July 24, 1956 G. A. CARLSON 2,755,843

EXTENSIBLE AND COLLAPSIBLE POSTURE CHAIR

Filed May 4, 1953 2 Sheets-Sheet 1

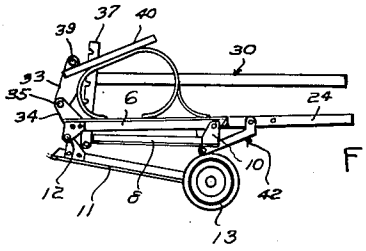


Fig. 3.

Fig. 1.

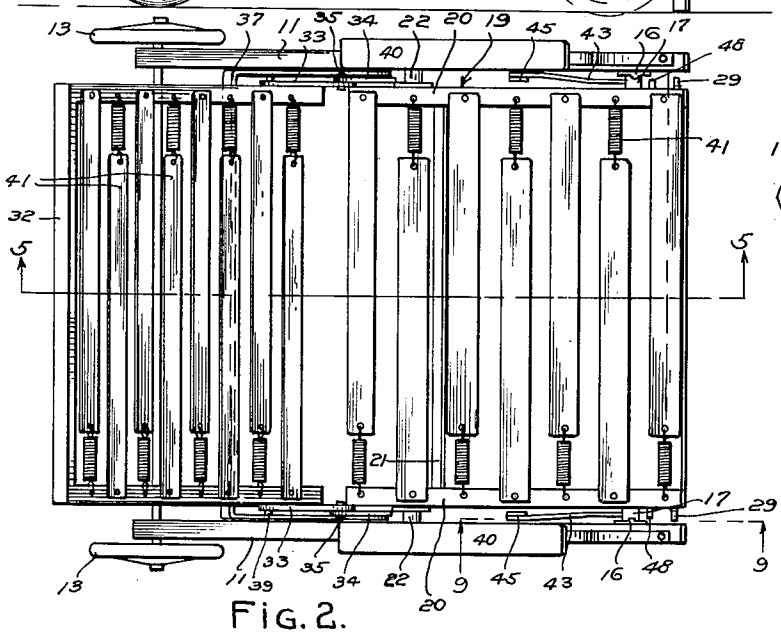


Fig. 2.

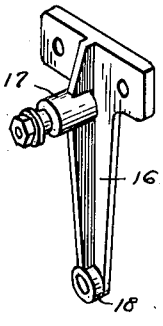


Fig. 4.

INVENTOR.
GUSTAVE A. CARLSON,
BY
James N. Tyler
ATTORNEY.

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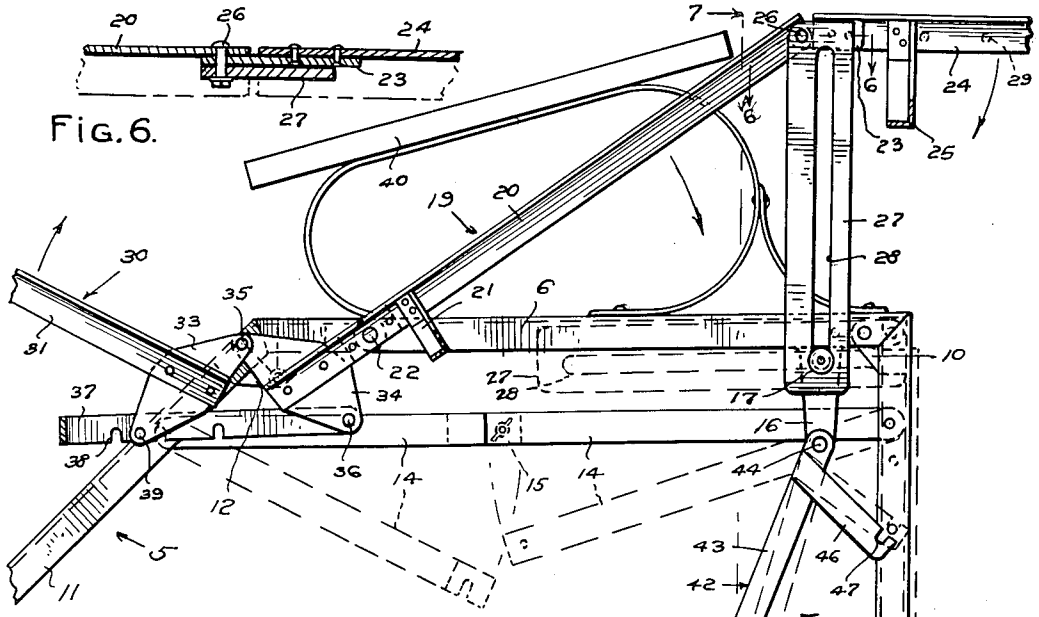


Fig. 6.

Fig. 5.

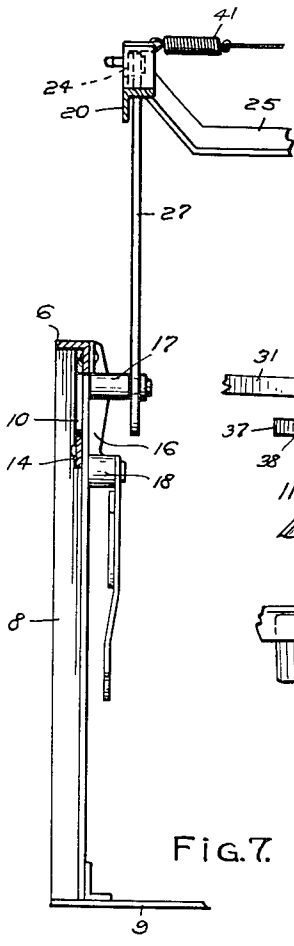


Fig. 7.

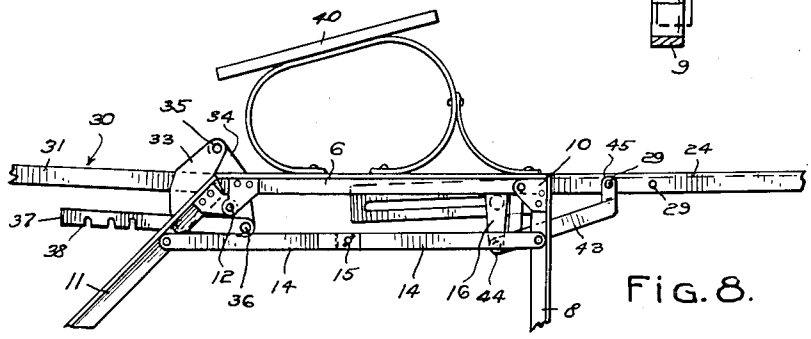


Fig. 8.

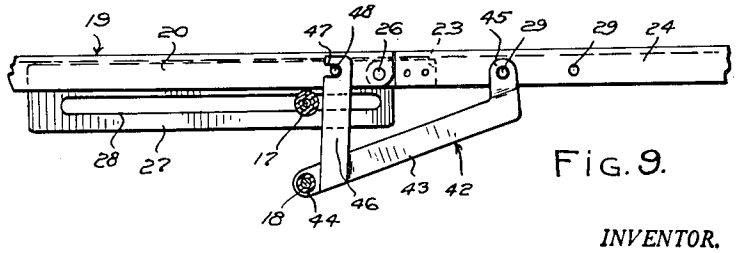


Fig. 9.

INVENTOR.
GUSTAVE A. CARLSON,
BY
James N. Gyle
ATTORNEY.

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EXTENSIBLE AND COLLAPSIBLE POSTURE CHAIR

Gustave A. Carlson, Miami, Fla.

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6 Claims. (Cl. 155—105)

This invention relates to improvements in an extensible and collapsible article of furniture and has particular reference to a device of such nature that is constructed in a manner to serve as a conventional upright chair, an inclined and elevated posture chair or an extended and horizontally arranged bed forming device.

The invention contemplates a novel article of furniture having multiple parts that are assembled to provide a seat portion, a back support and a leg support, with the several parts being supported in a novel manner upon a suitable base frame whereby they may be easily shifted by the occupant to quickly and easily shift the back support rearwardly to cause the seat portion to be angled upwardly and the leg support to be shifted outwardly and upwardly, the several parts being moveable by the shifting of the occupant's body rearwardly.

The invention further contemplates novel assembly details, including hinge connections between the several parts that assure of a proper balanced relation therebetween.

An object of the invention resides in novel means which, when the seat portion is angled upwardly, causes the leg support to be swung outwardly and upwardly to be disposed in a horizontal leg supporting position.

Another and important object of the invention resides in novel latch means whereby the device may be quickly and easily latched into relatively rigid position against the shifting of the seat or leg support independent of the back rest, which latch means serving also to latch the seat against shifting upwardly and simultaneously supporting the leg support in extended bed forming position.

Another object of the invention resides in novel structural details whereby the entire group of parts may be quickly and easily collapsed into a relatively compact position to facilitate packing and shipment or for storage in a minimum of space.

Various other features of novelty and operation will be readily apparent during the course of the following description, reference being had to the accompanying drawings, wherein has been illustrated a preferred example of the device and wherein like characters of reference are employed to denote like parts throughout.

Referring to the drawings:

Figure 1 is a side elevation of chair constructed in accordance with the invention,

Figure 2 is a plan view thereof,

Figure 3 is a side elevation of the chair in the fully collapsed position,

Figure 4 is a perspective view of a multiple purpose bracket employed to form guide means for an elevating link for the foot support and as a rest for the seat frame, together as a pivotal support for latch means,

Figure 5 is a substantially central vertical sectional view of the device, taken on line 5—5 of Figure 2,

Figure 6 is a fragmentary horizontal section, taken on line 6—6 of Figure 5,

Figure 7 is a fragmentary vertical section, taken on line 7—7 of Figure 5,

Figure 8 is a fragmentary side elevation showing the device in extended bed forming position, and

Figure 9 is a fragmentary section, taken on line 9—9 of Figure 2, illustrating the latch means in the position to support the foot rest in extended position and to lock the seat frame against upward shifting.

Referring specifically to the drawings, the numeral 5 designates a base frame, embodying upper substantially horizontal and parallel spaced apart angles 6, supported at their forward ends by a rigid front frame 7, formed of angle irons 8, tied together at their lower ends in any suitable manner by a foot bar 9. The upper ends of the angle irons 8 are pivotally connected to the forward ends of the angles 6, as by hinge plates 10, in a manner that permits the front frame 7 to be swung bodily inwardly when the structure is to be collapsed. The angles 6 are supported at their rear ends by outwardly and rearwardly inclined legs 11, pivotally connected with the angles 6, as by hinge plates 12, in a manner that permits the rear legs to be bodily swung inwardly when the structure is to be collapsed. The rear legs are supported by ground wheels 13 that serve to provide a mobile support for the chair. Means are provided upon both sides of the device to rigidly maintain the front frame 7 and rear legs 11 in the extended supporting position against accidental shifting, comprising each a pair of brace bars 14 that are pivotally connected to the front angle irons 8 and the rear legs 11 respectively. The free ends of each pair of brace bars 14 having overlapping engagement and a screw 15, engaging in a slot of one bar serves to maintain the pairs of brace bars in the operative bracing position. The various members 6, 8 and 11 have been shown as being angle irons that are suitably braced against any tendency to twist, though it will be apparent that other forms of construction may be employed with equal success.

Rigidly connected to the inner sides of each of the angles 6 adjacent their forward ends, are depending brackets 16, see particularly Figure 4. Each bracket 16 is provided with an integral, inwardly directed and horizontal hub 17, the top of which is substantially flush with the bottom of the angles 6. Each of the hubs have a reduced neck portion at its free end for the guiding support of elevating links, to be described. The lower free ends of each bracket is further provided with a pivotal hub 18, for the pivotal support of latch arms, to be described.

Mounted within the base frame 5, to swing in a vertical plane, is a seat supporting frame 19, including parallel side rails 20, rigidly braced against twisting by suitable cross members 21. The side rails 20 are inwardly spaced from the angles 6 and in normal use, are disposed in parallel flush relation thereto. The seat frame 5, adjacent its rear end, is pivotally supported upon the angles 6, as by rigid brackets 22. Pivotally connected, as by fixed hinge plates 23 to the forward ends of the side rails 20, is a leg support 24, formed of angle irons and rigidly braced against twisting by suitable cross braces 25. The hinge plates 23 are rivetted or otherwise connected to the opposite terminal ends of the angle irons forming the sides of the leg support and these hinge plates are pivotally supported upon pins 26, carried by the forward ends of the rails 20. Also pivotally connected to the pins 26, are combined elevating and limit links 27, see particularly Figures 5 and 6. The links 27 are in the form of flat elongated plates that are slotted for their major length, as at 28. The links, through the medium of the slots, have guiding engagement over the reduced neck portions of the hubs 17 and

are slidably supported thereon against displacement by suitable washers and retaining nuts. The side rails **20** in normal seat forming position have resting support upon the hubs **17**, in which position the rails **20** are parallel with and flush with the side angles **6**. The leg support **24** is normally suspended in a vertical plane from the seat frame **19** by the hinge plates **23** to lie within and substantially flush with the outer or front sides of the front frame **7** when the frame **19** is in the seat forming position. The leg support **24** is co-extensive in width with the seat frame **19**. Each side angle of the leg support are provided with outwardly projecting pins **29** for a purpose to be presently described.

A generally rectangular back rest **30**, formed of angle irons including side rails **31** and an upper connecting cross rail **32**, is hingedly connected to the rear end of the seat frame **19**, as by flat hinge plates **33** and **34**. The hinge plates **33** are riveted or otherwise connected to the lower terminal ends of the rails **31**, while the companion hinge plates **34** are riveted or otherwise connected to the side rails **20** adjacent their rear ends. The plates **33** and **34** are pivotally connected at **35** to permit the back rest to be shifted in a vertical plane in a manner to be presently described. The plates **34** are extended below the side rails **20** and carry pivotal studs **36** for the pivotal support of a generally U-shaped angle adjustment **37** for the back rest. The side bars of adjustment are notched at predetermined points, as at **38** for engagement over headed studs **39**, carried by lower extensions of the plates **33**. Through this means, the angularity of the back rest may be varied with respect to the seat frame **19**. The back rest is substantially co-extensive in width with the seat frame **19**. Each base frame angle **6** is provided with arm rests **40**, disposed at any desired angularity. The seat frame, leg support and back rest are provided with any desirable form of cushion or pad supporting means, such as springs, indicated generally at **41**.

It becomes necessary that means be provided to prevent the accidental vertical swinging movement of the seat frame, leg rest and back rest to the end that the device may be maintained in either the position of a conventional chair or, when in an extended position to form a bed, such means comprising latching links **42**, pivotally supported upon the hub portion **18** of the brackets **16**. Each of the links comprise a laterally offset bar **43**, having one end pivotally connected at **44** to the hub **18** and with its opposite end being angularly disposed and apertured, as at **45**. Rigidly connected with the bars **43** adjacent their pivotal ends, are angularly disposed arms **46**, notched adjacent their free ends, as at **47**. The notched arm **46** serves a dual purpose namely, as means to latch the foot rest in the downward position by engaging over the outermost pins **29**, as shown clearly in Figure 5, or for latching engagement with a pin **48**, carried by each of the side rails **20**, when the device is extended to bed forming position, shown more clearly in Figure 9. When the latch bar is shifted to the position as shown in Figure 9 to latch the seat frame in its resting position upon the hubs **17**, the leg rest is swung upwardly manually and the apertured angled end **45** is engaged with the innermost pin **29**, in which position the leg rest is supported in the extended position for forming a bed.

In the use of the device, when the operator desires to employ, the structure as a conventional chair, as shown in Figure 1, the latch bar **42** is shifted forwardly to engage the arms **46** with one of the pins **29** at each side. Since, in this position, the leg rest cannot swing outwardly, the seat frame and leg rest are maintained against shifting and the operator may lean back against the back rest without disturbing the relative position of the seat frame and leg rest. The back rest may be easily and quickly adjusted as to angularity by elevating the adjustment member **37** and engaging the studs **39** in a selected notch **38**, all other parts remaining fixed. Now, when the operator desires to shift the parts in order to form the recognized posture chair, the latch bar **42** is shifted rearwardly to the position shown in Figure 5 and then, by grasping the arm rests **40** and bodily shifting his weight rearwardly, the pressure exerted upon the back rest will angle the seat frame upwardly on its pivots **22** and, as the seat frame angles upwardly, the links **27** shift forwardly and upwardly in an arc, being guided by the brackets **16**, which action causes the leg rest to swing outwardly and upwardly by the engagement of the ends of the links under the side angles of the leg rest. The links **27** are formed sufficiently wide as to dispose the major portion of their square ends beneath the angles of the leg rest to form a support against the downwardly shifting of the leg rest when the weight of the operator's legs are resting thereon. The slots **28** limit the upward swinging movement of both the seat frame and the leg rest and at the maximum upper position, the leg rest is disposed in a substantially horizontal position. With the device in the position for forming a posture chair as shown in Figure 5, the operator may shift the parts freely at will to again assume the conventional chair forming position by merely leaning forward to shift his balance of weight. The frames are so pivoted that they will readily shift with a minimum of effort.

When the device is to be extended to form a bed, the seat frame **19** is first shifted to a position of rest upon the hubs **17**, after which the leg rest is manually swung upward on its hinge connection with the seat frame and the latch members **42** then swung forwardly in an arc to engage the notch **47** of the arm **46** over the pins **48**. The apertured ends **45** are then engaged over the innermost pins **29**, such action maintaining the leg rest in the extended position and the seat frame maintained against upward swinging movement, such position being clearly shown in Figure 9. The operator then proceeds to lift the adjustment member upwardly and swings the back rest downwardly to engage the studs **39** into the innermost notches **38**, in which position the back rest is disposed in a slightly upwardly inclined position with respect to the seat frame. While the angularity of the back rest is desirable, from the standpoint of sleeping comfort, it will be obvious that it may be disposed in axial alignment with the seat frame, this being merely dependent on the positioning of the notches **38**. The angularity of the rear legs **11** avoids any tendency for the device to become overbalanced. The parts are quickly and easily returned to their normal positions by simply releasing the latch bars **42** and again shifting the back rest to a desired position of adjustment with the adjustment member. It will thus be apparent, that since the seat frame, back rest and leg rest are all pivotally connected together, any swinging movement of the seat frame is imparted to the back rest and leg rest simultaneously, maintaining the several supports in their desired relative positions to support a continuous pad or cushion in a comfortable manner.

For purposes of shipment or storage, it is desirable that the device be collapsible to a minimum size, such as illustrated in Figure 3. To accomplish such a collapsing, the seat support and leg rest are disposed as in Figure 9, the latch bar engaged and then the back rest adjustment disengaged from the stud **39** and the back rest then swung forwardly and downwardly to overlie the seat frame. The brace bars **14** are then disconnected and the bars swung downwardly with the forward bars lying parallel with the forward frame **7** and the rear bars lying parallel with the rear inclined legs **11**. The front frame **7** is then swung inwardly upon its pivotal connection with the angle irons **6** to lie parallel with the angle irons **6** and seat frame **19**. The rear legs and their supported ground wheels are then swung forwardly upon their pivots **12** to underlie the seat frame and associated parts, making a relatively compact assembly that will occupy a minimum space. The several parts are quickly and easily extended to form

the chair with a minimum of effort and without the use of tools.

It will therefore be apparent that a very desirable convertible seating and sleeping device has been provided. The several parts are simple and cheap to manufacture, are strong, durable and have been designed to facilitate the adjustment of the device to its several positions by anyone, regardless of his mechanical ability. The elevating and limit link for the foot rest is extremely novel and provides an elevating means for the leg rest that automatically swings the leg rest to operative position whenever the seat frame is angled upwardly and provides a very substantial support for the leg rest in a manner that permits the manual shifing of the leg rest independent of the link means. The latch bars are also simple and highly effective for the purposes designed.

It is to be understood, that the invention is not limited to the precise arrangement shown, but that changes are contemplated as shall readily fall within the spirit of the invention or the scope of the subjoined claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An adjustable and collapsible chair device of the character described having an elevated base frame, a forward ground support for the frame, rear ground legs for the frame that are inclined outwardly and downwardly for a substantial distance rearwardly of the frame, ground wheels carried by the rear legs, a seat frame that is pivotally supported in the base frame at opposite sides and adjacent the rear end of the seat frame whereby the seat frame may be angled upwardly in a vertical plane, a back rest that is hingedly connected to the rear end of the seat frame, adjustable means for varying the angularity of the back rest with respect to the seat frame, a leg rest that is freely hingedly connected to the forward end of the seat frame for normal perpendicular positioning in flush arrangement with the forward ground support, at least one link device pivotally connected to the forward end of the seat frame, the link device having a relatively wide portion that has abutting engagement with the under surface of the leg rest adjacent its point of hinging, a fixed guide device for the link that is carried by the base frame, the seat frame when angled upwardly serving to cause the leg rest to simultaneously angle upward by the abutting engagement of the link, latch means pivotally connected to the base frame and that is shiftable to lock the seat frame and leg rest against upward shifting movement, the leg rest being freely manually shiftable upward to lie in the same plane with the seat frame, the leg rest when shifted upward manually being supported by the latch means against downward movement, the latch means embodying locking means for maintaining the seat frame in the downward position against shifting when the leg rest has been manually extended and supported by the latch means.

2. A chair device that is shiftable by the body of an occupant to form a contour seating arrangement, comprising a base frame, a seat frame pivotally supported in the base frame to swing in a vertical plane to be angularly disposed with respect to the base frame, a back rest hingedly connected to the seat frame and which is manually adjustable as to angularity with respect to the seat frame, a leg rest that is freely hingedly connected to the forward end of the seat frame to normally be disposed in a perpendicular plane, flat link devices pivotally connected to the forward end of the seat frame, the link devices having square ends that have normal abutment with the under side of the leg rest, rigid guide means carried by the base frame that have guiding engagement with the links, means associated with the guide means to limit the downward movement of the seat frame whereby the seat frame is normally parallel with the base frame, the leg rest being shifted upward to a substantially horizontal position when the seat frame is angled upward by the abutment of the squared ends of the links therewith,

the seat frame and leg rest being shifted by a shifting of the bodily weight of the occupant, the guide means limiting the upward movement of the seat frame, latch means pivotally supported on the guide means and shiftable to lock the seat frame and leg rest against movement, the latch means also shiftable to lock the seat frame against vertical movement and to engage and support the leg rest in an extended plane in horizontal alignment with the seat frame, the back rest being adjustable downwardly to a position of slight upward incline with respect to the seat frame for forming a cushion supporting bed with the seat frame and the leg rest and arm rests carried by the base frame at both sides.

3. A chair of the character described having a collapsible base frame, a seat frame, a back rest and a leg rest, the seat frame, the back rest and the leg rest being connected in a manner to permit the varying angularity thereof, the seat frame being pivotally supported in the base frame and the back rest and leg rest being hingedly connected to the seat frame at opposite ends by hinging pins, rigid brackets carried by the base frame at opposite sides, stop shoulders formed on the brackets to support the seat frame against downward movement, slotted links pivotally connected with the opposite sides of the seat frame and upon hinge pins of the leg rest, the links each having a square end that has abutting engagement with the under side of the leg rest for a substantial distance, guide means formed on the brackets that engage within the slots of the links to guide and limit the movement of the links, the seat frame being shiftable in an arcuate vertical plane within the base frame and being limited in its upward shifting movement by the slot engagement of the links on the guide means, the leg rest being shifted in an upward and arcuate path by the engagement of the square link ends therebeneath to dispose the leg rest in an extended horizontal plane with respect to the seat frame and latch means pivotally connected with the brackets and having a latched engagement with the leg rest in one position to lock the leg rest and seat frame against vertical shifting and when in another position to lock the seat frame against vertical movement, the leg rest being manually shiftable to a horizontal position and supported by the latch means in the second named position.

4. The structure as recited in claim 3, wherein the links are formed of elongated flat plates that are slotted for their major length to engage the guide means, the links being pivotally connected with the seat frame at one corner adjacent the squared ends, the stop shoulders being reduced to form a cylindrical guide for engagement in the slots, the seat frame when in resting position on the stop shoulders disposing the links in a horizontal position in substantial alignment with the underneath side of the seat frame.

5. The structure as recited in claim 3, wherein the latch means each embody an offset bar that is pivotally connected at one end to the brackets, the opposite end of the bars being angled forwardly and apertured, a rigid angularly disposed arm fixed on each bar that extends forwardly and have their forward free ends notched, outwardly directed fixed pins carried by the seat frame at opposite sides that are disposed in the path of pivotal movement of the notched ends of the arms to be engaged by the notched ends to lock the seat frame in resting position upon the stop shoulders, spaced apart pins carried upon opposite sides of the leg rest that extend outwardly in the path of movement of the latch bar, one pin at each side of the leg rest being engageable by the notched ends of the arms to lock the leg rest against shifting, the other of said pins at opposite sides of the leg rest being engageable with the apertured end of the latch bar when the leg rest is manually shifted to horizontal position, the engagement of the apertured ends with their respective pins simultaneously engaging the

notched end of the arms with their respective pins on the seat frame.

6. The structure as recited in claim 1, wherein the forward ground support and the rear ground legs are pivotally connected to the base frame to be folded inwardly to underlie the base frame and the seat frame, shiftable brace bars pivotally connected to the ground support and the rear legs to normally maintain the ground

support and rear legs in extended supporting position and upstanding arm rests rigidly supported on the base frame.

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