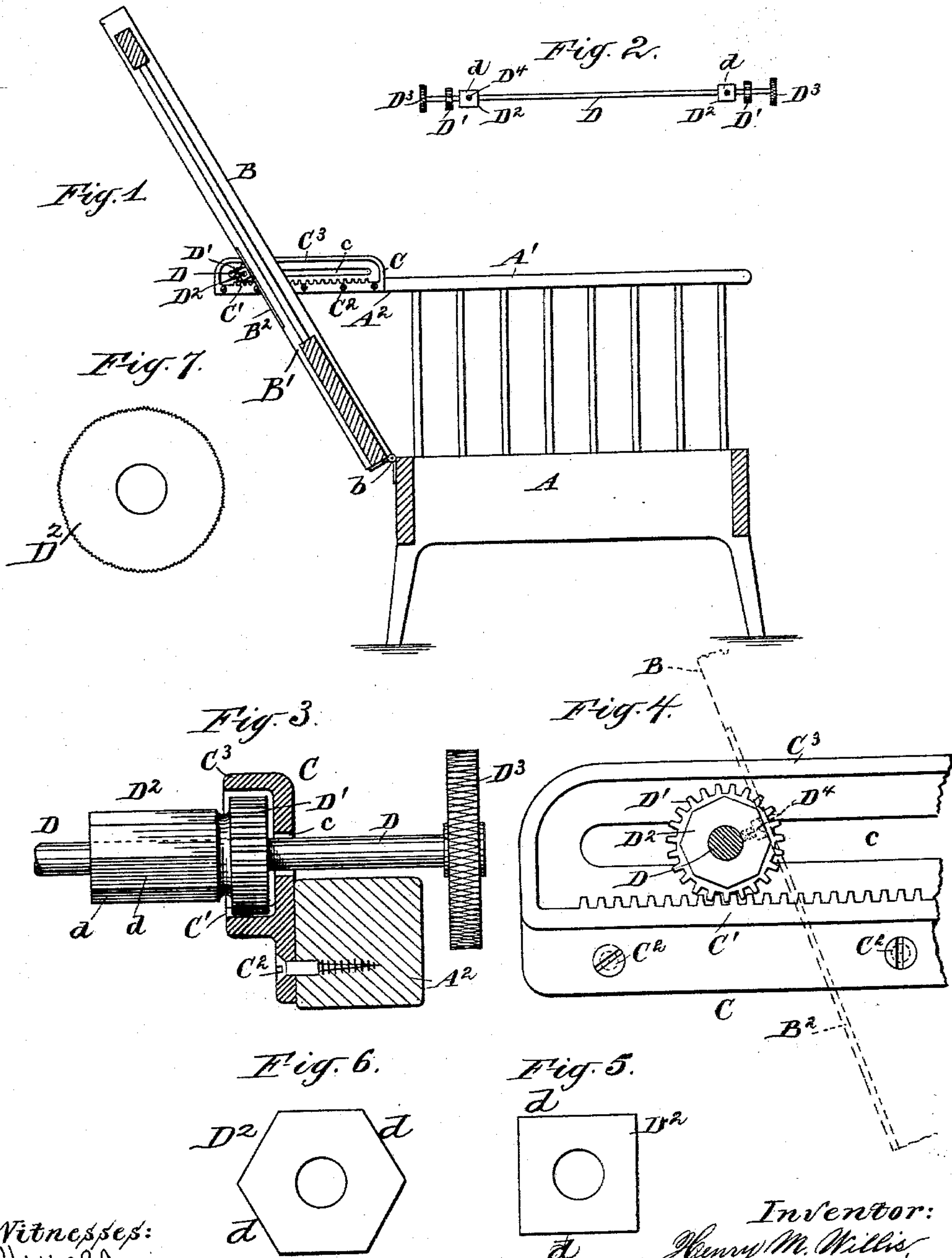


(No Model.)

H. M. WILLIS.  
CHAIR.

No. 593,263.

Patented Nov. 9, 1897.



Witnesses:  
Wm. H. Jones  
Edw. A. Henely

Inventor:  
Henry M. Willis,  
by his attorney  
Charles R. Seale.



# UNITED STATES PATENT OFFICE.

HENRY M. WILLIS, OF EAST WILLISTON, NEW YORK.

## CHAIR.

SPECIFICATION forming part of Letters Patent No. 593,263, dated November 9, 1897.

Application filed February 16, 1897. Serial No. 623,605. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY M. WILLIS, a citizen of the United States, residing at East Williston, in the county of Queens and State of New York, have invented a certain new and useful Improvement in Chairs, of which the following is a specification.

The invention relates more particularly to chairs having movable backs and to the mechanism for adjusting the chair-back to the required angle and holding it reliably in the desired position.

It consists of racks supported on the framing of the chair above the line of the joint with the back and extending rearwardly at the sides of the latter. They receive pinions fast on a rod extending transversely of the back and supporting it. Hand-wheels on one or both ends of the rod afford means for turning it and through the pinions and racks carrying it nearer to or farther from the line of the hinge and correspondingly varying the inclination of the back.

The locking device consists of a frictional surface on the rod contacting with a corresponding surface on the chair-back and adapted to prevent the rotation of the rod. Means are provided for holding the pinions and racks reliably in mesh.

In practice I have used blocks having plane surfaces of sufficient area fixed on the rod and matching automatically to corresponding plane surfaces provided on the chair-back. The latter cannot be forced backward without rotating the rod, and the rod cannot turn as long as the plane surfaces are in contact.

The invention may be employed on all classes of chairs, both ordinary and rockers, and is simple, easily operated by the occupant of the chair without leaving it, and holds the back with great reliability.

The accompanying drawings form a part of this specification and show the invention as I have carried it out.

Figure 1 is a central vertical section through a chair equipped with my invention. Fig. 2 is a view of the rod and its attachments alone. Fig. 3 is a transverse section through certain parts, showing the end of the rod and the immediately-adjacent portions. Fig. 4 is a corresponding view taken at a right angle

to the preceding figure. Figs. 5, 6, and 7 show different forms of blocks.

A is the frame of the chair, either ordinary or rocker. A' are the arms, and A<sup>2</sup> rearward extensions, of the same.

B is the back, hinged to the frame A at b and free to swing between the extensions A<sup>2</sup> into any required angle relatively to the seat.

C are yokes, of cast iron or other metal, fastened to the inner faces of the extensions by screws C<sup>2</sup>, and carry each an offset toothed on the upper face to form a rack C'.

D is a rod of brass or iron strong enough to support the rearward pressure exerted by the person occupying the chair.

D' D' are pinions fast on the shaft or rod D and meshing each with its rack C', adapted to carry the rod forward and backward parallel with the rear face of the back and thereby change the inclination of the latter. The yokes C are each slotted at c to allow the rod D to extend through and travel freely therein, but prevent it rising sufficiently to release the pinions from engagement with the racks, and C<sup>3</sup> is an inwardly-projecting flange lying close above the pinion for the same purpose and to present a smooth and finished face.

So far as yet described there is nothing to prevent the rearward movement of the back excepting the frictional contact of the rod D against it, which would in itself be insufficient to support the thrust of even a moderate weight. I utilize this frictional principle and provide means based thereon by which the back is automatically and reliably held.

D<sup>2</sup> D<sup>2</sup> are blocks of wood or metal fixed on the rod D and having plane surfaces d d lying parallel with the axial line thereof and coincident, each block with the other. In Figs. 1 and 5 I have shown the blocks as square, thus forming four surfaces d on each. The blocks are placed on the rod D so as to lie in line with the stiles or uprights B' at each side of the back B and receive the pressure directly therefrom. When pressure is applied to the back, as by the leaning backward of the occupant, the blocks will turn automatically, carrying the rod with them through the portion of a revolution necessary to present a plane face of each in contact with the corresponding faces on the back, and will



then resist any further turning until the pressure is relieved, supporting the back at that angle until changed. A certain proportion of the pressure will be felt in the direction to lift the pinions out of mesh. This is resisted by the friction and positively by the flanges  $C^3$  and the close fit of the slots  $c$  to the projecting ends of the rod.

To change the inclination, it is only necessary for the occupant of the chair to lean forward enough to relieve the back, and then by means of the hand-wheels  $D^3$  on the overhung ends rotate the rod and traverse it along the slot to the desired new position. As soon as the pressure is again applied upon the back the blocks  $D^2$  assume a position of close contact and the back is held as before, but at a different angle to the seat.

In the most complete form of the invention the blocks  $D^2$  are of metal cast in one with the pinions, as in Figs. 3 and 4, and are held to the rod by set-screws  $D^4$ , lying below the plane face of the block, and the back is protected by metal plates  $B^2$ , fixed thereon at the proper height on the stiles  $B'$  to receive the blocks.

Modifications may be made in the forms and proportions without departing from the principle of the invention or sacrificing its advantages.

Instead of the blocks of square section, six or eight sided blocks may be substituted, as shown in Figs. 4 and 6, or the blocks may be cylindrical with toothed or roughened surfaces (see Fig. 7) received in corresponding surfaces on the plates  $B^2$ .

Although I have shown the invention as applied to an ordinary chair, it will be understood that it will serve on rockers and also on invalid and reclining chairs.

I claim—

1. In a chair, a back hinged to the frame so that its inclination may be varied, in combination with a loose rod extending transversely of the back in rear thereof, a pinion on the rod meshing into a rack carried by the frame, the said rod adapted to support the back at the desired angle and held against rotation by its contact therewith, all substantially as herein specified.

2. In a chair, a back hinged to the frame so that its inclination may be varied, in com-

bination with a loose rod extending transversely of the back in rear thereof, pinions on the rod meshing into racks carried by rearwardly-extending portions of the frame, and a surface on said rod adapted to engage with a corresponding surface on the chair-back, to support the latter and hold it at the desired angle relatively to the frame, all substantially as herein specified.

3. In a chair, a back hinged to the frame so that its inclination may be varied, in combination with a loose rod extending transversely of the back in rear thereof, pinions on the rod meshing into racks carried by rearwardly-extending portions of the frame, and a surface on said rod adapted to engage frictionally with a corresponding surface on the chair-back, to support the latter and hold it at the desired angle relatively to the frame, and means for preventing the rise of said pinions out of mesh with said racks, all substantially as herein specified.

4. In a chair, a back hinged to the frame so that its inclination may be varied, in combination with a loose rod extending transversely of the back in rear thereof, rearwardly-extending frame portions adjacent to the back at the sides, yokes on said frame portions, having slots receiving the ends of the rods, racks on said yokes, pinions fixed on the said rod meshing with the racks, and plane-faced blocks fixed on said rod and adapted by engaging corresponding plane surfaces on the chair-back, to hold the rod against rotation, all substantially as herein specified.

5. In a chair, a back hinged to the frame at  $b$ , and rearward extensions  $A^2$  adjacent to the back at the sides, in combination with the yokes  $C$  having the slots  $c$ , racks  $C'$  and flanges  $C^3$  on the yokes, the rod  $D$ , the pinions  $D'$ , blocks  $D^2$  and hand-wheels  $D^3$  thereon, and the plates  $B^2$  on said back to receive the blocks, all substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

H. M. WILLIS.

Witnesses:

ROBT. CONNOR,  
GEO. W. CASE, Jr.