



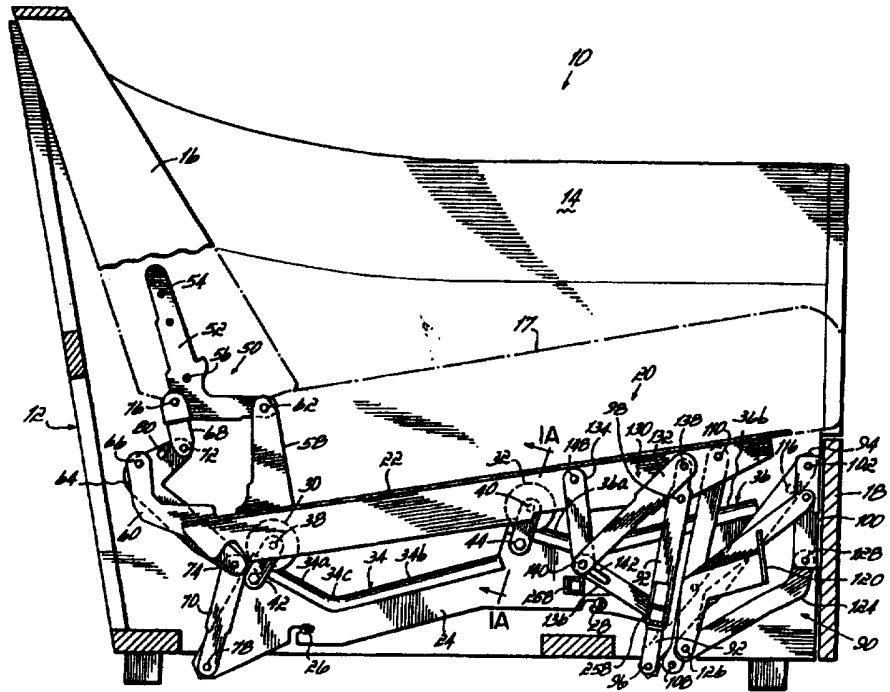
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<p>(21) International Application Number: PCT/US97/10185 (22) International Filing Date: 13 June 1997 (13.06.97) (30) Priority Data: 08/664,000 14 June 1996 (14.06.96) US (71) Applicant: L & P PROPERTY MANAGEMENT COMPANY [US/US]; 4095 Firestone Boulevard, South Gate, CA 90280 (US). (72) Inventors: HARTLINE, Mike; Route 2, Box 242, Saltillo, MS 38866 (US). WHITE, Nikki; 349 Longview Road, Pontotoc, MS 38863 (US). (74) Agents: POFFENBERGER, John, D. et al.; Wood, Herron & Evans, L.L.P., 2700 Carew Tower, Cincinnati, OH 45202 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>	

(54) Title: THREE-WAY RECLINING FURNITURE ITEM

(57) Abstract

A reclining furniture item (10) including a reclining mechanism (20) employing a roller and track system which significantly reduce the number of linkages and provide a zero or near zero wall proximity feature. The first embodiment includes a moveable seat link (22) having rollers (30, 32) mounted thereon which move along angled track sections (34, 36) formed on a stationary base member (24). These rollers (30, 32) form the major connection made between the moveable seat link (22) and the stationary base member (24). Backrest linkage (50) is also provided for allowing angling of the backrest (16) with respect to the seat (17) during reclining movement. Footrest linkage (90) is connected to the front of the mechanism for extension and retraction in moving between a fully upright and a reclined



T.V. position. A second embodiment (Figs. 4-7) of the invention utilizes a similar track and roller system except that the rollers (210, 212) are fixed and stationary and the track sections (206, 208) are formed on a seat member (202, 230). Preferably, the seat member (202, 230) is formed as a tubular seat frame having the track sections (206, 208) formed in side members thereof. Preferably, the tubular seat frame structure is adjustable (236, 238) in size to correspond to a variety of furniture sizes.

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Three-Way Reclining Furniture Item

Background of the Invention

This invention generally relates to reclining furniture and, more specifically, to a three-way reclining furniture item having a moveable seat, backrest and footrest.

5 Conventional reclining furniture items, such as chairs, sofas and sectionals, generally have either two-way or three-way mechanisms for allowing the chair to be moved between upright and reclined positions. In a two-way mechanism, the seat is fixed to the backrest as a unitary structure so that the angle therebetween
10 remains the same during reclining motion. If the piece of furniture has a three-way mechanism, the top of the backrest will angle downwardly and rearwardly relative to the seat as the piece of furniture moves from an intermediate reclined or "T.V." position to a

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fully reclined position. Likewise, the backrest will move or tilt back up as the chair moves from the fully reclined position to the T.V. position. One major problem with existing three-way reclining mechanisms has been their complexity and cost. Generally, these mechanisms comprise large numbers of linkages and pivots.

5 Understandably, the more linkages and pivot connections in a given reclining mechanism, the higher the cost of manufacture and assembly. It has also become conventional practice to design reclining mechanisms with a "zero wall proximity" ability. This refers to the ability to place the item of furniture with the top of the backrest against or very close to a wall while still allowing movement of the furniture item into both intermediate and fully reclined positions without encountering interference from the wall. Generally, the addition of this feature to a mechanism has even further complicated the typical three-way reclining mechanism. Another problem associated with typical three-way reclining mechanisms has been the noise that they produce in moving between the various chair positions. Again, this noise can be associated with the numerous moving linkages in the mechanisms.

20 There have been many attempts to incorporate rollers in reclining mechanisms in various ways to produce mechanisms allowing reclining furniture to be placed closely adjacent to a wall. For example, see U.S. Patent Nos. 3,874,724; 4,072,342; 4,364,603; and 4,531,778. Each of the mechanisms and associated

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furniture items disclosed in these patents suffers from various disadvantages. Generally stated, none of these mechanisms fully utilize the potential for a roller and track system to take the place of a significant number of linkages while retaining the ability to move a chair between three comfortable positions in a smooth manner and without interfering with a closely adjacent wall. Some rely on rollers during initial movement of the chair, such as Johnson, U.S. Patent No. 4,364,603 and some rely on rollers only in moving from the intermediate position to the fully reclined, such as Rogers, Jr., U.S. Patent No. 4,531,778. Still others, such as U.S. Patent Nos. 3,874,724 and 4,072,342 utilize rollers during the entire movement of the chair, however, these rollers are still part of rather complex mechanisms.

In view of the problems with conventional three-way reclining mechanisms, it would be desirable to simplify these mechanisms by significantly reducing the number of linkages to reduce both the costs and the noise associated with the mechanisms. At the same time, it would be advantageous to provide a mechanism which fully reclines in a smooth manner without significant effort by the seat occupant and without interfering with a closely adjacent wall.

Summary of the Invention

The present invention improves upon past three-way reclining mechanisms by incorporating a roller and track system

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which substitutes for many typical linkages associated with moving the furniture item from a fully upright position, through an intermediate or T.V. position and finally into a fully reclined position. The roller and track system associated with the mechanism of this invention includes at least one track with a first sloped section and a second sloped section. The two track sections are sloped in opposite directions with a generally angled intersection therebetween. The roller and track engage and one moves with respect to the other during movement from the upright position to the intermediate or T.V. position and during movement from the intermediate or T.V. position into the fully reclined position. During movement along the first track section, the rear of the seat angles downwardly and moves forwardly. During subsequent full recline movement along the second track section, the seat moves upwardly and forwardly. These motions allow the furniture item to be placed with the backrest in close proximity to a wall.

In a first embodiment of this invention, the track system is formed as part of the stationary base of the furniture item. In a preferred embodiment, the differently sloped track sections are formed on a base member or link which is rigidly fixed to a stationary wooden frame of the furniture item. It is contemplated, however, that in this embodiment the track system may be formed as part of the chair frame. At least one roller is connected for rotation to a seat link such that the seat link rides along the track by way of the

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roller. Preferably, two rollers and two different tracks are provided to support front and rear portions of the seat link. Backrest linkage is provided for supporting a backrest from the seat link and the base member. Also, footrest linkage is provided at the forward end of the seat link and is moveable between fully extended and fully retracted positions with the movement of the seat link. Footrest actuating linkage is provided between the seat link and the base member. The footrest actuating linkage is connected to the footrest linkage such that forward movement of the seat link during a movement into the intermediate or T.V. position actuates the footrest linkage into the fully extended position.

The operation of a furniture item constructed in accordance with the first embodiment is initiated when the user actuates a latch mechanism to release the seat link when the furniture item is in a fully upright position. Once released, the weight of the occupant causes the rollers to move down the first sloped track section to the intersection between the first and second track sections. During this movement, the footrest linkage is actuated into its fully extended position. Movement of the seat link and the attached seat in a forward direction also moves the backrest in a forward direction away from any wall which may be in close proximity. Movement of the furniture item into a fully reclined position is initiated by the seat occupant placing rearward pressure on the backrest to angle the backrest with respect to the seat and

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move the seat link and attached rollers up the second sloped track section in a forward direction. Because of the continued forward movement of the seat and backrest in this manner, the backrest still does not interfere with a wall in close proximity to the chair despite
5 being at a greater angle relative to the seat. Movement back into the intermediate position is attained by simply releasing pressure from the backrest. This causes the rollers to roll back down the second track section to the intersection between the two track sections. Movement into the fully upright position is initiated by the occupant
10 placing downward pressure on the footrest to move the footrest into a retracted position. This also moves the rollers up the first inclined track section to their initial starting points until the latch mechanism is engaged.

In the second embodiment, the track system is
15 incorporated into a seat supporting member, which may or may not be a linkage member. The rollers in this embodiment are fixed and stationary, such as by being affixed to a stationary base member or directly to a frame member of the furniture item. In the second embodiment, at least one track is provided again with two differently
20 sloped track sections. In each embodiment, the first track section is sloped downwardly in a forward direction and the second track section is sloped upwardly in a forward direction. Like the first embodiment, backrest linkage is provided between the seat member and the base member for allowing the backrest to angle with respect

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to the seat and footrest linkage is provided at the forward end of the seat member to allow a footrest to be extended and retracted.

The operation of the second embodiment is similar to the first embodiment except that the track system moves along the stationary rollers instead of vice versa as in the first embodiment. Therefore, during movement from the fully upright position to the intermediate or T.V. position, the first track section of each track associated with the seat member moves along a respective roller in a downward and forward direction while also carrying the seat. This downward and forward movement of the seat and seat member actuates the footrest linkage through appropriate actuating linkage in the manner of the first embodiment. To cause the furniture item to move into the fully reclined position, the occupant applies rearward pressure to the seat back angling it with respect to the seat and, at the same time, moving the seat member in a forward direction such that the second track section moves upward in a forward direction along a respective roller. Preferably, each mechanism of the invention includes front and rear tracks and corresponding rollers.

Another advantageous aspect of the second embodiment is that the seat member may be formed as part of a tubular frame with each of the side tube members including the front and rear tracks formed by first and second track sections as discussed above. This tubular seat frame or seat member may be formed in a plurality of, for example, two sections which are

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preferably connected together in an adjustable fashion. In addition to ease of manufacture and assembly, this construction thereby also provides for adjustment in size of the seat frame by simply adjusting the connection between the seat members.

5 Additional advantages and objectives of this invention will be recognized upon review of the following detailed description and accompanying drawings.

Brief Description of the Drawings

10 Fig. 1 is a side cross-sectional view of a schematically illustrated furniture item incorporating a reclining mechanism constructed in accordance with a first embodiment of this invention but eliminating the seat latching mechanism for clarity;

Fig. 1A is a cross-sectional view taken along line 1A-1A of Fig. 1;

15 Fig. 2 is a side elevational view of the mechanism shown in Fig. 1, eliminating the furniture item for clarity, and showing the mechanism in an intermediate or T.V. position;

Fig. 3 is a side elevational view of the mechanisms of Figs. 1 and 2 but showing the mechanism in a fully reclined position;

20 Fig. 4 is a side cross-sectional view of a schematically illustrated furniture item similar to Fig 1, but illustrating a second embodiment of the reclining mechanism;

Fig. 5 is a side elevational view of the reclining mechanism shown in Fig. 4 but eliminating the furniture item for

clarity and showing the reclining mechanism in an intermediate or T.V. position;

Fig. 6 is a side elevational view of the reclining mechanism of Fig. 5 but shown in a fully reclined position;

5 Fig. 7 is a perspective view of a tubular seat frame incorporating side track systems utilized in the reclining mechanism of the second embodiment; and

Fig. 8 is an enlarged view of the front of the mechanism of Fig. 1 including the latch mechanism.

10 **Detailed Description of the Preferred Embodiments**

Referring first to Fig. 1, an item of furniture 10 is shown and includes a stationary base frame 12 having an arm frame portion 14. Furniture item 10 further includes a moveable backrest 16 and a moveable seat 17 and footrest 18. Furniture item 10 may be a
15 reclining chair or sofa or any type of so-called action furniture which utilizes a seat, backrest and footrest moveable between upright, intermediate or T.V. and fully reclined positions. To accomplish the movement of furniture item 10 between these three positions, the furniture item 10 incorporates an improved linkage mechanism 20
20 constructed in accordance with the present invention. Only one mechanism 20 is shown and described with the understanding that furniture item 10 includes another mechanism on the other side being a mirror image of mechanism 20.

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Linkage Mechanism of the First Embodiment

A first embodiment of linkage mechanism 20 includes a moveable seat link 22 and a stationary base member or link 24. Base member 24 is rigidly affixed to chair frame 12 by suitable threaded fasteners 26, 28. A pair of rollers 30, 32 are mounted between seat link 22 and base member 24 to form a rolling connection therebetween. Specifically, rollers 30, 32 roll along a pair of tracks 34, 36 formed on stationary base member 24. Each track 34, 36 has first and second track sections 34a, 34b and 36a, 36b separated by respective generally angled intersections 34c, 36c. It will be appreciated that stationary base member 24 is shown as a separate link in this first embodiment, however, base member 24 may instead be an integral part of chair frame 12 or, more specifically, arm frame structure 14.

In the first embodiment as shown in Figs. 1 and 1A, rollers 30, 32 are connected for rotation with respect to seat link 22 by respective roller mounts 38, 40. Respective guide members 42, 44 extend from pivot mounts 38, 40 and include rolling followers (only one follower 46 being shown in Fig. 1A) at opposite ends thereof. It will therefore be appreciated that rollers 30, 32 respectively engage and roll along an upper surface of the respective tracks 34, 36 while rolling followers 46 may engage and roll along the respective lower surfaces of tracks 34, 36. As shown, the followers 46 do not normally contact base member 24 since their

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main function is to keep the seat 17 from being lifted from furniture item 10.

Linkage mechanism 20 further includes backrest linkage 50 generally connected between backrest 16, seat link 22 and base member 24. Backrest linkage 50 supports the backrest frame 16 for pivotal movement relative to seat link 22 and an attached seat 17. Backrest linkage 50 includes a backrest link 52 rigidly affixed to backrest frame 16 by suitable fasteners 54, 56. Many different configurations for backrest linkage 50 may be chosen and utilized in linkage mechanism 20 of the present invention, however, the presently contemplated linkage includes a pair of support members 58, 60 rigidly affixed to a rear end of seat link 22. An upper end of support link 58 is connected to backrest link 52 by a pivot connection 62. An upper end of support link 60 is connected to a backrest actuating link 64 by a pivot connection 66. Backrest actuating link is part of further actuating and supporting linkage including upper and lower links 68, 70 connected by respective pivot connections 72, 74 at opposite ends of actuating link 64. Upper actuating link 68 is also connected to backrest link 52 by a pivot connection 76 and lower actuating link 70 is also connected to base member 24 by a lower pivot connection 78 to complete the connection between backrest frame 16, seat link 22 and base member 24 or frame 12. Backrest actuating link 64 further includes

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a stop stud 80 for limiting reclining motion of backrest frame 16 in a manner to be described.

Footrest linkage 90 is suspended from the front of seat link 22 as perhaps best shown in Figs. 2 and 3. Footrest linkage 90
5 comprises conventional scissor-type linkage which is only representative of the various types of footrest actuating mechanisms which may be employed in the present invention. Footrest linkage 90 comprises a rear footrest link 92 and a front footrest link 94
10 connected together at a pivot connection 96. Rear footrest link 92 is further connected to seat link 22 at a pivot connection 98 and front footrest link 94 is further connected to a footrest support link 100 at a pivot connection 102. Footrest linkage 90 further comprises footrest support links 104, 106 connected together at a pivot
15 connection 108. Rear footrest support link 104 is further connected to seat link 22 at a pivot connection 110 and front footrest support link 106 is further connected to footrest link 100 at a pivot connection 112.

The pairs of footrest links 92, 94 and 104, 106 are pivotally connected together at a pivot connection 114 between links
20 94 and 104. Stop studs 116, 118 are provided for respectively providing stops for footrest linkage 90 in the retracted position as shown in Fig. 1 and the extended position as shown in Fig. 2. In this regard, stop stud 116 engages footrest link 100 in the retracted position and stop stud 118 engages front footrest link 94 in the

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extended position. A legrest support 120 is also provided and pivotally connected to front footrest support link 106 at a pivot connection 122 and actuated into position by a connecting link 124 attached to legrest support link 120 at a pivot connection 126 and to footrest link 100 at a pivot connection 128.

Footrest actuating linkage 130 is provided and generally connected between seat link 22, base member 24 and footrest linkage 90 for actuating footrest linkage 90 into an extended position in going from the fully upright position shown in Fig. 1 to the intermediate or T.V. position shown in Fig. 2. Specifically, footrest actuating linkage 130 comprises link members 132, 134, 136 connected between seat link 22, base member 24 and rear footrest link 92. Link member 132 is connected by a pivot connection 138 to rear footrest link 92 and connected to link members 134, 136 at a pivot connection 140. Pivot connection 140 is directly connected to one end of each of link members 132 and 134 and connected to a slot 142 in link member 136 by a pin 144. Pin 144 essentially allows movement of the ends of link members 132 and 134 with respect to link member 136 during actuation of footrest linkage 90. A lower end of link member 136 is connected to base member 24 by a pivot connection 146 and an upper end of link member 134 is connected to seat link 22 by a pivot connection 148.

Linkage Mechanism of the Second Embodiment

Figs. 4-7 illustrate a second embodiment of the present invention. Fig. 4 shows a reclining furniture item 10' which again may be a chair, sofa, sectional or the like and which generally comprises a stationary frame structure 12 including an arm frame portion 14 and a backrest 16 which is moveable with respect to a seat (see Fig. 1). The furniture item 10' further includes an extendable and retractable footrest 18. The footrest and backrest linkage associated with furniture item 10' is the same as that described above in connection with the first embodiment and therefore like numbers have been shown in Figs. 4-6. It will be noted, however, that the seat supporting member 202 in this embodiment requires a front plate 203 affixed thereto as shown to provide connection points for links 92 and 104. The description of backrest linkage 50, footrest linkage 90 and footrest actuating linkage 130 found above with reference to Figs. 1-3 may be referred to and will therefore not be repeated here.

The main difference between the first and second embodiments lies in the roller and track system. In the second embodiment, a moveable seat member 202 is provided as well as a stationary base member 204 which may be rigidly affixed to arm frame portion 14 as in the first embodiment. In the second embodiment, however, seat member 202 includes a pair of tracks 206, 208 each including first and second sloped track sections

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206a, 206b and 208a, 208b each separated by respective generally angled intersections 206c, 208c. Rollers 210, 212 are mounted for rotation on stationary base member 204 by respective roller mounts 214, 216. Like the first embodiment, each roller 210, 212 includes
5 a respective guide member 218, 220. Roller followers 222, 224 are mounted for rotation at the upper ends of each guide member 218, 220. It will therefore be appreciated that rollers 210, 212 roll along lower surfaces of tracks 206, 208 while roller followers 222, 224 travel along corresponding upper surfaces of seat member 202
10 during movement between the fully upright, intermediate and fully reclined positions to be described below. Also like the first embodiment, followers 222, 224 may, but do not have to, contact the upper surface of seat member 202. Their main function is to prevent lifting of the seat.

15 As shown in Fig. 7, seat member 202, which forms part of reclining mechanism 200 on each side of furniture item 10' is preferably formed for adjustable connection to another seat member 230 which is a mirror image of seat member 202 for use in connection with another reclining mechanism on the opposite side of
20 furniture item 10'. As mentioned above, these mechanisms are also mirror images of each other and therefore the full description of each mechanism is not necessary. The adjustable connection made between seat member 202, 230 is preferably formed through telescopic connections 232, 234. This type of connection is

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5 preferred because seat members 202, 230 are formed from steel tubular members which may be easily bent to the required shape and with the necessary angled track sections described above. Each adjustable connection 232, 234 may be formed with respective
5 telescopic portions 236, 238 of seat members 202, 230 connected by way of a pin 242 extending through one of a series of aligned holes 240 extending through both telescopic portions 236, 238. Of course, other adjustable connections may be used which allow seat members 202, 230 to be adjusted with respect to each other to
10 correspond in size to the particular furniture item 10' utilizing mechanism 200 (Fig. 4).

Seat Actuating Mechanism

Fig. 8 illustrates a seat actuating mechanism 250 which is the presently preferred manner of actuating each of the linkage mechanisms 20, 200 described hereinabove. It will be appreciated
15 that other types of conventional actuating or latching mechanisms may be substituted for mechanism 250. Although mechanism 250 is specifically shown and will be described in connection with linkage mechanism 20, the same actuating mechanism 250 is utilized and
20 mounted to the same components in mechanism 200.

Latch or mechanism 250 comprises a hook latch 252 which engages a pin 254 when footrest linkage 90 is in the retracted position shown in Fig. 8. This corresponds to furniture item 10 (Fig. 1) being in a fully upright position. Pin 254 is attached to a

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mounting bracket 256 which, in turn, is attached to a mounting tube 258. Tube 258 is secured to rear footrest link 92 by a bracket 260. The opposite end of tube 258 is secured to the corresponding rear footrest link of the linkage mechanism (not shown) on the opposite side of the furniture item. Hook latch 252 is attached to a mounting bracket 262 at a pivot connection 264 and is normally biased downward by a torsion spring 266 connected between hook latch 252 and bracket 262. Bracket 262 is mounted to a tube 268 connected to base member 24 and to the corresponding base member of the linkage mechanism (not shown) located on the opposite side of the furniture item. A cable 270 forming part of a conventional cable assembly 272 is attached to a pin 274 at the upper end of hook latch 252. A conventional operating handle (not shown) is mounted on the side of the furniture item and is operative to pull cable 270 thereby pivoting hook latch 252 upwardly or counter-clockwise about pivot connection 264 as shown in phantom to release engagement with pin 254. This allows footrest linkage 90 to extend to the position shown in Fig. 2 as will be described below. A stop pin 276 is provided on hook latch 252 and contacts bracket 262 to limit upward movement of hook latch 252.

When hook latch 252 is subsequently released by the seat occupant, it is biased downwardly to the position shown in solid in Fig. 8. When the seat occupant then pushes the footrest and footrest linkage 90 into the retracted position shown in Fig. 8, pin

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254 engages cam surface 252a moving hook latch 252 upwardly until pin 254 moves behind the lower end 252b thereof as shown.

At this point, latch 252 is biased downwardly into the latched position by spring 266.

5 **Operation**

Referring again to Fig. 1, furniture item 10 is in an initial fully upright position with seat actuating mechanism 250 latched in place to prevent reclining motion. Rollers 30, 32 are positioned at the upper ends of the first sloped track sections 34a, 36a. When seat actuating mechanism 250 is released as described above, the weight of the seat occupant forces rollers 30, 32 and the attached seat link 22 to move downwardly and forwardly until rollers 30, 32 reach the respective intersections 34c, 36c of track sections 34a, 34b and 36a, 36b. During this same forward and upward movement, seat link 22 will rotate footrest actuating linkage 130 so as to extend footrest linkage 90. Specifically, link member 132 will pull rearwardly on pivot connection 138 thereby rotating rear footrest link 92 counter-clockwise about its pivot connection 98 to seat link 22 until stop stud 118 is engaged with front footrest link 94 as shown in Fig. 2. To move furniture item 10 into a fully reclined position, the seat occupant simply places rearward pressure on the seat back 16 (Fig. 1). This moves seat link 22 in a forward direction as rollers 30, 32 roll upwardly along track sections 34b, 36b. To move mechanism 20 back into the intermediate position shown in

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Fig. 2, the seat occupant simply releases pressure from the backrest 16 (Fig. 1). This allows rollers 30, 32 to roll back down track sections 34b, 36b to angled intersections 34c, 36c. To move mechanism 20 back into the fully upright position shown in Fig. 1, 5 the seat occupant presses down on the footrest 18 to retract footrest linkage 90 and force rollers 30, 32 up track sections 34a, 36a until latch mechanism 250 engages.

The operation of the second embodiment shown in Figs. 4-6 is very similar to the operation of the first embodiment. The 10 difference is that the track sections are moving along stationary rollers instead of vice versa. Thus, when seat actuating mechanism 250 is released by the seat occupant, seat member 202 will move downwardly and forwardly as track sections 206a, 208a move along stationary rollers 210, 212 until intersections 206c, 208c reach 15 rollers 210, 212, as shown in Fig. 5. Like the first embodiment, to move from the intermediate or T.V. position, as shown in Fig. 5, to the fully reclined position shown in Fig. 6, the seat occupant places rearward pressure on the seat back (Fig. 4). This forces track sections 206b, 208b to move upwardly along rollers 210, 212 until 20 stop stud 80 contacts link 68 as shown in Fig. 6. Movement back into the intermediate or T.V. position and into the fully upright position is initiated and accomplished in the same manner as described above with respect to the first embodiment.

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It will be appreciated that many modifications and substitutions may be made for the specific detailed components described herein. For example, the footrest and backrest linkage assemblies described herein are essentially conventional ones and may be modified in many different manners while still retaining the spirit and scope of the inventive concepts which pertain mainly to the track and roller systems disclosed and claimed herein. Thus, while a detailed description of various embodiments of this invention has been provided, Applicant intends to be bound only by the scope of the claims appended hereto.

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WHAT IS CLAIMED IS:

1. A three way reclining mechanism for moving an item of reclining furniture between fully upright, intermediate reclined and fully reclined positions, the mechanism comprising:

5 a stationary base member;

a seat supporting member;

backrest linkage connected to a rear end of said seat supporting member and including a pivoting backrest link for attachment to a backrest and operable to pivot with respect to said seat supporting member;

10

a footrest support operatively connected to a forward end of said seat supporting member to allow extension and retraction of said footrest support; and,

15

a roller and track system operatively connected between said stationary base member and said seat supporting member to allow relative forward and rearward movement therebetween, said roller and track system including at least one roller engaging a track and said track including first and second differently sloped sections separated by a generally angled intersection, wherein said roller is disposed at an end portion of the first sloped track section in the fully upright position, at said intersection in the intermediate reclined position and at an end portion of the second sloped track section in the fully reclined position.

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2. The mechanism of claim 1 wherein said roller and track system further comprises two of said rollers and two of said tracks, said rollers and said tracks being respectively engaged with each other at front and rear locations on said seat supporting member and said base member.

5

3. The mechanism of claim 1 wherein said track is disposed on said base member and said roller is mounted for rotation to said seat supporting member.

4. The mechanism of claim 3 wherein said first track section slopes downwardly in a forward direction and said second track section slopes upwardly in a forward direction.

10

5. The mechanism of claim 4 wherein said base member is a base link adapted for attachment to frame structure of the furniture item and said track is formed on an upper edge of said base member.

15

6. The mechanism of claim 4 wherein said roller and track system further comprises two of said rollers and two of said tracks, said rollers and said tracks being respectively engaged with each other at front and rear locations on said seat supporting member and said base member.

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7. The mechanism of claim 1 wherein said roller is part of a roller assembly including a roller follower for moving along an opposite side of said track with respect to said roller.

5 8. The mechanism of claim 1 wherein said track is disposed on said seat supporting member and said roller is mounted for rotation to said base member.

9. The mechanism of claim 8 wherein said first track section slopes downwardly in a forward direction and said second track section slopes upwardly in a forward direction.

10 10. The mechanism of claim 9 wherein said base member is a base link adapted for attachment to frame structure of the furniture item and said track is formed on a lower edge of said seat supporting member.

15 11. The mechanism of claim 9 wherein said roller and track system further comprises two of said rollers and two of said tracks, said rollers and said tracks being respectively engaged with each other at front and rear locations on said seat supporting member and said base member.

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12. The mechanism of claim 8 wherein said roller is part of a roller assembly including a roller follower for moving along an opposite side of said track with respect to said roller.

13. The mechanism of claim 1 wherein said seat supporting member is formed as a portion of a tubular seat frame structure.

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14. The mechanism of claim 13 wherein said tubular seat frame structure is formed from a plurality tubular members with adjustable connections therebetween to allow size adjustment corresponding to differently sized furniture items.

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15. A reclining furniture item movable between fully upright, intermediate reclined and fully reclined positions comprising:

a) a stationary base member;

b) a backrest, a seat and a footrest connected for

5 movement with respect to each other by a pair of reclining mechanisms, each reclining mechanism including:

i) a seat supporting member connected to said seat;

10 ii) backrest linkage connected to and to a rear end of said seat supporting member and including a pivoting backrest link connected to said backrest and operable to allow pivoting of said backrest with respect to said seat;

15 iii) a footrest support operatively connected to a forward end of said seat supporting member and connected to said footrest to allow extension and retraction of said footrest with respect to said seat; and,

20 iv) a roller and track system operatively connected between said stationary base member and said seat supporting member to allow relative forward and rearward movement therebetween, said roller and track system including at least one roller engaging a track and said track including first and second differently sloped sections separated by a generally angled intersection, wherein said roller is disposed at an end portion of the first sloped track section in the fully upright position, at said

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intersection in the intermediate reclined position and at an end
portion of the second sloped track section in the fully reclined
position.

5 16. The furniture item of claim 15 wherein said roller and
track system further comprises two of said rollers and two of said
tracks, said rollers and said tracks being respectively engaged with
each other at front and rear locations on said seat supporting
member and said base member.

10 17. The furniture item of claim 15 wherein said track is
disposed on said base member and said roller is mounted for rotation
to said seat supporting member.

18. The furniture item of claim 17 wherein said first track
section slopes downwardly in a forward direction and said second
track section slopes upwardly in a forward direction.

15 19. The furniture item of claim 18 wherein said base
member is a base link attached to frame structure of the furniture
item and said track is formed on an upper edge of said base member.

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20. The furniture item of claim 18 wherein said roller and track system further comprises two of said rollers and two of said tracks, said rollers and said tracks being respectively engaged with each other at front and rear locations on said seat supporting member and said base member.

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21. The furniture item of claim 15 wherein said roller is part of a roller assembly including a roller follower for moving along an opposite side of said track with respect to said roller.

22. The furniture item of claim 15 wherein said track is disposed on said seat supporting member and said roller is mounted for rotation to said base member.

10

23. The furniture item of claim 22 wherein said first track section slopes downwardly in a forward direction and said second track section slopes upwardly in a forward direction.

24. The furniture item of claim 23 wherein said base member is a base link attached to frame structure of the furniture item and said track is formed on a lower edge of said seat supporting member.

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25 The furniture item of claim 23 wherein said roller and track system further comprises two of said rollers and two of said tracks, said rollers and said tracks being respectively engaged with each other at front and rear locations on said seat supporting member and said base member.

5

26. The furniture item of claim 22 wherein said roller is part of a roller assembly including a roller follower for moving along an opposite side of said track with respect to said roller.

27. The mechanism of claim 15 wherein said seat supporting member is formed as a portion of a tubular seat frame structure.

10

28. The mechanism of claim 27 wherein said tubular seat frame structure is formed from a plurality tubular members with adjustable connections therebetween to allow size adjustment corresponding to differently sized furniture items.

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29. A reclining furniture item movable between fully upright, intermediate reclined and fully reclined positions comprising:

a) a stationary base member;

b) a backrest, a seat and a footrest connected for

5 movement with respect to each other by a pair of reclining mechanisms, each reclining mechanism including:

i) a tubular seat supporting member connected to said seat;

10 ii) backrest linkage connected to and to a rear end of said seat supporting member and including a pivoting backrest link connected to said backrest and operable to allow pivoting of said backrest with respect to said seat;

15 iii) a footrest support operatively connected to a forward end of said seat supporting member and connected to said footrest to allow extension and retraction of said footrest with respect to said seat;

iv) at least one roller connected for rotation to said base member; and

20 v) a track formed on said tubular seat supporting member and mounted on said roller, said track including first and second differently sloped sections separated by a generally angled intersection, wherein said roller is disposed at an end portion of the first sloped track section in the fully upright position, at said intersection in the intermediate reclined position and at an end

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portion of the second sloped track section in the fully reclined position.

5 30. The mechanism of claim 29 wherein said first track section slopes downwardly in a forward direction and said second track section slopes upwardly in a forward direction.

31. The mechanism of claim 30 wherein said base member is a base link attached to frame structure of said furniture item.

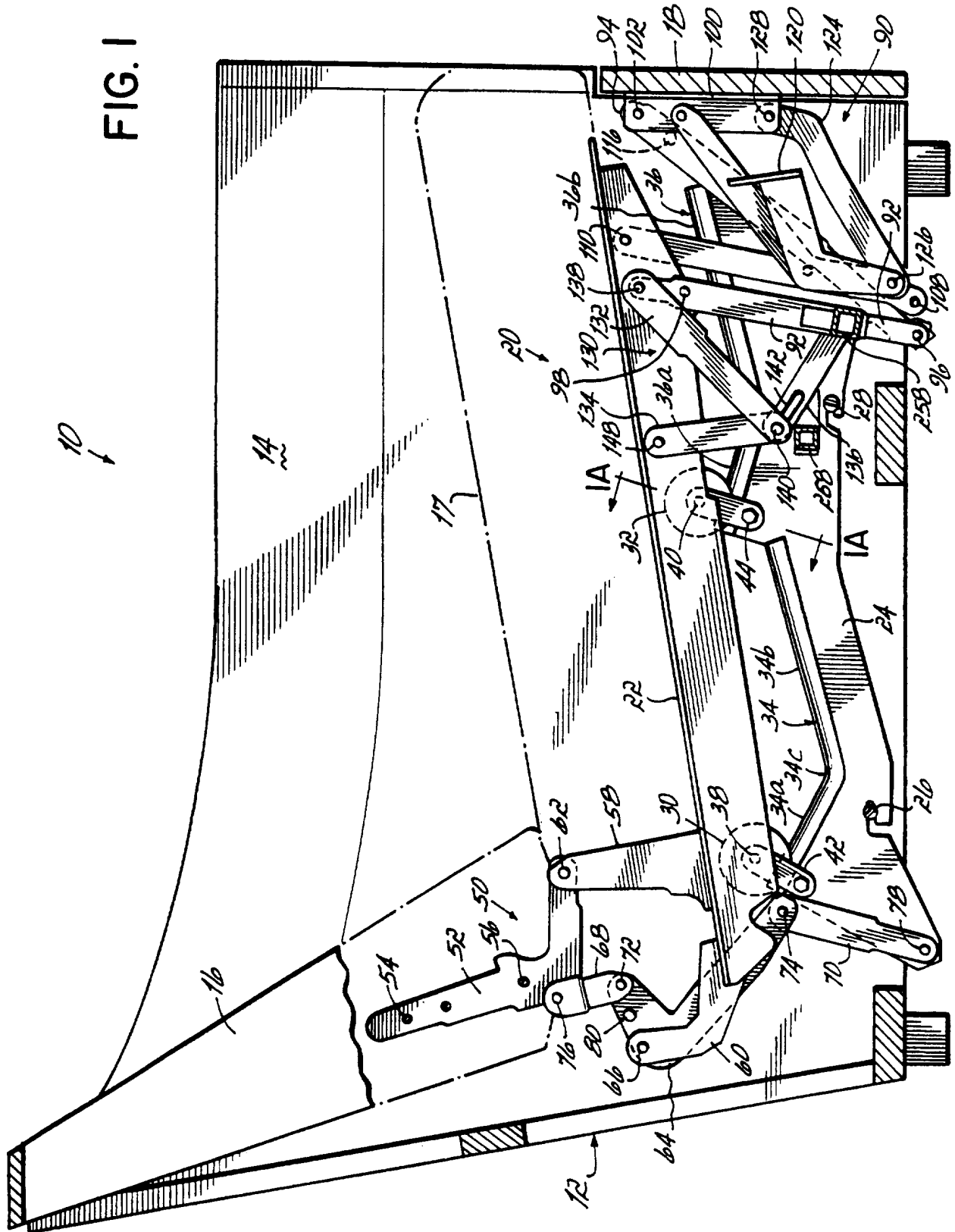
10 32. The mechanism of claim 30 wherein said mechanism further comprises two of said rollers mounted to said base member two of said tracks formed on said tubular seat supporting member, said rollers and said tracks being respectively engaged with each other at front and rear locations on said tubular seat supporting member and said base member.

15 33. The mechanism of claim 29 wherein said roller is part of a roller assembly including a roller follower for moving along an opposite side of said track with respect to said roller.

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34. The mechanism of claim 29 wherein said tubular seat supporting member is formed from a plurality tubular members with adjustable connections therebetween to allow size adjustment corresponding to differently sized furniture items.

FIG. 1



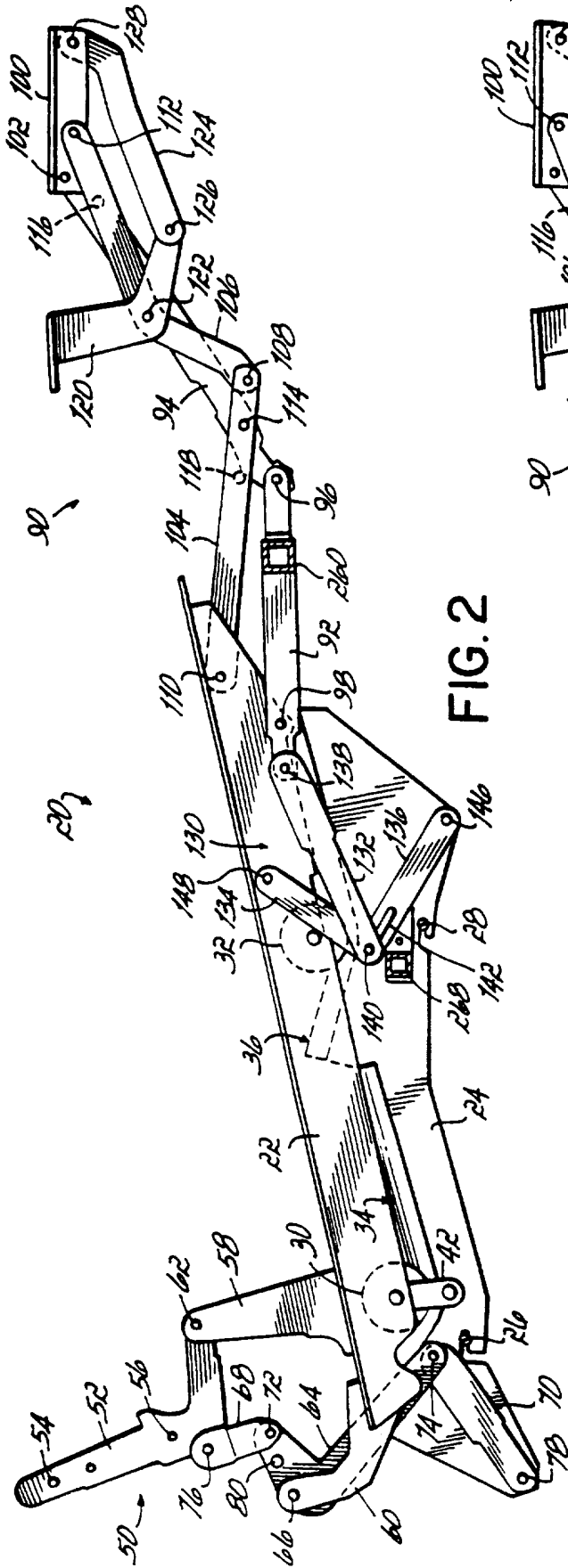


FIG. 2

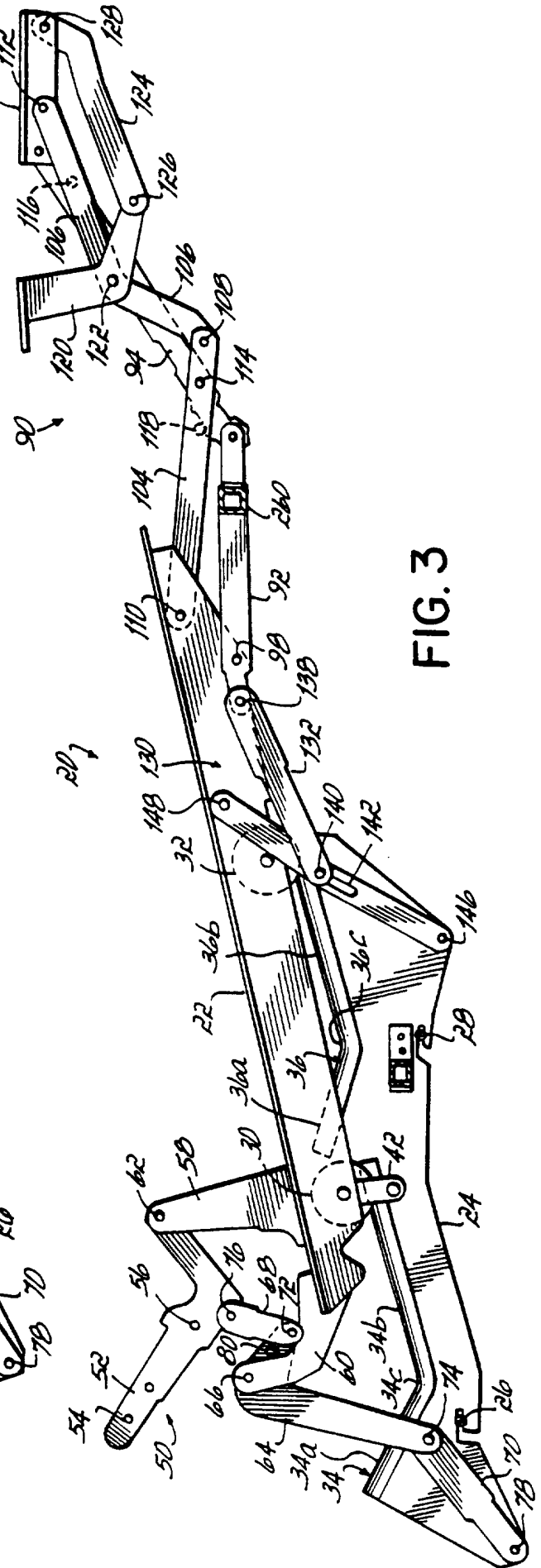


FIG. 3

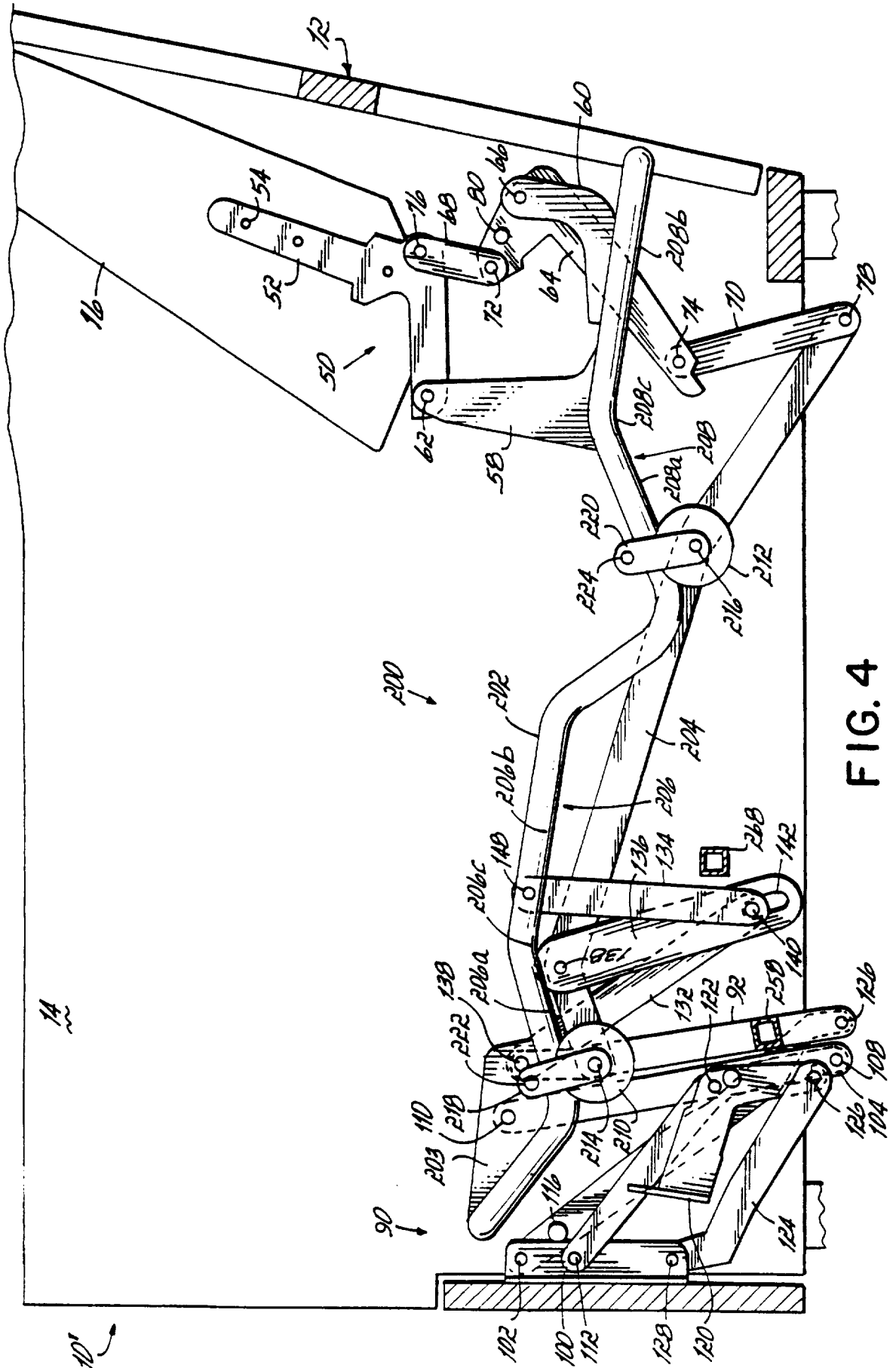


FIG. 4

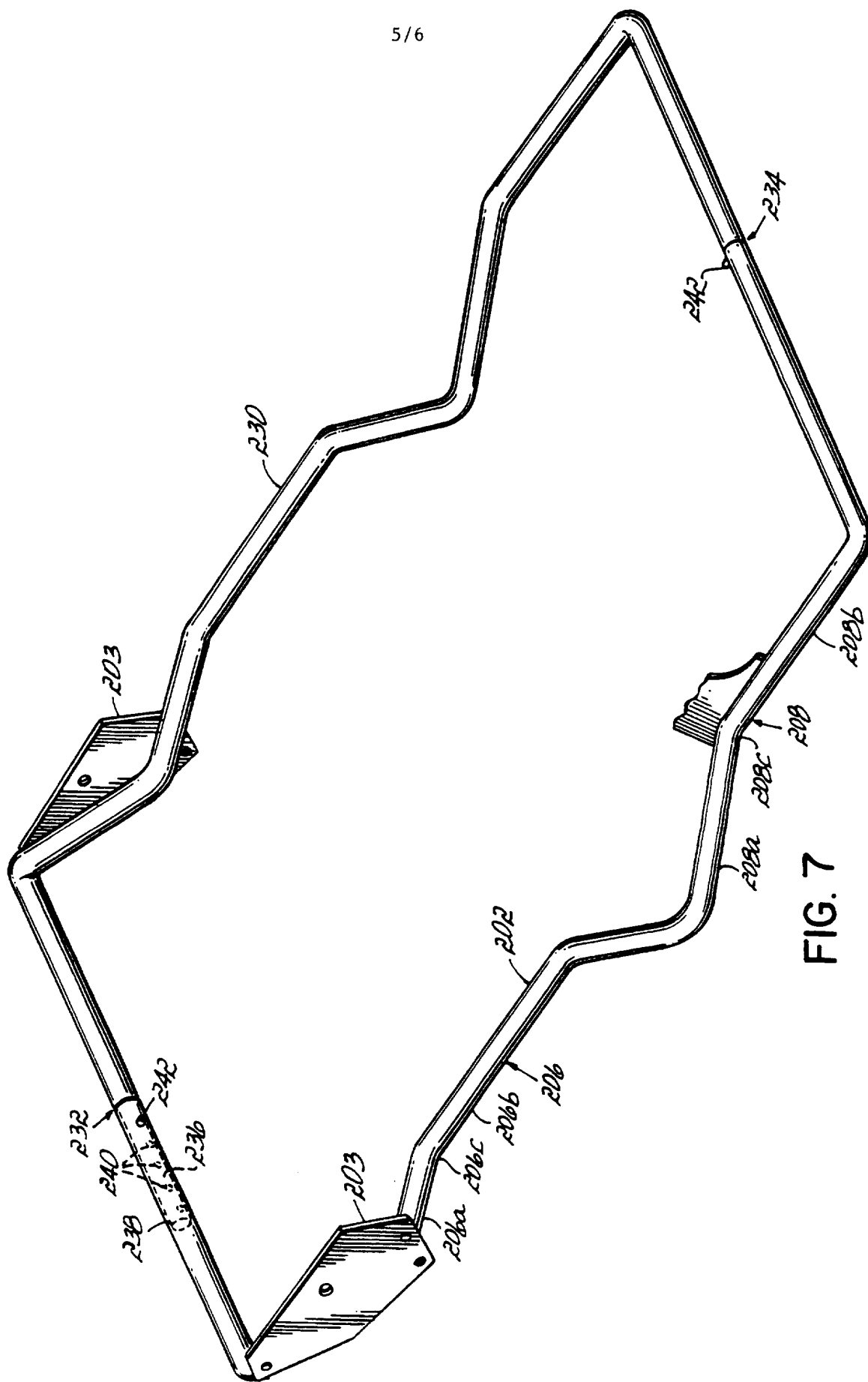


FIG. 7

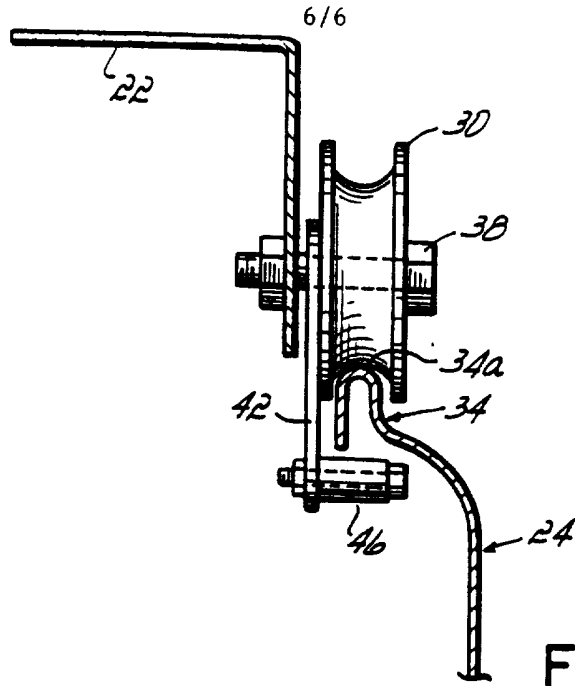


FIG. 1A

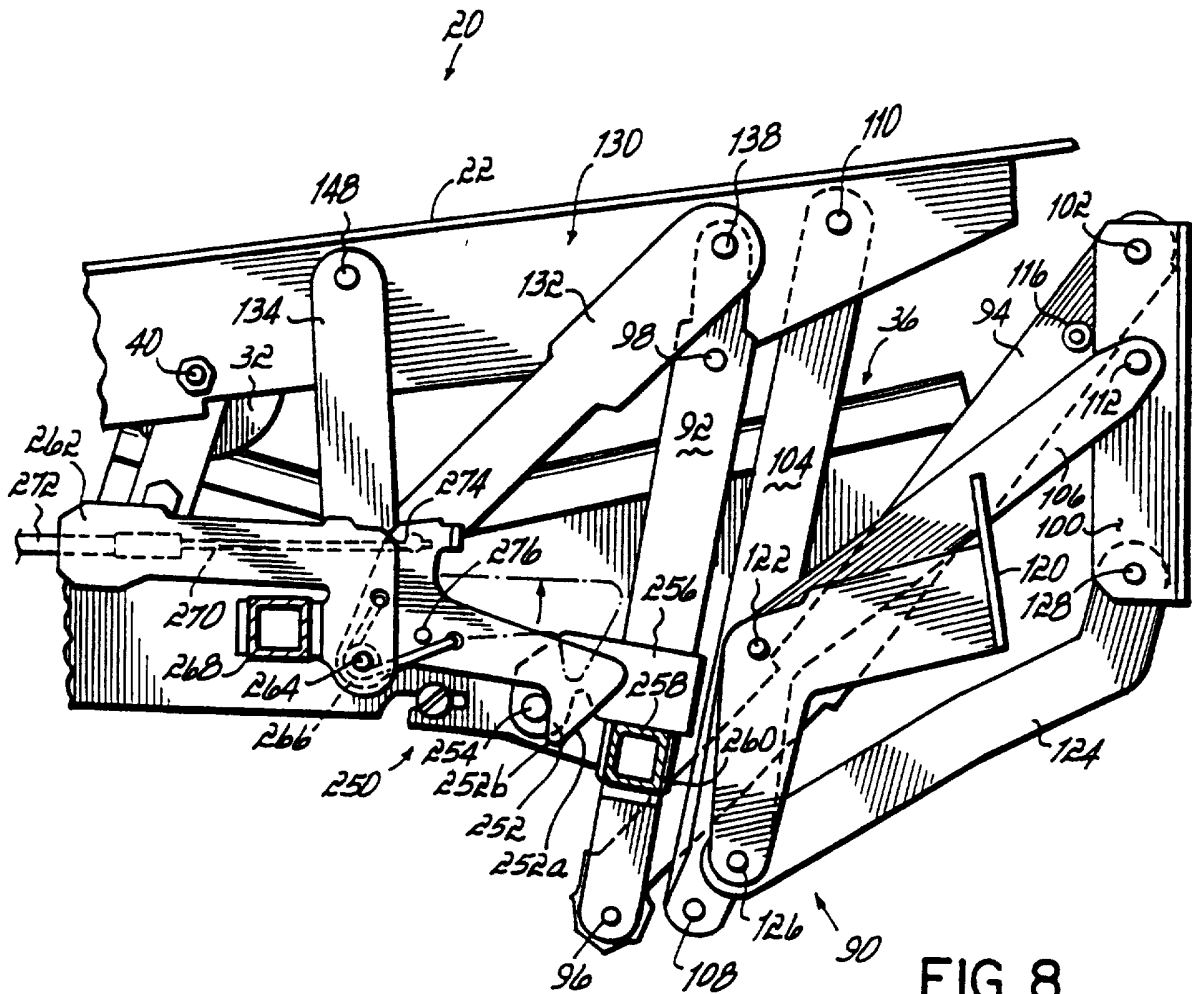


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/10185

A CLASSIFICATION OF SUBJECT MATTER
 IPC(6) :A47C 1/035
 US CL :297/85, 68, 84, 452.2, 452.4
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 297/85, 68, 84, 452.2, 452.4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

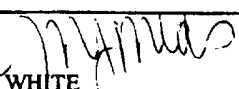
C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3,121,590 A (SCHLIEPHACKE) 18 February 1964 (18/02/64), See entire document.	1-34
X	US 3,856,346 A (HERMAN) 24 DECEMBER 1974 (24/12/74), See entire document.	1-34
X	US 5,147,108 A (LaPOINTE) 15 September 1992 (15/09/92), See entire document.	1-34
X	US 5,570,927 A (LaPOINTE ET AL) 05 November 1996 (05/11/96), See entire document.	1-34

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 18 AUGUST 1997	Date of mailing of the international search report 05 SEP 1997
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