screw 40, carried by the spider, is projected, this arrangement effectively preventing the seat from being removed from the spindle, while permitting relative rotation between these two members.

It will be readily observed that with the foregoing construction, the seat is entirely supported upon the beveled shoulders 34 and 35, and that when the weight of the operator is upon the seat, a firm support is secured. This type of construction moreover maintains a firm support, without lost motion or binding, regardless of the expansion or contraction of the parts due to changes in atmospheric conditions. While the foregoing construction may be of wood, it is understood that any material, such as metal, may be used, and in the latter event, precision machining of the parts is avoided, while obtaining a firm and stable support.

The present invention, in addition to the foregoing, provides a novel arrangement for adjustably positioning and securing the spindle 14 in the base 12, and as shown, such arrangement is so constituted that the height adjustment of the spindle may be quickly effected. For the above purposes, the base 13 is provided with a substantially cylindrical opening or bore 41 which extends downwardly from the top of the base and communicates with an enlarged opening 42. Adjacent the back of the bore 41, the same is enlarged to form a portion 43, having a crescent-shaped cross section, said portion extending the length of the bore 41. With this arrangement a pair of bearing portions 44 and 45 are formed, as shown in Fig. 2, extending downwardly the full depth of bore 41, for a purpose which will appear hereinafter.

Adjacent the front of the bore 41, the base 13 is provided with a slot 46 for receiving an elongated locking member 47 having a head provided with a projection 48, adapted to be selectively engaged with one of the notches 49 on the spindle 14, and provided also with a supporting portion 50 cooperating with a ledge 51 on the base 13. The latter threadedly receives a clamping screw 52 which, when screwed inwardly, contacts the member 47 substantially intermediate its ends and firmly forces said ends into engagement with the spindle and in turn forces the latter backwardly into engagement with the bearing portions 44 and 45. It will be noted that the locking member is so constructed that only the upper portion, in the form of projection 48, and the lower end, engage the spindle. With such a two-point spaced-apart contact, it will be seen that as the screw 52 is screwed inwardly, a firm engagement will be insured between the spindle and portions 44 and 45 throughout the length of the latter. Thus, as will be observed from Fig. 2, the spindle 14 is firmly supported within the base at three places, spaced substantially equally around the circumference of the opening. Moreover, these three places constitute supporting surfaces which extend downwardly into the opening, a distance sufficient to achieve a firm and rigid support for the spindle when the screw 52 is tightened. The construction is especially advantageous when a wooden spindle and base are used, it being obvious that a tight and rigid support is secured regardless of swelling or shrinking.

It will be understood that when it is desired to adjust the height of the seat, the screw 52 is loosened and the locking member 47 is moved to the right, as viewed in Fig. 3, to withdraw projection 48 from notch 49. Thereafter, the spindle 14 is moved upwardly or downwardly to the desired position, the member 47 is moved back to engage the proper notch 49, and the screw 52 is tightened. The adjustment is thereby quickly and efficiently effected.

In the event that the chair is used with the seat adjusted a substantial height above the floor, it may be desirable to provide an adjustable foot rest. Such an arrangement is illustrated in Figs. 1, 2 and 3 comprises a platform 53, the rear portion of which is adapted to register with one of a plurality of notches 54. To the underside of the platform is secured a pair of arms 55 and 56, which bear against the base 13. When it is desired to vary the height of the platform, the same is tilted upwardly, as viewed in Fig. 1, to disengage the rear portion thereof from the notch 54.

Thereafter, the platform is adjusted to the desired position, and moved downwardly to the position shown in Fig. 1.

The novel features heretofore described are particularly useful and advantageous in the event that the structural portions of the chair are made of wood, inasmuch as the arrangements are such that the various parts will cooperate in an efficient manner irrespective of shrinking or swelling due to changes in moisture conditions. However, it is to be understood that the chair may be made of metal parts if desired and in this connection it is pointed out that a substantial and rigid construction will result without the precision machining methods and closely fitting parts heretofore utilized.

While one embodiment of the invention has been illustrated herein, and described with considerable particularity, it is to be understood that the invention is not limited thereto but may be embodied in various other forms, without departing from the spirit or scope of the invention, as will appear to those skilled in the art. Reference will therefore be had to the appended claims for a definition of the limits of the invention. Certain of the subject matter disclosed and described herein is disclosed and claimed in our divisional application, Serial No. 631,646, filed November 29, 1945, for Chairs.

We claim:

1. A chair comprising a seat, supporting means for the seat, a member carried by and extending upward from said supporting means and provided at its upper end with a recess having a slot at its lower end, a support pivotally mounted adjacent the upper end of said recess and provided with a leaf spring extending downwardly in said recess and received in said slot, and a back rest carried by said support.

2. A chair comprising a seat, supporting means for the seat, a member carried by and extending upwardly from said supporting means and provided at its upper end with a cut-away portion defining a hollow recess, a back-rest support having a hub portion pivotally mounted on said recessed member within the recess adjacent the upper end thereof, a leaf spring connected with said support and extending downwardly within the recess, said spring being operatively connected at its lower end with the recessed member, and a back rest carried by said support.

3. A chair comprising a seat, supporting means for the seat, a member carried by and extending upwardly from said supporting means and provided at its upper end with a recess having a slot at its lower end, a support pivotally mounted adjacent the upper end of said recess and provided with a plurality of leaf springs extending downwardly in said recess and having the lower ends thereof positioned in said slot, and a back rest carried by the upper portion of said support.

4. In a chair, a supporting member provided with an upright arm having an elongated recess formed at its upper end, a back rest, and means for pivotally mounting said back rest to said arm comprising a one-piece support having a hub pivotally connected to the walls of the recess adjacent the top thereof and having also a relatively thin, flexible portion extending downwardly within the recess and operatively connected with the bottom wall thereof, said last-named portion normally maintaining said back rest in a normal centered position but capable of flexing to permit limited movement of the back rest

in opposite directions about the pivotal connection.

5. In a chair, a supporting member provided with an upright arm having an elongated recess formed at its upper end, a back rest, and means for pivotally mounting said back rest to said arm comprising a one-piece support having a pair of right-angularly related arms joined by a hub portion, means for pivotally connecting the hub portion to the walls of the recess, means connecting one arm to the back rest, and means connecting the other arm to the bottom wall of the recess, said other arm being flexible and serving to yieldably maintain the support and back rest in a normally centered position.

6. In a chair, a supporting member provided with an upright arm, the upper portion thereof having a pair of spaced-apart side portions, a back rest, and means for pivotally mounting said back rest with respect to said arm comprising an angle member having one arm connected with the back rest, means pivotally connecting the angle member to the side portions, the other arm of said angle member comprising a plurality of leaf springs extending downwardly from the pivotal connection and having the lower ends thereof operatively connected with said upright arm.

7. In a chair, a supporting member provided with an upright arm, the upper portion thereof having a pair of spaced-apart side portions, a back rest, and means for pivotally mounting said back rest with respect to said arm comprising a support member positioned between said side portions and pivotally connected thereto, said member having a part extending beyond said side portions connected with the back rest, and means for yieldably maintaining said support member and back rest in normal position while allowing pivotal movement thereof in opposite directions comprising a pair of leaf springs having the lower ends thereof operatively received in a slot provided in said upright arm below the pivotal connection, and having the upper ends thereof operatively connected with said support member adjacent the pivotal connection.

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