March 4, 1941. L. POTTER 2,233,797

ADJUSTABLE CHAIR

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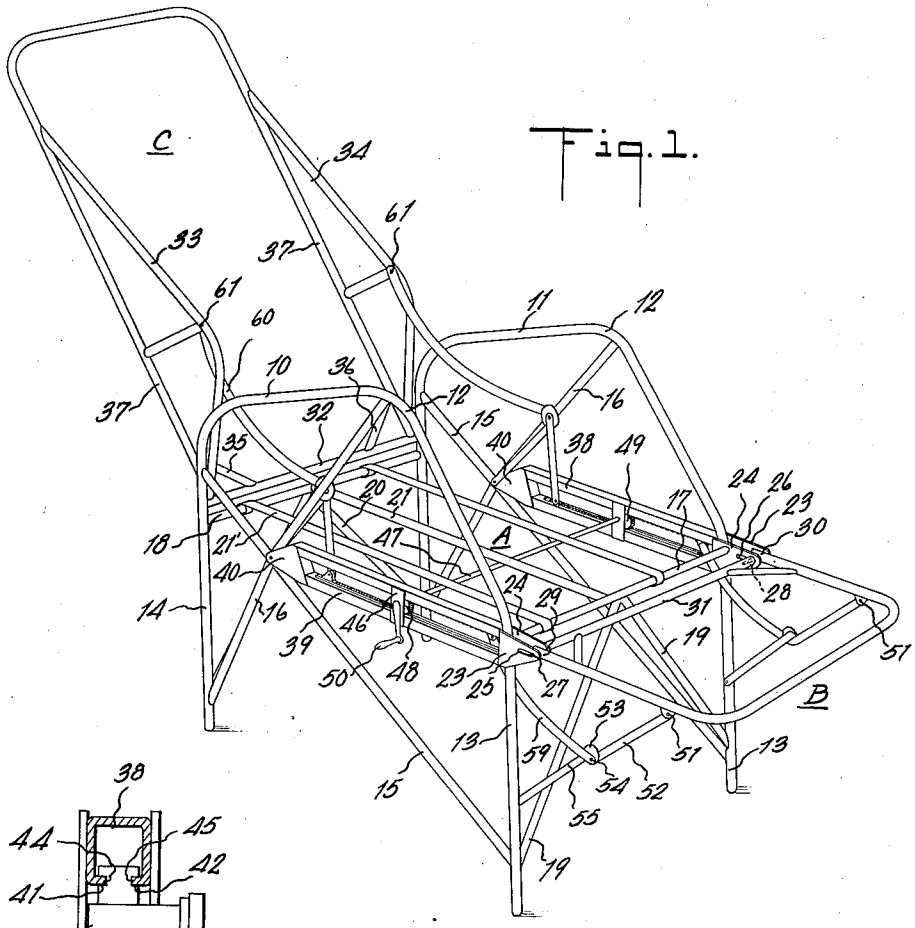


Fig. 1.

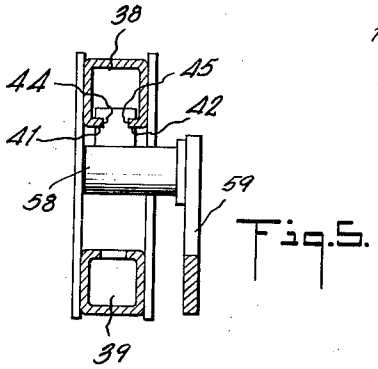


Fig. 5.

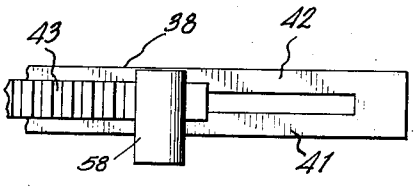


Fig. 2.

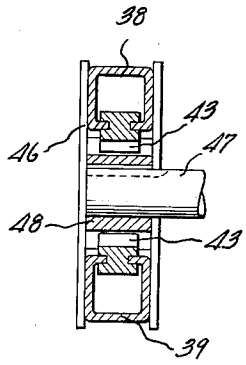


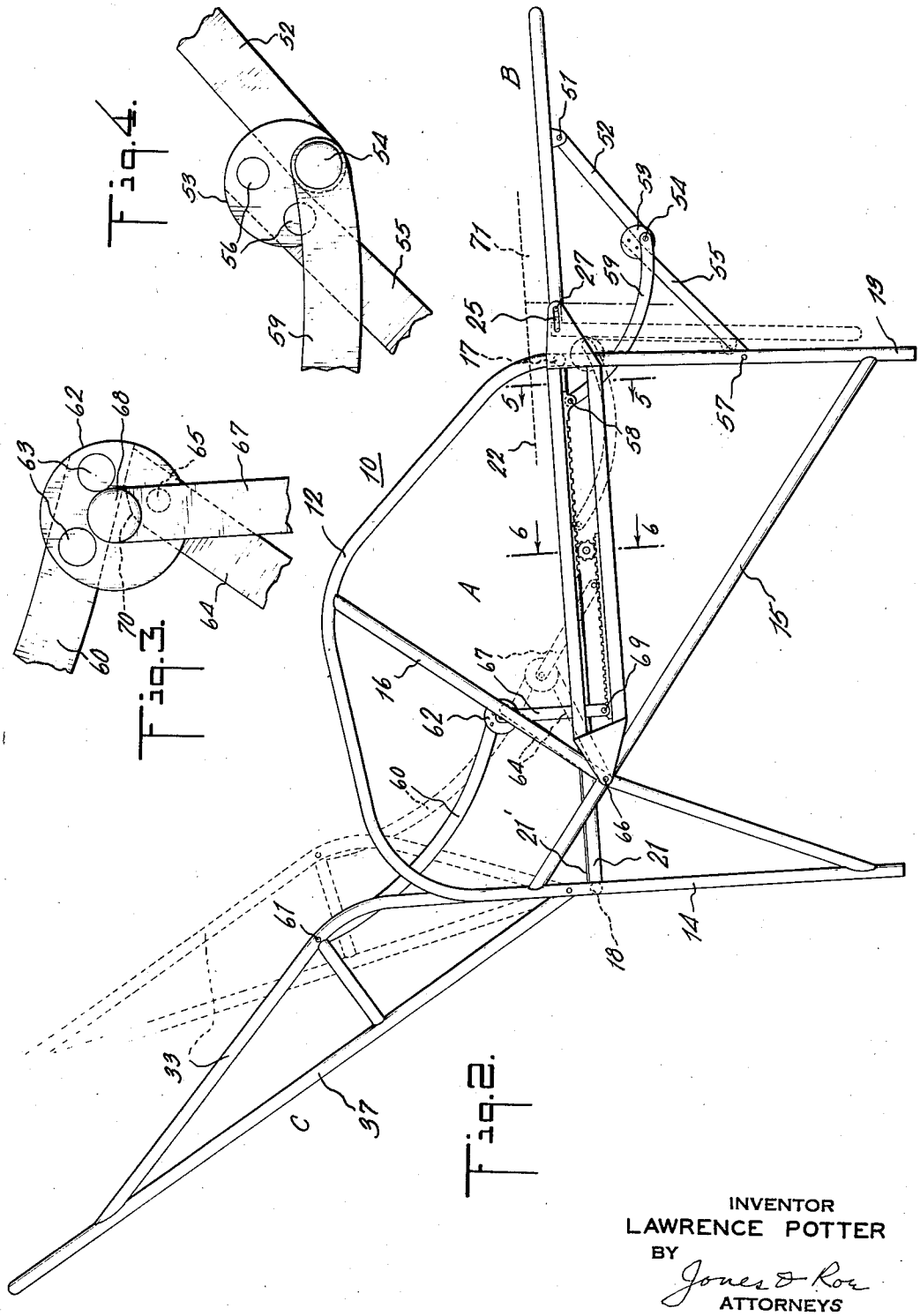
Fig. 6.

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ADJUSTABLE CHAIR

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Patented Mar. 4, 1941 2,233,797

UNITED STATES PATENT OFFICE

2,233,797

ADJUSTABLE CHAIR

Lawrence Potter, Rosedale, N. Y.

Application June 14, 1939, Serial No. 279,087

11 Claims. (Cl. 155—108)

The improvements comprise the provision of a chair with a fixed seat and a movable leg-rest and back, whereby one is enabled to sit in an upright position or a reclining position, or in a position intermediate the extreme positions, the change of position being effected by the user through the operation of a readily accessible control device; the provision of a leg-rest and back which may be simultaneously adjusted by clockwise movement thereof through the medium of oppositely reciprocating elements, floating fulcrums and interconnections; the provision of means for rendering flush the upholstery of the leg-rest and the contiguous upholstery of the seat, regardless of whether the leg-rest is in an extended or retracted position; the automatic locking of the leg-rest and back when adjusted in either of their maximum or mean positions; and other subordinate features which lend themselves to simplicity and efficiency of operation, economy of manufacture, and sturdiness of structure.

In the accompanying drawings, which illustrate one embodiment of the invention:

Fig. 1 is a perspective view of the chair,

Fig. 2 is a side elevation of the chair—full lines illustrating one extreme position and dotted lines indicating another extreme position of the back-rest and leg-rest—and for the sake of clarity plate **46** and crank handle **50** have been eliminated,

Fig. 3 is an enlarged detailed fragmentary elevation of the rear floating fulcrum and connections,

Fig. 4 is a similar view of the front floating fulcrum and connections,

Fig. 5 is a vertical sectional view taken along lines **5—5** of Fig. 2,

Fig. 6 is a similar view taken along lines **6—6** of Fig. 2, and

Fig. 7 is a bottom plan of the forward portion of one of the racks.

Referring more particularly to the drawings, A designates the seat-frame, B the leg-rest, and C the back-frame.

Seat-frame A comprises a pair of suitably spaced side-frames **10, 11**, having the conformation of an inverted U, and each of which consists of an arcuate portion **12** and legs **13, 14**, which are firmly held together against perpendicular and lateral distortion by diagonally disposed cross braces **15, 16**. In turn the frames are connected to each other by the transverse rungs **17, 18**, in the front and rear respectively, as well as by pairs of angle braces **19, 20**, also in the front and rear. The space between rungs **17, 18**, is fitted with longitudinal support **21** and straps **21'** adapted to accommodate a suitable seat—for example, a cushion **22**, as shown by dotted lines in Fig. 2.

At the upper extremity of each front leg is fixed a pair of forwardly extending brackets **23, 24**, arranged in parallelism and provided with horizontal, elongated registering slots **25, 26**, which receive the opposed laterally projecting pintles **27, 28**, carried by the inner terminals **29, 30**, of the leg-rest frame B. The latter is substantially quadrilateral in contour, and has an inner cross member **31** secured to the said pintles **27, 28**. Manifestly, such assembly makes for longitudinal and pivotal movements of the leg-rest frame in relation to the seat.

Back-frame C is pivoted at its base **32** just above the rung **18** between the rear legs of the seat. Trussed arm-rests **33, 34**, extend forwardly from the frame, and corner braces **35, 36**, are provided between the side members **37** and base **32**.

One of the outstanding features of the present invention is the synchronized movements of the leg-rest and back-frame with relation to the seat. As will be observed in Figs. 1 and 2, there are on each side of the seat-frame a pair of opposed tubular-like channels **38, 39**, conveniently spaced, and connected at the front to the rear of brackets **23, 24**, and at their rear to brackets **40**, which latter are rigidly secured at the intersection of cross braces **15, 16**. As best seen in Figs. 5 and 6, each channel is formed with spaced inwardly deflected ledges **41, 42**, which constitute a track or runway for a rack **43**, the outer portion of the rack being recessed longitudinally at **44, 45**, to engage said ledges. Medially of channels **38, 39** is a vertical plate **46**—this serving to maintain uniform spaced relationship of the channels, and also as desirable points at which to journal the transverse torque shaft **47**, carrying an operating pinion **48**, and a follower pinion **49**. These pinions mesh with the respective pairs of racks when actuated by crank handle **50**, and through the medium of mechanism now to be described, produce, simultaneously, desirable adjustments of the leg-rest and back of the chair.

Pivoted approximately midway of the underneath sides of leg-rest B, as at **51**, is a straight depending arm **52** having its inner terminal eccentrically pivoted to a floating fulcrum disc or plate **53**, at **54**. A link **55** has its outer extremity fixed to the same side of disc **53** as arm **52**, by rivets **56**, or other suitable means, and extends downwardly to about the middle of the front leg **13**, where it is pivoted at **57**. Also pivoted at **54** on the opposite side of disc **53**, and to the for-

ward end 58 of the upper rack, is a rocker arm 59, having a slight curvature.

The same floating fulcrum principle just described structurally, is utilized for the transmission of movement to the back-frame C. Curved link arms 60 are pivoted at their outer terminals to arm rests 33, 34—as at 61, and fixed at their inner terminals to the floating fulcrum disc or plate 62, at 63, while arm 64 is pivoted eccentrically at 65, and also at 66; and rocker arm 67 is pivoted concentrically on the opposite side of said disc at 68 and to the rear end of the lower rack at 69. An additional feature resides in beveling the outer edge 70 of arm 64 for a purpose to be presently explained.

In the illustration shown by dotted lines in Fig. 2, the chair is in, what will be styled, its normal position, with the leg-rest B and its cushion 71 suspended vertically below the plane of seat A—pintles 27, 28 are at the inner ends of slots 25, 26, the inner edge of cushion 71 abuts the under protruding margin of seat cushion 22, thereby presenting a flush joint of the two cushions. Simultaneously, arm 52 and link 55 parallel each other vertically, and rocker arm 59 lies in a plane proximate the seat-frame—in fact, the leg-rest frame, its cushion, the floating fulcrum and connecting arms and links are all compactly nested below the forward portion of the seat-frame. Also back C is disposed rearwardly slightly off from the perpendicular and the floating fulcrum 62 and its connections positioned as exhibited in Fig. 3.

As handle 50 is turned forwardly, pinions 48, 49 impel upper racks 38 to advance and lower racks 39 to recede to points adjacent the limits of their rectilinear travel. Coincident with the movement of the racks, rocker arms 59 are constrained forwardly clockwise and with disc 53 as a floating fulcrum arm 52 and link 55 are unfolded and swung outwardly and upwardly so as to shift the leg-rest frame and cushion 71 to the horizontal position depicted in full lines of Fig. 2. In this last mentioned position, pintles 27, 28 obviously move forwardly to the opposite ends of slots 25, 26, and the upper surface of cushion 71 registers to a nicety with the corresponding surface of the seat cushion. Concurrently, back C, through a counterclockwise movement of links 60, arms 64 and rocker arms 67 about floating fulcrum 62, is oscillated in a retrograde direction.

Another important characteristic of the invention is the manner in which the arms and links of the two sets of floating fulcrums are held fast when in their extreme positions. With respect to the leg-rest, for example, supports are provided at three distinct points 54, 57 and 58, which together delineate a triangle, and, moreover, the inner edge of arm 52 and the confronting edge of link 55 meet to form a joint unbreakable in one direction, as seen in Fig. 4. Similarly, in connection with the back, a three point support 66, 68 and 69, in conjunction with the beveled edge 70 of arm 64, which impinges against the lower edge of arm 60, serves to lock the back against accidental rearward displacement.

To clarify the description of the invention, reference has been made herein generally to the extreme movements of the leg-rest and back, but it will be understood that these parts of the chair may be adjusted in any desired intermediate positions according to the dictates of the occupant. And in any of these mean adjustments the mechanism specifically described in the paragraph immediately preceding sustains the leg-rest and back, when once set, against further movement.

In its broader aspects, the invention comprises not only the various means described, but equivalent means for performing the recited functions. For example, while the major portion of the chair is shown as being constructed of tubular metal, other materials may be employed; while the primary operating pinion is on the right side, and the follower pinion on the left side of the seat-frame, their positions may be reversed, in fact, it is readily conceivable, although not illustrated, that a single pinion co-operating with a pair of racks, would produce eminently satisfactory results; that the operating pinion may be actuated by a motor or other similar means; that hydraulic pistons may be employed in lieu of the racks; that the chair structure may be equipped with suitable upholstery or supplied to users or the trade without upholstery; and that the chair may be adapted to aeroplanes, omnibusses, boats, and diverse other purposes. It is desired to reserve the right to effect such changes and modifications as may come fairly within the scope of the appended claims.

I claim:

1. An adjustable chair comprising in combination, a rigid seat-frame, including supporting members therefor, a leg-rest frame, a back-frame, both of said latter frames being pivoted to the seat-frame, a pair of racks movably mounted on said seat-frame, a pinion mounted on the seat frame meshing with said racks for moving the same in opposite directions, connections between the leg-rest frame and back-frame and said racks, and means whereby upon actuation of the pinion the leg-rest frame and back-frame will be oscillated with respect to the seat-frame.

2. An adjustable chair comprising in combination, a rigid seat-frame including supporting members therefor, a leg-rest frame, a back-frame, both of said latter frames being pivoted to the seat-frame, a pair of racks movably mounted on said seat-frame, a pinion mounted on the seat frame meshing with said racks for moving the same in opposite directions, jointed link connections between the leg-rest frame and back-frame and said racks, and means whereby upon actuation of the pinion the leg-rest frame and back-frame will be oscillated with respect to the seat-frame.

3. An adjustable chair comprising in combination, a rigid seat-frame including supporting members therefor, a leg-rest frame, a back-frame, both of said latter frames being pivoted to the seat-frame, a pair of racks carried by each side of said seat-frame, movably mounted on said seat frame, a pinion mounted on the seat frame meshing with each pair of racks for moving the same in opposite directions, connections between the leg-rest frame and back-frame and each of said racks, and means whereby upon actuation of one pinion the leg-rest frame and back-frame will be oscillated with respect to the seat-frame.

4. An adjustable chair comprising in combination, a rigid seat-frame including supporting members therefor, a leg-rest frame, a back-frame, both of said latter frames being pivoted to the seat-frame, a pair of racks carried by each side of said seat-frame and movably mounted on said seat frame, a torque shaft with a pinion on each end mounted on the seat frame, one of said pinions being the primary mover pinion and the other being a follower pinion, and

each pinion meshing with one pair of racks, connections between the leg-rest frame and back-frame and each of said racks, and means whereby upon actuation of the primary pinion the leg-rest frame and back-frame will be oscillated with respect to the seat-frame.

5. An adjustable chair comprising in combination, a rigid seat frame including supporting members therefor, a leg-rest frame, a back frame, both of said latter frames being pivoted to the seat frame, connections between the leg-rest frame and the back frame with the seat frame involving a pair of plates, one positioned between the seat frame and the leg-rest frame, the other positioned between the seat frame and the back frame, an arm pivoted to said leg-rest frame and to one side of said first mentioned plate, a link pivoted to one of said supporting members and fixedly connected to the same side of the last mentioned plate as said arm, a rocker arm pivoted to the other side of the same plate, a link pivoted to said back frame and fixedly connected to one side of the second mentioned plate, an arm pivoted to one of said seat frame members and to the same side of the last mentioned plate as said link, a rocker arm pivoted to the opposite side of said plate, and means connectible with the rocker arms for simultaneously oscillating said back frame and leg-rest frame.

6. An adjustable chair comprising in combination, a rigid seat frame, including supporting members therefor, a leg-rest frame, a back frame, both of said latter frames being pivoted to the seat frame, connections between the leg-rest frame and the back frame with the seat frame involving a pair of plates, one positioned between the seat frame and the leg-rest frame, the other positioned between the seat frame and the back frame, an arm pivoted to said leg-rest frame and to one side of said first mentioned plate, a link pivoted to one of said supporting members and fixedly connected to the same side of the last mentioned plate as said arm, the inner edge of said arm and the confronting edge of said link adapted to meet to form a joint unbreakable in one direction when said link and arm are in one of their extreme positions, a rocker arm pivoted to the other side of the same plate, a link pivoted to said back frame and fixedly connected to one side of the second mentioned plate, an arm having one edge bevelled pivoted to the seat frame and to the same side of the last mentioned plate as said link, the beveled edge of said arm impinging against the lower edge of said link when said arm and link are in one of their extreme positions, a rocker arm pivoted to the opposite side of the same plate, and means connectible with said rocker arms for locking said back and leg-rest frame against accidental rearward displacement.

7. An adjustable chair comprising in combination, a rigid seat frame including supporting members therefor, a leg-rest frame, a back frame, both of said latter frames being pivoted to the seat frame, connections between the leg-rest frame and the back frame with the seat frame involving a pair of plates, one positioned between the seat frame and the leg-rest frame, the other positioned between the seat frame and the back frame, an arm pivoted to said leg-rest frame and to said first mentioned plate, a link pivoted to one of said supporting members, and fixedly connected to the same plate, a rocker arm pivoted to the same plate, a link pivoted to said back frame and fixedly connected to the second mentioned plate, an arm pivoted to said seat frame and to the same plate, a rocker arm pivoted to said second plate, the pivot points of the arm and rocker arm with respect to said first mentioned plate being eccentric, the pivot point of the arm relative to the second mentioned plate being eccentric, while the pivot point of the rocker arm relative to the second mentioned plate is concentric, and means connectible with said rocker arms for simultaneously oscillating said back frame and leg-rest frame.

8. An adjustable chair comprising in combination, a rigid seat frame, including supporting members therefor, a leg rest frame, a back frame, both of said latter frames being pivoted to the seat frame, linkage connections comprising a pair of fulcrums, one disposed between the seat frame and the leg rest frame, the other positioned between the seat frame and the back frame, an arm pivoted to the leg rest frame, a link pivoted to the front support of the seat frame, and a rocker arm, said arm, link, and rocker arm elements being pivotally connected at one end to a common pivot, a link pivoted to the back frame, an arm pivoted to the seat frame, and a rocker arm, said arm, link, and rocker arm elements being pivotally connected at one end to a common element, and means engageable with the rocker arms and operable from the seat frame for simultaneously oscillating the leg rest frame and the back frame.

9. In an adjustable chair in combination, a rigid seat frame, including supporting members therefor and having forwardly extending brackets with slots therein and a cushion mounted on said frame extending to the outer terminal of said brackets, a leg rest frame provided with a cushion, having pintles carried by its inner terminals, registering with said slots, connections between the seat frame and leg rest frame and means for operating said connections to cause said leg rest frame and cushion to move from its normal depending position in advance of said supporting members and beneath the cushion of said seat frame with said pintles at the inner ends of the slots, outwardly and upwardly to a position substantially level with said seat frame and its cushion, with said pintles at the outer ends of said slots.

10. An adjustable chair comprising in combination, a rigid seat frame including supporting members therefor, a leg rest frame, a back frame, both of said latter frames being pivoted to the seat frame, linkage connections comprising two pair of floating fulcrums, one pair disposed between the seat frame and the leg rest frame, the other pair positioned between the seat frame and the back frame, a pair of arms pivoted to the leg rest frame, a pair of links pivoted to the front supports of the seat frame, and a pair of rocker arms, said arm, link, and rocker arm elements being pivotally connected at one end to common pivots, a pair of links pivoted to the back frame, a pair of arms pivoted to the seat frame, and a pair of rocker arms, said arm, link, and rocker arm elements being pivoted at one end to common elements, means associated with the rocker arms for oscillating the leg rest frame and the back frame, and means for locking said links against displacement when one of the last mentioned frames has been moved to its extreme position.

11. In an adjustable chair, a rigid seat frame, including supporting members therefor, a leg

rest frame, a back frame, both of said latter frames being pivoted to the seat frame, a pair of reciprocating members movably mounted on said seat frame, means to impell the same simultaneously in opposite directions, and connections between the leg rest frame and back frame and said members whereby upon movement of the said members the leg rest frame and back frame will be simultaneously oscillated with respect to the seat frame.

LAWRENCE POTTER.