ABSTRACT

A retractable footrest for reclining chairs supported upon a pair of parallel rails movable endwise on the chair, forward to extend the footrest and backward to retract. The rails are tubular to house the operating link that rotates the footrest on the rail ends to present its supporting surface upwardly, and are supported from the seat and guided by a forward fulcrum roller and a guide track which confines and directs a roller on the rear end of the rail. Extension and retraction of the rails is by a drive linkage that magnifies a limited rotation to produce a large linear movement.

14 Claims, 11 Drawing Figures
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RETRACTABLE FOOTREST MECHANISM

Our invention relates to an extensible and retractable footrest for reclining chairs, and more particularly to mechanism for supporting a footrest on a chair body for movement from a stowed position, where it may serve as the front board of the chair, to an extended forward position for supporting the outstretched legs of the occupant above the floor.

The footrests commonly used in reclining chairs, and in combination so-called “rocker-recliners,” quite commonly employ scissors, or “lazy tong,” linkages to provide the considerable extension that is required to support the footrest sufficiently forwardly of the chair to perform its function. This has been particularly true as styling demands have required that the body of the chair be elevated somewhat above the floor, thus limiting not only the height of the front board, which in turn becomes the supporting surface of the footrest, but also limiting the amount of available space in which to stow the operating mechanism beneath the chair seat.

Lazy tongs or scissors linkages, while adequate for the purpose, have certain disadvantages which are overcome in the present invention. The multiplicity of operating pivot joints in a lazy tong linkage are multiple points for wear, and, in time, after much usage, the footrest supported on such a linkage becomes loose and “floppy” when extended, and when stowed does not properly reassume its tightly retracted position at the front of the chair.

Furthermore, such linkages usually have little lateral strength or stability and are subject to damage from sideward thrust when the footrest is extended. Moreover, any scissors linkage is capable of cutting off a finger, particularly when it is retracted quickly, as is customary, by drawing in the footrest from its extended position with the occupant’s heels.

The difficulties encountered with extension mechanisms of the above-described type are obviated in the footrest extension mechanism of the present invention, in which the footrest is supported upon a pair of rails which are extended and retracted in an essentially endwise movement by a suitable driving mechanism. The rails are formed to house a linkage for adjusting the angularity of the front board-footrest frame the same is extended, and the support for the rails is further adjusted to change the effective angularity of the footrest further as the chair is reclin ed.

The invention is described in detail in the accompanying specification in conjunction with the accompanying drawings in which:

FIG. 1 is a somewhat fanciful isometric illustration of a rocker-recliner equipped with our footrest, showing the clean lines of its simple rail supports and also showing diagrammatically how the load on the extended footrest is borne in the chair;

FIG. 1 A is a sideview of the footrest and the outer end of the near extension rail, showing their stowed relationship in full line and their relationship when extended by broken line;

FIG. 2 is a side elevation of our footrest extension mechanism as applied to a rocker-recliner chair;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2 to better illustrate the track by which the movement of the back end of each extension rail is supported during its movement forwardly and rearwardly of the chair;

FIG. 4 is a section on the line 4—4 of FIG. 2, depicting the mounting of one of the driving links of the extension mechanism, which when fitted for handle operation becomes the driving lever for the extension of the footrest;

FIG. 5 is a section taken on the line 5—5 of FIG. 2 to better illustrate the mounting of the front one of the two driving links, its attachment to, and the support of, the cross-shaft which extends to similar linkage on the opposite side of the chair to unify the forward and rearward movement of the extension mechanism;

FIG. 6 is a section taken on the line 6—6 of FIG. 2 to illustrate in more detail the front support for each extension rail; and

FIGS. 7, 8, 9 and 10 are diagrammatic illustrations of the linkage of FIG. 2 shown respectively in the fully retracted position of the footrest for orientation with the detailed showing of FIG. 2, and, thereafter, in an intermediate position, in fully extended position, and, lastly, in a further adjusted position of even greater angularity to the seat occasioned both by the elevation of the front of the seat and the lowering of the front support of the extension rails conjointly with the reclining of the chair.

By way of summary at the outset, the footrest extension and support mechanism of the invention comprises a pair of spaced parallel rails or beams 10 which are supported from the underside of the seat of a reclining chair, and are driven from the fully retracted position to full extension by linkage which is likewise suspended from the seat of the chair. The footrest 12 itself, which serves as the front panel of the chair when retracted, is pivotally mounted on the front ends of the rails 10, which are preferably tubular not only for greater beam strength but also for purpose of housing and concealing an adjusting link 14 by means of which the angularity of the footrest 12 is adjusted coincident with its extension to its functional position forwardly of the chair seat.

The pair of supporting rails 10, one on each side of the chair, are driven by identical operating linkages 16 only one of which is specifically illustrated in FIG. 2, but whose counterpart will be understood to be its mirror image. The two linkages 16 are connected together for movement in unison by a cross-shaft 18 which extends transversely of the chair, is supported for rotation in the seat bracket hardware 20 and to which one member of the linkage 16 at either side of the chair is attached as an arm. In FIG. 2, the cross-shaft 18 is illustrated as connecting the pair of forward drive links 22 at opposite sides of the chair so as not to present an obstacle to resilient deflection of the seat cushion by the occupant’s weight.

As indicated by FIG. 2, and also by the diagrammatic illustrations 7 to 10 inclusive, the invention is illustrated in connection with a linkage 16 which is extended to the forward position by a hand lever 24, i.e., by action independent of a relative motion of other parts of the chair. As is well understood in this art, however, the footrest 12 could also be extended as an incident to movement of the seat relative to any of the other chair parts as, for example, relative to the rocker portion of a “rocker-recliner” to achieve footrest extension in the more or less upright sitting position referred to as the “TV” position illustrated in FIG. 1. In another setting, it could be extended by reclining motion of the back of the chair relative to the seat. In such
instances, driving force or torque could be applied to activate the extension and retracting linkage at any convenient point, such as, for example, to another arm (not shown) connected to the cross shaft 18.

Referring now to FIGS. 2 to 6 of the drawings for a more detailed description of our footrest extension mechanism 16, the same, as previously noted, is suspended from a bracket 20 affixed to the underside of the cushioned chair seat. In the present case, the bracket 20 is also that which supports the seat for relative movement with respect to the rocker element 26 of a rocker base 28 as indicated in FIG. 1, being supported thereon by means of suitable linkage 30 such, for example, as that disclosed in our co-pending application Ser. No. 374,355 filed June 28, 1973 to which reference may be made for more detailed illustration. We wish it to be understood, however, that our footrest extension mechanism 16 is not confined in its application to only that seat support mechanism 30 shown here in part and in detail in our above-mentioned co-pending application, but may be utilized with any reclining chair mechanism that offers either the possibility of hand-lever operation of the linkage 16, or operation thereof by movement of the seat or back relative to another portion of the chair.

To avoid obscuring the footrest extension linkage 16, we show only a portion of the actual seat-support mechanism 30 of our co-pending application, in particular, the forward support link 32 pivoted at its upper end to seat bracket 20 and at its lower end to a base bracket 34 of angle iron secured by screws 36, as indicated, to the rocker element 26 of the rocking base. It is contemplated, in any event, that, utilizing the aforesaid seat-support mechanism 30, the reclining motion of the back of the chair is accompanied by a forward motion of the chair seat relative to the rocker element 26, and, as will be appreciated from the inclination of the front seat support link 32, by a rather fast rising of the front of the chair seat. This may be seen by comparing FIGS. 9 and 10. Neither the forward nor the upward movement of the seat bracket 20 is necessary to the operation of the linkage 16 insofar as the extension of the footrest 12 to its forward supporting position is concerned. However, we prefer to provide a further adjustment of the attitude of the footrest relative to the seat as the back is reclined, and, inasmuch as the back and seat move conjointly during the recline of the back, we conveniently make that final further adjustment of the footrest 12 by utilizing the rotation of the main support link 32 for the seat.

Referring still to FIGS. 2 to 6 inclusive for the details of the construction, it may be noted that the footrest 12 is secured to a mounting bracket 38 pivoted at the front end of the rail or beam 10 which is approximately coextensive in length with the front-to-rear dimension of the seat bracket 20. Each rail 10 is tubular, and rectangular of cross section, with its greater cross-sectional dimension upright. At its front end, the rail is supported on a roller 40 which in turn is supported by a pair of parallel links 42 suspended from the seat bracket 20. The position of the link-supported front roller 40 is determined by a link-rod 44 extending rearwardly and pivoted to the front support link 32 of the seat. As the seat support link 32 is rotated to elevate the seat bracket 20, the seat support link 32 rotates rearwardly of the seat bracket 20 and, through the control link-rod 44, draws the foot supporting roller 40 rearwardly, and slightly downwardly, with respect to the seat bracket 20.

At its rear end, each rail 10 is provided with an upwardly extending bracket 46 which supports a guide roller 48 positioned in a channel-shaped track 50 secured to, and facing outwardly from, the seat bracket 20. As the rail 10 is moved forward and back in the extension and retraction movement, the guide roller 48 remains confined in its track 50 and transfers to the seat bracket 20 the upward thrust occasioned by loads exerted generally downwardly on the footrest.

The linkage 16 for extending and retracting the rails 10 includes, at the forward end of the seat bracket 20, the drive link 22 which, as previously noted, is fixed as an arm to the cross shaft 18. Spaced rearwardly is yet another drive link 52, likewise pivoted to the seat bracket 20, and assuming an attitude approximately parallel with the forward drive link 22 when the mechanism is in the fully retracted position. The two links 22 and 52 are connected for movement in unison by an upper connecting link 54.

Secured to the rearward drive link 52 at its end remote from the seat bracket 20 is a rock lever 56, the forward end of which is pivoted to a lower restraining link 58 which extends rearwardly and is pivoted to the end of the front drive link 22 at its end remote from the cross shaft 18. The rear end of the rock lever 56 is pivoted to a short drag link 60, which in turn is pivoted to the rail 10 on a shoulder rivet 62 which also serves to stake the guide-roller bracket 46 to the back end of the rail 10.

In the illustrated case, the rear link 52 serves as the driver, having connected thereto an operating handle 24 accessible to the occupant of the chair on the outside of the arm thereof. For the sake of functional illustration, the handle is shown in FIG. 2 in broken outline as an extension across the center of rotation of the rearward drive link 52, and it will be understood that for such purpose, the hand lever 24, being on the outside of the chair arm, and the linkage mechanism 16 being concealed inwardly thereof, a suitable short shaft (not shown) is provided to connect the handle lever 24 and the drive link 52 along or close to their common axes of rotation, such detail being omitted in FIG. 1 for sake of clarity.

In any event, when the rearward drive link 52 moves rearwardly relative to the seat bracket 20, whether driven by the aforesaid handle lever 24 or otherwise, it rotates the forward drive link 22 through the upper connecting link 54 and simultaneously rotates the similar linkage on the opposite side of the chair through the cross shaft 18 to which the front drive links 22 of both linkages are secured.

As the two drive links 52 and 22 rotate forwardly and downwardly, the rock lever 56 mounted at the lower end of the rear drive link 52, guided by the lower restraining link 58, rotates forwardly (clockwise in FIG. 2) at an accelerated pace relative to the seat bracket 20, and through a path of movement such that its rearward end rises only slightly above the level shown in FIG. 2. The forward motion of the rock lever 56, being in turn transmitted to the extension rail 10 at its rearward end through the drag link 60, propels the footrest 12 forwardly from its stowed position, snugged to the front of the chair, to its extended position, ready to support the feet or legs of the occupant.
The footrest 12 proper, as earlier indicated, is pivotally mounted on the front end of the two extension rails 10 by means of an angle bracket 38 pivoted to each of said rails. It will be appreciated that to render the footrest usable, it must be rotated counterclockwise as viewed in FIG. 2 in order to present its upholstered surface at an appropriate angle to the occupant's legs. For this purpose, we have provided the operating link 14, preferably in the form of a rod which has a circular section and which is housed within the extension rail 10. The rod 14 is provided with a right angle bend 64 and 66 at each end. Extending toward the viewer in FIGS. 1 A and 2, the bend 64 is passed through a suitable hole in the footrest bracket 38, and the bend 66 at its rearward end, also extending toward the viewer, passes outwardly through a window 68 in the outer side wall of the tubular rail 10 and through a suitable pivot hole near the rearward end of the rock lever 56. Thus, as the extension rail 10 is propelled forwardly by the linkage 16, the rotation of the rock lever 56 causes movement of the concealed rod-link 14 rearwardly within and relative to the rail 10, drawing the footrest bracket 38 rearwardly, or counterclockwise as seen in FIG. 1, to appropriately adjust the angle of the front face of the footrest 12.

Note from FIG. 1 A that the forward end of the rail is also relieved at an angle to provide a stop and support for the bent end 64 of the link rod when the footrest is laid back in the extended position. This relieves the link rod 14 of any longitudinal compressive force from downward load on the footrest, and also assures that the extension linkage 16 is likewise free of load from the weight of the occupant's outstretched legs.

The motion of the rod link 14 at its rearward end is very nearly a straight-line motion and the window 68 in the side wall of the rail is therefore essentially a longitudinal extending slot which may be of dimension only slightly greater than the diameter of the rod link 14 to provide necessary clearance. As the forward movement proceeds, the rock lever 56 at the end of the rear drive link 52 rotates sufficiently that the rod-link pivot 66 moves across the pivot of the lever 56 to the drag link 60. The necessary clearance to accommodate this movement at full extension of the support rail 10 is provided by means of a notch 70 cut into the lower edge of the drag link 60.

Further detail of the above-described parts, as we have made them to accommodate the foregoing movements, are shown in FIG. 2, augmented by the several sectional views of FIGS. 3 to 6 inclusive.

The seat bracket 20 in its forward portion is an inverted channel, and in its rearward portion is angle-shaped in cross section, having only an inner vertical flange 72 of gradually increasing depth from front to rear. This is to provide a convenient point of attachment for the rearward portion of a seat-supporting mechanism illustrated in our aforementioned co-pending application Ser. No. 374,355 filed June 28, 1973, and having been noted for that purpose need not be mentioned further.

Secured to the vertical flange 72 of the seat bracket, and extending from its very rearward end forwardly well into the channel-shaped forward portion thereof as well, is the channel-shaped roller guide 50 the contacting surfaces of which are V-shaped to receive the beveled guide roller 48 at the back end of the extension rail 10. The roller 48 itself is journaled upon a shoulder rivet 74 at the upper end of the bracket 46 which encircles the extreme rearward end of the extension rail 10 (compare FIGS. 2 and 3). The bracket 46 is staked to the rear end of the rail by a pair of rivets, one of which, the shoulder rivet 62, provides the point of connection for the drag link 60 to the rail 10. The rail 10 itself is chipped at an angle to reduce its depth to provide clearance from the base member 28 on the rearward rocking motion of the chair. The roller guide 50 is preferably formed from light gauge steel and projection-welded to the inner vertical flange 72 of the seat bracket.

At the forward, channel-shaped end of the seat bracket 20 are mounted the double support links 42 which support the front fulcrum roller 40. As indicated in the sectional view of FIG. 6, the parallel links 42 extend into the inverted channel of the seat bracket, and are journaled on a pivot pin 76 and maintained thereon in spaced relation by an upper roller 78 which is of molded Nylor or the like. Clearance space is occupied by spacing washers 80, and the side of the journal pin opposite its head is secured by a self-locking push-on fastener 82 of the Tinnerman type. At the lower end of the parallel links 42, the roller 40, likewise of molded Nylor, is journaled on the front end 84 of the rod-shaped control link 44 which extends rearwardly to the seat support link 32. The control link is bent at each end at right angles to its shank and in opposite directions, the outer end 84 providing the journal for the fulcrum roller 40 extending toward the viewer in FIG. 2, and maintained in assembled relation with the parallel links 42 by means of a Cotter key. Its opposite end 86, (FIG. 6) which provides its pivotal connection to the seat support link 32, is bent away from the viewer, and similarly fastened in assembled relation with that link.

It will be noted from FIG. 6 that both rollers, the lower support or fulcrum roller 40 and the upper spacing roller 78 are flanged not only to maintain clearance between the extension rail 10 and the parallel front suspension links 42 for silent operation, but also to provide lateral stability to the extended footrest.

Moving rearwardly to the operating linkage 16 per se, it will be noted by comparison of FIGS. 2 and 5 that the coordinating cross shaft 18 is preferably square in cross section to facilitate the rigid mounting of the forward drive link 22 thereto. From FIG. 5, it will be noted that the cross shaft 18 passes through both flanges of the seat bracket 20, channel-shaped at that point, through an oversize clearance hole 88 in the inner flange, and snugly through a bushing 90, also of molded plastic, by means of which the cross shaft 18 is journaled in a suitably finished hole in the outer flange of the seat bracket 20. The bushing 90 is provided with a conforming square hole to receive the shaft 18, and also with an outer flange which serves to space the front drive link 22 from the seat bracket 20. To fix the front link 22 firmly to the shaft 18 as an arm, its upper end is formed as a channel and pierced to receive the shaft, with the flanges of the channel flanking the square shaft 18 on opposite sides. The flanges are suitably pierced, and the shaft end drilled, to receive a keying bolt or drive pin 94.

Moving further rearwardly to the rear drive link 52 and to a comparison of FIGS. 2 and 4, it will be noted that the rear drive link 52 is pivoted to the outer flange of the seat bracket 20 by means of a shoulder rivet 96, and is offset immediately outwardly to provide clear-
come for the end 66 of the link-rod 14 as the rear end of the rock lever 56 crosses under the drive link 52 and the upper connecting link 54 on the extension, and retraction movement. At its lower end, the drive link 52 is offset inwardly. The rock lever 56 is offset outwardly at the location of its pivotal connection to the rear drive link 52, so that the two mating offsets of the link 52 and lever 56 position the lever fairly close to the outer side wall of the extension rail 10 for convenient pivotal connection at 66 to the end of the link rod 14 that passes through the extension rail from back to front to vary the angle of the footrest. That connection is similarly maintained by a Cotter key or suitable substitute.

The operation of the extension linkage 16 will best be understood by examining the series of diagrammatic drawings, FIGS. 7 to 10, inclusive, in which the extension rail 10, the seat bracket 20, and the base bracket 34, are shown as they actually are, and the extension linkage 16 and the front link 32 of the seat-support linkage are represented as single lines along the axes of those members.

FIG. 7 depicts the footrest 12 and extension linkage 16 in the position of FIG. 2 to aid in orienting the simplified line drawing of FIG. 7 with its fully illustrated counterpart, FIG. 2. The footrest 12 and associated extension linkage 16 are shown installed in a chair of the rocker recliner type, which is indicated only in outline form to illustrate the location of the footrest mechanism of the invention with respect to the body of the chair of which it is a part.

As in FIG. 2, the simplified diagrammatic form of the linkage of FIGS. 7 to 10 is illustrated as being operated by the hand lever 24 to extend the footrest 12 and, for that matter, to retract it as well, although, as will be understood by those skilled in this art, the footrest may also be retracted to the stowed position if it is drawn rearwardly by the occupant’s heels, there being no locked toggle in the extension linkage 16 tending to resist retraction either by direct application of an inwardly directed horizontal force to the footrest, or by a torque applied thereto in a clockwise direction as seen in the drawings.

Also, as earlier mentioned, while we contemplate operation of the illustrated form by means of the operating hand lever 24 at the side of the chair, conventionally at the occupant’s right side, and for this purpose have attached the operating lever 24 to operate the rearward drive link 52, we also contemplate operation by other modes, for example, either a shifting of the seat forward or backward with respect to the chair arms and rocker base to a non-reclined intermediate or “TV” position, or operation in some instances by the reclining of the chair back. In such case, the extension linkage 16 might well be driven from a different point, for example, as also previously suggested, by the application of a driving torque to the cross-shaft 18 in any feasible way, such as a suitably positioned arm connected by means of an operating link to another portion of the chair with respect to which the seat is relatively movable.

In FIG. 7 the footrest is stowed, and thus serves as the front board or front panel of the chair, being shown in solid outline within the broken outline of the chair itself. The operating handle 24 extends diagnostically within the grasp of the occupant of the chair. In a rocker-recliner chair, chosen to illustrate the application of the invention, it will be understood that it is conventional to lock or block the rocker base as an incident to the extension of the leg rest. This may be achieved by a number of blocking mechanisms (not shown) which may for example, be folded legs extended for the purpose, or may be an improved selective rocker-recliner lock of our own development illustrated, described, and claimed in our co-pending application Ser. No. 374,356, filed June 28, 1973. However, inasmuch as the footrest extension mechanism here illustrated and claimed is equally usable in chairs of the non-rocking type, we have omitted illustration of the rocker blocking mechanism as not specifically relevant to the present invention.

FIG. 8 shows the footrest advanced to an intermediate position. It is not intended as a use position but merely to illustrate the movement of the respective parts of the linkage 16 in the travel of the footrest 12 from its stowed to its fully extended position.

FIG. 9 shows the footrest 12 fully extended and cocked to a comfortable leg supporting angle by the rearward draw of the retracting link rod 14 housed within the tubular extension rails 10. It should be noticed that the very substantial forward linear movement of the footrest on its extension rails is achieved through the multiplied throw of the rock lever 56 mounted at the lower end of the drive link 52, and rotated thereon by the lower restraining link 58. This multiplication results from the differential rotation of the two drive links 52 and 22, due in turn to the differences of the swing radii of the pivot points of the connecting link 54 with respect to the pivot axes of the two drive links, and also from the differential forward movement of the outer ends of the drive links 52 and 22 due to their unequal lengths. By this device, the rock lever 56 is rotated rapidly relative to the seat bracket 20, and to the extension rail 10, through an arc of approximately 150° in the course of the entire extension movement, whereas, for example, the forward drive link 22 rotates only through approximately 90°. In any event, the rock lever 56, notwithstanding the forward movement of its pivotal attachment to the drive link 52, moves rapidly forward to extend the footrest 12.

In reclining chairs having an intermediate so-called “TV” position, i.e., with leg rest extended but without appreciable recline of the back, and having as well as a range of positions of further recline, we have found that the angularity of the footrest comfortable and suitable in the so-called “TV” position is not necessarily comfortable in positions of further recline, as, for example, when the back of the chair is fully reclined for sleeping purposes. In such instance, as the legs or feet are supported high without commensurate elevation of the front of the seat, the supporting pressure of the footrest upon the legs tends to impair circulation of the blood to the lower legs and feet, resulting in the numbness commonly described as having one’s feet “go to sleep.”

To overcome that difficulty, we have made provision in our improved footrest mechanism for a further adjustment of the angularity of the footrest relative to the seat when the back of the chair is reclined. As will be evident from comparison of FIGS. 9 and 10, (the extension linkage 16 previously has been omitted from FIG. 10 for clarity) this further angular adjustment which increases the permissible knee flexure of the occupant is accomplished by the drawing the forward fulcrum rol-
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1. The forward location of the seat support link 32 and its movement relative to the seat upon the reclining of the back of the chair, make it a logical one for the retraction of the fulcrum roller 40 to drop the footrest 12 in FIG. 10 from the dotted line position to the solid line position. As will be readily understood, however, by those skilled in the art of recliner-chair linkages, a slight retraction or a lowering of the fulcrum roller 40 might also be readily achieved by a connection to any of several link members movable relative to the seat upon recline of the back.

By our improved footrest mechanism herein illustrated and described, we have achieved a very considerable extension movement of the footrest 12 without the use of exposed lazy-tong linkages, and, by so doing, we have eliminated not only the danger, instability, and wear problems associated with linkages of that kind, we have added to the stability of the footrest 12 and greatly improved the appearance of the chair by reducing the footrest support to a pair of attractive yet simple and strong functional rails or beams 10 in which the only operating link extending forward to the footrest proper is hidden from view as well as being removed as a source of danger to crawling children or household pets by being totally enclosed within the extension rails.

Not only is there no "scissors" relationship between any of the exposed portions of the mechanism, but, in further contrast to "scissors" footrest support linkages, the weight load on our footrest is carried by the rails 10, and not by the extension linkage 16, as a result of which our extension linkage members are greatly relieved of wear.

Moreover, the further adjustment of the angularity of the footrest 12 occasioned by the retraction of the forward fulcrum roller 40 upon the recline of the chair is a significant addition to the comfort of the occupant by providing better distribution of the weight of the legs between the seat and the footrest proper, in order to prevent impairment of circulation to the lower limbs during extended periods of occupancy while sleeping.

The features of the invention believed new and patentable are set forth in the following claims.

What is claimed is:

1. A footrest extension mechanism for a reclining chair comprising a footrest pivoted to the ends of a pair of parallel rails supported on the chair for essentially endwise movement forwardly and rearwardly of the chair for extending and retracting the footrest, drive means connected to said rails to cause said movement, and means connected to said footrest to alter the angularity of the footrest relative to said rails as an incident to said endwise movement between a retracted position with its supporting surface in the front plane of the chair and a forward position facing upwardly to support the occupant's legs, said angularity-altering means being operable as aforesaid by connection with a portion of the chair with respect to which said rails are moveable upon extension of the footrest to said forward position and being also thereby movable relative to said rails, said rails being shaped to provide protective masking of said angularity-altering means during movement thereof relative to said rails.

2. The mechanism of claim 1 wherein said rails are tubular and said angularity-altering means is a link enclosed within and movable longitudinally of at least one of said rails.

3. The mechanism of claim 1 wherein the downward load of the weight of the occupant's legs upon said footrest when extended is borne by said rails substantially independently of said drive means and said angularity-altering means.

4. The mechanism of claim 1 in accordance with claim 2 wherein said link means is connected to said drive means, and the downward load of the weight of the legs of the occupant upon said footrest when extended is borne by said rails substantially independently of said drive means and said link means, but wherein a torque applied to said extended footrest by flexure of the occupant's knees will operate said drive and link means in reverse and retract the footrest.

5. In a footrest extension mechanism for a reclining chair in which the footrest is supported on the ends of a pair of parallel rails supported for endwise movement forwardly and rearwardly of the chair for extending and retracting the footrest, the improvement which comprises a motion multiplying drive linkage for each of said rails for moving the same forwardly and rearwardly, said linkage including a drive link pivoted to the chair for movement of one of its ends forward and back relative to the chair, a rock lever pivoted medially thereof to said drive link and having one of its ends restrained relative to its medial pivot and having its length apportioned relative to said medial pivot to move its end opposite said restrained end forwardly and rearwardly of the chair at a faster rate than the rate of movement of said drive link, and means connecting said rock lever to its associated rail to propel the same upon movement of said drive link; means connecting said linkages for unison movement; and means for applying a driving effort to said drive link to rotate the same to extend said footrest.

6. The improvement of claim 5 wherein the footrest when retracted has its supporting surface in the front plane of the chair, wherein the support of the footrest upon said rails is a pivotal support and wherein said footrest is connected by link means to the rock lever of at least one of said drive linkages to rotate the footrest on its pivots to turn its supporting surface upwardly as the footrest is extended.

7. The improvement of claim 5 in accordance with claim 6, and wherein said rails are tubular and said link means connecting said footrest and rock lever is housed within the tubular rail.

8. The improvement of claim 5 wherein said linkage also includes a second drive link, a connecting link pivoted to both of said drive links to cause them to rotate in unison, and a restraining link pivoted to said second drive link and to said one end of said rock lever to restrain the same and thereby to multiply the throw of the end of said rock lever connected to propel said associated rail.

9. The improvement of claim 5 in accordance with claim 8 wherein both rails and both drive linkages are supported on the underside of the chair seat adjacent the sides thereof and the means connecting said linkages for unison movement is a cross shaft extending
11. A chair in accordance with claim 10 in which said bearing fulcrum at the front of the chair comprises a roller supporting an undersurface of each rail, and the footrest is lowered by shifting the roller axis by the relative movement of the chair parts in the reclining movement.

12. A chair in accordance with claim 11 wherein each rail is supported by its own fulcrum roller which in turn is supported on the chair by a shiftable link connected by yet another link to one of the chair parts movable relative to the swing axis of said shiftable roller-support link by the reclining movement of the chair.