

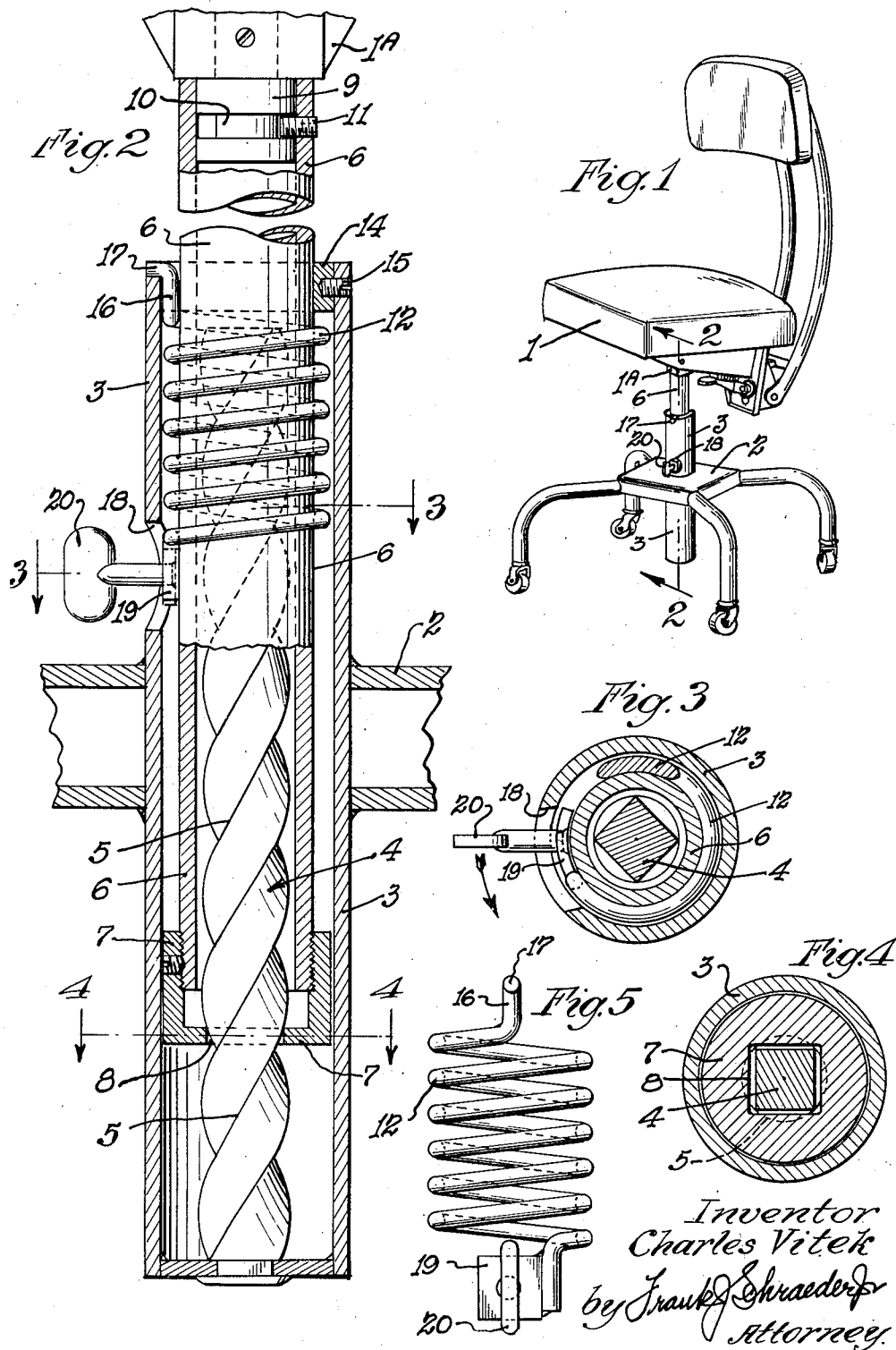
March 28, 1950

C. VITEK
ADJUSTABLE SUPPORT FOR CHAIRS,
STOOLS, AND THE LIKE

2,501,976

Filed June 4, 1945

3 Sheets-Sheet 1



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Fig. 6

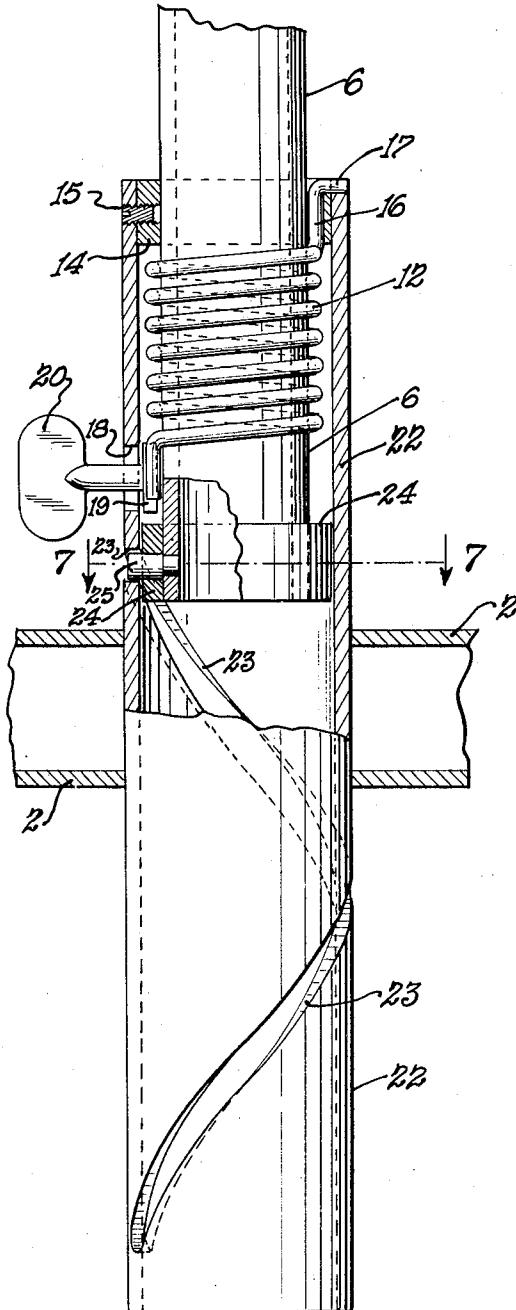
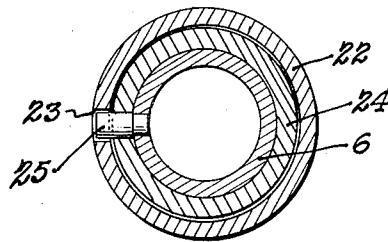


Fig. 7



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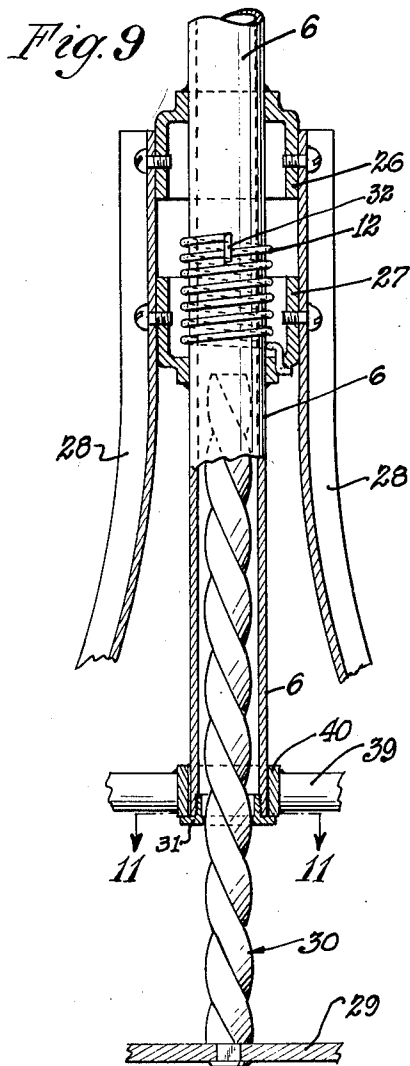
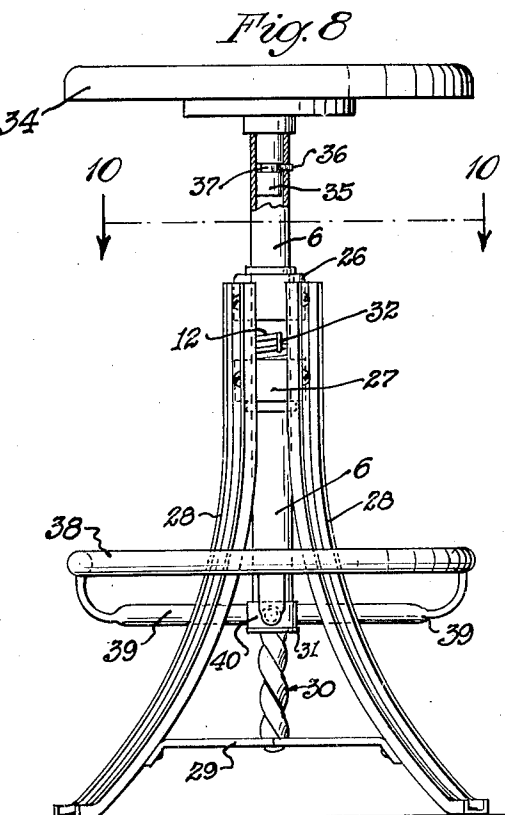
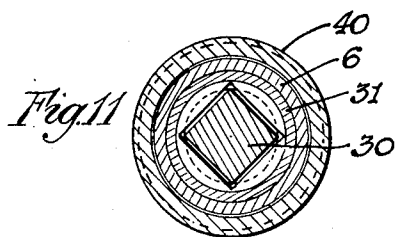
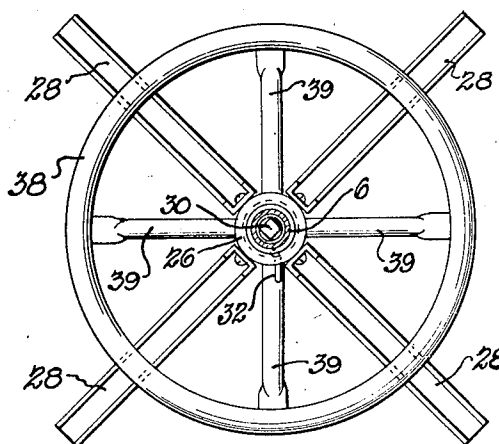


Fig. 10
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UNITED STATES PATENT OFFICE

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ADJUSTABLE SUPPORT FOR CHAIRS,
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20 Claims. (Cl. 155—93)

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The present invention relates primarily to the art of chairs, stools and the like, and has for its object to provide simple and novel means for quickly and easily raising and lowering the seat and causing it to be securely held against undesired downward movement from any position into which it may be adjusted.

In carrying out my invention, I support the seat on the upper end of a novel vertically-adjustable column; and, since this column may be used elsewhere than in chairs or stools, the present invention, viewed in one of its aspects, may be said to have for its object to produce a simple and novel extensible column or other member which automatically locks itself against lengthening or shortening, as the case may be, after an adjustment has been made.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawing, wherein:

Figure 1 is a perspective view of a chair embodying the present invention; Fig. 2 is a section on an enlarged scale on line 2—2 of Fig. 1; Figs. 3 and 4 are sections taken, respectively, on lines 3—3 and 4—4 of Fig. 2; Fig. 5 is a side view of the locking and holding spring; Fig. 6 is a view, similar to Fig. 2, showing a modification; Fig. 7 is a section on line 7—7 of Fig. 6; Fig. 8 is an elevational view of a stool embodying the invention; Fig. 9 is a section, on a larger scale, on a plane containing the vertical axis of the seat supporting means in Fig. 8, showing only fragments of the structure; Fig. 10 is a section on line 10—10 of Fig. 8; and Fig. 11 is a section on line 11—11 of Fig. 9.

Referring to Figs. 1—5 of the drawings, 1 represents the seat and other superstructure of a common type of chair, and 2 the base portion. The superstructure is supported on the upper end of a vertical column rising from the base. Generally speaking, this column is composed of two telescoped members one of which is movable relatively to the other which is stationary and fixed to the base. The two column members are united by a screwthread connection of steep pitch, whereby a single turn of the movable member causes it to rise or move down quickly through a considerable distance. Normally the movable member is locked against downward movement by a coiled spring fitting closely around the same

and anchored at one end only so that its grip may be released by moving the free end in a direction tending to unwind the spring.

In the particular arrangement illustrated, the base 2 comprises a small table or platform supported on legs. Extending through the center of the table, and rigidly fastened thereto, is a deep socket 3 in the form of a tube closed at the lower end and constituting a housing for the operative members. The stationary member of the two-piece operative column is a bar 4 of any suitable cross-section having relatively angularly disposed sides. It may be of triangular cross-section or, as preferably shown, of square cross-section. The bar 4 is twisted into spiral form to give the exterior the shape of a multiple helical screw thread 5 of steep pitch. The bar member 4 is fixed at its lower end to the bottom of the socket 3 and rises, at the axis of the socket, almost to the top of the socket. The movable member of the column is a tube 6 somewhat larger in internal diameter than the diameter of the stationary member 4. The lower end of the movable tubular member 6 is provided with an opening 8 fitting the cross-section of the spiral column member 4. As shown in the drawing, the lower end of the tubular member 6 is closed by a screw threaded cap 7, having at the center a square hole 8 slightly larger than the cross-sectional area of the stationary bar 4 before the latter was twisted. The transverse wall of the cap 7 therefore serves as a nut element that interlocks the two column members together so that relative lengthwise movement and relative rotary movement must accompany each other. It should also be noted that the cap 7 serves to guide the movable member 6 within the inner surface of the housing 3.

The seat portion 1^A has a short cylindrical stem 9 depending therefrom that fits rotatably within the upper end of the movable tubular member 6 of the column. There is an annular groove 10 within the periphery of the stem 9; this groove receiving the inner end of a set screw 11 extending through the wall of the movable member 6. The seat must therefore move up and down with the movable member 6 of the column, and is rotatable on the same.

The tubular body of the movable member 6, proper, is smaller in external diameter than the internal diameter of the socket-like housing 3, thereby providing an annular space between them for the reception of a sturdy coil spring 12. This spring 12 is of such size that it normally fits closely about and grips the movable column member 6. The spring 12 is wound in

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the same direction as the spirals or helices on the stationary member 4 of the column. The upper end of the spring 12 is supported on or carried by the stationary housing 3, in any suitable manner. In the arrangement shown, there is a ring or collar 14 in the upper end of the tubular housing 3, held in place by a set screw 15, and serving as a guide that centers and guides the movable column member 6. This collar has a vertical slot cut through the edge thereof to receive the upturned end 16 of the spring 12 and permits a laterally bent tip 17 thereof to lie within a recess of the upper edge of the housing 3 and, consequently, the upper end of the spring is removably supported on the stationary housing 3. The housing 3 has in the side thereof an opening 18 through which the lower free end of the spring 12 is exposed. Secured to the spring 12 at this free end is a plate 19 from which a screw 20, having a wing head, extends outwardly through the opening 18 in the side of the housing 3.

Normally the spring 12 grips the movable column member and holds it against turning movement in the direction to cause or permit downward movement. When there is a load on the seat, a force is exerted in a direction to force a movable outer column member 6 down. Since any downward movement must be accompanied by a turning movement of outer member 6 in the direction to cause the frictional grip between the spring and such member to exert itself in a manner tending to wind the spring into coils of smaller diameter, the greater the load, the more tightly the movable member 6 of the column will be held. Therefore, in order to lower the seat, the screw or finger piece 20 must be manually pressed to swing it a little angularly of the axis of the column, toward the observer, as viewed in Figs. 2 and 3, thereby slightly unwinding the spring so as to relax its grip sufficiently to permit the outer movable member 6 of the column to turn freely in either direction. When the seat is to be raised, the screw 20 need not be pressed laterally in the manner just described, since the direction in which movable member 6 must rotate, in moving upward, is such that the grip of the spring is automatically urged by friction into release position through the consequent slight expansion of the convolutions of the coiled spring 12.

Instead of a stationary column member within a movable tubular member, there may be provided a tubular stationary member that surrounds the movable member. Such a construction is illustrated in Figs. 6 and 7. In this form of the invention, the outer stationary member 22 corresponds functionally to member 4 in Figs. 1 to 4, and serves, also, as the stationary member of the column. In the arrangement shown, the stationary outer member 22 is provided with a helical slot 23 of steep pitch. To the lower end of the herein described inner movable column member 6 is secured a collar 24 having on the periphery a projection or pin 25 which is adapted to move in the helical slot 23 to thus interlock the two members just as they are interlocked in the first form.

In Figs. 8 to 11, a column nearly like that in the heretofore described first form is shown as applied to a stool. The base of the stool illustrated comprises two sturdy similar cup-shaped members 26 and 27, arranged one above the other, in spaced relation to each other, and with their open sides facing each other; four legs 28 of

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structural steel having their upper ends spaced about and fastened to the cup-shaped members and flaring outwardly as their lower ends are approached; and a horizontal spider 29 positioned between and fixed to the legs near the lower ends of the latter. The lower end of the stationary column member 30, like the stationary member 4 in the first form, except that the spirals are, respectively, right hand and left hand, is fixed to and rises from the center of the spider.

The outer tubular movable column member 6 has screw threaded to its lower end a cap 31, cooperating with the member 30 just as the cap 7 in the first form cooperates with the stationary member 4. Spring 12 is supported at its lower end in the cup-shaped part 27, while the upper end of the spring is free and is bent downward, as indicated at 32, to provide a finger piece that may be grasped to release the frictional grip of the spring on the outer column member 6.

The seat 34 is mounted on the upper end of the column in the same way as the chair seat of the first form; namely, a short cylindrical stem 35 extends into the top of the outer column member 6 and is held in place by a set screw 36 that extends into an annular peripheral groove 37 in the stem 35.

Where the stool has a foot rest, it may be caused to move up and down with the seat, so as always to be spaced at the same distance below the latter. In the arrangement shown, there is a foot rest like a spoked wheel, the rest, proper, being a wide ring 38 surrounding and spaced apart from the legs somewhat above the lower end of the outer column member. Radial arms or spokes 39 connect the ring with a central hub 40 loose on the lower end of member 6 and are supported on a projecting marginal portion of plate 31.

It is believed that various features of structure and operation with respect to my invention have been fully explained in the foregoing description. It will also be understood that the advantages resulting from the invention are due to the novel adjustable column which automatically locks itself against unintended relative movement of the two sections in one direction, while allowing freedom of such movement in the other direction.

While I have illustrated and described with particularity only a single preferred form of my invention, together with a few simple modifications, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. A structure comprising a base, a vertically adjustable column composed of two telescoped members rising from the base, the lower one of such members being stationary and fixed to the base and the upper member being movable, a seat supported on the upper end of the upper movable member, one of the members having thereon a screw thread of steep pitch, an element on the other member interlocked with the screw thread to cause the upper movable member to rotate when it is moved up and down on the stationary member, and a helical spring disposed coaxially with and embracing the movable member so as normally to grip the same, one end of the spring being anchored in fixed relation to said

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stationary member and the other end standing free in space, and the spring being wound in the direction to tighten about the movable member under downward pressure on said seat after the seat has been raised to a selected elevation within its range of adjustment and to relax its grip when the seat and its supporting movable member are raised.

2. A structure as set forth in claim 1, wherein the free end of the spring has thereon a finger piece through which pressure may manually be exerted to expand the spring to permit lowering of the seat.

3. A structure as set forth in claim 1, wherein the stationary column member is a spindle externally screw threaded, and the movable member is tubular and surrounds the spindle.

4. A structure as set forth in claim 1, wherein the stationary column member is tubular, surrounds the movable member and has a helical slot therein constituting the screw thread of steep pitch.

5. A structure as set forth in claim 1 wherein the stationary column member is tubular, surrounds the movable member, and wherein the upper end of the spring is supported on the upper end of the stationary member.

6. A structure as set forth in claim 1, wherein an annular foot rest is mounted on and surrounds the movable column member so that it is movable up and down with and rotatable relatively to the movable member to thereby remain at a constant distance from the seat upon raising and lowering the latter.

7. A structure as set forth in claim 1, wherein the base has an elongated vertical tubular housing surrounding, and forming the immediate support for, the column and to which the anchored end of the spring is attached.

8. A structure as set forth in claim 1, wherein the base includes a group of elongated legs spaced about and fixed at their upper ends to two oppositely-disposed cup elements through which the column extends and to one of which the spring is anchored.

9. In a chair, a base; a deep tubular socket closed at the lower end thereof and connected at the medial portion thereof to the base; a lengthwise adjustable column composed of two telescoped members arranged in said socket and the external one of said members projecting above the upper end of said socket, the internal one of said members of the column being fixed to the bottom of the socket; a seat on the upper end of said external column member; a screw threaded connection between said column members to cause a long relative lengthwise movement of said external member relatively to said internal member for each axial turn of said external member, a coiled spring in the socket disposed coaxially with and embracing said external member so as normally to grip the same, one end of the spring standing free in space and the other end being anchored to the socket, the relative inclination of the screw threads and the convolutions of the coiled spring being such that the spring tightens about the movable external column member under downward pressure on the seat.

10. A chair as set forth in claim 9, wherein the socket has an opening in the side thereof, and means extending from the free end of the spring out through said opening adapted for movement to loosen the gripping action of the spring.

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11. A stool comprising a base, a column rising above the base, and a seat on the upper end of the column; the base including two cup shaped elements arranged one above the other in spaced relation and with their open sides facing each other, a group of legs spaced about said elements at their upper ends and fixed thereto, the legs gradually flaring away from each other below said elements, a horizontal spider arranged between and connecting the legs together near their lower ends; the column rising from said spider through and above said cup-shaped elements, said column including an inner spiral member having thereon a steep thread and an outer tubular member having a part complementary to said screw thread to cause said outer member to rotate as it moves up and down; and a coiled spring fitting closely around said tubular member, anchored at one end to one of the cup-shaped elements and having the other end standing free in space; the parts being so constructed and arranged that the spring tightens on the outer tubular member under pressure on the seat and relaxes its grip when the seat is pulled up.

12. A stool as set forth in claim 11, wherein there is a foot rest in the form of a horizontal ring surrounding the base and carried at the lower end of the outer tubular column member, and means being provided to support the ring from said outer tubular member while permitting relative rotary movements between said outer and inner members.

13. A lengthwise adjustable column comprising two relatively movable coaxial members in telescoped relation to each other, one of said members having thereon a helical thread of steep pitch, an element fixed to the other of said members and interlocked with said thread to compel relative rotary movements between said members when they move lengthwise relatively to each other, a coiled spring wound around and embracing one of said members so as normally to grip the same, one end of the spring standing free in space and the other end being fixed with respect to the other of said members, said spring being wound in the direction to tighten about and grip said spring-embraced member when collapsing pressure is exerted on said spring-embraced member after the same has been adjusted after pulling out to any position relatively to the other of said members within its range of adjustment.

14. A vertically adjustable column comprising stationary supporting means, a pair of relatively movable coaxial members in telescoped relation with each other mounted on said supporting means, one of said members being stationary and having a helical thread thereon, a nut element meshing with said thread and fixed to the movable member to rotate when moved lengthwise relatively to the stationary member, and a coiled spring disposed coaxially with and embracing the movable member so as normally to grip the same, one end of the spring standing free in space and the other end being anchored on said supporting means, said spring being wound in the direction to tighten about and grip the movable member when downward pressure is exerted upon said movable member after said movable member has been vertically adjusted to a selected extent relatively to said stationary member within its range of adjustment.

15. A column as set forth in claim 13, wherein

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the screw threaded column member consists of a bar, which in cross-section is a regular polygon, twisted about its long axis to give it a helical contour.

16. In a chair as set forth in claim 9 wherein the inner one of said members consists of a bar of a cross-section having relatively angularly disposed sides and being twisted about its longitudinal axis to give it a spiral contour constituting a screw thread for said screw threaded connection.

17. A stool as set forth in claim 11 wherein said inner member consists of a bar of regular polygonal cross-section twisted about its longitudinal axis to provide thereon said steep thread.

18. A lengthwise adjustable column as set forth in claim 14 wherein said stationary member consists of a bar having at least one pair of relatively angularly disposed faces whereby when the bar is twisted about its longitudinal axis throughout its full length there is provided thereon said helical thread.

19. A lengthwise adjustable column comprising two relatively movable coaxial members in telescoped relation to each other, one of said members having therein a helical slot of steep pitch, an element fixed to the other of said members and interlocked with said slot to compel relative rotary movements between said members when they move lengthwise relatively to each other, a coiled spring disposed coaxially with and embracing one of said members and fitting snugly on the same, one end of the spring standing free in space and the other end being fixed with respect to the other of said members.

20. A support comprising a base, a vertically adjustable column composed of two telescoped

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members rising from the base, one of such members being stationary and fixed to the base and the other member being movable, a seat supported on the upper end of the movable member, one of the members having a helical slot of steep pitch, an element on the other member disposed for movement within said slot to cause the movable member to rotate when it is moved up and down on the stationary member, and a helical spring disposed coaxially with and embracing the movable member so as normally to grip the same, one end of the spring being anchored in fixed relation to said stationary member and the other end standing free in space and the spring being wound in the direction to tighten about the movable member under downward pressure on said seat and to relax its grip when the movable member is raised.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
159,243	Woodward	Jan. 26, 1875
514,307	Crapp	Feb. 6, 1894
598,681	Root	Feb. 6, 1898
965,113	Konstantinides	July 19, 1910
1,334,660	Loeffler	Mar. 23, 1920
2,308,358	Cramer	Jan. 12, 1943
2,320,688	Wesling	June 1, 1943

FOREIGN PATENTS

Number	Country	Date
18,200	Great Britain	Nov. 14, 1889