July 30, 1963 E. M. KNABUSCH ETAL 3,099,487

LEG REST FIXTURE AND SUPPLEMENTAL HOLDING MECHANISM

Filed May 21, 1962 2 Sheets-Sheet 1

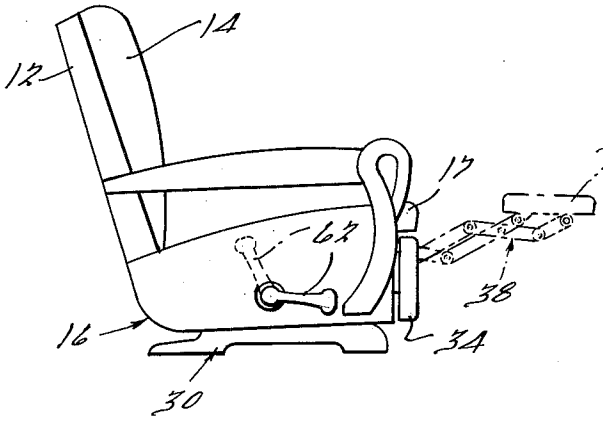


FIG. 1.

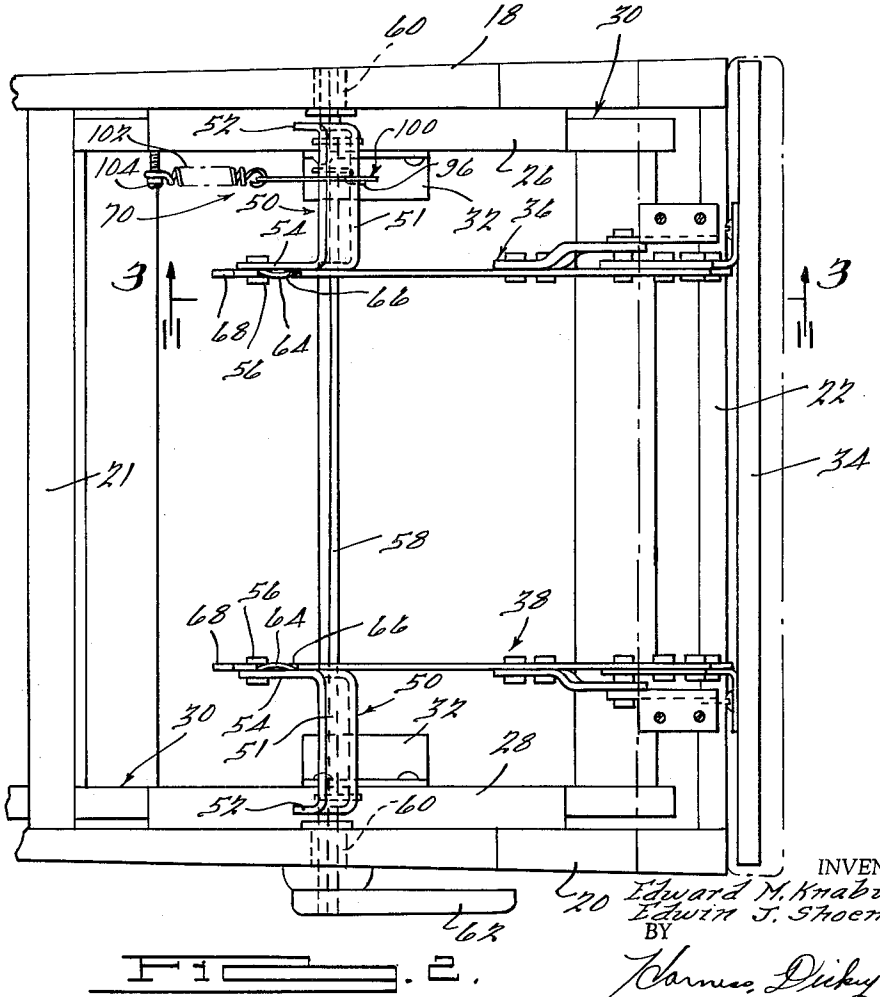


FIG. 2.

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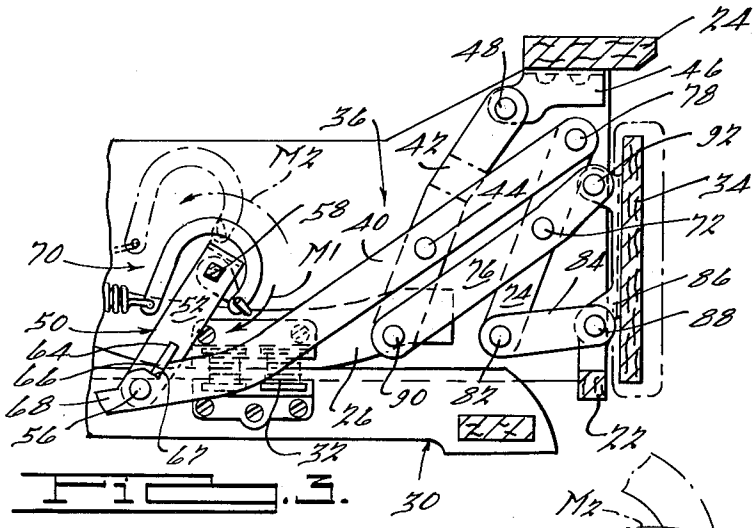


FIG. 3.

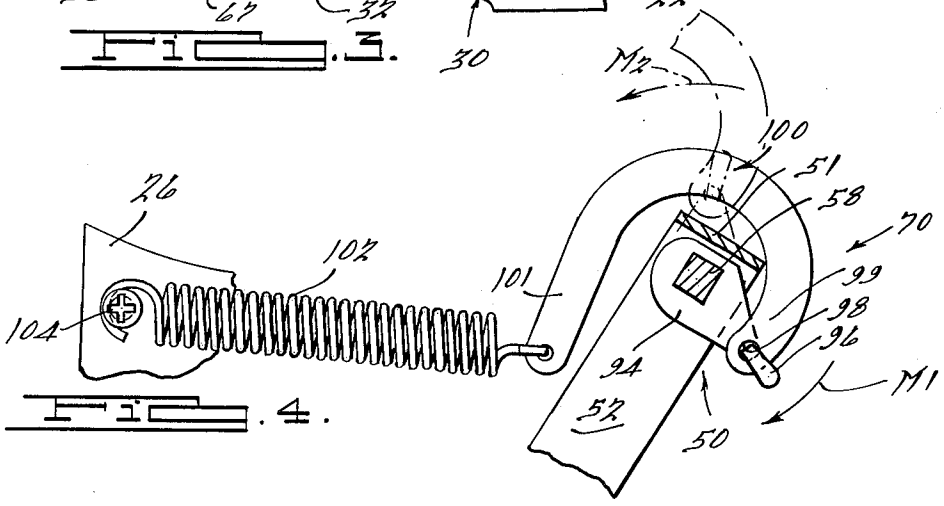


FIG. 4.

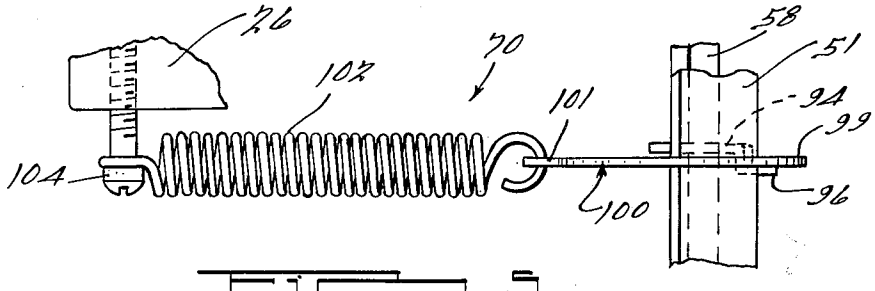


FIG. 5.

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3,099,487

LEG REST FIXTURE AND SUPPLEMENTAL HOLDING MECHANISM

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3 Claims. (Cl. 297—429)

This invention relates to chairs having extensible and retractable leg rests, and more particularly constitutes an improvement over the platform rocking chair illustrated and described in our copending application Serial No. 125,874, dated July 21, 1961.

The chair of the aforementioned copending application includes a leg rest which is secured to the chair by a pair of laterally spaced pantograph mechanisms which are actuated by means including a rotatable shaft for moving the leg rest into a lower retracted position or an extended, raised leg-supporting position. The leg rest is then held in such positions by the pantograph mechanisms and the actuating means.

When the leg rest is in a retracted position it is desirable that it fit tightly against the front end of the chair. Occasionally, however, the pantograph mechanism and actuating means will wear and, consequently, develop some slack or play causing the retracted leg rest to hang outwardly from the rest of the chair and thereby become an obstacle over which a person might inadvertently trip. Furthermore, an outwardly hanging leg rest detracts from the appearance of the chair.

The present invention includes a supplemental holding mechanism for solving this problem which coacts with the rotatable shaft to impose an inward pull on the leg rest so that it will be resiliently held tightly against the chair when it is in its retracted position. The supplemental holding mechanism also helps to raise the leg rest toward its raised leg-supporting position and to hold it in such a position.

Accordingly, important objects of this invention are to improve a chair having a leg rest which is held in a lower, retracted position or a raised leg-supporting position by a pantograph mechanism and actuating means including a rotatable shaft, by providing a supplemental holding mechanism which coacts with the rotatable shaft to resiliently hold the leg rest in its retracted position; and to provide such a supplemental holding mechanism including a toggle joint comprising a first link fastened to the rotatable shaft and a second link which is bent around the rotatable shaft with one of its ends pivotally connected to the first link and its opposite end connected to spring means which imposes reversely directed moments on the rotatable actuating shaft when the first and second links are moved into over-toggle positions for resiliently holding the leg rest in either a retracted or a raised position.

With the above, as well as other, and in certain cases more detailed objects in view, a preferred but illustrative embodiment of the invention is shown in the accompanying drawing in which:

FIGURE 1 is a view in side elevation of a platform rocking chair having a leg rest and operating mechanism therefor, embodying features of the present invention;

FIGURE 2 is an enlarged broken plan view of the seat frame of the chair illustrated in FIGURE 1;

FIGURE 3 is a sectional view of the structure illustrated in FIGURE 2, taken on the line 3—3 thereof showing the leg rest in its retracted position and the rocker in horizontal position;

FIGURE 4 is an enlarged, broken side view of a supplemental holding mechanism constructed in accordance with certain of the concepts of the present invention; and

FIGURE 5 is a plan view of the supplemental holding mechanism illustrated in FIGURE 4.

One embodiment of the invention is illustrated in the drawings as including a chair, representatively illustrated as being a platform rocker chair, having a back frame portion **12** containing a back cushion **14** fixed with respect to a seat frame **16** having a resiliently supported seat cushion **17** thereon. The seat frame **16** includes a pair of laterally spaced side frame members **18, 20** which are joined at the rear by a rail **21** and at the front by a rail **22**. The side members are further interconnected by a crossbar **24** at the front, upper end thereof. Rockers **26, 28** secured on the inside surface of the side frame members **18, 20** engage the upper surface of side members of a base supporting frame **30** in rockable relationship therewith. The rockers **26, 28** and the side members of the base **30** are interconnected by double coil spring devices **32** which are of a form well known in the art. It should be understood that the seat frame **16** can be fixedly mounted upon a fixed platform or base, or be connected to such a base for swiveling movement rather than rocking movement.

The illustrated embodiment of the invention further includes a leg rest **34** supported on the seat frame **16** for movement between an inactive, lowered or retracted position, as illustrated in FIGURES 1–3, and a raised, leg-supporting position, as illustrated in dotted lines in FIGURE 1, by means of a pair of spaced pantograph mechanisms **36, 38** each of which includes a first pair of links **40, 42** secured in scissor relation by a pivot **44**. The upper end of the link **42** is secured to a bracket **46** on the underside of the crossarm **24** by means of a pivot **48**. A U-shaped link **50** comprising a crossarm **51** joining a pair of laterally spaced legs **52, 54** is operatively associated with the rear end of the link **40** by means of a pivot **56** which interconnects the rear end of the link **40** and the free end of the leg **54**. An actuating shaft **58** of square section extends through openings in each of the legs **52, 54** adjacent the joined ends of the laterally spaced legs **52, 54** and has end portions which are rotatably carried by bushings **60** supported in the side frame members **18, 20**. The openings in the legs **52, 54** are squared to snugly fit the shaft **58**. A supplemental holding mechanism **70** is operatively associated with one end of the actuating shaft **58** and, as will be subsequently discussed in greater detail, coacts therewith to hold the leg rest **34** tightly against the chair frame when the leg rest is in its retracted position.

The actuating shaft **58** is adapted to be rotated by means of an operating arm **62** secured on the outer end thereof to produce movement of the leg rest **34** from its retracted position to its leg-supporting position. When the operating arm **62** is positioned forwardly as shown in solid lines on FIGURE 1, an outwardly directed stop tab **64** on each leg portion **54** engages a forward surface **66** of a clearance notch **67** in the rear end of the link **40**. When the arm **62** is moved rearwardly into the position shown in broken lines in FIGURE 1, the leg rest **34** is moved into its leg-supporting position and held therein by the engagement of the stop tab **64** with the upper surface of an extending finger **68** at the end of the link **40**. The relationship between the surface **66** and the upper surface of the extending finger **68** is such that the operating arm **62** moves slightly more than 90°, as illustrated in FIGURE 1, to produce movement of the leg portion **54** between the points at which the stop tab **64** will engage the forward and rearward surfaces of the clearance notch **67**, respectively. When the leg rest **34** is in its leg-supporting position, the relationship of the shaft **58** and the pivot **56** is such that they are in an on, or over-toggle relationship so as to lock the leg rest **34** in its leg-supporting position.

Returning now to a description of the pantograph mechanisms **36**, **38** which support the leg rest **34** on the chair frame, each such mechanism further includes a second set of links **74**, **76** which are disposed in scissor relationship and secured together by a pivot **72**. The upper end of the link **74** is connected to the upper end of the link **40** by means of a pivot **78** and its lower end is connected by means of a pivot **82** to the rear end of a link **84** having its opposite end connected to a bracket **86** on the underside of the leg rest **34** by means of a pivot **88**. The lower end of the link **76** is connected to the lower end of the link **42** by means of a pivot **90** and its opposite end is connected to the bracket **86** on the leg rest **34** by means of a pivot **92** near the upper end of the leg rest **34** when it is in its inactive position.

The lengths of the various links on either side of the pivots are such as to produce a desired movement of the leg rest **34** from its retracted position to a horizontally extending or leg-supporting position. The operation of the links for so moving the leg rest **34** has been explained in more detail in Patent No. 2,963,077, issued December 6, 1961 to E. M. Knabusch, et al., for Platform Rocker, and will not be described further herein.

The main concept of the present invention embodies the manner in which the leg rest **34** is held against the chair when it is in its retracted position. As was indicated above, it has been found that supporting means having a number of links may develop a certain amount of slack after a period of use such that the leg rest **34** will hang outwardly of the chair when it is in its retracted position. Such slack can develop through wear at the bearing points between the various pivots and links and between the bearing points at the U-shaped links **50** and the actuating arm **58**. Therefore, in accordance with certain of the concepts of the present invention, a supplemental holding mechanism **70** is operatively associated with the actuating shaft **58** to cause the pantograph mechanisms **36**, **38** to resiliently hold the retracted leg rest **34** tightly against the seat frame **16**.

The illustrated embodiment of the supplemental holding mechanism **70** includes a spring actuated toggle joint which preferably comprises a link **94** having a square hole **95** in one end thereof which snugly fits the surfaces of the squared actuating shaft **58**. The link **94** is representatively illustrated as being located on the shaft **58** between the legs **52**, **54** of one of the U-shaped links **50** and is so arranged that the outer end thereof extends generally downwardly when the leg rest **34** is in its retracted position. The outer end of the link **94** has an outwardly directed, offset tip portion **96** which extends through an aperture **98** in one end **99** of a bent link **100** for providing pivotal movement therebetween. The link **100** is bent upwardly and over the crossarm **51** of the U-shaped link **50** such that its opposite end **101** is offset at a point rearwardly from its pivoted end **99**. One end of an elongated spring **102** connects to fixed support means, for example, to a screw **104** secured on the inside surface of the rocker **26**. The opposite end of the spring **102** connects to the offset end **101** of the bent link **100** for imposing a rearward pull thereon.

When the leg rest **34** is in its retracted position the spring **102** will pull the bent link **100** rearwardly so as to impose a clockwise movement M_1 on the actuating shaft **58**. Force components from the shaft **58** are transmitted through the U-shaped link **50** to remove any slack that exists in the supporting pantograph mechanisms **36**, **38**. Accordingly, the leg rest **34** is resiliently held tightly against the seat frame **16**. When the leg rest **34** is moved toward its horizontally extended or raised leg-supporting position, the actuating shaft **58** will rotate the link element **94** in a counterclockwise direction as viewed in FIGURES 3 and 4 causing the bent link **100** to initially move against the force of the spring **102** until the offset tip portion **96** of the link **94** passes upwardly through a horizontal plane including the centerline of the actuating shaft **58** and snaps into an over-toggle position at which point the spring force **102** will impose a counterclockwise moment M_2 on the actuating shaft **58**. Force components acting through the actuating arm **58**, the U-shaped links **50** and the extensible pantograph mechanisms **36**, **38** will accordingly act to raise the leg rest **34** toward and to resiliently hold it in its horizontally extended or raised leg-supporting position.

The elements of the illustrated embodiment of the supplemental holding mechanism **70** are so proportioned that they provide a sufficient force to take up any slack which might otherwise cause the leg rest **34** to hang outwardly of the chair but yet are proportioned to enable the operating handle **62** to be easily operated while moving the leg rest **34** between its retracted and extended positions. Furthermore, the elements of the supplemental holding mechanism **70** can be quickly assembled by merely sliding the link **94** on the shaft **58**, inserting the tip portion **96** through the aperture **98** in the bent link **100** and connecting the spring **102** between the screw **104** and the link **100**.

While it will be apparent that the embodiment of the invention herein disclosed is well calculated to fulfill the objects of the invention, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In a chair structure, the combination of a seat frame, a leg rest, means including extensible linkage means securing said leg rest to said seat frame for movement between a retracted position and a raised leg-supporting position, means operatively connected to said extensible linkage means for moving said leg rest into its retracted or raised leg-supporting positions including a rotatable transverse shaft adapted to be manually actuated, a first link non-rotatably connected to said shaft, a curved generally sickle shaped link having one end pivotally connected to said first link on one side fore and aft of said shaft and the opposite end disposed on the other side of said shaft when said leg rest is in its retracted position, and resilient means connected to the opposite end of said curved link for moving said leg rest operating means in a direction to cause said extensible linkage means to resiliently hold said leg rest against said seat frame when said leg rest is in its retracted position.

2. In a chair structure, the combination of a seat frame, a leg rest, means including extensible linkage means securing said leg rest to said seat frame for movement between a retracted position and a raised leg-supporting position, means operatively connected to said extensible linkage means for moving said leg rest into its retracted or raised leg-supporting positions, a first link operatively connected to said leg rest operating means and having an outwardly directed offset tip, a bent link having offset ends, one of said offset ends having an aperture therein through which said offset tip fits for pivotally interconnecting said first link and said bent link, and spring means connected to the other of said offset ends for moving said leg rest operating means in a direction to cause said linkage means to resiliently hold said leg rest against said seat frame when said leg rest is in its retracted position, for raising said leg rest when it is moved a predetermined amount toward its leg-supporting position and for resiliently holding said leg rest in its leg-supporting position.

3. In a chair structure, the combination of a seat frame, a leg rest, means including extensible linkage means securing said leg rest to said seat frame for movement between a retracted position and a raised leg-supporting position, means including a rotatable shaft operatively connected to said extensible linkage means for moving said leg rest into its retracted or raised leg-supporting positions, a first link connected to said rotatable shaft and having an offset tip directed outwardly therefrom, a bent link having offset ends, one of said offset ends having

an aperture therein through which said offset tip fits for pivotally interconnecting said first link and said bent link, and spring means connected to the other of said offset ends for rotating said shaft in a direction to cause said linkage means to resiliently hold said leg rest against said seat frame when said leg rest is in its retracted position, for raising said leg rest when it is moved a predetermined distance toward its leg-supporting position and for resiliently holding said leg rest in its leg-supporting position.

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