

Sept. 12, 1961

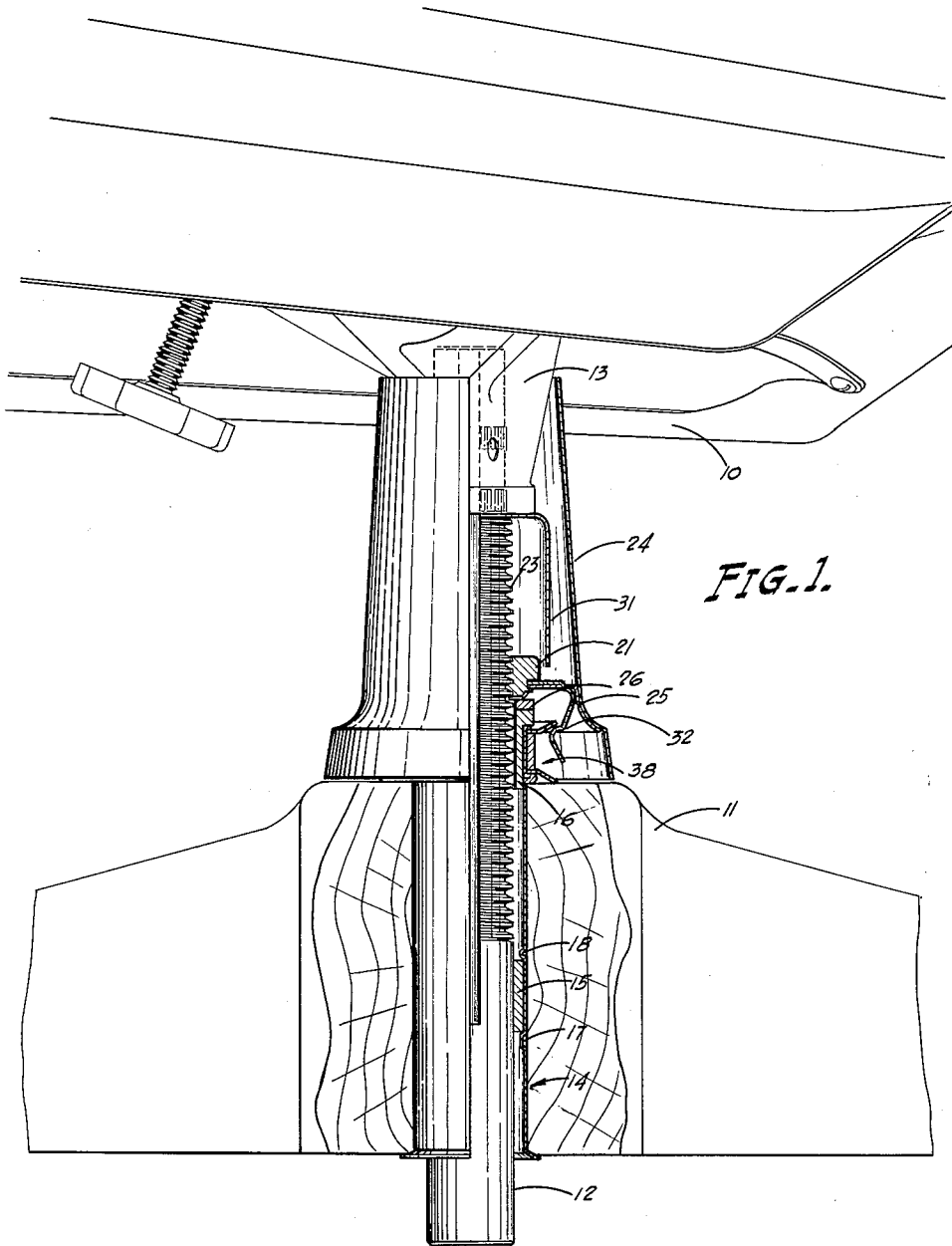
S. A. ERICSON ET AL

2,999,665

LOCKING ARRANGEMENT FOR SWIVEL CHAIR STRUCTURE

Filed June 2, 1958

2 Sheets-Sheet 1



INVENTORS
SYDNEY A. ERICSON
HENRY W. PARROTT

BY *A. G. Dawes*
ATTORNEY

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S. A. ERICSON ET AL

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FIG. 2

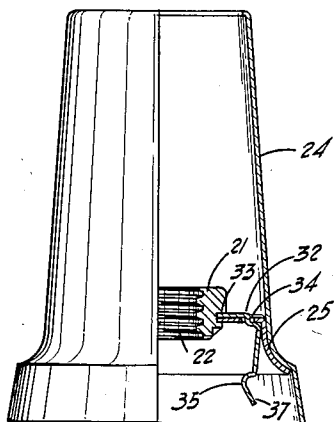


FIG. 5

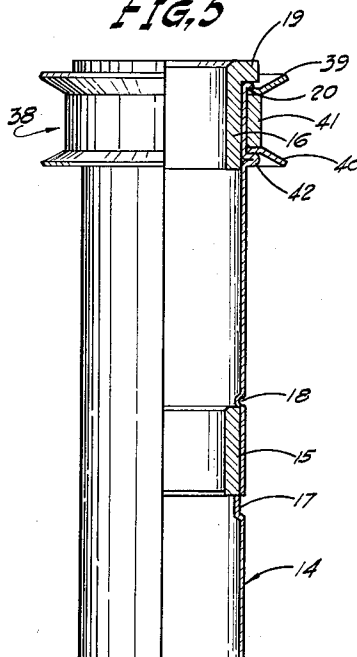


FIG. 3

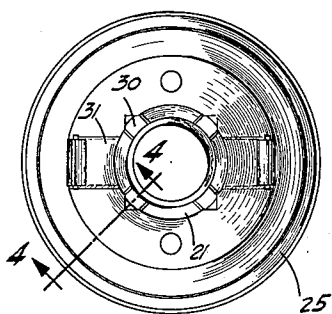


FIG. 6

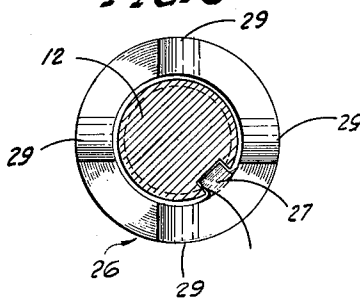
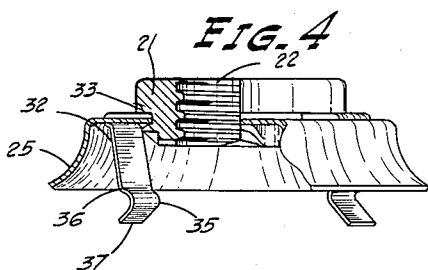
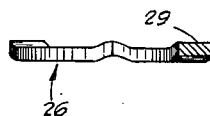


FIG. 7



INVENTORS
SIDNEY A. ERICSON
HENRY W. PARROTT

By A. J. Dowds

ATTORNEY

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2,999,665 LOCKING ARRANGEMENT FOR SWIVEL CHAIR STRUCTURE

Sidney Albert Ericson, Bridgeport, and Henry Wheeler Parrott, Shelton, Conn., assignors to The Bassick Company, Bridgeport, Conn., a corporation of Connecticut
Filed June 2, 1958, Ser. No. 739,426
8 Claims. (Cl. 248—405)

This invention relates to swivel chair structures of the type in which a screw post for supporting the chair seat is adapted to be raised and lowered by rotation of a nut associated with the chair base, and in particular to an improved arrangement for locking the chair seat to the base support member.

In the past, swivel chair structures have incorporated arrangements for raising and lowering the seat with respect to the base which have included means for locking the base to the chair seat while allowing free and easy adjustment of the seat height after the seat and base have been assembled. One such arrangement for locking the seat to the base is shown in United States Patent 2,251,841—Walter F. Herold. However, the prior arrangements have been found to be rather bulky and cumbersome and require a rather lengthy manual operation to assemble the two units, in some cases necessitating the use of a screwdriver or similar tool to rotate a locking screw a sufficient number of turns to lock the two units together. In addition the esthetic appearance of the structure has been marred by the inclusion of unsightly irregularities in the masking shields surrounding the height adjusting means. The present invention incorporates improved locking means, eliminating the disadvantages of the prior art structures.

It is therefore an object of this invention to provide a locking arrangement for a swivel chair structure which locks automatically when the chair seat and base sections are assembled by sliding them together.

It is another object of our invention to reduce greatly the time required for assembling and locking an adjustable swivel chair structure.

It is a further object of this invention to provide such a locking arrangement for a swivel chair structure which includes no moving parts which may become loosened during extended use and which requires but a single operation to assemble.

In accordance with one form of this invention, there is provided on the conventional height adjustment nut of a swivel chair a plurality of longitudinally extending locking springs which have inwardly curved portions adapted to engage a flange member rigidly attached to the base of the chair. Longitudinal movement of the chair seat, screw post and the adjusting nut with respect to the base causes the flat spring members to deflect outwardly, thus locating the spring members within or without a flange member.

Further objects and advantages of our invention will become apparent as the following description proceeds, and the features of novelty which characterize our invention will be pointed out with particularity in the claims annexed to and forming a part of the specification.

For a better understanding of this invention, reference may be had to the accompanying drawings illustrating a preferred embodiment wherein:

FIGURE 1 is a perspective view partially in section of the assembled chair structure;

FIGURE 2 is a front elevation view of the height adjustment nut and its supporting structure, partially in section;

FIGURE 3 is a bottom view of the height adjustment nut and the intermediate cup member;

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FIGURE 4 is a sectional view of the assembly shown in FIGURE 3 taken along lines 4—4;

FIGURE 5 is a front elevation view, partially in section, of the tubular hub assembly;

FIGURE 6 is a top view of the J washer as positioned on the screw post;

FIGURE 7 is a front view partially in section of the washer shown in FIGURE 6.

Referring now to FIGURE 1 of the drawing, there is shown a swivel chair structure including a chair seat or member 10 which is supported upon the chair base or member 11 by means of screw post 12. The screw post 12 is provided at its upper end with a suitable support or frame member 13 by means of which the chair seat 10 is supported, usually for tilting movement about a horizontal axis, controlled by a suitable counter-balancing means. The means by which the seat is tilted, forms no part of the present invention and it is not considered necessary to illustrate in detail the means connecting the support member 13 with the chair seat 10.

A tubular hub assembly 14, shown in detail in FIGURE 5, is rigidly secured to the chair base 11 and is adapted to receive the screw post 12 and support this post by means of a pair of sleeve bearings 15 and 16. These sleeve bearings are spaced as indicated to effect proper positioning of the screw post within the tubular hub assembly while at the same time permitting the screw post to move longitudinally as well as to rotate easily within the tubular hub assembly. In order to retain the lower sleeve bearing 15 within the tubular hub assembly 14, there is provided a pair of projections 17 and 18 on either side of the bearing 15 which function to prevent axial movement of the sleeve bearing. The upper bearing 16 is prevented from moving in an axial direction by having at its upper extremity an outwardly projecting flange section 19 which is adapted to seat upon a similarly outwardly projecting end portion or rim 20 of the tubular hub assembly 14.

In order to adjust the height of the chair seat, there is provided a suitable adjusting nut 21, as indicated in detail in FIGURE 2, having on its inner periphery screw threads 22 which engage threads 23 on the screw post. To enable the user to more easily adjust the height of the chair seat, a generally tubular member or handwheel 24 is rigidly attached to the height-adjusting nut 21 by means of an intermediate cup support member 25. The tubular member 24 extends upwardly and has its upper end open so as to allow it to surround the lower portion of the frame member 13 and present a pleasant appearance to the viewer by substantially masking the operating elements of the height adjustment structure.

To insure that the chair remains permanently stationed at the desired height, a washer 26, which is conventionally known as a J washer, is positioned between the upper bearing 16 and the height adjustment nut 21. The J washer shown in detail in FIGURES 6 and 7 is positioned on the screw post 12 by means of a key tongue 27 which occupies a cooperating key way 28 formed within screw post 12. This arrangement allows the specially formed J washer to move axially but is restrained from rotative movement with respect to the screw post 12. Thus, whenever the chair is revolved, the J washer turns while the chair base remains stationary. To insure that the height of the chair remains constant when it is revolved, four embossings 29 are provided on the J washer which cooperate and nest in mating indentations 30 which are struck in the lower face of the adjusting nut 21 as indicated in FIGURE 3.

In the operation of the height-adjusting mechanism of the chair, the nut 21 is rotated by manipulation of the upwardly extending rotatable adjustable tubular member or handwheel 24. This member provides a relatively

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large area for grasping by the hand so that the rotation of the nut can be very readily effected. During this operation, the adjusting nut 21 is revolved about the J washer 26 whereby the four indents 30 of nut 21 move out of the embossed sections 29 of the washer and when the desired height is attained the nut will find its seat either when turned or when the chair is revolving.

If the height of the chair is increased sufficiently, there would be a tendency to expose the threaded portion 23 of the screw post 12 adjacent the lower end of frame member 13. To prevent an otherwise unsightly appearance, there is attached to the screw post 12 an inverted cup-shaped member 31 having a diameter somewhat less than the diameter of the adjusting tubular member 24, FIGURE 1. The masking effect provided by the outer tubular member 24 is therefore completed by the use of member 30 and the screw threads of the post 12 will not be visible in the normal and ordinary adjusted positions of the chair.

The present invention is directed to an improved arrangement for locking the chair seat to the base member after assembly of the two parts, while allowing free height adjustment of the seat in the manner outlined above. To provide an automatic locking arrangement, a pair of flat spring locking members or fingers 32 are rigidly attached to the intermediate cup member 25 as indicated in FIGURE 2, with one end coupled to the height-adjusting nut 21 by being securely held within slot 33. The slot 33 holds both the end portions of the locking spring members 32 as well and the intermediate cup member 25. The flat spring locking members 32 are formed so that one end portion lies adjacent the upper surface of the intermediate cup member 25, the intermediate cup member being slotted at 34 to allow a portion of the spring member to pass through the intermediate cup member 25 at this point, presenting a relatively rigid cantilever support for the spring locking member 32. While the slot 3 is formed in the intermediate cup member 25 to allow the spring members to be rigidly secured to the adjusting nut and the intermediate cup member, any suitable arrangement for rigidly securing the end portion of the spring members to the intermediate cup member means may be utilized. The spring locking member 32 as indicated in FIGURES 2 and 4 is formed so that the upper portion follows the inner surface of the intermediate cup member, while the intermediate portion extends in a generally vertical direction, but tapers inwardly at a slight angle to provide a biasing force. At the outer extremity of the spring locking member 32, there is formed a generally rounded, inwardly directed flange-engaging portion 35. The flange engaging portion 35 has its upper contact surface 36 formed at a relatively greater angle with respect to the longitudinal axis of the chair than its lower contact surface 37.

The pair of flat, flexible locking spring members 32 engage a flange portion 38 of the tubular hub assembly 14 to permanently lock together the base and the chair seat. As shown in FIGURE 5, the flange portion 38 comprises two spaced discs 39 and 40 whose outwardly directed lip portions are turned away from each other at an angle of approximately 60° with the vertical axis. In the embodiment shown in FIGURE 5, the discs are spaced apart and secured to the tubular hub assembly by means of a cylindrical member 41. While the arrangement shown for rigidly securing the flange assembly to the tubular hub assembly includes the use of rim 20 and ridge 42 formed in the tubular hub assembly, any conventional method may be employed.

During the assembly of the chair structure, the chair seat portion including the height adjustment nut and the screw post are slidably lowered within the base 11 allowing the rounded portion 35 of the flat locking spring member or members 32 to engage the flange assembly 38. While there is shown a pair of spring locking

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members for locking the seat to the base, any suitable number may be employed.

The lower contact surface 37 of the locking spring will slide over the edge of the upper disc 39 of the flange assembly 38 with relatively little effort since the lower contact surface 37 makes approximately a 30° angle with the disc edge. In addition, assembly of the two units is facilitated since the locking spring members 32 are secured in cantilever fashion, and contact is made between the flange assembly 38 and the lower contact surface 37 of the locking spring members 32 during assembly, while contact is made between the upper contact surface 36 and the flange assembly during disassembly and therefore much closer to the rigidly secured end of the locking spring member.

In like manner, it will require additional force to disassemble the two units, since the upper contact surface 36 is at a greater angle with respect to the edge of the disc portion 39 of the flange assembly. As indicated in FIGURE 2, this angle is approximately 60° with respect to the longitudinal axis of the chair.

It will also be understood that the force of gravity acts to aid assembly and to oppose disassembly of the chair seat and base. After the spring member 32 has passed the flange assembly 38, the upper portion of the chair will seat upon the base since the adjusting nut contacts the J washer and the J washer is supported by the upper bearing 16. Thus, the spring members 32 and the flange do not support the chair seat but only serve as a clamping arrangement for preventing the chair seat from being pulled from the base portion unless sufficient pressure is exerted. In this regard, the present improved arrangement allows the chair seat to be disconnected from the base member by merely placing the user's foot upon the base member or a portion thereof and exerting sufficient upward force upon the chair seat sufficient to disengage the spring member or members 32 from the flange assembly 38.

The improved structure herein disclosed is quite simple and can be manufactured at relatively low cost. The appearance of the structure is also greatly enhanced since there is in the present structure no opening through which an adjustment screw protrudes or through which a tool may be inserted to reach the conventional adjusting screw previously used. In addition, considerable time can be saved during the shipping operation or whenever the chair requires disassembly.

While I have shown a single embodiment of the invention, it will be understood that the invention is susceptible to many other embodiments and that various changes in the organization of the parts and in the details of the construction may be made without departing from the principles of the invention or the scope of the claims.

What is claimed is:

1. A device for locking a swivel chair seat to a chair base of the type including a screw post having an upper portion connected to said chair seat and having a lower portion operating in said base, a nut supported from said base and manipulatable for rotation for raising and lowering the screw post, the improvement comprising: a flange member rigidly secured to said base and at least one flexible spring member attached to said nut and adapted to yieldably engage said flange member in locking relation, whereby said chair seat is locked to said chair base.

2. A device for locking a swivel chair seat to a chair base of the type including a screw post connected to said chair seat and having a portion operating in said base, a nut supported from said base and manipulatable for rotation for raising and lowering the screw post, the improvement comprising: a flange member rigidly secured to said chair base, said flange member including at its upper extremity an outwardly projecting lip portion, at least one flexible spring member attached to said nut

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and adapted to engage said flange member in locking relation, said flexible spring member being formed to include a downward projecting portion terminating in a generally rounded inwardly projecting end portion and adapted to slide over said outwardly projecting lip portion of said flange member to engage said flange member in locking relation whereby said chair seat is locked to said chair base.

3. A device for locking a swivel chair seat to a chair base of the type including a screw post connected to said chair seat and having a portion operating in said base, a nut supported from said base and manipulatable for rotation for raising and lowering the screw post, the improvement comprising; a flange member rigidly secured to said chair base, said flange member including at its upper extremity an outwardly projecting lip portion, at least one flexible spring member attached to said nut, said flexible spring member being formed to include a downwardly projecting portion terminating in a generally rounded inwardly projecting end portion, said rounded inwardly projecting end portion being formed with one of its two contact surfaces at a greater angle with respect to the longitudinal axis of said screw post than the other of its contact surfaces, whereby said flexible spring member requires less pressure to slide over said outwardly projecting lip portion of said flange member in one direction than the other, said flexible spring member adapted to engage said flange member in locking relation whereby said chair seat is locked to said chair base.

4. The device as claimed in claim 2 wherein said outwardly projecting lip portion of said flange member is bent upwards towards said chair seat at an angle of approximately 60° with the longitudinal axis of said screw post.

5. A device as claimed in claim 2 wherein said rounded inwardly projecting end portion of said flexible spring member is formed so as to provide an upper contact surface at an angle of approximately 60° with the longitudinal axis of said screw post and a lower contact surface at angle of approximately 30° with the same axis, whereby greater pressure is required when disengaging said flexible spring members from said flange member than is required when engaging said member.

6. A device for locking a chair seat to a chair base of the type including a screw post having an upper portion connected to said chair seat and having a lower portion operating in said base, a nut supported from said base and

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manipulatable for rotation for raising and lowering the screw post, the improvement comprising; a flange member rigidly secured to said chair base and formed with a projecting lip portion, at least one spring member attached to said nut and adapted to engage said flange member in locking relation, said spring member being formed to include a downwardly projecting portion adapted to slide over said lip portion of said flange member to engage said flange member in locking relation whereby said chair seat is locked to said chair base.

7. A device for locking a chair seat to a chair base of type including a screw post having an upper portion connected to said chair seat and having a lower portion operating in said base, a nut supported from said base and coupled to said screw post to raise and lower the screw post through manual rotation of said nut, the improvement comprising; at least one spring member, a coupling member including a spring mating element, one of said members being rigidly secured to said chair base and the other member being movable along the longitudinal axis of said post responsive to rotation of said nut, said spring member being formed to include a longitudinally projecting portion to engage said spring mating element in locking relation whereby said chair seat is locked to said base.

8. A device for locking a chair seat to a chair base of the type including a screw post having an upper portion connected to said chair seat and having a lower portion operating in said base, a nut supported from said base and coupled to said screw post to raise and lower the screw post through manual rotation of said nut, the improvement comprising; a coupling member rigidly secured to said chair base and including a spring mating element, at least one spring member movable along the longitudinal axis of said post in response to the rotation of said nut, said spring member being formed to include a downwardly projecting portion which engages said spring mating element in locking relation whereby said chair seat is locked to said chair base.

References Cited in the file of this patent

UNITED STATES PATENTS

229,761	Seymour	July 6, 1880
1,873,054	Sheldrick	Aug. 23, 1932
2,713,386	Holtz	July 18, 1955
2,755,846	Shepherdson	July 24, 1956

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,999,665

September 12, 1961

Sidney Albert Ericson et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 62, before "base" insert -- chair --;
column 5, line 40, before "angle" insert -- an --.

Signed and sealed this 16th day of January 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents