Nov. 3, 1970 W. C. ROGERS, JR 3,537,747

ROCKING AND RECLINING CHAIR

Filed July 31, 1968 5 Sheets-Sheet 1

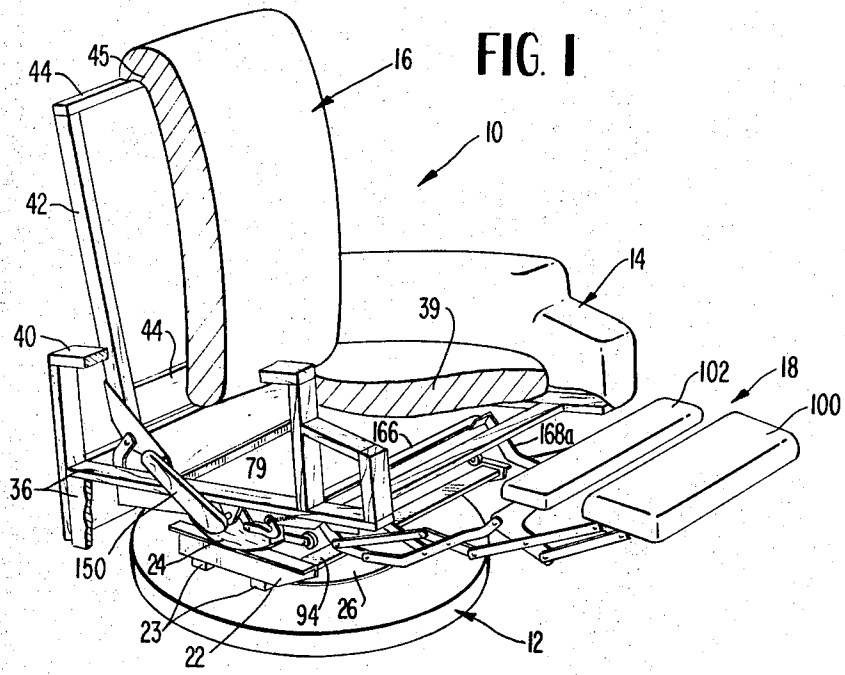

FIG. 1

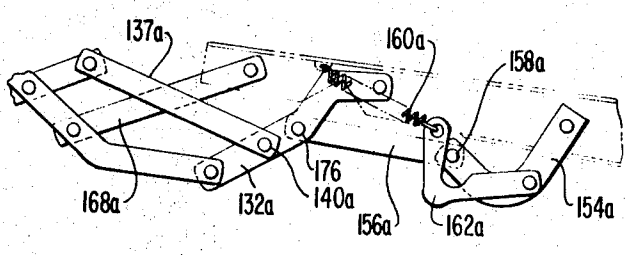

FIG. 10

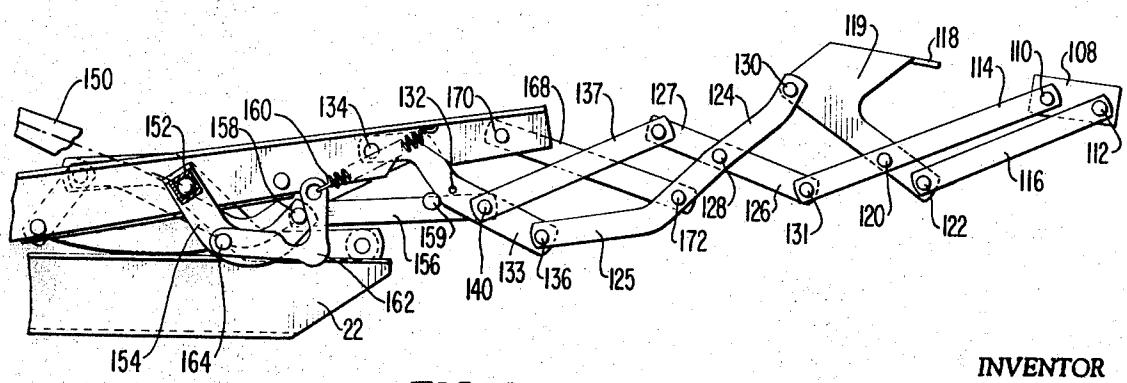

FIG. 9

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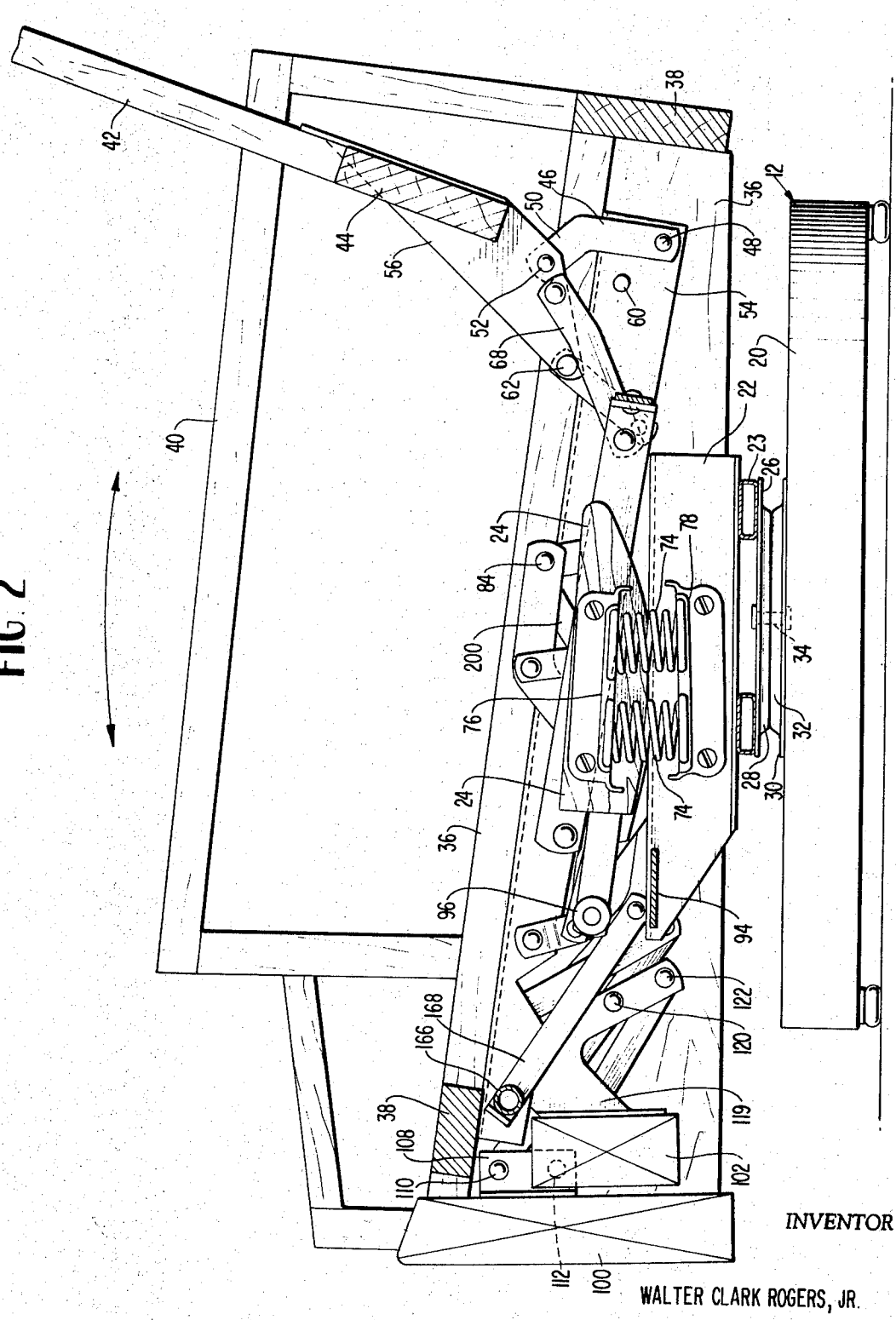
FIG. 2



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ROCKING AND RECLINING CHAIR

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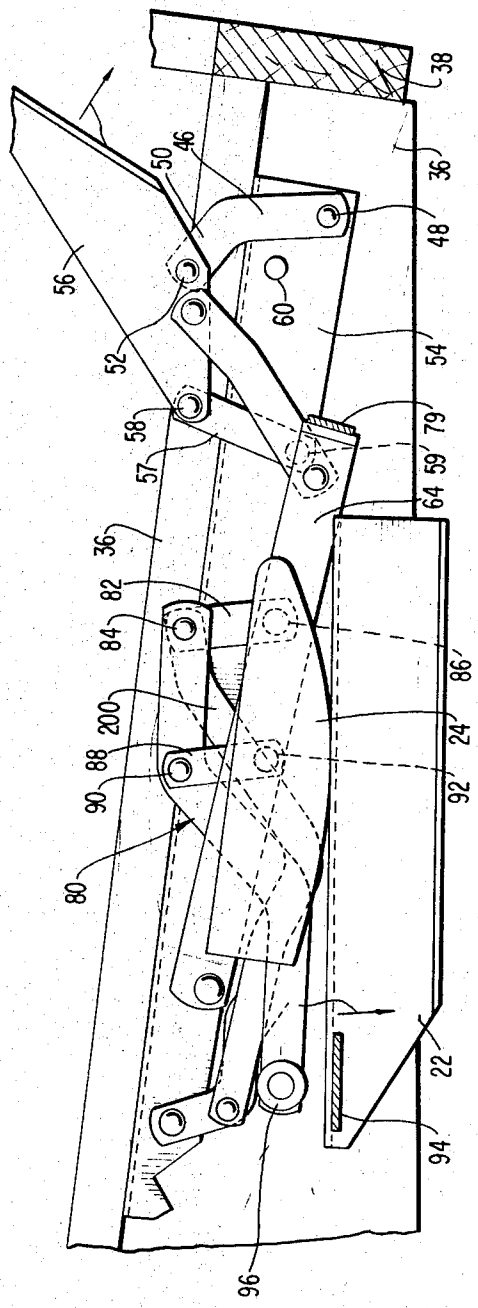

FIG. 3

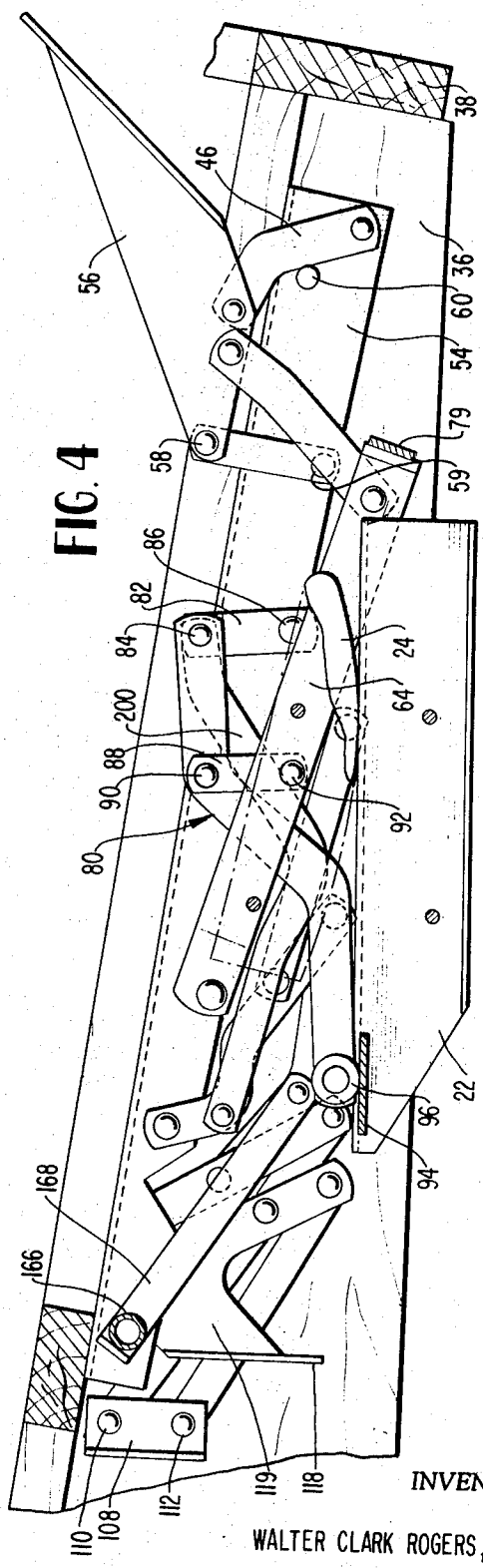

FIG. 4

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FIG. 5

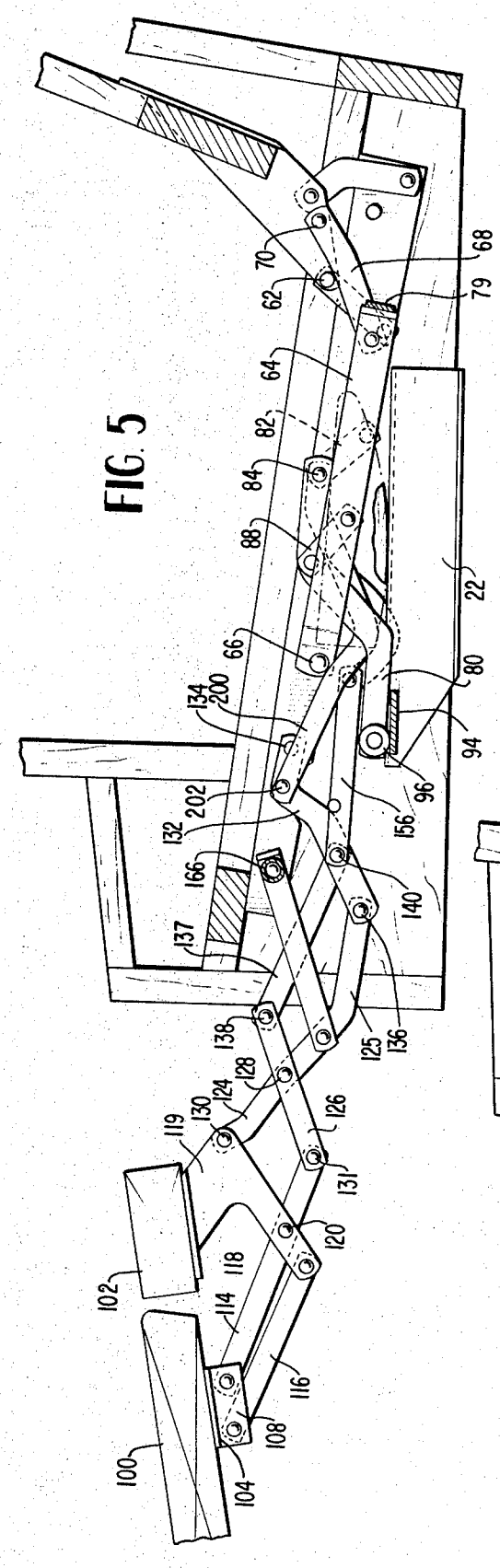
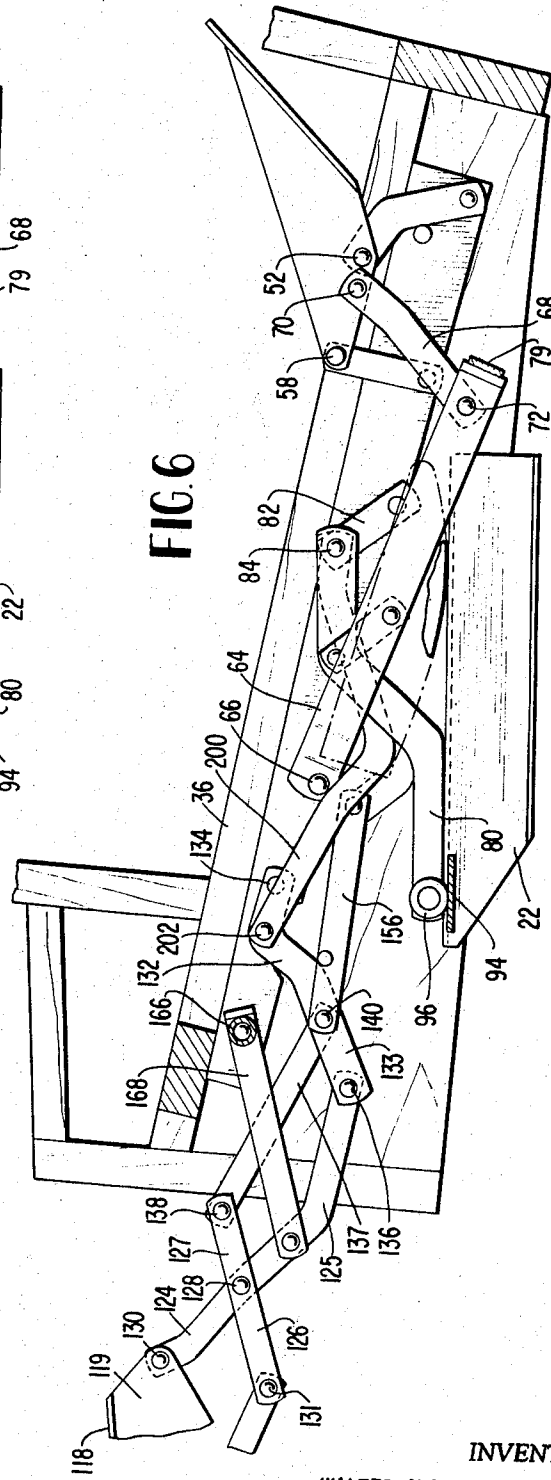


FIG. 6



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ROCKING AND RECLINING CHAIR

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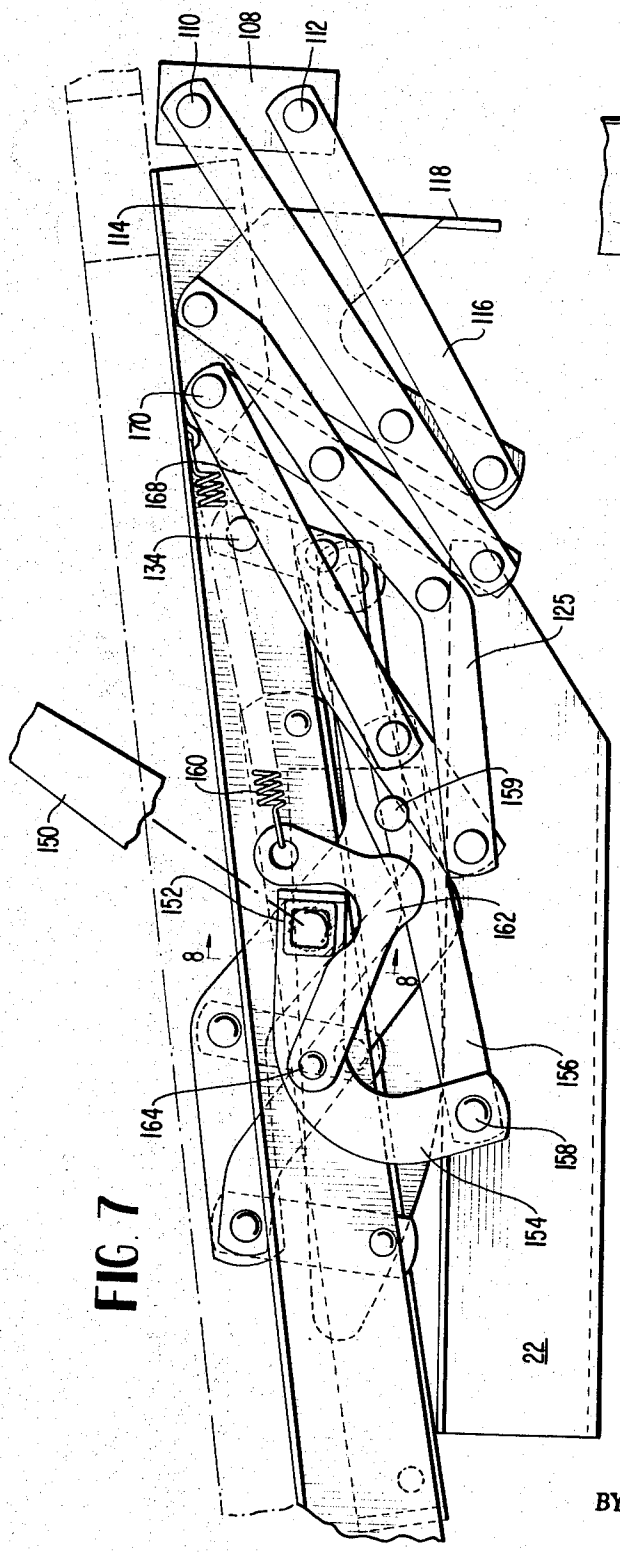

FIG. 7

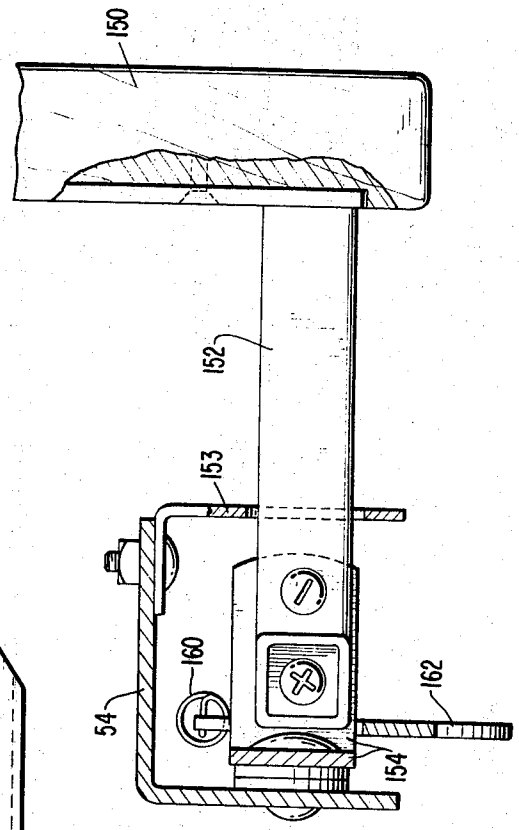

FIG. 8

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3,537,747

ROCKING AND RECLINING CHAIR

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Int. Cl. A47c 1/024
U.S. Cl. 297—85 23 Claims

ABSTRACT OF THE DISCLOSURE

A chair including a base, a seat frame mounted on the base for rocking movement, a backrest pivotally connected to the seat frame for movement between upright and reclining positions and a footrest assembly attached to the seat frame for movement between extended and retracted positions. Linkage is provided such that when the backrest is pivoted for reclining, a locking bar descends and engages the base to lock the seat frame against forward rocking movement. When the backrest is in the fully reclining position, engagement of the rocking cams on the base prevents rocking movement in the rearward direction so that the seat frame is locked against rocking movement in both the forward and rearward directions. Actuation of the backrest is effected by the occupant exerting rearward back pressure thereon which also causes the seat frame to be raised and moved rearwardly relative to the base so that the occupant's weight is used to balance the seat frame and backrest in the various reclining positions.

The footrest is comprised of dual footrest sections actuated through a handle located on one side of the chair for convenient access by the occupant even from the fully reclining position. In the retracted position the footrest sections extend vertically in parallel relationship and in the extended position they are disposed horizontally in coplanar relationship. Linkage between the locking bar and the footrest causes the locking bar to descend into engagement with the base to prevent forward rocking movement when the footrest is extended. If desired, the base of the chair may be formed in two sections, the upper section being rotatable about a vertical axis relative to the lower section so that in addition to rocking and reclining, the occupant may also revolve the chair as desired.

SUMMARY OF INVENTION AND OBJECTS

This invention relates to a new and improved rocking and reclining chair which also incorporates an extendible and retractable footrest. Additionally, the chair of the present invention may incorporate a swivel feature for rotating the chair about a vertical axis however the invention need not be limited thereto.

One of the objects of the present invention is to provide a combination rocking and reclining chair that is easy to operate while affording enhanced user comfort without sacrificing design or construction of the chair.

A further object of the present invention is to provide an improved footrest assembly and a combination rocking and reclining chair incorporating the latter.

Included herein is such a chair in which the footrest assembly may be conveniently actuated by the occupant even from the fully reclining position.

Another object of the present invention is to provide such a combination rocking and reclining chair that is automatically locked against rocking movement when the footrest is extended and/or the backrest is in the reclining position.

A further object is to provide new and improved linkage mechanisms for supporting and actuating the various movable parts of the aforedescribed chair. Included herein

is such linkage mechanisms which provide simple and smooth operation of the various chair parts while at the same time permitting the chair to be manufactured with a highly compact and attractive design which moreover achieves ultimate user comfort.

A still further object of the present invention is to provide such improved linkage mechanisms which permit the chair to incorporate a conventional or other swivel feature without sacrificing design or easy operation of the chair.

Yet a further object of the present invention is to provide such a combination rocking and reclining chair which utilizes the occupant's weight to balance the seat frame and backrest relative to each other during reclining.

A still further object of the present invention is to provide such a combination rocking and reclining chair which may be rocked as desired without accidentally moving the chair into the reclining position.

Yet another object of the present invention is to provide a novel linkage mechanism for attaching the backrest of the chair to the seat portion of the chair to provide improved movement of the backrest for reclining in accordance with the physical characteristics of the occupant.

The above and other objects are achieved in a chair having a seat frame including arm rests fixed thereto, and a backrest pivotally connected to the seat frame for movement between upright and reclining positions. The latter movement of the backrest is achieved by a linkage that provides a shifting fulcrum for the backrest generally conforming to the movement of the occupant's pelvis during such movement.

The seat frame is mounted for rocking movement relative to the base by rocking cams which rock on runners secured to the base. Additionally the rocking cams are secured to a linkage interconnected between the seat frame and the backrest to move in response to movement of the backrest into reclining position. In this way, the seat frame is slightly raised and moved to the rear when the backrest is moved into reclining position, for allowing the occupant's weight to balance the seat frame and the backrest. The linkage which has the rocking cams, is also employed to lower a locking bar into engagement with the base to prevent forward rocking movement of the seat frame when the backrest is moved into reclining position. In the fully reclining position of the backrest, the rocking cams have reached their rocking limit and the locking bar is moved down further to maintain blocking engagement with the base whereby rocking movement is precluded in both the forward and rearward direction. When the backrest is returned to a normal upright position, the locking bar is raised to permit normal rocking movement in both the forward and rearward directions.

At the front of the seat frame, a linkage mounts a pair of footrest sections for movement between retracted positions wherein they extend vertically in parallel planes at the front of the chair, and extended positions wherein they extend generally horizontally in the same place. The locking bar is also moved downwardly into engagement with the base when the footrest is extended by means of a linkage which interconnects the locking bar and the footrest linkage. This linkage includes a control link that also functions to stabilize the pivot point of the locking bar when moving in response to the backrest movement.

In the preferred embodiment employing two footrest linkages connected to the same footrest sections on opposite sides of the chair, one footrest linkage on one side of the chair is operated through means of a handle conveniently mounted for easy manipulation by the occupant at all times even in the fully reclining position. The footrest linkage on the other side of the chair is operated by a motion-transmitting connecting rod extending under the

chair and interconnecting both footrest linkages at a point spaced forwardly from the operating handle.

Other objects and advantages will be apparent from the following more detailed description set forth below taken in conjunction with the attached drawings in which:

FIG. 1 is a perspective view of a rocking and reclining chair embodying the present invention with its footrest in extended position and with portions broken away to show the internal construction and certain linkage mechanisms;

FIG. 2 is an enlarged side cross sectional view of the chair showing what will be referred to as the right hand side linkage mechanisms as seen from what would be the occupant's left hand side when the chair is in a normal position, that is, with the backrest in upright position and the footrest retracted;

FIG. 3 is a view generally similar to FIG. 2 with the footrest and base of the chair removed and illustrating the position of certain linkage mechanisms when the backrest is in a reclining position intermediate the upright and fully reclining positions;

FIG. 4 is a view generally similar to FIG. 3 but illustrating the position of the linkage mechanisms when the backrest is in the fully reclining position;

FIG. 5 is a view generally similar to FIG. 2 except with the base of the chair removed and with the footrest linkage shown in the fully extended position for use;

FIG. 6 is a view generally similar to FIG. 5 further illustrating the position of the linkage mechanisms when the backrest is in the fully reclining position while the footrest is fully extended;

FIG. 7 is a side elevational view of the right hand linkage mechanisms in the fully folded positions thereof as seen from what would be the occupant's right hand side of the pair;

FIG. 8 is an enlarged fragmental cross sectional view taken generally along lines 8—8 of FIG. 7 and illustrating a handle and associated mechanism for operating the footrest between extended and retracted positions;

FIG. 9 is a view generally similar to FIG. 7 except with the footrest shown in the fully extended position; and

FIG. 10 is a view of certain linkage mechanisms generally corresponding to that of FIG. 9 but located on the left hand side of the chair.

DETAILED DESCRIPTION

Referring now to the drawings in detail, there is shown for illustrative purposes only a combination rocking and reclining chair generally designated **10** embodying the present invention. As shown in FIG. 1, basic elements of chair **10** include a base **12**, seat frame **14** mounted for rocking movement on the base, backrest **16** pivotally connected to the seat frame for movement between a normal, generally upright position and an inclined position for reclining. In addition, a footrest assembly **18** is connected to seat frame **14** for movement between extended and retracted positions.

In the allustrated embodiment, base **12** incorporates a swivel feature which allows seat frame **14** including backrest **16** and footrest assembly **18** to be swung about a vertical axis as desired. To achieve this end and with reference to FIGS. 1 and 2, base **12** is formed in two sections, the lower section including a platform **20** which engages the floor, and the upper section including a pair of runners **22** (only one shown) which receive rocking cams **24** as will be described subsequently in greater detail. Runners **22** are spaced transversely of the chair and fixed to transversely extending steel tubes **23** which are secured to a horizontal mounting plate **26** that has affixed thereto, an annular nylon bearing **28**. Lower base section **20** has a similar underlying plate **30** including a nylon annular bearing **32** which concentrically engages below nylon bearing **28** of the upper base plate **26**.

Base plates **26**, **30** are interconnected for revolving movement about a vertical axis by a vertical pin **34**. It will be apparent that the upper base section may rotate about the axis of pin **34** relative to the lower base section with annular bearings **28**, **32** in relative sliding engagement with each other. Although the described swivel structure is conventional, other swivel mechanisms may be employed in the chair of the present invention; it being understood that the swivel structure per se forms no part of the present invention.

Seat frame **14** may have any suitable shape including opposite side members **36** which may be formed from wood or other suitable material, extending in the forward-rearward direction of the chair and interconnected by front and rear members **38**. In addition arm rests **40** are rigidly secured to seat frame **14** to move therewith as a unit. As represented at **39**, any suitable upholstery may be applied to the seat frame.

Backrest frame **16** may have any suitable construction including side members **42** which extend generally vertically and are interconnected by top and bottom cross members **44** to form a rectangular frame. As with the seat frame, any suitable upholstery **45** may be applied to the backrest frame.

BACKREST LINKAGE

Pivotal connection of the backrest frame **16** to seat frame **14** is achieved through a unique linkage which allows the fulcrum of the backrest frame to shift forwardly during movement of the backrest into the reclining position. In the preferred embodiment as shown, two identical linkages are employed on each side of the chair to mount the backrest to the seat frame. Referring to FIGS. 2 and 3, each such linkage includes what will be termed a "rear backrest link" **46** having a lower portion pivotally connected by pin **48** with respect to seat frame **14** and an upper portion **50** projecting forwardly at an obtuse angle and pivotally connected by pin **52** with respect to backrest frame **16**. Although these pivotal connections as well as those to be described may be directly to the backrest and seat frames, in the preferred embodiment, pivot pins **48**, **52** are installed in mounting plates which in turn are directly rigidly fastened with respect to the frame members. Thus, in the illustrated embodiment, elongated steel mounting plates **54** having a generally right angle cross section, are rigidly secured to side members **36** respectively of the seat frame to receive the various pivot pins. In addition, mounting plates **56** are rigidly secured to side members **42** respectively of the backrest frame to receive the pivot pins.

Backrest frame **16** is also pivotally connected to seat frame **14** by means of what will be termed a "front backrest link" **57** having a rectilinear shape with one end pivotally connected by pivot pin **58** to the backrest frame and an opposite end pivotally connected by pin **59** to the seat frame. Front backrest link **57** is located forwardly of rear backrest link **46** as shown in the drawings. Moreover in the upright position of the backrest as shown in FIG. 2, pivot pin **52** of rear backrest link **46** is at a higher elevation than pivot pin **58** of the front backrest link.

To move the backrest into a reclining position such as shown in FIG. 3, the occupant exerts back pressure on the backrest which causes the backrest to pivot rearwardly relative to backrest links **46**, **57** which in turn pivot in an opposite direction forwardly of the chair relative to the seat frame. In effect, a sliding fulcrum is thus provided for the backrest which is in greater conformity to the movement of the human back at the pelvis than that of conventional or prior art reclining chairs. The present fulcrum arrangement provides enhanced comfort, ease of operation and moreover obviates annoying displacement of the occupant's shirt tail upon reclining as has been a drawback with certain chairs in the past.

Movement of the backrest into the fully reclining position shown in FIG. 4, is governed by a stop **60** fixed to the seat frame to engage rear backrest link **46** and thereby arrest rearward movement of the backrest in the fully reclining position. The opposite normal or upright position

of the backrest shown in FIG. 2 is governed by a stop **62** secured with respect to the backrest frame to be engageable with a link to be described below.

SEAT FRAME LINKAGE

In accordance with another aspect of the present invention, seat frame **14** is mounted for rocking movement on base **12** through means of a novel linkage mechanism; two identical mechanisms being employed on opposite sides of the chair respectively in the shown embodiment. Referring to FIGS. 5, 6 each such linkage mechanism includes a main support link **64** extending generally in the forward-rearward direction of the chair. The forward end of main support link **64** is pivotally connected by pivot pin **66** with respect to side member **36** of the chair frame in the location indicated in the drawings.

The opposite rear portion of main support link **64** is connected to the backrest by means of link **68**; the upper end portion of the latter being connected by pivot pin **70** to the backrest at a location between pivots **52**, **58** of the rear and forward backrest links. The lower end of link **68** is pivotally connected by pivot pin **72** with respect to the rear end portion of main support link **64** so that when the backrest is moved into the reclining position, link **68** will translate forwardly while swinging downwardly to swing the rear portion of main support link **64** downwardly as shown in FIG. 6. During this latter movement, main support **64** link pivots about its forward pivot **66**.

Rocking cams **24** are rigidly fixed to the main support links **64** of each linkage respectively so as to be received on the top surfaces of the runners **22** as shown in the drawings. Although rocking cams **24** are free to rock on runners **22**, translational movement between the seat frame including the rocking cams and the base is prevented by coil extension springs **74** secured between the seat frame and the base. In the specific form shown, two pairs of springs **74** are secured between flanges **76** and **78** projecting inwardly from the sides of runners **22** and rocking cams **24** as shown in FIG. 2. Each pair of springs **74** is balanced on opposite sides of the rocking axis to bias the seat frame in the normal upright position.

Inasmuch as rocking cams **24** are rigidly fixed to the main support links **64**, the latter will rock cams **24** rearwardly, when the backrest is moved to a reclining position. This will cause the seat frame to rock rearwardly with its front end moving upwardly. When the rocking cams have reached their rearward rocking limit as shown in FIGS. 4 and 6, the entire seat frame will be displaced upwardly relative to the base through the action of the main support links **64** and their associate links **68**. At the same time the seat frame will also have undergone slight rearward movement relative to the base. The result is that the occupant's weight is employed to balance the backrest and the seat frame in the various reclining positions of the chair. Return of the backrest to the normal upright position is limited by stops **62** described above which engage the forward edges of links **68** respectively as shown in FIGS. 2 and 5.

In the preferred embodiment, main support links **64** are interconnected at their rear ends by a cross member **79** to insure that the main support linkages on the opposite sides of the chair move in unison.

BLOCKING MECHANISM

In order to prevent forward rocking movement of the seat frame relative to the base when the backrest is moved into any of the reclining positions, a unique "locking" or "blocking" mechanism is provided, there being two such locking mechanisms in the shown embodiment on opposite sides of the chair respectively. Each locking mechanism in the form illustrated includes what may be referred to as a "locking" or "blocking" bar **80** having a generally open S-shape as shown in the drawings. Referring to FIGS. 3 and 4 the upper end of locking bar **80** is pivotally connected with respect to the seat frame by means of a short link **82**. Pivot pin **84** pivotally interconnects the upper ends of locking bar **80** and short link **82** while pivot pin **86** pivotally connects the lower end of short link **82** to the seat frame.

The lower end of locking bar **80** is movable into and out of engagement with the base to block and release the seat frame with respect to rocking movement relative to the base. Movement of locking bar **80** between its raised and lowered positions is effected through main support link **64** acting through a second short link **88**. The upper end of short link **88** is pivotally connected by pin **90** to locking bar **80** at the intermediate location indicated in the drawings while the lower end of short link **88** is pivotally connected by pivot pin **92** to an intermediate portion of main support link **64**.

When the backrest is moved into a reclining position, downward pivoting movement of main support link **64** will move short link **88** downwardly and in turn locking bar **80** until the lower extremity of locking bar **80** engages the base as shown in FIG. 4. It will be noted that the extent of downward movement of locking bar **80** is proportioned to the extent of rearward displacement of the backrest. In this way, locking bar **80** is engaged in any of the reclining positions of the backrest. In the form illustrated, the portion of the base engaged by locking bar **80** is formed by a transversely extending striker bar **94** fixed across the forward top surfaces of runners **22**. In addition a nylon roller **96** may be mounted on the extremity of locking bar **80** to minimize wear. In addition to being locked by lock bar **80** against forward rocking movement, the seat frame is also prevented from rocking rearwardly when the backrest is in the fully reclining position shown in FIG. 4. This results from the fact this position of the backrest causes the rear rocking cam surfaces to be in substantial engagement with the runners **22** as shown in FIG. 4 of the drawings.

When the backrest is moved from the reclining position into the normal upright position, the movement of main support link **64** acting through short link **88** will raise the extremity of locking bar **80** out of engagement with the base as shown in FIGS. 2 and 3. During movement of locking bar **80** between its raised and lowered positions, it pivots about pivot pin **84** which connects the locking bar to the other short link **82**. It will be apparent that by associating locking bar **80** with the main support linkage in the manner of the present invention, a highly compact and efficient arrangement is provided.

FOOTREST ASSEMBLY

Footrest assembly **18** includes a pair of footrest sections **100** and **102** which in the extended positions lie one behind the other in a generally horizontal plane as shown in FIG. 1, and in the retracted position extend vertically one behind the other in generally parallel planes adjacent the front of the chair as shown in FIG. 2. Moreover footrest section **100** which may be termed the "front footrest section," forms the lower external front portion of the chair as shown in FIG. 2. With reference to the footrest linkage shown on the right hand side of the chair, that is the occupant's right hand side, it includes a right angle mounting bracket **104** the upper portion of which is rigidly secured to front footrest section **100**. Lower portion **108** is pivotally connected by pins **110**, **112** to the ends of a pair of parallel links **114** and **116** as shown in FIGS. 2 and 9.

The other footrest section **102**, which may be termed the "rear footrest section," is fastened to a mounting bracket **118** the lower end portion **119** of which extends in a vertical plane perpendicular to rear footrest section **102** and is pivotally connected by pivot pins **120** and **122** to parallel links **114** and **116**. The spacing between pivot pins **120** and **122** is generally the same as the spacing between pivot pins **110** and **112** so that parallel links **114**

and **116** remain generally in parallel relationship throughout movement of the footrest linkage as will be further described.

Rotation of footrest bracket **104** for moving the front footrest section between the horizontal and vertical positions is achieved by relative movement of parallel links **114** and **116** and by pivoting of bracket **118**. For this purpose there is provided a pair of cross links **124** and **126** pivotally interconnected by pivot pin **128** at their point of intersection. The forward end of cross link **124** is pivotally connected by pin **130** to the upper portion of bracket **118** while the forward end of cross link **126** is pivotally connected by pin **131** to the rear end of parallel link **114**. Upon pivoting of cross links **124** and **126** about their pivot intersection **128**, bracket **118** will pivot about pin **120** to activate parallel link **116** and in turn bracket **108**. The other parallel link **114** will also be activated through movement of cross links **126**. Thus parallel links **114** and **116** undergo sufficient relative movement to rotate brackets **104** and **118** into the desired position either vertically or generally horizontally depending on whether the footrest linkage is being extended or retracted.

Extension and retraction of cross links **124** and **126** is achieved through a main support and actuator link **132** having its upper end pivotally connected by pin **134** with respect to the seat frame and its lower end pivotally connected by pin **136** to the rear end portion **125** of cross link **124** which projects rearwardly at an obtuse angle beyond the rear end of cross link **126**. Swing movement of actuator link **132** about pivot **134** will extend or retract cross links **124** and **126** and consequently the footrest sections.

Pivoting of cross-links **124** and **126** about their pivot intersection **128** for rotating the footrest sections, is achieved by a link **137** pivotally connected by pin **138** to cross link **126** and pivotally connected by pin **140** to an intermediate portion of actuator link **132**. It will be seen that link **137** together with rear segment **125** of cross link **124** form a parallelogram linkage with segments **127** and **133** of cross link **126** and actuator link respectively as shown in FIGS. 6 and 9. This paralellogram linkage is operated by actuator link **132** to operate cross links **124** and **126** and consequently footrest sections **100** and **102**. Actuator link **132** also serves to mount the footrest linkage with respect to the seat frame.

Referring to FIGS. 7, 8 and 9 actuator link **132** is driven between extended and retracted positions for extending and retracting the footrest section by an operating handle **150** located on the occupant's right hand side of the chair in a convenient position which may be grasped by the occupant even when the chair is in the fully reclining position. Handle **150** is secured to a stub shaft **152** projecting perpendicularly inwardly from the handle where it is rotatably mounted in a bracket **153** fixed to the seat frame. The inner extremity of stub shaft **152** is rigidly secured to the upper end of a drive crank **154** to operate this crank forwardly and rearwardly of the chair in a vertical plane. The lower end of drive crank **154** is connected by a drive link **156** to swing actuator link **132** about its pivot **134** for extending and retracting the footrest. Pivot pin **158** connects drive link **156** to crank **154** whereas pivot pin **140** which also connects link **137**, also connects drive link **156** to actuator link **132**.

Assuming the footrest linkage is in the fully retracted position, pivoting of handle **150** in the rearward direction will cause drive crank **154** to swing forwardly which in turn will forwardly project drive link **156** to swing actuator link forwardly to actuate the parallelogram linkage and ultimately position footrest sections **100** and **102** in the coplanar fully extended position for use. Retraction of the footrest sections into their vertical positions is achieved merely by pivoting the handle forwardly.

To limit rearward motion of handle **150** when moving the footrest assembly to the extended position, a stop **159** (see FIG. 9) is fixed on drive link **156** to engage the back edge of actuator link **132**. Additionally, stop **159** engages segment **133** of actuator link **132** when the footrest linkage is in the fully retracted position shown in FIG. 7.

In order to assist extension of the footrest linkage, a biasing spring generally designated **160** is connected between the seat frame and the drive crank **154** as shown in FIGS. 7 to 9. In the specific form shown, one end of spring **160** is anchored to the seat frame while the other end is connected to a right angle mounting link **162** which in turn is pivotally connected by pin **164** to drive crank **154** generally at the bend area thereof. When the footrest linkage is in the fully retracted position, spring mounting link **162** will be positioned such that spring **160** will be under sufficient tension to assist movement of drive crank **154** forwardly of the chair for purposes of extending the footrest sections. In the extended position of the footrest assembly, spring **160** is generally relaxed.

With the exceptions to be described below, the footrest linkage on the occupant's left hand side of the chair is generally the same as that described above. However in contrast to many conventional footrest assemblies, the footrest linkage on the left hand side is actuated through a transmission connecting bar **166** which extends under the chair at a point spaced forwardly of the stub shaft **152** of operating handle **150**. In the specific form shown, and with referring to FIGS.1 and 5 cross bar **166** is rigidly connected to a link **168** located forwardly of actuating link **132** in the right hand footrest linkage. Link **168** has its upper end pivotally connected by pin **170** to the seat frame and its lower end pivotally connected by pin **172** with respect to an intermediate portion of cross link **124** located between pivots **128** and **136** as shown in FIG. 9. Connecting bar **166** extends across to the left hand footrest linkage where it is rigidly connected to a link **168*a*** (see FIG. 1) which corresponds to link **168** except that it functions as an actuator link for the footrest linkage on the left hand side of the chair. Thus, when the right hand footrest linkage is actuated by handle **150**, its motion will be transmitted to the left hand footrest linkage through connecting bar **166** and link **168*a***.

Referring to FIG. 10, link **132*a*** in the left hand footrest linkage which corresponds to drive link **132** in the right hand footrest linkage acts as an idler link. However link **132*a*** still is effective in controlling the parallelogram linkage in the left hand footrest linkage. It should also be understood that links **168** and **168*a*** aid links **132** and **132*a*** in supporting the footrest linkages from the seat frame.

Bell crank **154*a*** in the left hand footrest linkage acts as an idler link inasmuch as the left hand footrest linkage is actuated through connecting bar **166** and link **168*a*** as described. As shown in FIG. 10, idler bell crank **154*a*** has a slightly different shape than drive crank **154** whereby the rear pivot **158*a*** of link **156*a*** in the left hand footrest linkage is at a lower elevation than the corresponding pivot **158** of drive link **156** in the right hand footrest linkage. Moreover link **156*a*** which connects idler bell crank **154*a*** to link **132*a*** in the left hand linkage is pivotally connected to link **132*a*** by pivot **176** at a point spaced above pivot **140*a*** which connects link **132*a*** to link **137*a*** in contrast to the right hand footrest linkage wherein link **137** is connected to actuator link **132** by the same pivot **140** which connects link **132** to drive link **156**.

It will be seen that the location of transmission connecting bar **166** forwardly of operating handle **150** avoids obstruction from the seat frame support linkage thus allowing the chair to be designed in a compact fashion while at the same time permitting operating handle **50** to be positioned sufficiently rearwardly to provide the occupant with convenient access at all times.

BLOCKING MECHANISM-FOOTREST ACTUATED

In accordance with a further aspect of the present invention, provision is made for lowering locking bar **80** into engagement with the base to prevent forward rocking movement upon extension of the footrest assembly. In the specific embodiment illustrated wherein two locking bars **80** are provided, one on each side of the chair, the footrest linkages on opposite sides of the chair are operatively connected to the locking bars respectively to achieve the above features. With reference to the linkage mechanisms on the right hand side of the chair and to FIGS. 5 and 6, the foregoing is accomplished by what will be termed a control link **200**, the forward end of which is pivotally connected by pin **202** to the bend area at the upper end of actuator link **132**. The opposite rear end of control link **200** is pivotally connected by pin **84** to the short link **82** which also connects the upper end of locking bar **80** with respect to the seat frame. Thus pivot pin **84** is common to both control link **200** and locking bar **80** as well as the upper end of short link **82**. In the specific embodiment, control link **200** has a generally V-shape allowing it to pass under the forward end of main support link **64**.

In operation, when the footrest assembly is extended, the forward motion of actuator link **132** will carry with it control link **200** which in turn will pivot short link **82** forwardly to cause locking bar **80** to descend into engagement with striker bar **94** on the base as shown in FIG. 5. During this phase of movement, the other short link **88** will also pivot forwardly about its pivotal connection **92** to main support link **64**. When the footrest assembly is returned to the retracted position, the opposite motion will result and locking bar **80** will be raised out of engagement with the base to permit rocking movement. Although locking bar **80** will prevent forward rocking movement when the footrest is extended, rearward forward rocking movement is still available providing the backrest is in the upright position. The quick and efficient action of blocking bar **80** when actuated by the footrest assembly prevents the lower extremities of the footrest sections from digging into the floor as has been the case in certain prior chairs.

In addition to acting as a drive connection from the footrest assembly to locking bar **80** to actuate the locking bar, control link **200** also serves to maintain the position of pivot **84** at a stationary location as illustrated in FIGS. 2, 4 and 6 when the backrest is moved between normal and upright positions. In this manner, pivot **84** is stabilized to enable locking bar **80** to pivot downwardly or upwardly about pivot **84** in response to movement of the backrest between normal and fully reclined positions. The control link on the left hand side of the chair is identical to the above described control link **200** and is also similarly connected with respect to the locking bar and the associated footrest linkage on the left hand side of the chair.

SUMMARY OF OPERATION

In the normal upright position of the chair with the footrest retracted, the occupant may rock in the forward and rearward directions as well as swivel about the vertical axis of the base. In order to move the chair to a reclining position, the occupant merely exerts backpressure on the backrest to pivot the backrest rearwardly into the desired position. This causes the locking bar to engage the base to prevent forward rocking motion. However, short of the fully reclining position, the occupant may still rock the chair rearwardly. In the fully reclining position, all rocking motion is blocked.

If the occupant wishes to extend the footrest sections, he merely rotates the handle rearwardly which may be accomplished in any position of the backrest. Assuming the backrest is in the normal upright position upon extension of the footrest, the locking bar will descend (upon actuating footrest) to prevent forward rocking movement of the chair regardless of the position of the backrest. In all positions of the backrest and footrest, the chair is free to swivel.

Modifications and adaptations of the present invention will become readily apparent from the foregoing description and associated drawings, although not specifically mentioned herein.

I claim:

1. A combination rocking and reclining chair comprising in combination, a base, a seat frame, means mounting said seat frame to said base for rocking movement in the forward and rearward direction of the chair, a backrest, backrest linkage means mounting said backrest with respect to said frame for movement between upright and reclining positions, a locking bar pivoted with respect to said seat frame and having a free end movable between a raised position spaced from said base and lowered position in engagement with said base to lock said seat frame against forward rocking movement and rearward rocking movement, said seat frame being locked against forward rocking movement prior to its being locked against rearward rocking movement, and linkage means for lowering said lock bar into engagement with said base in response to movement of said backrest to a reclining position.

2. The chair defined in claim **1** further including a footrest, footrest linkage means mounting the footrest for movement between a retracted position and an extended position projected forwardly from the seat frame, and linkage means for moving the locking bar downwardly into engagement with the base in response to movement of the footrest to the extended position.

3. The chair defined in claim **1** wherein said linkage means for lowering the locking bar includes a first link extending generally in the forward-rearward direction of the chair and having one end pivotally connected with respect to said seat frame, a second link pivotally connected with respect to the backrest and pivotally connected with respect to a rear portion of said first link such that movement of the bakrest into reclining position swings said first link with the front portion of said first link moving upwardly and the rear portion of said first link moving downwardly to thereby raise said seat frame, and linkage means interconnecting said first link and said locking bar to move the locking bar downwardly into engagement with said base upon movement of said first link resulting from movement of the backrest into a reclining position.

4. The chair defined in claim **3** wherein said last recited linkage means includes a pair of short links, one of said short links being pivotally connected to said locking bar and said seat frame, the other of said short links being pivotally connected to said locking bar and said first link.

5. The chair defined in claim **3** wherein said means mounting said seat frame for rocking movement includes a rocking cam fixed to said first link to move therewith.

6. The chair defined in claim **5** wherein said rocking cam has a convexly curved lower surface engageable on said base, said curved lower surface being dimensioned such that when said backrest is moved into the fully reclined position, the rear portion of said lower curved surface engages said base to prevent further rearward rocking movement.

7. The chair defined in claim **1** wherein said bakrest linkage means includes a first backrest link pivotally connected to said backrest and said seat frame generally at the rear of said seat frame, a second backrest link pivotally connected to said backrest and said seat frame forwardly of said first backrest link, said first and second backrest links being arranged to pivot forwardly when the backrest is moved rearwardly into a reclining position.

8. The chair defined in claim **7** wherein said linkage means for lowering said locking bar includes a third link extending generally in the forward-rearward direction of

the chair and having its forward end pivotally connected with respect to said seat frame, a fourth link having one end pivotally connected with respect to said backrest and an opposite end pivotally connected to the rear of said third link, and linkage means interconnecting said third link and said locking bar whereby when the backrest is moved to reclining position, said fourth link moves the rear of said third link downwardly with the forward end of said third link moving upwardly to raise said seat frame and also cause lowering of said locking bar into engagement with said base, and wherein said means mounting said seat frame to said base for rocking movement includes a rocking cam rigidly fixed to said third link and having a lower convexly curved rocking surface engageable on the base.

9. The chair defined in claim **8** further including in combination; a footrest, footrest linkage means mounting said footrest for movement between a retracted position and an extended position projected forwardly from the chair, and linkage means including a control link having one end pivotally connected with respect to said footrest linkage means and an opposite end connected with respect to said locking bar to move the locking bar downwardly into engagement with the base upon extension of said footrest.

10. The chair defined in claim **9** wherein said linkage means interconnecting said third link and said locking bar includes a fifth link having one end pivotally connected with respect to said locking bar and an opposite end pivotally connected to said third link, and wherein there is further included a sixth link having one end pivotally connected with respect to said control link and said locking bar and an opposite end pivotally connected to said seat frame.

11. The chair defined in claim **3** further including a link pivotally connecting said locking bar to said seat frame, a footrest, a footrest linkage mounting said footrest between a retracted position and an extended position projecting forwardly from the chair, and a control link having one end pivotally connected to said footrest linkage and an opposite end pivotally connected to said link which connects said locking bar to said seat frame whereby when said footrest is extended the control link causes said locking bar to move downwardly into engagement with said base to prevent forward rocking of said seat frame.

12. A rocking chair comprising in combination, a base, a seat frame, means mounting said seat frame on said base for rocking movement in the forward-rearward direction of said chair, a footrest, footrest linkage means mounting the footrest for movement between a retracted position and an extended position projected forwardly from the chair, a locking bar, locking bar linkage means mounting the locking bar with respect to said seat frame for movement between a raised position spaced from said base to permit rocking of the chair and a lowered position into engagement with said base at the front of the base to prevent forward rocking movement of said seat frame, and linkage means interconnecting said footrest linkage means and said locking bar linkage means for lowering said locking bar into engagement with said base when said footrest is extended.

13. The chair defined in claim **12** wherein said locking bar linkage means includes a first link having one end pivotally connected to said locking bar and an opposite end pivotally connected to said seat frame, and wherein said linkage means interconnecting said footrest linkage and said locking bar linkage means includes a control link having one end pivotally connected to said first link at said one end thereof.

14. In combination with a chair including a base and a seat frame, a dual footrest assembly comprising a pair of footrests, and linkage means mounting the footrest for movement between a retracted position wherein the footrests extend in parallel, vertical planes adjacent the front of the chair and extended positions wherein the footrests extend in generally coplanar relationship with one footrest positioned forwardly of the other footrest.

15. The combination defined in claim **14** wherein said one footrest is positioned forwardly of said other footrest when in the retracted positions thereof.

16. The chair defined in claim **15** wherein said linkage means includes a first mounting link secured to said one footrest, second and third extension links having adjacent ends pivotally connected with respect to said first link at spaced points on said first link, a fourth link secured to said other footrest and pivotally connected to said second and third links at points spaced from said first link, and fiifth and sixth links intersecting each other and being pivotally connected to each other at their points of intersection, said fifth and sixth links being pivotally connected to said third and fourth links respectively, and linkage means for projecting said intersecting links forwardly and rearwardly of the chair and for pivoting said intersecting links about their point of intersection for swinging said footrests into their coplanar extended positions.

17. In a combination rocking and reclining chair including a base, a seat frame, a backrest frame, and backrest linkage means for attaching said backrest frame to said seat frame for movement between a normal generally upright position and a reclining position extending generally rearwardly of the chair; means for mounting said seat frame for rocking movement on said base including a main support link extending generally in the forward rearward direction of the chair, pivot means pivotally connecting the forward end portion of said main link with respect to said seat frame, a rocking cam rigidly fixed to said main link and engaged on said base for rocking movement, a second link, and means pivotally connecting said second link to said backrest frame and to the rear end portion of said main link such that upon movement of said backrest frame into the reclining position the rear end portion of said main link will be swung downwardly by said second link causing said seat frame to move upwardly relative to the base.

18. The combination defined in claim **17** wherein said backrest linkage means includes a first backrest link having its opposite ends pivotally connected with respect to said seat frame and said backrest frame, a second backrest link having its opposite ends pivotally connected with respect to said backrest frame and said seat frame at points located forwardly of the pivot points of said first backrest link, the pivot point of said first backrest link with respect to said backrest frame being at a higher elevation than the pivot point of said second backrest link to said backrest frame such that upon application of rearward pressure on said backrest frame, the backrest frame will pivot rearwardly relative to said first and second backrest links and said first and second backrest links will pivot forwardly relative to said seat frame.

19. The combination defined in claim **20** further including a first stop means located on said seat frame to engage said first backrest link to limit forward movement of said first backrest link upon movement of the backrest into reclining position, and a second stop means located on said backrest frame to engage said second link to limit movement of said backrest frame forwardly of the chair into the normal upright position.

20. The combination defined in claim **17** further including a locking bar, means mounting said locking bar with respect to said seat frame for movement between a raised position spaced from the base and a lowered locking position engaging the base, and means connected to said main link for actuating said locking bar into the lowered locking position upon movement of said backrest into the reclining position.

21. For use in a combination rocking and reclining chair of the type including a base, a seat frame overlying the base, and a backrest assembly connected to said seat frame for movement relative to said seat frame between

upright and reclining positions; a linkage assembly comprising in combination, a main link having one end adapted to be pivotally connected with respect to said seat frame, a cam fixed to said main link to be placed on said base for mounting said seat frame for rocking movement on said base, a second link having one end pivotally connected with respect to the rear end portion of said main link and an opposite end adapted to be pivotally connected with respect to said backrest to activate said main link upon movement of the backrest frame into reclining position, a locking bar adapted to be pivotally connected with respect to said seat frame, and a third link having one end pivotally connected to an intermediate portion of said main link and an opposite end pivotally connected with respect to an intermediate portion of said locking bar to actuate the locking bar between raised and lowered positions in response to movement of said main link caused by movement of said second link resulting from movement of the backrest frame into reclining position.

22. The linkage assembly defined in claim **21** further including in combination a footrest linkage for mounting and actuating a footrest between extended and retracted positions relative to the chair, and a fourth control link

interconnecting said footrest linkage and said locking bar for lowering said locking bar upon extension of said footrest linkage.

23. The linkage assembly defined in claim **22** further including a fifth link having one end pivotally connected to said locking bar and said control link and an opposite end adapted to be pivotally connected to said seat frame.

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