Feb. 23, 1932. I. C. DECKER 1,846,797

CHAIR

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Fig. 1.

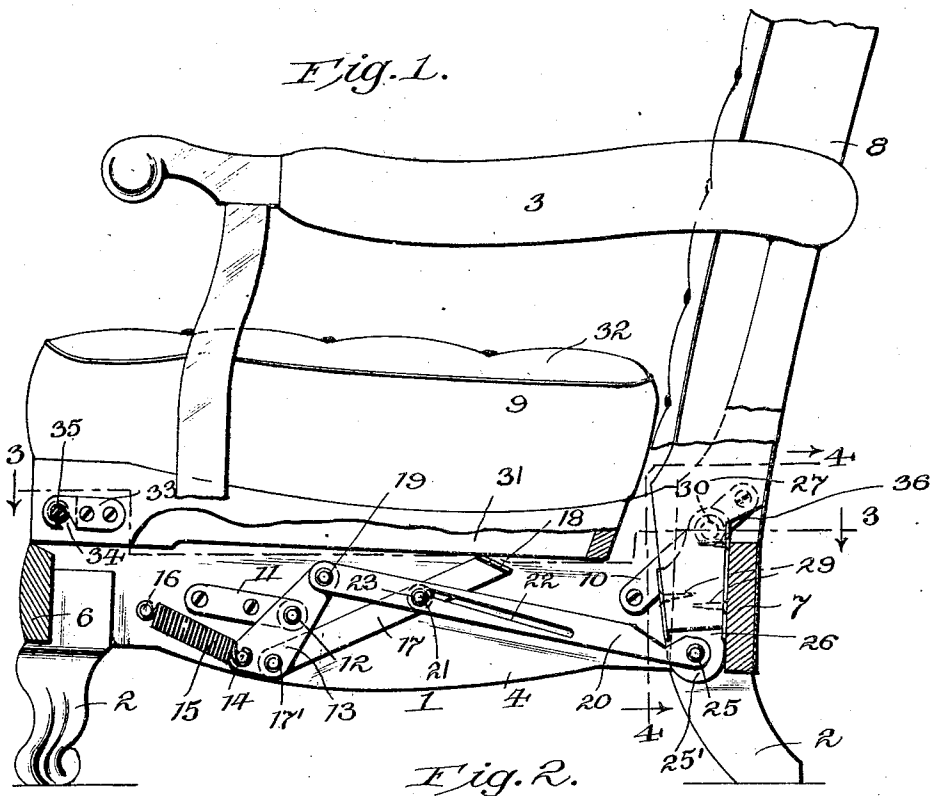
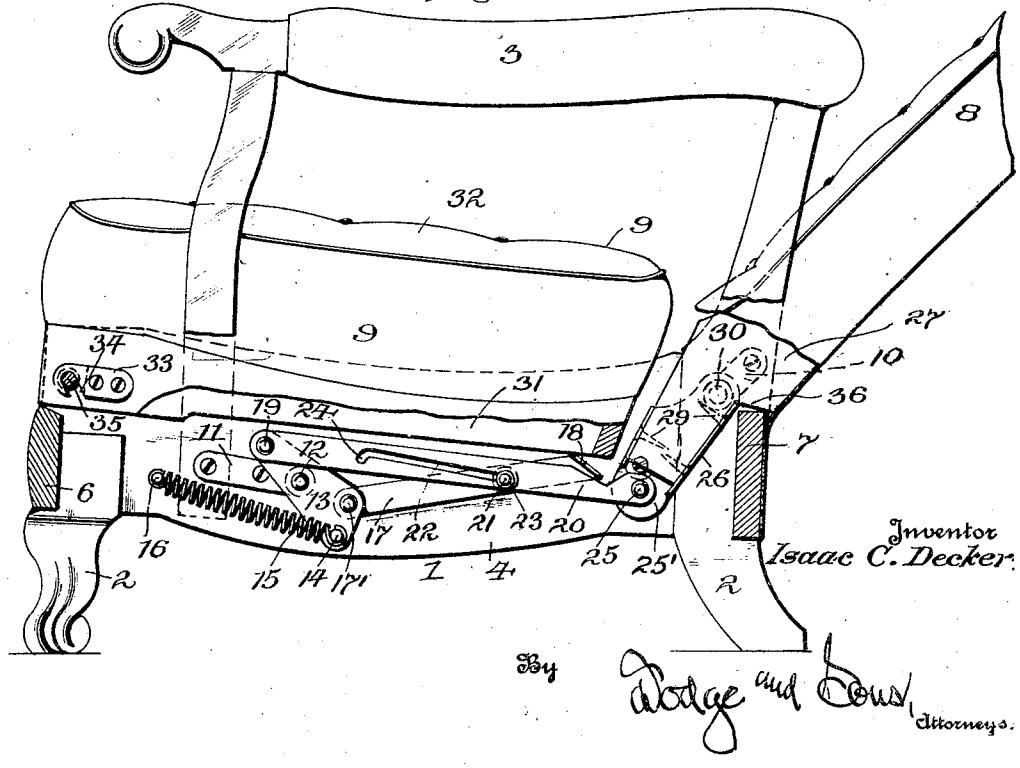


Fig. 2.



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Fig. 3.

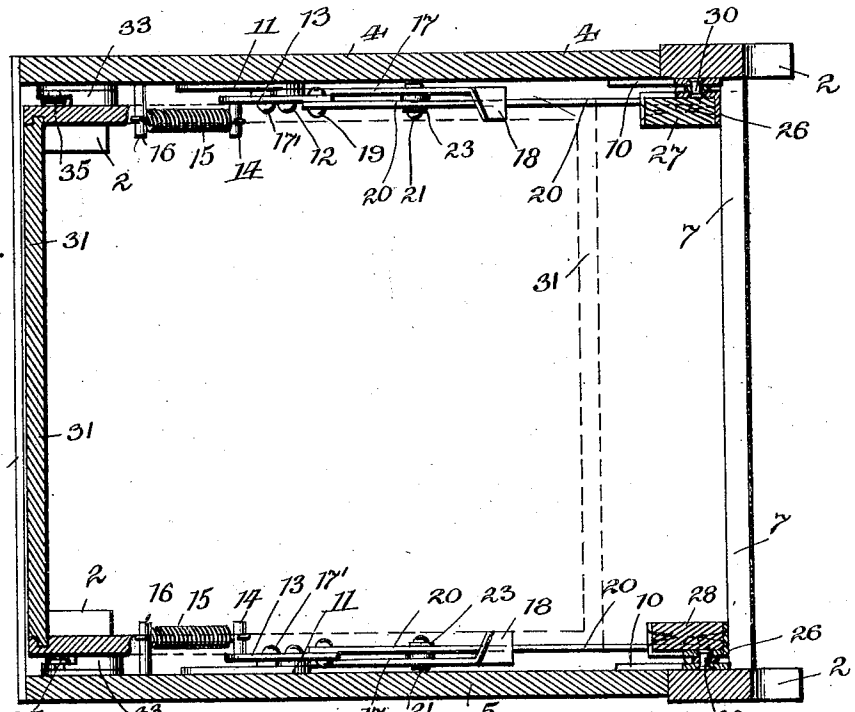


Fig. 4.

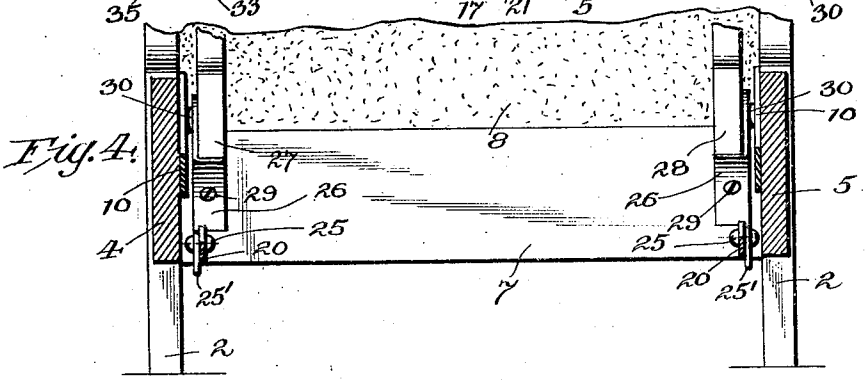
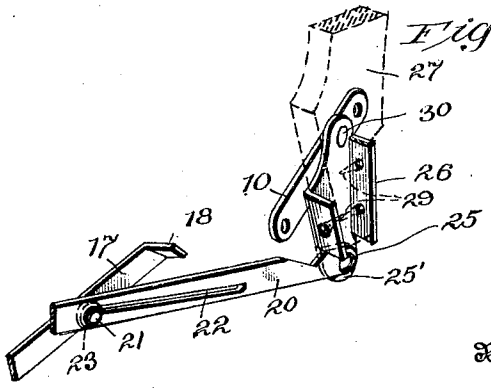


Fig. 5.



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UNITED STATES PATENT OFFICE

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CHAIR

Application filed July 6, 1929. Serial No. 376,437.

This invention pertains to chairs. It has to do particularly with chairs of the reclining type in which the back and seat are connected so that they may be moved together.

The primary object of the invention is to furnish improved operating mechanism between the back and seat, whereby any one occupying the chair may readily effect adjustment of the back and seat to accommodate his particular desires by simply altering the position of his body.

It is intended that the adjustable back and seat have a range of movement from sitting position to full lounging or reclining position, with provision for automatic maintenance of the parts in any adjusted relation as long as the position of the occupant's body remains unchanged. Means are provided for automatically returning the parts to their normal, sitting position when the occupant leaves the chair.

A feature of my improved chair construction is the utilization of the weight of the occupant's body to automatically hold the back and seat in any adjusted position.

Further objects will appear from the detailed description given hereinafter.

In the accompanying drawings, there is illustrated a practical embodiment of the invention. In these,

Fig. 1 is a side elevational view of the chair with the parts in their normal or sitting position, certain of the parts being shown in section in order to make clear the details of construction;

Fig. 2, a similar view with the parts in full lounging or reclining position;

Fig. 3, a horizontal section taken on line 3—3 of Fig. 1;

Fig. 4, a section taken on line 4—4 of Fig. 1; and

Fig. 5, a fragmentary perspective view of one of the lower corners of the back and a part of the operating mechanism connected therewith.

The chair consists of a main frame-work 1 provided with the usual legs 2 and arms 3. Frame-work 1 is made up of side boards 4, 5, and end boards 6, 7. These are firmly connected together at their extremities to provide a rigid frame which is adapted to support the other parts of the chair proper and also the mechanism which permits relative adjustment of the seat and the back.

Attached to the inner faces of side boards 4, 5 of the chair frame is the mechanism by which the chair back 8 is mounted for pivotal or swinging movement in the frame 1 and is operatively connected with the seat 9. Inasmuch as this mechanism is duplicated on each side of the chair, only one of the devices will be described in detail.

Each device comprises an elongated metal plate 10 suitably secured, as by means of screws, to the inner face of side board 4 near the rear end thereof. In this plate 10 and the corresponding plate on the opposite side of the chair the back 8 is adapted to be pivotally mounted, as will be described more particularly hereinafter.

Also secured to the inner face of side board 4, but near the front end thereof, is a second elongated metal plate 11. Pivotally mounted intermediate its ends on the inner face of plate 11 and on a rivet 12 extending through the two members, is a triangular plate 13. The outer face of plate 13 is provided with a pin 14 in its lower left hand corner to which is connected one end of a coil spring 15. The opposite end of the spring is attached at 16 to side board 4 of the frame.

One end of an elongated floating bar 17 is pivotally connected at 17′ to the lower right hand corner of the triangular plate 13. The opposite end of bar 17 is bent outwardly to provide an inclined bearing portion 18 which acts on the under side of the seat to effect raising and lowering thereof as will be explained later.

To the upper corner of plate 13 there is piv-

otally connected by means of a rivet 19 a link 20, the rivet extending through suitable openings provided in the two members for this purpose. A stud or pin 21 projects from the outer face of bar 17 intermediate its ends and has its outer end extending through an inclined slot 22 provided in link 20. Pin 21 has an enlarged outer end 23 located adjacent the outer face of link 20, so as to retain the pin at all times in slot 22. A depression 24 (see Fig. 2) is provided in the upper left hand end of slot 22 in which pin 21 is located normally, as shown in Fig. 1.

At its rear end link 20 is pivotally connected by a rivet 25 to a perforated extension 25′ formed on a socket 26 which carries the lower part of the chair back.

The chair back 8 consists of a wooden frame, usually upholstered. This frame has a pair of side members 27, 28. As shown in Fig. 5, socket 26, which is preferably made of sheet metal, is tapered downwardly and inwardly. In order that side members 27, 28 may be received in the pair of sockets on the opposite sides of the chair, side members 27, 28 are tapered correspondingly at their lower ends. When in place, the back 8 is firmly secured in the pair of sockets 26 by suitable fastening means, such as screws 29 extending through openings in the sockets and into the side members 27, 28.

Each socket 26 is pivotally mounted on the corresponding plate 10 secured to the side board of the chair frame. For this purpose each plate and socket is provided with registering openings through which extends a rivet or pin 30. This rivet forms the pivotal connection between the members.

With the arrangement above described, it will be evident that, since coil springs 15 are put in place under tension, they will serve normally to maintain the floating, camming members or bars 17 in the position shown in Fig. 1. This is due to the fact that each spring 15 tends to rotate its corresponding pivoted plate 13 in a clockwise direction. This movement, through links 20, forces the lower part of the chair back 8 rearwardly against the end board 7 of the chair frame, thereby holding the upper portion of the back in its normal sitting position. At the same time, the lower end of pivoted plate 13, moving to the left, carries with it the floating bar 17. Thus, bar 17 moves forwardly, until its pivot pin 21 reaches the front end of the slot in link 20. During this movement, the bearing portion 18 at the upper end of bar 17 slides along the under face of the seat 9. This serves to effect a certain vertical swinging movement of the seat, as will be explained shortly.

As shown in Fig. 2, when the upper portion of the chair back is swung rearwardly about its pivot pins 30, towards the lounging or reclining position, links 20 are forced forwardly. This results in pivoted plates 13 being rotated in a counter-clockwise direction against the gradually increasing tension of coil springs 15 which latter always tend to return the parts to the normal position of Fig. 1. Movement of the lower ends of plates 13 in this direction first causes floating bars 17 to be forced rearwardly until their pivot pins have moved out of the inclined portions 24 of slots 22. Pivot pins 21 then continue their rearward movement in slots 22. As a result of both the inclined position of links 20 and the inclination of the slots 22, the outer bearing ends 18 of the floating bars 17 gradually move from their elevated position of Fig. 1 to their lowered position of Fig. 2.

The chair seat 9, which comprises a frame 31 and upholstery 32, is also mounted pivotally in chair frame 1. The pivotal connection between the seat and the chair frame is located at the front of the chair and includes two small metal plates 33. A plate 33 is suitably secured, as by screws, to the front portion of each of the side boards of the seat frame 31. Each plate 33 has an inclined slot 34 which is open at its lower end to receive a headed pivot pin or stud 35 on the chair frame 1. Clearance is provided under plate 33 to permit free movement of the head of stud 35.

With the construction described, it will be seen that the seat is pivoted near its front edge, while the rear portion thereof rests on the upper ends of floating bars 17 and is free to be elevated or lowered by these members upon operation of the chair back.

As stated, the seat and back are normally held in sitting position, as shown in Fig. 1, by means of springs 15. When the chair is occupied, the parts are further maintained in this position by the weight of the occupant's body on the rear portion of the seat. The resulting downward pressure on this portion of the seat tends to force the rear ends of bars 17 downwardly, as a result of which the pivot pins 21 of these members bind tightly against the lower edges of the slots in links 20. In other words, as far as pressure applied to the chair seat is concerned, the mechanism interconnecting the seat and the back is locked against movement. Movement of the mechanism must be effected by operation of the back. This is so, no matter what the relative position of the back and seat may be.

The purpose of the normal interengagement of pivot pins 21 and the forward inclined portions 24 of the slots in links 20 is to further insure maintenance of the seat and back in setting position, unless the occupant exerts more than ordinary pressure against the chair back in order to move it towards reclining position.

To move the back 8 towards reclining po-

sition, the occupant merely exerts a slight pressure against the back of the chair. At the same time he naturally raises most of his weight from the rear portion of the seat. This lessens the frictional resistance in the operating connections and the parts function as heretofore described. It will be seen that the presence of inclined slot portions 24 causes an initial relatively high resistance to movement of the parts from the sitting position. As soon as pins 21 reach the main portion of slots 22 however, this resistance is overcome and adjustment of the parts is accomplished more readily.

As is evident, movement of the back rearwardly toward the reclining position results in a gradual lowering of the rear portion of the chair seat. This is accomplished without any change in the height of the front portion of the seat and thus serves to adjust the body supporting portions of the chair, so as to render them most comfortable.

The occupant will still have full control over the relative angular relation of the seat and back, whether these parts be in sitting or full lounging position, or in any intermediate position. This is due, in the main, to the frictional resistance to continued movement of the parts caused by the binding action of pivot pins 21 in the slots in links 20, as a result of the weight of the occupant's body on the rear portion of the seat. The occupant is thereby relieved of any strain or effort in order to maintain the parts in adjusted position.

In full reclining position, further movement of the parts is prevented by the engagement of ends 18 of bars 17 with the upper edges of links 20. Shoulders 36 provided on the outer edges of back frame members 27, 28 also serve as limiting stops by engaging with end board 7 of the chair frame (see Fig. 2).

As soon as the occupant removes the weight of his body from the rear portion of the seat, coil springs 15 operate through the mechanism described to move the back towards full sitting position. As the back moves in this direction, the rear portion of the seat is gradually elevated to its normal sitting position.

Various changes may be made in the details of construction, since it is not intended to restrict the invention to the structure illustrated, except as it may be limited by the appended claims.

What is claimed is:

1. In a chair, the combination of a frame; a seat pivotally mounted at its forward edge for vertical swinging movement in the frame; a back pivotally mounted intermediate its ends in the frame; and operative connections between the seat and the back, including a bodily movable member carried by said operative connections and slidably supporting the free end of the seat, for effecting a downward swinging movement of the rear portion of the seat upon rearward swinging movement of the back.

2. In a chair, the combination of a frame; a seat movably mounted in the frame; a back mounted for swinging movement in the frame; and operative connections between the seat and the back for causing simultaneous movement of the seat and the back, said connections including a pair of crossed members supported by the frame and having a pin-and-slot connection intermediate their ends, one of said members being connected to the back and the other engaging the seat, said crossed members also being movably connected together, whereby movement of the chair back operates the seat engaging member and effects relative movement of the pin and slot to actuate the seat.

3. In a chair, the combination of a frame; a seat pivotally mounted in the frame; a back pivotally mounted in the frame; and mechanism between the back and the seat for effecting movement of the seat when the back is operated, said mechanism including a pair of interconnected crossed members pivotally connected together at their point of intersection and at one end, said members at their opposite ends being one in engagement with the movable seat and the other connected to the back.

4. In a chair of the reclining type, the combination of a frame; a seat pivotally mounted therein; a back pivotally mounted in the frame; and means interposed between the back and the seat to adjust the seat upon movement of the back, said means including a pair of crossed members having a pin-and-slot connection with each other intermediate their ends, a member pivotally mounted on the frame and pivotally connecting the forward ends of the crossed members, and a spring connecting one end of said pivoted member to the frame, the rear end of one of said crossed members being connected to the back and the rear end of the other crossed member frictionally supporting the seat.

5. The combination in a reclining chair of a frame; a seat pivotally mounted at its front edge in the frame; a back pivotally mounted in the frame; a pair of crossed members pivotally mounted at each side of the frame, said crossed members being pivotally connected intermediate their ends, the ends of certain of said members being connected to the back and the ends of the other members frictionally supporting the rear portion of the seat; and spring means for normally maintaining the back in an upright, sitting position.

6. The combination in a reclining chair of a frame; a seat pivotally mounted in the frame; a back pivotally mounted in the frame; and means connecting the seat and the back for operating the seat upon movement of the back, said means including a member

movably mounted on the frame and engaging the seat, and a second member operatively connected to the back and to the first-mentioned member, said members also having separate slidable engagement with each other intermediate their ends, whereby actuation of the chair back operates the seat engaging member and shifts the point of slidable engagement between said members to move the seat.

In testimony whereof I have signed my name to this specification.

ISAAC C. DECKER.