

Aug. 26, 1958

F. F. SCHLIEPHACKE
LEG REST RECLINING SEATING UNITS
RETRACTABLE UNDER SEAT

2,849,052

Filed June 8, 1956

5 Sheets-Sheet 1

FIG. 1.

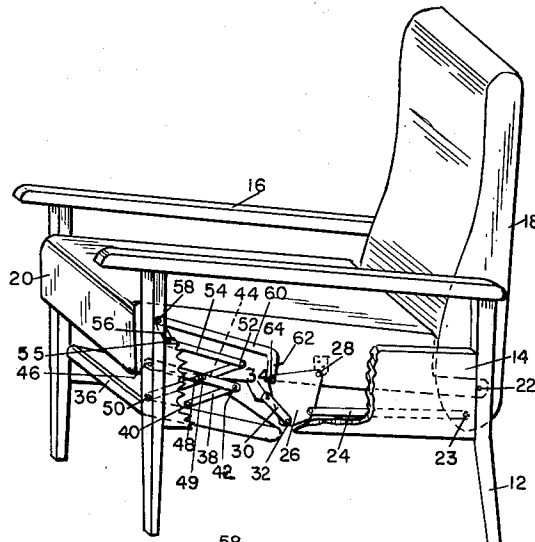


FIG. 2.

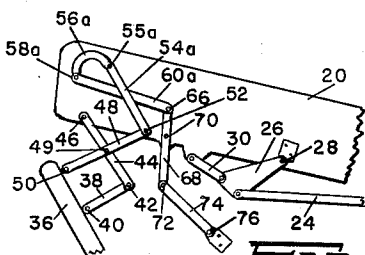
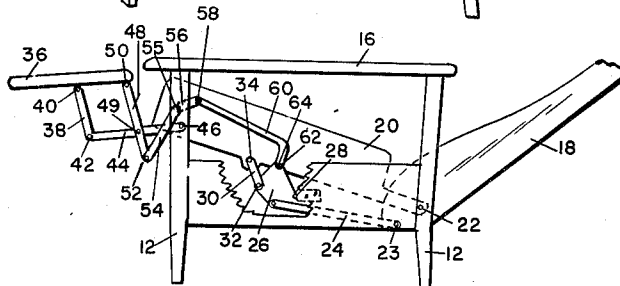


FIG. 4.

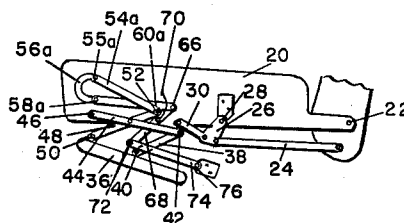


FIG. 3.

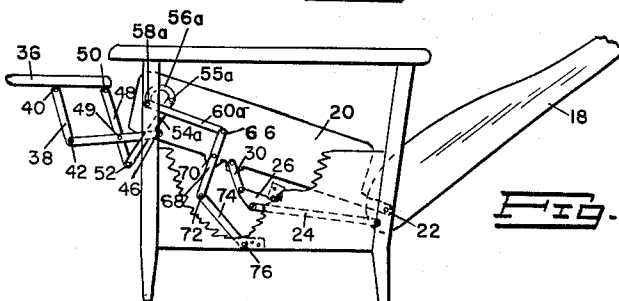


FIG. 5.

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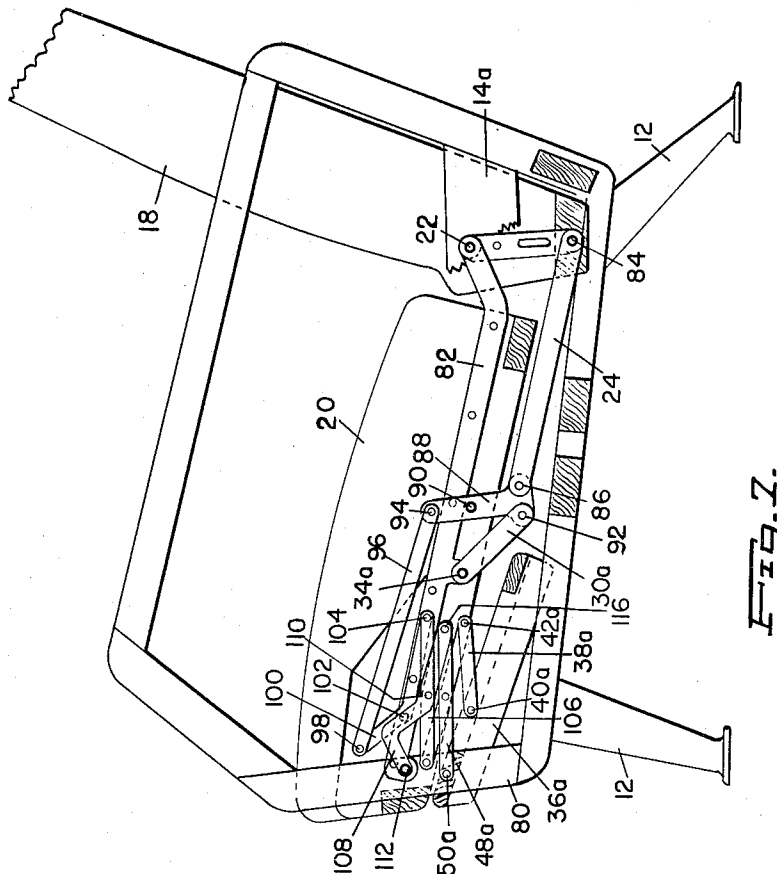


Fig. 7.

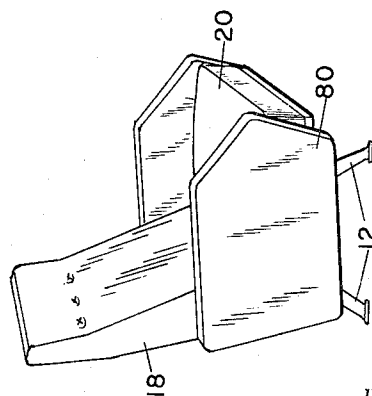


Fig. 6.

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5 Sheets-Sheet 3

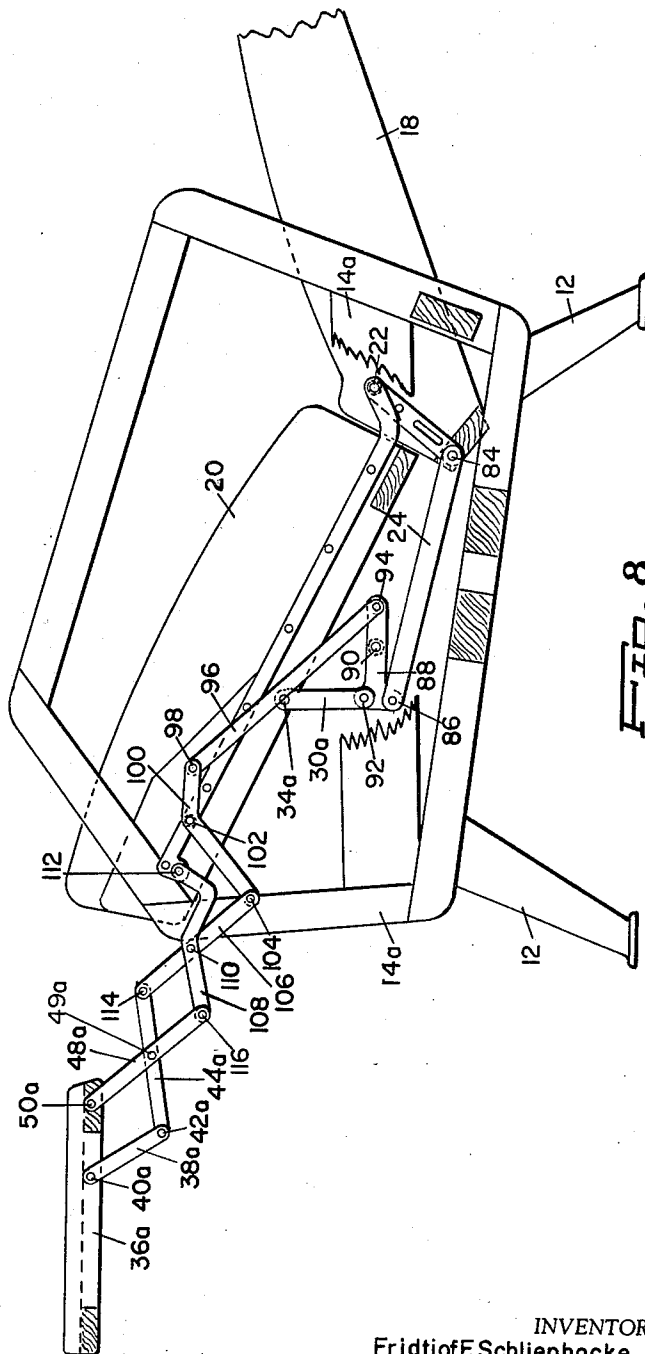


Fig. 8.

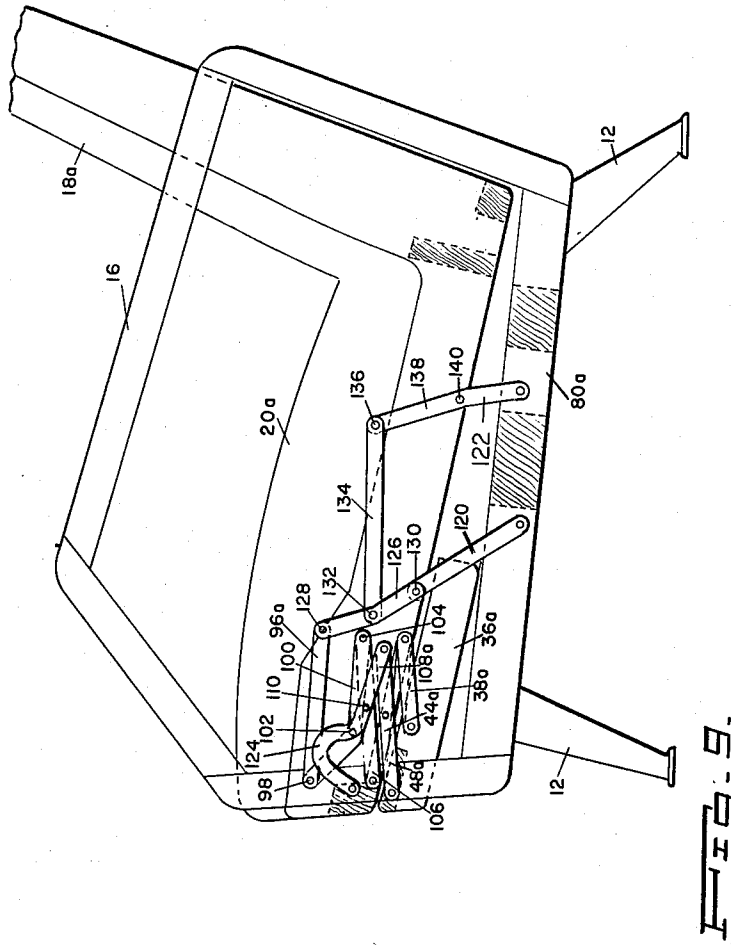
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2,849,052

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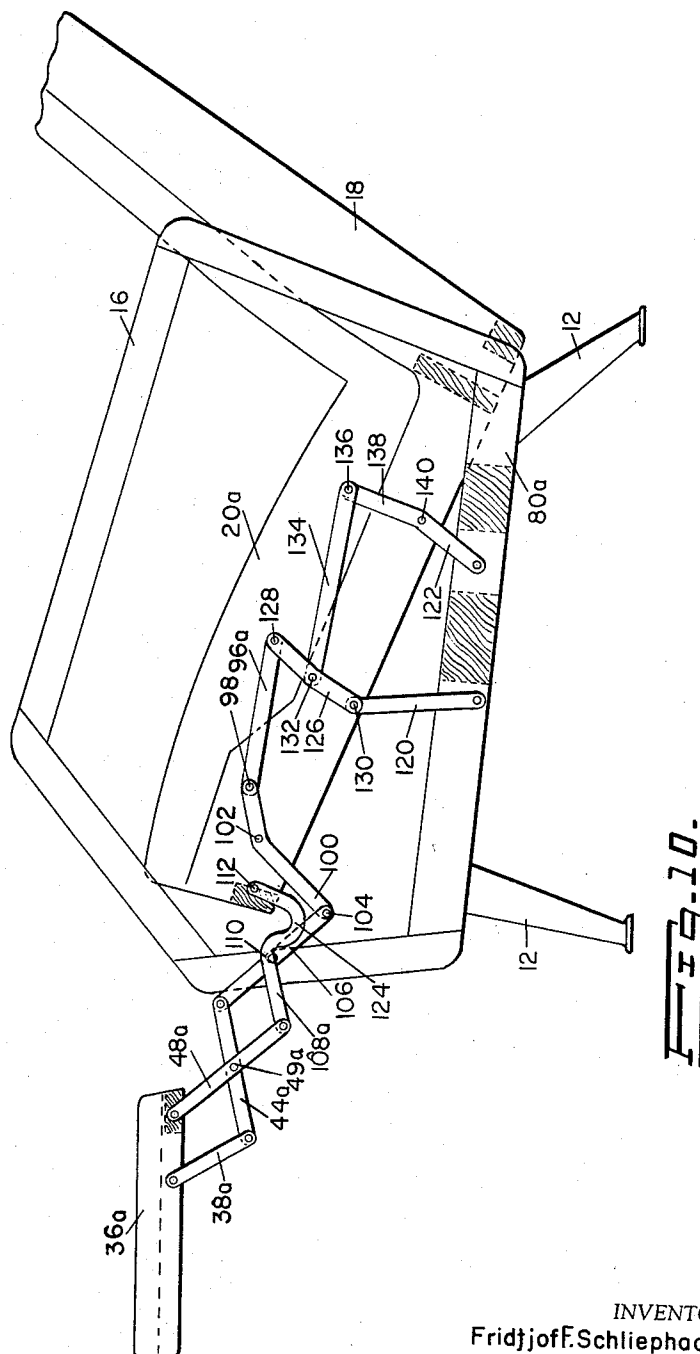


FIG. 10.

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LEG REST RECLINING SEATING UNITS RETRACTABLE UNDER SEAT

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Application June 8, 1956, Serial No. 590,284

7 Claims. (Cl. 155-106)

This invention relates to articles of furniture or seating units adjustable from a regular sitting position to a more or less reclining position. In particular it relates to such articles provided with a leg rest which occupies a retracted or inoperative position when the seating elements are in a position to support the body in an upright sitting posture and which is advanced and raised so as to support the legs when the seating elements are moved to a reclining position.

The seating elements comprise a back rest and a seat which may be mounted in a swingable manner upon a base resting on the floor. The back rest and seat may be separately pivoted to the base and so connected by linkage that when the back rest is tilted backward the seat will be tilted upward at its forward edge. In other instances the back rest and seat may be a rigid unit which tilts so as to incline the back rest and tilt the forward edge of the seat upward. In either case the leg rest portion is pivoted to the front part of the seat and linkage is provided which raises the leg rest portion when the back rest and seat tilt. Such linkage may be operated to raise the leg rest by means of a connection to the pivoted back rest or the linkage may be connected to the tilting seat and to the fixed base so that tilting of the seat provides power for raising the leg rest. The latter construction is also applicable to the unit construction of the back rest and seat.

In previous constructions involving a leg rest and linkage for raising it, the links and levers used have extended a considerable distance below the seat level, frequently almost to the floor, and have necessitated the use of a stationary base closed in all the way to the floor so as to conceal the linkage. It is an object of the present invention to provide a leg rest operating linkage which is located as close to the seat level and as far above the floor as possible so as to enable the article of furniture to be built with an open base. This permits the article to present the appearance of an ordinary article of furniture supported upon legs and open underneath so as to provide a stylish and airy appearance.

It is a particular object of the present invention to provide a leg rest which when the chair is in upright sitting position is completely retracted and folded upon the seat where it is substantially hidden from view and in which the leg rest carrying linkage is folded up along the sides of the seat so that no part of it projects below the surface of the leg rest when retracted. The mechanism is essentially concealed by the side members of the chair frame so that a clean-looking construction is presented which has the appearance of an ordinary chair. At the same time when the occupant leans back in the chair so as to move the back rest toward a reclining position the leg rest is automatically brought out from under the seat and projected forward and upward into a proper leg supporting position.

In the accompanying drawings certain preferred embodiments of the invention are shown for purposes of illustrating the principles thereof.

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Fig. 1 is a perspective view of a chair embodying one form of the invention. In this as in subsequent views a part of the side frame of the chair is shown broken away.

Fig. 2 is a side elevation of the chair shown in Fig. 1 in reclining position.

Fig. 3 is a side elevation of the chair seat and part of the back rest showing a modified form of linkage for carrying the leg rest, the leg rest being shown in fully retracted position.

Fig. 4 is a view similar to Fig. 3 showing intermediate position of the seat and leg rest.

Fig. 5 is a side elevation of the chair of Figs. 3 and 4 showing the chair in reclining position, and the leg rest fully projected.

Fig. 6 is a perspective view of another form of chair embodying the invention.

Fig. 7 is a side elevation of the chair shown in Figure 6 with one of the side frames or panels removed so as to show the mechanism, the parts being shown in the upright sitting position of the chair.

Fig. 8 is a view similar to Figure 7 showing the chair in the reclining position with the leg rest extended.

Figs. 9 and 10 are side elevations of a modified form of the invention with side panel removed, showing upright and reclining positions respectively.

Referring to the drawings in detail and particularly to Figs. 1 and 2, the chair comprises a stationary frame of any suitable form. As shown this comprises legs 12 connected by side frames 14 and arms 16. The chair is provided with a back rest 18 and a seat 20 pivoted to swing about a common axis 22. Obviously the seat and back rest may be mounted on separate pivotal axes if found more convenient. Suitable means are provided for connecting the back rest and seat in such manner that when the back rest is swung backward the seat will be tilted upward at its front edge so as to place the occupant in a comfortable posture. In the example illustrated the back rest is pivoted at points below the pivotal axis 22 to drive links 24 which are connected to guide plates 26 pivoted at 28 to brackets on the frame members 14. The guide plates 26 have guide links 30 pivoted to them at points 32, the upper ends of the guide links being pivoted at 34 to the seat. It will be understood that this linkage is preferably duplicated at each side of the chair.

The leg rest 36 has links 38 pivoted to brackets on its bottom at points 40 which are between the front and rear edges of the leg rest. Links 38 are pivoted at 42 to guide links 44 which are pivoted at 46 to the seat 20. Second leg rest carrying links 48 are pivoted to the under side of the leg rest at 50 and where said links cross links 44 they are pivoted to links 44 at the points 49. Links 48 are also pivoted at their free ends at the points 52 to the levers 54. Levers 54 are pivoted at points 55 to the seat 20 and short arms 56 are pivoted at 58 to bent links 60 having angular offset arms 62 which are pivoted at 64 to the guide plates 26. When the chair is in an upright position as shown in Fig. 1 the linkage inverts the leg rest and moves it to a concealed position under the chair seat and between the side frames of the chair. When the chair is moved to a reclining position as shown in Fig. 2 then the movement of the plates 26 shifts the links 60 which pull on the levers 54 and expand the lazy tongs formed by the links 38, 48, 44 and the leg rest 36 so as to project this lazy tongs arrangement and at the same time rotate it through nearly 180° around the pivots 46 on the chair seat. This brings the top of the leg rest 36 into a position to receive the legs at a level with the raised front edge of the seat and spaced some distance forward thereof.

Figs. 3, 4 and 5 show a modified form of the invention in which the linkage operating the leg rest is not

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connected with the linkage connecting the back rest and seat. It is therefore applicable to any construction involving the tilting seat irrespective of how the back rest is mounted. In this construction the back rest 18 and seat 20 are pivoted to the fixed chair frame at points 22 for example. The leg rest 36 is pivoted at 40 to the links 38 which are pivoted at 42 to the links 44 pivoted at 46 to the seat 20. Also pivoted to the leg rest at points 50 are links 48 which are pivoted at 49 to the links 44. All this is similar to the construction described in Figs. 1 and 2. The links 48 are pivoted at 22 to levers 54a which are pivoted at 55a to the seat 20 and have curved extensions 56a. The other ends of these extensions are pivoted at 58a to the links 60a which are not bent links as are the links 60 in Figs. 1 and 2. The links 60a are pivoted at 66 to levers 68 pivoted at 70 to the chair seat. The other ends of the levers 68 are connected at 72 to links or guide members 74 which are pivoted to the fixed frame of the chair at 76. When the chair seat is in its lowest position as shown in Fig. 3 the leg rest 36 is completely retracted under the seat as in the form of the invention shown in Figs. 1 and 2. When this seat is moved into a tilted position as shown in Fig. 4 the movement of the pivot points 70 away from the anchor points 76 on the chair frame partly straighten out the levers 68 as related to the links 74 swinging the levers about the pivots 70 and thereby pushing on the links 60a. This rotates the levers 54a which spreads the lazy tongs formed by the links 38, 44, 48 and the leg rest 36, turning the leg rest over, raising it and projecting it forward as shown in Fig. 5.

In Figures 6, 7 and 8 another modification of the invention is shown which is characterized by the fact that the leg rest supporting linkage is what may be termed a compound lazy tongs, embodying a duplicate set of crossed levers. This gives a substantial projection of the leg rest without necessitating the use of levers of excessive length. This permits the leg rest and linkage to be retracted and folded under the chair seat in a very compact manner so that it is completely concealed and the chair given a very trim appearance as shown in Figure 6. The chair comprises a base or stationary frame 80 mounted on legs 12, the base including side frame members 14a to which various parts are pivoted as in previous modifications. 18 is the back rest which is pivoted to members 14a at points 22. 20 is the seat to which are attached hinge irons 82 which are pivoted to the frame members at 22. A portion of the back rest extends below the pivot points 22 and pivoted to such extension of the back rest at points 84 are drive links 24 which are pivoted at their front ends at points 86 to guide plates or levers 88. The latter are pivoted at points 90 to the frame members 14a. The plates 88 are pivoted at 92 to links 30a which are pivoted at points 34a to the chair seat. The plates 88 have third pivot points 94 thereon so that the three pivot points on the plate, namely, 86, 92 and 94 constitute the apices of a triangle which is pivoted to the frame at an intermediate point thereof 90. Pivoted to the points 94 are drive links 96 which are pivoted at 98 to bent levers 100. The latter are pivoted between their ends to the seat at points 102. The other ends of the levers 100 are pivoted at points 104 to one pair of the links or levers 106 constituting members of the inner set of lazy tongs. The other members of this inner set of lazy tongs comprise the bent links or levers 108 which are pivoted to levers 106 at points 110. The inner angularly bent ends of the levers 108 are pivoted at 112 to the seat. The leg rest 36a is pivoted at 40a to links 38a which are pivoted at 42a to links or levers 44a constituting one pair of the members of the outer set of lazy tongs. The inner ends of 44a are pivoted at 114 to the outer ends of links 106. The other members of the outer set of lazy tongs comprise links or levers 48a which are pivoted at 50a to the leg rest 36a near the inner margin thereof. At their inner ends

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the links 48a are pivoted at 116 to the outer ends of links 108, and where they cross the links 44a they are pivoted thereto at 49a. When the chair is in a reclining position as shown in Fig. 8 the lazy tongs are extended and the leg rest is projected into a position to support the legs of the reclining occupant. When the occupant of the chair sits up and presses down on the forward part of the seat, causing the back rest to straighten up, the two sets of lazy tongs fold up and, at the same time, together with the leg rest, are inverted under the chair seat so that the parts assume the compact arrangement shown in Fig. 7. It will be seen that no part of the linkage is exposed and that the leg rest is fitted closely under the chair seat between side frames of the chair thus presenting the finished appearance illustrated in Fig. 6. Of course, the style of the chair may be varied to suit the ideas of the furniture designer.

Figures 9 and 10 show another modification of the invention as applied to a chair in which the seat and back rest are formed as a unit which is mounted for tilting movement upon the base. In this construction the chair base is marked 80a and the seating unit comprises a backrest 18a which is formed as a unit with the seat 20a. The seat is mounted on the base in any suitable manner to permit it to be tilted into a more or less reclining position. As shown the seat is mounted on front guide links or members 120 and rear guide links or members 122, this construction permitting the rearward tilting of the seating unit in a well understood manner. The leg rest 36a is mounted on compound lazy tongs comprising the links 38a and 48a and 44a, the last two of which are pivoted where they cross each other at 49a, all as shown in Figures 7 and 8. There is an inner pair of lazy tongs links 106 and 108a which are pivoted where they cross at 110. The links 108a are similar to the links 108 shown in Fig. 8, except that they have differently curved goose-neck ends 124. These links are shaped in such manner as to clear the front edge of the seat when the leg rest is extended. The links 108a are pivoted to the seat at points 112. The inner ends of links 106 are pivoted at 104 to bent levers 100 which are pivoted to the seat at points 102. A somewhat different linkage is used to operate the levers 100 from that disclosed in Figs. 7 and 8. In Figures 9 and 10 the ends of levers 100 are pivoted at 98 to links 96a which are pivoted to levers 126 at points 128. The lower ends of the levers are pivoted to the guide member 120 at points 130. The levers 126 are pivoted at points 132 to drive or transmission links 134 which are pivoted at points 136 to extension arms 138 of the links 122, such arms extending above the points 140 where the links 122 are pivoted to the seat. On tilting of the seating unit backward it will be seen that links 122 and their extensions 138 are moved backward which will pull on links 134 and swing the levers 126 about their pivots 130. This will pull on the links 96a and extend the lazy tongs carrying the leg rest.

It is understood that certain parts, elements or mechanisms shown in a certain figure may be substituted for corresponding parts, elements, or mechanisms of the embodiments shown in other figures of the drawings.

I have described preferred embodiments of my invention, but it is understood that this disclosure is for the purpose of illustration, and that various omissions or changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A reclining article of furniture having a stationary frame, a seat and a back rest and means for mounting said seat and back rest on said frame permitting tilting movement thereof with respect to the frame, a leg rest and a system of linkage for supporting the leg rest from

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the seat and causing movement thereof from a retracted position below the seat to a projected position when the seat is tilted, said system including links attached to the leg rest at spaced points from front to rear of the leg rest, said system including at least one pair of crossed links pivoted to each other at their point of crossing, one of said links being pivoted to the seat near the front thereof, a leg rest lever pivoted between its ends to the seat at a point spaced from the point at which the crossed link is pivoted to the seat, said leg rest lever being pivoted at one end to the other of said crossed links and having an extension beyond the point at which it is pivoted to the seat, at least one guide member pivoted to a part of the article of furniture, connections between guide member and a part of the article of furniture relatively movable with respect to the part of the article of furniture to which the guide member is pivoted, when the seat and back rest are tilted, and a leg rest operating link connected at one end to the extension of said leg rest lever at a point spaced from the point at which said lever is pivoted to the seat and operatively connected at its other end to a guide member at a point spaced from the point at which said guide member is pivoted to the first named part of the article of furniture, said leg rest operating linkage being so constructed and arranged that said leg rest operating link holds the leg rest retracted under the seat in upright sitting position and holds the leg rest projected in reclining position.

2. A construction as claimed in claim 1 in which the linkage system includes a multiple series of pivoted crossed links forming a combination lazy tongs.

3. A construction as claimed in claim 1 in which the leg rest is foldable into a position under and substantially parallel to the seat, the linkage system being collapsed between the leg rest and the plane of the seating surface of the seat.

4. A reclining article of furniture having a stationary frame, a seat and a back rest and means for mounting said seat and back rest on said frame permitting tilting movement thereof with respect to the frame, a leg rest and a system of linkage for supporting the leg rest from the seat and causing movement thereof from a retracted position below the seat to a projected position when the seat is tilted, said system including links attached to the leg rest at spaced points from front to rear of the leg rest, said system including at least one pair of crossed links pivoted to each other at their point of crossing, one of said links being pivoted to the seat near the front thereof, a leg rest lever pivoted between its ends to the seat at a point spaced from the point at which the crossed link is pivoted to the seat, said leg rest lever being pivoted at one end to the other of said crossed links and having an extension beyond the point at which it is pivoted to the seat, at least one guide member pivoted to the stationary frame, connections between the guide member and a part of the article of furniture relatively movable with respect to the stationary frame when the seat and back rest are tilted, and a leg rest operating link connected at one end to the extension of said leg rest lever at a point spaced from the point at which said lever is pivoted to the seat and operatively connected at its other end to a guide member at a point spaced from the point at which said guide member is pivoted to the frame, said leg rest operating linkage being so constructed and arranged that said leg rest operating link holds the leg rest retracted under the seat in upright sitting position and holds the leg rest projected in reclining position.

5. A reclining article of furniture having a stationary frame, a seat and a back rest and means for mounting said seat and back rest on said frame permitting tilting movement thereof with respect to the frame, a leg rest and a system of linkage for supporting the leg rest from the seat and causing movement thereof from a retracted position below the seat to a projected position when the

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seat is tilted, said system including links attached to the leg rest at spaced points from front to rear of the leg rest, said system including at least one pair of crossed links pivoted to each other at their point of crossing, one of said links being pivoted to the seat near the front thereof, a leg rest lever pivoted between its ends to the seat at a point spaced from the point at which the crossed link is pivoted to the seat, said leg rest lever being pivoted at one end to the other of said crossed links and having an extension beyond the point at which it is pivoted to the seat, a first guide member pivoted between its ends to the seat and at its lower end to the stationary frame, a second guide member pivoted with one of its ends to the seat and its lower end to the stationary frame spaced from said first guide member, an intermediate guide member pivoted at its lower end to the second guide member, a transmission link pivoted at its ends to the first guide member and the intermediate guide member respectively, and a leg rest operating link connected at one end to the extension of said leg rest lever at a point spaced from the point at which said leg rest lever is pivoted to the seat and connected at its other end to said intermediate guide member at a point spaced from the point at which said intermediate guide member is pivoted to the second guide member, said leg rest operating linkage being so constructed and arranged that said leg rest operating link holds the leg rest retracted under the seat in upright sitting position and holds the leg rest projected in reclining position.

6. A reclining article of furniture having a stationary frame, a seat and a separate back rest pivotally mounted on said frame, a leg rest and a system of linkage for supporting the leg rest from the seat and causing movement thereof from a retracted position below the seat to a projected position when the seat and back rest are tilted, said system including links attached to the leg rest at spaced points from front to rear of the leg rest, said system including at least one pair of crossed links pivoted to each other at their point of crossing, one of said links being pivoted to the seat near the front thereof, a leg rest lever pivoted between its ends to the seat at a point spaced from the point at which the crossed link is pivoted to the seat, said leg rest lever being pivoted at one end to the other of said crossed links and having an extension beyond the point at which it is pivoted to the seat, at least one guide member pivoted to the stationary frame, drive linkage connecting the back rest to the guide member, and a leg rest operating link connected at one end to said leg rest lever at a point on said lever above the point at which said lever is pivoted to the seat and connected at its other end to said guide member at a point spaced from the point at which said guide member is pivoted to the frame, said leg rest operating linkage being so constructed and arranged that said leg rest operating link acts for the time being as a compression link and holds the leg rest retracted under the seat in upright sitting position and holds the leg rest projected in reclining positions, said link when in the latter position being under tension.

7. A reclining article of furniture having a stationary frame, a seat and a back rest and means for mounting said seat and back rest on said frame permitting tilting movement thereof with respect to the frame, a leg rest and a system of linkage for supporting the leg rest from the seat and causing movement thereof from a retracted position below the seat to a projected position when the seat is tilted, said system including links attached to the leg rest at spaced points from front to rear of the leg rest, said system including at least one pair of crossed links pivoted to each other at their point of crossing, one of said links being pivoted to the seat near the front thereof, a leg rest lever pivoted between its ends to the seat at a point spaced from the point at which the crossed link is pivoted to the seat, said leg rest lever being piv-

oted at one end to the other of said crossed links and having an extension beyond the point at which it is pivoted to the seat, at least one guide member pivoted to the stationary frame, a second lever pivoted at spaced points to the seat and to said guide member, and a leg rest 5 operating link connected at one end to the extension of said leg rest lever at a point spaced from the point at which said leg rest lever is pivoted to the seat and connected at its other end to said second seat-pivoted lever 10 at a point spaced from the points at which said second lever is pivoted to the seat and guide member, respectively, said leg rest operating linkage being so constructed

and arranged that said leg rest operating link holds the leg rest retracted under the seat in upright sitting position and holds the leg rest projected in reclining position.

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