

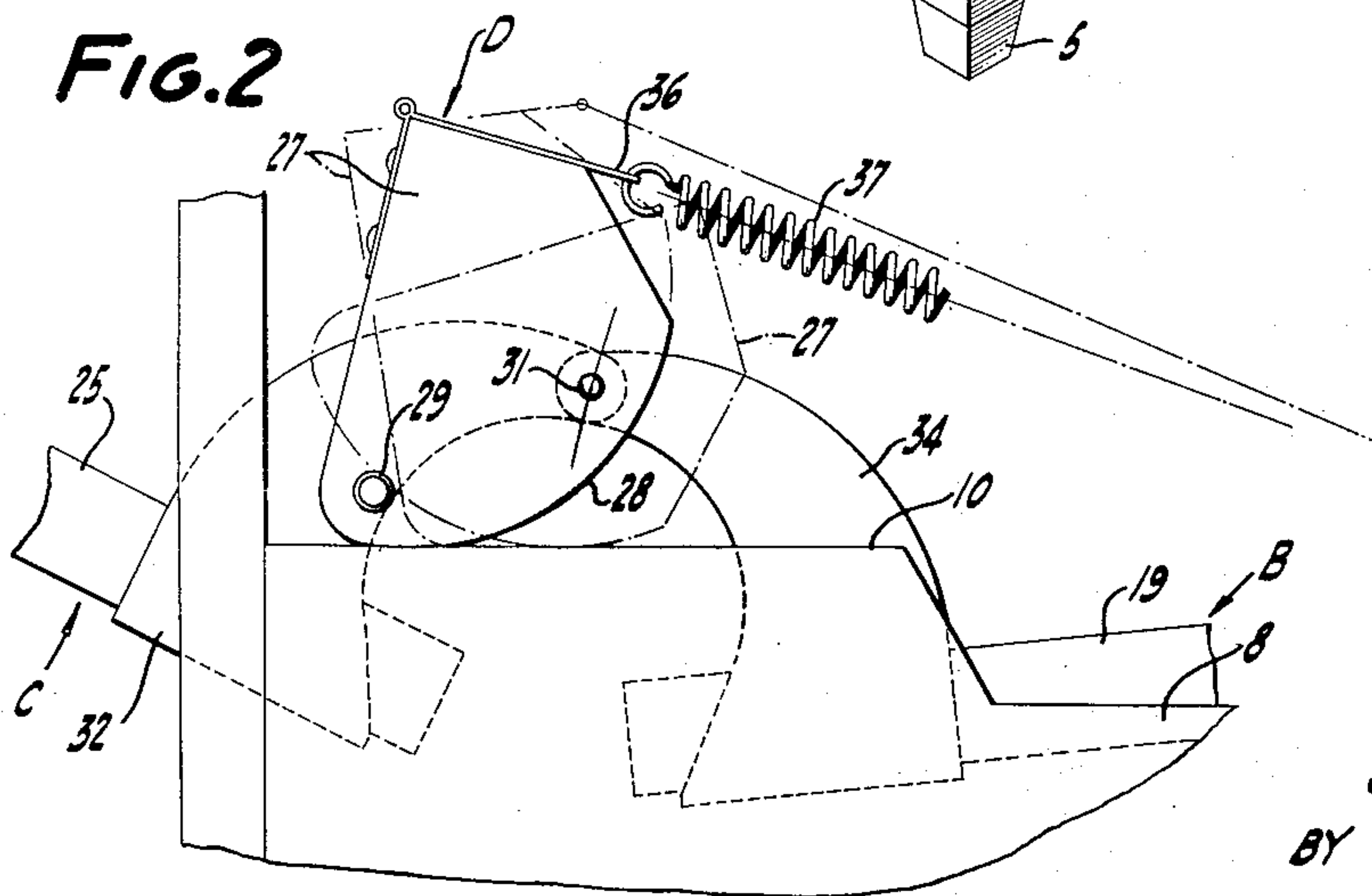
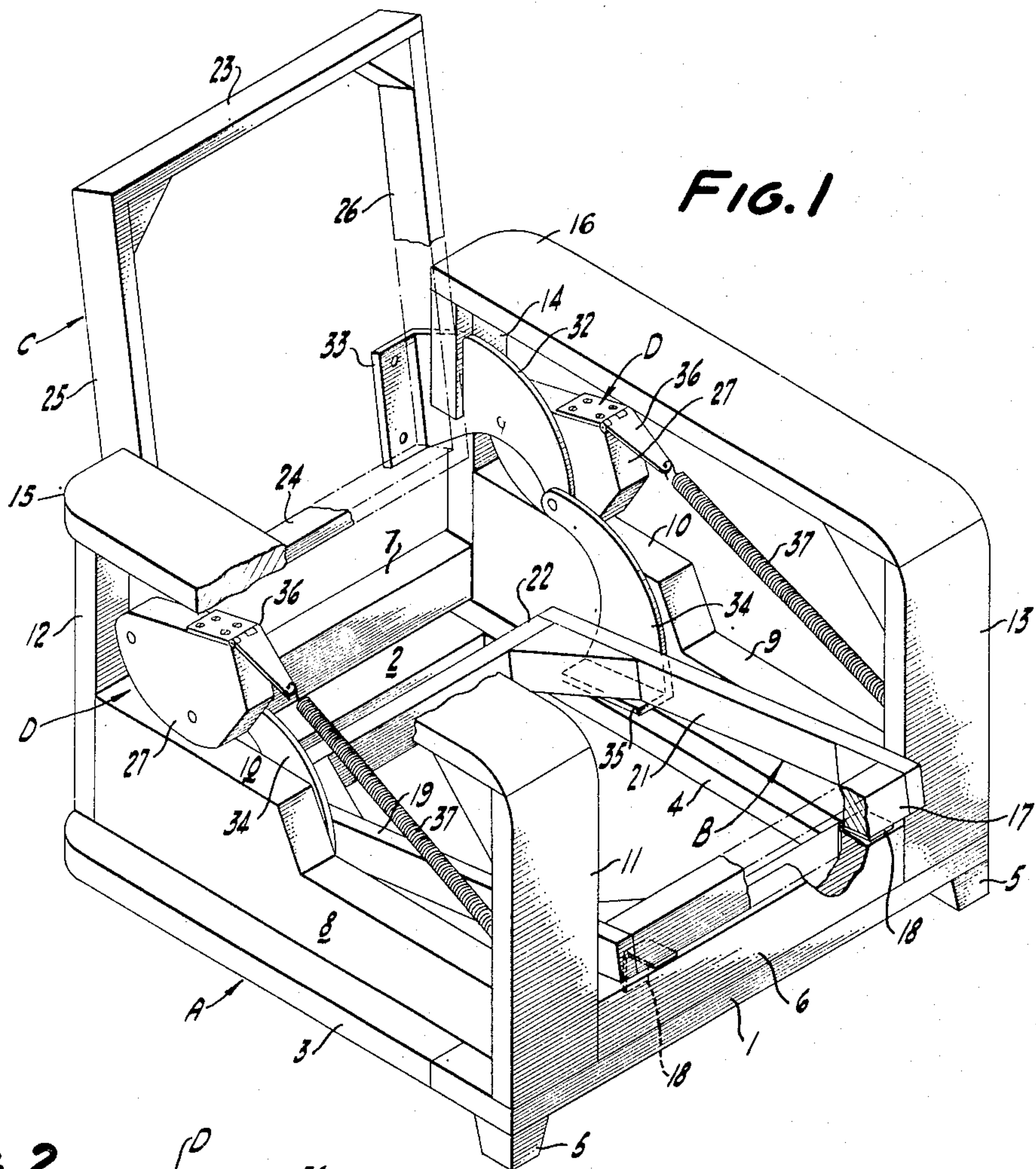
Feb. 17, 1953

J. M. JENSEN  
RECLINING CHAIR

2,628,663

Filed Oct. 27, 1947

2 SHEETS—SHEET 1



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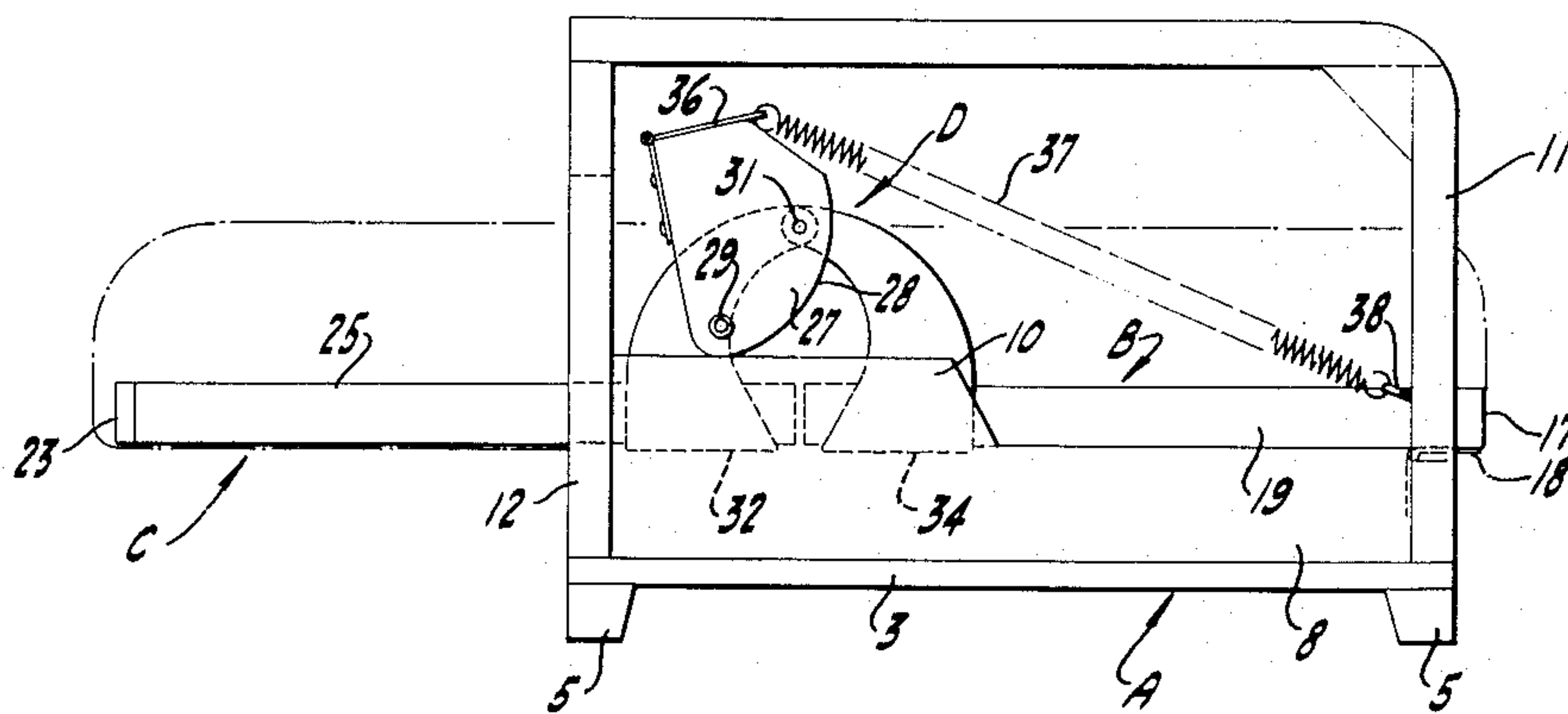
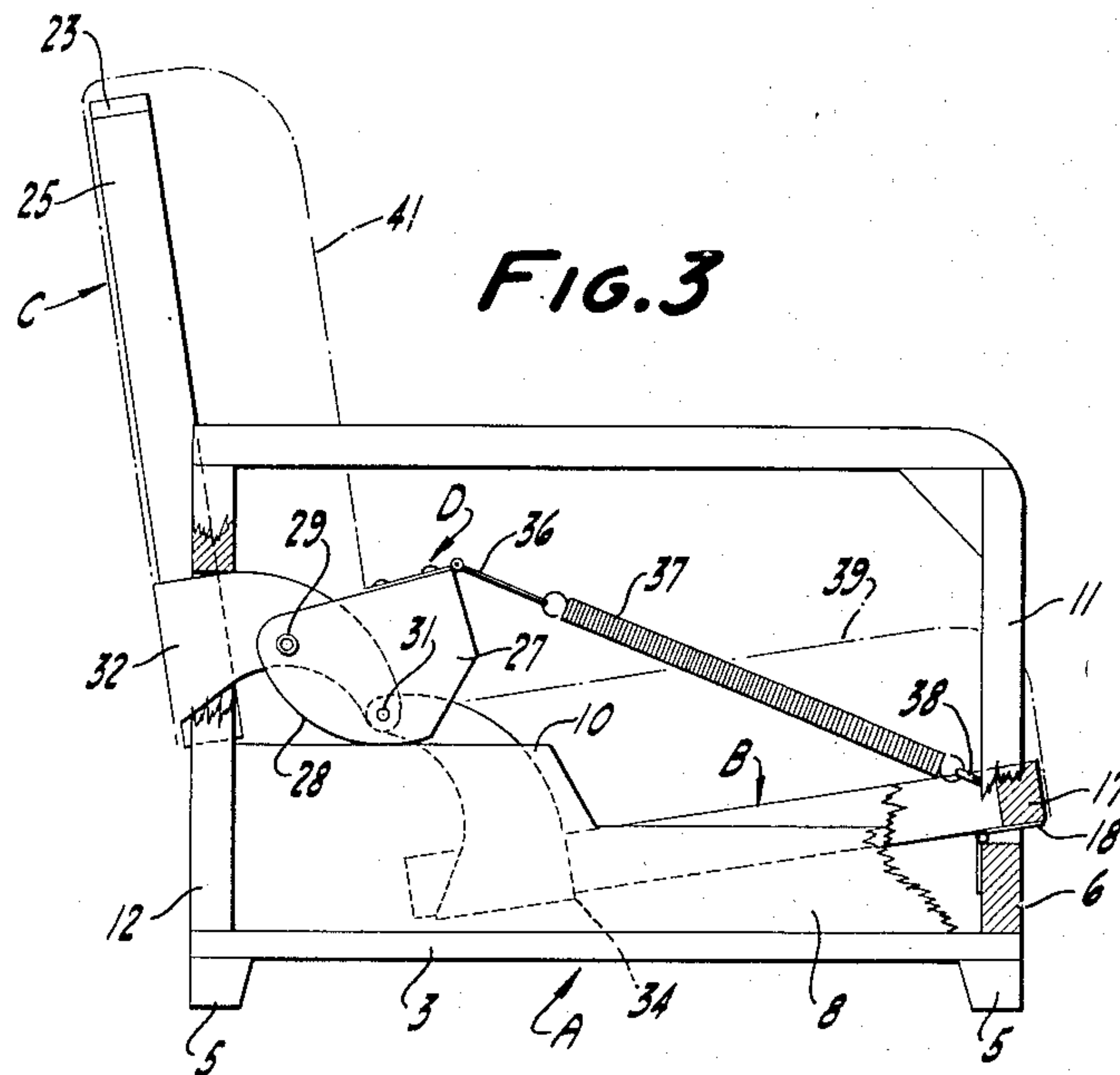
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**FIG. 4**

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## UNITED STATES PATENT OFFICE

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## RECLINING CHAIR

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4 Claims. (Cl. 155—116)

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This invention relates to reclining chairs of the type described in my copending application Serial No. 594,677, now Patent No. 2,616,483, and in general has for its object the provision of a chair wherein the angle assumed between its seat frame and back frame depends upon the distribution of the weight of the occupant between these two members, and wherein such angle is substantially independent of the weight and size of the occupant. More specifically the object of this invention is a reclining chair wherein its back frame is articulated to its seat frame by hinge plates pivoted to each other for rotation on an axis substantially coincident with the line of intersection of the outer sides of the seat and back cushions, wherein the back frame hinge plates are pivoted intermediate their ends on a movable fulcrum and wherein the seat frame is fixed against sliding movement with respect to the main chair frame.

The invention possesses other advantageous features, some of which with the foregoing will be set forth at length in the following description where that form of the invention, which has been selected for illustration in the drawing accompanying and forming a part of the present specification, is outlined in full. In said drawing, one form of the invention is shown, but is to be understood that it is not limited to such form, since the invention, as set forth in the claims, may be embodied in a plurality of forms.

Referring to the drawings:

Fig. 1 is an isometric projection of a reclining chair embodying the objects of my invention.

Fig. 2 is an enlarged detail of the hinge mechanism shown in Fig. 1.

Fig. 3 is a side elevation of the chair shown in Fig. 1, with its back frame in an upright position and with portions thereof broken away to better illustrate its construction.

Fig. 4 is a view similar to that illustrated in Fig. 3, but showing the chair with its back frame in its fully reclining position.

The chair illustrated in these various figures comprises a main frame generally designated by the letter A, a seat frame generally designated by the letter B, a back frame generally designated by the letter C and a pair of opposed and identical hinge assemblies generally designated by the letter D.

The main frame A includes a base comprising front and back plates 1 and 2 joined to opposed side plates 2 and 4 to form a rectangular base frame and arranged to be supported on feet 5. Supported on and secured to this base frame are front and back rails 6 and 7, and opposed side

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rails 8 and 9, each provided with a step 10. Secured to the four corners of this assembly are legs 11, 12, 13 and 14 and bridging these two pair of legs are arm rests 15 and 16. The main frame as so far described is of more or less conventional construction and can be built up to produce chairs of various styling.

The seat frame B includes a front cross member 17 hinged along its lower rear corner by hinges 18 to the front rail 6 of the main frame. Secured to the ends of the cross member 17 are side rails 19 and 21 and extending across and secured to the ends of these rails is a rear cross member 22.

The back rest or frame C includes a pair of side rails 25 and 26 secured at their ends to cross members 23 and 24, and is arranged to be articulated to the seat frame B by the hinge assemblies D.

Each of the hinge assemblies D includes a rocker 27 formed with an arcuate surface 28 and arranged to rock on the step 10 of one of the side rails 8 and 9. Fixed to the outer face of the rocker 27, by a bolt 29 and a pin 31, and forming a rearward extension thereof is a hinge plate 32. The plate 32 is provided at its rear end with an inwardly extending flange 33 arranged to engage one of the lower corners of the back rest C and to be secured thereto by suitable screws. It is therefore apparent that the back rest C, hinge plates 32 and rockers 27 form an integral structure arranged to be supported by the arcuate surfaces 28 of the rockers on the side rails 8 and 9. Pivoted to the pin 31 of each hinge assembly, is a seat rest hinge plate 34 formed at its lower end with a flange 35. The flanges 34 are arranged to support and be secured to the rear ends of the seat frame side rails 19 and 21. Screwed to the upper end of each rocker 27 is a strap hinge 36, and fastened to each of these hinges is the rear end of a coil spring 37, the forward ends of these springs being attached by eye screws 38 to their associated main frame legs 11 and 13. The seat frame B and back frame C are arranged to carry cushions 39 and 41, and in this connection it should be particularly noted that the length of the hinge plates 32 and 34 should be so correlated with the depth of the cushions 39 and 41, that the line of intersection of the outer faces of the cushions is substantially coincident with the axis of the pins 31. This relation of parts is essential in order always to maintain the lower outer edge of the back cushion in engagement with the upper rear edge of the seat cushion. The sides of the chair



should, of course, be upholstered so as to completely enclose the hinge assemblies and to some extent determine the style of the chair.

From a study of Figs. 3, 2 and 4, respectively and diagrammatically showing the hinge assemblies in the upright, intermediate and fully reclining positions of the chair, it will be observed that when the seat and back frames are moving from the upright position of the chair to its reclining position, the pins 31 must of necessity swing clockwise about the axis of the hinges 18; the back frame C and its rockers swing counterclockwise about the axis of the hinges 18; the movement of this axle is determined by the configuration of the rockers; and the rockers slip as well as rock on their supporting steps 10. Furthermore, and as is apparent from an inspection of Figures 2, 3 and 4, the back frame C is always fulcrumed on the rocker at the point of contact between the rocker and its supporting step 10. That portion of the hinge plate 32 (or the rocker) lying between this fulcrum point and the pin 31, operates as a lever acted on by the rear end of the seat frame B (through the hinge plate 34), and any load placed upon it, to urge the back frame to rotate in a clockwise direction. The effective length of this lever is the distance between the fulcrum point and the vertical projection of the pin 31 on the step 10, and this distance varies with the inclination of the back frame.

When the occupant of the chair is sitting erect, his entire weight is carried by the seat frame, there being no substantial portion of his weight applied to the back frame. Under these conditions, the back frame is held in its upright position solely by the spring 37. From an inspection of Fig. 3 it will be seen that in this position the rocker is fulcrumed at a point directly beneath the pin 31. As the occupant assumes a partially reclining position the fulcrum point moves rearwardly, and a portion of the occupant's weight is placed on the back frame. Under these conditions, that portion of the weight of the occupant carried by the seat frame is acting on the lever above referred to, to hold the back frame in its then inclined position. If the occupant assumes a still more reclining position, the length of this lever arm will be increased to compensate for the additional portion of his weight then placed on the back frame. Simultaneously, the spring 37 also exerts a proportionately greater force, to balance the additional weight placed on the back frame. It will, therefore, be seen that by resorting to a floating fulcrum the distribution of the occupant's weight between the seat frame and back frame can be utilized to substantially balance these two members at any given position without the necessity of any mechanism for locking them in any predetermined position. This construction also makes it possible always to maintain the upper rear edge of the seat cushion in contact with the forward lower edge of the back cushion and to avoid any bodily outward movement of the seat frame. In this upright position of the chair the seat frame B has a substantial rake (forward inclination) whereas in its reclining position it assumes a horizontal position coplanar with the back frame C. If it is desired to have a portion of the weight of the occupant to assist in holding the chair in its upright position, the rockers 27 can be so formed that the fulcrum point in this position of the chair lies to the rear of the pin 31 rather than immediately beneath it.

I claim:

1. A reclining chair comprising: a main frame; a seat frame hinged at its forward end to the front of said main frame; a back frame hinged at its lower end to the rear end of said seat frame; and laterally opposed rockers in rolling contact with and supported by said main frame adjacent the sides thereof and movable in response to the movement of said seat frame for supporting said back frame to the rear of the axis about which said seat and back frames are hinged, said rockers being pivotally connected to the lower portion of said back frame.

2. A reclining chair comprising: a main frame including opposed side rails; a seat frame pivoted at its front end to the front of said main frame; a back rest frame hinged at its lower end to the rear end of said seat frame and rockers mounted on said back rest frame adjacent its lower end, said rockers being arranged to rock and slide on said side rails and to serve as movable fulcrums for supporting said seat and back rest frames.

3. A reclining chair comprising: a main frame including upstanding arm rest; a seat frame hinged at its forward end to the front of said main frame and arranged to support a seat cushion; upstanding seat frame hinge plates fastened to the rear end of said seat frame and arranged to straddle the rear end of said seat cushion; a back frame disposed between said arm rest and arranged to support a back cushion; back frame hinge plates secured to the lower end of said back frame and arranged to straddle the lower end of said back cushion; and a forwardly extending upstanding rocker fastened to the forward end of each of said back frame hinge plates and in rolling contact with and supported on said main frame within the confines of said arm rests, said rockers being movable in response to the movement of said seat frame, the outer ends of said seat frame hinge plates and back frame hinge plates being pivoted together.

4. A reclining chair comprising: a main frame; a seat frame hinged at its front end to the front end of said main frame; and a back frame hinged at its lower end to the rear end of said seat frame and provided adjacent its lower ends with rockers arranged to rock and slide on the sides of said main frame, said rockers constituting fulcrums for supporting said back frame on a transverse axis intermediate its ends and shiftable fore and aft in response to the distributing of the weight of an occupant of the chair between said seat and back frames.

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