

Feb. 18, 1958

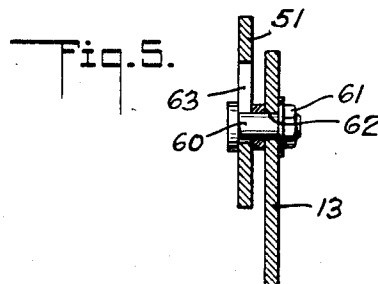
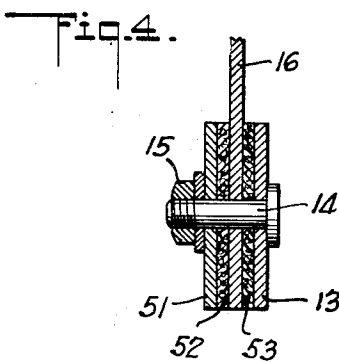
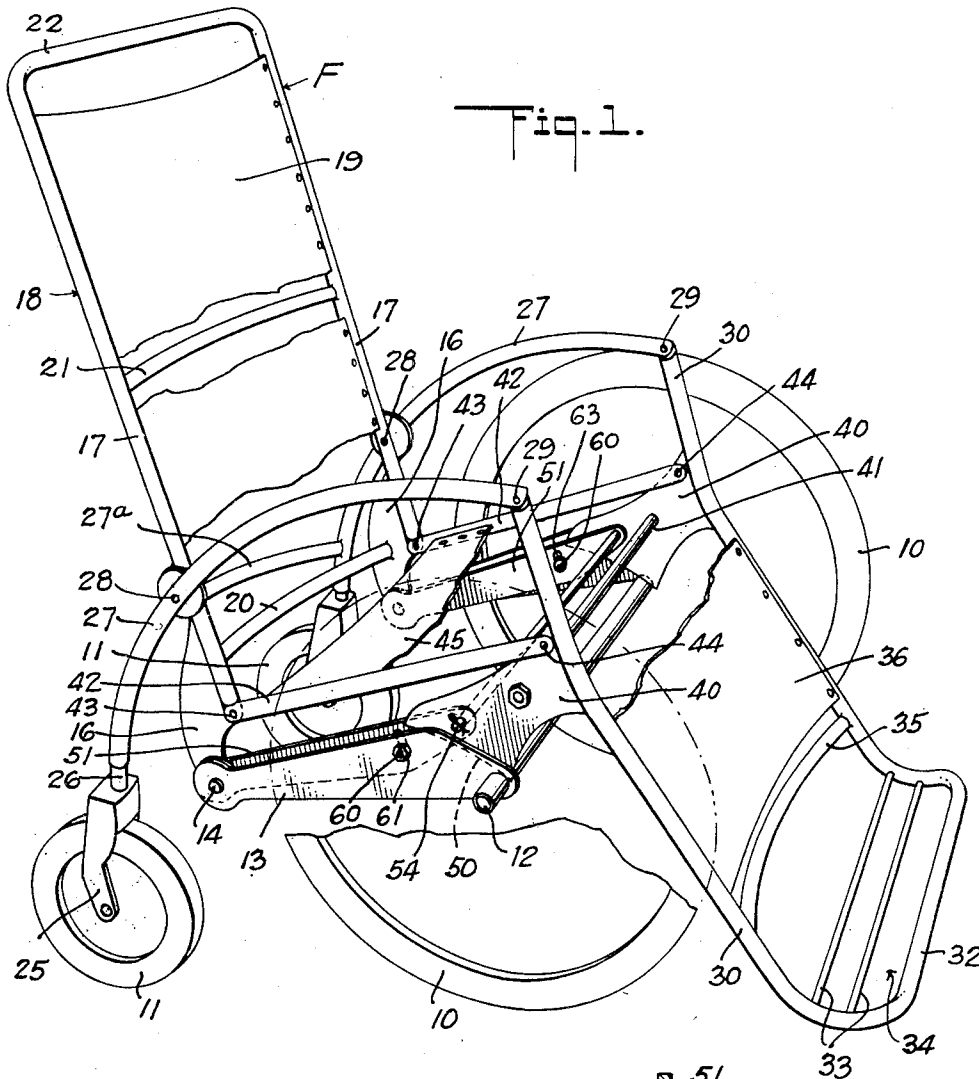
H. W. MILLER

2,823,731

ARTICLE OF FURNITURE

Filed Feb. 13, 1956

5 Sheets-Sheet 1



INVENTOR.  
HERBERT W. MILLER  
BY  
*Frederick Diehl*  
ATTORNEY

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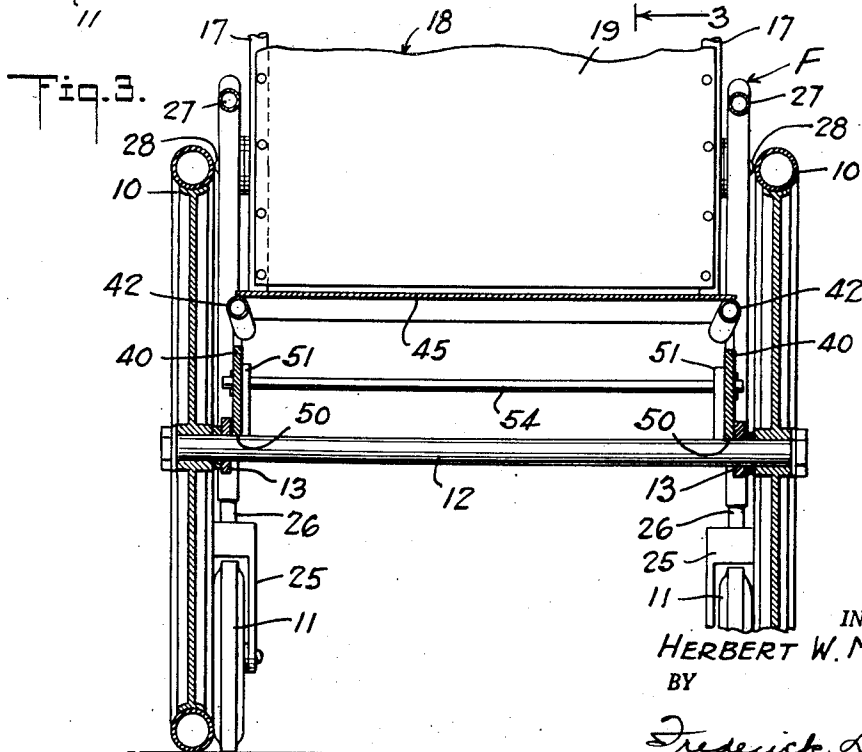
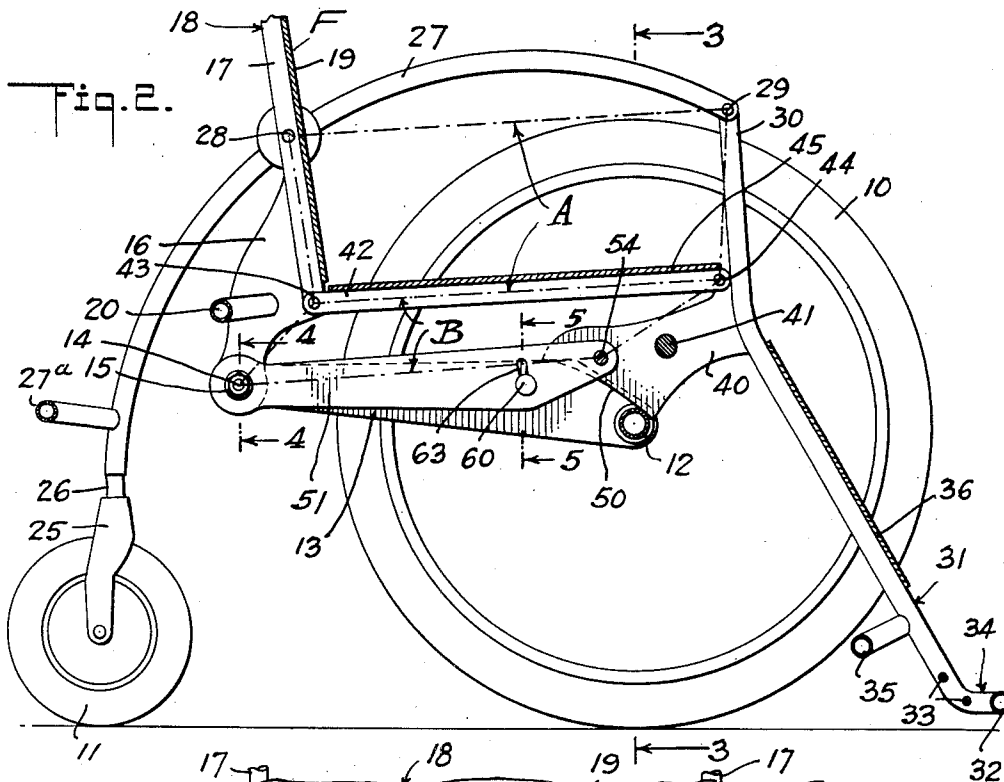
H. W. MILLER

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ARTICLE OF FURNITURE

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5 Sheets-Sheet 2



INVENTOR.  
HERBERT W. MILLER  
BY

*Frederick Diehl*  
ATTORNEY

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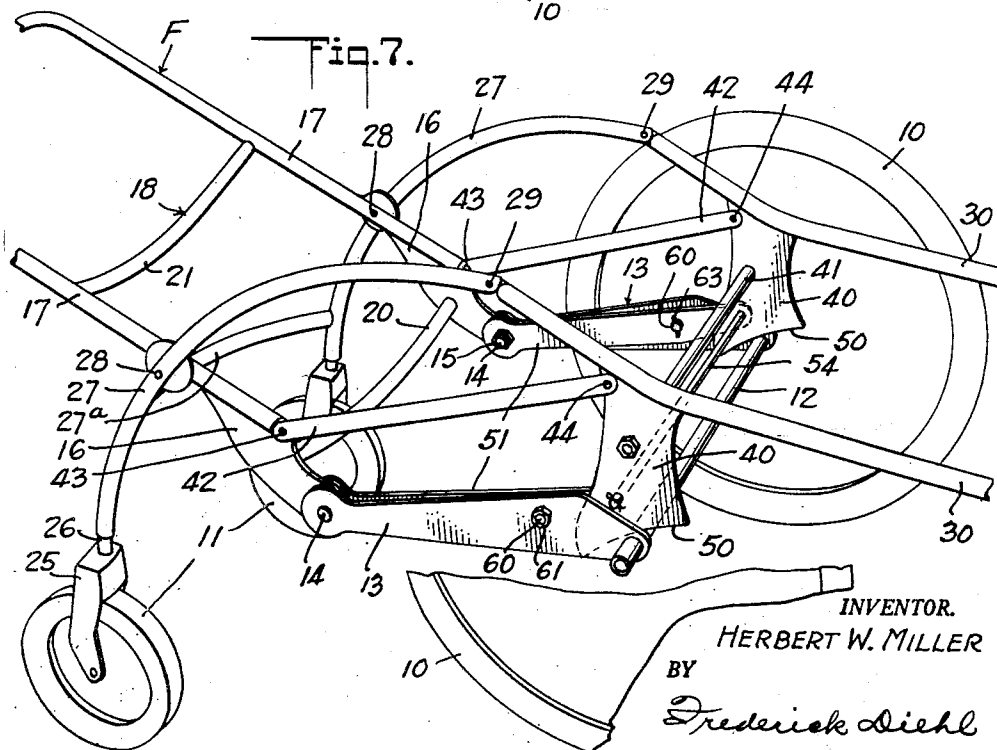
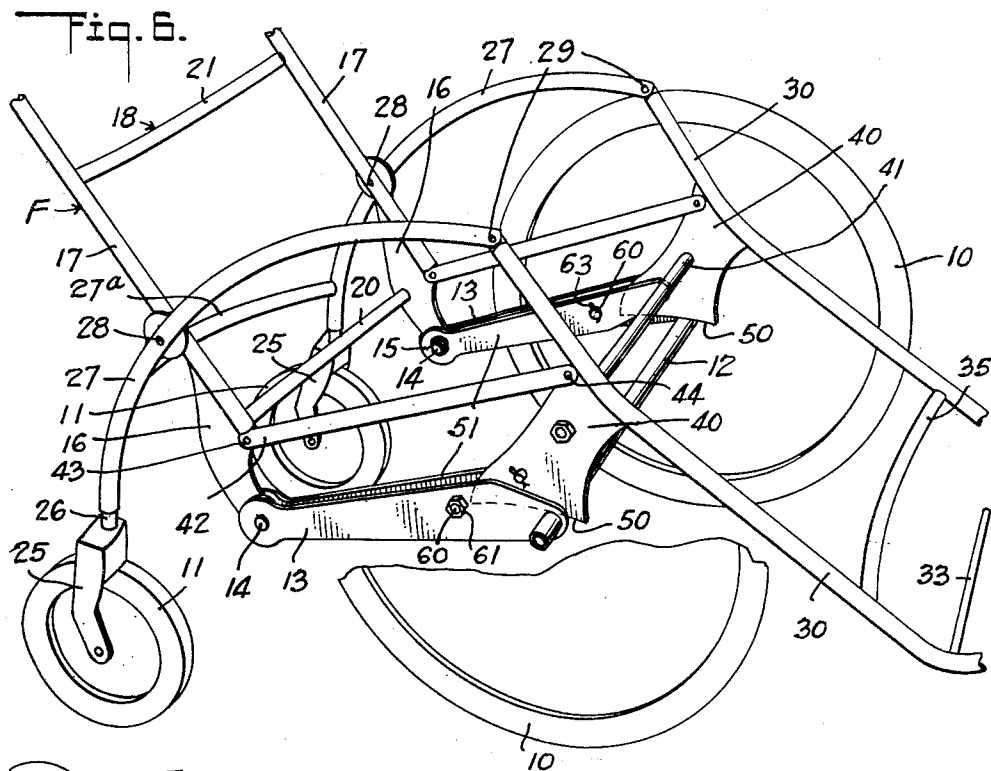
H. W. MILLER

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5 Sheets-Sheet 3



INVENTOR.  
HERBERT W. MILLER  
BY  
*Frederick Diehl*  
ATTORNEY

Feb. 18, 1958

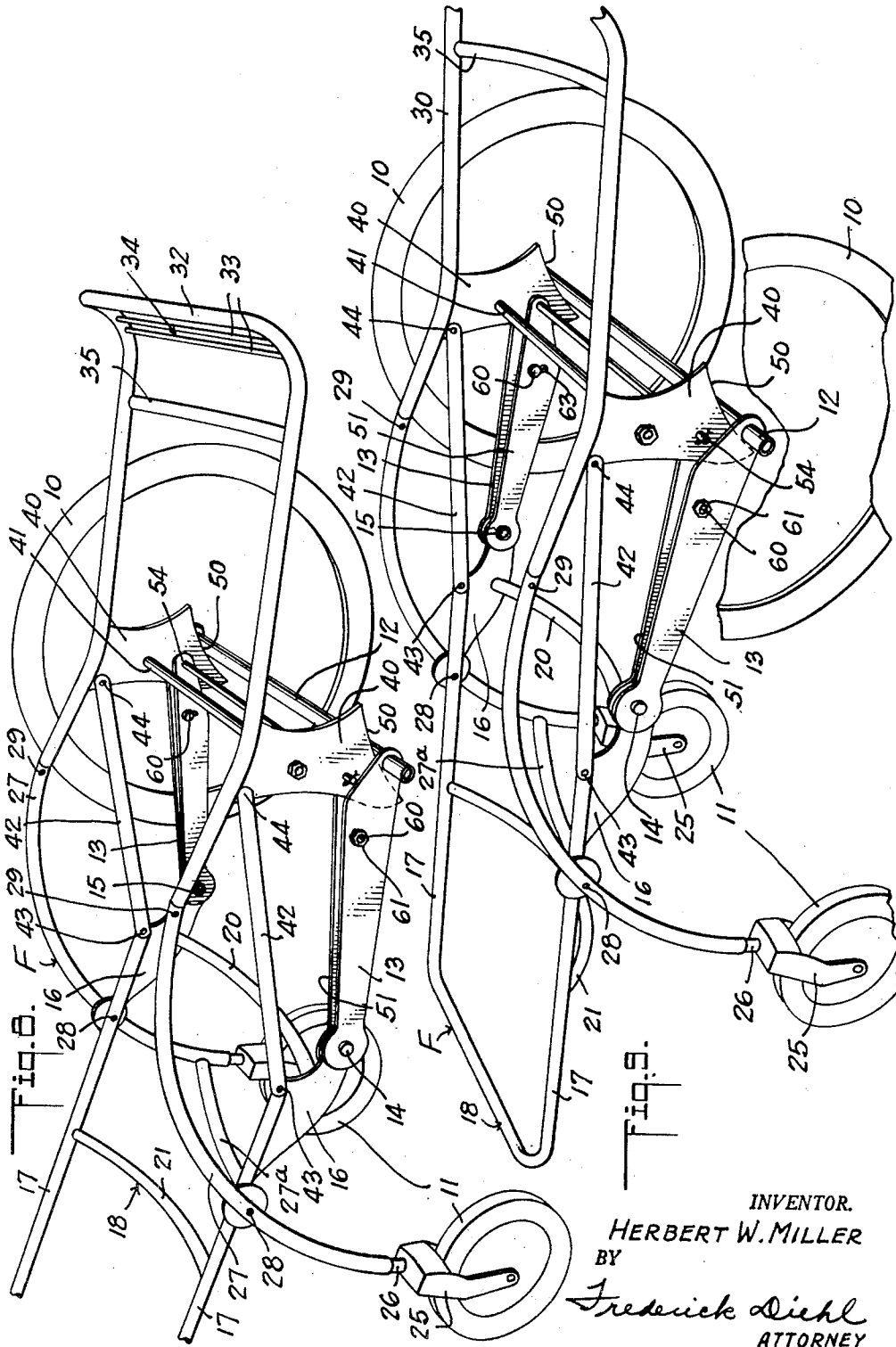
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ARTICLE OF FURNITURE

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**Feb. 18, 1958**

H. W. MILLER

**2,823,731**

ARTICLE OF FURNITURE

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Fig. 10.

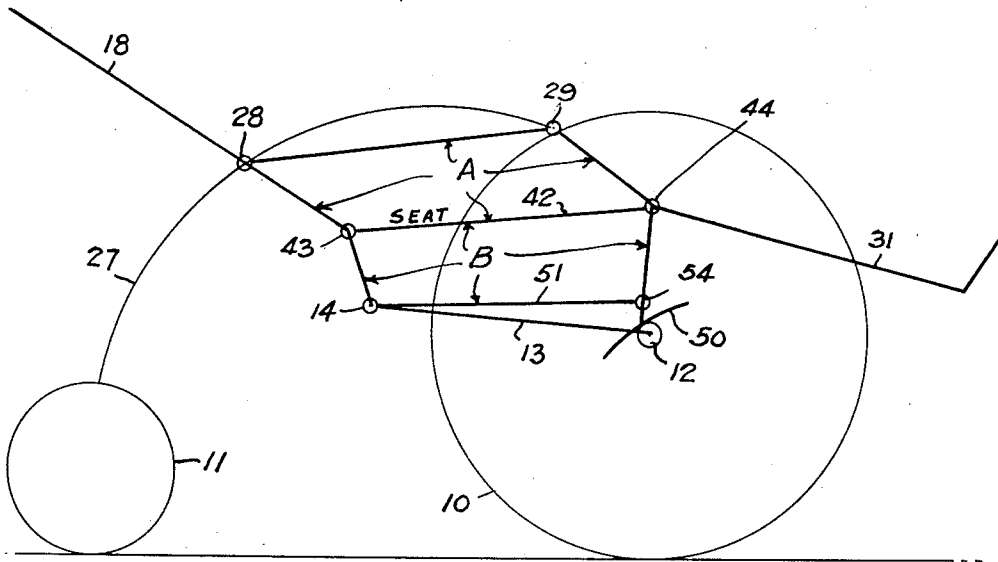
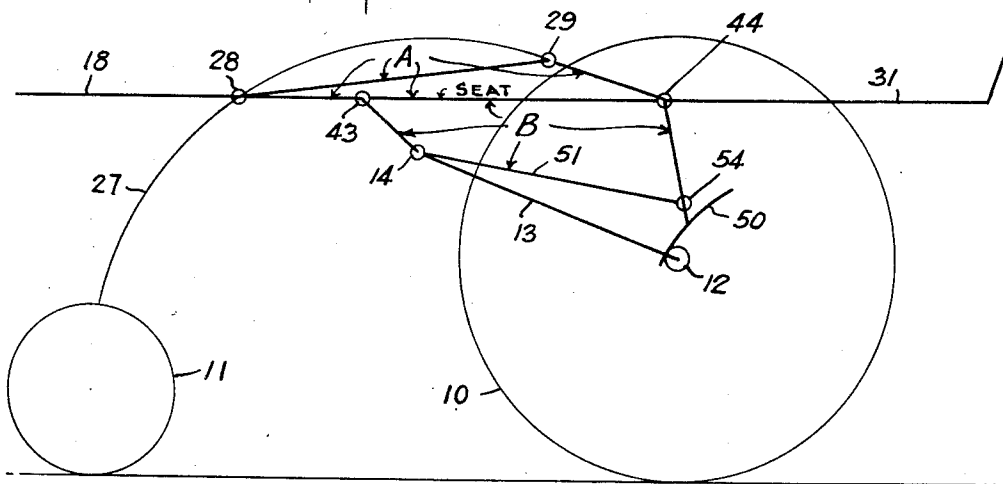


Fig. 11.



INVENTOR.  
HERBERT W. MILLER  
BY  
*Frederick Diehl*  
ATTORNEY

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2,823,731

## ARTICLE OF FURNITURE

Herbert W. Miller, Campbell, Calif.

Application February 13, 1956, Serial No. 565,156

8 Claims. (Cl. 155—30)

My invention relates generally to furniture and more particularly to articles of furniture which are adjustable to support the occupant in various positions.

An object of my invention is to provide an article of furniture which is preferably, although not necessarily constructed to provide a wheeled support rollable from one place to another and embodying means rendering it capable of being easily adjusted by the occupant to firmly support same in various positions, by the simple expedient of shifting of the weight of the occupant relative to the support, all in such manner as to dispense with any and all mechanisms to effect the adjustment and lock the article in adjusted position.

Another object of my invention is to provide an article of furniture of the above described character which is adjustable with but negligible effort on the part of the occupant to comfortably support same in a seated posture, a prone position, or any intermediate reclining position with such security that a change in the position of adjustment will be effected only in response to shifting of the weight of the occupant in a forward or rearward direction according as the occupant desires to assume a more raised or lowered position, to the end that the occupant will have full and complete control of the position of adjustment of the article and will be maintained with absolute assurance in any position to which the article is adjusted so long as no appreciable amount of forward or rearward weight shifting is effected, whereby to materially simplify the construction of the article and enable it to be manufactured and sold at a price considerably less than that of articles of this general class heretofore proposed which involve more or less complicated operating and locking mechanisms, when the range of body positions is this extensive.

A further object of my invention is to provide an article of furniture as above set forth which is readily adaptable for use as a desirable and presentable piece of furniture in the home either indoors or outdoors, as well as for hospital or sanitarium use; which is adaptable for use as a wheel chair, a recliner, or posture chair of an infinite number of adjustments, or a comfortable stretcher or cot; which enables patients to be transferred easily and safely to and from a bed; which is adapted for use as a stretcher on which a patient can be secured for safe handling under difficult conditions; and which embodies a foot rest clearing the floor in the seat-forming position of the article, and caused to be engaged with the floor when stood upon in the act of occupying the seat, all so as to prevent the article from rolling away.

With these and other objects in view, my invention resides in the combinations, arrangements and functional relationships of elements as set forth in the following specification and particularly pointed out in the appended claims.

In the accompanying drawings,

Figure 1 is a perspective view of one form of article of furniture embodying my invention, in its fully raised

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or seat-forming position of adjustment, parts being broken away for the sake of clearness;

Figure 2 is a fragmentary vertical longitudinal sectional view of the article shown in Figure 1;

Figure 3 is a vertical, transverse sectional view taken on the line 3—3 of Figure 2;

Figure 4 is an enlarged detail sectional view taken on the line 4—4 of Figure 2;

Figure 5 is an enlarged detail sectional view taken on the line 5—5 of Figure 2;

Figures 6, 7 and 8 are perspective views similar to Figure 1 and respectively showing the article of furniture in successively increased reclined positions of adjustment;

Figure 9 is a perspective view of the article of furniture in its fully lowered or cot-forming position of adjustment; and

Figures 10 and 11 are diagrammatic views illustrating the positions of Figures 7 and 9, respectively.

Referring specifically to the drawings, my invention in its present embodiment comprises a frame F preferably composed of light-weight metal tubing mounted on a support which in the present instance is capable of rolling movement by means of a pair of relatively large main or traction wheels 10 and a pair of caster wheels 11 in trailing relation to the wheels 10. The wheels 10 are rotatably mounted on the ends of an axle structure 12 which is connected at the inner sides of the wheels 10 to the forward ends of links 13. The rear ends of the links 13 are pivotally connected by bolts 14 and nuts 15 to brackets 16 depending rigidly from the lower ends of side members 17 of a generally U-shaped back rest-forming section 18 spanned by a suitable sheet fabric or cushioned material 19. The brackets 16 are rigidly connected by a rearwardly curved cross member 20, while an intermediate cross member 21 and top cross member 22 rigidly connect the side members 17.

The caster wheels 11 are rotatably mounted in yokes 25 swiveled at 26 on the rear ends of leg and arm rest forming members 27 pivotally connected intermediate their ends by pins 28 to the side members 17 adjacent to the lower ends of the latter. A cross member 27a rigidly connects the members 27 adjacent to the swivels 26. The forward ends of the members 27 are pivotally connected by pins 29 to the upper ends of the side members 30 of a leg rest section 31. A bottom cross member 32 and foot rest rods 33 rigidly connect the lower ends of the side members 30 to form a foot rest portion 34, and coact with a rearwardly curved intermediate cross member 35 to provide a rigid structure. A sheet of fabric or cushioned material 36 spans the side members 30 to provide a comfortable leg rest section.

Near their upper ends the side members 30 are provided with brackets 40 rigidly connected by a tie rod 41, and side members 42 are pivotally connected to the lower ends of the side members 17 and to the side members 30 adjacent to their upper ends by means of pins 43 and 44, respectively, passing through the members 42 and through the brackets 16 and 40. A sheet of fabric or cushioned material 45 coacts with the members 42 to provide a comfortable seat section.

The brackets 40 rest upon the axle 12 to support the frame therefrom, and the portion of the brackets engaging the axle are formed to provide cams 50 which function in a manner to be later described. Links 51 are pivotally connected at their rear ends to the brackets 16 by the bolts 14, and interposed between the links 13 and 51 and the brackets 16 are disks of friction material 52 and 53 such as brake lining.

The forward ends of the links 51 have openings receiving a rod 54 spanning the brackets 40, so as to pivotally connect the links to such brackets. Bolts 60 have nuts 61

and pass through openings 62 (Figure 5) in the links 13 and arcuate slots 63 in the links 51 to provide a lost motion connection permitting a limited amount of relative pivotal movement therebetween about the common axis of the bolts 14, yet tying the frame to the axle.

The operation of the invention is as follows:

It will be noted from Figure 2 that the length of each of the links 42 between the pivot pins 43 and 44 forms the common side of two scalene quadrilateral figures A and B, the former of which has its other three sides defined by the lever arms between the pivots 43, 28, pivots 28, 29, and pivots 29, 44. The other three sides of the quadrilateral figure B are defined by the lever arms between the pivots 43, 14, pivots 14, 54, and pivots 54, 44. The provision of these two quadrilaterals by the above described construction functionally relates the seat, back rest and leg rest sections of the frame F to each other in a manner to enable the frame to be maintained in a state of equilibrium and stability in any position of adjustment, by the co-action of the cams 50 and the axle 12 on which the cams rest to support the weight of the forward portion of the frame.

By reference to Figures 7 and 10 which illustrate a predetermined intermediate position which is specifically the midway reclined position of the frame F between its extreme raised or seat-forming position shown in Figures 1 and 2, and its extreme lowered or cot-forming position shown in Figures 9 and 11, it will be seen that the cams 50 rest at a point medially of their lengths upon the axle 12 so as to be substantially balanced thereon in this mid position of the frame. Any disturbance of this balanced condition such as by shifting of the weight of an occupant of the frame forwardly towards a sitting position or backwardly towards a prone position will be resisted and counteracted by the cams 50 which will be accordingly tilted in one direction or the other as shown respectively in Figures 6 and 8, to thus present a steeper angle to the direction of movement of the cams in riding across the axle, with the result of requiring a gradually increasing force to lift the load of the frame relatively to the axle through the medium of the cams.

The extent to which the forward or rearward unbalancing of the load relative to the axle 12 is automatically counteracted to prevent a "running away" effect, is determined by the shape of the cams 50 and the changing relationship of the pivot 54 to the axle, in conjunction with the lever system provided by the upper and lower quadrilaterals A and B as previously defined.

It will be noted that the vertical distance of the pivot 54 from the axle 12 is greater in Figure 1 showing the sitting position than in Figures 7 and 10 illustrating the mid-reclined position. The extent to which the imbalance is counteracted by imposing on the axle a load to be raised, which is in opposition to the tendency of the entire assembly to accelerate or "run away" from the balanced mid-reclined position of Figures 7 and 10, is shown by the increasing vertical distance of the pivot 54 from the axle as adjustment of the frame is effected towards either of its extreme positions.

The result of this increasing load to be raised as adjustment of the frame is effected in either direction from the mid-reclined position of Figures 7 and 10 is inherent stability and assurance that the frame will remain in any assumed position without effort on the part of the occupant. Slight friction may be imposed by the disks 52 and 53 to aid in maintaining the position of adjustment irrespective of such unbalancing effects caused by more than minor movements of the arms and/or legs of the occupant.

The shifting of the caster wheels 11 rearwardly to provide an increased wheel base with the attending proper support for the body as reclining adjustment is effected, with the reverse movement of the caster wheels for com-

pactness in the sitting position, insures absolute stability in all positions.

The articulation of the various levers and links of predetermined lengths composing the upper and lower quadrilaterals A and B as above described provide the correct leverages for weight balance irrespective of the size and weight of the occupant. The automatic regulating action of the cams 50 on the axle 12 and the shifting of weight on the caster wheels 11, properly distribute the weight of the occupant to insure utmost comfort and yet enable the occupant, regardless of weight, to accomplish adjustments as desired with but negligible effort.

It is to be understood that the friction disks 52 and 53 are not necessary to the functioning of the cams 50 in maintaining any position of adjustment, the only friction present being between the cams and the axle structure 12 as all other points of relative movement are pivotal connections having negligible friction, thus enabling any change in adjustment of the frame to be accomplished with but little physical effort on the part of the occupant. It is only when supplementary friction or resistance is desired to counteract more extensive movements of the arms and legs which might disturb the position of adjustment of the frame F that the friction disks would be utilized, otherwise they can be rendered inoperative by loosening the nuts 15.

Furthermore, the resistance offered by the cams 50 to any change in the position of adjustment of the frame F is not an arbitrary or fixed amount, but is directly proportional to the weight of the occupant, with the extremely important advantage that the occupant, regardless of size and weight, can effect any desired adjustment of the frame with very little effort.

It will be manifest from the foregoing description that although the invention has been illustrated and described as a portable unit equipped with suitable wheels to enable it to be rolled about, that the invention is equally well adapted for use in the home either indoors or outdoors as a relatively fixed article of furniture by substituting for the wheels 10 a supporting structure of the general character found in well known articles such as loungers, recliners, or Morris chairs so as to have the exterior appearance of attractive conventional furniture. Therefore, the specification and claims are to be broadly construed in accordance with the scope of this disclosure.

I claim:

1. An article of furniture of the class described comprising: a frame having a seat section, back and leg rest sections pivotally connected to the seat section, and leg-forming members pivotally connected to said back and leg rest sections above the seat section to co-act with the aforesaid sections in rendering them relatively adjustable from one extreme position to another to support a person in a seated position, reclining positions, or a prone position; a pair of wheels having an axle; links pivotally connecting said axle to said back rest section below said seat section; a second pair of wheels rotatably mounted on said leg-forming members in trailing relation to the first said pair of wheels; and means co-acting with said back and leg rest sections to support said frame from said axle against uncontrolled adjustment from any adjusted position, yet yielding to shifting of the occupant's weight forwardly or rearwardly of the frame, so as to enable any position of adjustment of the frame to be assumed in response to such weight shifting and maintained without effort on the part of the occupant.

2. An article of furniture of the class described comprising: a frame having a seat section, back and leg rest sections pivotally connected to said seat section, and leg-forming members pivotally connected to said back and leg rest sections above the seat section to co-act with the aforesaid sections in rendering them relatively adjustable from one extreme position to another to support a person in a seated position, reclining positions, or a prone position; a pair of wheels having an axle; links

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pivotally connecting said axle to said back rest section below said seat section; a second pair of wheels rotatably mounted on said leg-forming members in trailing relation to the first said pair of wheels; and means co-acting with said back and leg rest sections to support the frame from said axle, and responsive to shifting of an occupant's weight forwardly or rearwardly of the frame, to adjust same; said means including cam means co-acting with said axle to counteract any tendency of the frame to self-adjust as a result of an unbalanced condition of the frame when adjusted in either direction from a predetermined reclined position wherein the weight of the frame and its occupant will be balanced about said axle, whereby the frame will be releasably retained in any position of adjustment without effort on the part of the occupant.

3. An article of furniture as embodied in claim 1 including friction braking means co-acting with the first said means to set up sufficiently increased resistance to adjustment of the frame to compensate for minor movements of the arms and/or legs of the occupant.

4. An article of furniture of the class described comprising: a frame having a seat section, back and leg rest sections pivotally connected to said seat section, and leg-forming members pivotally connected to said back and leg rest sections at locations above the seat section to co-act with the aforesaid sections in rendering them relatively adjustable from one extreme position to another to support a person in a seated position, reclining positions, or a prone position; a pair of wheels having an axle; links pivotally connecting said axle to said back rest section below said seat section; a second pair of wheels rotatably mounted on said leg-forming members in trailing relation to the first said pair of wheels; cam means carried by said leg rest section and co-acting with said axle to support the frame from the axle; and means co-acting with said back rest section and cam means to effect raising of the frame relative to the axle in response to adjustment of the frame towards either extreme position from a predetermined intermediate position wherein the weight of the frame will be balanced about the axle, whereby to counteract the tendency of the frame to self-adjust when unbalanced and to enable the frame to remain in any adjusted position to which it is moved by shifting of the occupant's weight forwardly or rearwardly of the frame.

5. An article of furniture of the class described comprising: a frame having a seat section, back and leg rest sections pivotally connected to said seat section, and leg-forming members pivotally connected to said back and leg rest sections at locations above the seat section to co-act with the aforesaid sections in rendering them relatively adjustable from one extreme position to another to support a person in a seated position, reclining positions, or a prone position; a pair of wheels having an axle; links pivotally connecting said back rest section below the seat section to said axle; a second pair of wheels rotatably mounted on said leg-forming members in trailing relation to the first said pair of wheels; cam

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means carried by said leg rest section and co-acting with said axle to support the frame from the axle; and other links pivotally connected to said back and leg rest sections below the seat section to co-act with said cam means in causing raising movement of the frame relative to the axle in response to adjustment of the frame towards either extreme position from a predetermined intermediate position wherein the weight of the frame will be balanced about the axle, whereby the tendency of the frame to self-adjust when unbalanced about the axle will be counteracted to enable the frame to remain in any position to which it is adjusted by shifting of the occupant's weight forwardly or rearwardly of the frame.

6. An article of furniture as embodied in claim 5 including a lost motion connection between the first and second said links enabling the first said pair of wheels to be lifted by lifting the frame when used as a stretcher.

7. An article of furniture of the class described comprising: a frame having a seat section, a back rest section having brackets, a leg rest section having brackets, and leg-forming members; means pivotally connecting said back and leg rest sections to said seat section and said members to said back and leg rest sections above the seat section to render said frame adjustable from one extreme position to another to support a person in various positions; a pair of wheels having an axle structure on which the wheels are rotatably mounted; caster wheels carried by said leg-forming members in trailing relation to the first said wheels; links pivotally connecting said axle structure to said brackets of said back rest section below said seat section; cams on said brackets of said leg rest section and resting on said axle structure to support said frame therefrom; and other links pivotally connected to said brackets of the back and leg rest sections for co-action with said cams in raising the frame relative to the axle structure when the frame is adjusted towards either extreme position from a predetermined intermediate position wherein the frame will be balanced about the axle, to counteract self-adjustment of the frame when in unbalanced positions and enable the frame to remain in any position to which it is adjusted by shifting of the occupant's weight forwardly or rearwardly of the frame.

8. An article of furniture as embodied in claim 7 including braking means co-acting with said links to provide sufficiently increased resistance to adjustment of the frame to compensate for major movements of the arms and/or legs of the occupant.

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