March 18, 1969 F. M. RÉ 3,433,527

RECLINING MECHANISM FOR T-CUSHION CHAIR

Filed April 17, 1967 Sheet 1 of 4

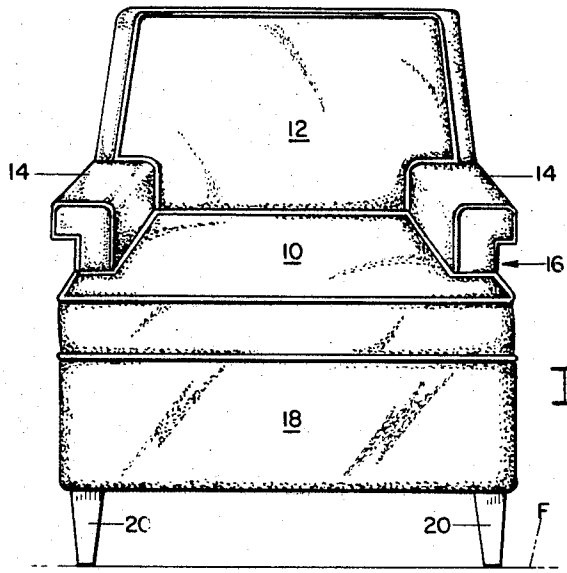

FIG. 1

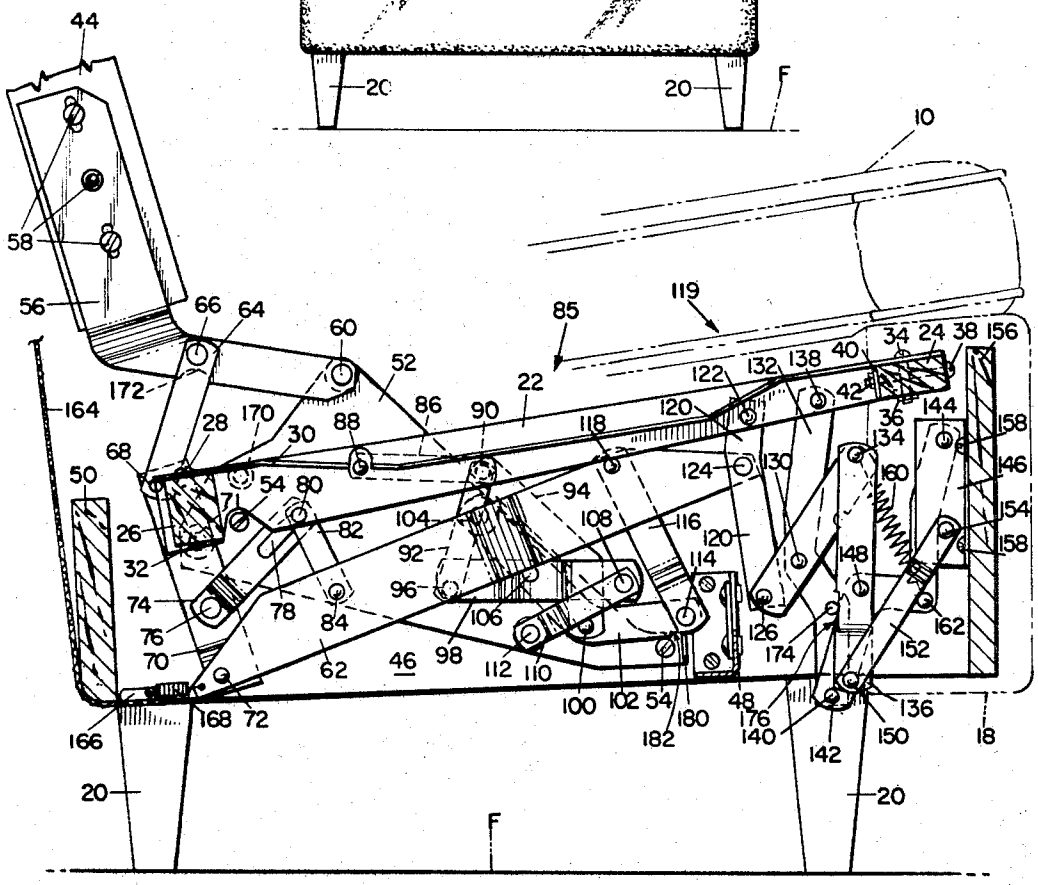

FIG. 2

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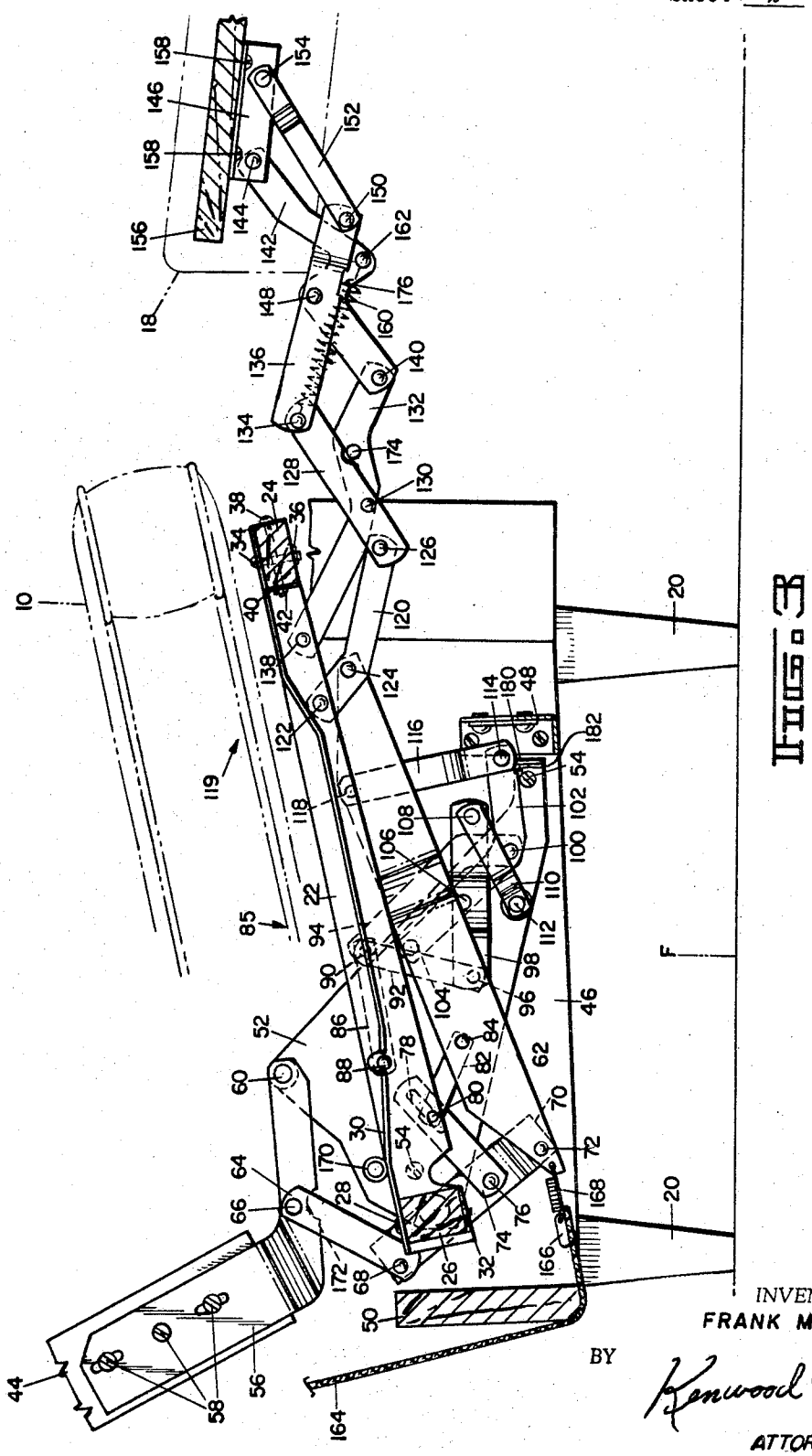

FIG. 3

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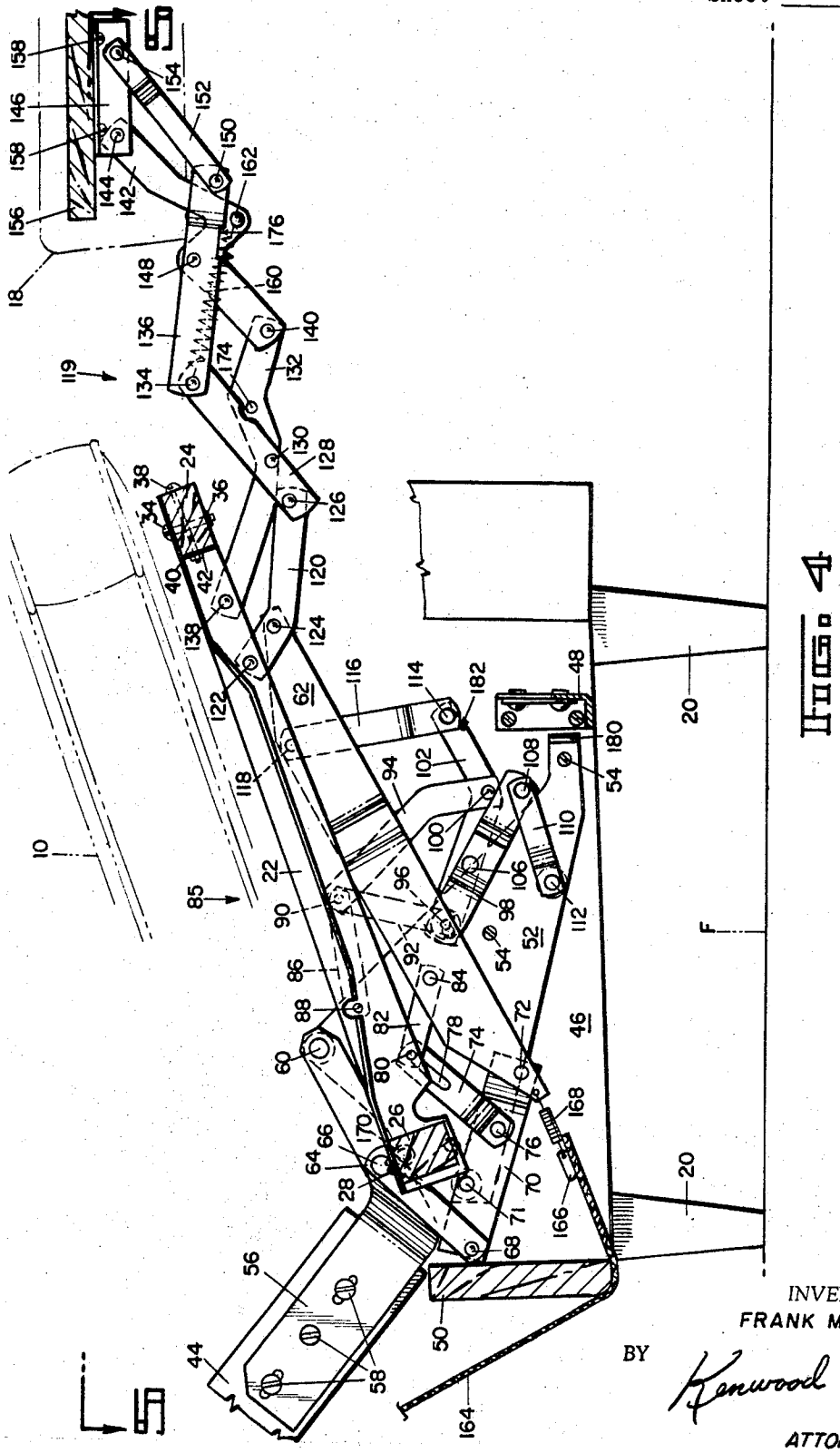

FIG. 4

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RECLINING MECHANISM FOR T-CUSHION CHAIR

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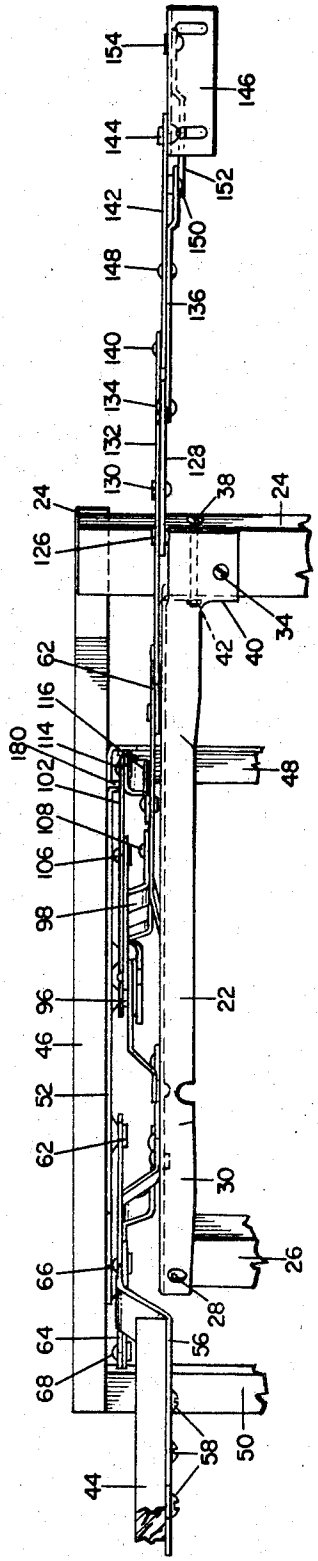

FIG. 5

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Patented Mar. 18, 1969

3,433,527

RECLINING MECHANISM FOR T-CUSHION CHAIR

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U.S. Cl. 297—85 2 Claims
Int. Cl. A47c 1/035

ABSTRACT OF THE DISCLOSURE

Mechanism for effecting automatic synchronized reclining movement of a seat and back rest relative to the fixed chassis of a chain coincident to the extension of a foot stool relative to the chassis, without the use of external handle and lever means, the seat being of the T-cushion type and the mechanism moving it forwardly relative to the fixed chassis during reclining movements to preclude binding of the T-cushion relative to the chair arms.

BACKGROUND OF THE INVENTION

Field of the invention

Chairs wherein a leg rest shifts with respect to a seat simultaneously with a movement of the seat and back.

Description of the prior art

To my knowledge, no one has successfully incorporated a mechanism into a T-cushion chair which will automatically and simultaneously extend the legrest or footrest as the seat and backrest are reclined. The T-cushion recliners of the prior art all teach the use of a handle or lever usually on the side of the chair for actuating the legrest or footrest after the seat and backrest are reclined and this for the reason that no one has been able to overcome the problem of the T-cushion binding at the arms of the chair.

SUMMARY OF THE INVENTION

A primary object of the invention is to provide, in a reclining chair, a T-cushion seat and mechanism for automatically moving the seat between sitting and reclining positions coincident with the tilting movement of a backrest and the extension of a foot stool without the use of an external handle or lever which detracts from the appearance of the chair.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a T-cushion chair of the type embodying the invention;

FIG. 2 is a fragmentary, side elevational view of a T-cushion chair in the upright or sitting, foot stool retracted position and with portions of the chair removed and other portions shown in phantom for purposes of clarity;

FIG. 3 is a fragmentary, side elevational view of the chair and mechanism of FIG. 2 in the partially-reclined, foot stool extended position;

FIG. 4 is fragmentary, side elevational view of the chair and mechanism of FIG. 3 in the fully-reclined, foot stool extended position; and

FIG. 5 is a fragmetnary top plan view taken on the line 5—5 of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The chair is of the T-cushion type, being so designated because the seat cushion is in the shape of an inverted T with portions thereof disposed forwardly of the arms of the chair.

A need for an automatic reclining chair incorporating this design without an objectionable actuating handle has

long been felt since the T-cushion is a standard item in conventional living room furniture design.

To my knowledge, no one has previously successfully employed such a T-cushion in a reclining chair without an actuating handle for the reason that the aforementioned portions of the seat cushion have exhibited a tendency to bind on the chair arms when the chair is moved between upright and reclining positions thereby precluding smooth reclining movement and, in some instances, actually precluding any reclining movement at all, and/or precluding extension of the foot stool.

The chair incorporates a T-cushion seat **10**, a back rest **12**, chair side arms **14**, a chassis **16**, a foot stool **18** disposed flush with the forward edge of the seat in the chair upright position, and chair legs **20** for supporting the chassis upwardly of the floor F.

A linkage mechanism, to be described, constitutes one of a pair, there being one such linkage mechanism at each side of the seat inwardly of the respective adjacent side of the chassis so as to be concealed from view.

Included as integral parts of the linkage mechanisms are seat side rails **22** which extend in a front-to-rear chair direction and are interconnected at their ends by front and rear stretchers **24** and **26** respectively, same constituting a supporting framework for the seat.

Rear stretcher **26** is fixed to the side rails by a bolt **28** which extends through an upper flange **30** of the side rail and through the stretcher with a nut **32** threaded thereon.

Front stretcher **24** is fixed to the side rails by a bolt **34** which extends downwardly through upper flange **30** of the side rail and through the stretcher with a nut **36** threaded thereon.

As seen in FIG. 5, the front stretcher extends outwardly from the side rail to form a support for the T-portion of the cushion. Accordingly, additional securing means is provided and constitutes a bolt **38** which extends inwardly through the stretcher and through a flange **40** provided adjacent the forward end of the side rail and has a nut **42** threaded thereon.

Back rest **12** is constituted by a pair of parallel side rails **44** connected by a plurality of cross rails, not shown, in conventional manner.

The chassis comprises spaced parallel and upright sides **46** interconnected by front and rear stretchers **48** and **50** respectively.

Mounting plates **52** fixed to the chassis sides **46** by bolts **54** or the like mount the linkage mechanisms upon the chassis.

A back rest link **56** has its upper end fixed to the backrest side rails **44** by bolts or screws **58** and has its lower end pivotally connected to mounting plate **52** as at **60** whereby the backrest is pivotally related to the chassis.

A push bar **62** serves as a means for connecting the backrest to the seat, the seat to the chassis and the footstool to the chassis and seat.

A pair of back links connect back rest link **56** to push bar **62** and comprises a first back link **64** pivoted at its upper end at **66** to back rest link **56** and at its lower end at **68** to the upper end of a second back link **70**, said second back link being pivoted adjacent its upper end at **71** to mounting plate **52** (see FIG. 4) and at **72** at its lower end to the rear end of push bar **62**.

A pair of links additionally connects the back rest to the seat and to the push bar and comprises a slotted control link **74** pivoted at its rear end at **76** to second back link **70** adjacent the lower end thereof and having a slot **78** at its forward end in which a pin **80** carried by seat side rail **22** is receivable, said pin additionally serving to pivotally connect the upper end of a support link **82** to the seat, the lower end of said support link being pivoted to the push bar at **84**.

The control link serves the dual functions of precluding reclining movement of the seat and back rest unless the foot stool is extended and precluding any retraction of the foot stool while the chair is in fully reclined position, with the supporting link supporting the rear end of the seat.

A system of links generally indicated by **85** further interconnects the seat, chassis and push bar to insure smooth, coordinated movements of the various chair components. In addition, this system of links performs the all-important function of guiding the seat during reclining movement of the chair components so that as the chair components are reclined the seat moves not only upwardly but forwardly to preclude binding with the chair arms.

This system of links includes a seat link **86** pivoted at its rear end at **88** to the seat side rail and pivoted at its opposite end at **90** to the upper ends of a first connecting link **92** and a first power link **94**.

First connecting link **92** is pivoted at its lower end at **96** to the rear end of a cross link **98**.

First power link **94** is pivoted at its lower end at **100** to an L-link **102** pivoted at its upper end at **104** to mounting plate **52**.

Cross link **98** is pivoted at its approximate midsection at **106** to L-link **102** and at its forward end at **108** to the forward end of a second connecting link **110** which is pivoted at its opposite end at **112** to mounting plate **52**.

L-link **102** is pivoted at its forward end at **114** to the lower end of a second power link **116** pivoted at its upper end at **118** to push bar **62**.

A system of links generally indicated by **119** further interconnects the foot stool to the seat and to the chassis to insure smooth coordinated movements of the foot stool as the chair components are moved between upright and reclining positions.

This system of links includes a first propeller link **120** pivoted at its upper end at **122** to seat side rail **22** and pivoted adjacent its upper end at **124** to the forward end of push bar **62**.

First propeller link **120** is pivoted at its lower end at **126** to the lower end of a push link **128** pivoted at its approximate midsection at **130** to a second propeller link **132** and pivoted at its forward end at **134** to the upper end of a third propeller link **136**.

Second propeller link **132** is pivoted at its upper end at **138** to seat side rail **22** and is pivoted at its lower end at **140** to the lower end of a first foot stool link **142** which is pivoted at its upper end at **144** to a foot stool plate **146**.

Third propeller link **136** is pivoted at its approximate midsection at **148** to the approximate midsection of first foot stool link **142** and is pivoted at its lower end at **150** to the lower end of a second foot stool link **152** which is pivoted at its upper end at **154** to foot stool plate **146**.

The foot stool cross stretcher **156** is fixed to the foot stool plate by screws **158** or the like.

A tension spring **160** extends between third propeller link **136** and first foot stool link **142** being fixed at one end to the pivotal connecting pin **134** and at its opposite end to a pin **162** provided on first foot stool link **142**.

Spring **160** helps to control the movement of the foot stool as it is extended and aids in its retraction when the chair is returned from reclining positions to upright position.

The usual fabric backing **164** is suspended from the back rest to conceal the various structural features of the chair.

In the past, as the chair was reclined, the lower end of this fabric backing encountered the floor so that it soon became soiled, tattered and unsightly.

I solve this problem by the simple expedient of sewing or otherwise attaching a small plate **166** to the lower end of the fabric backing, pulling the lower end of the backing around the rear stretcher **50** and connecting the plate **166** to the rear end of the push bar **62** by a tension spring **168**, thereby keeping the bottom edge of the fabric backing off the floor even when the chair is reclined.

I am able to employ a T-cushion in my chair because the seat does not move rearwardly as is common in recliners when the back rest is tilted, but rather moves forwardly and its rear end moves slightly downwardly. Since the seat moves forwardly, it cannot bind on the arms of the chair to hamper or preclude reclining movements or extension of the foot stool.

To reach the intermediate, semi-reclining or TV position of FIG. 3 from the upright, sitting position of FIG. 2, rearward pressure is exerted against the back rest, causing back rest link **56** to pivot relative to mounting plate **52** and setting up a rotative movement of first back link **64** and second back link **70** to drive push bar **62** forwardly.

Such forward movement of push bar **62** sets up a concomittant forward movement of seat rail **22** and seat **10** and the extension of the foot stool, it being recalled that the seat rail is connected to the push bar by support link **82** and first propeller link **120**.

Swinging movement of first propeller link **120** causes all of the links of the system of links **119** to swing outwardly, thereby moving the foot stool from its stored generally vertical position flush with the front of the chair to an extended generally horizontal position forwardly of the chair.

During this movement from the FIG. 2 position to the FIG. 3 position, the system of links **85** remains virtually stationary.

Additional pressure on the back rest moves the chair into the fully reclined position of FIG. 4, with the seat once again moving forwardly to avoid binding on the arms, but now also being moved upwardly by the rotation of the system of links **85** until a stop **170** provided on mounting plate **52** is engaged in a notch or cutout **172** in back rest link **56** to preclude further reclining movement of the chair components.

The chair occupant need only sit up to return the chair from FIG. 4 to FIG. 3 position, and by exerting pressure of the heels on the foot stool, he may return the chair from the FIG. 3 to the FIG. 2 position.

In the FIG. 2 position, a stop **174** on second propeller link **132** engages in a notch **176** on the rear edge of third propeller link **136** to preclude further retraction of the foot stool.

In addition, in the FIGS. 2 and 3 positions, the lower edge of L-link **102** abuts a stop **180** (best seen in FIG. 4), provided on the forward end of mounting plate **52**, the lower edge of L-link **102** being provided with a suitable notch **182** (see FIG. 4), in which the stop is engageable, the stop supporting the linkage.

I claim:

1. A reclining article of furniture comprising:

a stationary frame,

a body-supporting unit comprising a back-rest and a T-cushion seat pivotal relative to the frame and pivotal each relative to the other,

means mounting the body-supporting unit for movement relative to the frame successively between an upright sitting position and an intermediate reclined position and a fully reclined position and positions therebetween,

a foot stool movable between retracted position wherein it is disposed in a substantially vertical position beneath the seat and a plurality of extended positions wherein it is disposed in a substantially horizontal position forwardly of the seat,

actuating means connecting between the body-supporting unit, frame and foot stool for automatically moving the foot stool responsively to movement of the body-supporting unit,

the actuating means comprising, a seat link fixed to the seat, a push bar pivotally connected to the frame, to the body-supporting unit and to the foot stool,

a system of links pivotally connecting between the push bar, the frame and the seat link for coordinating the movements of the body-supporting unit and foot stool and for moving the T-cushion seat forwardly and upwardly as the body-supporting unit is reclined and the foot stool extended whereby binding between the T-cushion and the frame is precluded,

a slotted link operatively connected to the back rest, to the push bar and to the seat link,

a pin on the seat link receivable in the slot of the slotted link, a control link pivoted at one end to said pin and at its other end to the push bar for precluding reclining movement of the seat and backrest unless the foot stool is extended and for precluding retraction of the foot stool while the body-supporting unit is in any reclining position,

and plural stop means for limiting the range of movement of the foot stool and the body-supporting unit.

2. In a reclining article of furniture as set forth in claim 1, including a backing fixed to the rear surface of the backrest and depending therefrom, and spring means connecting the lower end of the backing to the push bar.

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U.S. Cl. X.R.

297—83