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(54) **TILTABLE SPRING-BIASED CHAIR**

(57)

ABSTRACT

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(21) Appl. No.: **10/209,143**

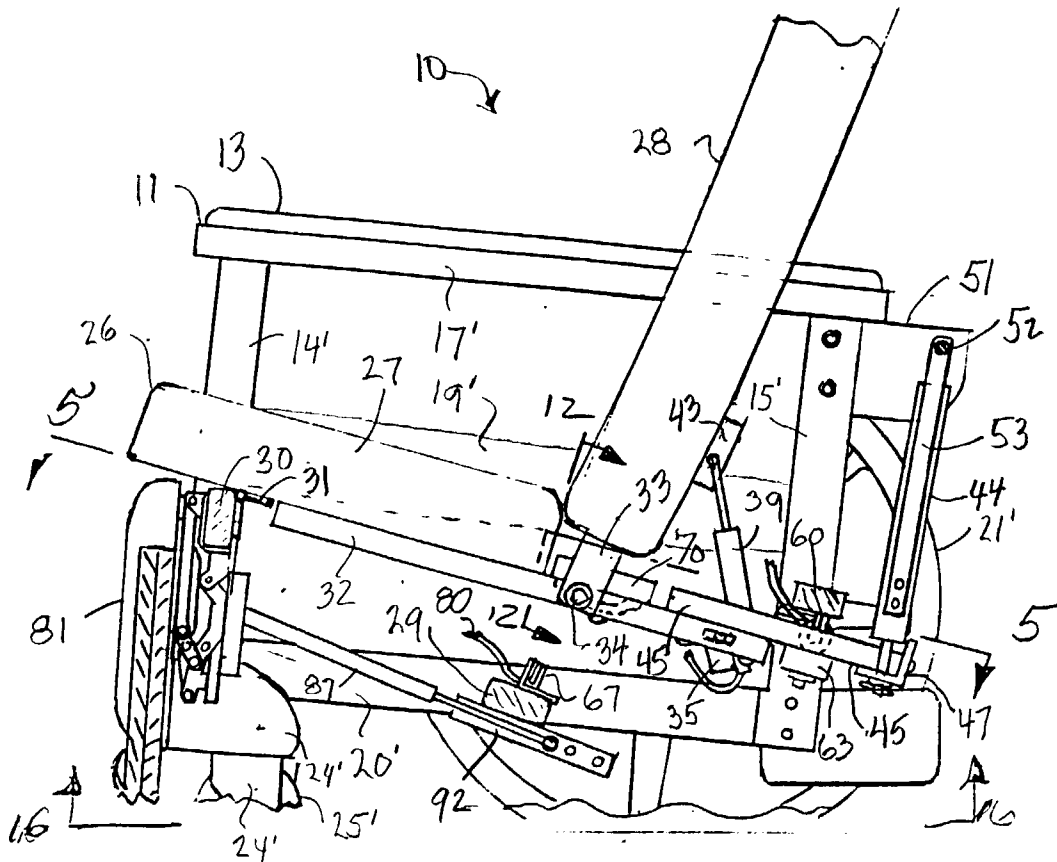
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(52) **U.S. Cl. 297/325; 297/354.1**

A chair including a frame, a seat pivotally mounted on the frame, a spring construction effectively positioned between the seat and the frame, a first selectively actuatable latch positioned between the seat and the frame effective to maintain the seat latched in a less inclined position on the frame, a second selectively actuatable latch positioned between the seat and the frame effective to maintain the seat latched in a more inclined position on the frame against the bias of the spring construction, a seat back pivotally mounted relative to the seat, a leg rest pivotally mounted on the frame and movable between a retracted stowed position and extended positions, a cable secured to the leg rest for selectively releasing the leg rest from the retracted stowed position, a leg rest extension mounted on the leg rest, and a foot rest mounted on the leg rest extension.



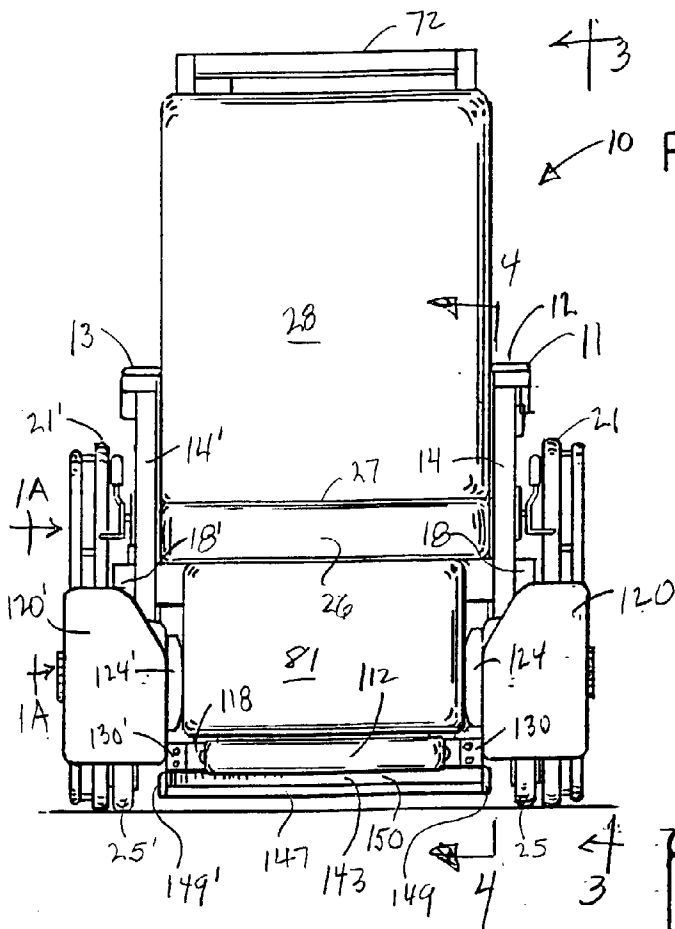


FIG 1

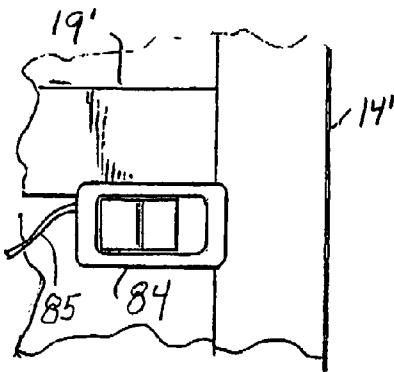


FIG. 1A

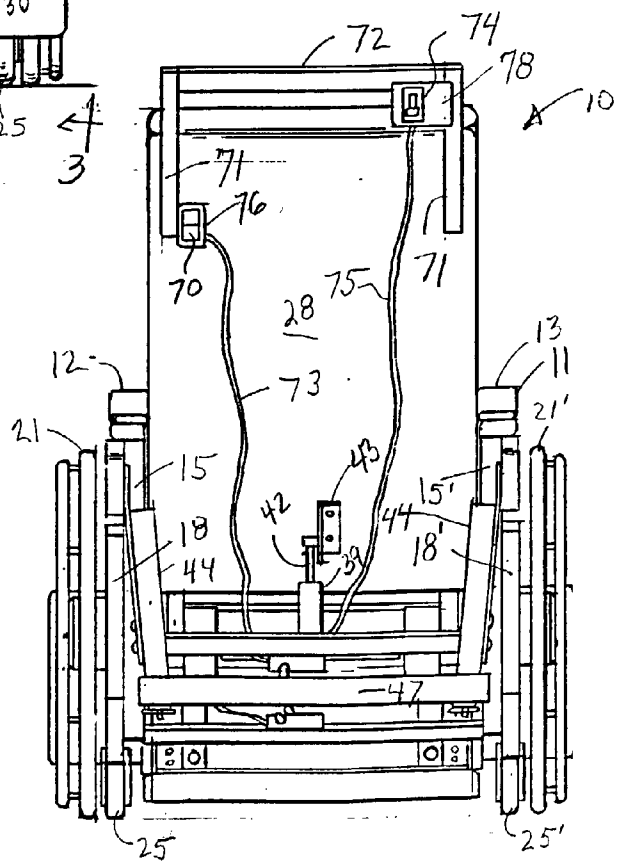


FIG 2

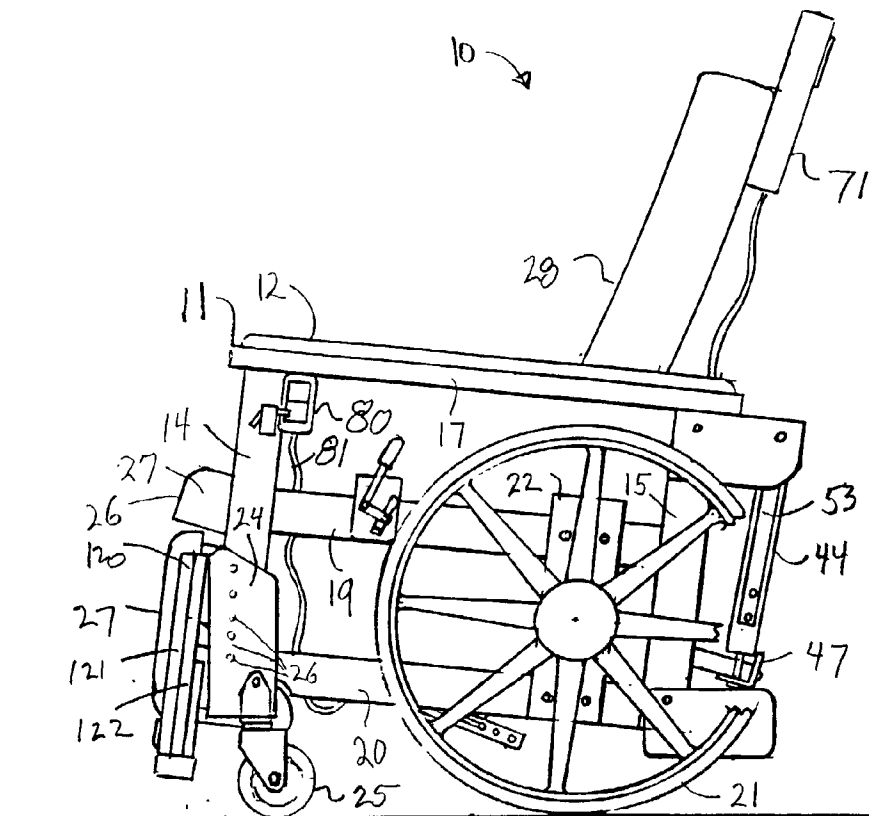


FIG. 3

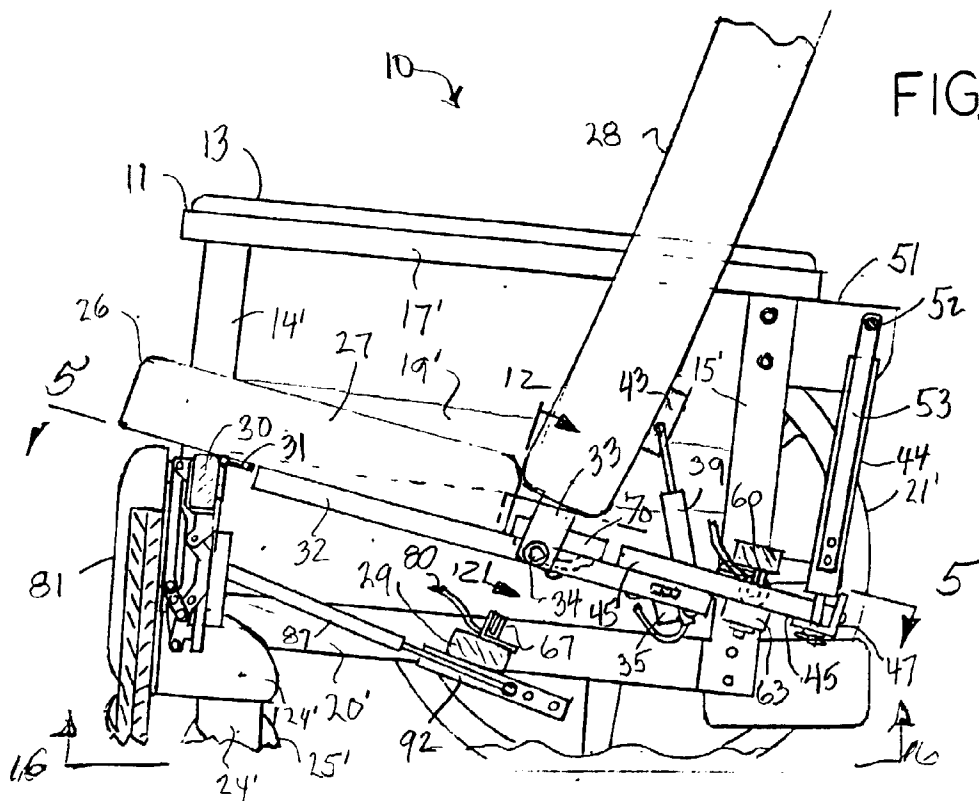


FIG. 4

FIG. 5

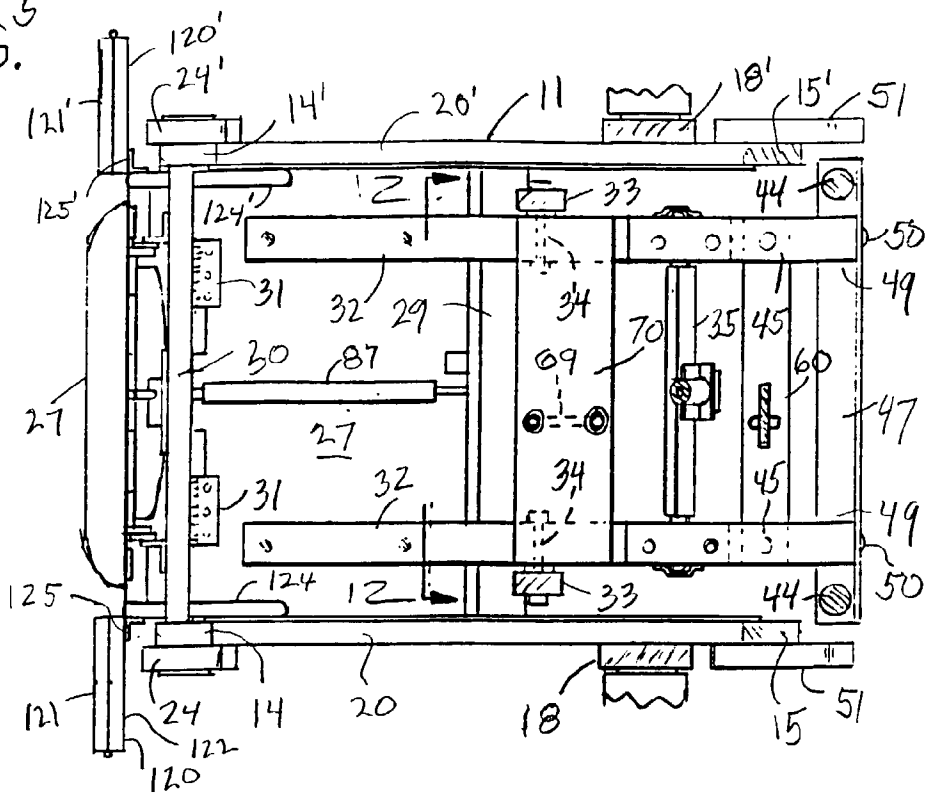


FIG 9

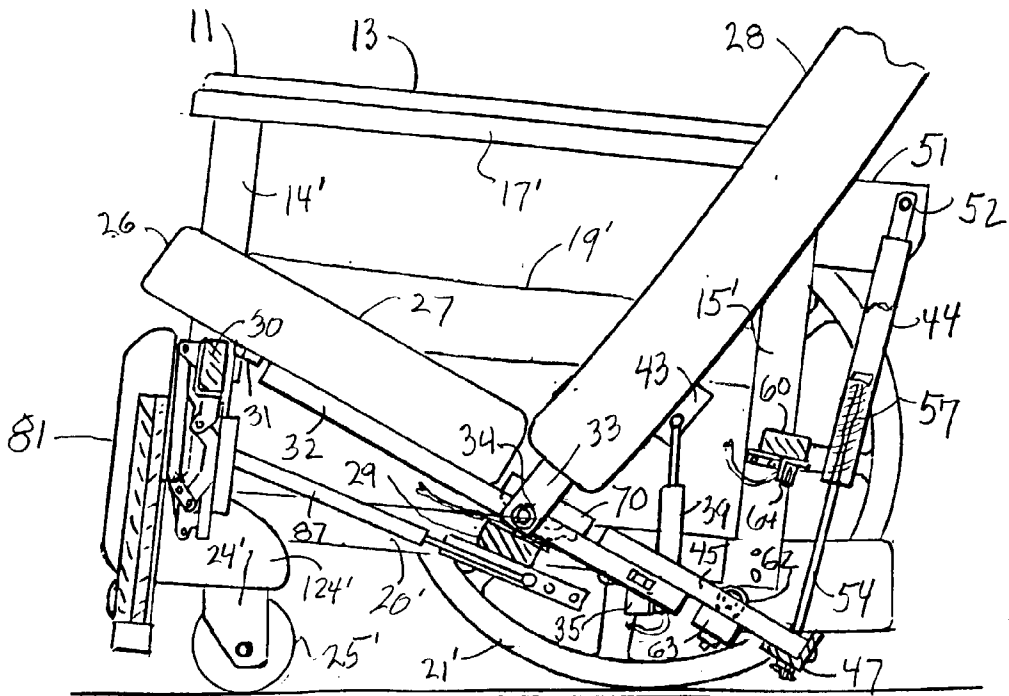


FIG. 6

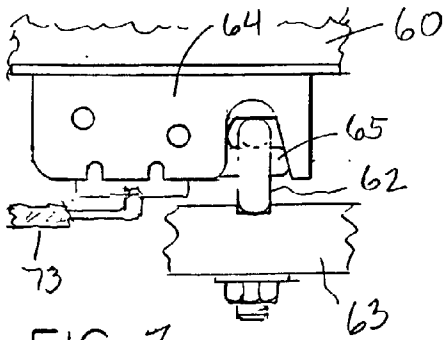
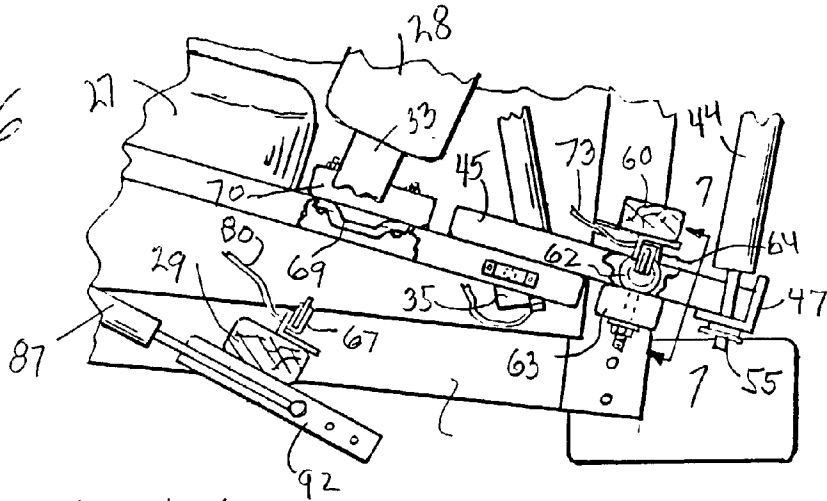


FIG. 7

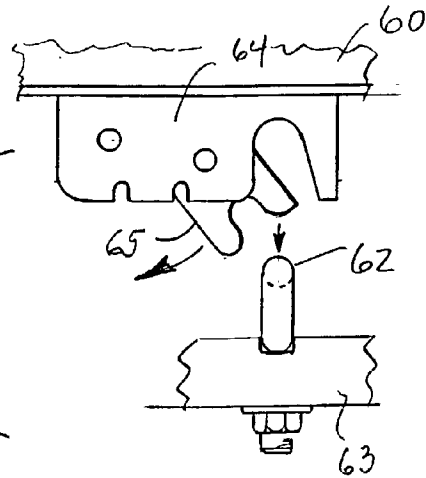


FIG. 8

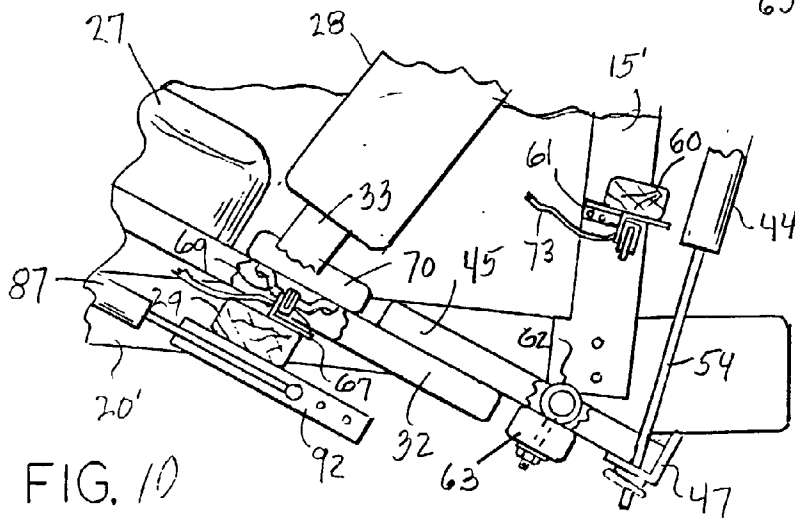


FIG. 10

FIG. 11

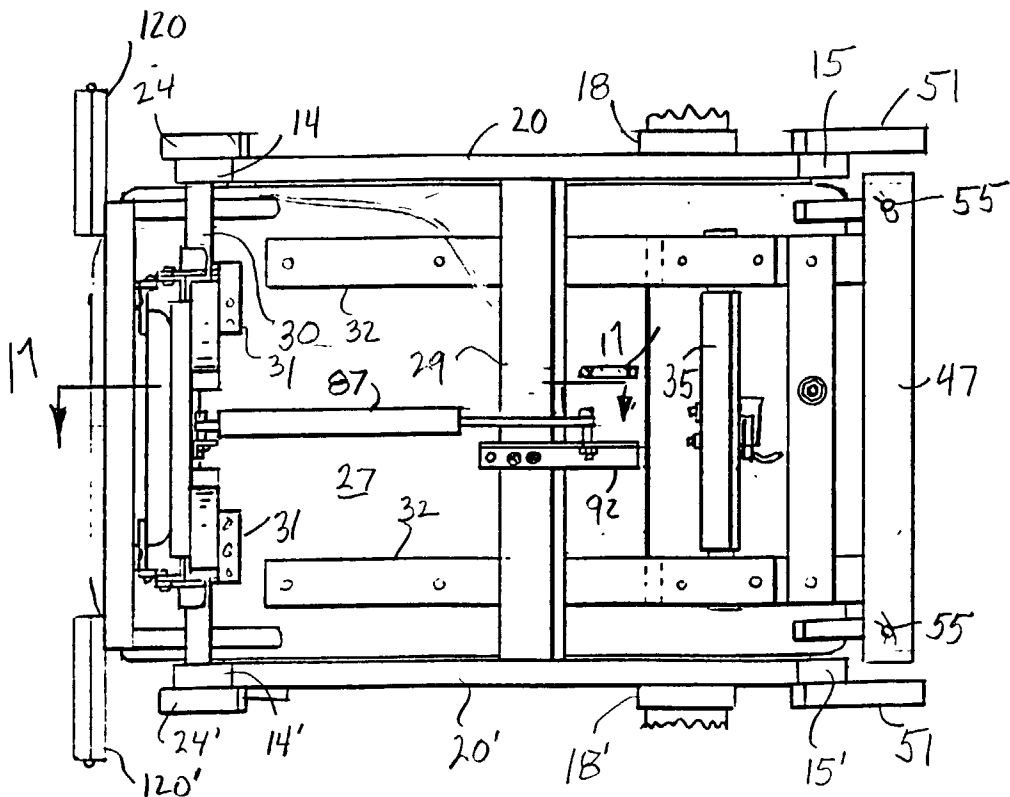
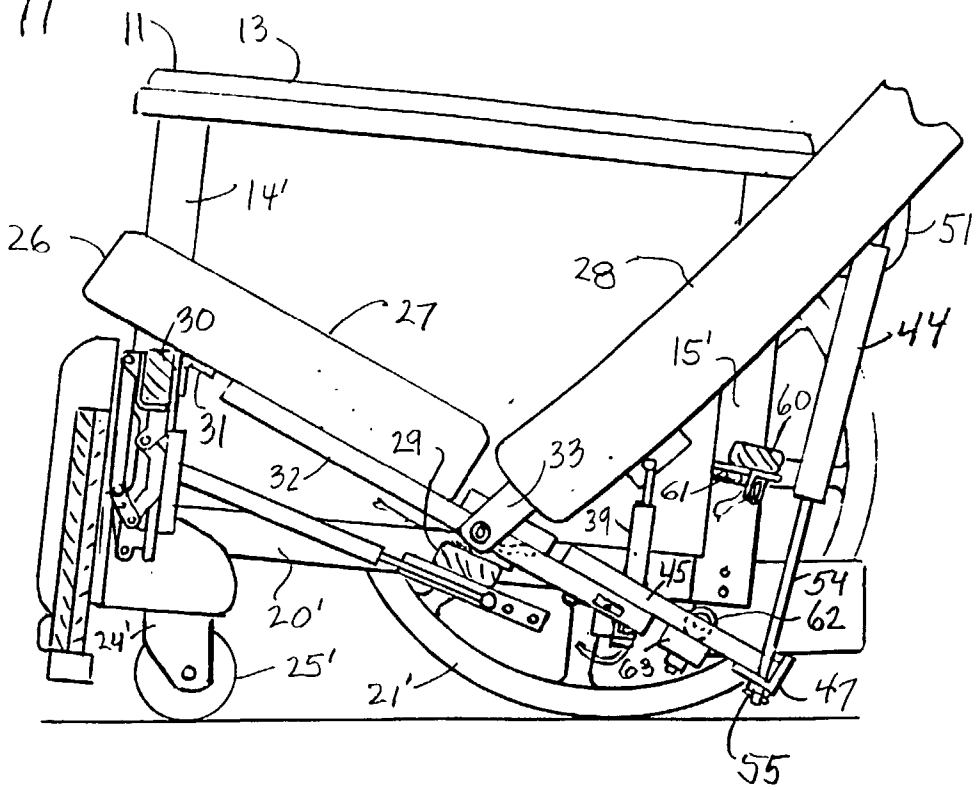


FIG. 16

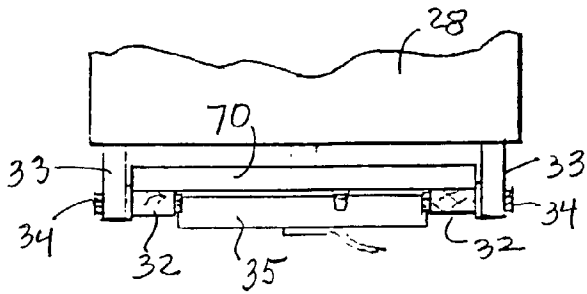


FIG. 12

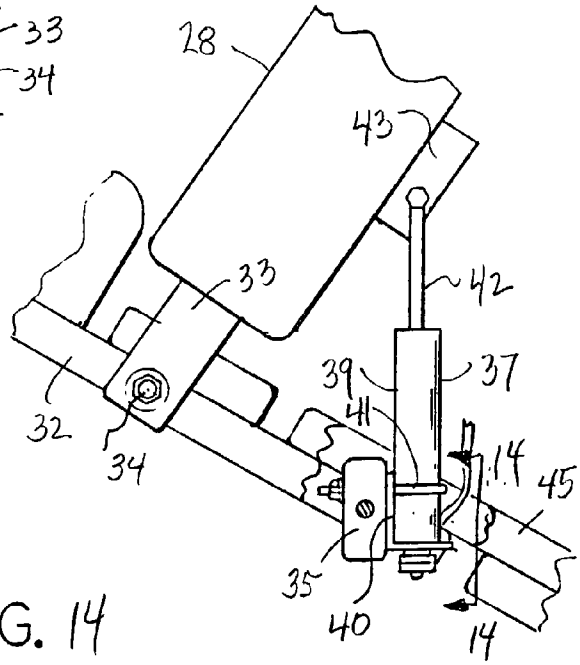


FIG. 13

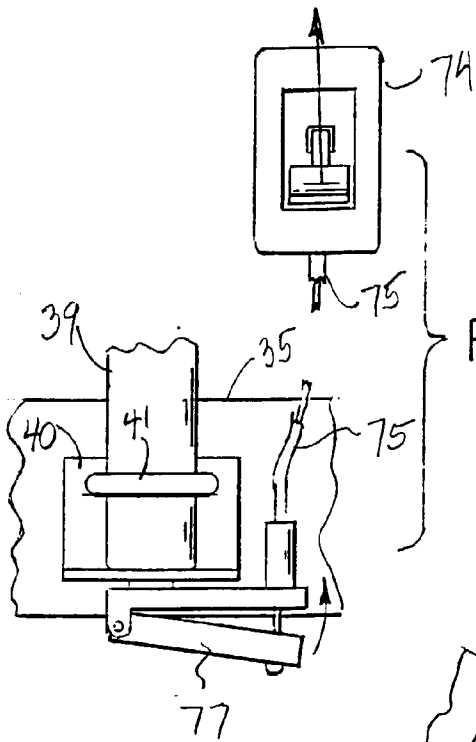


FIG. 14

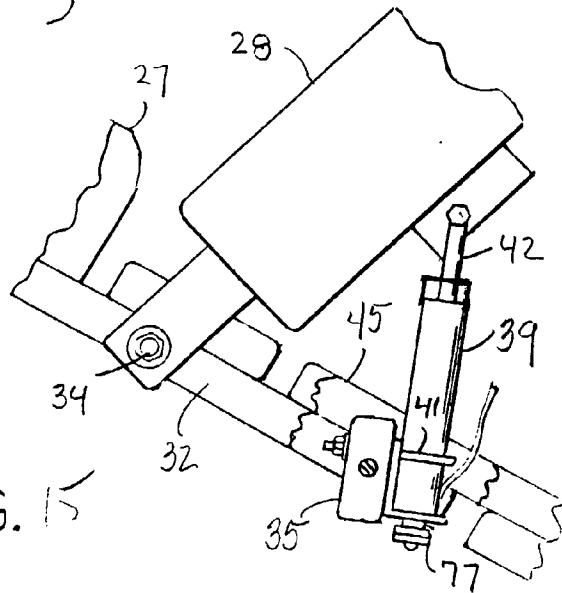


FIG. 15

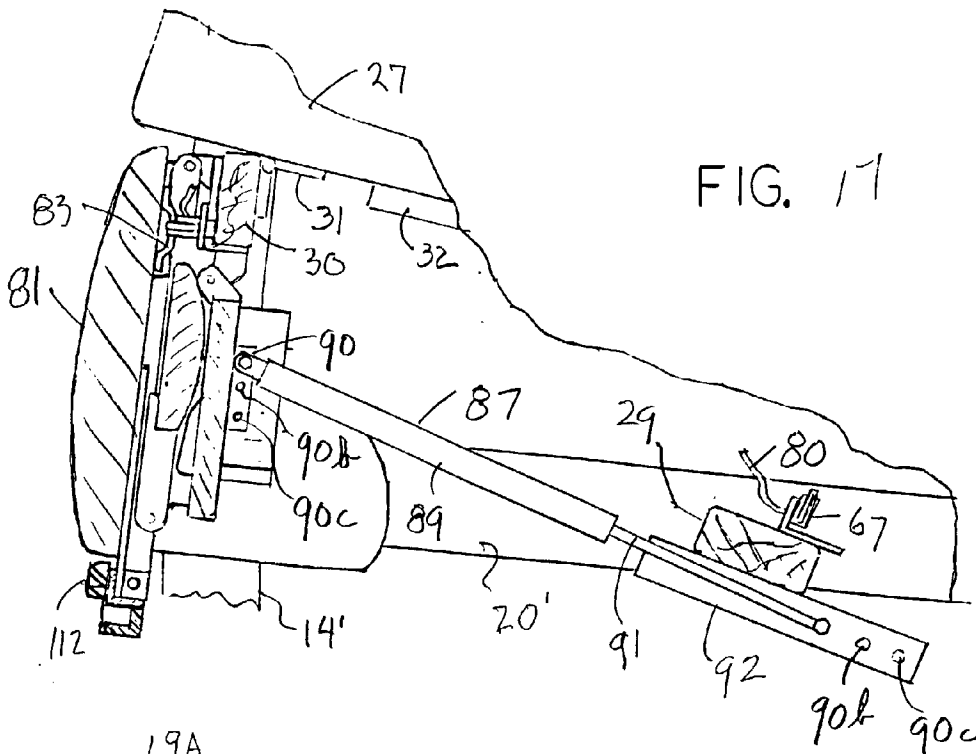


FIG. 17

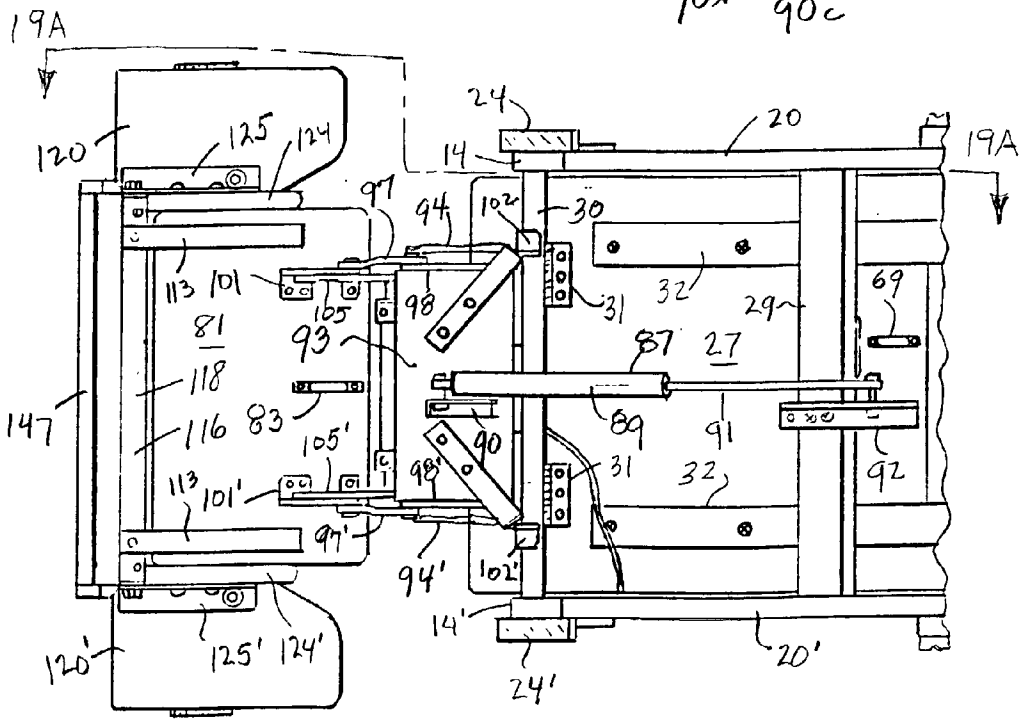


FIG. 18

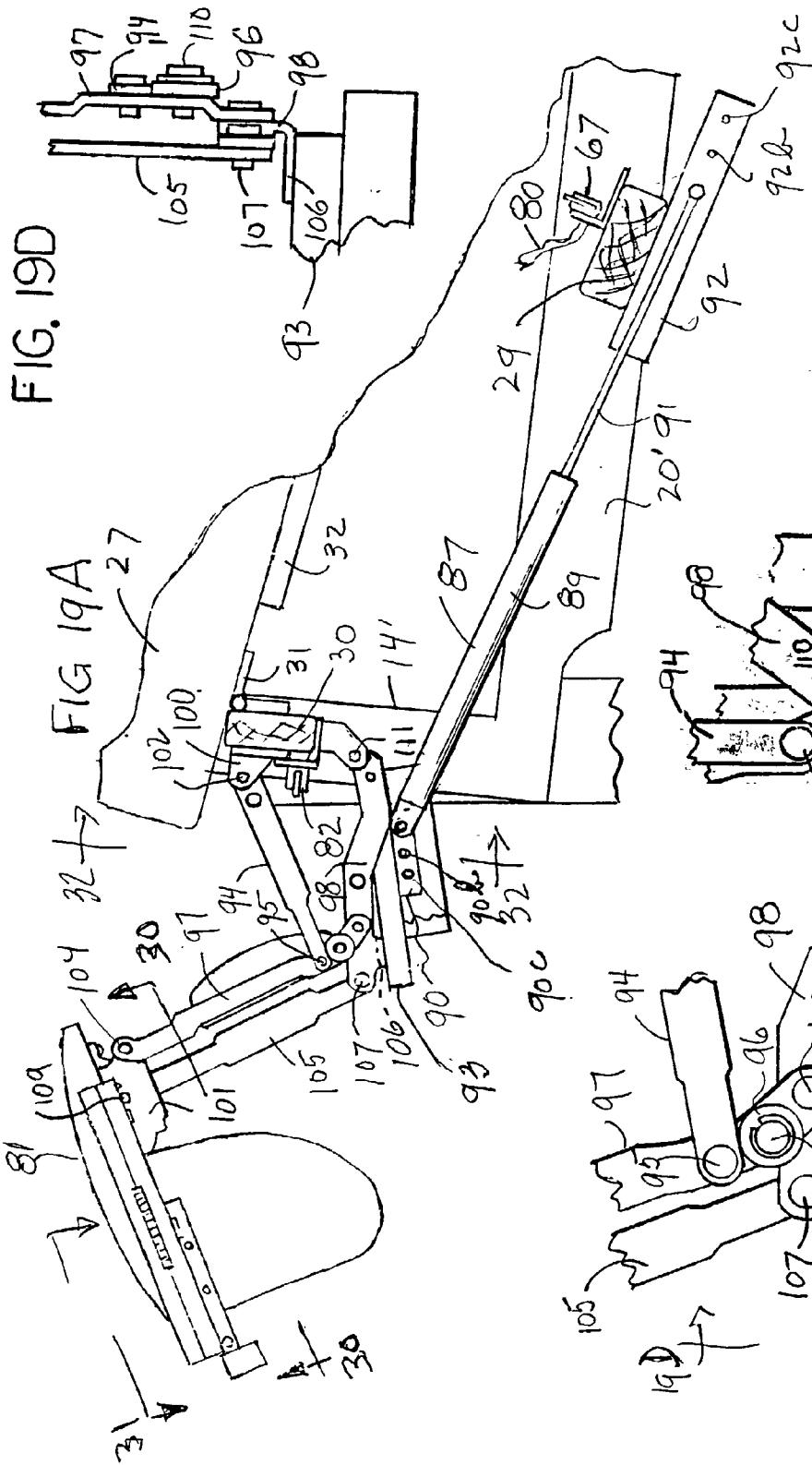


FIG. 19D

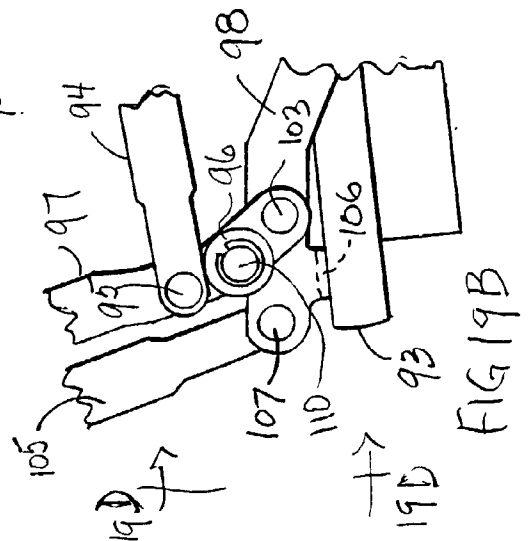


FIG. 19B

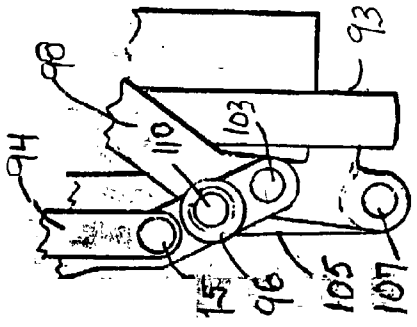


FIG. 19C

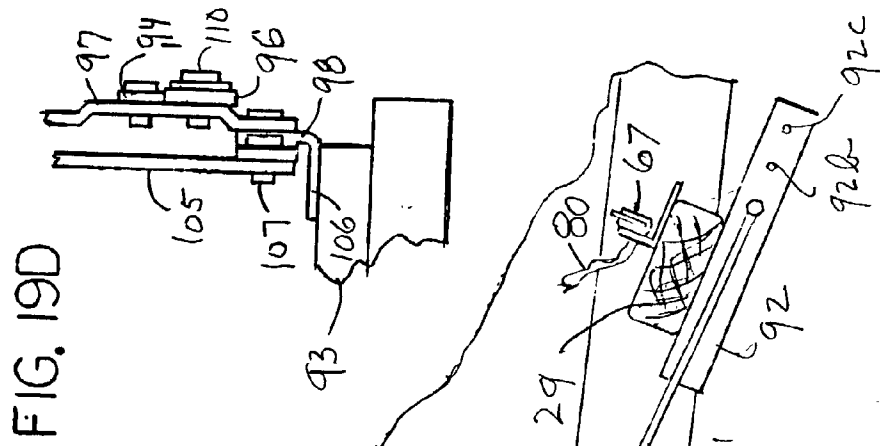


FIG. 19A

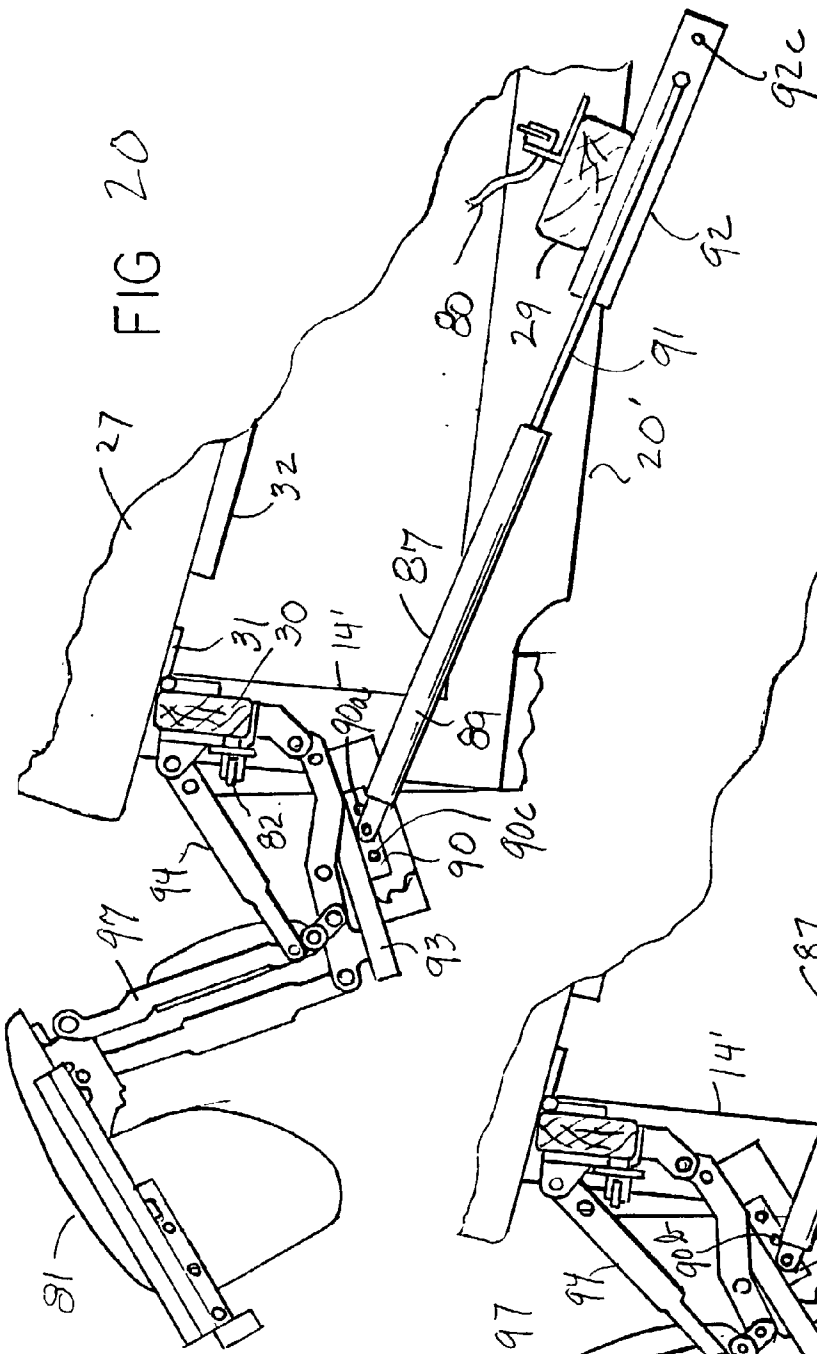


FIG 20

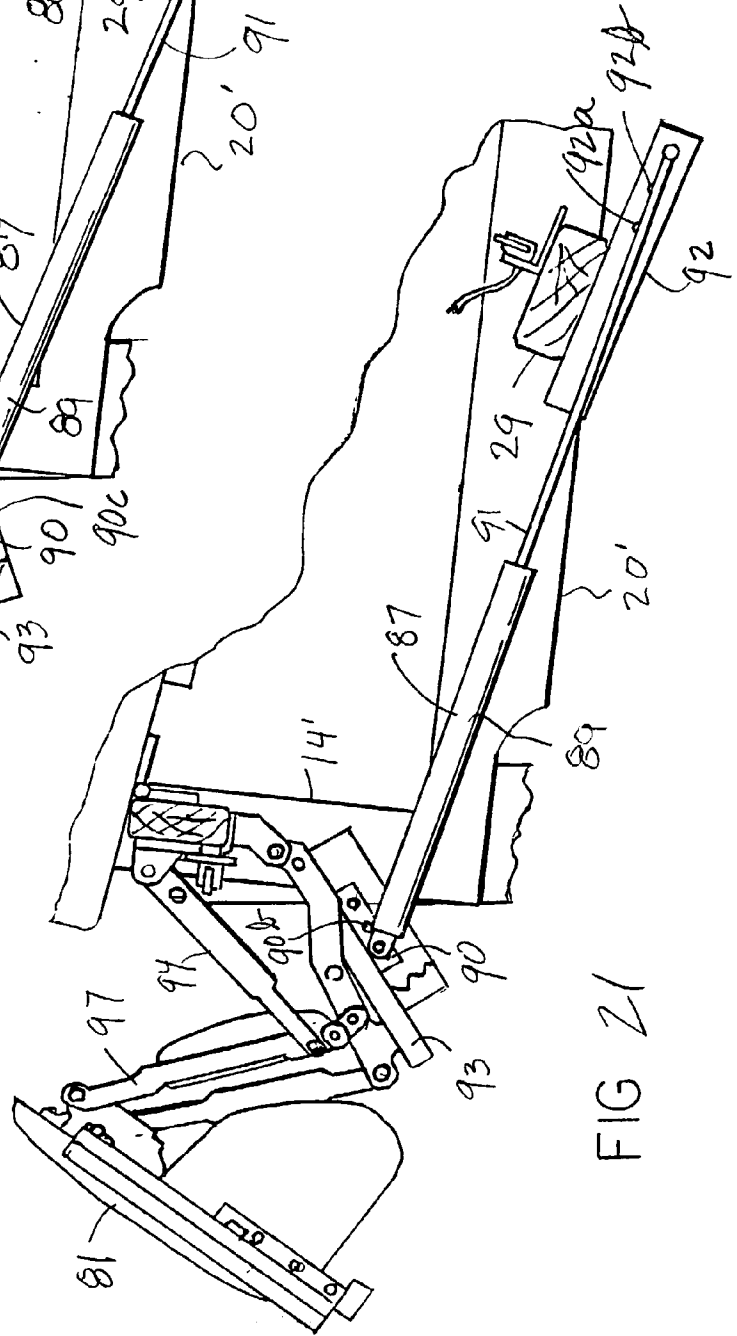


FIG 21

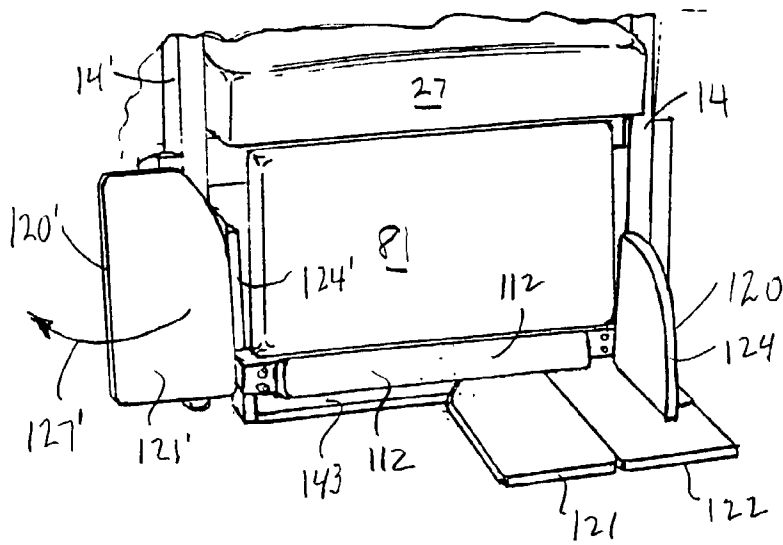


FIG 22

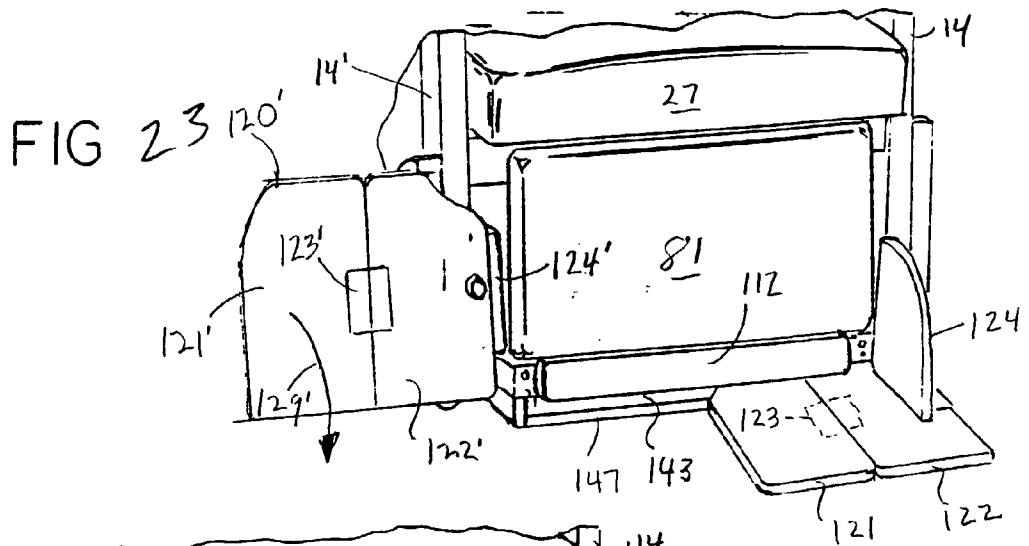


FIG 23

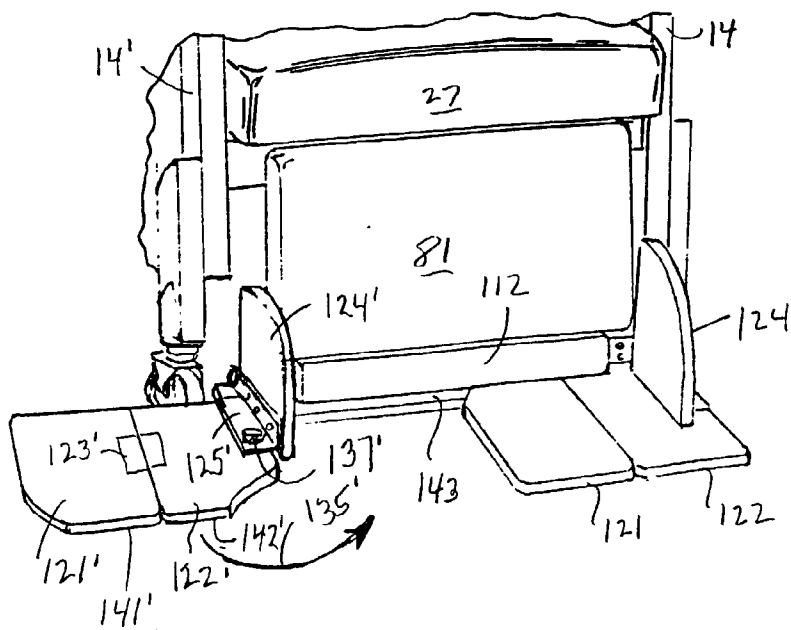


FIG 24

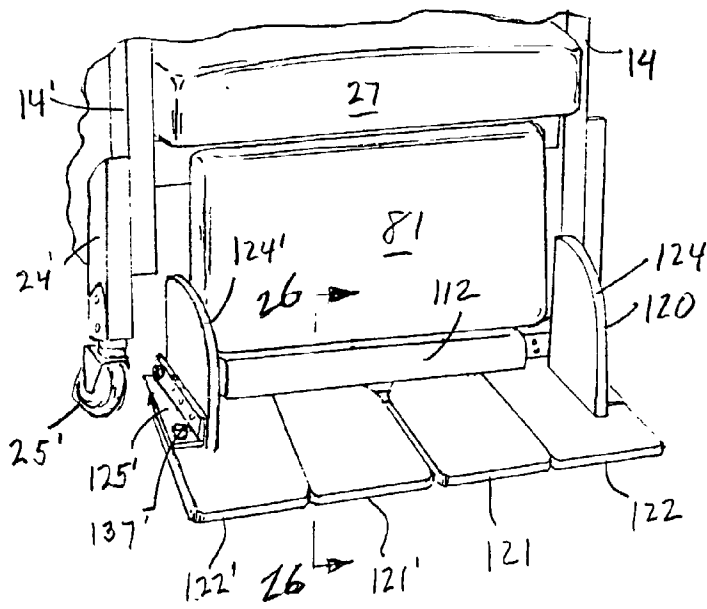


FIG. 25

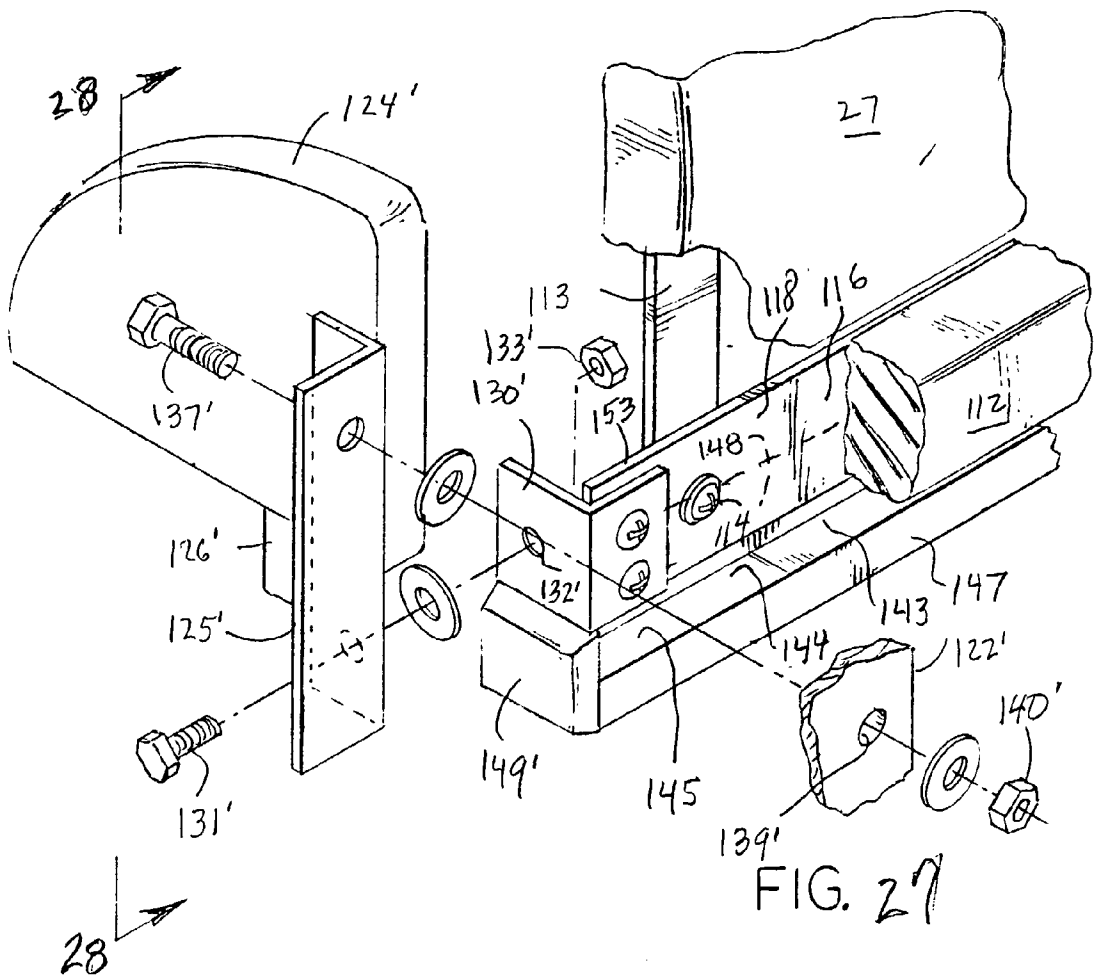


FIG. 27

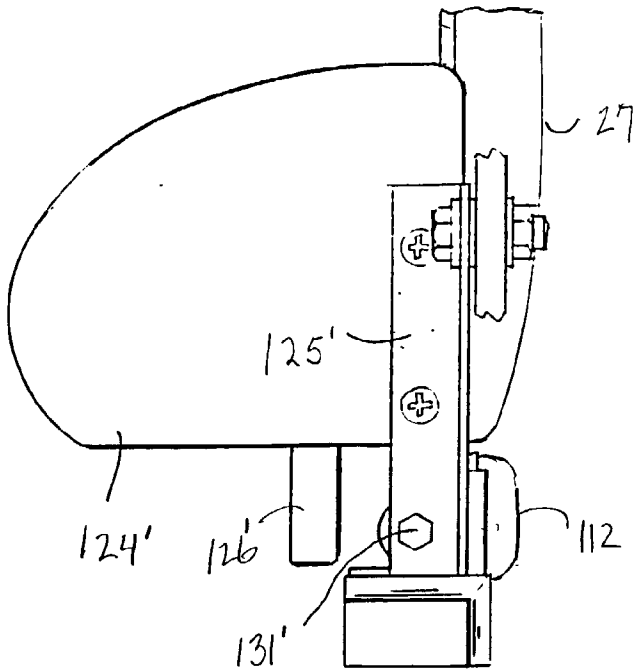


FIG 28

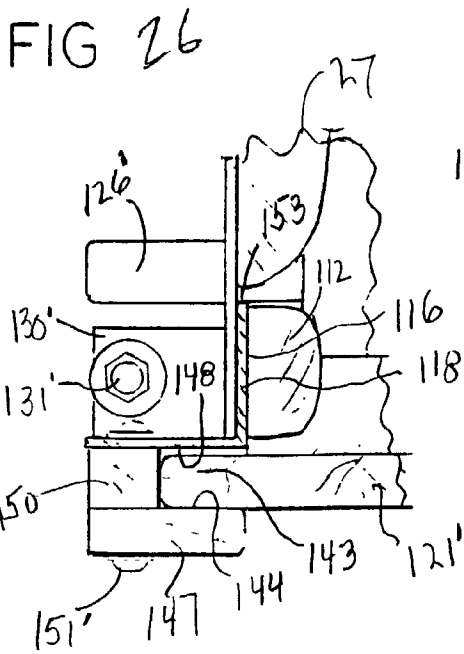


FIG 26

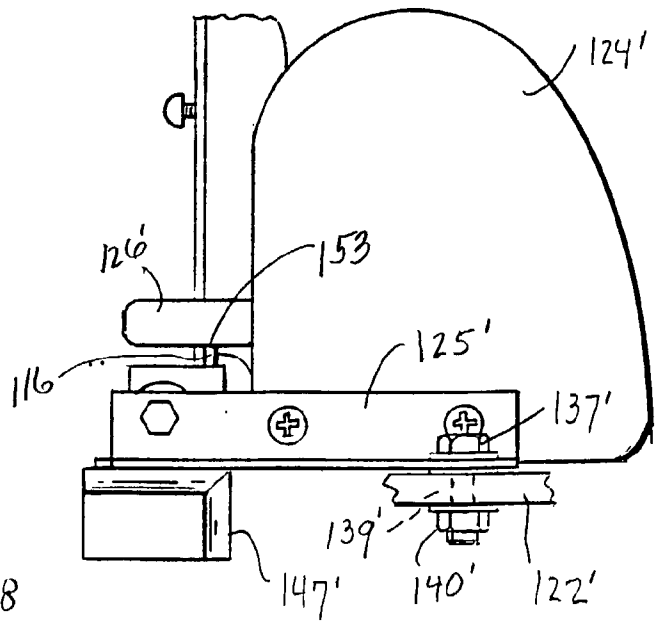
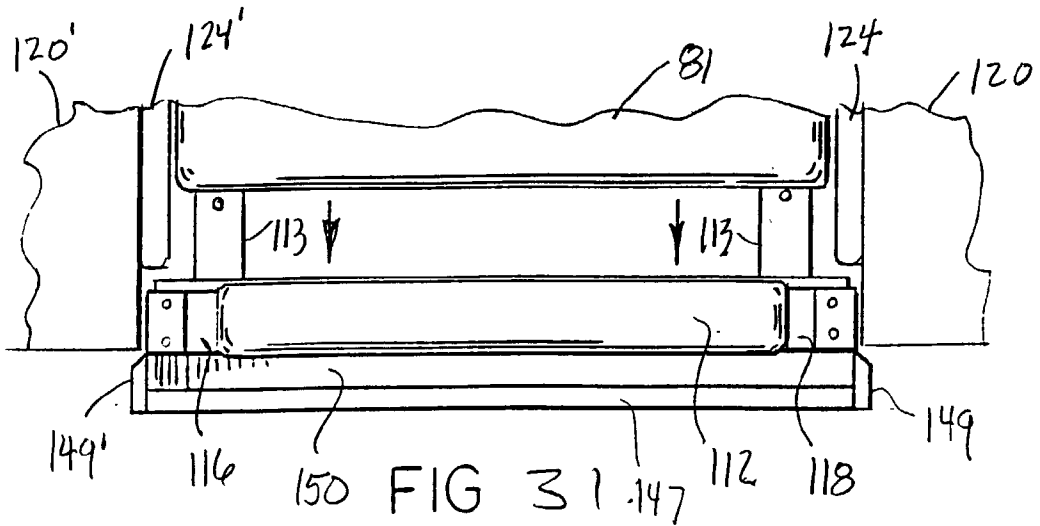
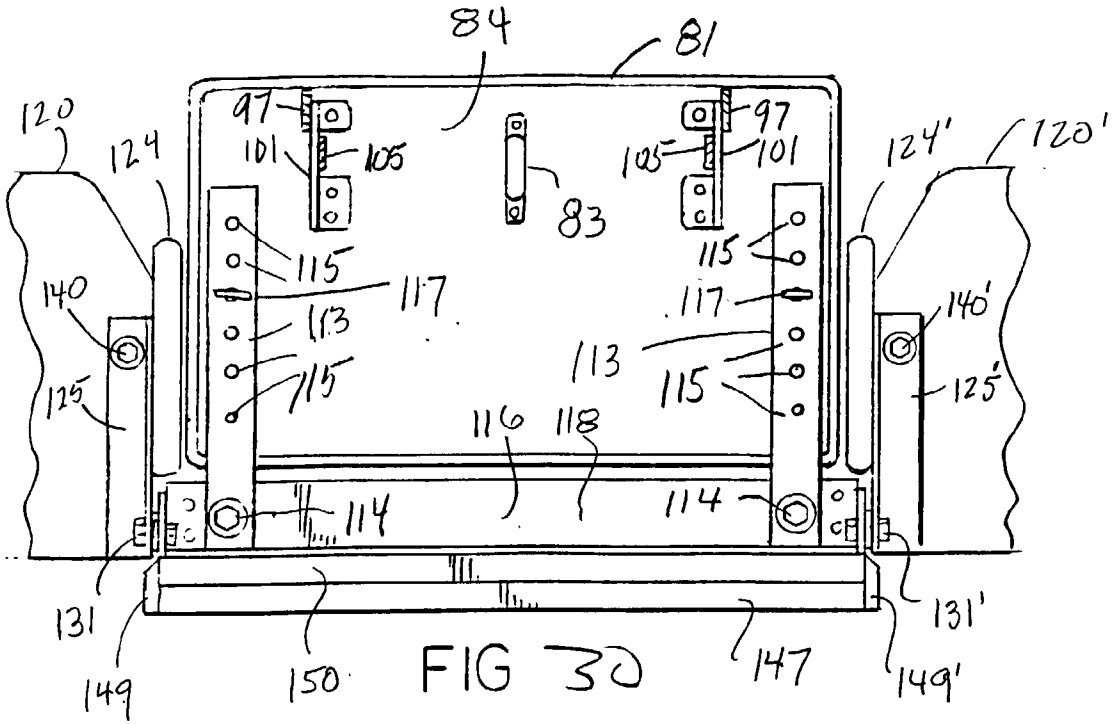


FIG 29



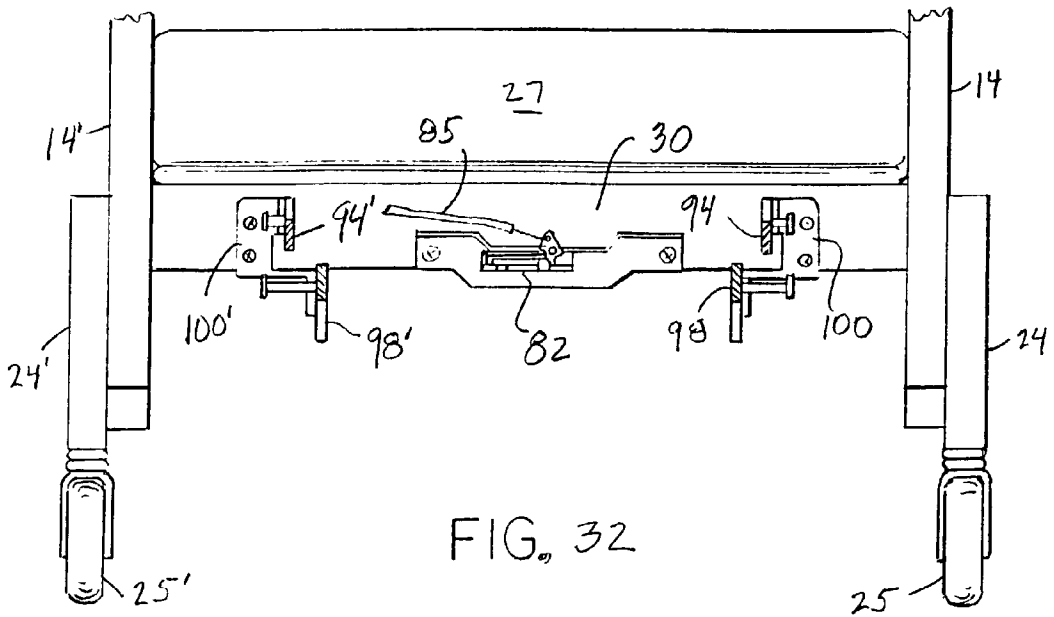


FIG. 32

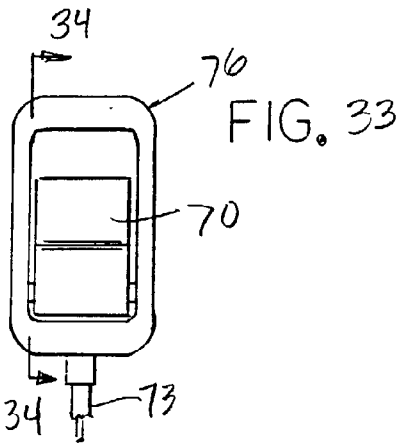


FIG. 33

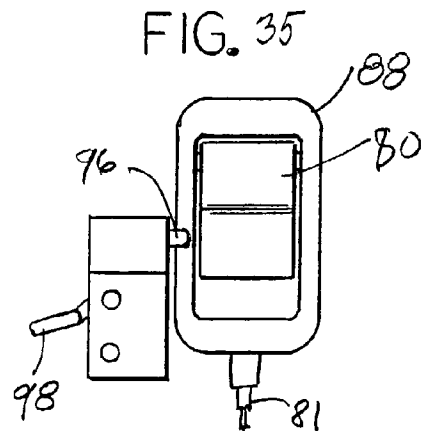


FIG. 35

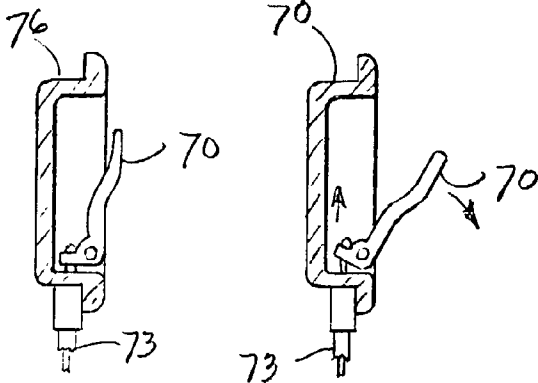


FIG. 34

FIG. 34A

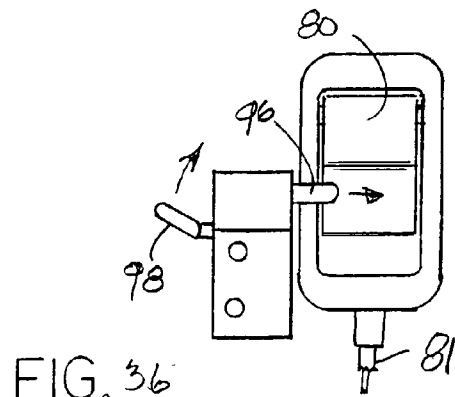


FIG. 36

TILTABLE SPRING-BIASED CHAIR**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

BACKGROUND OF THE INVENTION

[0003] The present invention relates to a chair which is primarily designed for use by nursing home patients who can enter and leave the chair in a normal manner and who also will be retained in the chair in a seated position without restraints.

[0004] Insofar as known, in the past nursing home patients were restrained in chairs by means of various types of tying arrangements. This was found unsatisfactory for a number of reasons which included the necessity to tie and untie the patient, and, in addition, the patient could sometimes be tangled in the ties and be injured. It is with overcoming the foregoing deficiencies of the prior art that the present chair is concerned.

BRIEF SUMMARY OF THE INVENTION

[0005] It is one object of the present invention to provide a chair which is to be used in facilities such as hospitals and nursing homes wherein the patient can enter and leave the chair when the seat and back are latched in a less inclined position and after the patient has been seated, the seat and back can be unlatched from the latched position whereby the center of gravity of the patient will cause the seat and back to pivot to a more inclined position against the bias of springs and then be automatically latched in the more inclined position from which a patient cannot leave the chair, notwithstanding that he is not restrained by ties, and, in addition, if desired, the seat back can be pivoted rearwardly to an even more rearward inclined position to thereby further prevent the untied patient from leaving the chair.

[0006] Another object of the present invention is to provide a chair as described above wherein the seat can be unlatched from its more inclined position so that when a patient leans forward to shift his center of gravity, the seat will return to its less inclined position with the aid of the springs and will be latched in said less inclined position so that the patient can leave the chair as he would from a normal type chair, regardless of the position of the pivotable back relative to the seat.

[0007] A further object of the present invention is to provide a chair which has the inclinable seat features described above which also has a leg rest which can be adjusted to accommodate patients having various leg lengths.

[0008] A still further object of the present invention is to provide a chair as described in the immediately preceding paragraph which has a stowable foot rest which is adjustable along with the leg rest. Other objects and attendant advantages of the present invention will readily be perceived hereafter.

[0009] The present invention relates to a chair comprising a frame, a seat having a front portion pivotally mounted on said frame and movable between a less inclined position and a more inclined position, a rear portion on said seat, a back pivotally mounted proximate said rear portion of said seat, and a spring structure effectively mounted between said seat and said frame, said spring structure being stressed when said seat is in said more inclined position.

[0010] The present invention also relates to a chair comprising a frame, first and second sides on said frame, a seat having a front portion and a rear portion, a back pivotally mounted relative to said rear portion of said seat, a first latch structure mounted for latching engagement of said seat at a first less inclined position relative to said frame, and a second latch structure mounted for latching engagement at a second more inclined position relative to said frame.

[0011] The present invention also relates to a chair as set forth in the immediately preceding paragraph which also includes a stowable leg rest which is also extendable to fit different leg lengths and stowable foot rests mounted on the extendable leg rest.

[0012] The various aspects of the present invention will be more fully understood when the following portions of the specification are read in conjunction with the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0013] **FIG. 1** is a front elevational view of the improved chair of the present invention;

[0014] **FIG. 1A** is a fragmentary view taken substantially in the direction of arrows 1A-1A of **FIG. 1**;

[0015] **FIG. 2** is a rear elevational view of the improved chair of the present invention;

[0016] **FIG. 3** is a fragmentary side elevational view taken substantially in the direction of arrows 3-3 of **FIG. 1**;

[0017] **FIG. 4** is an enlarged fragmentary cross sectional view taken substantially along line 4-4 of **FIG. 1** and showing the seat and back in their less inclined patient entry positions;

[0018] **FIG. 5** is a fragmentary cross sectional view taken substantially along line 5-5 of **FIG. 4** and showing structure to which the seat is attached and certain structures which are below the seat;

[0019] **FIG. 6** is a fragmentary enlarged partially broken away view of the structure of **FIG. 4** for latching the seat in its less inclined entry position;

[0020] **FIG. 7** is a fragmentary enlarged view taken substantially in the direction of arrows 7-7 of **FIG. 6** and showing the slam latch mechanism in its latched position for latching the seat;

[0021] **FIG. 8** is a view similar to **FIG. 7** but showing the mechanism of **FIG. 7** in its unlatched position;

[0022] **FIG. 9** is a view similar to **FIG. 4** but showing the seat latched in its more inclined position;

[0023] **FIG. 10** is a fragmentary enlarged view of a portion of **FIG. 9** and showing the latching mechanism for latching the seat in its more inclined position;

[0024] FIG. 11 is a view similar to FIG. 9 with the seat in its more inclined position and with the seat back pivoted to an even more rearwardly inclined position than in FIG. 9;

[0025] FIG. 12 is a fragmentary cross sectional view taken substantially along line 12-12 of FIG. 4 and showing the pivot structure about which the lower end of the seat back can pivot;

[0026] FIG. 13 is a fragmentary enlarged portion of FIG. 4 and showing the piston and cylinder structure which controls the position to which the seat back can be tilted between its more inclined position of FIG. 9 and its even more rearwardly inclined position of FIG. 11;

[0027] FIG. 14 is an enlarged fragmentary exploded view showing the lever and cable mechanism for releasing the holding structure of the piston and cylinder arrangement so as to permit selective pivotal movement of the seat back between the positions of FIG. 4 and FIG. 11;

[0028] FIG. 15 is an enlarged fragmentary side elevational view similar to FIG. 13 but showing the seat back in its even more rearwardly inclined position from its more inclined position of FIG. 12;

[0029] FIG. 16 is a fragmentary plan view of the underside of the chair taken substantially in the direction of arrows 16-16 of FIG. 4;

[0030] FIG. 17 is an enlarged fragmentary cross sectional view taken substantially along line 17-17 of FIG. 16 and showing certain of the mechanism for moving the leg rest which is shown in a stowed position;

[0031] FIG. 18 is a fragmentary bottom plan view similar to FIG. 16 but showing the leg rest in a fully extended position;

[0032] FIG. 19A is a fragmentary enlarged cross sectional view taken substantially along line 19A-19A of FIG. 18 and showing the leg rest in its most extended position;

[0033] FIG. 19B is a fragmentary enlarged view of the portion of the mechanism shown in FIG. 19A which holds the leg rest in an extended position such as shown in FIG. 19A;

[0034] FIG. 19C is a fragmentary side elevational view similar to FIG. 19B but showing the position of the locking linkage in an unlocked condition when the leg rest is fully stowed;

[0035] FIG. 19D is a fragmentary view taken substantially in the direction of arrows 19D-19D of FIG. 19B;

[0036] FIG. 20 is a fragmentary view similar to FIG. 19A but showing the leg rest locked in an intermediate position between the position of FIG. 19A and its fully stowed position of FIG. 11 and where it is more inclined than shown in FIG. 19A;

[0037] FIG. 21 is a view similar to FIG. 20 but showing the leg rest locked in a more intermediate position closer to its stowed position where it is more inclined than in FIG. 20;

[0038] FIG. 22 is a fragmentary perspective view of the front of the chair showing one foot rest portion in a fully deployed position and showing the other foot rest in a fully stowed position;

[0039] FIG. 23 is a fragmentary view similar to FIG. 23 but showing the position of the foot rest after the initial manipulation thereof toward a fully deployed position;

[0040] FIG. 24 is a view similar to FIG. 23 but showing the next manipulation moving the foot rest toward its final position;

[0041] FIG. 25 is a view similar to FIG. 24 but showing each of the foot rests in its final deployed position;

[0042] FIG. 26 is a fragmentary cross sectional view taken substantially along line 26-26 of FIG. 25 and showing the structure which retains a foot rest in its final installed position;

[0043] FIG. 27 is an enlarged fragmentary exploded view showing the position of the foot rest linkage when a foot rest is in its fully stowed position;

[0044] FIG. 28 is a fragmentary view taken substantially in the direction of arrows 28-28 of FIG. 27 and showing the position of a foot rest in its fully stowed position;

[0045] FIG. 29 is a view similar to FIG. 28 but showing that portion of the foot rest pivoted 90 degrees clockwise and also showing the mechanism for retaining it in that position;

[0046] FIG. 30 is a fragmentary cross sectional view taken substantially along line 30-30 of FIG. 19A and showing the structure on the underside of the leg rest which permits the adjustment of the leg rest to different positions toward and away from the seat;

[0047] FIG. 31 is a fragmentary view taken substantially in the direction of arrows 31-31 of FIG. 19A and showing the leg rest in a more extended position;

[0048] FIG. 32 is a cross sectional view taken substantially along line 32-32 of FIG. 19A with certain parts omitted;

[0049] FIG. 33 is a front elevational view of the lever which is attached to a cable which is used to actuate a slam lock;

[0050] FIG. 34 is a cross sectional view taken substantially along line 34-34 showing the lever is a dormant position;

[0051] FIG. 34A is a view similar to FIG. 34 showing the lever in an actuating position;

[0052] FIG. 35 is a view of the lever which is utilized to actuate the slam latch which holds the seat in its inclined position with the lever in an actuatable position; and

[0053] FIG. 36 is a view similar to FIG. 35 but showing the lever in a nonactuatable position.

DETAILED DESCRIPTION OF THE INVENTION

[0054] Summarizing briefly in advance, a patient can enter the tiltable spring-biased chair 10 of the present invention when the seat and back are both positively retained in less inclined patient entry positions. The seat and back can then be released as a unit from their less inclined entry positions whereby the center of gravity of the patient in the chair will cause both the seat and back to tilt rearwardly to more inclined positions against the bias of springs and then be automatically latched in the more inclined positions from

which a patient cannot leave the chair. Also, the back itself can thereafter be tilted to even more rearwardly inclined positions. When it is desired to have the patient leave the chair, the back can be returned from its even more rearwardly inclined position to its more inclined position, and the seat and back can then be released as a unit from their more inclined positions and the patient, by merely tilting forward, will shift his center of gravity so that the seat and back return to their less inclined entry positions and are automatically latched therein so that the patient can leave the chair.

[0055] Summarizing further in advance, the improved chair of the present invention also includes an adjustable leg rest which can be inclined relative to the seat in a plurality of attitudes to suit the comfort of a patient. The leg rest is normally retained in a latched stowed position, and when it is released, an air cylinder moves it to a preset inclined position. Its effective length can also be increased to accommodate people with longer legs. Also, the improved chair includes a foldable foot rest which is movable between a stowed position to an operative position in a unique manner.

[0056] The tiltable spring-biased chair 10 of the present invention includes a frame 11 having sides 12 and 13 which are mirror images of each other. Side 12 includes vertical members 14 and 15 which are connected across their tops by member 17 and across their central portions by member 19 and across their lower ends by member 20. The connections are by screws (not shown). Side 13 consists of parts which are designated by primed numerals and such primed numerals represent the mirror image counterparts of the parts of side 12 which are represented by unprimed numerals. Therefore the parts represented by primed numerals will be described only as necessary. Wheels 21 and 21' are rotatably mounted on frame members 22 and 22', respectively. Frame member 22 is bolted across frame members 19 and 20, and frame member 22' is bolted across frame members 19' and 20'. Blocks 24 and 24' are bolted to members 14 and 14', respectively, and pivotable wheels 25 and 25', respectively, are mounted on blocks 24 and 24', respectively. Block 24 is adjustably mounted on member 14 by three bolts 26 which pass through three of the five holes in block 24 and three matching holes in member 14. If it is desired to raise the front edge 26 of seat 27, block 24 is lowered so that bolts 26 will pass through three of the holes in block 24 including at least one of the upper holes in block 24 and through the three holes in member 14. Corresponding structure (not shown) is used in conjunction with block 24' which supports wheel 25'.

[0057] The seat 27 and back 28 are mounted on frame 11 in the following manner. Cross member 29 (FIGS. 4, 5, 6, 9, 11 and 16) is pivotally mounted at its ends between frame members 20 and 20' of sides 12 and 13, respectively. Another cross member 30 (FIGS. 4, 5, 9, 11 and 16) extends between frame members 14 and 14' and is suitably secured thereto by screws. A forward end portion of seat 27 is pivotally mounted on cross member 30 by hinges 31 (FIGS. 4, 5, 9, 11, 16 and 18). The underside of seat 27 is bolted to bars 32. Bars 33 (FIGS. 4, 5, 6, 9, 10 and 11) extend out of the back 28 and are pivotally mounted at 34 on bars 32. A cross member 35 (FIGS. 5, 13, 14 and 15) has its opposite ends pivotally mounted on bars 32. A piston and cylinder member 37 has its cylinder 39 rigidly secured by an angle bracket 40 and U-bolt 41 to the center of cross member 35

(FIG. 13). The piston and cylinder member 37 is commonly known as a lockable gas spring, and it operates to maintain its piston rod 42 in the position in which it was last placed within cylinder 39. The outer end of piston rod 42 is pivotally secured to bracket 43 affixed to the center of seat back 28.

[0058] The seat 27 and back 28 can be pivoted as a unit about hinges 31 in a clockwise direction in from the less inclined entry positions of FIG. 4 to the more inclined positions of FIG. 9 against the bias of spring units 44 which are mounted in the following manner. Slats 45 are bolted to the upper ends of bars 32. An angle member 47 has its opposite end portions 49 screwed to the ends of slats 45 (FIG. 5) by screws 50. Blocks 51 are bolted to members 15 and 15'. The upper ends of spring units 44 are pivotally attached to blocks 51 at 52 by brackets 53 (FIG. 4) which are secured to units 44. The rods 54 of spring units 44 are pivotally connected to angle 47 by extending through an oversize hole in angle 47 and being pinned to the underside thereof at 55. When the seat 27 is in its less inclined position of FIG. 4, the spring 57 within spring unit 44 is expanded, and when the seat is in its more inclined position of FIG. 9, the spring 57 is compressed. Therefore, the springs 57 bias the seat to its less inclined position.

[0059] Structure is provided for latching the seat 27 in either the less inclined position of FIG. 4 or the more inclined position of FIG. 9. This structure is known as a "slam latch" or "rotary latch" structure. In this respect, a cross member 60 (FIGS. 4, 5, 6, 7, 8, 9, 10 and 11) has its opposite ends secured by brackets 61 to members 15 and 15'. A cross member 63 has its opposite ends bolted to the undersides of slats 45. An eye bolt 62 is screwed into the center of cross member 63. A slam latch 64 is bolted to the center of cross member 60. When the seat 27 is in its less inclined position of FIG. 4, the eye of eye bolt 62 is retained within the latch 65 of slam latch 64 (FIGS. 4 and 7). A second slam latch structure is provided for retaining seat 27 in the more inclined position of FIG. 9. In this respect, a slam latch 67 (FIG. 4) is mounted on the central portion of cross member 29. A U-shaped member 69 (FIG. 10) is screwed to the central portion of cross member 70 which has its ends bolted to members 32. When U-shaped member 69 is engaged in slam latch 67, seat 27 will be retained in its more inclined position (FIG. 10).

[0060] The slam latches 64 and 67 operate in the following manner. When the eye of the eye bolt 62 or the U-shaped member 69 enters latch 65 of slam latch 64, the latch 65 will pivot from the position of FIG. 8 to the position of FIG. 7 to retain the eye or the U-shaped member in locked position. A cable attachment, which will be described hereafter, is used to release each slam latch when it is desired to move the seat between its positions of FIGS. 4 and 9. The slam latches 62 and 69 are identical and are commercially obtainable products sold under the trademark EBERHARD, and the specific model is identified by number 240/241. The slam latch is disclosed in U.S. Pat. No. 5,439,260, 5,564,295 and 5,884,948 which are incorporated herein by reference. The combination of the eye bolt and the slam latch and the combination of the U-shaped member and the slam latch are considered slam latch structures. The less inclined entry position of FIG. 4 is the position in which a patient initially enters the chair and the position in which the patient leaves the chair. The position of FIG. 9 is the more inclined

position which is obtained after the patient leans back in the chair after slam latch 64 is released. The slam latch 64 is released so that the seat 27 and back 28 move as a unit from the position of FIG. 4 to the position of FIG. 9 because of the center of gravity of the patient working against spring units 44 until such time as the seat reaches the position of FIG. 9 wherein slam latch 67 is actuated to retain the seat and back in the more inclined position of FIG. 9. As will be described in greater detail hereafter, when it is desired to have the patient leave the chair, it is returned to the position of FIG. 4 by releasing slam latch 67 and as the patient tilts forward, seat 27 will pivot in a counterclockwise direction about hinge 31 to return to the less inclined position of FIG. 4 wherein slam latch 64 is actuated to retain seat 27 in the position of FIG. 4 from which the patient can leave the chair. The movement of the seat to the less inclined position is aided by springs 57.

[0061] The above described structure operates in the following manner. A patient enters the seat when the seat 27 and back 28 are in the less inclined positions of FIG. 4 and he leans against the back 28. At this time the seat is latched in position by latch 64. An attendant can then actuate lever 70 (FIGS. 2 and 33-34A) which is pivotally mounted in housing 76 secured to one of the two struts 71 having a bar 72 secured across the tops thereof. Lever 70 actuates cable 73 (FIGS. 2, 6, 7 and 33-34A) to release slam latch 64. Lever 70 is shown in the dormant position in FIG. 34 and in an actuated position FIG. 34A. The patient's center of gravity when leaning against back 28 will cause seat 27 to pivot in a clockwise direction about hinges 31 from its less inclined position of FIG. 4 to its more inclined position in FIG. 9 wherein the slam latch 67 will be engaged by U-shaped member 69 (FIG. 6) to retain the seat 27 in the position of FIG. 9.

[0062] If it is desired to pivot seat back 28 from its less inclined position of FIGS. 4 and 9 to an even more rearwardly inclined position, lever 74 (FIG. 2) which is mounted on a plate 78 secured to strut 71 and bar 72, is actuated in the same manner as lever 70 to cause cable 75 secured thereto to activate lever 77 (FIGS. 14 and 15) associated with piston and cylinder unit 39 to release its holding force, and permit the seat back 28 to pivot in a clockwise direction from its more inclined position of FIG. 9 to its even more inclined position of FIG. 11 against the bias supplied by piston and cylinder unit 39. Actually the position of FIG. 11 is its most rearward position, but it will be appreciated that the cylinder and piston arrangement 39, because of its internal mechanism can be caused to hold seat back 28 at any intermediate position between its positions of FIGS. 9 and 11. It will also be appreciated that if desired, the seat back 28 may be pivoted rearwardly against the bias provided by unit 39 from the position of FIG. 4. Thus, if desired, the seat back 28 need not be held in its position of FIG. 4 when a patient is being seated, but it can be moved independently of seat 27 to any position between its position of FIG. 4 and its most rearward position relative to members 32 shown in FIG. 11 while members 32 are in the position of FIG. 4.

[0063] Assuming that the patient is seated in the chair when it is in the position of FIG. 11, and it is desired for the patient to leave the chair, the lever 74 is actuated to cause cable 75 to release the holding effect of cylinder unit 39 so that the attendant can push on bar 72 to cause seat back 28

to pivot in a counterclockwise direction from its even more rearwardly inclined position of FIG. 11 to its more inclined position of FIG. 9. The piston and cylinder unit 39 will produce a biasing force aiding in the counterclockwise movement of back 28 from its position of FIG. 11 to its position of FIG. 9. Thereafter, the attendant actuates lever 80 (FIG. 3) mounted in housing 88 which is attached to frame member 14. Lever 80 operates in the same manner as lever 70. A cable 81 leads from lever 80 to slam latch 67 (FIG. 6) to thereby release U-shaped member 69 from slam latch 67 so that when the patient leans forward, the seat 27 will pivot about hinge 31 from its more inclined position of FIG. 9 to its less inclined position of FIG. 4 wherein slam latch 64 will receive eye bolt 62 and lock the seat 27 in its position of FIG. 4 so that the patient can leave the chair. This movement is aided by springs 57. A pin 96 is movable from the inactive position of FIG. 35 to the extended position of FIG. 36 by manipulating lever 98 to block lever 80 from pivoting downwardly to release slam latch 67 to thereby prevent springs 57 from pivoting the seat 27 counterclockwise from its latched position of FIG. 9. The blocking of lever 80 is to prevent inadvertent release of slam latch 67. Also, pin 96 can be moved from the position of FIG. 35 to the position of FIG. 36 when the lever 80 is pivoted outwardly, as shown for lever 70 in FIG. 34A, to thereby disable slam latch 67 from effecting its latching function if U-shaped member 69 engages it.

[0064] In accordance with another aspect of the present invention, an adjustable leg rest structure is provided as shown in FIGS. 17-21 and 30-32. The adjustable leg rest structure includes a main leg rest 81 having a pad on its surface. Leg rest 81 is movable from its fully stowed position of FIGS. 1 and 17 to its fully extended position of FIG. 19A, and by use of the adjustments, it can also be moved to intermediate positions of 20 and 21. A slam latch 82 is mounted on the central portion of the opposite side of cross member 30 from hinges 31, and in the stowed position of FIG. 17 it latches U-shaped member 83 (FIGS. 17 and 30) which is screwed onto the back 84 of main leg rest 81. A lever 84 (FIG. 1A), which operates in the same manner as lever 70, is secured to frame members 14' and 19', and it has a cable 85 extending outwardly therefrom and the end of the cable is secured to slam latch 82. Thus when lever 84 is actuated, slam latch 82 will release U-shaped member 83 so that the piston and cylinder air strut 87 will move leg rest 81 outwardly to an extended position. In this respect, the end of piston 89 is pivotally connected to bracket 90. The piston rod 91 has its end pivotally mounted on bracket 92 which is screwed to the underside of cross member 29. Bracket 90 is screwed to the underside of board 93 which is secured to flanges such as 106 of links 98 and 98'. Links 94 and 94' have first ends mounted on brackets 100 and 100' (FIG. 32), respectively, which are mounted on cross member 30. Brackets 100 and 100' are mirror image counterparts as are links 94 and 94'. In fact, all the linkages extending from brackets 100 and 100' are mirror image counterparts. Therefore, only a set of links extending from bracket 100 will be described, and it will be understood that there are mirror image counterparts associated with bracket 100'. One end of link 94 is pivotally mounted on bracket 100 at 102. The opposite end of link 94 is pivotally mounted on link 97 at 95. One end of link 97 is pivotally mounted on link 98 at 103 (FIG. 19B). The opposite end of link 97 is pivotally mounted on bracket 101 at 104 (FIG. 19A). Link 98 has one

end pivotally mounted on bracket **100** at **111**. A link **105** has one end pivotally mounted on link **98** at **107**, and the opposite end of link **105** is pivotally mounted on bracket **101** at **109**. A washer **96** (FIGS. **19B**, **19C** and **19D**) is mounted on a pin **110** which is mounted on link **97**. When link **94** bears against washer **96**, the outward movement of the leg rest will stop, and this determines the amount that leg rest **81** will extend. To return the leg rest **81** to its stowed position of FIGS. **3** and **17**, an attendant can bear down on it with his knee to thereby pivot it counterclockwise in FIG. **19A** against the bias of air strut **87** until U-shaped member **83** is received in slam latch **82**.

[0065] In accordance with the adjustability aspect of the leg rest, bracket **92** has three holes. In this respect, bracket **92** has holes **92a**, **92b** and **92c**. Bracket **90** has holes **90a**, **90b** and **90c**. Air strut **87** has one end pivotally mounted on bracket **90**, and its piston rod is mounted on bracket **92**. By mounting the end of the piston rod **91** in various of the holes **92a**, **92b** and **92c**, the final inclination of leg rest **81** can be adjusted. By mounting the end of cylinder **89** in various of the holes **90a**, **90b** or **90c**, the speed with which the leg rest will extend will be determined. In this respect, it will extend the fastest when it is mounted in hole **90c**. For example, if the end of the piston rod **91** is mounted in hole **92a**, leg rest **81** will be inclined to its least extent (FIG. **19A**). If the end of piston rod **91** is mounted in hole **92c**, the leg rest **81** will be inclined to its greatest extent (FIG. **21**).

[0066] In addition to the foregoing aspect of adjustability, the effective length of the main leg rest **81** can be adjusted. In this respect, a leg rest extension in the form of an elongated bar-like member **112** (FIG. **31**) is mounted on leg **116** of angle **118** (FIG. **27**), and it has a padded upper surface. Two apertured metal strips **113** (FIG. **30**) are attached to leg **116** by bolts **114** (FIG. **30**). Each strip has a plurality of apertures **115** therein. A wing screw **117** can extend through any corresponding selected hole **115** in each of strips **113** and an underlying hole in the rear **84** of leg rest **81** so as to adjust the leg rest extension **112** relative to main leg rest **81**. The position of the leg rest extension is adjusted so that a patient's heels can rest on the leg rest extension, to thereby fit patients who have legs of different lengths.

[0067] In accordance with another aspect of the present invention, an improved adjustable foot rest structure is provided as shown in FIGS. **22-29**. In FIG. **22** two foot rests **120** and **120'** are shown. The foot rest **120** is shown in its fully deployed position. The foot rest **120'** is shown in its completely stowed position. The following description will set forth the steps in moving foot rest **120'** to its fully deployed position shown by foot rest **120**. It will be appreciated that the foot rests **120** and **120'** are mirror images of each other and therefore corresponding mirror image steps for deploying foot rest **120'** are followed for deploying foot rest **120**. Foot rest **120'** consists of foot rest plates **121'** and **122'** which are hinged on their undersides by hinge **123'**. Plate **122'** is rigidly connected to padded side plate **124'** by angle member **125'**. The padded sides of side plates **124'** and **124** face each other. Initially plate **124'** is recessed alongside frame member **14'** and located between member **14'** and leg rest **81**. To move from the position of FIG. **22** to the position of FIG. **23**, foot rest plate **121'** is merely pivoted outwardly about hinge **23'** in the direction of arrow **127'**. Thereafter, the opened plates **121'** and **122'** are pivoted downwardly in the direction of arrow **129'** from the position of FIG. **23** to the

position of FIG. **24**. This can be achieved because angle **125'** (FIG. **27**) is pivotally mounted on angle **130'** by bolt **131'** which extends through hole **132'** in flange **130'** and is retained therein by nut **133'**. Angle **130'** is secured to leg **116** of angle **118** on which pad **112** is mounted. A tab **126'** extends outwardly from the rear edge of side plate **124'** for limiting the pivotal movement of side plate **124'** from its stowed position of FIG. **28** to its fully deployed position of FIG. **29**. In this respect, tab **126'** will abut the upper edge **153** of leg **116** of angle **118** when side plate **124'** reaches the position of FIG. **29** to thereby prevent further clockwise rotation. After the side plate **124'** has been pivoted to the position of FIG. **24**, the plates **121'** and **122'** are swung horizontally in the direction of arrow **135'** about the axis of bolt **137'** which extends through angle **125'** (FIG. **27**) and is received in aperture **139'** (FIGS. **27** and **29**) of plate **122'** and is retained therein by nut **140'**.

[0068] After the plates **121'** and **122'** have been swung from the position of FIG. **24** to the position of FIG. **25**, their edges **141'** and **142'** are received in the slot **143** which is located between the upper side **144** of bar **147** (FIGS. **26** and **27**) and the leg **148** of angle **118**. The corresponding edges of plates **121** and **122** are also located in slot **143**. The edge **141'** of plate **121'** abuts bar **150** which extends between member **149'** and a corresponding mirror image member **149** (FIG. **1**). A bolt **151'** extends through bars **147** and **150** and the end portion of leg **148** of angle **118** to secure the bars to the angle. A bolt which corresponds to **151'** secures the opposite ends of bars **147** and **149** to the opposite end portion of angle leg **148**. Members **149'** and **149** are nailed to the ends of bars **147** and **150**. To stow the foot rests **120** it is merely necessary to manipulate them in an order reverse to that described above.

[0069] In accordance with another aspect of the present invention the footrests **120** and **120'** are adjustable vertically downwardly from their uppermost position of FIG. **25** to a position such as shown in FIG. **31** to accommodate patients with longer legs. In this respect, the footrests **120** and **120'** are mounted on angle **118** so that when the adjustment described above relative to FIGS. **30** and **31** is effected, the footrests will be moved downwardly along with pad **112** which serves as a heel rest.

[0070] While the above-described slam latch structures are preferred, it will be appreciated that any type of latch structure which will perform the above-described holding and releasing functions can be used. In this respect, for example, spring-biased bolt type of latches which can be unlatched by a cable connection can be used. This type of latch is normally closed, and it is biased to an open position as it is engaged by another part, and it returns to a closed position to retain the other part as the latter moves past it. It will be appreciated that there are numerous other types of latch structures which will function satisfactorily.

[0071] While preferred embodiments of the present invention have been disclosed, it will be appreciated that it is not limited thereto but may be otherwise embodied within the scope of the following claims.

1. A chair comprising a frame, a seat, a front portion on said seat pivotally mounted on said frame, a rear portion on said seat, a back mounted relative to said rear portion of said seat, a spring construction effectively positioned between said seat and said frame, a first selectively actuatable latch

positioned between said seat and said frame effective to maintain said seat latched in a less inclined entry position on said frame, a second selectively actuatable latch positioned between said seat and said frame effective to maintain said seat latched in a more inclined position on said frame against the bias of said spring construction, and said back being mounted in pivotal relationship to said seat.

2. A chair as set forth in claim 1 wherein said first and second latches are slam latches.

3. A chair as set forth in claim 1 including a leg rest pivotally mounted on said frame and movable between stowed and extended positions.

4. A chair as set forth in claim 3 including a slam latch mounted on said frame for retaining said leg rest in said stowed position.

5. A chair as set forth in claim 4 including a cable coupled to said slam latch for releasing said slam latch.

6. A chair as set forth in claim 3 including a foot rest mounted on said leg rest.

7. A chair as set forth in claim 3 including a leg rest extension mounted on said leg rest.

8. A chair as set forth in claim 7 including a foot rest mounted on said leg rest extension.

9. A chair as set forth in claim 8 wherein said foot rest is movable between stowed and extended positions.

10. A chair comprising a frame, first and second sides on said frame, a seat having a front portion and a rear portion, a back pivotally mounted relative to said rear portion of said seat, a first latch structure mounted for latching engagement of said seat at a first less inclined position relative to said frame, and a second latch structure mounted for latching engagement at a second more inclined position relative to said frame.

11. A chair as set forth in claim 10 including a first cable coupled relative to said first latch structure for selective unlatching thereof, and a second cable coupled to said second latch structure for selective unlatching thereof.

12. A chair as set forth in claim 11 including a spring structure effectively mounted between said seat and said frame, said spring structure being stressed when said second latch structure is latched in said more inclined position.

13. A chair as set forth in claim 12 including a first cable coupled relative to said first latch structure for selective unlatching thereof, and a second cable coupled to said second latch structure for selective unlatching thereof.

14. A chair as set forth in claim 10 wherein said frame includes a first cross member located at a first elevation between said first and second sides of said frame and a second cross member located at a second elevation between said first and second sides of said frame with said first elevation being higher than said second elevation, and wherein said first latch structure is mounted between said seat and said first cross member, and said second latch structure is mounted between said seat and said second cross member.

15. A chair as set forth in claim 10 including a leg rest pivotally mounted on said frame.

16. A chair as set forth in claim 15 including a third latch structure on said chair for retaining said leg rest in a retracted stowed position on said frame.

17. A chair as set forth in claim 15 including an air shock coupled between said leg rest and said frame biasing said leg rest to said extended position.

18. A chair as set forth in claim 17 including a bracket coupling one end of said air shock to said frame, and a plurality of coupling positions on said bracket.

19. A chair as set forth in claim 18 including a second bracket coupling a second end of said air shock to said leg rest.

20. A chair as set forth in claim 19 including a plurality of second coupling positions on said second bracket.

21. A chair as set forth in claim 15 wherein said leg rest includes a main section, and a leg rest extension coupled to said main section.

22. A chair as set forth in claim 21 including means adjustably mounting said leg rest extension on said main leg rest.

23. A chair as set forth in claim 21 wherein said leg rest extension has two strips coupled thereto, a plurality of apertures in said two strips, and a screw extending through a selected aperture in each of said strips and into said main section.

24. A chair as set forth in claim 21 including first and second foot rests mounted on opposite ends of said leg rest extension.

25. A chair as set forth in claim 24 wherein each of said foot rests includes first and second side plates pivotally mounted on said leg rest extension.

26. A chair as set forth in claim 25 including first and second foot rest plates pivotally mounted on said first and second side plates, respectively.

27. A chair as set forth in claim 26 including first and second additional foot rest plates hingedly secured to each of said first and second foot rest plates, respectively.

28. A chair comprising a frame, a seat having a front portion pivotally mounted on said frame and movable between a less inclined position and a more inclined position, a rear portion on said seat, a back pivotally mounted proximate said rear portion of said seat, and a spring structure effectively mounted between said seat and said frame, said spring structure being stressed when said seat is in said more inclined position.

29. A chair as set forth in claim 28 including a leg rest pivotally mounted relative to said front portion of said seat.

30. A chair as set forth in claim 29 including a foot rest mounted on said leg rest.

31. A chair as set forth in claim 29 including a leg rest extension on said leg rest.

32. A chair as set forth in claim 31 including a foot rest mounted on said leg rest extension.

33. A chair comprising a frame, a seat on said frame, a front and seat on said seat, a back proximate said rear of said seat, a leg rest pivotally mounted proximate said front of said seat, and a leg rest extension on said leg rest.

34. A chair as set forth in claim 33 wherein said leg rest extension comprises an elongated bar-like member.

35. A chair as set forth in claim 34 wherein said elongated bar-like member is secured to at least one member which extends outwardly therefrom.

36. A chair as set forth in claim 35 including at least one screw which secures said at least one member to said leg rest.

37. A chair as set forth in claim 34 including at least one foot rest on said elongated bar-like member.

38. A chair as set forth in claim 37 wherein said at least one foot rest is pivotally mounted on said bar-like member.

39. A chair as set forth in claim 33 including at least one foot rest mounted on said leg rest extension.

40. A chair as set forth in claim 39 wherein said at least one foot rest includes a member which is pivotally mounted on said leg rest extension.

41. A chair as set forth in claim 40 including a plate-like member pivotally mounted on said member.

42. A chair as set forth in claim 41 including a second plate-like member pivotally mounted on said first plate-like member.

43. A chair as set forth in claim 42 including a slot on said leg rest extension for receiving edges of said plate-like member and said second plate-like member.

44. A chair as set forth in claim 43 wherein said member is a third plate-like member which extends substantially perpendicularly to said first plate-like member.

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