

May 5, 1959

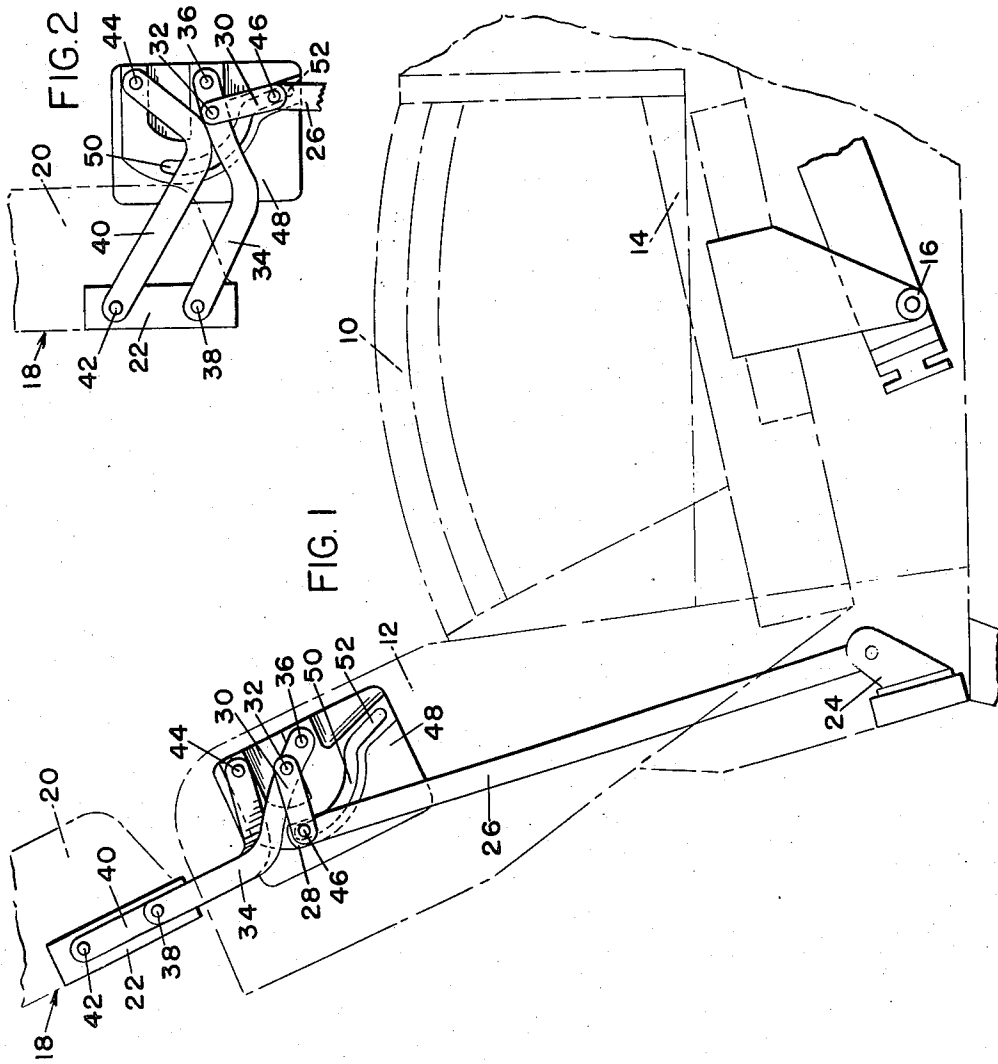
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RECLINING CHAIR HEADREST CONSTRUCTIONS

Filed Jan. 17, 1958

6 Sheets-Sheet 1



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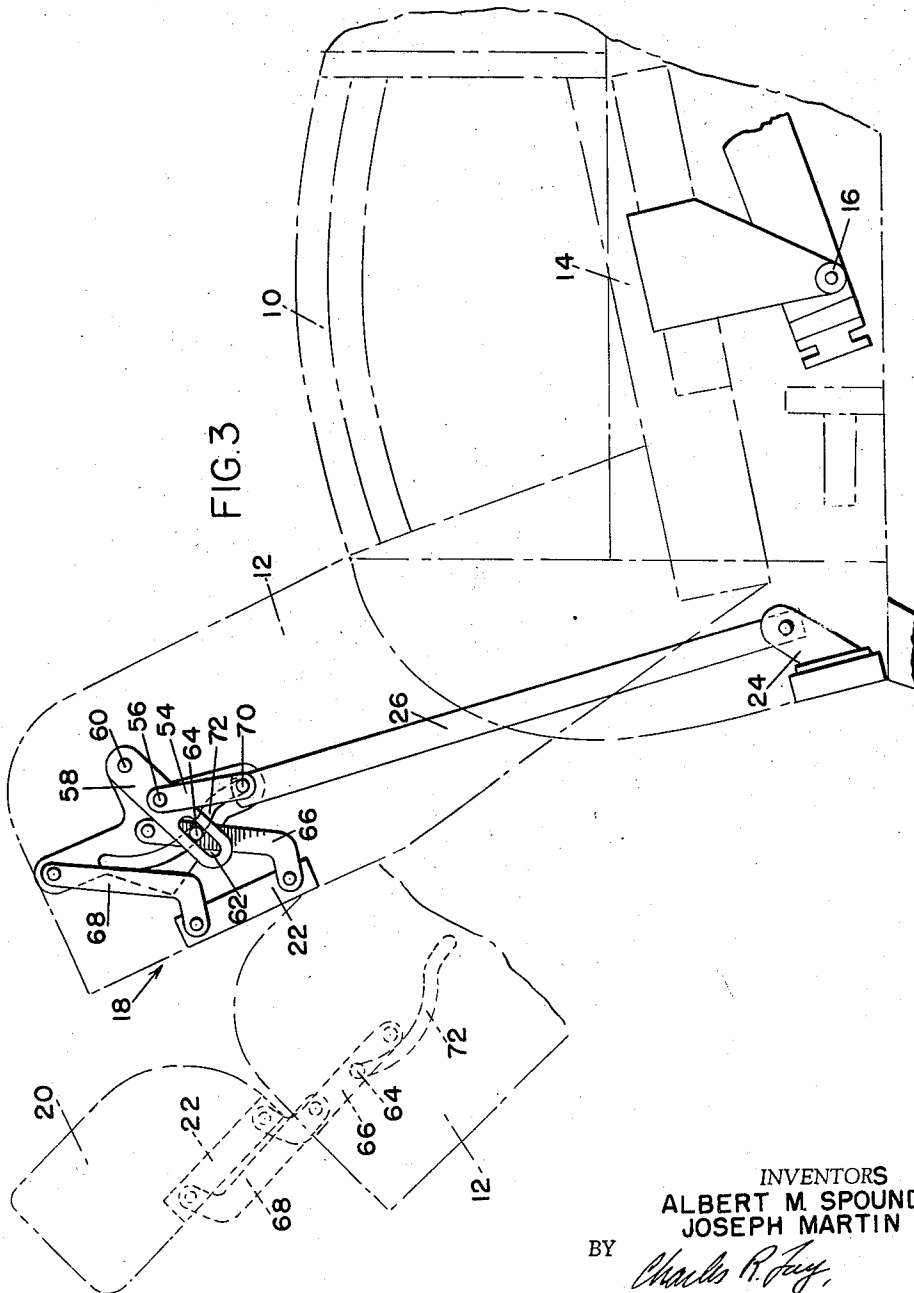


FIG. 3

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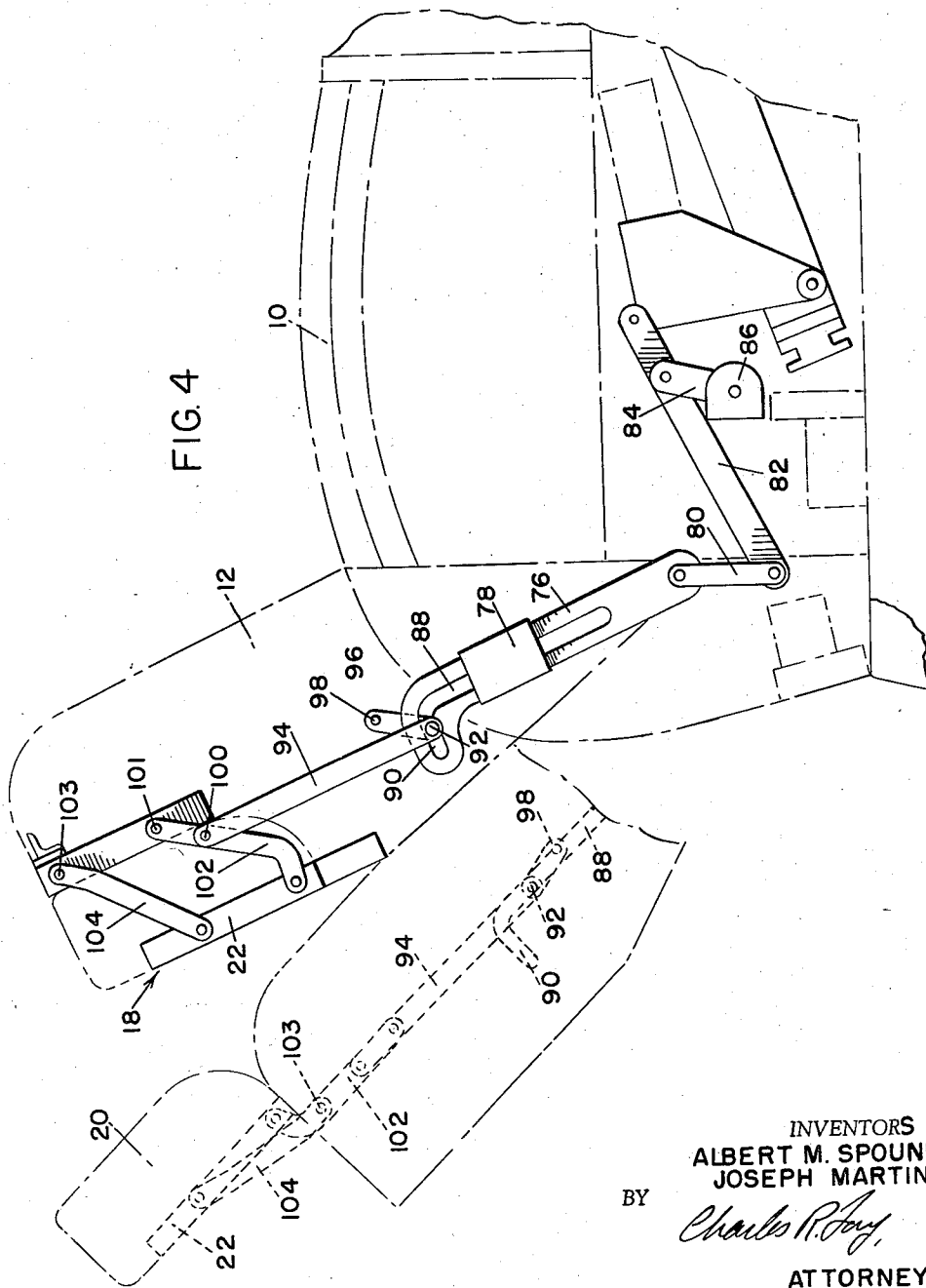
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RECLINING CHAIR HEADREST CONSTRUCTIONS

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6 Sheets-Sheet 3



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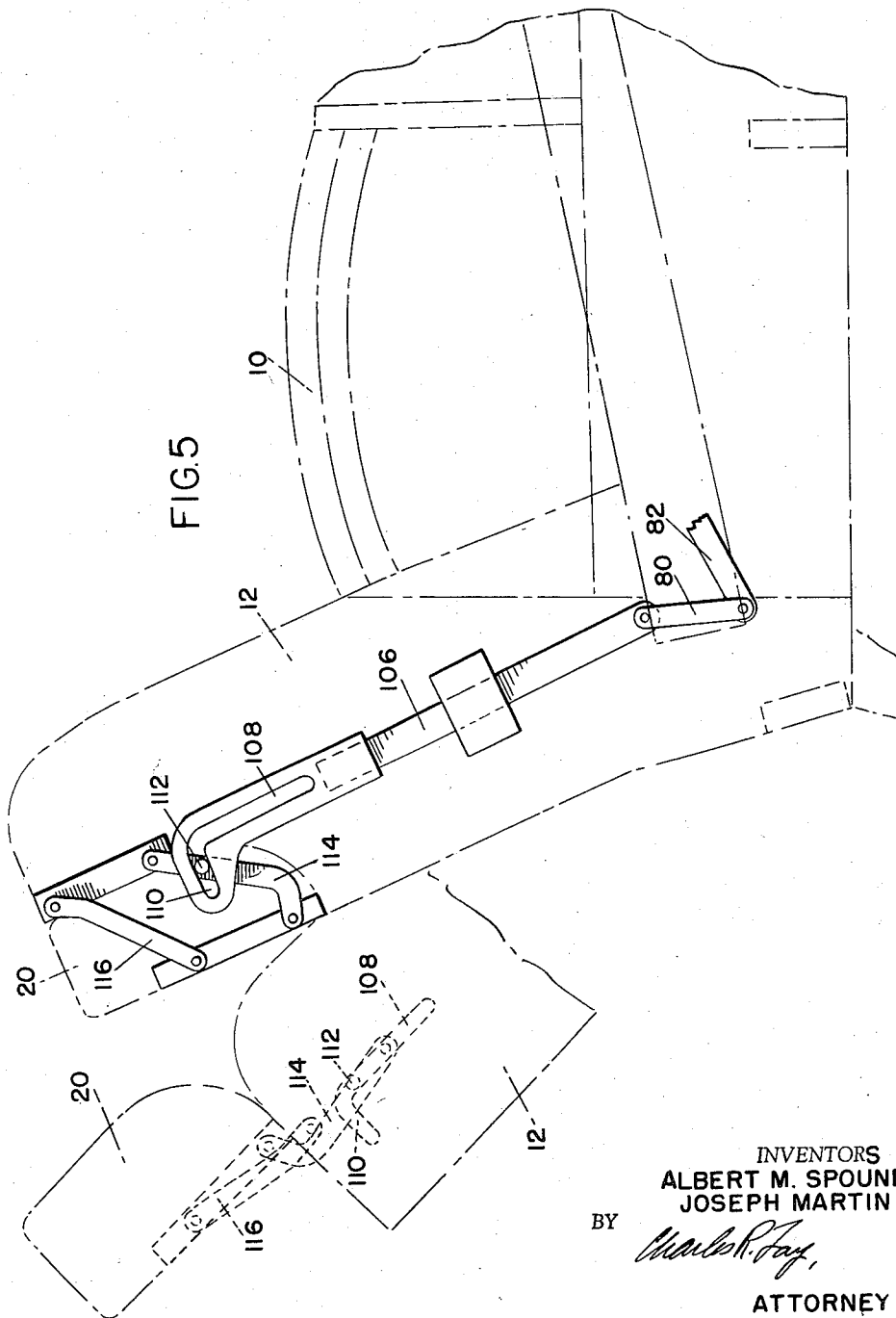
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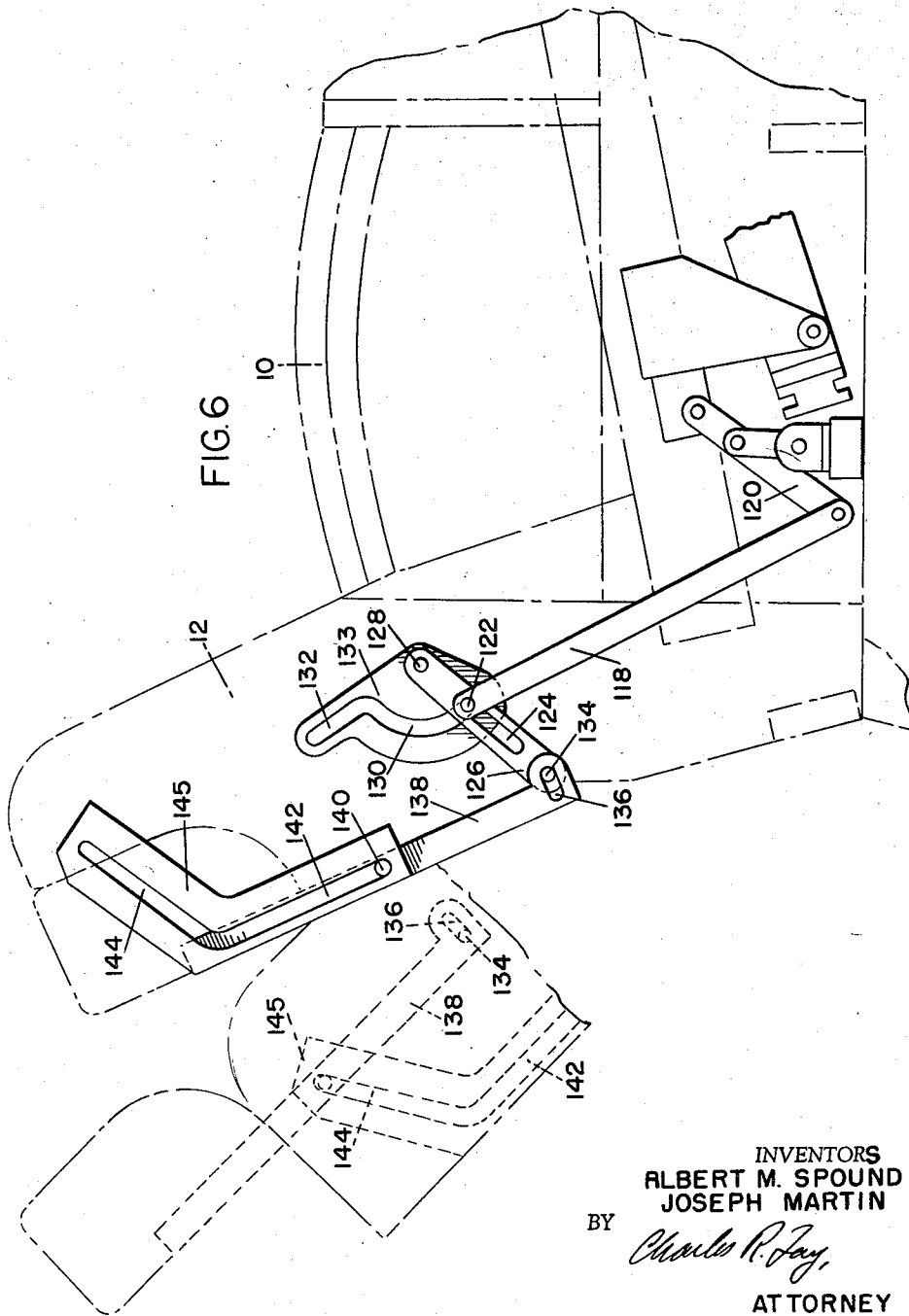
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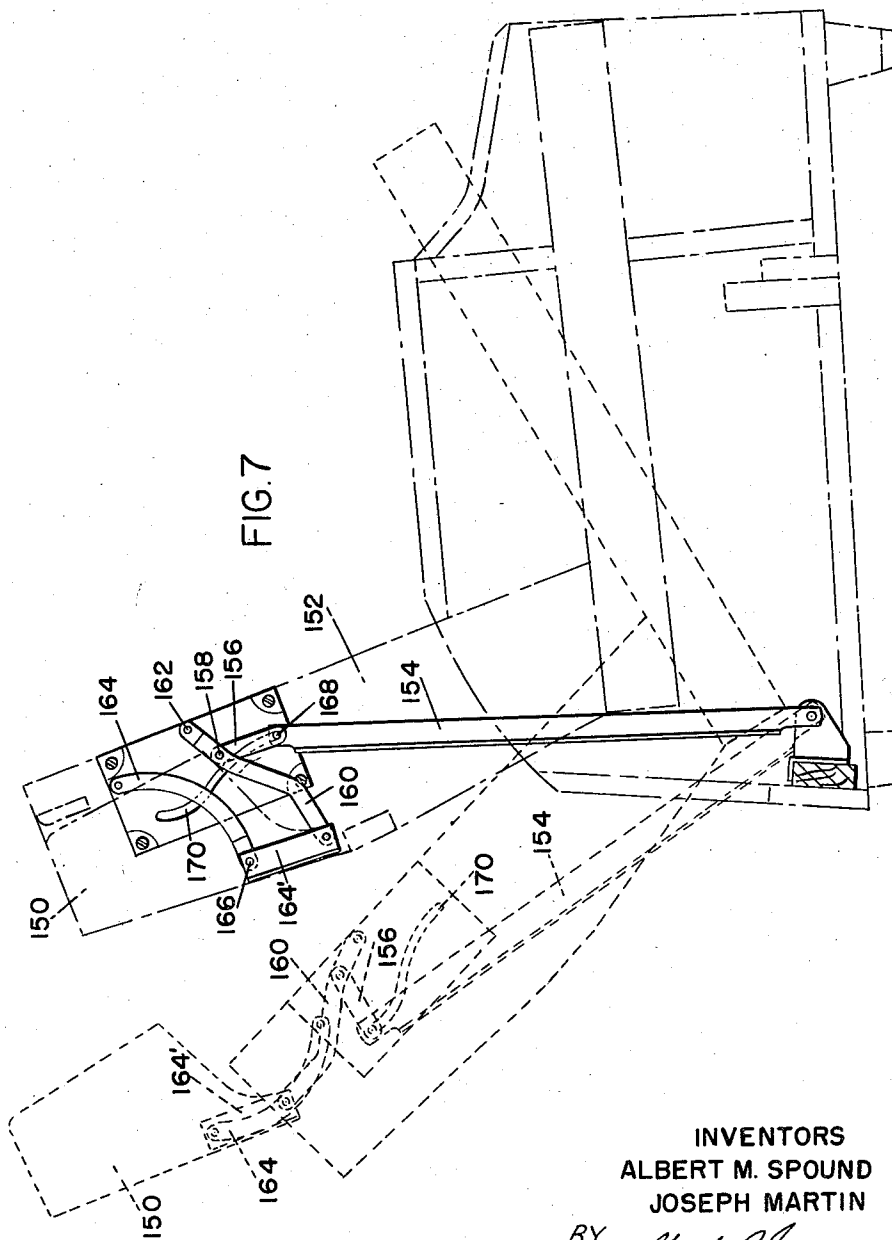


FIG. 7

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## RECLINING CHAIR HEADREST CONSTRUCTIONS 5

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12 Claims. (Cl. 155—177)

This invention relates to automatic projecting headrests for reclining chairs, and the principal object of the invention resides in the provision of a reclining backrest for a chair having a relatively movable headrest associated therewith and mechanism automatically projecting the headrest at the top portion of the backrest of the chair as the backrest is moved to a reclining position; and including mechanism for moving said headrest in a forward direction from a concealed position in the backrest so as to generally align the head-supporting surface of the backrest when the headrest is projected in useful position.

Further objects of the invention reside in the provision of an automatically movable headrest as above described and including mechanism for controlling the operation of the headrest so that the forward and upward motion thereof occurs only during the initial portion of the motion of the backrest toward a reclining position, whereby the user may be afforded the use of the headrest almost immediately upon starting to lean backward to move the backrest to reclining position; and the provision of mechanism as above described wherein the reverse motion of the headrest to retracted position occurs only during the final portion of the motion of the backrest toward sitting position.

Other object and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is an elevational view of one side of the frame of a chair embodying a form of the invention;

Fig. 2 is a view similar to Fig. 1 but showing the parts in a different relation;

Figs. 3, 4, 5 and 6 are similar views each illustrating a modification; and

Fig. 7 is a similar view illustrating a modification.

This invention relates to any type of reclining chair having an automatic projected headrest, but for purposes of illustration, the same has been shown applied to a conventional type of chair which comprises upholstered side arms 10 having located between them a rigid unit comprising in general an upholstered backrest 12 and an upholstered seat 14 fixed thereto.

The backrest and seat are generally rigidly connected so that they move together as a unit as illustrated in the drawings, between a sitting and a reclining position; and means of any nature well known in the art may be provided for pivotally mounting the backrest and seat in the frame of the chair as is here conventionally illustrated at 16. This frame of course provides the support for the arms 10, etc.

The present invention resides in the provision of the headrest generally indicated at 18 which may comprise an upholstered portion 20 and a supporting frame 22 as shown; and mechanism is provided for automatically projecting the headrest from a concealed position within the backrest, Figs. 1 and 2, when the device is used as a chair, to an exposed projected position for use when the chair is manipulated to place it in reclining position.

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This invention includes means for moving the headrest forwardly, after it has been projected sufficiently, in order to bring the head-supporting surface thereof generally in line with the back-supporting surface of the backrest.

Also, this invention includes special new and improved mechanism for projecting the headrest during the initial movement of the seat and backrest toward reclining position so that the occupant may have the use of the headrest almost at once upon leaning back to move the parts to reclining position; and conversely, the headrest stays in useful position until near the end of the motion of the backrest toward sitting position.

There is a fixed bracket 24 mounted on the fixed frame, this bracket pivotally mounting a driving member 26 which is in the nature of an elongated bar extending upwardly. It is to be understood that there is a bracket and driving member adjacent each side of the frame of the backrest member, only one being shown for clarity of illustration.

At its upper end, the driving member 26 is pivotally associated as at 28 with a lever 30 at one end thereof. The opposite end of the lever is pivoted as at 32 to an intermediate point on the link 34. This link is pivoted as at 36 to a fixed point on the frame of the backrest member 12. Link 34 is pivoted at its opposite end as at 38 to the supporting frame 22 for the headrest.

There is another link indicated at 40 which is pivoted at one end as at 42 to the member 22 but in vertically spaced relation with respect to the pivot-point at 38; and at its other end link 40 is pivoted as at 44 at a corresponding elevated fixed position on the frame of the backrest 12. These links may be of any desired shape but are conveniently stamped out in the shape shown herein.

At the pivot point of driving member 26 and lever member 30, there is provided a pin or rivet 46, this pin or rivet having a head underlying the edges of a cam slot which is provided in a cam plate 48. This cam slot has an arcuate portion 50, the center of which is to be found at the pivot-point 32 when the links are in their uppermost position, with the headrest extending upwardly and forwardly. The cam slot also has a communicating rectilinear portion 52 and it is to be understood that the pin or rivet 46 slides in slot 50, 52 in order to accomplish the objects of this invention.

With the seat in sitting position, the driving member 26 is at its lowermost position relative to the backrest and the pin or rivet 46 is located in the lower portion of slot 52. Upon swinging the backrest toward the rear in order to convert the chair to a reclining position, the pin or rivet 46 moves relatively upwardly in slot 52 and of course this action causes lever 30 to also move bodily upwardly and this in turn causes the link 34 to move in a clockwise direction which causes the headrest to move upwardly and forwardly within a very short motion at the initiation of the rearward motion of the backrest. It will be observed that links 34 and 40 act as a four-bar linkage or parallelogram and maintain the headrest erect and cause it to swing on an arc of a circle from retracted to fully extended useful position.

However, when pin or rivet 46 reaches the lower portion of the arc-shaped cam slot, no further effect is accomplished with respect to lever 30 because it then pivots about its own pivot-point 32 relative to the four-bar linkage, i.e. relative to link 34, and therefore the motion of the driving member 26, after pin 46 leaves the straight part 52 of the cam slot, is lost motion and merely allows the backrest to move further backwardly and downwardly without having any further effect on the headrest.

Conversely of course, upon moving the backrest forwardly and upwardly to sitting position, the pin or rivet 46 must move from the top of the curved portion of the cam slot 50 to the bottom thereof before any retraction of the headrest takes place so that such retraction takes

place only at the final portion of the motion of the backrest toward sitting position.

A modification of this construction is shown in Fig. 3 wherein the driving member 26 is connected to a link 54 having a pivot 56 intermediate the ends of lever 58. Lever 58 is pivoted in fixed position at 60 on the frame of the backrest 12 and extends rearwardly past pivot 56 to a portion having a longitudinal slot 62.

A pin 64 is located to relatively slide in the slot, pin 64 being mounted intermediate the ends of link 66 of the four-bar linkage which also includes link 68. These links are pivoted more or less as above described with respect to links 34 and 40 and the pin or rivet 70 at the upper end of driving member 26 is located in the cam slot 72 which is essentially the same as cam slot 50, 52 above described.

The operation of this mechanism is similar to that as above described except that the link 54 operates the lever 58 and lever 58 is pivoted at a fixed position rather than on link 66. Otherwise the operation is substantially the same as that above described.

A further modification of the invention in Fig. 4 resides in the provision of a driving member 76 which is rectilinearly slidable as in a guide 78 by means of a link 80 mounted at the end of a lever 82 and operated by a link 84 in a clockwise direction when the backrest is moved to the rear. Link 84 is mounted on a fixed bracket 86.

The driving member 76 is provided with a rectilinear slot 88 communicating with a right-angle slot 90. In this slot there is provided a pin or rivet 92 at one end of a link 94 and another link 96 having a fixed pivot 98 on the backrest member acts as a guide for link 94.

Link 94 is connected at its upper end as at 100 to link 102 which is equivalent to link 34 above described, and the bracket 22 is operated thereby in the same manner. Link 104 completes the four-bar linkage in this case, links 102 and 104 having pivots at 101 and 103, respectively.

With the parts as shown, driving member 76 rises upon rotation of lever 82 in a clockwise direction, as the backrest moves to the rear. The pin 92 being in the portion 90 of the slot, this causes link 94 and the headrest to rise substantially as above described. However, when the backrest has reached its final forward position, the pin 92 is then in alignment with slot 88 and continued rising of driving member 76 will have no further effect. The reverse operation is true as before and the initial portion of the return motion of the backrest to a sitting position has no effect upon the headrest until pin 92 has relatively ascended to reach portion 90 of the slot in the driving member 76.

If desired, driving member 76 may be applied directly to the link 102 without the use of the intermediary link 94 or 96 and this is illustrated in Fig. 5 wherein driving member 106 is operated as above described with respect to driving member 76 and has a similar slot shown at 108 and 110. This is provided with a pin 112 mounted directly on link 114, which in combination with link 116 forms the four-bar linkage. Links 114 and 116 have fixed pivots at 115 and 117. In this case the operation is substantially the same as above described because when link 114 moves in a clockwise direction, in final headrest exposing position, pin 112 aligns with the longitudinal portion of the slot at 108.

Another form of the invention is shown in Fig. 6 wherein driving member 118 may derive its motion in any way desired as by a link 120. Driving member 118 is provided with a pin 122 located in a slot 124 in a lever 126 which has a fixed pivot at 128. Pin 122 also extends into cam slot 130 which is arcuate and communicates with a rectilinear cam slot portion 132 in a cam plate 133. The lever 126 is provided with a pin 134 in a short slot 136 in a rectilinearly movable member 138 to which the headrest is connected. The link 138 is pro-

vided with a pin 140 in a cam slot 142 which has an angular portion as indicated at 144 in another cam plate 145.

As the backrest pivots to the rear, the driving member 118 rises, carrying with it lever 126 as long as pin 122 is located in the arcuate portion 130 of the cam slot, and this causes link 138 to rise, carrying with it the headrest. When pin 140 reaches the portion 144 of cam slot 142, the headrest is constrained to move forwardly, after the rise occasioned by the portion 142 of the cam slot, and when pin 140 reaches the end of slot 144, the headrest is in its final position and approximately at that point pin 122 enters slot 132 and thereafter the driving member 108 is provided with a lost motion which allows the backrest to continue tilting to the rear without, however, any further effecting the position of the headrest.

In Fig. 7 there is shown a modification of a similar device but in which the headrest indicated at 150, when projected in reclining position of the chair, is also projected somewhat forwardly and at an inclination to the surface of the backrest 152. This is desirable in order to provide for a more comfortable head-supporting position of the device.

In the construction of Fig. 7, the driving member is indicated at 154 and it may be operated longitudinally relative to the backrest 152 by any means such as previously indicated. In any event, it is provided with a pivoted link 156 at its upper end, and this link in turn is pivotally connected at 158 to the link 160 intermediate the ends thereof. Link 160 is pivoted at a fixed point on the backrest at 162 and at its opposite end to a headrest supporting member 164.

The other link of the parallel bar arrangement is indicated at 164 and it is also pivoted as at 166 to the headrest in spaced relation with respect to link 160.

The driving member 154 and the link 156 are inter-pivoted by a pin or rivet 168 which rides in the cam slot 170, and it will be seen that in the initial portion of the operation, the headrest is projected upwardly outwardly and at a tilt and in the upper approximately one-half of the cam slot 170, the pin or rivet 168 will ride in an arc about the center of the pivot at 158 providing for the lost-motion as above described with respect to the other forms of the invention.

Having thus described our invention and the advantages thereof, we do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what we claim is:

1. A reclining chair comprising a stationary frame and a backrest unit swingably mounted thereon for disposition between a sitting position and a reclining position, a headrest movably mounted within said unit, means projecting said headrest from said unit upon swinging motion of the latter from seating toward reclining position, said means comprising a link pivotally disposed upon said backrest and connected to said headrest, said link guiding the headrest in a generally curvilinear direction upwardly and forwardly, a second link, a driving member pivoted to the latter, the second link operating the first link, and the driving member being pivoted to the stationary frame, the second link being pivoted to the first link at one end intermediate the ends of the latter.

2. A reclining chair comprising a stationary frame and a backrest unit swingably mounted thereon for disposition between a sitting position and a reclining position, a headrest movably mounted within said unit, means projecting said headrest from said unit upon swinging motion of the latter from seating toward reclining position, said means comprising a link pivotally disposed upon said backrest and connected to said headrest, said link guiding the headrest in a generally curvilinear direction upwardly and forwardly, a second link, a driving member pivoted to the latter, the second link operating the first link, and the driving member being pivoted to the stationary frame, the second link being pivoted at



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one end to the first link intermediate the ends of the latter, and to the driving member at its other end.

3. Article of furniture comprising a frame, a backrest pivotally mounted on said frame for disposition between reclining and seating positions, a movable headrest associated with said unit, a link mounting said headrest for extension from said backrest member to useful condition thereof, and means operating said headrest projecting link automatically upon pivoting of said unit from seating position to reclining position, said means comprising a slotted driving member pivoted at one end with relation to the frame, said slot having two connected portions at angles to each other, a slidable element in the slot, said element being connected to the link intermediate the ends of the link, one portion of the slot being generally at right angles to the direction of motion of the driving member and the other portion of the slot being parallel thereto providing a lost motion connection for the link.

4. Article of furniture comprising a frame, a backrest pivotally mounted on said frame for disposition between reclining and seating positions, a headrest associated with said unit, a member mounting said headrest on the backrest for projection from concealment in said backrest member to an exposed useful condition, means including a lever operating said headrest projecting member automatically upon pivoting of said unit, from seating position to reclining position and including means moving the headrest forwardly to align with the backrest, a driving member pivoted with relation to the frame and connected to the lever intermediate the ends of the latter, a cam, a projection on the driving member engaging the cam for motion of the lever by the driving member during a portion only of the travel of the latter, said last-named means including a second cam engaging the headrest and controlling its path of movement.

5. A reclining chair comprising a stationary frame and a backrest unit swingably mounted thereon for disposition between a sitting position and a reclining position, a headrest movably mounted within said unit, means projecting said headrest from said unit upon swinging motion of the latter from seating toward reclining position, said means comprising a link pivotally disposed upon said backrest and connected to said headrest, said link guiding the headrest in a generally curvilinear direction upwardly and forwardly, a second link, a driving member pivoted to the latter, the second link operating the first link, the driving member being pivoted to the stationary frame, the second link being pivoted at one end to the first link intermediate the ends of the first link and to the driving members, said links being effectively arranged to provide a final tilted position of the headrest relative to the backrest in reclining position of the latter.

6. Article of furniture comprising a fixed frame, a backrest unit pivotally mounted on said frame for disposition between a reclining position and a sitting position, a headrest associated with said unit, means mounting said headrest for projection from said backrest member from concealed position within said backrest to exposed useful condition, means operating said headrest projecting means, said operating means being associated with the frame and including a driving member, a cam member on the backrest unit, a connection between the driving member and cam, and a link connecting the driving member and headrest.

7. A reclining chair comprising a stationary frame and a backrest unit swingably mounted on the frame, a stationary bracket mounted on the frame, a link pivoted to

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said bracket intermediate its ends, one end of the link being pivotally connected to the unit, a headrest, a movable frame in the bracket unit mounting the headrest, the other end of the link being pivotally mounted to the headrest mounting frame so that when the backrest unit is swung upon the frame toward reclining position, the link is pivoted and causes the headrest frame to move relative to the backrest to project the headrest from a concealed position within the backrest.

8. The reclining chair of claim 7 including cam means in the backrest in position to force the headrest and its supporting frame in a forward direction during the motion of the headrest frame.

9. Article of furniture comprising a frame, a backrest unit pivotally mounted on said frame for disposition between a reclining position and a sitting position, a headrest associated with said unit, means including a parallelogram type of linkage for mounting said headrest for projection from said backrest member from concealed position within said backrest to exposed useful condition, operating means for automatically projecting the headrest upon pivoting of said unit from sitting position to reclining position, and means controlling the operating means to provide for the projection of the headrest to function only during the initial motion of the backrest from sitting position toward reclining position, the relation of the headrest and backrest remaining constant during the remainder of the motion of the backrest to reclining position.

10. The article of furniture recited in claim 9 wherein said controlling means includes a cam associated with the operating means and providing a lost motion device during a part of the motion of the backrest.

11. The article of furniture recited in claim 9 wherein said controlling means includes a cam associated with the operating means and providing a lost motion device during a part of the motion of the backrest, said cam having a generally rectilinear operating portion and an arcuate portion, the arcuate portion providing the lost motion device.

12. A reclining chair comprising a stationary frame and a backrest unit having a substantially uninterrupted body-supporting surface, said unit being swingably mounted on the frame for disposition between a seating position and a reclining position, a headrest movably mounted on said unit, said headrest having a head supporting surface, said backrest unit having a cavity at the rear portion thereof, said cavity receiving the headrest in substantially concealed position therein behind the body-supporting surface, means including a parallelogram type linkage for projecting said headrest from said concealed position within said unit upon swinging motion of the latter from seating to reclining position, said means comprising a driving member pivotally associated with said stationary frame and operatively connected to said linkage, means guiding the headrest in the motion thereof from concealed position to projected position and causing said headrest to move bodily upwardly and forwardly, positioning the headrest head with its supporting surface in closely adjacent cooperative relation with the backrest supporting surface and above the same.

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