United States Patent

[11] 3,580,635

[72] Inventor **Raymond C. Posh**
Livonia, Mich.

[21] Appl. No. **752,529**
[22] Filed **Aug. 14, 1968**
[45] Patented **May 25, 1971**

[73] Assignee **Lear Siegler, Inc.**
Santa Monica, Calif.

[54] **RECLINING FORWARD FOLDING SEAT**
36 Claims, 15 Drawing Figs.

[52] **U.S. Cl.** **297/355,** 297/379
[51] **Int. Cl.** **A47c 1/032**
[50] **Field of Search** 297/355, 354, 379, 378

[56] **References Cited**

UNITED STATES PATENTS

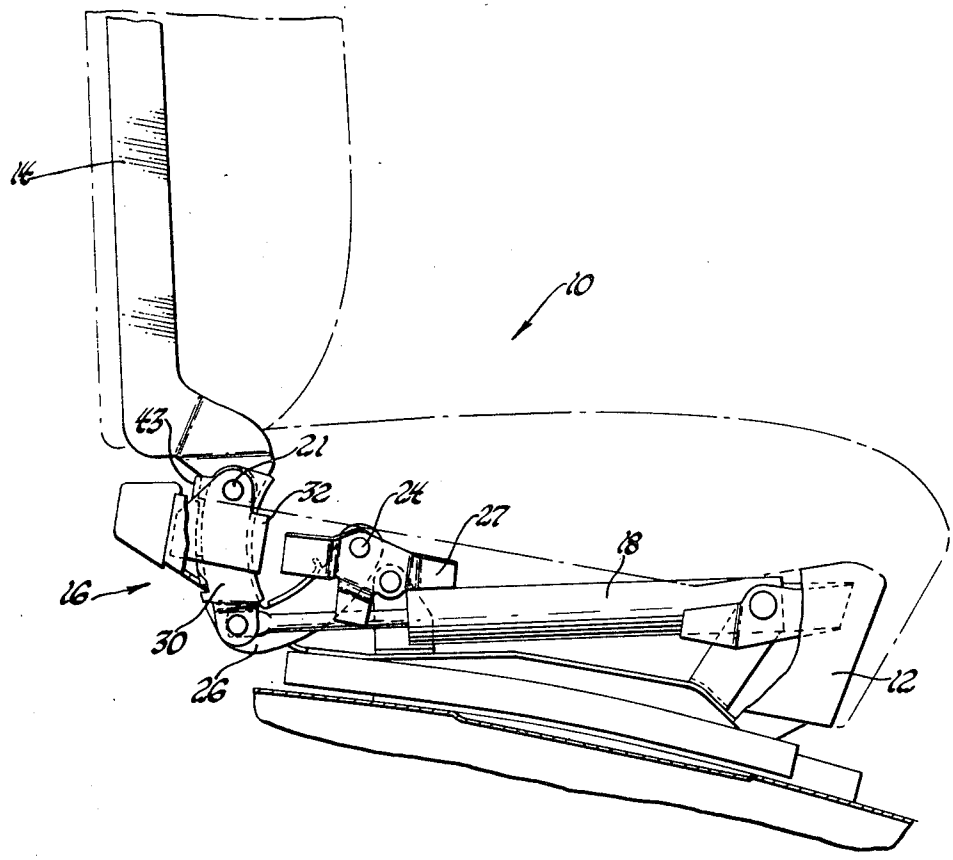
1,701,417	2/1929	Minelli	297/378
2,177,892	10/1939	Kaiser	297/378
2,309,445	1/1943	Edwards	297/355
2,320,370	6/1943	Luker	297/378
2,955,644	10/1960	Kramer	297/378
3,104,130	9/1963	Martens	297/355
3,185,525	5/1965	Welsh	297/379
3,288,527	11/1966	Martens	297/355
3,356,411	12/1967	Homier	297/355
3,473,176	10/1969	Taylor	297/379X

FOREIGN PATENTS

629,551	10/1961	Canada	297/379

Primary Examiner—Francis K. Zugel
Attorney—Barnard, McGlynn & Reising

ABSTRACT: A seat assembly including a cushion frame and a back frame with control means operatively interconnecting the frames for allowing the back frame to recline from an upright seat-forming position while preventing forward folding movement and for allowing forward folding movement of the back frame from the upright seat-forming position while preventing reclining movement. Two embodiments are disclosed and in each embodiment the control means includes a C-shaped link pivotally connected to the cushion frame on the folding axis and pivotally connected to the back frame at a point on the reclining axis when in the upright seat-forming position. A second link is pivotally connected to the cushion frame on the reclining axis and depends therefrom and has various flanges to coact with a dependent arcuate section of the back frame and the C-shaped link for allowing folding movement while preventing reclining movement and vice versa. A positioning mechanism interconnects the cushion frame and the lower end of the second link for controlling the reclining position of the back frame. In one embodiment the reclining and folding axes intersect and in another embodiment the axes are parallel.



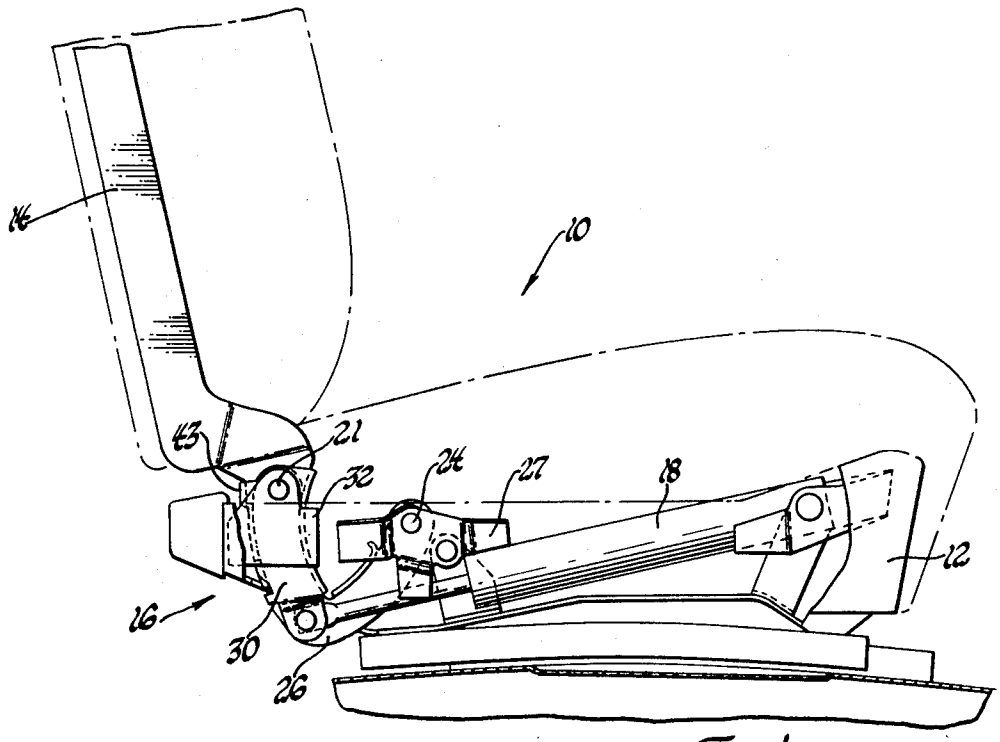


Fig. 1

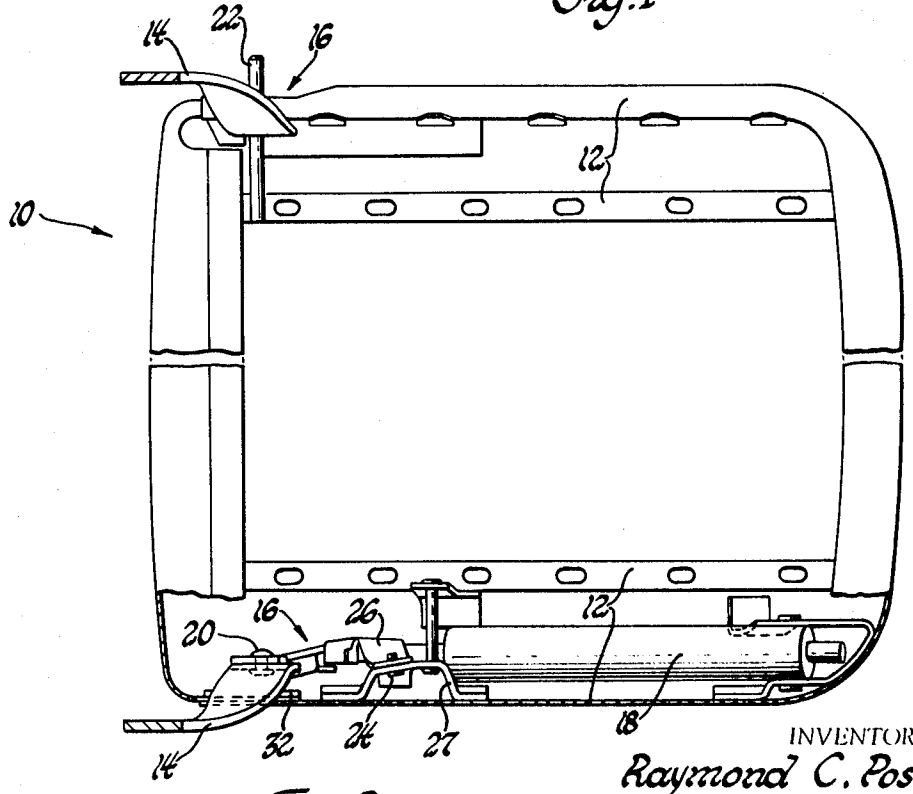


Fig. 2

INVENTOR.
Raymond C. Posh
BY
Barnard, McGlynn & Reising
ATTORNEYS

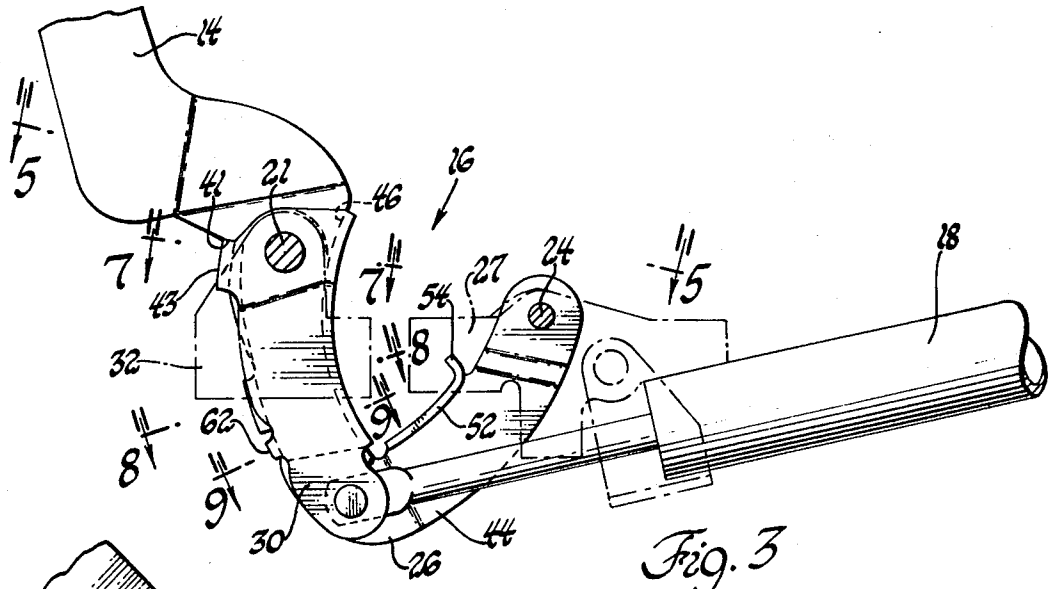


Fig. 3

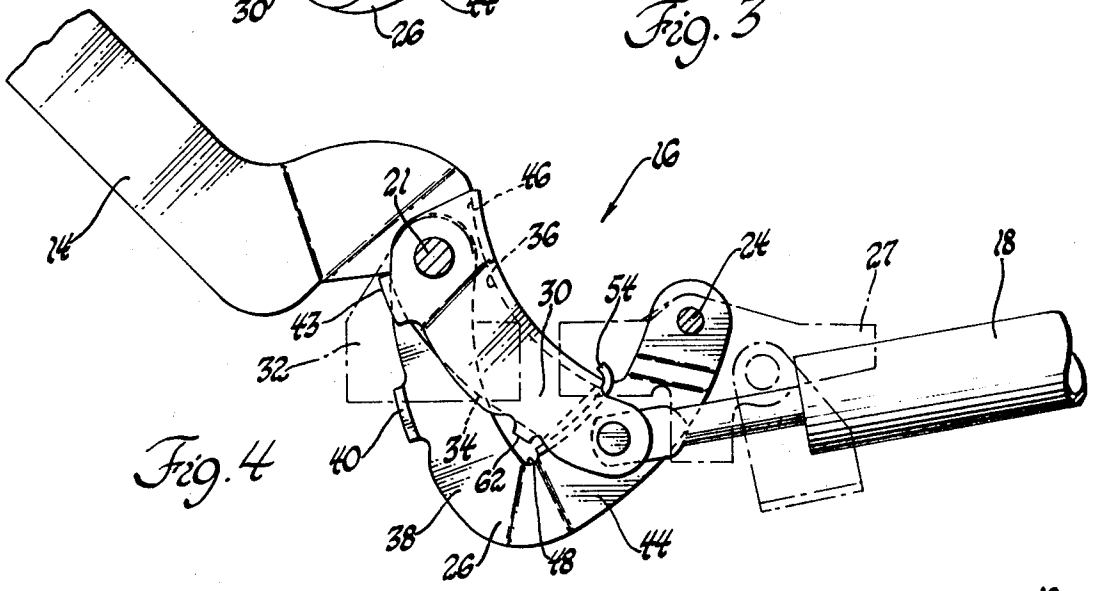


Fig. 4

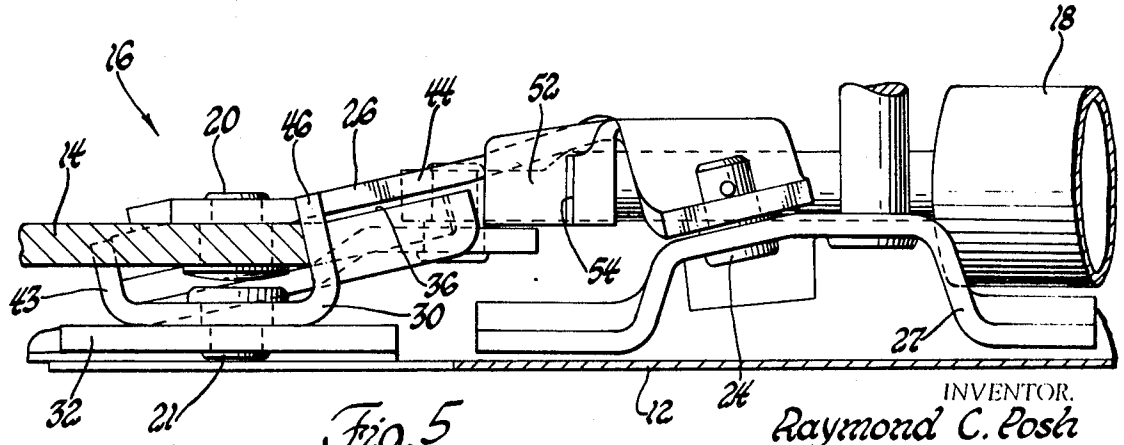


Fig. 5

INVENTOR.
Raymond C. Posh
BY
Bernard, McGlynn & Reising
ATTORNEYS

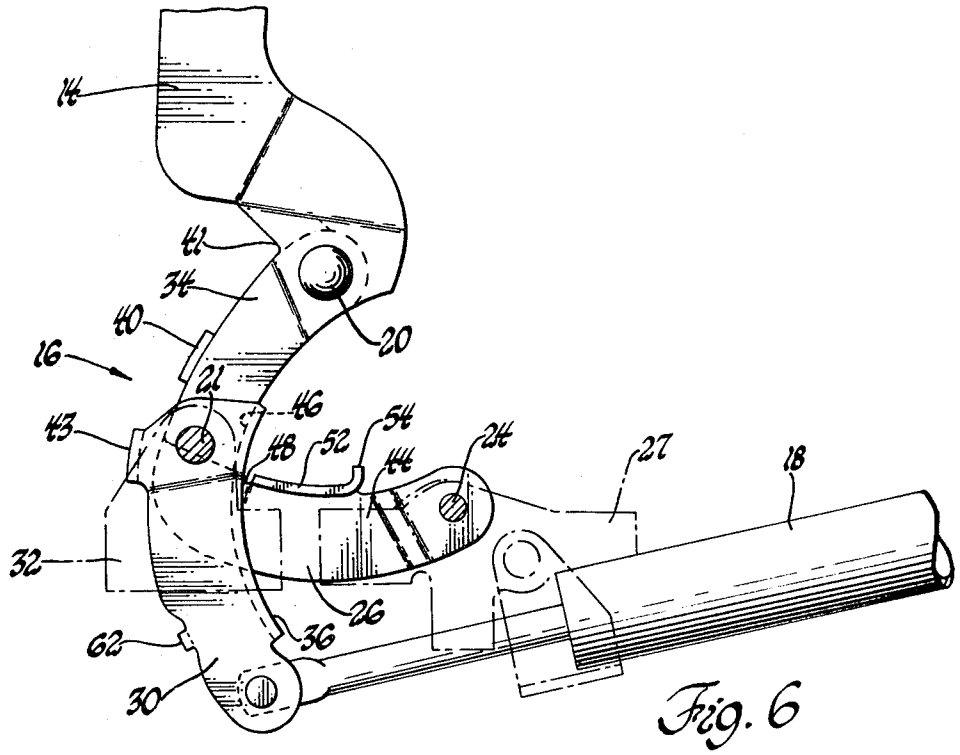


Fig. 6

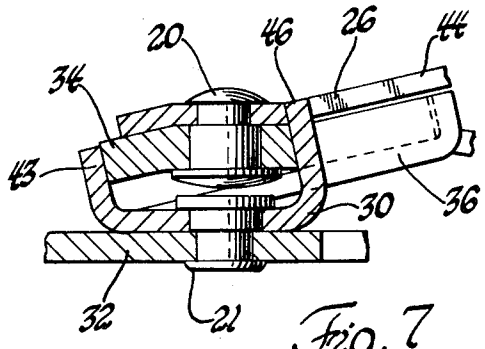


Fig. 7

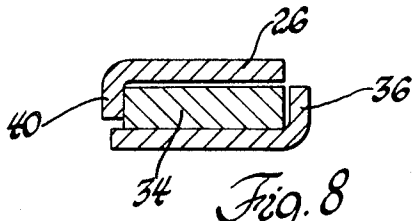


Fig. 8

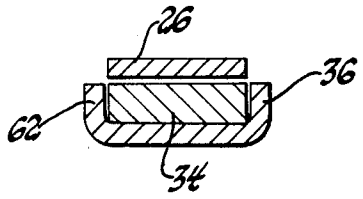


Fig. 9

INVENTOR.
Raymond C. Posh
BY
Barnard, McGlynn & Reising
ATTORNEYS

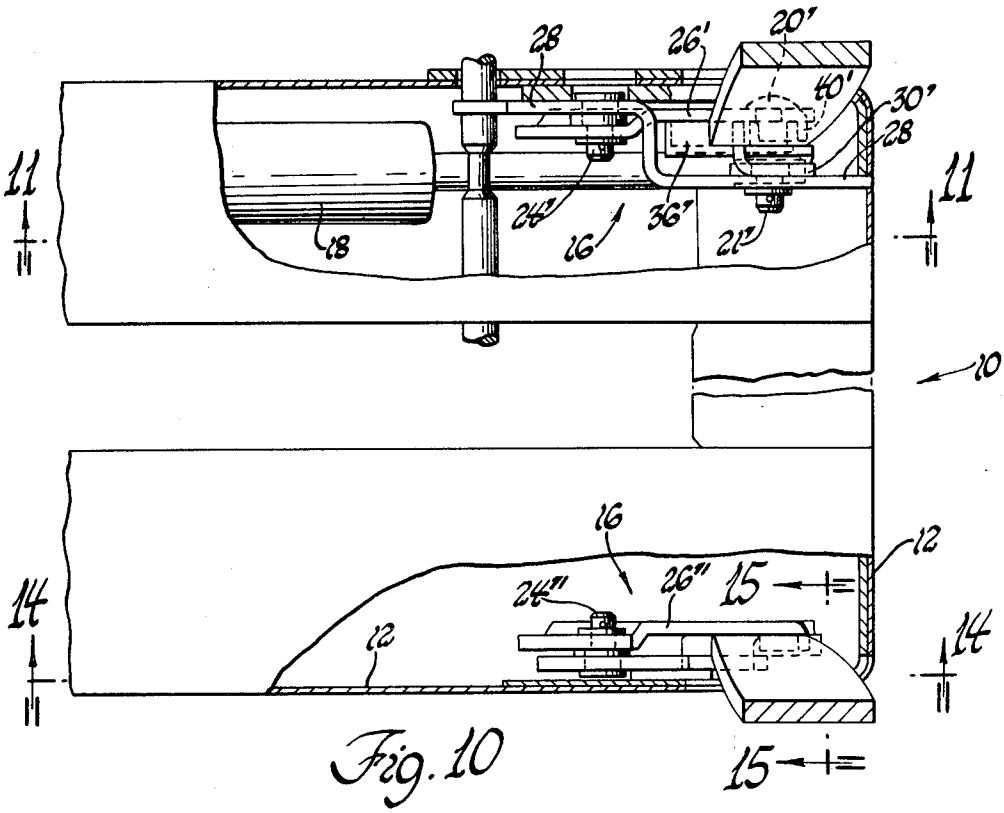


Fig. 10

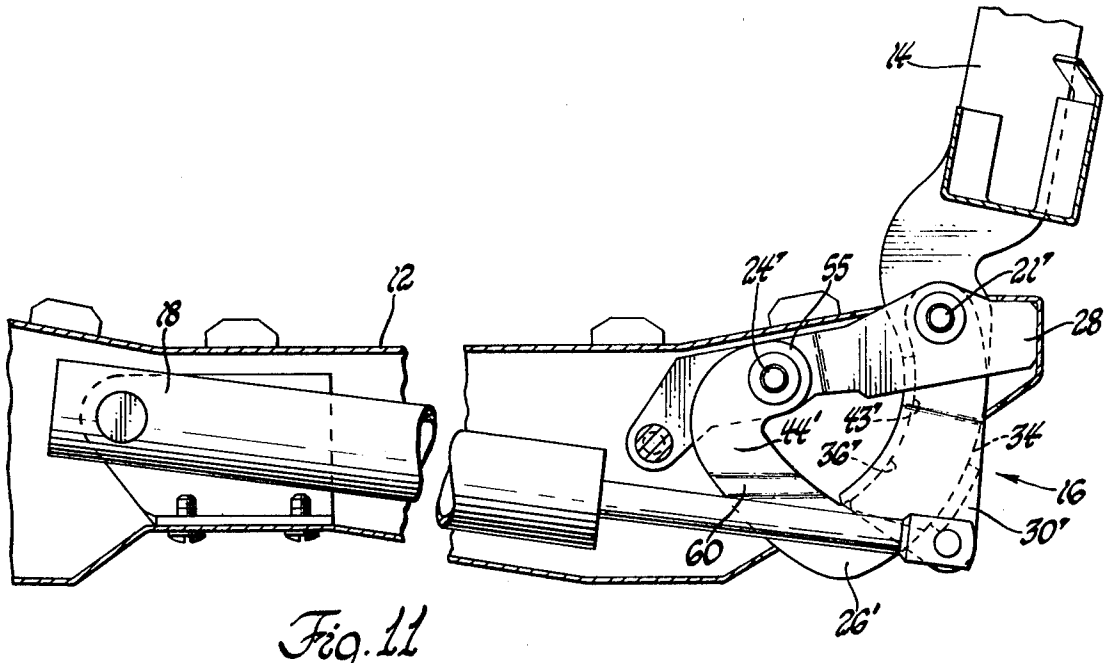


Fig. 11

INVENTOR.
Raymond C. Posh
BY
Barnard, McGlynn & Ruising
ATTORNEYS

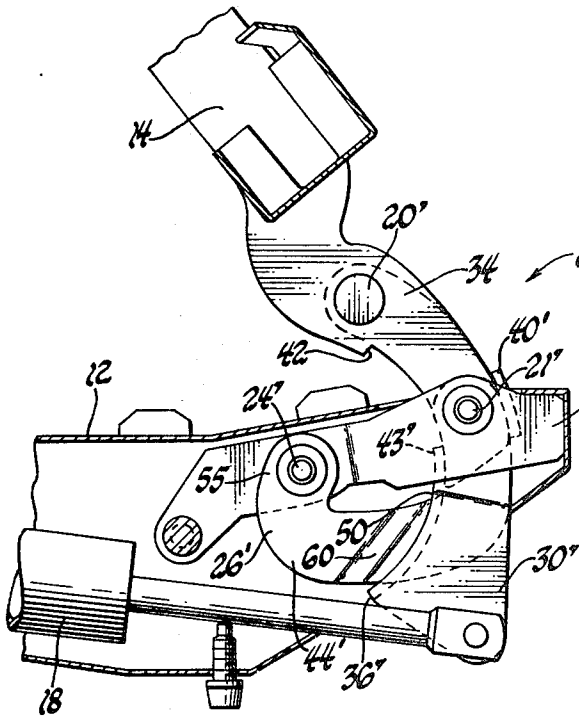


Fig. 12

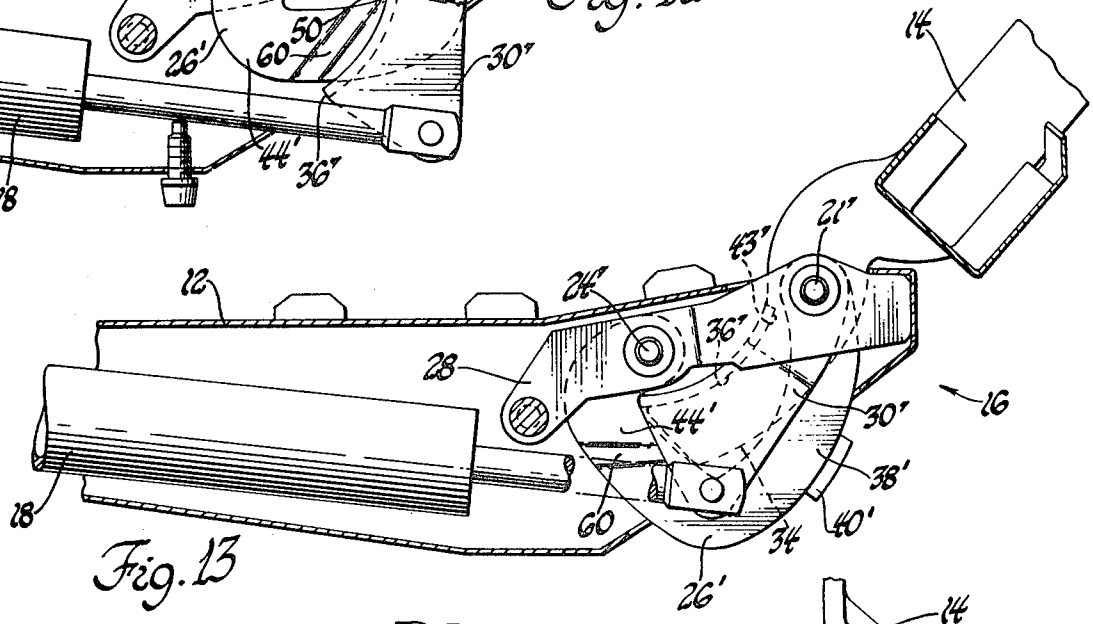


Fig. 13

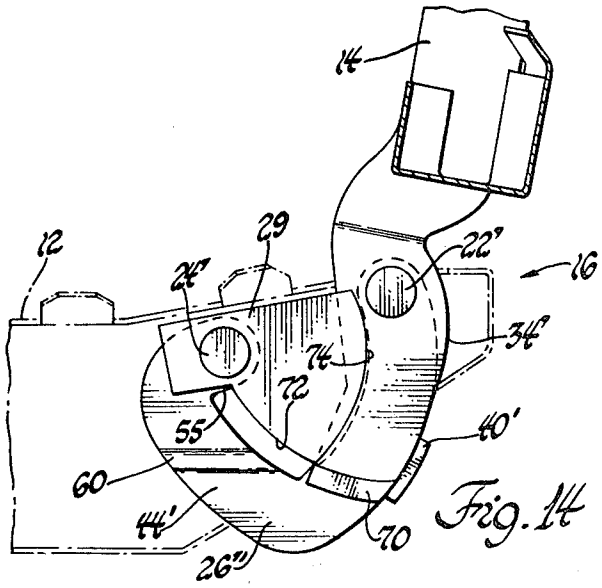


Fig. 14

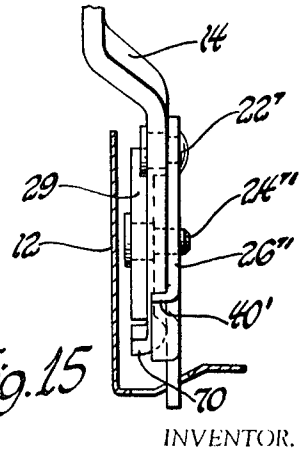


Fig. 15

INVENTOR.
Raymond C. Posh
BY
Barnard, McGlynn & Reising
ATTORNEYS

RECLINING FORWARD FOLDING SEAT

The instant invention relates to a seat assembly of the type utilized in vehicles such as automobiles and trucks. More specifically, the invention relates to a seat assembly including a cushion frame and a back frame wherein the back frame mat pivot relative to the cushion frame forwardly from an upright seat-forming position and rearwardly to one of various reclined positions. Such a seat is frequently utilized in a two-door passenger car to facilitate ingress and egress to and from the rear seat of the vehicle by forwardly folding the back frame relative to the cushion frame and where the back frame may be moved to one of various reclined positions for greater comfort.

This is accomplished in one prior-art seat assembly by utilizing an intermediate frame member which is pivotally connected at one end to the cushion frame and is pivotally connected at the other end to the back frame. A positioning mechanism interconnects the back frame and the intermediate frame to control the reclining pivotal movement of the back frame relative to the intermediate frame. In order to move the back frame to a forward folded position, the back frame and the intermediate frame are pivoted together about the pivotal connection of the intermediate frame to the cushion frame. There is, however, no provision in such an assembly to prevent the intermediate frame from pivoting relative to the cushion frame while the back frame is in a reclined position. Furthermore, such an intermediate frame must be connected outwardly of the cushion frame so as to clear the padding, upholstery, trim, etc., disposed on the cushion frame. This, of course, does not provide an aesthetically attractive seat assembly. Thus, one of the major problems with prior-art seat assemblies is that no seat assembly exists which includes a forwardly folding and rearwardly reclining back frame which is supported by members inboard of the side extremities of the cushion frame so as to extend through a very small opening in the upholstery and padding supported by the cushion frame. In other words, any known means for pivotally interconnecting the back frame and the cushion frame to allow both forwardly folding and rearwardly reclining movement requires an unacceptably large aperture in the upholstery and cushioning material if disposed inboard of the side extremities of the cushion frame.

Accordingly, it is an object and feature of this invention to provide a seat assembly including a back frame and a cushion frame with control means operatively interconnecting the frames for allowing the back frame to recline from an upright seat-forming position while preventing forward folding movement thereof and for allowing forward folding movement of the back frame from the upright seat-forming position while preventing reclining movement thereof.

Another object and feature of this invention is to provide a seat assembly including a cushion frame having side extremities and a back frame with control means disposed inwardly of the side extremities of the cushion frame pivotally interconnecting the back frame and the cushion frame for allowing the back frame to move between an upright seat-forming position and a reclined position and to move between the upright seat-forming position and a forwardly folded position.

In correlation with the foregoing objects and features, another object and feature of this invention is to include in the seat assembly a first link means pivotally connected to the back frame to allow the back frame to pivot relative thereto back and forth between the upright seat-forming position and a reclined position and pivotally connected to the cushion frame to allow the back frame to pivot between the upright seat-forming position and a forwardly folded position.

In correlation with the foregoing objects and features, another object and feature of this invention is to provide a seat assembly wherein the back frame has a section disposed in overlapping relationship with the first link means when in the upright seat-forming position and including means operably with this section of the back frame and the first link means for allowing the back frame to recline while preventing forward folding movement thereof and for allowing the forward folding movement of the back frame while preventing reclining movement thereof.

In correlation of the foregoing objects and features of this invention, another object and feature is to provide a seat assembly wherein the means for controlling movement of the seat of the back frame includes a second link means pivotally connected to the cushion frame and cooperably with the section of the back frame and the first link means.

In correlation with the foregoing objects and features of this invention, another object and feature is to provide a seat assembly wherein a first segment of the first link means is arcuate in an arc about the pivotal connection thereof to the cushion frame and the section of the back frame and the second link means are disposed in the same arc and are in overlapping relationship when the back frame is in the upright seat-forming position.

In correlation with the foregoing objects and features of this invention, another object and feature is to provide a seat assembly wherein the arcuate section of the back frame, the first segment of the first link means, and the second link means have front and rear edges with various tabs extending therefrom to coact with one another to limit the forwardly folding and reclining movements of the back frame as well as preventing reclining movement during forwardly folding movement and vice versa.

Other objects and attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. **1** is a fragmentary side elevational view of a first preferred embodiment of the instant invention and showing the upholstery and cushioning material in phantom and a major portion of the side of the cushion frame broken away;

FIG. **2** is a plan view partially broken away and in cross section of the embodiment of FIG. **1**;

FIG. **3** is an enlarged fragmentary view of the control means of the instant invention which pivotally interconnects the back frame and the cushion frame with the outwardly disposed support elements of the cushion frame shown in phantom and the back frame shown in the upright seat-forming position;

FIG. **4** is a view similar to FIG. **3** but showing the back frame in the fully reclined position;

FIG. **5** is an enlarged fragmentary cross-sectional view taken substantially along line **5–5** of FIG. **3**;

FIG. **6** is a view similar to FIG. **3** but showing the back frame in the fully forwardly folded position;

FIG. **7** is an enlarged cross-sectional view taken substantially along line **7–7** of FIG. **3**;

FIG. **8** is an enlarged view taken substantially along line **8–8** of FIG. **3**;

FIG. **9** is an enlarged cross-sectional view taken substantially along line **9–9** of FIG. **3**;

FIG. **10** is a fragmentary plan view partially broken away and in cross section of another preferred embodiment of the instant invention;

FIG. **11** is a fragmentary cross-sectional view taken substantially along line **11–11** of FIG. **10** and showing the back frame in the upright seat-forming position;

FIG. **12** is a fragmentary cross-sectional view similar to FIG. **11** but showing the back frame in the fully forwardly folded position;

FIG. **13** is a view similar to FIG. **11** but showing the back frame in the fully reclined position;

FIG. **14** is a view taken substantially along line **14–14** of FIG. **10**; and

FIG. **15** is a view taken substantially along line **15–15** of FIG. **10**.

Referring now to the drawings wherein like numerals indicate like or corresponding parts throughout the several views, a seat assembly incorporating the instant invention is generally shown at **10**.

As alluded to hereinabove, two preferred embodiments of the invention are set forth herein. The first embodiment is illustrated in FIGS. 1 through 9 and the second embodiment is illustrated in FIGS. 10 through 15. Both embodiments will be described simultaneously and those components and elements which are common will be indicated with numerals the same or the same numerals with the numeral of the second embodiment having a prime (') therewith.

The seat assembly 10 includes a cushion frame 12 and a back frame 14. The back frame 14 includes a pair of arms which are interconnected and support upholstery and cushioning material as is well known in the art. The cushion frame 12 has lateral sides or extremities and the lower ends of the arms of the back frame 14 are disposed inwardly of the sides of the cushion frame 12.

The seat assembly 10 includes control means generally shown at 16 operatively interconnecting the frames 12 and 14 for allowing the back frame 14 to recline from an upright seat-forming position while preventing forward folding movement thereof and for automatically allowing forward folding movement of the back frame 14 from the upright seat-forming position while preventing reclining movement thereof.

The seat assembly 10 also includes a positioning means 18 for positioning the back frame 14 in any one of various reclined positions.

The control means 16 includes a first pivotal connection for defining a reclining axis about which the back frame 14 reclines relative to the cushion frame 12 and a second pivotal connection for defining a forward folding axis about which the back frame 14 pivots forwardly relative to the cushion frame 12 to accomplish the forward folding movement. In the first embodiment of FIGS. 1 through 9, the first pivotal connection is defined by the rivets or pins 20 and 21 and the shaft 22 and the second pivotal connection is defined by the rivet or pin 24 and the shaft 22. In the second embodiment of FIGS. 10 through 15, the first pivotal connection is defined by the rivets or pins 20', 21', and the rivet or pin 22', and the second pivotal connection is defined by the rivets or pins 24'. Therefore, in the first embodiment, the control means 16 operatively interconnects the back frame 14 the cushion frame 12 adjacent one side of the seat assembly at spaced pivotal connections and interconnects the back frame 14 and the cushion frame 16 at the opposite side of the seat assembly through a single pivotal connection as defined by the shaft 22. The shaft 22 extends from the cushion frame 12 and through the back frame 14 so as to define a reclining axis which extends through the rivets 20 and 21 and the shaft 22 when the seat is in the upright seat-forming position and defines a folding axis which extends through the pin 24 and the interconnection of the shaft 22 and the back frame 14. Hence, in the first embodiment, the reclining axis and the folding axis intersect at the single pivotal connection between the shaft 22 and back frame 14. Thus, in the first embodiment of FIGS. 1 through 9, the back frame 14 will recline straight backwardly about a substantially horizontal axis and will fold forwardly at an angle so as to move forwardly and toward one side of the cushion frame 12. This, of course, facilitates the ingress and the egress to and from the rear seat of a two-door automobile. In the second embodiment, illustrated in FIGS. 10 through 15, the control means operatively interconnects the back frame 14 and the cushion frame 12 adjacent opposite sides of the seat assembly so that the rivets or pins 20', 21', and 22' define a reclining axis when the back frame 14 is in the upright seat-forming position and the rivets or pins 24' define a forwardly folding axis. Thus, the control means 16 of the second embodiment interconnects the back frame 14 and the cushion frame 12 adjacent opposite sides of the seat assembly so that the reclining axis and the folding axis are generally parallel to one another. Hence, in the second embodiment, the back frame 14 will forwardly fold straight over the cushion frame 12.

The control means 16 includes first link means 26, 26'and 26'' pivotally connected to the cushion frame 12 on the folding axis through the first pivotal connection and pivotally connected to the back frame 14 so that the back frame 14 may pivot relative thereto about the reclining axis. The second embodiment of FIGS. 10 through 15 utilizes two such first link means one being indicated at 26' and one being indicated at 26''. Although both first link means 26' and 26'' of the second embodiment are identical, they are associated with other components in a slightly different manner, which will become more clear hereinafter. In the first embodiment, the first link means 26 is pivotally connected to the cushion frame 12 through the rivet or pin 24 and the bracket 27, the bracket 27 being welded in position and forming a part of the cushion frame 12. In the second embodiment, the first link means 26' is pivotally connected to the cushion frame 12 through the the rivet or pin 24' and the bracket 28, the bracket 28 being welded or otherwise secured in place and forming a part of the cushion frame 12. The first link means 26'' of the second embodiment is pivotally connected to the cushion 12 through a rivet or pin 24'' and a bracket 29, the bracket 29 being welded or otherwise secured in place and forming a part of the cushion frame 12. The first link means 26, 26'' are respectively pivotally connected to the back frame 14 by the rivets or pins 20 in the first embodiment and the rivets or pins 20', and 22' in the second embodiment.

The other components to be described hereinafter which are cooperable and engageable with the first link means 26, 26' 26'' define means for automatically preventing the first link means 26, 26' and 26'' from pivoting about the reclining axis during forward folding movement of the back frame 14 from the upright seat-forming position and for automatically preventing the first link means 26, 26' and 26'' from pivoting about the forward folding axis during reclining movement of the back frame 14 from the upright seat-forming position.

The control means 16 also includes second link means 30 and 30' with the back frame 14 and the first link means 26' for allowing reclining movement of the back frame 14 by allowing the back frame to pivot relative to the first link means 26, 26'' while preventing movement of the first link means 26, 26' and 26'' about the folding axis and for allowing folding movement of the back frame 14 by allowing the first link means 26, 26'' to pivot relative to the cushion frame 12 about the folding axis while preventing the back frame 14 from pivoting relative to the first link means 26, 26' and 26''. The second link means 30 of the first embodiment is pivotally connected adjacent a first end thereof through the rivet or pin 21 and a bracket 32 to the cushion frame 12, the bracket 32 being welded in position and forming a part of the cushion frame 12, whereby the second link means 30 may pivot relative to the cushion frame 12 about the reclining axis. The second link means 30' of the second embodiment is pivotally connected adjacent a first end thereof through the rivet or pin 21' to the bracket 28 of the cushion frame 12 for pivotal movement relative thereto about the reclining axis. Each of the second link means 30 and 30' has a second end and has at least one generally arcuate edge or extremity extending between the ends thereof. The second link means 30 of the first embodiment is generally arcuate in configuration whereas the second link means 30' of the second embodiment has but one arcuate extremity or edge.

The back frame 14 includes an arcuate section 34 having the same radius as the arcuate extremity of the second link means 30 and 30' respectively. The second link means 30 and 30' are generally coextensive with the associated arcuate section 34 when the seat is in the upright seat-forming position, as best illustrated in FIGS. 3 and 11 respectively.

First flange means extend from the second link means 30 and 31' respectively for coacting with the arcuate section 34 so that the second link means 30 and 30' pivot about the reclining axis with the back frame 14 at least in one direction to control the reclined position of the back frame 14. More specifically, in the first embodiment, the first flange means includes the tab or flange 36 extending from the front edge of the second link means 30 to coact with the front edge of the arcuate section 34 of the back frame 14 so that the arcuate

section 34 and the second link means 30 pivot together about the reclining axis during reclining movement of the back frame 14 toward the fully reclined position.

In the first embodiment, first flange means also includes a tab 62 extending from the rear edge of the second link means 30 for coacting with the rear edge of the arcuate section 34 of the back frame 14. Thus, the tabs 36 and 62 cause the second link means 30 to rotate with the arcuate section 34 when the back frame 14 is moving in either direction of reclining movement. In the second embodiment, the first flange means includes a tab 36' extending from the front edge of the second link means 30' to coact with the front edge of the associated arcuate section 34 of the back frame 14 so that the arcuate section 34 and the second link means 30' pivot together about the reclining axis during reclining movement of the back frame 14 toward the fully reclined position.

The second link means 30 and 30' and the associated arcuate sections 34 are disposed in an arc about the first pivotal connection, which is the pivotal connection of the first link means 26 and 26' to the cushion frame 12 by the rivets or pins 24 and 24'. Thus, the arcuate sections 34 may move relative to the respective second link means 30 and 30' by pivoting in the arc about the pivotal connection of the first link means 26 and 26' to the cushion frame to allow forward folding movement to the back frame 14. Such a movement is illustrated in FIGS. 6 and 12 respectively.

The first link means 26 and 26' and 26'' in each embodiment includes a first segment 38 and 38' (as viewed in FIGS. 4 and 13 respectively) which is disposed in an arc about the first pivotal connection of the first link means to the cushion frame 12. The first segments 38 and 38' are generally coextensive with the arcuate sections 34 and the second link means 30 and 30' respectively when in the upright seat-forming position. It will be noted that each of the second link means 30 and 30', the arcuate sections 34, and the first segments 38 and 38' have respective front and rear edges with the front edges respectively being closer to the folding axis, i.e., the pivotal connection of the first link means to the cushion frame, than the rear edges.

The control means 16 also includes first and second stop means operably between the first and second link means and the back frame for limiting reclining movement of the back frame at the upright seat-forming position and at a fully reclined position and for limiting folding movement of the back frame at the upright seat-forming position and at a fully forwardly folded position. The upright seat-forming position for the respective embodiments is respectively illustrated in FIGS. 3 and 11. The fully reclined position for the respective embodiments is respectively illustrated in FIGS. 4 and 13. The fully folded forward position for the embodiments is respectively illustrated in FIGS. 6 and 12.

The second stop means includes stop tabs 40 and 40' extending from the rear edges of the the first segments 38 and 38' of the first link means 26 and 26' for coacting with the rear edges of the arcuate sections 34 of the back frames 14. The second stop means also includes a portion of the back frame offset from one of the edges of the arcuate section 34. In the first embodiment, this offset is indicated at 41 and in the second embodiment, the offset if indicated at 42. Also included in the second stop means is a first tab extending from one edge of the second link means for engaging the offset portion to limit folding movement in the upright seat-forming position as the back frame 14 is pivoted from the forward folded position toward the upright seat-forming position and to support the back frame 14. In the first embodiment, the first tab is indicated at 43 and extends from the rear edge of the second link means 30. In the second embodiment the first tab is indicated at 43' and extends from the front edge of the second link means 30'.

Each of the first link means 26, 26' and 26'' includes second segments 44 and 44' which extends from one end of the first segments 38 and 38' to the first pivotal connection as defined by the rivets or pins 24 and 24'.

The tab 36, extending from the front edge of the second link means 30 in the first embodiment, and the tab 36', extending from the front edge of the second link means 30' of the second embodiment, have previously been described and shall be referred to as second tabs. The second stop means includes an extension of one of the first and second tabs for engaging the second segment 44 or 44' of the first link means 26 or 26' to prevent further folding movement of the back frame 14 when the latter reaches the fully forwardly folded position. More specifically, in the embodiment of FIGS. 1 through 9, the extension is indicated at 46 and is a part of the second tab 36 on the front edge of the second link means 30 and engages the second segment 44 of the first link means 26 at 48 to limit forward folding movement as illustrated in FIG. 6. In the second embodiment, the first tab 43' extends from the front edge of the second link means 30' and is juxtaposed to the second tab 36' and the extension is a part of the first tab 43' and engages the second segment 44' of the first link means 26' at 50, as illustrated in FIG. 12, to limit forward folding movement of the back frame 14.

The first stop means includes the tabs 36 and 36' of the respective embodiments and a first offset portion of the second segments 44 and 44' of the first link means 26 and 26'. In the first embodiment, the first offset portion comprises a projection 54 extending transversely from a tab 52, the tab 52 in turn extending from the second segment 44 of the first link means 26. In the second embodiment, the first offset portion comprises a hook 55. In the first embodiment, the projection 54 coacts with the second tab 36 to prevent further reclining movement of the back frame 14 when the latter reaches the fully reclined position as illustrated in FIG. 4. In the second embodiment the hook portion 55 of the first link means 26' coacts with and is engaged by the second tab 36' to prevent further reclining movement of the back frame 14 when the latter reaches the fully reclined position as illustrated in FIG. 13.

There is also included a second offset portion in the second segments 44 and 44' of each of the first link means 26 and 26' for coacting with the second link means 30 and 30' respectively to prevent forward folding movement during reclining movement of the back frame 14 and to prevent reclining movement during forward folding reclining movement during forward folding movement of the back frame 14. In the first embodiment, the second offset portion comprises the tab 52 extending from the second segment 44 of the first link means 26. The tab 52 coacts with the lower extremity of the first tab 36 on the second link means during reclining movement of the back frame 14. In other words, since the second link means 30 is pivotally connected to the cushion frame 12 by the rivet 21, the first link means 26 cannot pivot about the rivet 24 when in the position illustrated in FIG. 4 because of the interference between the tabs 36 and 52. The tab 52 also coacts with the second tab 36 during forward folding movement to prevent reclining movement of the second link means 30.

In the second embodiment, the second offset portion comprises a jog 60 along the second segment 44' of the first link means 26' so that the portions of the second segment 44' on the opposite sides of the jog are in different planes. The jog 60 coacts with the second or lower end of the second link means 30' during reclining movement to prevent forward folding movement by preventing the first link means 26' from pivoting about the rivet 24'. The jog 60 also coacts with the second tab 36' along the second link means during folding movement to prevent reclining movement by preventing the second link means 30' from pivoting about its pivotal connection to the cushion frame 12.

It will be noted that in each embodiment the positioning means 18 is connected at one end to the cushion frame 12 and has a piston extending therefrom and connected to the second end of the second link means 30 and 30' respectively to control the pivotal movement of the second link means 30 and 30' respectively about the reclining axis for positioning the back frame 14 in any one of various reclined positions. Positioning

mechanisms of the type which may be utilized with the instant invention are well known in the art.

As alluded hereinbefore, the embodiment of FIGS. 1 through 9 includes a back frame 14 which reclines about an axis which is at an angle to and intersects the axis about which the back frame forwardly folds whereas the embodiment of FIGS. 10 through 15 includes a back frame 14 which reclines about an axis which is parallel and spaced from the axis about which the back frame forwardly folds. Thus, the embodiment of FIGS. 10 through 15 includes a control means disposed on opposite sides of the seat assembly for pivotally connecting the back frame 14 to the cushion frame 12. In the second embodiment, however, on one side of the seat no positioning mechanism is utilized and there is no need for a second link means 30' on that side. Thus, only a similar first link means 26'' and a similar arcuate section 34' interconnect the back frame 14 and the cushion frame 12 on one side of the assembly in the second embodiment. Such is illustrated in FIGS. 14 and 15. The arcuate section 34' is not quite arcuate or of the same shape as the arcuate section 34 on the other side of the seat assembly. Also, the lower extremity of the arcuate section 34' includes a flange 70. As viewed in FIG. 14, the outwardly most spaced member is the bracket 29 and the inwardly most spaced member is the first link means 26''. The bracket 29 has two arcuate surfaces. During reclining movement of the back frame 14, the flange 70 coacts with the arcuate surface 72 of the bracket 29 to prevent forward folding movement of the back frame 14. The flange 70 also limits the reclining movement by engaging either the hook 55 or the projection of the bracket 29. The flange 70 also coacts with the arcuate surface 74 of the bracket 29 during forward folding movement to prevent reclining movement of the back frame 14.

In the operation of the first embodiment illustrated in FIGS. 1 through 9, the seat is normally positioned with the back frame 14 in the upright seat-forming position as illustrated in FIGS. 1 and 3. If it is desired to recline the back frame 14 about the reclining axis, the positioning mechanism 18 is manually actuated and a force is applied against the back frame 14 to recline it rearwardly toward the fully reclined position illustrated in FIG. 4. During this reclining movement the second link means 30 coacts through the tab 36 with the arcuate section 34 of the back frame 14 to control the amount of reclining movement. To prevent the first link means 26 from pivoting about the pin 24, the tab 52 interferes with the tab 36. To return the back frame 14 to the upright seat-forming position, the positioning mechanism 18 is actuated and normally applies a thrust to the second link means 30 which in turn transmits the force through the arcuate section 34 to move the back frame 14 toward the upright seat-forming position. If it is desirous to forwardly fold the back frame 14 to allow ingress or egress to or from the rear seat of a two-door automobile, the back frame 14 is merely pushed forwardly when in the upright forming position. As the back frame 14 is pushed forwardly, the first link means 26 pivots with the arcuate section 34 about the pivotal connection at 24 of the first link means 26 to the cushion frame 12. During this forward folding movement, the tab 52 interferes with the tab 36 to prevent movement of the second link means 30 which in turn prevents any reclining movement of the back frame.

The second embodiment illustrated in FIGS. 11 through 15 operates in a very similar manner in that from the upright seat-forming position, as illustrated in FIG. 11, the back frame 14 may be moved to a reclined position, as illustrated in FIG. 13, by actuating the positioning mechanism 18 whereby the second link means 30' will, through the tab 36', control movement of the back frame 14 by coacting with the the arcuate section 34. The back frame 14 of the second embodiment may be moved to a forwardly folded position by pushing on the back frame 14 so that the arcuate section 34 of the back frame moves with the first link means 26' while at the same time on the opposite side of the seat the arcuate section 34 will move with the first link means 26''. During reclining movement of the second embodiment, the jog 60 coacts with the lower end of the second link means 30' to prevent forward folding movement while the seat is in any reclined position. Also, during forward folding movement the jog 60 coacts with the tab 36' to prevent movement of the second link means 30' and thus, any reclining movement.

The invention has been described in an illustrative manner and it is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A seat assembly comprising: a cushion frame, a back frame, said control means including first link means pivotally connected to said back frame through a first pivotal connection to define a reclining axis about which said back frame reclines and pivotally connected to said cushion frame through a second pivotal connection to define a forward folding axis about which said back frame pivots forwardly relative to said cushion frame, and means engageable with said first link means for automatically preventing said first link means from pivoting about said reclining axis during forward folding movement of said back frame from said upright seat-forming position until said back frame returns to said upright position and for automatically preventing said first link means from pivoting about said forward folding axis during reclining movement of said back frame from said upright seat-forming position until said back frame returns to said upright position.

2. An assembly as set forth in claim 1 including positioning means for positioning said back frame in any one of various reclined positions.

3. An assembly as set forth in claim 1 wherein said last-mentioned means includes first stop means for limiting reclining movement of said back frame.

4. An assembly as set forth in claim 3 wherein said last-mentioned means includes second stop means for limiting folding movement of said back frame.

5. An assembly as set forth in claim 1 wherein said control means includes second link means operable with said back frame and said first link means for allowing reclining movement of said back frame by allowing said back frame to pivot relative to said first link means while preventing movement of said first link means about said folding axis and for allowing folding movement of said back frame by allowing said first link means to pivot relative to said cushion frame about said folding axis while preventing said back frame from pivoting relative to said first link means.

6. An assembly as set forth in claim 5 including first stop means operable between said first and second link means and said back frame for limiting reclining movement of said back frame at said upright seat-forming position and at a fully reclined position.

7. An assembly as set forth in claim 6 including second stop means operable between said first and second link means and said back frame for limiting folding movement of said back frame at said upright seat-forming position and at a fully forwardly folded position.

8. A seat assembly comprising: a cushion frame, a back frame, control means operatively interconnecting said frames for allowing said back frame to recline from an upright seat-forming position while preventing forward folding movement thereof and for allowing forward folding movement of said back frame from said upright seat-forming position while preventing reclining movement thereof, said control means including at least one first pivotal connection for defining a reclining axis about which said back frame reclines relative to said cushion frame and at least one second pivotal connection for defining a forward folding axis about which said back

frame pivots forwardly relative to said cushion frame to accomplish said forward folding movement, first link means pivotally connected to said cushion frame on said folding axis through said second pivotal connection and pivotally connected to said back frame so that said back frame may pivot relative thereto about said reclining axis, second link means operably with said back frame and said first link means for allowing reclining movement of said back frame by allowing said back frame to pivot relative to said first link means while preventing movement of said first link means about said folding axis and for allowing folding movement of said back frame by allowing said first link means to pivot relative to said cushion frame about said folding axis while preventing said back frame from pivoting relative to said first link means, said second link means being pivotally connected adjacent a first end thereof to said cushion frame for pivotal movement relative thereto about said reclining axis.

9. An assembly as set forth in claim **8** wherein said second link means has a second end and has at least one generally arcuate extremity between the ends thereof, said back frame includes an arcuate section having the same radius as said arcuate extremity of said second link means, said second link means and said arcuate section being generally coextensive in said upright seat-forming position, first flange means extending from said second link means for coacting with said arcuate section so that said second link means pivots about said reclining axis with said back frame at least in one direction to control the reclined position of said back frame.

10. An assembly as set forth in claim **9** including positioning means interconnecting said cushion frame and said second end of said second link means to control the pivotal movement of said second link means about said reclining axis for positioning said back frame in any one of various reclined positions.

11. An assembly as set forth in claim **9** wherein said second link means and said arcuate section are disposed in an arc about said first mentioned pivotal connection so that said arcuate section may move relative to said second link means by pivoting in said arc about said first-mentioned pivotal connection to allow forwardly folding movement of said back frame.

12. An assembly as set forth in claim **11** wherein said control means includes first stop means operable between said first and second link means and said back frame for limiting reclining movement of said back frame at said upright seat-forming position and at a fully reclined position.

13. An assembly as set forth in claim **12** wherein said control means includes second stop means operable between said first and second link means and said back frame for limiting folding movement of said back frame at said upright seat-forming position and at a fully forwardly folded position.

14. An assembly as set forth in claim **13** wherein said first link means includes a first segment which is disposed in an arc about said first-mentioned pivotal connection and is generally coextensive with said arcuate section and said second link means when in said upright seat forming position.

15. An assembly as set forth in claim **14** wherein said control means operatively interconnects said back frame and said cushion frame adjacent one side of said seat assembly and a single pivotal connection interconnects said back frame and said cushion frame adjacent the opposite side of said seat assembly so that said reclining axis and said folding axis intersect at said single pivotal connection.

16. An assembly as set forth in claim **14** wherein said control means operatively interconnects said back frame and said cushion frame adjacent opposite sides of said seat assembly so that said reclining axis and said folding axis are generally parallel to one another.

17. An assembly as set forth in claim **14** wherein said control means is disposed inwardly of the sides of said cushion frame.

18. An assembly as set forth in claim **17** wherein each of said second link means, said arcuate section and said first segment has respective front and rear edges with said front edges being closer to said folding axis than said rear edges.

19. An assembly as set forth in claim **18** wherein said second stop means includes a stop tab extending from said rear edge of said first segment of said first link means for coacting with said rear edge of said arcuate section of said back frame and a portion of said back frame offset from one of said edges of said arcuate section and a first tab extending from one edge of said second link means for engaging the offset portion to limit folding movement in said upright seat-forming position as said back frame is pivoted from said forward folded position toward said upright seat-forming position and to support said back frame.

20. An assembly as set forth in claim **19** wherein said first flange means includes a second tab extending from said front edge of said second link means to coact with said front edge of said arcuate section of said back frame whereby said arcuate section and said second link means pivot together during reclining movement of said back frame toward said fully reclined position.

21. An assembly as set forth in claim **20** wherein said first link means includes a second segment extending from one end of said first segment to said first-mentioned pivotal connection.

22. An assembly as set forth in claim **21** wherein said second stop means includes an extension of one of said first and second tabs for engaging said second segment of said first link means to prevent further folding movement of said back frame when the latter reaches said fully forwardly folded position.

23. An assembly as set forth in claim **22** wherein said first stop means includes said first flange means and a first offset portion of said second segment of said first link means which coacts with said second tab to prevent further reclining movement of said back frame when the latter reaches said fully reclined position.

24. An assembly as set forth in claim **23** including a second offset portion in said second segment of said first link means for coacting with said second link means to prevent forward folding movement during reclining movement of said back frame and to prevent reclining movement during forward folding movement of said back frame.

25. An assembly as set forth in claim **24** wherein said control means operatively interconnects said back frame and said cushion frame adjacent one side of said seat assembly and a single pivotal connection interconnects said back frame and said cushion frame adjacent the opposite side of said seat assembly so that said reclining axis and said folding axis intersect at said single pivotal connection.

26. An assembly as set forth in claim **25** wherein said first tab extends from said rear edge of said second link means.

27. An assembly as set forth in claim **26** wherein said extension is part of said second tab on said front edge of said second link means.

28. An assembly as set forth in claim **27** wherein said first flange means includes a third tab extending from said rear edge of said second link means for coacting with said rear edge of said arcuate section of said back frame.

29. An assembly as set forth in claim **28** wherein said second offset portion of said second segment of said first link means comprises a fourth tab extending therefrom for coacting with the extremity of said first tab extending from said second link means during reclining movement and for coacting with said second tab of said second link means during forward folding movement.

30. An assembly as set forth in claim **29** wherein said first offset portion of said second segment of said first link means comprises a projection extending transversely from said fourth tab for coacting with said second tab of said second link means when said back frame reaches said fully reclined position.

31. An assembly as set forth in claim **24** wherein said control means operatively interconnects said back frame and said cushion frame adjacent opposite sides of said seat assembly so that said reclining axis and said folding axis are generally parallel to one another.

32. An assembly as set forth in claim **31** wherein said first tab extends from said front edge of said second link means and is juxtaposed to said second tab.

33. An assembly as set forth in claim 32 wherein said extension is part of said first tab on said front edge of said second link means.

34. An assembly as set forth in claim 33 wherein said second offset portion of said second segment of said first link means comprises a jog therealong so that the portions of said second segment on opposite sides of said jog are in different planes whereby said jog coacts with said second end of said second link means during reclining movement and coacts with said second tab of said second link means during folding movement.

35. An assembly as set forth in claim 34 wherein said first offset portion of said second segment of said first link means comprises a hook for coacting with said second tab of said second link means when said back frame reaches said fully reclined position.

36. An assembly as set forth in claim 35 operatively interconnecting said back frame and said cushion frame adjacent one side of the seat assembly and including only a similar first link means and arcuate section of said back frame for interconnecting said back frame and said cushion frame on the opposite side of said seat assembly.