M. D. CONNOLLY.

TILTING-CHAIR.

No. 185,501. Patented Dec. 19, 1876.

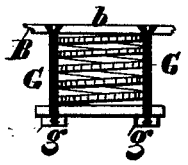

Fig. 3

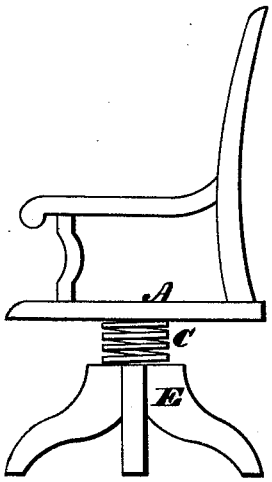

Fig. 4

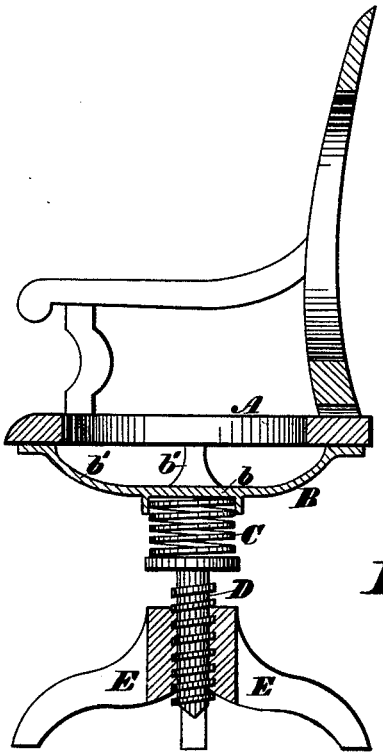

Fig. 1

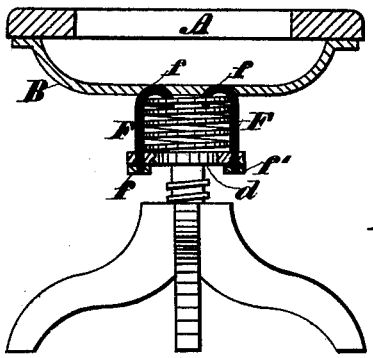

Fig. 2

Witnesses

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M. DANIEL CONNOLLY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO THOMAS A. CONNOLLY, OF WASHINGTON, D. C.

IMPROVEMENT IN TILTING-CHAIRS.

Specification forming part of Letters Patent No. **185,501**, dated December 19, 1876; application filed February 19, 1876.

To all whom it may concern:

Be it known that I, M. DANL. CONNOLLY, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Tilting-Chairs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a vertical section of a chair, showing my improved arrangement of spring. Fig. 2 is a vertical transverse section back of the spring, showing limiting stop and adjustment. Fig. 3 is a vertical elevation of a modified form of stop and adjustment. Fig. 4 is a side elevation of chair, without screw or spider.

The aim and intent of the improvements herein described are to provide a chair furnished with a spring, which will afford an elastic or yielding support for the seat, and which will, at the same time, permit said seat to be tilted or rocked, according to the inclination of the occupier's body and limbs.

The essence of the invention consists in the application or employment of a spiral spring in such manner that it will afford a support to the seat, being compressed, wholly or in part, when said seat is occupied, and opening or expanding on one side whenever the latter is tilted or rocked.

In the accompanying drawings I have illustrated a method and modifications of applying my improvements, remarking, however, that the same may be considerably varied in application and detail without departing from the spirit of the invention, herein contained and described.

In carrying my invention into effect I take a chair-seat and legs of the usual or any suitable construction, those preferred being the same as are now commonly employed for revolving chairs for offices, &c., wherein a cane, veneer, or upholstered seat is attached, through the medium of a spider and screw, to legs, which spread as they descend from a common hub or apex. Between the screw and the spider, and forming the means of connecting the two, I place a spiral spring, the longitudinal axis of which is perpendicular or in a line with the vertical axis of the screw. The spring thus located forms a yielding or elastic support for the seat, and also permits the rocking of the same, in any direction, from side to side, as well as front and back, facilitating, by its tendency to contract or coil, the return of said seat to a horizontal or approximately horizontal line after being tilted.

A, in the drawing, represents a chair-seat, to the under side of which is rigidly secured a spider, B. By preference this spider is made in the form of a central hub, *b*, from which radiate four upwardly-curving arms, *b'*, the outer extremities of which are attached to the frame of the seat by screws or other retaining devices. To the hub *b* is affixed the upper end of a spiral spring, C, the connection being made by any suitable means, as screws, clamps, or by inserting the end of the spring in the mold in which the spider is cast, and allowing the metal of the latter to flow around and become fast to the other. D represents the screw turning in the threaded apex of the legs E E, and fastened by any suitable means, as a clamp, or by welding, to the lower extremity or coil of the spring C.

If the spring be made of the required thickness and quality of metal it is apprehended that it will never break or fly, as flat metal springs are very apt to do. Still, to avoid, as far as possible, any permanent inconvenience from an accident of this character I deem it probably advisable to fasten the ends of the spring to the spider and screw, respectively in such manner that if it should happen to break it may be readily withdrawn, and a new one put in its place.

In some cases it may be desirable to provide a chair which shall be capable of tilting in one direction only—namely, by the elevation of the seat in front and its depression in the rear, or backwardly. This may be accomplished in various ways, all looking, however, in the one direction—namely, to prevent the opening of the spring on any side except on the side opposite to that on which it is desired to tilt. For instance, suppose it be de-

sired to have the chair tilt backwardly alone. In that case the spring should open only in front, and not on either right or left side or back. To accomplish this I have illustrated means in Fig. 2. Therein F F are rods passing through openings in the enlarged head *d* of the screw D. Said rods terminate at their upper extremities in hooks *f f*, which pass over the upper turn or coil of the spring C, their lower extremities being provided with adjusting-nuts *f' f'*.

It will be observed that to whatever side one of these rods be applied in the manner shown, on that side the spring cannot open, if bent, though free to be compressed. Thus, if applied to the right and left sides of the spring, the chair may be tilted front and back, but in no other direction. If applied to the back or rear part of the spring, and to the right and left sides, the seat can be tilted backwardly only, and will be perfectly solid as regards every other direction.

A modification of the hooks F is shown in Fig. 3, wherein bolts G pass through the spider and head of the screw D with effect like unto that just described—namely, limiting the opening of the spring on the side thereof to which one of them is applied. The tension of the spring is regulated by means of the rods F or G, and the nuts *f'* or *g*, as when the nuts are adjusted the rods are lengthened or shortened, as the case may be, and the spring thereby compressed or allowed to expand.

I have shown my improvement applied to a revolving office-chair provided with a screw and spider, as it is for such the same is particularly designed; but I here wish to specifically state that I do not confine my claim to that or any other class of chairs to which my invention is applicable, deeming that the same may be used to great advantage on, for instance, opera-chairs and drawing-room car-chairs, particularly on the latter, where the jolting of the car will render a yielding seat in a special manner desirable.

In some cases where a cheaper chair is desired, the spider and screw may be dispensed with, either or both, and the ends of the spring fastened directly to the chair-seat and apex of the legs, as shown in Fig. 4.

I have described throughout, and shown, a spiral spring of true cylindrical form, though I do not mean to be confined thereto, reserving the privilege of using in the described arrangement a conical or volute spiral. Though my invention does not consist in the construction of the spring itself, but rather in its combination and arrangement, together with means for preventing tilting in undesirable directions, I deem it but proper to say that I consider an edge-rolled spiral of true cylindrical form the one best adapted to the object in view. The number of coils of the spiral will depend to some extent upon the quality and thickness of metal used, as also upon the yielding capacity it may be desired to have the seat possess. For ordinary cases I consider four and a half coils, as shown, will be amply sufficient, though a less or greater number may be used.

The rods F or G, besides preventing tilting to any side not desired, may be made to subserve the purpose of graduating the tension of the spring by turning the nuts *f'* or *g*, thus adapting the chair to persons of different weights.

I have shown the screw D below the spring C; but it may be above said spring and turn in the spider. So, too, while I design making the spring separately from the screw, still both spring and screw may be made in one piece and from the same rod or bar. In lieu of the screw, a plain spindle, allowing the seat to be revolved without being raised or lowered, may be sometimes used.

What I claim as my invention is—

1. A tilting-chair having its seat and base connected through the medium of a spiral spring, which constitutes the only intermediate connection and support between the seat parts and base parts, said spring being arranged with its longitudinal axis in a vertical line, so as to permit the seat to yield and tilt, substantially as shown and described.

2. In combination with a spiral spring, C, a stop, F, for limiting the opening or expansion of the spring, so as to prevent the chair-seat from tilting in any undesirable direction, substantially as described.

3. In combination with a spiral spring, C, arranged beneath the seat of a chair, with its longitudinal axis vertical, a rod or rods, F, and adjusting-nuts for adjusting the tension of said spring.

In testimony that I claim the foregoing I have hereunto set my hand this 12th day of February, 1876.

M. DANL. CONNOLLY.

Witnesses:
SAML. J. VAN STAVOREN,
CHAS. F. VAN HORN.