June 19, 1956 E. R. McGREGOR 2,750,993

FOLDING AND ADJUSTABLE CHAIR BACK

Filed Dec. 16, 1953 4 Sheets-Sheet 1

Fig. 1.

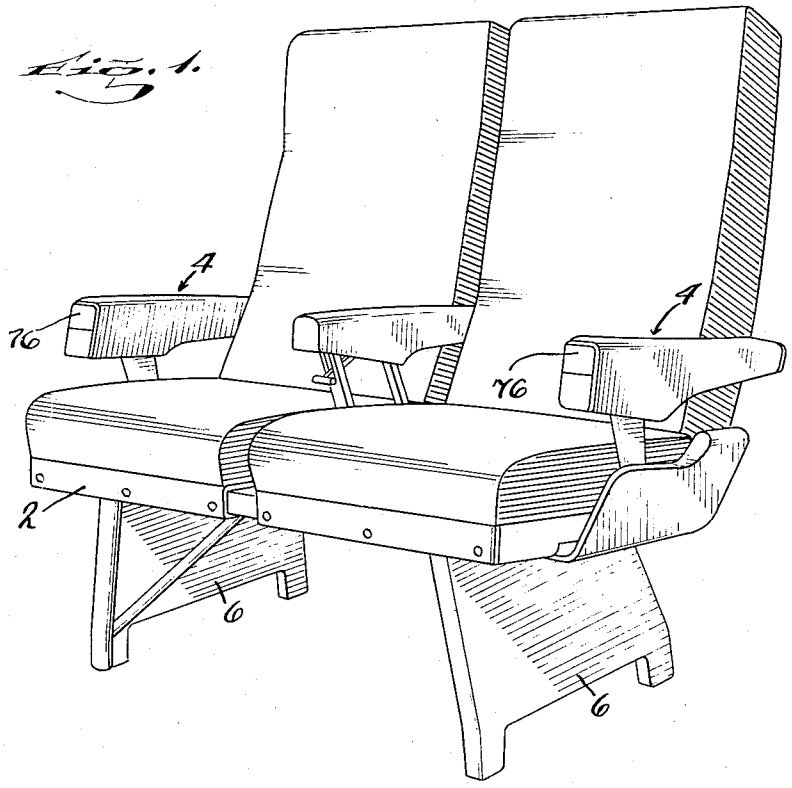
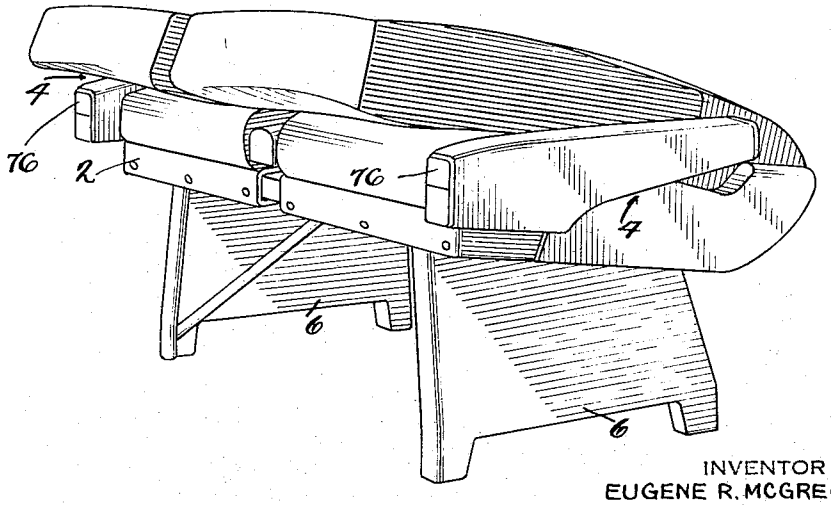


Fig. 2.



INVENTOR
EUGENE R. McGREGOR
BY James G. Bethell
ATTORNEY

June 19, 1956 E. R. McGREGOR 2,750,993

FOLDING AND ADJUSTABLE CHAIR BACK

Filed Dec. 16, 1953 4 Sheets-Sheet 2

Fig. 7.

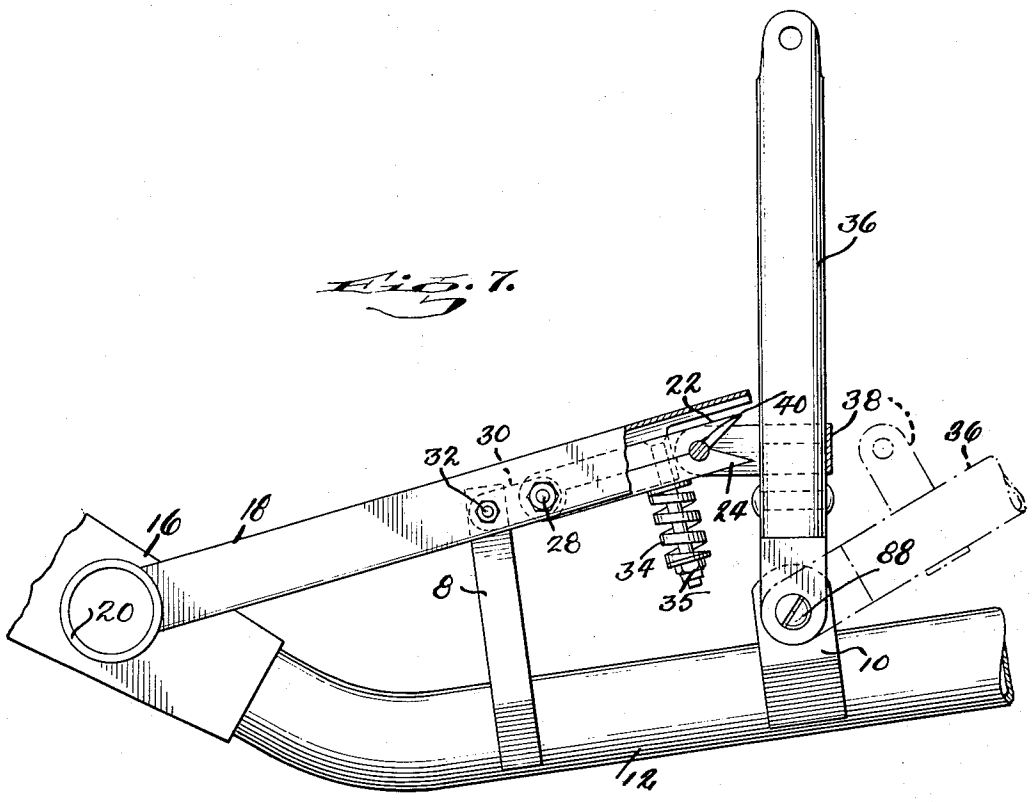


Fig. 3.

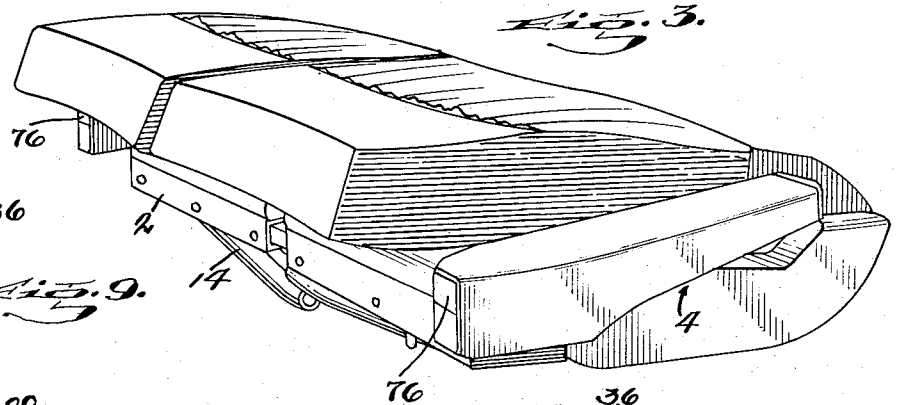


Fig. 9.

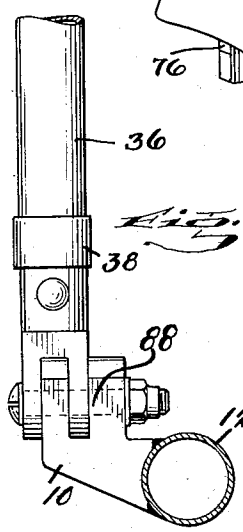
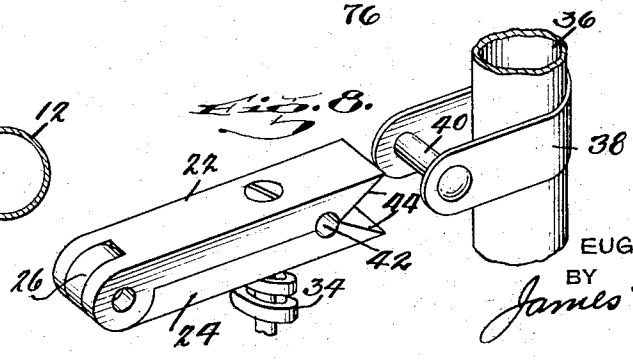


Fig. 8.

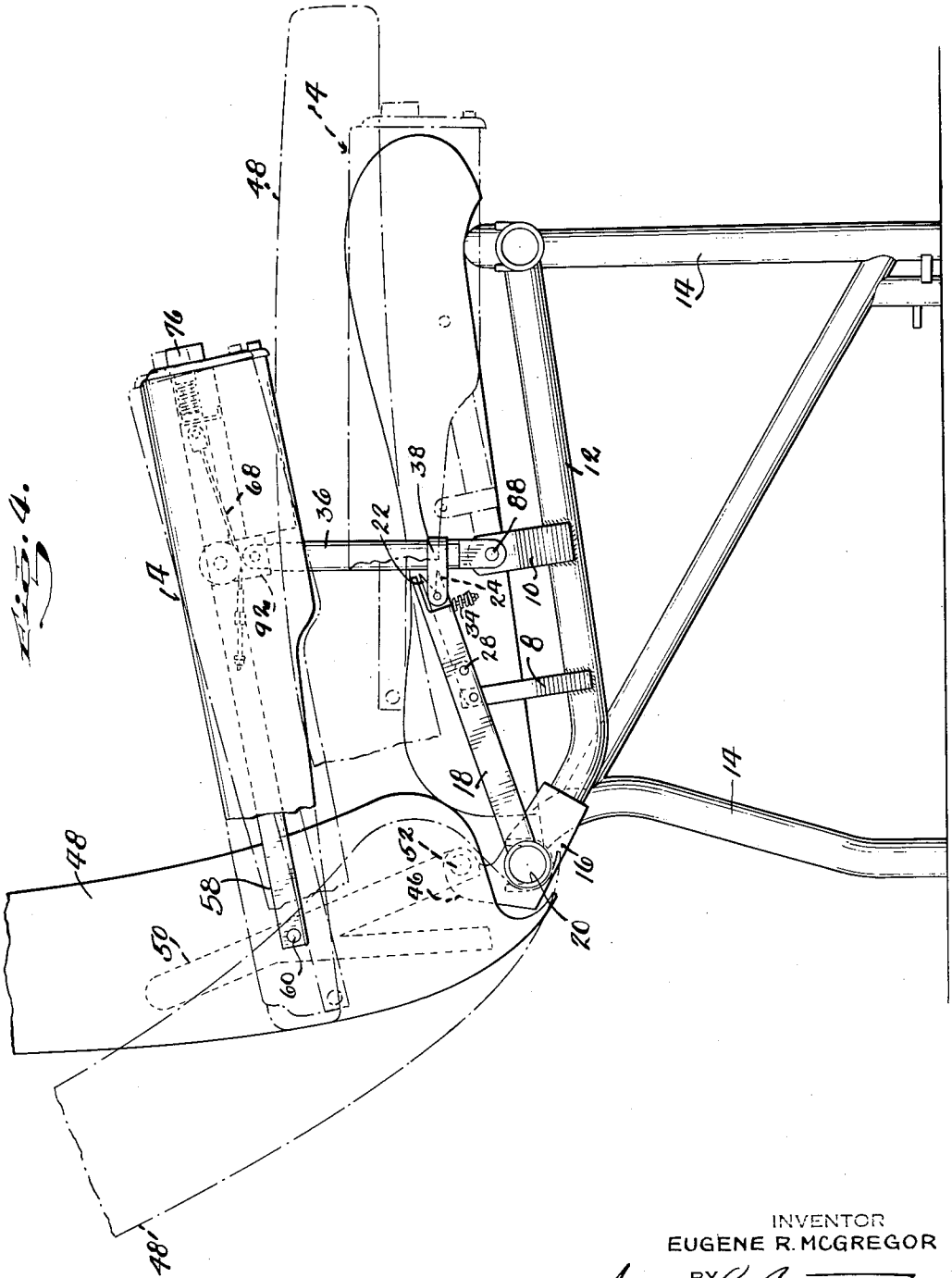


INVENTOR
EUGENE R. MCGREGOR
BY
James G. Bellows
ATTORNEY

June 19, 1956 E. R. McGREGOR 2,750,993

FOLDING AND ADJUSTABLE CHAIR BACK

Filed Dec. 16, 1953 4 Sheets-Sheet 3



INVENTOR
EUGENE R. McGREGOR
BY James G Bechtel
ATTORNEY

June 19, 1956 E. R. McGREGOR 2,750,993

FOLDING AND ADJUSTABLE CHAIR BACK

Filed Dec. 16, 1953 4 Sheets-Sheet 4

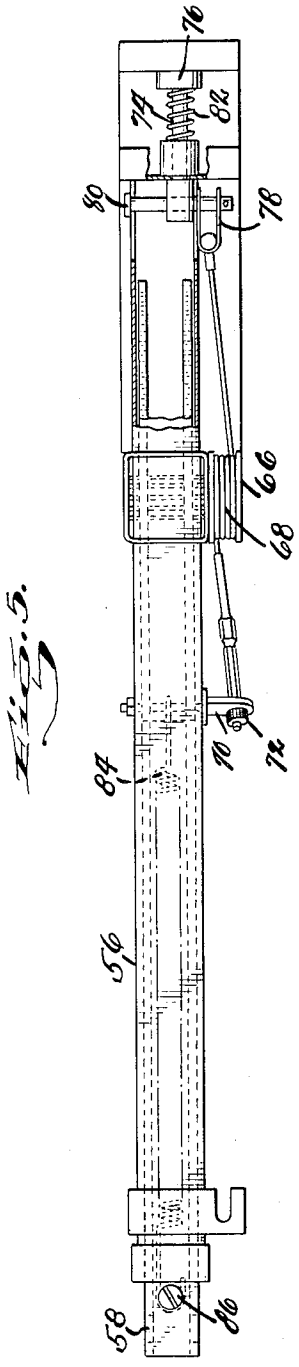


Fig. 5.

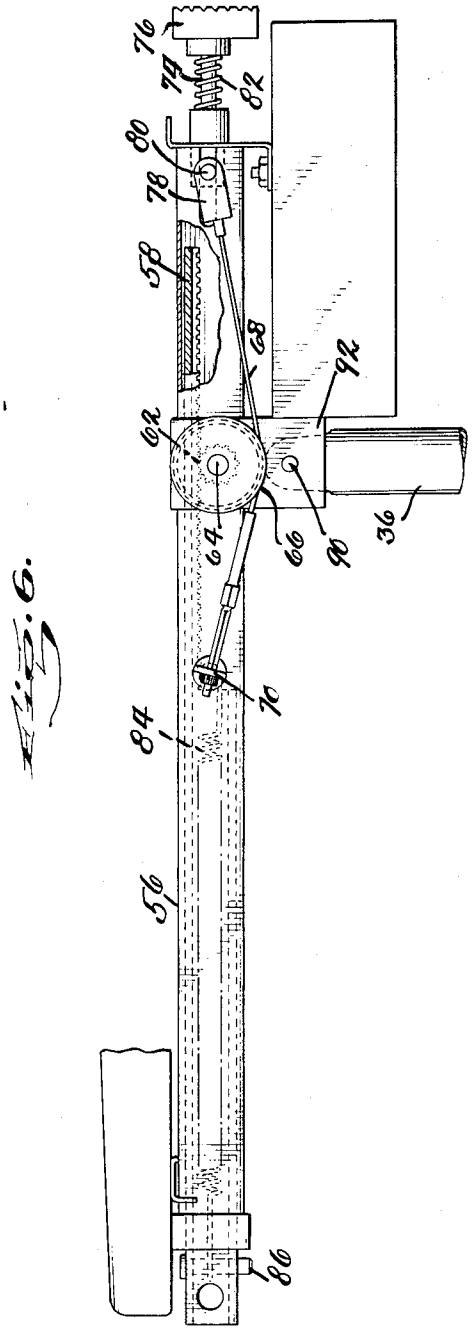


Fig. 6.

INVENTOR
EUGENE R. MCGREGOR
BY James G. Bethell
ATTORNEY

United States Patent Office 2,750,993 Patented June 19, 1956

2,750,993

FOLDING AND ADJUSTABLE CHAIR BACK

Eugene R. McGregor, Litchfield, Conn., assignor, by mesne assignments, to Reconstruction Finance Corporation, Washington, D. C.

Application December 16, 1953, Serial No. 398,487

7 Claims. (Cl. 155—155)

My invention relates to an improvement in chairs and has for one of its objects to provide a chair or seat with new and improved reclining mechanism as well as new and improved mechanism for permitting the chair and its arm rests to be folded or collapsed for storage, transportation, etc.

More specifically, the present invention provides a chair or seat in which the reclining mechanism, that is to say, the mechanism which controls the movement of the chair back to various reclining positions, is enclosed in the side arm rests of the chair.

The reclining mechanism just referred to and the mechanism which permits the back to be folded or collapsed are of simple, sturdy construction, and the latter is connected to the arm rests and their contained reclining mechanism in such a manner that the back and arm rests collapse simultaneously. Furthermore the arrangement is such that not only may the back be folded down or collapsed so as to occupy the minimum of space, but the arm rests at the same time will lie below the level of the folded back. In this way, not only are the dimensions of the folded or collapsed chair assembly reduced to a minimum, but the arm rests are protected against storage and transportation abuse.

The mechanism which adapts the chair back for tipping or reclining to an infinite number of positions may be referred to as a lock drag and, as mentioned, is installed in the side arm shell of the chair, and, inasmuch as this shell is open on its underside, the lock-drag mechanism is always available for adjustment without the aid of special tools. Furthermore, the arm shell is readily removable so as to expose the entire enclosed mechanism for maintenance.

Other and further objects of this invention will appear from the description to follow.

In the accompanying drawings, wherein I have illustrated one embodiment of my invention,

Figs. 1, 2, and 3 are perspective views, showing a chair embodying my invention in extended position, partially folded position, and completely folded or collapsed position, respectively;

Fig. 4 is a side-elevational view of the chair of Figs. 1, 2, and 3;

Fig. 5 is a plan view of one of the arm rests with the shell removed;

Fig. 6 is a side-elevational view of the same arm rest;

Fig. 7 is a fragmentary view, showing part of the chair-folding mechanism; and

Figs. 8 and 9 are fragmentary views also showing certain details of the folding mechanism.

Referring to the drawings in detail and, first of all, to the general views of Figs.1, 2, and 3 wherein I have shown a chair of the two-seat type, 2 designates the chair frame. A two-seated chair has been shown for illustrative purposes only, my invention being usable with single-seated chairs as well as with chairs having more than two seats.

The arm rests, within which the reclining or lock-drag mechanism is enclosed, are designated 4, and each comprises a removable shell, as will be brought out hereinafter.

6 designates the foldable legs of the chair, which are attached to the chair frame, but, inasmuch as the method of attaching the legs to the frame of the chair constitutes no part of the present invention, it has not been shown in any detail on the drawings, nor will it be described in this specification.

Referring now more particularly to Figs. 4, 7, 8 and 9. 8 and 10 designate brackets, which are welded or otherwise rigidly attached to each of the tubular members 12, constituting the sides of the chair frame. The chair frame also comprises tubular members or legs 14, which are a part of the members 6, above referred to. Each side frame member 12 at its rear end is provided with an extension 16.

Each of the brackets 8 supports a tubular member or brace 18, which is anchored to the rear frame member 20 of the chair frame and extends forwardly to a point above the bracket 10. The brace 18 is open at its bottom at its front end, and lying within the same is a locking element constituting part of the mechanism by which the chair is held in extended position. Although other types of locking mechanism may be employed, the illustrated mechanism comprises two metal locking jaws 22 and 24, attached to each other at 26 by a bolt 28. A strap 30 extends from this bolt to a bolt 32, by which the tubular element 18 is rigidly attached to the upper end of the bracket 8. The jaws 22 and 24 pivot on the bolt 28, so that the outer ends of these two jaws may be separated slightly for unlocking purposes, as will be brought out hereinafter. To hold these two jaws closed, I provide an adjustable spring 34, which may be adjusted simply by rotating the adjusting nut 35.

Pivotally attached to the upper end of the bracket 10 is an upright tubular member or vertical post 36, this pivotal connection between the bracket and the post being clearly shown in Fig. 9. Secured to the tubular member 36, adjacent the outer ends of the jaws 22 and 24, is a strap 38, across the ends of which I provide a locking pin 40, this pin lying in a hole 42, provided for that purpose in the jaws 22 and 24 near the front end thereof. The outer ends of the jaw members 22 and 24 are beveled, as indicated at 44, to enable the pin 40 to force the jaws apart sufficiently to enable it to move into the transverse hole 42. When the pin 40 lies within the hole 42, as best seen in Fig. 7, the chair parts are in extended position.

Reverting to the side frame extensions 16, above referred to, it will be seen from Fig. 4, for example, that the outer end of each of these extensions is shaped to provide a neck 46, which constitutes one of the bearings for the chair back 48 about which the back is moved for reclining purposes and for collapsing or folding of the chair.

The frame of the chair back comprises a frame 50, and this is pivoted to the necks 46, as indicated at 52.

Referring now more particularly to Figs. 4, 5, and 6 of the drawings, it will be seen that installed within each arm rest shell 4 is a lock drag for controlling tilting of the chair back 48, and, as will be brought out shortly, this mechanism is tied to the post 36 so that not only may the arm rests and contained mechanism be folded down into collapsed position, but they must be folded simultaneously with the movement of the chair back to collapsed position.

The lock-drag mechanism comprises a tubular element 56, which is rectangular in cross-section.

Contained within the tubular element 56 is a rack 58.

This rack is pivoted to the frame 50 of the back of the chair, as seen at 60, and is bodily movable longitudinally, rearwardly and forwardly relatively to the chair frame. In other words, when the chair back 48 is tilted rearwardly from the vertical, the rack 58 will be moved endwise within the tube 56 and in the same direction. By the same token, the rack will be moved in the opposite direction when the chair back is moved again toward vertical position. The teeth of the rack 58 constantly mesh with a pinion 62, mounted on pinion shaft 64, which passes through the side walls of the tubular member 56. This pinion shaft 64 carries a drum 66, which, for clarity, will be referred to as a lock-drag drum, this drum being mounted at the exterior of 56. Wound upon this drum is a lock-drag cable 68, one end of which is anchored to the tubular member 56 to one side of the drum 66 through the medium of member 70, the stem of which passes through the two side walls of the tubular member. This anchor, for this end of the cable, may be adjusted by manipulation of the knurled nut 72. The opposite end of the cable 68 is attached at the other side of the drum 66 to the stem 74 of a push button 76 through the medium of clevis 78 and a pin 80, which passes through the push button stem 74. The push button stem 74 is equipped with coil spring 82 for maintaining tension on the cable 68 at all times, so that there is always a braking effect or drag on the drum 66, this drag effect being adjustable or variable by manipulation of the knurled nut 72, previously referred to.

Within the tubular member 56 is a tension spring 84, one end of which is fastened to the stem of the cable anchor 70, previously referred to, and, hence, fixed with respect to member 56; the other end of this spring is attached to the rack 58 through the medium of a pin 86. This spring 84 cooperates with the cable 68 and drum 66 in tilting of the chair back in both rearward and forward directions, the cable tension being so set as barely to overcome the spring 84 when the chair back is at full recline. The stem of the anchor member 70 limits forward movement of the rack. This stopped position of the rack 58 is the position which it takes when the chair back 48 is in vertical position. When the occupant of the chair desires to tilt the back rearwardly to any extent he may desire, he depresses a push button 76 against the action of spring 82. This will produce a slack in the cable 68 and, hence, reduce the friction on the lock-drag drum 66, so that, by a slight rearward pressure on the back of the chair, the back may be reclined to any degree desired and will remain in that position. On the reverse motion of the chair back, 76 may again be depressed, to permit the chair back to be restored by spring 84 to its original position, or the chair back may be restored to upright position by exerting a relatively slight forward pressure on the back.

The upright posts 36, which have previously been referred to, are pivoted at their lower ends to the brackets 10, as seen at 88, while at their upper ends they are pivoted, as seen at 90, to straps 92 with which the members 56 are provided.

The movement of the chair back from upright to reclining position has already been described, but, as above pointed out, the chair and arm rests are capable of being folded or collapsed simultaneously to the position shown in Fig. 2, for instance, provided, however, the chair back first is brought to or is in upright position. To effect such folding, it is merely necessary to either pull forward upon the chair back or to push upon the chair back from the rear with sufficient force to release the pins 40 from the locking jaws 22 and 24, the applied force acting through racks 58 to posts 36. This will move the arm rests and contained mechanism forwardly, the rests pivoting on the upper ends of the posts 36 about the pivot 99, while the posts will pivot on brackets 10. The parts are so dimensioned and relatively disposed

that, not only will the back and arm rests collapse simultaneously, but in fully collapsed position the arm rests and their contained mechanism lie below the level of the back, as clearly illustrated in Fig. 4. This reduces the total folded thickness of the chair assembly and, of course, protects the arms of the chair from abuse.

The arm rest construction above described provides for ready adjustment and maintenance of the lock drag and tilting mechanism, while the arm rest construction, together with the locking and folding mechanism shown in Fig. 7, for example, reduces the dimensions of the chair for storage or shipment purposes and also makes it possible quickly to collapse the back of the chair so as to gain access to an emergency exit, for example, which permits the chair to be placed anywhere in an aircraft cabin without regard to exit locations.

It is to be understood that changes may be made in the details of construction and arrangement of parts hereinabove described within the purview of my invention.

What I claim is:

1. A chair comprising, in combination, a frame; a back pivoted to the frame; an arm rest; and lock-drag mechanism for controlling tilting of the back, said lock-drag mechanism comprising a rack within the arm rest and pivotally attached at its rear end to said back, a tension spring lying within the arm rest attached at one end to said rack and at its other end to the arm rest, a pinion within the arm rest meshing with said rack, and means carried by the arm rest for applying an adjustable braking effort to the pinion.

2. A chair comprising, in combination, a frame; a back pivoted to the frame; an arm rest; lock-drag mechanism mounted within said arm rest and pivotally attached to said back for controlling tilting of said back; a post beneath said arm rest; a pivotal connection between the upper end of said post and the arm rest and between the lower end of said post and the chair frame, said pivots being so disposed relatively to each other as to enable the arm rest and its contained lock-drag mechanism and the chair back to be folded or lowered into completely collapsed position upon the chair frame.

3. A chair comprising, in combination, a frame; a back pivoted thereto; an arm rest; and lock-drag mechanism within the arm rest for controlling tilting of the said back about the pivotal connection between the back and frame, said lock-drag mechanism comprising a tubular element constituting part of an arm rest, a rack mounted within the said tubular element and movable along the same, means for pivotally attaching the rear end of the rack to the chair back, a pinion within the tubular element in constant mesh with said rack, a lock-drag drum carried by the tubular element concentric with said pinion, a cable about said drum, means for anchoring the inner end of the cable to the tubular element, a spring-loaded push button extending into the outer end of said tubular element, and means for attaching the outer end of said cable to said button, whereby the push-button loading spring will maintain said cable under tension about said drum to exert a drag against rotation of the same, thereby to control tilting of the chair back about its pivotal connection to the chair frame.

4. A chair comprising, in combination, a frame; a back pivoted thereto; an arm rest; and lock-drag mechanism within the arm rest for controlling tilting of the chair back about the pivotal connection between the back and frame, said lock-drag mechanism comprising a tubular element constituting part of the arm rest, a rack mounted within said arm rest element and having its inner end pivoted to the chair back, said rack being movable lengthwise within said arm rest element, a spring within the arm rest element having its inner end attached to the rack and its outer end anchored to the said tubular element, a pin extending across said tubular element, a pinion within said element mounted on said pin and constantly in mesh with said rack, a drum concentric

with the pinion mounted on said pin at the exterior of said tubular element, a lock-drag cable about said drum, one end of the cable being adjustably anchored to the tubular element, a push button at the outer end of the tubular element, the other end of said cable being attached to said button, and an expansion spring carried by the push button outwardly of said tubular element, thereby to maintain tension on said lock-drag cable.

5. A chair comprising, in combination, a frame; a chair back pivoted thereto; an arm rest comprising lock-drag mechanism pivotally attached to the chair back; a post beneath the arm rest having its upper end pivoted to the arm rest and its lower end pivoted to the chair frame, whereby the chair back and arm rest including the lock-drag mechanism may be folded over or collapsed upon the chair frame; and locking mechanism for normally maintaining the back and arm rest in extended position, said locking mechanism comprising a tubular member attached at one end to the rear part of the chair frame and extending forwardly into close proximity to said post, spring-closed locking jaws within the said tubular member at the forward end thereof, and a pin carried by said post and adapted to be gripped by said jaws, thereby to lock the post in upright position to maintain the chair back and arm rest in extended or uncollapsed position.

6. A chair comprising, in combination, a frame; a chair back pivoted thereto; an arm rest; mechanism mounted within the arm rest and attached to the chair back; a post pivoted to the arm rest and to said frame; spring locking jaws attached to the frame and cooperating with said post to lock the chair in uncollapsed position while permitting tilting of the chair back, said locking jaws being arranged to release said post upon the application of force to the chair back in a directon to fold

the back down upon sad frame, the parts being so disposed relatively to each other that, in folded or collapsed position, the arm rest will lie below the level of the upper face of the chair back.

7. A chair comprising, in combination, a frame; a chair back pivoted thereto; an arm rest; lock-drag mechanism within the arm rest and attached to one end to the chair back to control tilting of the chair back relative to the frame; a member intermediate the lock-drag mechanism and said frame and pivotally attached to each; and quick-release locking mechanism carried by said frame for locking said intermediate member against pivotal movement relative to said frame during tilting of the chair back relative to said frame under the control of said lock-drag mechanism, said chair back, arm rest, lock-drag mechanism, and intermediate member being collapsible as a unit in a forward direction upon release of said locking mechanism.

References Cited in the file of this patent

UNITED STATES PATENTS

201,912	Collignon	Apr. 2, 1878
293,393	Young	Feb. 12, 1884
960,607	Wersel	June 7, 1910
1,444,024	Burdick	Feb. 6, 1923
1,701,604	Boery	Feb. 12, 1929
1,773,597	Myerson	Aug. 19, 1930
1,929,471	Bank	Oct. 10, 1933
2,133,471	Opperman	Oct. 18, 1938
2,273,428	Bank	Feb. 17, 1942

FOREIGN PATENTS

35,395	France	Aug. 6, 1929
37,158	Denmark	Feb. 21, 1927