(No Model.)

2 Sheets—Sheet 1.

J. W. KENNA.

TILTING CHAIR.

No. 382,235. Patented May 1, 1888.

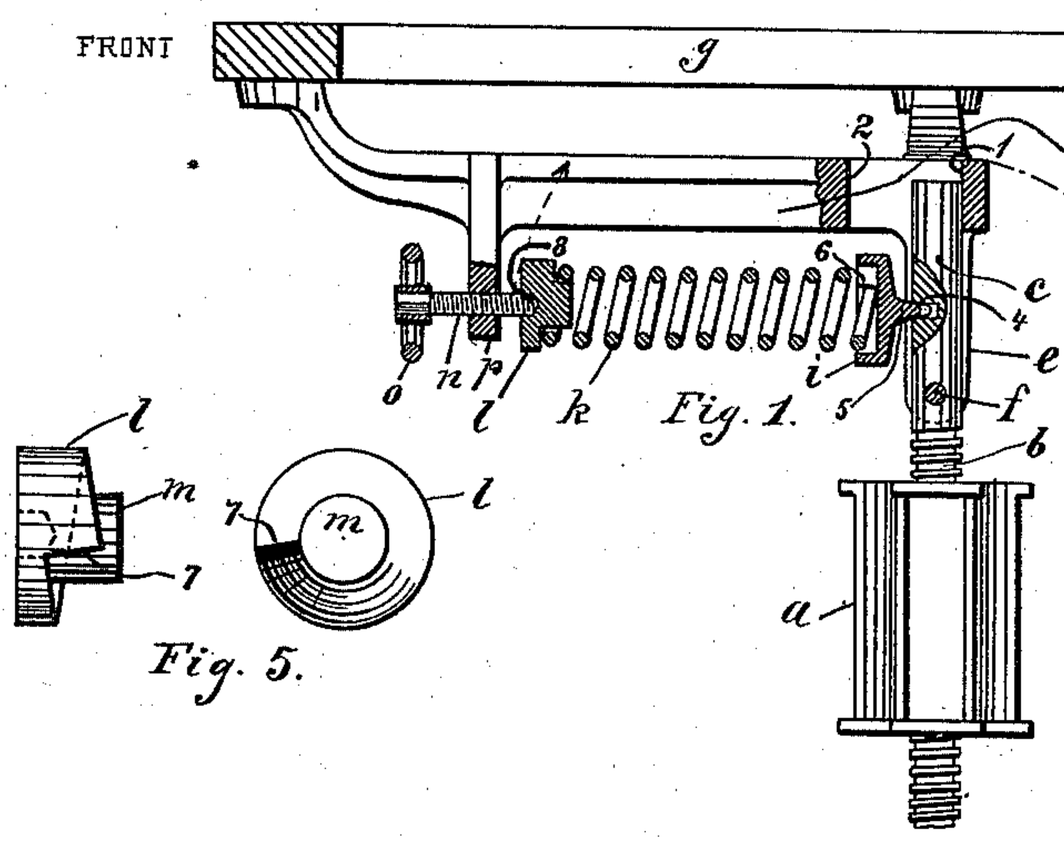

Fig. 1.

Fig. 5.

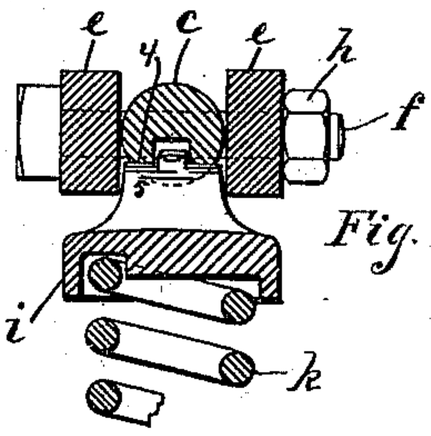

Fig. 6.

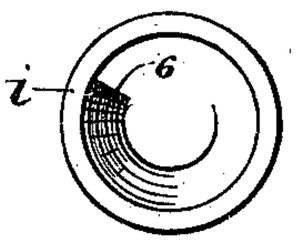

Fig. 6a.

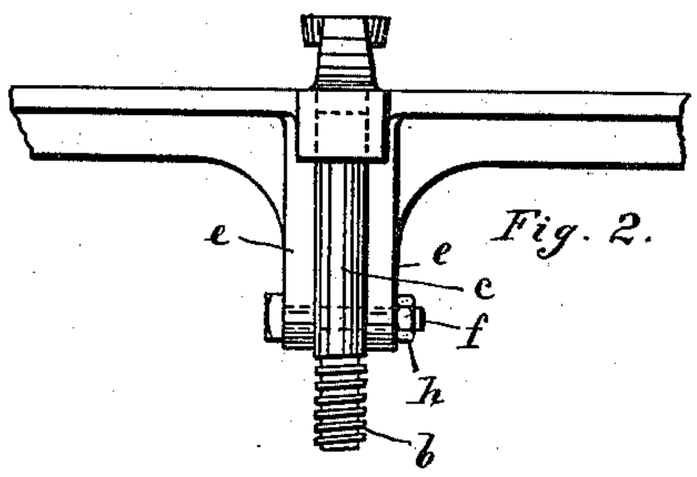

Fig. 2.

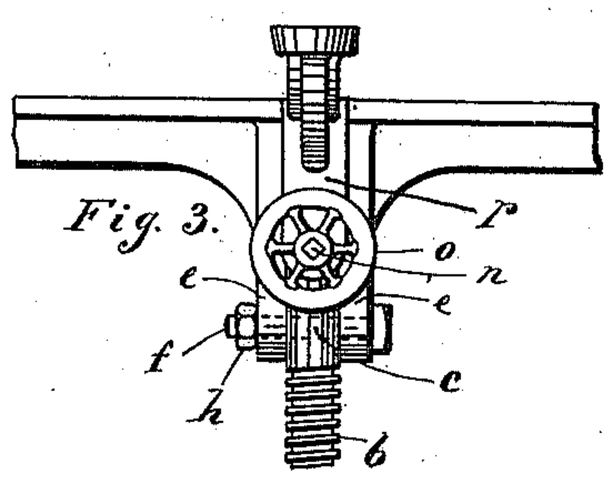

Fig. 3.

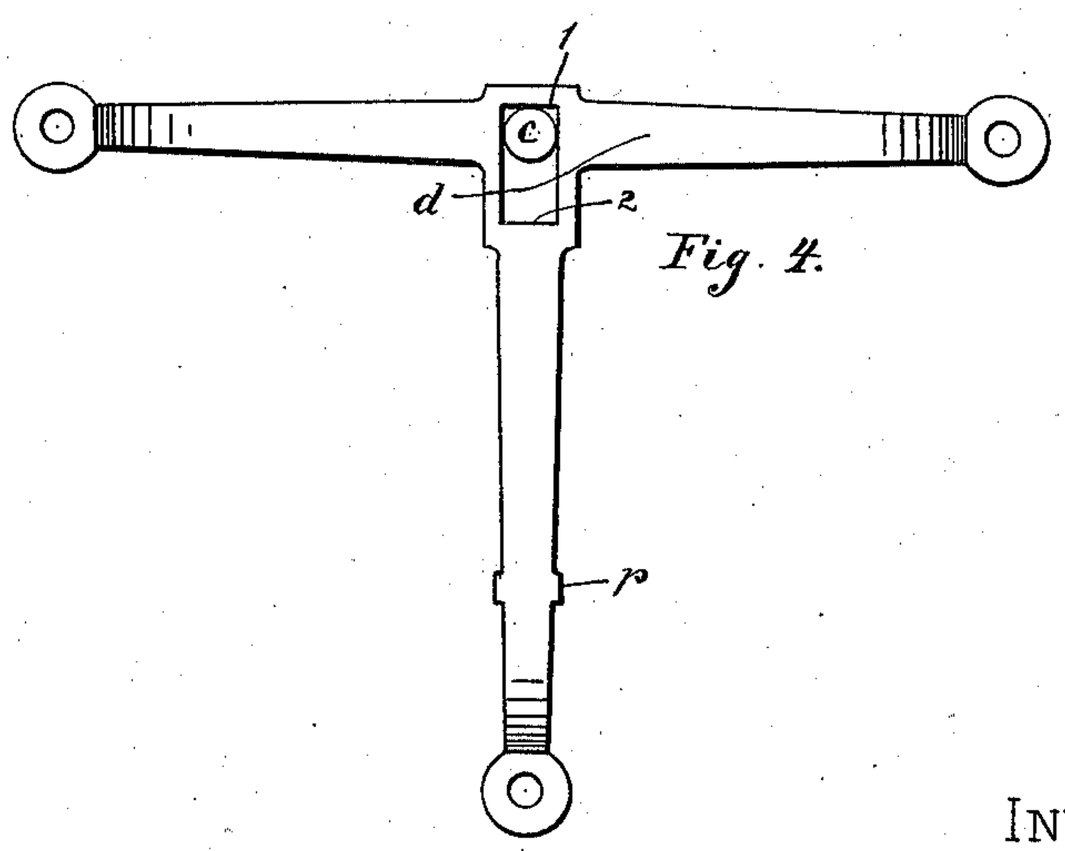

Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

J. W. KENNA.

TILTING CHAIR.

No. 382,235. Patented May 1, 1888.

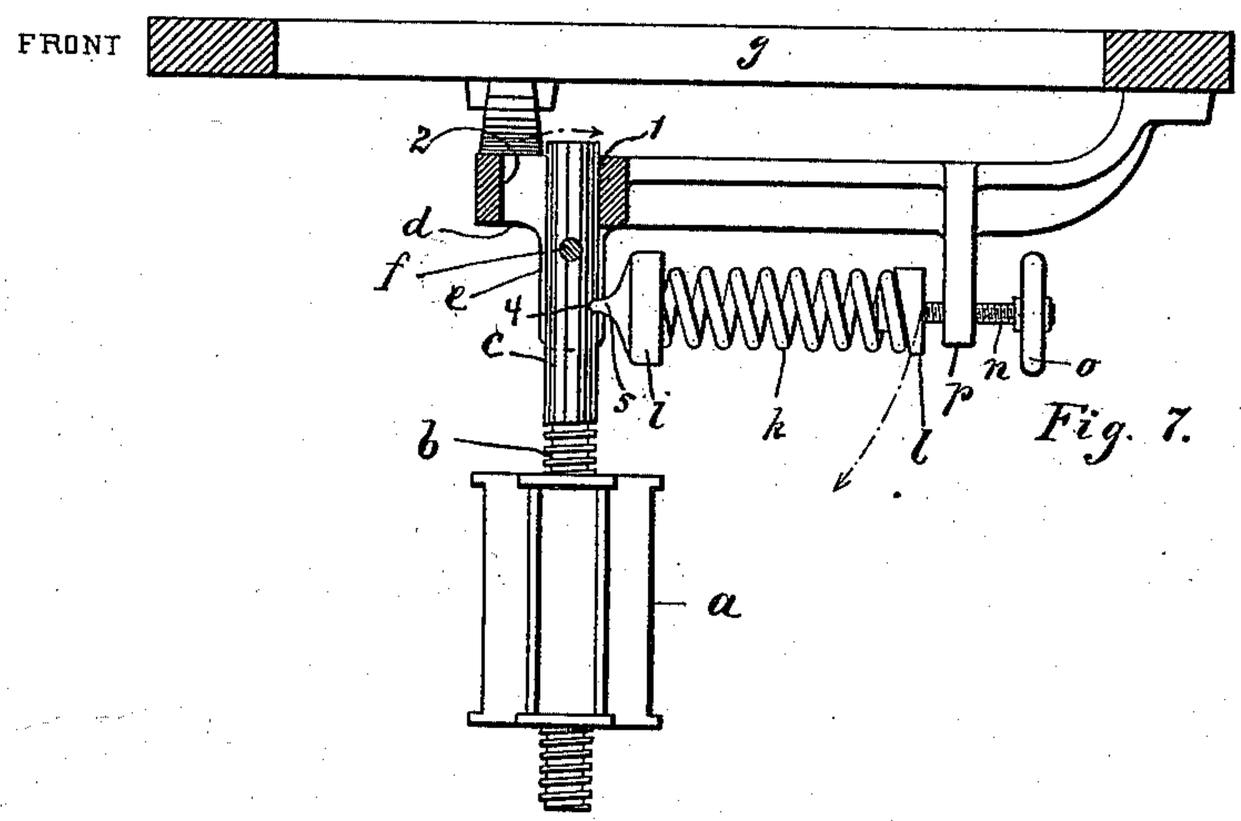

Fig. 7.

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UNITED STATES PATENT OFFICE.

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TILTING-CHAIR.

SPECIFICATION forming part of Letters Patent No. 382,235, dated May 1, 1888.

Application filed September 15, 1884. Serial No. 143,149. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. KENNA, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Tilting-Chairs, of which the following is hereby declared to be a full, clear, and exact description, sufficient to enable others skilled in the art to make and use the same.

In Letters Patent No. 197,195, granted H. G. E. Wolff, November 13, 1877, is shown and described a tilting-chair, wherein the chair body or seat is separate from the tripod-base, and is sustained adjustably thereon by an upright screw-spindle which engages a threaded perforation in the base. At its upper end the screw-spindle furnishes a fixed standard or support, about and upon which pivots a spider-frame, to the horizontal extended arms whereof the chair-seat is attached. An adjustable spring-connection between the spider and the standard serves to regulate the tilting action of the chair. These parts of structure between the chair-seat and the tripod-base are generally known as "tilting-chair irons," and are made and fitted together and furnished to the trade in readiness to be applied to any particular design of chair and base which the taste or fancy of the manufacturer may have selected.

My invention relates to that part of the tilting-chair known as the "irons;" and it consists in certain improvements in the construction thereof, the precise nature of which will hereinafter more fully appear from the description and claims following.

In the drawings which accompany and form part of this specification like letters of reference denote like parts of structure throughout.

Figure 1 is a view in side elevation (with parts in section) of my improved tilting-chair iron, the controlling-spring being applied to the front spider-arm. Figs. 2 and 3 are rear and front elevation views, respectively, of said iron; Fig. 4, a top plan view of spider-frame and the upright standard; Fig. 5, side and front elevation views of the spring bearing-nut detached; Fig. 6, a transverse section view of the standard at point of application of the spring pivot-plate thereto; Fig. 6ª, a front view of the pivot-plate detached; Fig. 7, a side elevation view, similar to Fig. 1, showing the controlling-spring applied to the rear spider-arm.

The spindle-nut *a* is of usual construction, having rectangular sockets in its faces to receive the convergent ends of the base-legs constituting the tripod of the chair. The upright screw-spindle *b* passes through and is sustained in a long centrally-threaded perforation of the spindle-nut *a*, and may be adjusted up and down therein at will to accommodate the occupant of the chair. The smooth upper portion of the spindle, as at *c*, constitutes a standard or support which projects at its top within an elongated slot or opening in the spider-frame *d*. This standard serves to sustain said spider-frame, there being two yoke-like arms, *e*, dependent from the spider-frame, between which the standard *c* is snugly received, while the cross-bolt *f*, passing through holes in the yoke-arms and standard, respectively, furnishes a pivot-joint about which the spider-frame may tilt. Opposite faces, 1 2, of the elongated slot in the spider-frame contact with the projecting end of the standard *c* and determine the limits of the tilting movement about the cross-bolt *f*.

To the horizontal radial arms of the spider the chair-seat *g* is attached in the usual manner. Upon removing the set-nut *h* from the cross-bolt *f* said bolt may be slipped from its bearing and the spider-frame and standard be taken apart for convenience and compactness in shipment.

The spring mechanism next to be detailed controls the tilting movement of the spider-frame and chair-seat about the upright standard. This spring mechanism is not dependent for its successful operation upon the special form of cross bolt or pin and pivotal joint hereinbefore set forth, but may be used with like advantage even though the structure of the same be materially changed. In the transverse recess, as at 4, formed in the standard *c*, rests the tongue 5 of the pivot-plate *i*, said plate having a cup-like face with spiral seat therein to receive the end of the coil-spring *k*. The abutment 6 at the terminus of the sunken spiral seat engages the tip of the spring and prevents it from turning in place. A bearing-nut, *l*, with central core or boss, *m*, and spiral-

like face, receives the opposite end of the coil-spring, *k*, the tip whereof comes against the abutment or shoulder 7 to prevent the slipping of the spring. An adjusting-rod, *n*, having hand-wheel *o* thereon, engages the arm *p*, projecting from the spider-frame, and has a loose seat, as at 8, in a socket of the bearing-nut *l*. By turning the hand-wheel *o* to and fro the coil-spring *k* may be compressed or relaxed to suit the comfort of the occupant of the chair.

In Fig. 1 of the drawings the coil-spring *k* is shown sustained by the arm of the spider-frame beneath and near the front of the chair. This location makes the hand-wheel *o* conveniently accessible to the occupant of the chair, so that the spring may be readjusted without moving from the seat.

In Fig. 7 the coil-spring is sustained by the spider-arm at the rear of the chair; but this difference in arrangement involves no change in structure or organization of the parts, merely requiring the spring pivot-plate *i* to be applied to the standard *c* at a point below the cross-bolt *f* instead of above said bolt, as in Fig. 1.

Whichever one of the constructions hereinbefore detailed be selected, the mode of operation of the controlling-spring in adapting itself to the change in position of the spider-frame about the standard is precisely the same; but, in addition thereto, the radial movement of the parts tends to bend or deflect the coil-spring in bow-like form, and thus to force the ends thereof from the bearing-seats. Since, however, one of said seats—viz., the bearing-plate—is pivotally set and the other—viz., the bearing-nut—is loosely mounted in position, it is obvious that such bearings readily readjust themselves, together with the spring, as the tilting proceeds, so that the bending of the spring is prevented and the strain thereon is one of compression only. It is noteworthy that the spiral recess and abutment 6 on pivot-plate *i* and the spiral face and abutment 7 on bearing-nut *l* are important adjuncts, since they retain the ends of the spring solidly and prevent any rotation or slip thereof in the seats, which slip, when it occurs during the tilting movement, gives a sense of insecurity to the occupant of the chair. The double function of the pivot-plate *i*, in securely seating the coil-spring and permitting its radial readjustment at a point where the leverage ordinarily is greatest, makes said plate an important and valuable feature of my invention. Obviously, the pivot-plate, in lieu of the cup-like face and sunken spiral seat, as shown, may be furnished with raised spiral seat similar to the bearing-nut *l*, Fig. 5. These and other like modifications in detail requiring simply the skill of the mechanic to effect are equally within the scope of my invention, which is not restricted to the precise structure hereinbefore set forth.

In Wolff's Letters Patent before mentioned there is shown a pivot-plate which seats against the radially-moving dependent extension of the spider-frame. Said plate has the adjusting-rod attached thereto, while the coil-spring, instead of resting upon the pivot-plate, is permanently seated against the vertical standard. During the tilting movement the adjusting-rod and the coil-spring as well have a strictly rectilineal play. The pivot-plate merely furnishes a bearing for the shifting radial traverse of the dependent extensions, whereas in my device the coil-spring is constantly subjected to a radial strain which it is the function of the pivot-plate to compensate and readjust.

In my former Letters Patent, No. 294,391, dated March 4, A. D. 1884, the coil-spring is not set upon a pivot-plate, but rests against a dependent extension of the spider-frame; hence during the tilting movement the spring, for want of a radial readjustment, is apt to slip from its seat, while the adjusting-rod, being rigidly secured to the vertical standard, is liable to be bent or broken. The pivot-plate in my present invention obviates these difficulties.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In tilting-chair irons, the combination, with the vertical screw-spindle and with the standard at the upper end thereof, of the spider-frame constructed to sustain the chair-seat, said spider-frame being suitably pivoted upon said standard and being provided with dependent yoke-like arms to snugly inclose the same, and having also an elongated slot therein, against the opposite faces of which the end of the standard projecting within said slot abuts above the pivotal point of the standard to limit the tilting movement, substantially as described.

2. In tilting-chair irons, the combination, with the vertical screw-spindle and with the standard at the upper part thereof, of the spider-frame constructed to sustain the chair-seat and suitably pivoted upon said standard, the pivotal bearing-plate and the bearing-nut, the coil-spring retained at its ends between said plate and nut, and the adjustable screw-rod to vary the tension of the spring, said several parts being arranged, substantially as described, whereby said coil-spring readjusts itself pivotally to the tilting movement, substantially as set forth.

3. In tilting-chair irons, the combination, with the vertical screw-spindle *b*, having the standard *c* thereon, of the spider-frame *d*, constructed to sustain the chair-seat and suitably pivoted upon said standard, the pivot-plate *i*, provided with spiral-like face, the coil-spring *k*, resting at one end against said spiral-like face, the loosely-sustained bearing-nut *l*, having spiral-like face to receive the opposite end of said spring, and the adjusting-rod *n*, to vary the tension of the coil-spring, said rod being supported by an arm of the spider-frame, substantially as described.

4. In tilting-chair irons, the combination,

with the spindle and with the standard at the upper end thereof, of the spider-frame constructed to sustain the chair-seat and suitably pivoted upon said standard, the sustaining-plate resting pivotally upon said standard, and the compression coil-spring having its end coil-face set against said pivot-plate and the opposite end adjustably sustained from an arm of the spider-frame, whereby the spring shifts radially during the tilting movement, substantially as described.

5. In tilting-chair irons, the combination, with the standard and with a spider-frame constructed to sustain the chair-seat and suitably pivoted to said standard, of an adjustable compression-spring for controlling the tilting movement of the spider, and a sustaining-plate for the end face of said spring, said plate resting against the standard and being provided with a projecting tongue, whereby it may be pivotally mounted in position, substantially as set forth.

6. In a tilting-chair iron, the combination, with the standard and with a spider-frame constructed to sustain the chair-seat and suitably pivoted to said standard, of a pivotal adjustable coil-spring for controlling the tilting movement of the spider, an adjusting-rod for the coiled spring, and a bearing-nut to seat the end of the spring, said nut having spiral-like face and being mounted upon the adjusting-rod, substantially as described.

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