June 19, 1962 L. P. FRANK 3,039,818

CHAIR FOR ARTHRITICS AND THE LIKE

Filed Aug. 9, 1961

3 Sheets-Sheet 1

Fig. 1

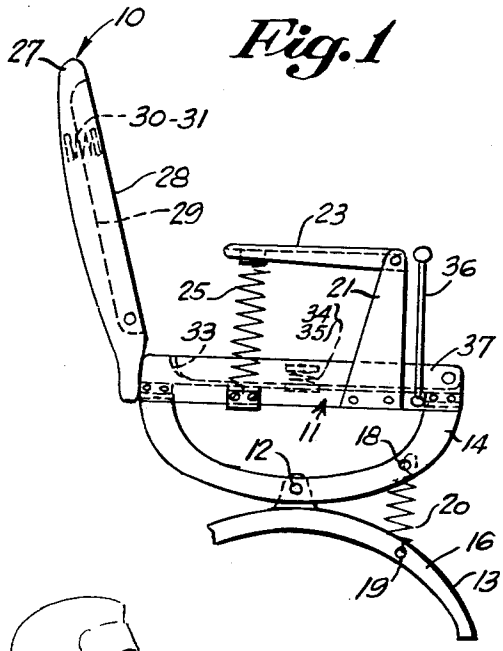


Fig. 2

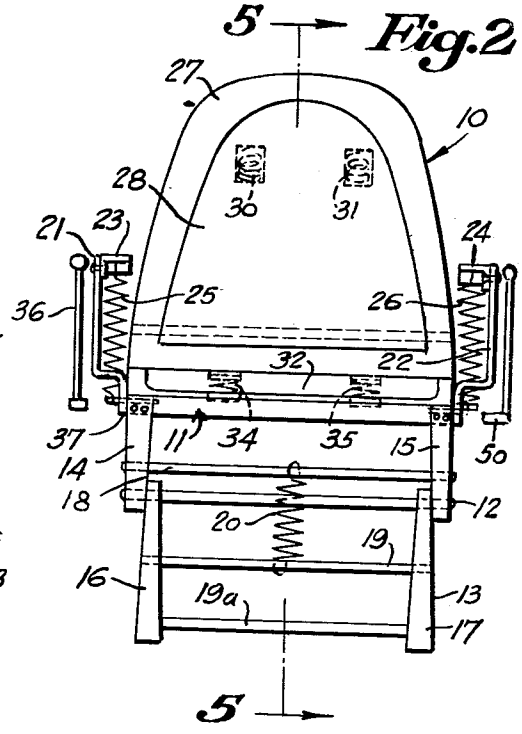
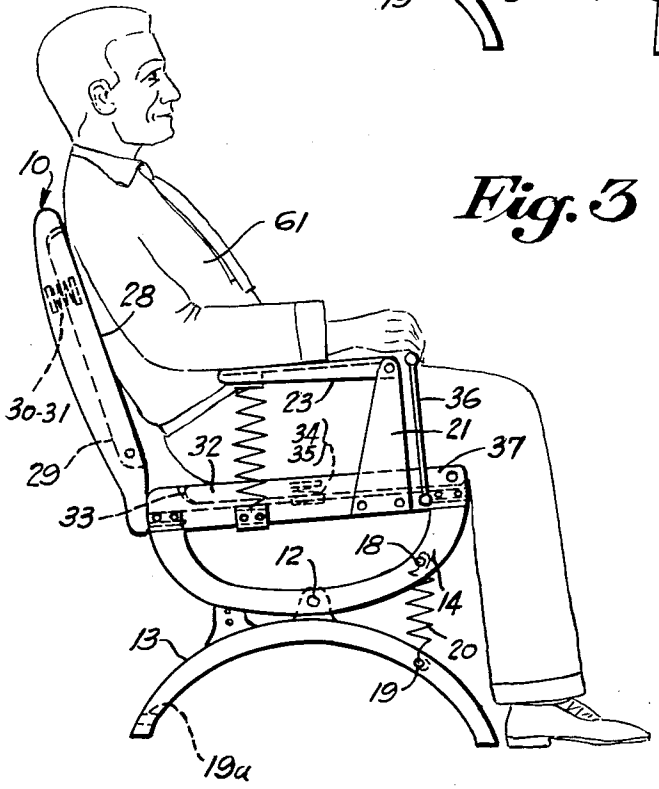


Fig. 3



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Fig. 4

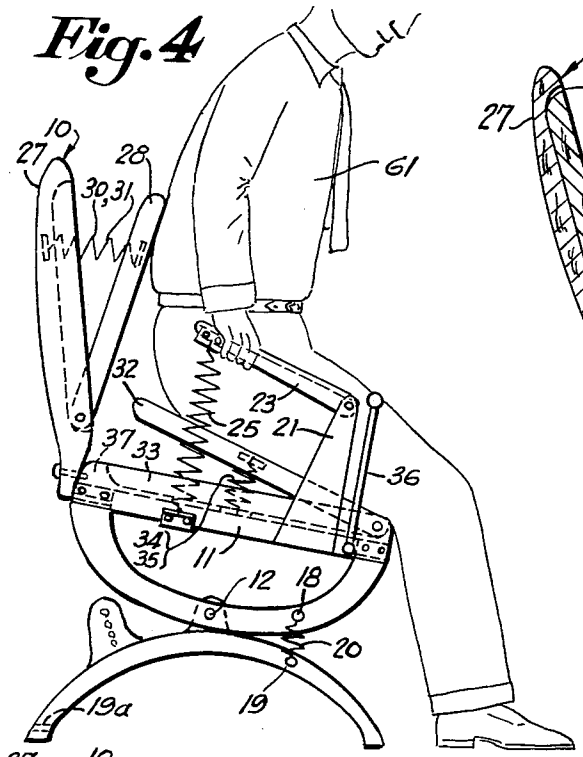


Fig. 5

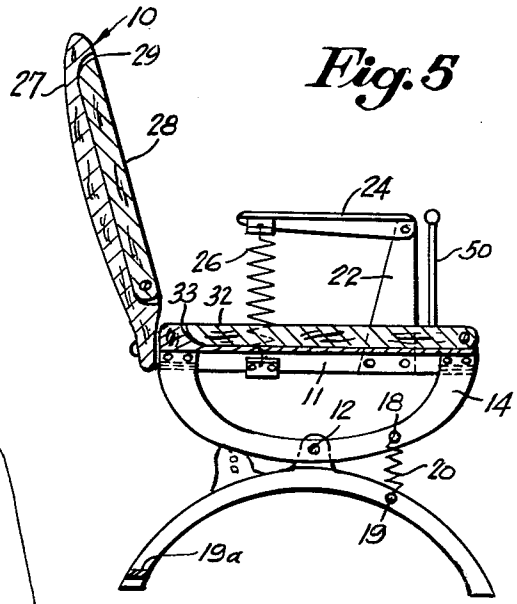


Fig. 6

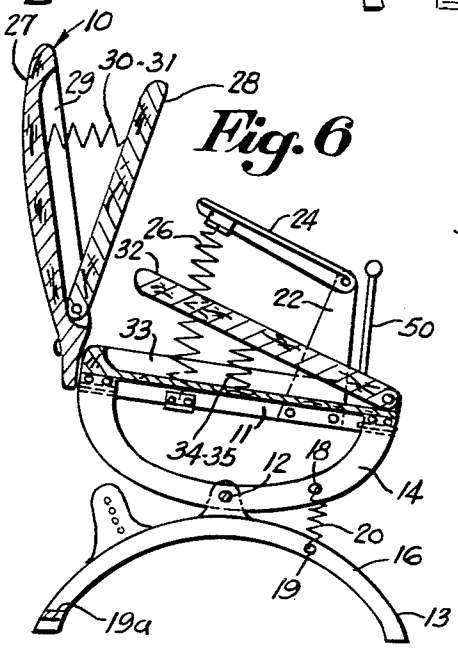
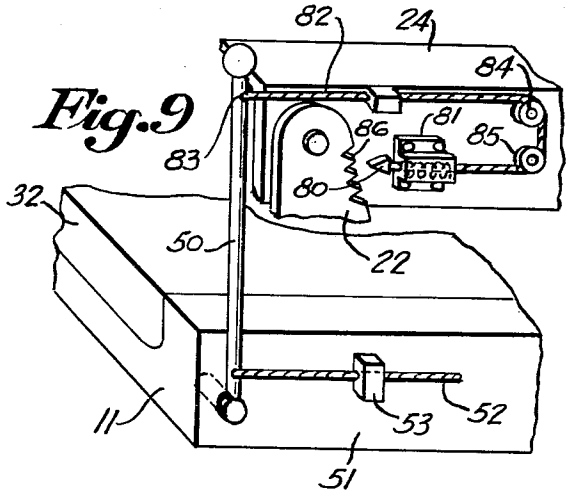


Fig. 9



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Fig. 7

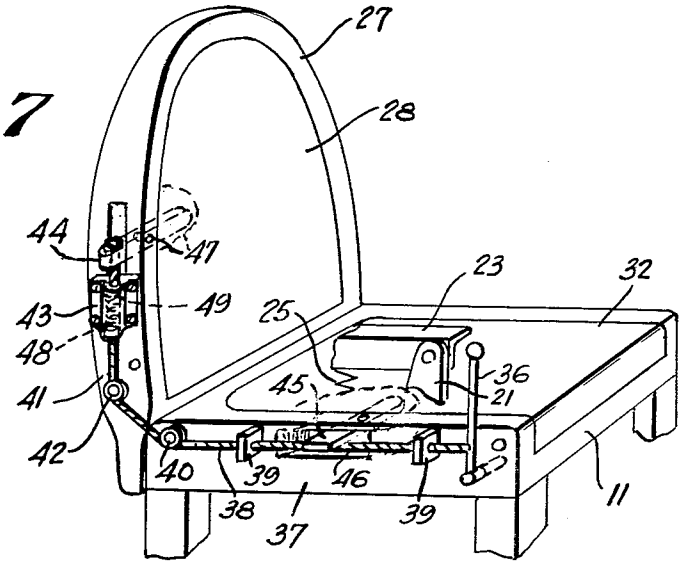
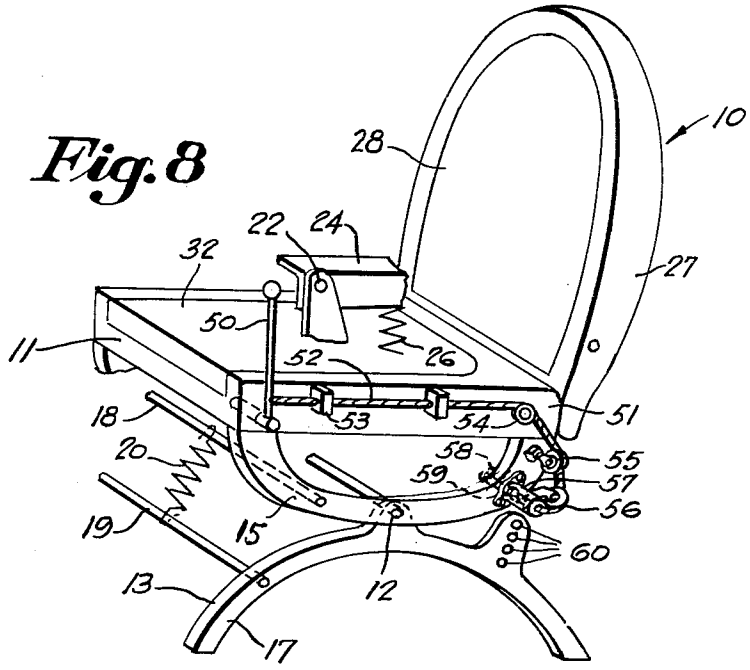


Fig. 8



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3,039,818

CHAIR FOR ARTHRITICS AND THE LIKE

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Filed Aug. 9, 1961, Ser. No. 130,324
6 Claims. (Cl. 297—264)

This invention relates to a chair for use by invalids, semi-invalids and arthritics, and refers more particularly to a chair which enables a user to lower himself into or rise up from a seated position by expending as little physical effort as possible, the latter being achieved by reason of construction features in the chair which act to support the user as he sits down and physically lift the user as he stands up.

It is known that many persons, particularly elderly persons, can often be afflicted with one or several of a variety of physical infirmities which makes it painful and difficult for them to lift themselves up from a seated position in a chair. As, for example, in the case of arthritic persons, the movement of the arms and legs required to lift the body can, and often does cause excruciating pain. Then again a person may be so lacking in general physical strength by reason of age, that they are not only unable to lift themselves, but any effort to do so might be harmfully taxing on their physical stamina. Thus, a person so afflicted must be prepared to undergo the painful efforts attendant with standing up, or they must rely on the help and assistance of another person to get up from a seated position.

It is, therefore, the primary object of the present invention to provide a chair which is especially adapted for use by invalid persons, arthritics and the like.

It is another object of the present invention to provide a chair which in use acts to support and assist a person when sitting down and lift and support the user as he stands up from a seated position.

A still further object of the present invention is to provide a chair which in use enables a user to stand up from a seated position while exerting only slight physical effort to cause his body to be lifted.

Other objects of the present invention will become apparent in the course of the following specification.

In achieving the aforementioned objectives of the present invention it was found advantageous to provide a chair construction in which the seat portion is pivotally connected to a leg-frame portion with the seat portion being rotatable about the leg portion in a vertical plane from a rearwardly inclined position to a frontally inclined position. Arm rests are pivotally connected to frame members rigidly connected at each side of the seat portion and a spring member connects the free end of each arm rest and the seat portion. A back rest is also rigidly connected to the seat portion. Both the back rest and seat portion contain recessed panel members which are pivotally connected at the bottom of the back portion and front of the seat portion, respectively. A spring member extends between the rigid part of the back rest and its panel member and acts to hold the panel member some distance in front of the back rest when the chair is not occupied. Similarly, a spring member extends between the rigid part of the seat portion and its panel member so that when the chair is not occupied, the panel member extends upwardly at an acute angle from the seat portion. The arm rests, under the impetus of their connected spring members, also extend upwardly at an acute angle with the seat portion when the chair is not in use. As a person sits down on the chair in a normal manner, the weight of the person's body overcomes the force of the springs holding the panel members extended, and the panel members pivot back into their respective recesses and form part of the chair contour.

Likewise, the arm rests under the weight of the person's arms pivot downwardly to a position parallel to the seat of the chair. Eventually, as the person sinks fully into the chair, his center of weight moves past the pivot point of the seat portion and the seat portion pivots backwardly until it is inclined to the horizontal. By moving a suitable control mechanism, the chair can then be locked to hold the person seated in a comfortable position. When the person wishes to get up from the chair, he need only unlock the seat. A slight shifting of his center of weight to a point in front of the seat pivot will cause the seat portion to pivot forwardly to an inclined position while at the same time imparting lift to the person's body. Simultaneously, the panel members will move out of their recesses and aid in lifting his body. The seat panel member will lift him from underneath, the back rest panel member will push on his back, pushing him forwardly and upwardly. The arm rests will also raise up, lifting the arms. By the time the chair has moved all the way forward, the person will occupy a standing position only slightly removed from being a completely erect stance. The seat portion of the chair will then return to a position parallel to the horizontal, the latter being effected by a spring connecting the leg-frame and seat portions.

The invention will appear more clearly from the following detailed description when taken in conjunction with the accompanying drawings showing, by way of example, a preferred embodiment of the inventive concept.

In the drawings:

FIGURE 1 is a side elevational view of a chair constructed in accordance with the principles of the present invention, the chair being shown as it appears when occupied.

FIGURE 2 is a front elevational view of the chair shown in FIGURE 1;

FIGURE 3 is a side elevational view of the chair as it appears when occupied by a person seated in a reclined position;

FIGURE 4 is a side elevational view of the chair in an unoccupied position, the back rest panel, seat panel and arm rest members being shown at their open positions in moving to which from a closed position they act to lift and support a person standing up;

FIGURE 5 is a sectional view along line 5—5 of FIGURE 2 illustrating the recessed or closed position of the panel members connected to the back rest and seat portion of the chair, the chair being shown as it appears when occupied;

FIGURE 6 is a sectional view taken along the same line as FIGURE 5 except that the chair is shown in a forwardly inclined unoccupied position, the seat panel member, back rest panel member and arm rests being in the open position;

FIGURE 7 is a partial perspective view of one side of the chair showing the controls used to lock and unlock the panel members connected to the back rest and seat portions;

FIGURE 8 is a partial perspective view of the other side of the chair showing the control used to lock and unlock the seat portion with the leg-frame; and

FIGURE 9 is a fragmentary perspective view of FIGURE 8 showing locking means for locking the arm rests in a position parallel to the seat portion.

Referring now in greater detail to the drawings, where like reference numerals indicate like parts, the chair **10** is provided with a seat portion **11** which is pivotally connected at **12** to leg-frame portion **13**. The seat portion **11** is thus rotatable about the leg-frame in a vertical plane from a frontally inclined, to a rearwardly inclined position. The seat portion includes side frame members **14**

and 15, and the leg-frame comprises a leg 16 and 17 at each side. Tie rods 18, 19 and 19*a* extend between the seat frame members 14—15 and the legs 16—17, respectively. A compression spring 20, the purpose and function of which will be more fully described later on, is connected at one end to the rod 18 and at the other end to the tie rod 19 and assists in tilting the seat portion forwardly to a point below the horizontal when a person seated in the chair stands up.

Arm rest frame members 21 and 22 are rigidly connected to the seat portion 11 at each side. Arm rests 23 and 24 are, in turn, pivotally connected to frame members 21 and 22, respectively. Expansion springs 25 and 26 are connected at one end to the free end of each arm rest and at the other end to the sides of seat portion 11. When a person sits down in the chair, the weight of his arms will compress the springs sufficiently to hold the arm rests 23 and 24 down in a position fairly parallel to that of the seat portion (FIG. 3). When the chair is not occupied, the springs 25 and 26 will expand and hold the arm rests up at an angle from the seat as shown in FIGURES 4 and 6.

A back rest 27 is rigidly connected to the rear of seat portion 11. A panel member 28 is pivotally mounted in the back rest 27 at the bottom and functions such that when the chair is occupied, it lies closed up in the recess 29 contained in the back rest, and forms part of the front contour of the back rest (FIGS. 3 and 5). When the chair is not occupied, the panel member 28 is held open away from the back rest by expansion springs 30 and 31 (FIGS. 4 and 6). Similarly, a panel member 32 is pivotally mounted in seat portion 11 at the front and as shown in FIGURE 3, lies closed up in a recess 33 when the seat is occupied. When the seat is not occupied, panel member 32 is held open by expansion springs 34 and 35 as shown in FIGURE 4.

Referring now to FIGURE 7, the chair 10 includes a control mechanism for locking the panel members 28 and 32 securely in their respective recesses 29 and 33 when a person is seated in the chair, and for releasing the locks so that the panel members, by action of their associated springs open out, acting to assist in lifting a person when he stands up from a seated position. The mechanism includes a control lever 36 pivotally connected to one side 37 of seat portion 11. A length of steel wire or small diameter, pre-stretched wire rope 38 is connected at one end to the lever 36 intermediate its length. The wire rope 38 extends along the side 37 of seat portion 11, being supported in brackets 39. It passes over a sheave 40 and onto one side 41 of the back rest 27. Thereon, it passes over another sheave 42, through a spring chamber 43, and is connected at its other end to the after described locking bar 44. A second locking bar 45 is pivotally mounted in the seat portion 11 and extends out through a slot 46 in the side of the seat portion where it is connected to the wire rope 38. The other end of the locking bar 45 (in the lock position) extends inwardly into the slotted side of seat portion panel member 32. Similarly, locking bar 44 is pivotally mounted in the back rest 27, extending through a slot 47 therein, and being connected to the end of wire rope 38 as previously described. Locking bar 44 (when it also is moved to a lock position) extends into the slotted side of back rest panel member 28. The spring chamber 43 contains a spring 48 and a piston 49, the latter being rigidly connected to wire rope 38. Spring 48 acts to force piston 49 and hence the wire rope, upwardly, so that the locking bars 44 and 45 are normally in a locked position. When it is desired to move them to an unlocked position, such as when a seated person wishes to stand or to allow the panel members 28 and 32 to recess when a person sits down, the lever 36 is moved forward. This moves wire rope 38 forward, and overcomes the force of spring 48. Simultaneously, the locking bars 44 and 45 pivot outwardly in the chair until they lie wholly within the slots 47 and 46, respectively, thereby allowing the panel members 28 and 32 to either move out of, or into their respective recesses 29 and 33.

FIGURE 8 shows the mechanism used for locking the seat portion 11 to the leg-frame portion 13. It includes a control lever 50 pivotally connected to side 51 of the seat portion. A length of wire rope 52, similar to that previously described, is connected to the lever 50. The wire rope 52 extends along side 51, being guided and supported thereon in brackets 53, and thence passes over sheave 54 and downwardly below the seat portion. It then passes on another sheave 55 which is rigidly connected to seat frame side member 15, the wire rope passing in between the sheave and the side member. The wire rope then passes over another sheave 56 which is mounted on the outer end of locking member 57 and the end of the wire rope is secured to a locking pin 58. The locking member 57 includes a housing rigidly connected to side member 15, a spring member 59 disposed inside the housing, and a locking pin 58 centrally disposed in the housing and extensible through a hole in the side member 15. The action of spring 59 normally keeps locking pin 58 extended out through side member 15, so that when side member 15 is properly positioned with respect to leg 17, the locking pin 58 will engage in one of the several holes 60 fashioned in the leg. In this manner, the seat portion 11 can be securely locked to the leg-frame 13 so that a person seated in the chair can recline to a comfortable position without being concerned that the seat will tilt forward due to the action of spring 20. The lever 50 is moved forwardly to unlock locking member 57. Thus, the unlocking of the various elements of the chair is accomplished by moving the controls in the same direction. When lever 50 is moved forwardly, spring 59 is compressed and locking pin 58 withdrawn into side member 15. Thus, seat portion 11 is free to be rotated about leg-frame 13 and can be positioned according to whether a person is sitting down in the chair or getting up from a seated position.

In operation:

When the chair is not occupied, the back rest panel member 28, seat panel member 32 and arm rests 23 and 24 are extended out in the positions illustrated in FIGURE 6. However, the position of seat portion 11 itself, is generally parallel to the floor as shown in FIGURE 1. The latter occurs due to the fact that spring member 20 is designed to hold the seat level with the floor when the chair is not in use.

Let us assume that a person 61 wishes to sit down in the chair. He stands in front of the chair and places both hands on the front of arm rests 23 and 24. With the same movement of his hands, he moves control levers 36 and 50 forwardly to unlock the various locks in the chair. A slight downward pressure of the arms will tilt the seat portion forwardly to the inclined position shown in FIGURE 4. He then lowers his body until he is seated on the front part of the seat portion 11. As he shifts his body weight to the rear, it overcomes the force of springs 34 and 35 and seat panel member 32 will recess back into the seat portion, while at the same time the seat portion will start to rotate about the leg-frame 13 toward a rearwardly inclined position. As the upper half of his torso sinks against the back rest 27, its weight overcomes the force of springs 30 and 31 and the back rest panel member 28 will recess into the back rest. It should be pointed out here that as the person sits down, arm rests 23 and 24 also pivot downwardly following the movement of his arms. The person then releases control lever 36. Spring 48 will automatically return the lever to neutral, while at the same time moving the wire rope to cause locking bars 44 and 45 to pivot inwardly to engage the slots in the respective panel members, whereby they are securely locked. As the person continues to incline his upper torso, the shifting of his center of weight past the center of the chair causes seat

portion **11** to incline rearwardly as shown in FIGURE 3. As the seat portion is reclined, it works against spring **20**, so that the reclining motion is not sharp and pronounced to the point where the chair could be easily overturned. When the person **61** has inclined the chair to a comfortable position such as that shown in FIGURE 3, the locking member **57** will be generally opposed to the several holes **60** in leg **17**. Lever **50** is then released, and spring **59** forces locking pin **58** out through side member **15** and into engagement with one of the holes **60**, thereby locking the seat portion to the leg-frame and hence the chair in the desired reclined position. If per chance, the seat be positioned such that the locking pin **58** bears against the side of leg **17** rather than engaging a hole therein, a slight rocking of the chair will move the side member to a position where the pin will "automatically find" a hole **60**. The person **61** is now comfortably and securely seated in the position shown in FIGURE 3.

Assume that the person seated now desires to stand up. He grasps control levers **36** and **50** and moves them forward, holding them in that position. This will cause the unlocking of the panel members **28** and **32** and the seat portion **11**. A slight shifting of the person's weight will tip the seat portion forwardly, which motion will be further facilitated by the action of spring **20** which is now free to compress. As the seat portion rotates about pivot **12**, it will impart a vertical component of lift to the person. Simultaneously, the springs **30** and **31** will force panel member **28** to open, the springs **34** and **35** will force panel member **32** to open, and the arm rests **23** and **24** will pivot upwardly. The panel member **28** will force the upper torso forward while at the same time generating a vertical force component which acts to lift the body in the region of the back. Panel member **32** will exert a direct upward lift on the person's lower spinal and thigh regions. The arm rests will lift up the person's arms. By the time the panel members and arm rests have moved to a fully extended position, the person's body will have been physically lifted and supported to the semi-erect position shown in FIGURE 4. The lift offered by the seat portion is maintained almost to the point where the person is standing fully erect since it follows the bending of the person's legs and thus can exert necessary lift to the last possible moment. The person need now only exert a slight lift with his hands to bring himself to a fully erect standing position.

It should be obvious from the foregoing that the person was required to expand little, if any, physical effort in standing up from the chair. It follows, therefore, that the chair construction of the present invention is particularly adaptable for use by arthritics, and other invalid and semi-invalid persons since the chair itself actually does the lifting of the person's body.

An additional locking device for locking the arm rests **23** and **24** parallel to the seat portion **11** when the chair is occupied is illustrated in FIGURE 9. The locking device comprises a spring loaded bolt **80** carried in a housing **81** secured to the side of arm rest **24**. A wire rope **82** is connected at one end to the bolt **80** and at the other end **83** to lever **50**. Sheaves **84** and **85** guide the wire rope in the same manner as previously described for the several other locking devices. In use the bolt **80** will engage in notches **86** in frame member **22** to lock the arm rest **24** securely in a position parallel to the seat portion **11**. Thus when lever **50** is moved forward to unlock the seat panel **32**, the unlocking of the arm rest **24** will occur simultaneously to aid in lifting a seated person as previously described. A similar locking device can be used on the other side of the chair to lock arm rest **23** being actuated in similar fashion by lever **36**.

The above described chair includes several facets of construction which have been given by may of example and illustration only, and hence they are subject within the scope of the inventive concept herein disclosed to

modification and variation. For example, flat springs could be used in place of the coil springs shown. The chair is shown as being made of wood. Obviously, other materials such as plastic, fiberglass, etc. can be used. Further, the chair can be upholstered as desired. Other niceties not shown, but which could easily be used in the chair include an accordion-pleated cover extending between the back rest **27** and the top of the back rest panel member **28** to prevent a person's hair or clothing from being drawn into the recess **29**. Also, the springs **25** and **26** could be housed in a telescopic housing to obviate catching the arms in the coils. It is desired, therefore, that only such limitations be imposed on the appended claims as are stated therein.

It should be also noted that the chair constituting the subject of the present invention can be used as a rocking chair for a variety of therapeutic treatments.

What is claimed is:

1. A chair adapted to support an arthritic person or the like, said chair comprising, a leg-frame, a seat portion pivotally connected to said leg-frame and rotatably movable thereabout from a frontally inclined position to a rearwardly inclined position, a back rest rigidly connected to said seat portion, movable arm rests carried on said seat portion, means exerting an upwardly directed force on said arm rests, movable means carried by said arm rest and said seat portion and adapted to exert an upward lift on a person's body when said seat portion is tilted to a forwardly inclined position, resilient means interconnecting said leg-frame and said seat portion for holding said seat portion in a horizontal position when the chair is not occupied, and means for locking said seat portion in a rearwardly inclined position when a person is seated in said chair.

2. A chair adapted to support an arthritic person or the like, said chair comprising, a leg-frame, a seat portion pivotally connected to said leg-frame and rotatably movable thereabout from a frontally inclined position to a rearwardly inclined position, a back rest rigidly connected to said seat portion, a frame member rigidly connected to each side of said seat portion and extending upwardly a distance therefrom, an arm rest pivotally connected at one end to the top of each of said frame members, a panel member pivotally connected to the bottom of said back rest and adapted to be recessable therein, said panel member extending substantially the full length and width of the front side of said back rest, a second panel member pivotally connected to the front of said seat portion and adapted to be recessable therein, said second-mentioned panel member extending substantially the full length and width of the top side of said seat portion, resilient means connecting the free end of each of said arm rests and acting to urge said arm rests in an upward direction away from said seat portion, resilient means connecting the back rest and the first-mentioned panel member and acting to urge said panel member forwardly away from said back rest in the direction of the front of said seat portion, resilient means connecting the second-mentioned panel member and the seat portion and acting to urge said panel member upwardly away from said seat portion, resilient means interconnecting said leg-frame and said seat portion for holding said seat portion in a horizontal position when the chair is not occupied, locking means for locking said panel members in their recessed positions, and locking means for locking said seat portion to said leg-frame whereby said seat portion can be maintained securely in a rearwardly inclined position when a person is seated in said chair.

3. A chair in accordance with claim 2 wherein said resilient means comprise coil springs.

4. A chair in accordance with claim 2, wherein the first-mentioned locking means comprises a lever pivotally connected to one side of said seat portion, a length of wire rope connected at one end to said lever and supported

locking member pivotally supported in said seat portion along one side of said seat portion and said back rest, a and connected at one end to said wire rope, a second locking member pivotally supported in said back rest and connected at one end to said wire rope, said locking members being movable from a first position wthin said seat portion and said back rest respectively to a second position in which they engage slots in the second-mentioned and first-mentioned panel members respectively, and resilient means carried on said back rest and connected to said wire rope for holding said locking members in their said second positions.

5. A chair in accordance with claim 2, wherein the second-mentioned locking means comprises a lever pivotally connected to another side of said seat portion, a length of wire rope connected at one end to said lever and supported along the side of said seat portion, and a spring loaded locking pin supported on the side of said seat portion and connected to the other end of said wire rope, said locking pin extending through a hole in the side of said seat portion and engaging a hole in the side of said leg-frame when said seat portion is moved to a rearwardly inclined position.

6. A chair in accordance with claim 2, comprising a spring loaded locking bolt carried on each arm rest and engageable in notches in said frame members whereby said arm rests can be locked in a predetermined position with respect to said frame members.

No references cited.