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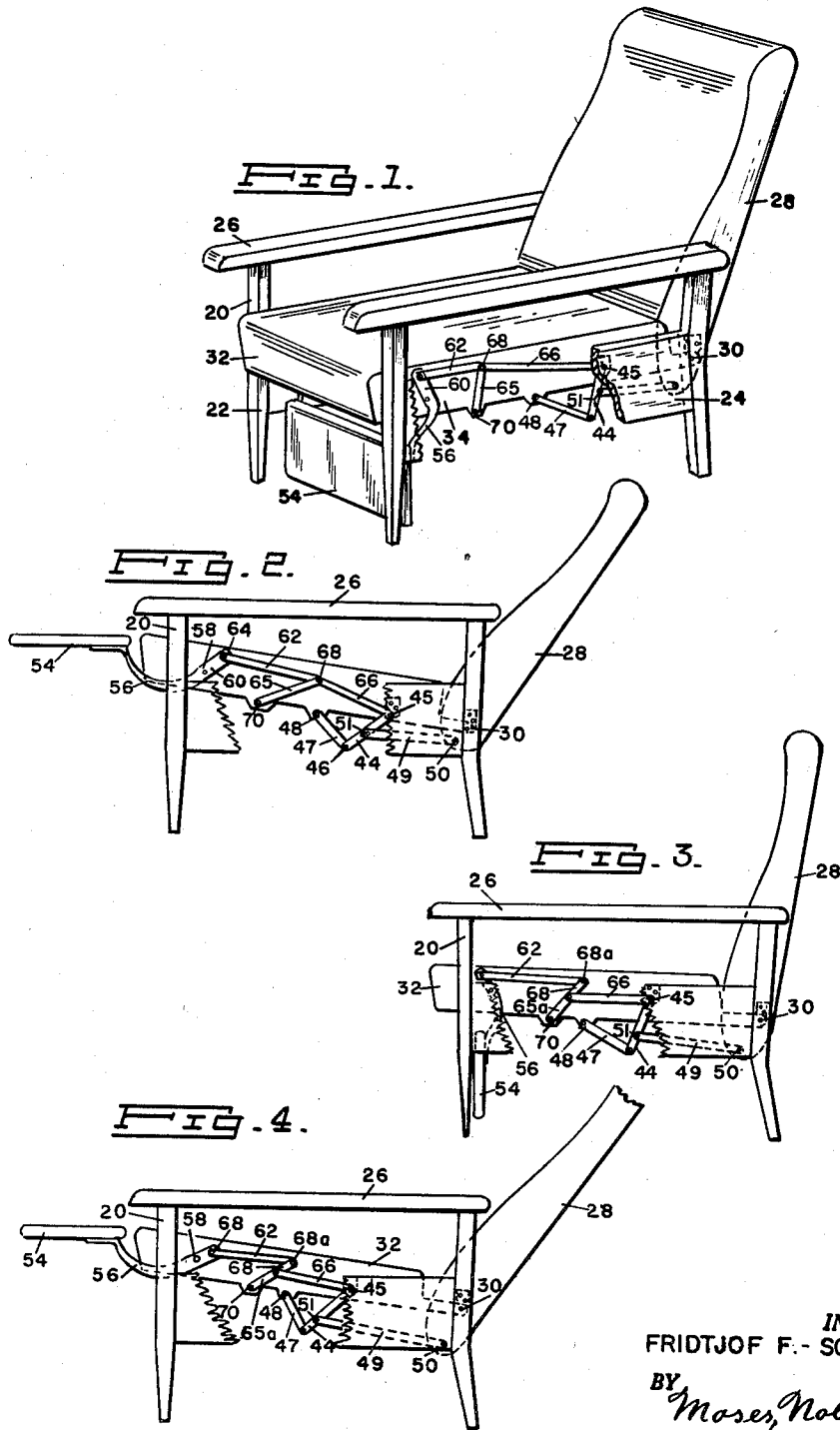
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LEG REST OPERATING MECHANISM FOR RECLINING SEATING UNITS

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2 Sheets-Sheet 1



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LEG-REST OPERATING MECHANISM FOR RECLINING SEATING UNITS

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2 Sheets-Sheet 2

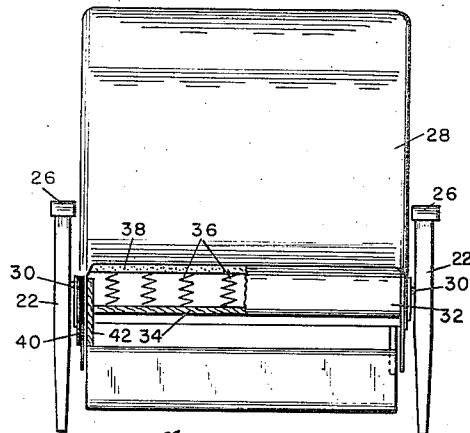


Fig. 5.

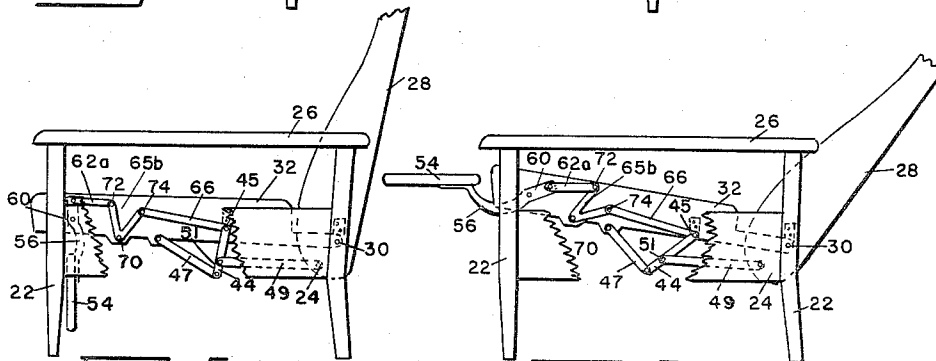


Fig. 6.

Fig. 7.

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LEG REST OPERATING MECHANISM FOR RECLINING SEATING UNITS

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5 Claims. (Cl. 155-106)

This invention relates to articles of furniture or seating units adjustable from a regular sitting position to a more or less reclining position. In particular it relates to such articles provided with a leg rest which occupies a retracted or inoperative position when the seating elements are in a position to support the body in an upright sitting posture and which is advanced and raised so as to support the legs when the seating elements are moved to a reclining position.

The seating elements comprise a seat portion and a back rest portion which may be mounted in a swingable or tiltable manner upon a base resting on the floor. The back rest and seat portions may be separately pivoted to the base and so connected by linkage that when the back rest is tilted backward the seat portion will be tilted upward at its forward edge. In other instances the back rest and seat may be a rigid unit which tilts so as to incline the back rest and tilt the forward edge of the seat upward. In either case the leg rest portion is pivoted to the front part of the seat and linkage is provided which raises the leg rest portion when the back rest and seat tilt. Such linkage may be operated to raise the leg rest by means of a connection to the pivoted back rest or the linkage may be connected to the tilting seat and to the fixed base so that tilting of the seat provides power for raising the leg rest. The latter construction is also applicable to the unit construction of back rest and seat.

In previous constructions involving a leg rest and linkage for raising it, the links and levers used have extended a considerable distance below the seat level, frequently almost to the floor, and have necessitated the use of a stationary base closed in all the way to the floor so as to conceal the linkage. It is an object of the present invention to provide a leg rest operating linkage which is located as close to the seat level and as far above the floor as possible so as to enable the article of furniture to be built with an open base. This permits the article to present the appearance of an ordinary article of furniture supported upon legs and open underneath so as to provide a stylish and airy appearance. Other objects are to improve the construction and general efficiency of reclining articles of furniture.

In general the objects of the invention are secured by mounting the leg rest on rigid arms pivoted on the side members of the seat near the front edge of the seat but spaced rearward therefrom a short distance and also spaced a short distance below the actual seating surface of the seat. The edge of the leg rest nearest to the seat is spaced from the pivotal axis of the arms a sufficient distance to permit the arms to swing into a substantially horizontal position, the leg rest clearing the front edge of the seat and projecting in a more or less horizontal direction forward therefrom. A linkage is used which has its leg rest operating links connected to the leg rest supporting arms at points near the pivotal axis of the arms but spaced therefrom sufficiently so that on the application of sufficient force the leg rest arms will be swung about their pivotal axis. The pivotal connection

of the linkage to the arms is nearer to the pivotal axis than the inner edge of the leg rest and is preferably within the outline of the side members of the seat so that this linkage does not project above or forward of the seat outline and usually not below the side members of the seat at the forward part thereof.

The leg rest carrying arms may have portions projecting above the pivotal axis thereof but terminating below the actual seating surface, in which case the operating links are pivoted to such extensions above the pivotal axis and operate to raise the arms and leg rest by a pulling force. This is particularly desirable, as the links are subjected to tension stresses and may therefore be made of light construction without danger of bending. In some instances, however, it may be desirable to connect the operating links to the leg rest carrying arms between the pivotal axis and the inner edge of the leg rest, in which case a pushing force is exerted upon the links.

Whether the force for tilting the linkage is derived from the swinging of the back rest or from the tilting of the seat, it is desirable to keep the connecting linkage as near to the seat level as possible. In many instances a series of links and levers or guide plates are used lying closely along or within the side members of the seat and in which one or more guide levers or plates are fulcrumed on the seat itself. Connecting links lead from these guide plates or levers to the leg rest supporting arms to which they are connected either above or below the pivotal axis thereof as stated above and other links lead from the guide levers or plates to the movable back rest or to the fixed supporting member or both.

Where the driving force for the linkage is not derived from direct connection to tilting back rest, the tilting movement of the seat with respect to the fixed base is relied upon as a means for actuating the linkage. This force may be applied by direct link connection attached at one end to the leg rest operating arms and at the other end to the fixed base, or it may be applied by a series of links and levers, one of the pairs of links being attached to the fixed base and to guide levers or plates fulcrumed on the seat and connected by a second pair of links to the leg rest carrying arms.

In the accompanying drawings illustrating certain preferred embodiments of the invention.

Fig. 1 is a perspective view of a chair embodying one form of the invention. In this as in subsequent views, a part of the side frame of the chair is shown broken away for clearness of illustration;

Fig. 2 is a side elevation of the chair in a reclining position showing the leg rest raised;

Fig. 3 is a side elevation of another form of chair in a sitting position;

Fig. 4 is a similar view of the chair shown in Fig. 3 in reclining position;

Fig. 5 is a front view of the chair shown in Figs. 1 and 2, this front view being also applicable to the chair shown in the other figures. One of the chair seat side frames and a portion of the chair seat are shown in transverse vertical section;

Figs. 6 and 7 show another form of the invention in sitting and reclining positions respectively.

Referring to the drawings in detail, the chair shown comprises a frame 20 having legs 22 connected by side frame members 24. Arms 26 are also shown. The frame shown is conventional and obviously may be of any desired form, depending upon the style of the chair and use to which it is to be put. The present trend of fashion is to provide a chair which stands upon legs so that the body of the chair is raised from the floor, thereby providing an article of furniture which is light and airy in appearance and under which a broom or a vacuum cleaner may be passed. The chair is provided with

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a back rest 28 which is pivoted to the frame at 30 and with a seat 32 which is also pivoted to the frame at 30. Obviously the seat and back rest do not have to be pivoted at the same point, but this is usually found most convenient. The seat and back rest may be of any suitable construction, but are illustrated as upholstered parts of substantial thickness. As shown in Fig. 5, the seat comprises side frames 34 between which are mounted springs 36 covered by the usual covering 38 of padding and fabric.

Referring particularly to Figs. 1 and 2, the chair seat and back are shown as connected by a linkage which serves to tilt the chair seat upward as the back is tilted or swung backward. A relationship which is usually found satisfactory is for the seat to be tilted up at half the angle at which the back rest is swung backward. This gives what is usually found to be a desirable angle for the back rest and seat. Of course this is subject to modification as desired. Any suitable linkage connecting the back rest and seat may be provided, such as, for instance, the pairs of guide links 44 pivoted at one end at 45 to the stationary supporting frame. At the other end the links 44 are pivoted at 46 to the guide links 47 which are pivoted at 48 to the side frames 34 of the seat. The back rest 28 has a portion extending below its pivot 30, and this downwardly extending portion is connected to the links 44 by the drive links 49 which are pivoted to the back rest at 50 and to links 44 at 51. This method of connecting the back rest and seat is merely illustrative of one typical connection which may be used and forms no part of the present invention.

Reclining chairs of the character under discussion are commonly provided with leg rests as illustrated at 54 which are moved from a more or less concealed and out-of-the-way position as shown in Fig. 1 to a raised position as shown in Fig. 2 so as to support the legs when the occupant of the chair is in the reclining position. The present invention relates to improved means for mounting and operating such a leg rest, and various examples of the invention are illustrated. In all of the forms of the invention illustrated in the present application the leg rest 54 is mounted upon the free ends of rigid arms 56 pivoted at 58 to the seat side frames 34. In the forms of the invention illustrated in this case the arms 56 have extension portions 60 which extend above the pivots 58 but are of such length that they do not project above the seating surface of the chair seat, nor can they project forwardly of the front edge of the chair where they would be unsightly and possibly come in contact with the legs of the user. The pivotal axis of the arms 56 is therefore spaced from the front edge of the chair and some distance below the seating surface. Pull or tension links 62 are provided which are pivoted to the extensions 60 of the arms 56 at the points 64 and apply a pull to the arms so as to swing them to the raised position when the chair seat is tilted upward.

In the form of invention shown in Figs. 1 and 2 the rear ends of links 62 are pivoted to the free ends of guide links 65 and to the forward ends of rear operating links 66 at points 68. The lower ends of guide links 65 are pivoted to the chair seat side frames at 70. The rear ends of links 66 are pivoted to the stationary chair base, this connection in the present instance being at points 45 to brackets attached to the chair base side members 24. For convenience these points 45 are the same as those on which the guide links 44 are connected to the chair base, but obviously the same points of connection for the two sets of links need not be used, as the system of linkage 44, 47 and 49 for mounting the seat on the base is distinct from the system of linkage for operating the leg rest. The leg rest operating system consists of the links 62 connected to the arms 56, links 66 and guide links 65 and depends for its operation on the fact that the links 66 are anchored at fixed points 45 while the pivot axis 58 on which the arms 56 are pivoted moves

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upward and away from points 45 when the chair seat is tilted upward. This produces a pull on the arm extensions 60 and swings the arms around the axis 58 so as to raise the leg rest. There is no direct connection between the back rest and the leg rest linkage. The movement of the back rest merely tilts the seat in the manner described and the tilting of the seat with respect to the fixed chair frame produces the force for elevating the leg rest. The guide links 65 guide the links 62 so that they maintain a more or less parallel position with respect to the chair seat so that the force is applied to the extensions 60 of the arms 56 at the most effective angle.

Figs. 3 and 4 show a modified construction of linkage from that shown in Figs. 1 and 2. Similar parts are designated by similar numerals. The only difference between the construction shown in Figs. 3 and 4 and that shown in Figs. 1 and 2 is that in Figs. 3 and 4 the rear links 66 are pivoted to guide links or levers 65a between the ends thereof at points 68a. This gives a leverage multiplication so that the links 62 will be moved further for a given tilting movement of the seat, which will result in a more rapid advancement of the arms 56 and leg rest 54 to a raised position.

Figs. 6 and 7 show another slightly modified leg rest linkage. In this case, instead of simple guide links 65, a plate 65b is used which is pivoted at its bottom at 70 to the chair frame but has two spaced pivot points 72 and 74 at the upper part thereof. Rear links 66 are pivoted to the points 74 while the pull links 62a, which are somewhat shorter than the previously described links 62, are pivoted to the plates at points 72. The plates are shown as of V-shape, but obviously may be in any other form. This arrangement gives a somewhat greater angularity between links 62 and 66 than the form shown in Figs. 1 and 2.

In all of the forms of the invention illustrated it will be seen that the links 62, 62a are pull links and are subjected to tension only when under stress. Thus they may be of light construction and there is no danger of their being bent in use. The same is true of the rear links 66.

It is also another characteristic of all the constructions shown that the linkage is in line with or close to the chair seat and in no case does it extend close to the floor. Thus a chair standing on legs and with an open space beneath the seat is provided in all instances. In several forms of the invention intermediate guide members such as links 65, 65a and 65b are provided which are pivotally mounted upon the chair seat itself, thus enabling a guided linkage to be used which permits power to be applied in desired directions and at desired ratios without use of long guide levers or the like which would prevent a mounting of the mechanism close to the chair seat where it would interfere with the open construction desired.

It is understood that certain parts, elements, or mechanisms shown in a certain figure may be substituted for corresponding parts, elements, or mechanisms of the embodiments shown in other figures of the drawings.

I have described preferred embodiments of my invention, but it is understood that this disclosure is for the purpose of illustration, and that various omissions or changes in shape, proportion, and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A reclining article of furniture comprising a support, a back rest pivotally mounted on the support, a seat tiltably mounted on said support, rigid arms pivoted on said seat near the front thereof and having extensions above the pivotal axes of said arms, a leg rest fixed to the free ends of said arms at a distance from the pivotal

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axis thereof sufficient to permit the edge of the leg rest nearest to the seat to clear the front edge of the seat when the arms are swung about their pivotal axis, first pull links connected at one end to the extensions of said arms at points above the pivotal axis thereof, guide links pivoted at their lower ends to the seat and at their upper ends to the rear ends of said first links, and second links pivoted at their forward ends to said guide links above the points at which said guide links are pivoted to the seat and at their rear ends to the support.

2. A construction as claimed in claim 1 in which the first links and second links and the upper ends of the guide links lie below the level of the seating surface of the seat.

3. A construction as claimed in claim 1 in which the arms have extensions at their upper ends extending above the pivotal axis thereof and terminating below the level of the seating surface of the seat, the front ends of the first links being connected to said extensions, the front ends of the second links being connected to the upper ends of the guide links.

4. A construction as claimed in claim 1 in which the front ends of the second links are pivoted to the guide links below the upper ends thereof.

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5. A construction as claimed in claim 1 in which the guide links have three pivot points arranged at the apices of a triangle, the links being pivoted to the seat at the lower apices and the first links and second links being pivoted to the guide links at their other two apices respectively.

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