Nov. 29, 1960 C. J. BARECKI ET AL 2,962,087

RECLINING CHAIR

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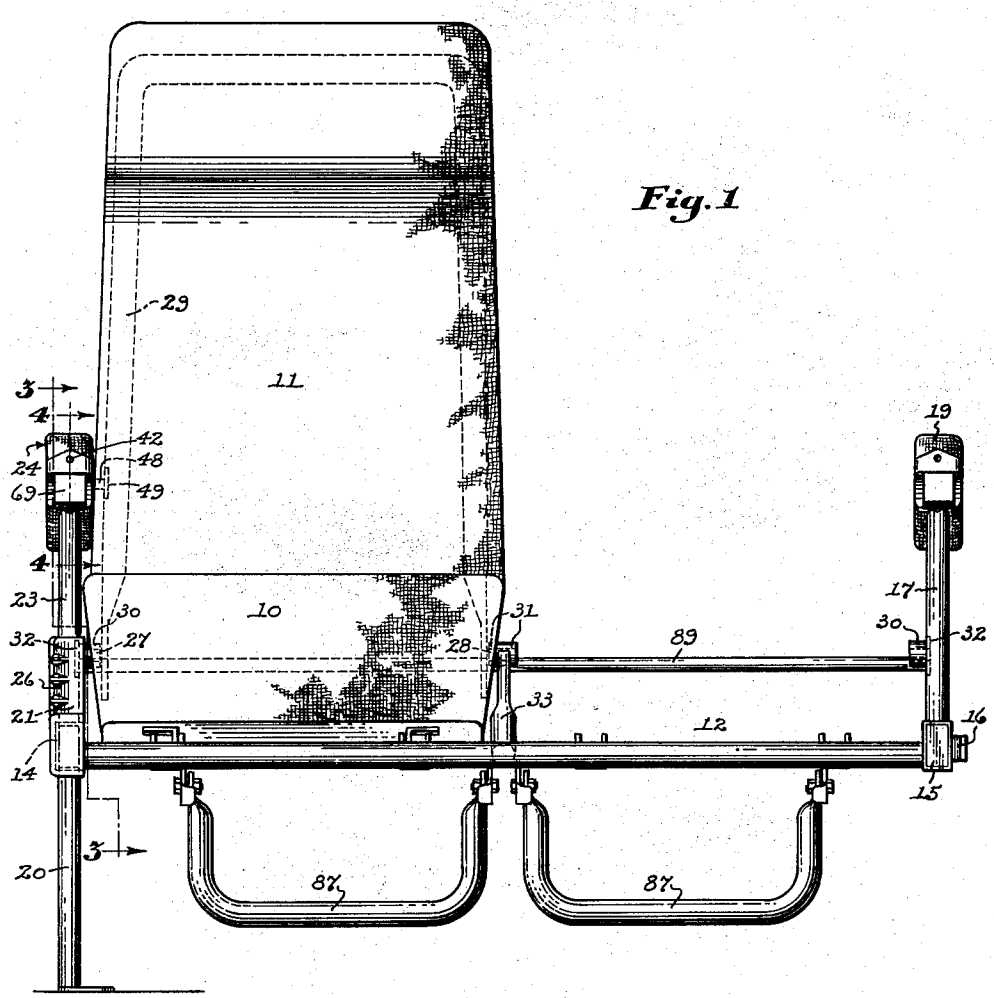


Fig. 1

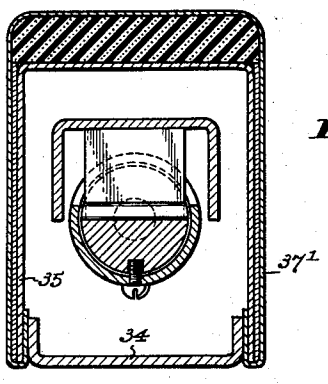


Fig. 13

INVENTORS

Chester J. Barecki

Douglas N. Humphries

Gerald F. Thompson

BY

John S. Braddock

ATTORNEY

WITNESS

Harry S. Brown Jr.

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Fig. 3

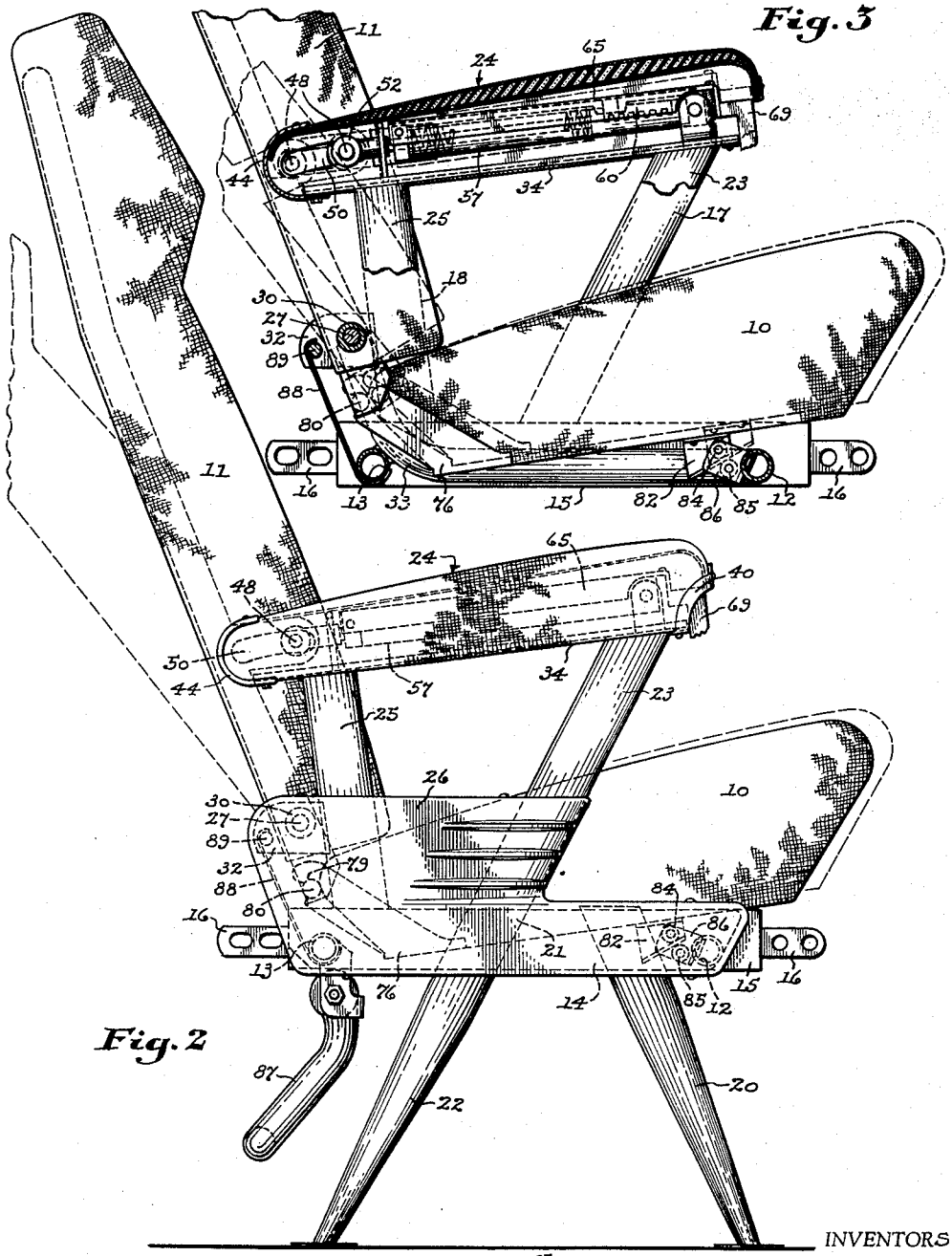


Fig. 2

INVENTORS

Chester J. Barecki

Douglas N. Humphries

Gerald F. Thompson

BY John S. Braddock

ATTORNEY

WITNESS

Harry S. Brown Jr.

Nov. 29, 1960 C. J. BARECKI ET AL 2,962,087

RECLINING CHAIR

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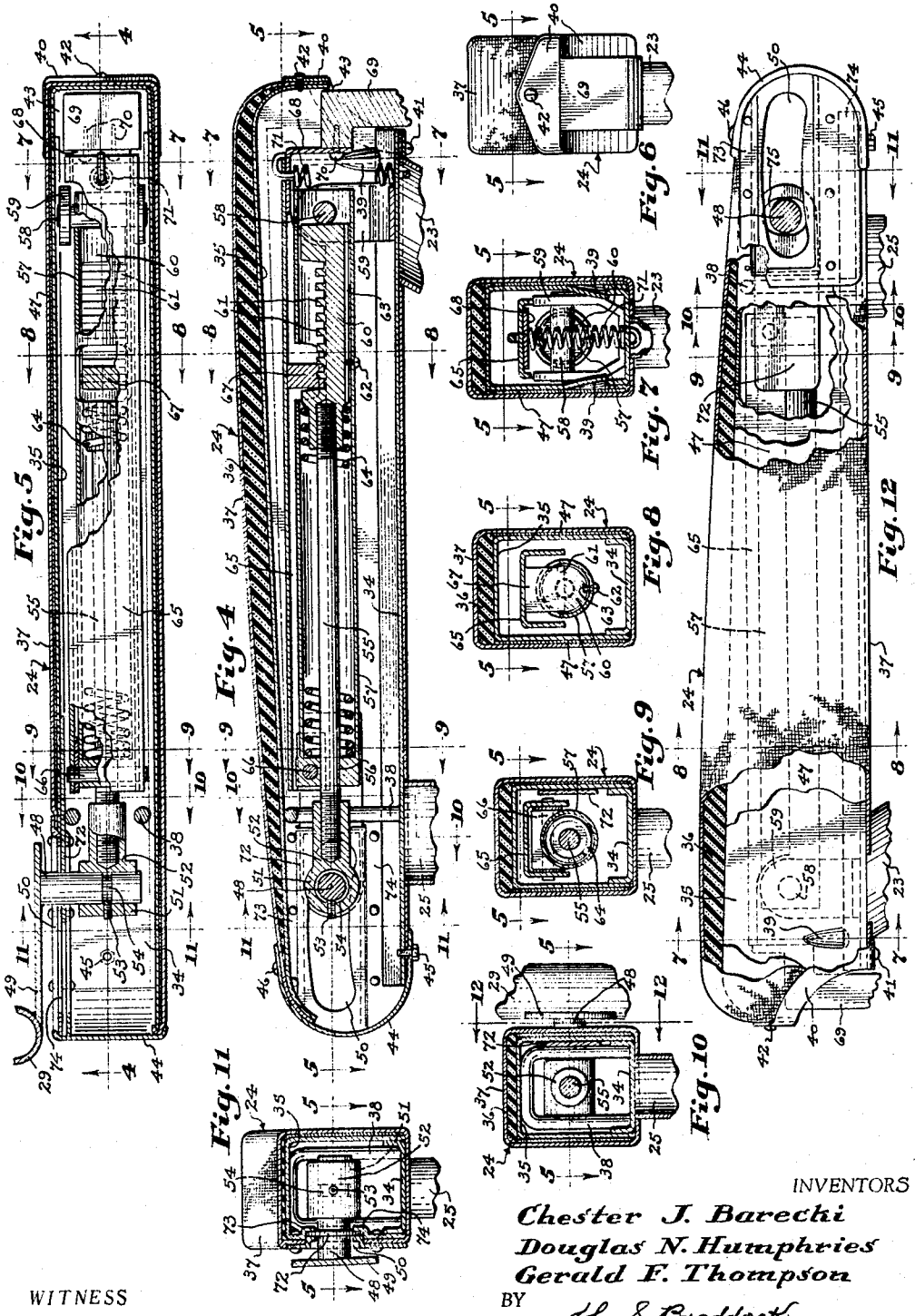


Fig. 5

Fig. 4

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

Fig. 11

Fig. 12

WITNESS

Harry S. Brown Jr.

INVENTORS

Chester J. Barecki

Douglas N. Humphries

Gerald F. Thompson

BY

John S. Braddock

ATTORNEY

Nov. 29, 1960 C. J. BARECKI ET AL 2,962,087

RECLINING CHAIR

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Fig. 14

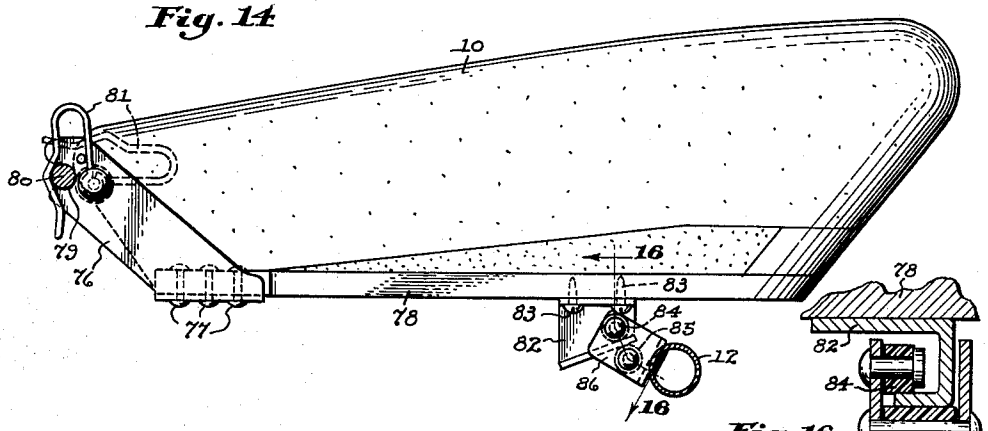
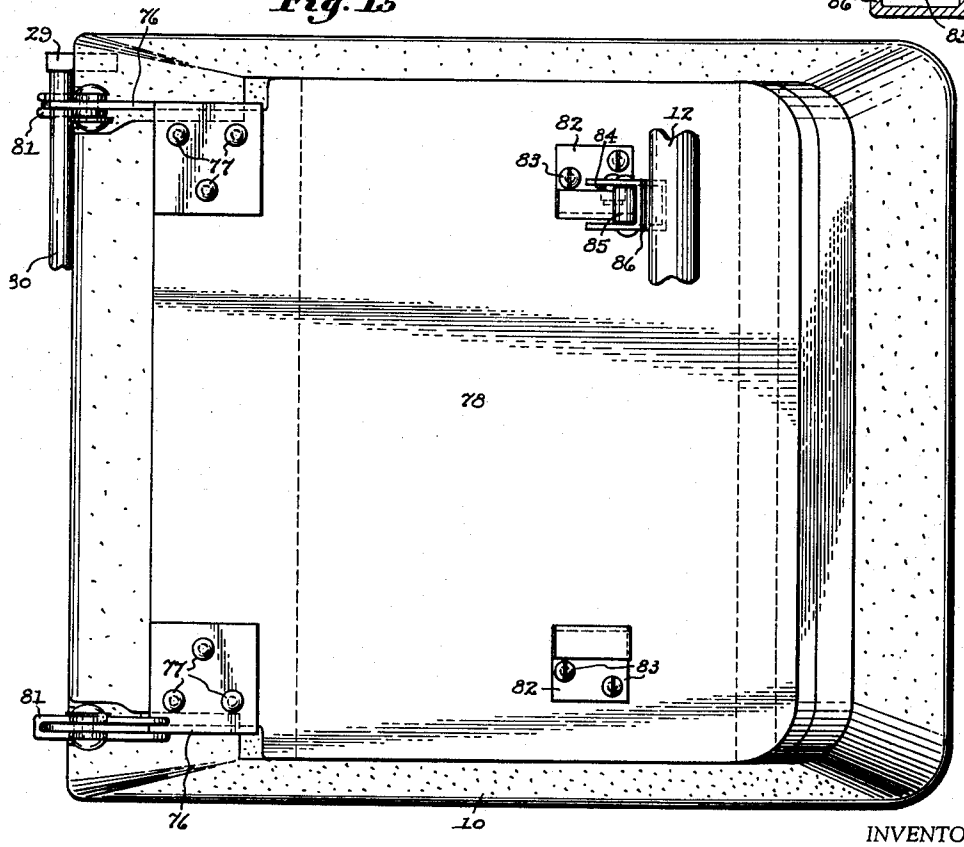


Fig. 16

Fig. 15



INVENTORS

Chester J. Barecki
Douglas N. Humphries
Gerald E. Thompson

BY

John S. Braddock

ATTORNEY

WITNESS

Harry S. Brown Jr.

United States Patent Office 2,962,087 Patented Nov. 29, 1960

2,962,087

RECLINING CHAIR

Chester J. Barecki, Douglas N. Humphries, and Gerald F. Thompson, all of Grand Rapids, Mich., assignors to American Seating Company, Grand Rapids, Mich., a corporation of New Jersey

Filed Dec. 19, 1958, Ser. No. 781,674

4 Claims. (Cl. 155—159)

The present invention relates to reclining chairs such as are commonly installed in motor busses, airliners, railway coaches and other vehicles.

The primary objects of the invention are to provide such a reclining chair having an improved operating mechanism whereby the chair back may be tilted rearwardly while at the same time the chair seat is moved slightly forwardly and upwardly; to provide such a chair wherein the operating parts of the reclining mechanism are housed within an arm rest of the chair and thus are out of sight and out of any possible contact with the chair occupant; to provide such a chair having an improved supporting standard for the aisle side of the chair, the other side of the structure, which may be designed for one, two or more occupants, being mounted in more-or-less conventional manner on a side wall of the vehicle; to provide such a chair structure in which the seat cushion is readily removable for repair or replacement; and in general to provide an improved reclining chair which is rugged and sturdy in construction, reasonably economical in manufacture, and attractive in appearance.

Illustrative embodiments of the invention are shown in the accompanying drawings, wherein:

Figure 1 is a front elevational view of the new recliner, the frame for which includes a supporting standard at the aisle side of the seat structure, the opposite or wall side of the frame having means adapting it for attachment to a side wall of the vehicle, and the seat and back cushion at the wall side of the two-passenger seat structure having been omitted in this view;

Figure 2 is a side elevational view of the seat structure as seen from the aisle side thereof;

Figure 3 is a fragmentary vertical sectional view of parts of the structure, taken on line 3—3 of Figure 1;

Figure 4 is a greatly enlarged vertical sectional view through the longitudinal center of the arm rest at one side of the chair and showing operating parts inside the arm rest which control the reclining movements of the chair, the plane of section of this view being indicated by the lines 4—4 of Figures 1 and 5;

Figure 5 is a horizontal sectional view of the same, taken on the lines 5—5 of Figures 4 and 6 through 11;

Figure 6 is a front elevational view of the arm rest seen in section in Figures 4 and 5;

Figure 7 is a vertical sectional view of the arm rest taken on lines 7—7 of Figures 4, 5 and 12;

Figure 8 is a vertical sectional view thereof taken on lines 8—8 of Figures 4, 5 and 12;

Figure 9 is a vertical sectional view thereof taken on lines 9—9 of Figures 4, 5 and 12;

Figure 10 is a vertical sectional view thereof taken on lines 10—10 of Figures 4, 5 and 12;

Figure 11 is a vertical sectional view thereof taken on lines 11—11 of Figures 4, 5 and 12;

Figure 12 is an inside elevational view of the arm rest with portions thereof broken away to reveal parts inside

the arm rest, and shown partly in section taken on line 12—12 of Figure 10;

Figure 13 is an enlarged vertical sectional view, similar to Figure 8, showing a slightly modified form of the arm rest;

Figure 14 is a side elevational view of a seat cushion for the structure with the upholstery cover removed, and showing parts on which the seat is supported in vertical section;

Figure 15 is a bottom plan view of the same; and

Figure 16 is an enlarged fragmentary sectional view of parts thereof taken on line 16—16 of Figure 14.

Referring now in detail to these drawings the chair structure shown in Figures 1–3 is of the two-passenger type having individual upholstered seats 10 and backs 11 mounted for reclining and returning movements on a supporting frame which at one side is adapted for attachment to a side wall of the vehicle and which at the other—or "aisle"—side is mounted on a supporting standard which extends to the floor of the vehicle. The seat and back at the wall side of the structure have been omitted from Figure 1 so as to better reveal the supporting frame which generally comprises a pair of forwardly-rearwardly spaced, parallel, tubular metal bars 12, 13 having their opposite ends secured as by welding to a pair of forwardly-rearwardly elongated side bars 14, 15.

The side bar 15 has apertured ears 16 adapting it for attachment by means of bolts (not shown) to the side wall of a vehicle. A front strut 17 and a rear strut 18, both of tubular metal, are secured as by welding to the side bar 15 and extend upwardly therefrom, and an arm rest 19 is mounted on top of the struts 17 and 18. This arm rest 19 houses the reclining mechanism for the chair at the wall side of the structure, which mechanism is not shown in detail inasmuch as it is substantially identical to that for the chair at the aisle side of the structure which is hereinafter fully described.

The side bar 14 at the aisle side of the structure is of cross-sectionally rectangular tubular metal construction and is supported at the front by a tubular metal front leg 20 the upper end of which extends into the hollow side bar and is secured thereto as by welding. This front leg extends in a forward-downward direction. A medial support member 21, likewise of tubular metal, extends completely through the hollow side bar 14 in a forward-upward direction and is welded thereto, so as to form a rearwardly-downwardly extending rear leg 22 and a forwardly-upwardly extending front strut 23 for supporting the front end of the arm rest 24 at the aisle side of the structure. A rear strut 25, likewise of tubular metal, is secured as by welding to the side bar 14 and extends upwardly therefrom for supporting the arm rest 24 in the rear. A decorative panel 26 is applied over the intersecting segments of the side bar 14, front leg 20, rear leg 22, front strut 23 and rear strut 25, as shown.

The chair backs 11 are pivotally mounted at their lower ends on the frame of tilting movement between a forwardmost position shown in full lines in Figures 2 and 3 and an extreme rearwardly swung position indicated in dotted lines in these views. The pivotal connections between each chair back 11 and the frame comprise pivot pins 27, 28 which extend outwardly from the chair back's inner tubular metal frame 29 and which are journalled in trunnions 30, 31, on the frame. The outer trunnions 30 are secured to brackets 32 which are welded to the frame's rear struts 18 and 25, while the inner trunnions 31 are on the upper rearward end of a tubular metal middle bar 33 secured as by welding to the front and rear tubular bars 12 and 13.

As seen in Figures 4–12, the hollow arm rest 24 comprises an upwardly opening channel base 34 which is

welded to the struts 23 and 25, a downwardly opening channel cover 35 mounted on the base 34 and provided with a thin upholstery pad 36 over its upper surface, and a sheet of upholstery material 37 enveloping these parts and secured thereto as by means of a suitable adhesive. The cover 35 is maintained in properly spaced position on the base 34 by means of an inverted U-shaped rod 38 welded to the base in the latter's rearward region, and by means of inwardly embossed stops 39 on the cover which contact the base's side flanges in their forward regions. At the front of the arm rest the base 34 and cover 35 are fastened together by an arcuate rim 40 secured to the base by a screw 41 and to the cover by a screw 42. The rim 40 surrounds a front opening 43 through the cover 35 and the upholstery material. At the rear of the arm rest the base 34 and cover 35 are fastened together by means of an arcuate closure plate 44 secured to the base by a screw 45 and to the cover by a screw 46. At the sides of the arm rest sheets of cardboard 47 are desirably interposed between the sides of the cover 35 and the upholstery sheet 37.

In the modified form of the arm rest seen in Figure 13, the upholstery sheet 37^1 does not pass beneath the channel base 34 but has its lower edges drawn inwardly and upwardly adjacent the inner side walls of the cover 35 and secured thereto by an adhesive. This construction facilitates removal of the cover from the base for inspection or repair of the mechanism within the hollow arm rest.

The chair back 11 can be secured in any one of several selective positions of rearwardly tilted adjustment as desired by the chair occupant, by the mechanism which is housed entirely within the hollow arm rest 24. A pintle 48 projects outwardly from a plate 49 welded to the tubular inner frame 29 of the back 11, through an arcuate slot 50 in the adjacent side wall of the arm rest 24 and into the rearward part of the arm rest's interior. The outer end of the pintle 48 is journalled in a bearing 51 in the rearward part of a link 52, and a set screw 53 threaded in the link enters a groove 54 in the pintle for maintaining these parts in assembly and in proper alignment. A connecting rod 55 has its rearward end threaded into the forward part of the link 52 and extends forwardly therefrom through a bearing 56 in the rear wall of a tube assembly 57 and into the tube. The forward end of the tube 57 is pivotally mounted on a pivot pin 58 extending between the arms of a bracket 59 which is mounted on the base 34 as by means of welding.

The forward end of the connecting rod 55 is threaded into the rearward end of a rack bar 60 which is slidably disposed in the tube 57. The rack bar 60 has a recess in its upper middle part at the bottom of which recess are a plurality of rack teeth 61. A set screw 62 threaded in the bottom of the tube 57 enters a groove 63 in the bottom of the rack bar 60 to insure the proper upright disposition of the rack bar during the latter's forward and rearward movements in the tube. A stiff compression spring 64 in the tube 57 bears against the rear wall of the tube and the rear end of the rack bar 60. This spring 64 urges rack bar 60, connecting rod 55, link 52, pintle 48 and the chair back 11 all in a forwardly direction so that the chair back is normally maintained in its forwardmost, non-reclining position.

A lever 65 in the form of a downwardly opening channel bar has its rearward end pivotally connected to the rear wall of the tube assembly 57 by means of a transverse pivot pin 66. The lever 65 carries a detent 67 which engages with the teeth 61 of the rack bar 60 when the lever 65 is in its lowered position seen in Figure 4, and the detent 67 can be disengaged from the rack bar 60 by swinging it upwardly about its pivot 66 thus to permit forward-rearward sliding movement of the rack bar 60 in the tube 57. An angle bracket 68 is secured as by welding to the forward end of the lever 65 and a release knob 69, secured as by means of screws 70 to the angle bracket 68, depends through the opening 43 in the front of the arm rest so as to be accessible to the chair occupant. A tension spring 71 has its lower end fastened to the base 34 of the arm rest, and has its upper end fastened to the forward end of the lever 65, and this spring 71 serves to normally maintain the lever 65 and control knob 69 in their lowered positions and with the detent 67 in engagement with the rack bar 60.

It will readily be seen that when the chair occupant wishes to recline he merely lifts the release knob 69 thus disengaging detent 67 from rack bar 60, and thus permitting the chair back 11 to yield rearwardly under rearward pressure by the occupant. After the occupant has selected the desired pitch of the back, he then releases the release knob 69, and spring 71 lowers lever 65 so that detent 67 again engages rack bar 60 thus securing the chair back 11 in the selected position. When it is desired to return the chair back 11 to its normal, non-reclining position, it is only necessary to lift the release knob 69 whereupon the compression spring 64 moves the back forwardly to starting position.

When the chair back 11 is in a reclined position, there would normally be exposed the open forward part of the arcuate slot 50 through which pintle 48 extends. Since this might present a finger-pinching hazard, there is provided means for closing this exposed forward part of slot 50 at all times. This means comprises a flat plate 72 which is in flush engagement with the inside wall of the arm rest and which is forwardly-rearwardly slidable in upper and lower glides 73, 74 secured as by means of rivets to the side wall of the arm rest. The pintle 48 passes through an opening 75 in the plate 72 so that as the pintle moves rearwardly the plate also moves rearwardly thus keeping the forward part of slot 50 sealed at all times. The rearward part of slot 50 presents no problem in this respect since it is covered by the chair back 11 in any position of the back.

The chair seat 10 is mounted in such a manner that as the back 11 is tilted rearwardly, the forward part of the seat is moved slightly forwardly and upwardly so as to increase the comfort of the passenger. Brackets 76 are secured to the rear corners of the seat by means of rivets 77 which pass through the baseboard 78 of the seat. (See Figures 14–16.) These brackets 76 have at their upper ends rearwardly opening slots 79 which hook over a rod 80 secured to lower extensions of the back frame 29 below the upholstered part of the back 11. Spring wire clips 81 secured to the brackets 76 by means of rivets are turned from the dotted line positon indicated in Figure 14 to the solid line position to secure the brackets in assembly with the rod 80.

Side brackets 82 are secured to the underside of the seat 10 by means of screws 83. The forwardly-upwardly extending lower slide portions of these brackets 82 extend between upper rollers 84 and lower rollers 85 mounted on U-shaped brackets 86 which are welded onto the tubular front frame bar 12. It will be seen that as the chair back 11 is reclined rearwardly, rod 80 moves forwardly thus moving the seat 10 forwardly, and that because of the inclination of the lower slide portions of brackets 82 the forward part of the seat also moves slightly upwardly as indicated in dotted lines in Figures 2 and 3. The rollers 84 and 85 are desirably made of Nylon for quietness of operation and lasting wear. The seat 10 is shown in Figures 14 and 15 without its outer fabric upholstery covering, which covering is desirably applied over the foam cushion shown and around and under the baseboard 78 with suitable openings therein for the brackets 76 and 82 to extend through. The entire seat 10 can be removed from the structure for reupholstering by simply unhooking the clips 81 from the rod 80 and sliding the seat forwardly and upwardly until the slide portions of brackets 82 clear the rollers 84 and 85.

The recliner may be provided with conventional foot rests **87**, as shown, for the use of occupants of chairs in the rear of those shown. Also, a suitable scuff plate **88** may be provided as shown, the lower edge of which is curled around the tubular rear frame bar **13** and the upper edge of which is secured to a rod **89** extending between the brackets **32** at opposite sides of the structure.

It will thus be seen that the invention provides an attractive and efficient reclining chair in which the operating mechanism is concealed within the arm rest of the chair, and while but two specific embodiments of the invention have been herein shown and described it will be understood that numerous details may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

We claim:

1. In a reclining chair: a supporting frame; a chair seat, a chair back and an arm rest mounted on said supporting frame, said back being pivotally mounted near its lower end for tilting movements between non-reclining and reclining positions, and said arm rest being hollow and having an arcuate slot through the rear side wall thereof adjacent the back and concentric with the pivotal mounting of the back; a pintle on the chair back projecting through said slot into the interior of said arm rest; a link having a bearing in which said pintle is journalled, said link extending from the bearing forwardly within the arm rest; a tube pivotally mounted in the forward part of the arm rest and extending rearwardly in the arm rest toward said link and provided with a rear wall; a rack bar slidably disposed in the forward part of the tube and having upwardly extending rack teeth thereon; a connecting rod connecting the link with the rack bar and extending through a bearing in the rear wall of the tube; a compression spring interposed between the rack bar and the rear wall of the tube for normally urging forwardly the back bar, the connecting rod, the link, the pintle and the chair back; a lever pivotally mounted at its rear end on the tube and extending forwardly in the rest above the tube, said lever having a detent near its forward end movable therewith to a lowered position of engagement with the rack bar and to a raised position of disengagement therefrom; and a release knob connected to the forward end of said lever and extending through an opening in the forward end of the arm rest so as to be accessible to an occupant of the chair.

2. A reclining chair according to claim 1 in which a spring is connected to the arm rest and to the lever for normally urging the lever and the release knob toward lowered position.

3. In a reclining chair: a supporting frame; a chair seat, a chair back and an arm rest mounted on said supporting frame, said back being pivotally mounted near its lower end for tilting movements between non-reclining and reclining positions, and said arm rest being hollow and having a slot through the rear side wall thereof adjacent the chair back; a pintle on the chair back projecting laterally through said slot into the interior of said arm rest; a flat plate mounted in the arm rest for forward-rearward sliding movement adjacent the slotted side wall thereof, said plate having an opening through which said pintle extends whereby the plate moves with the pintle thus sealing the open forward part of said slot at all times; and mechanism housed within the arm rest and associated with said pintle for controlling movement of said chair back.

4. A reclining chair according to claim 3 in which the slot in the arm rest is of arcuate form concentric with the pivotal mounting of the chair back on the supporting frame.

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