Dec. 18, 1951 A. LORENZ 2,578,708

RECLINING ARTICLE OF FURNITURE

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FIG. 2

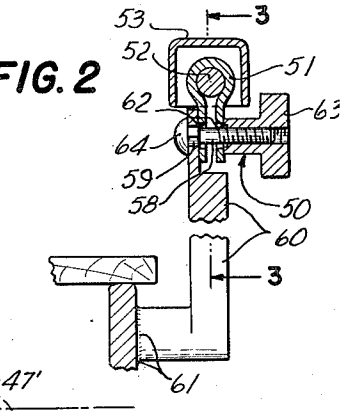


FIG. 1

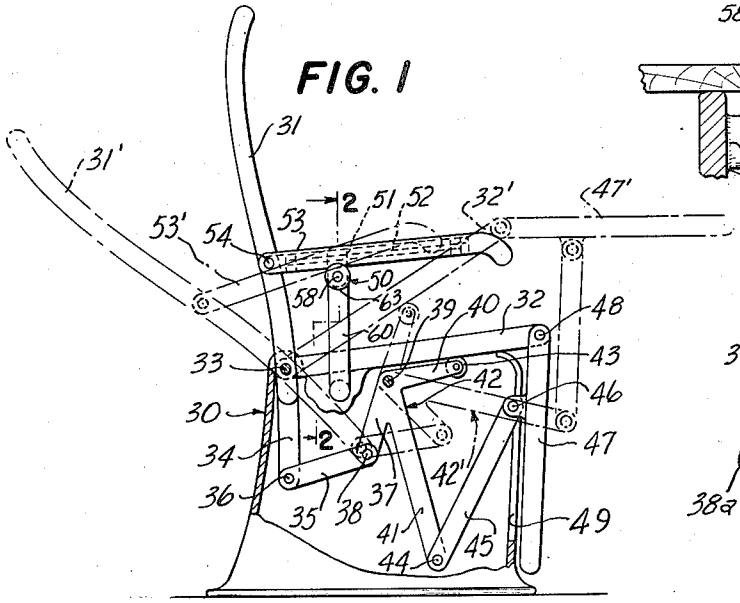


FIG. 4

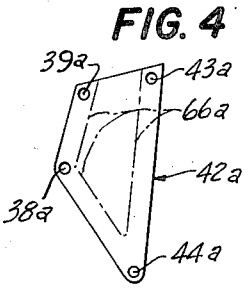


FIG. 3

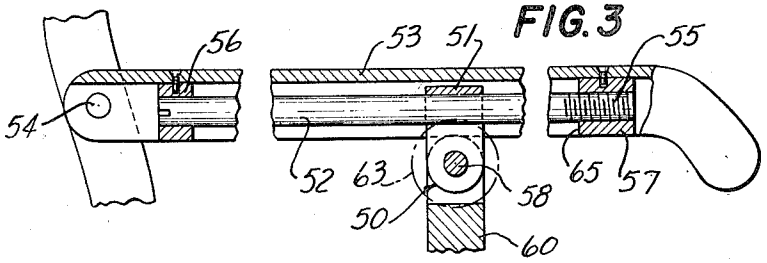


FIG. 5

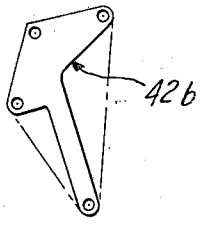
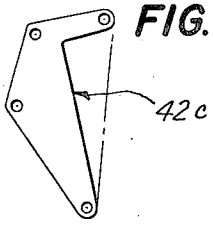


FIG. 6



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FIG. 7

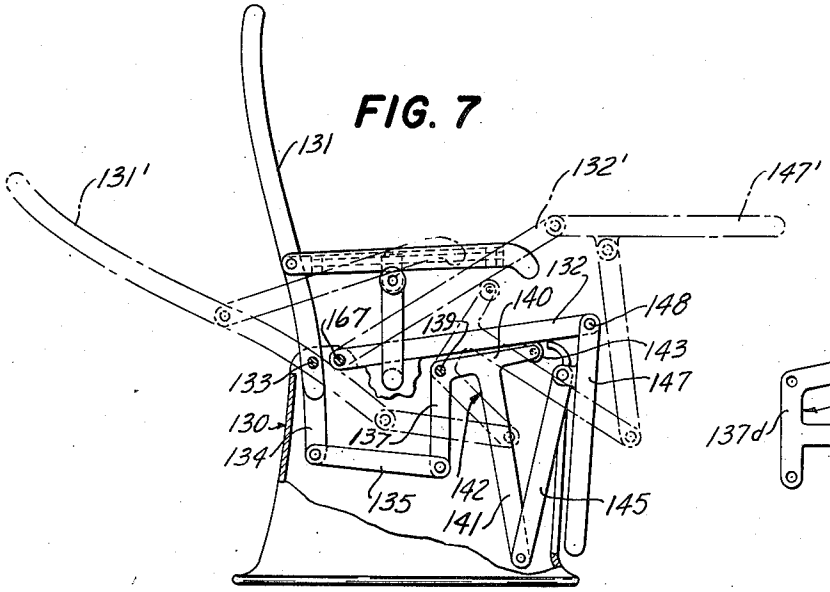


FIG. 8

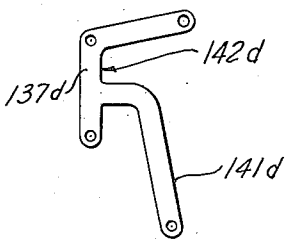


FIG. 9

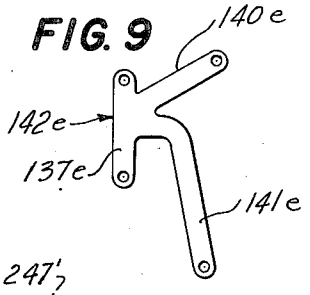
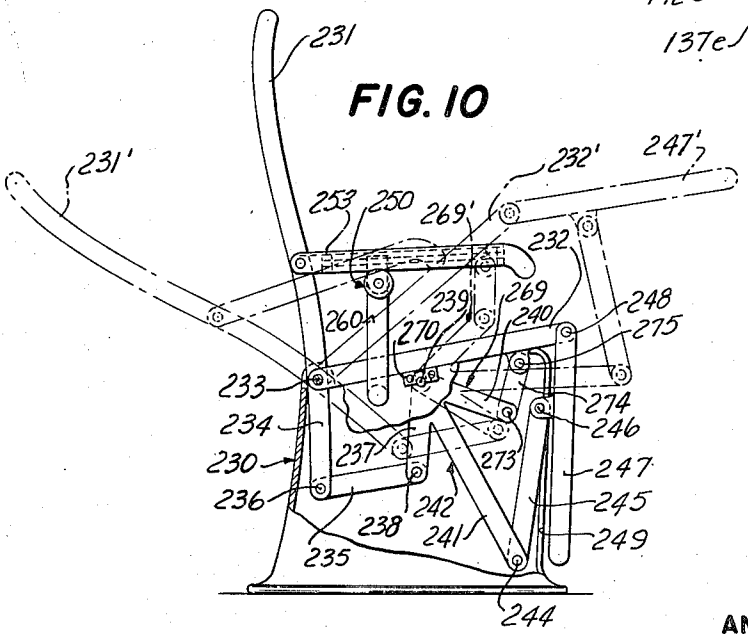


FIG. 10



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FIG. 11

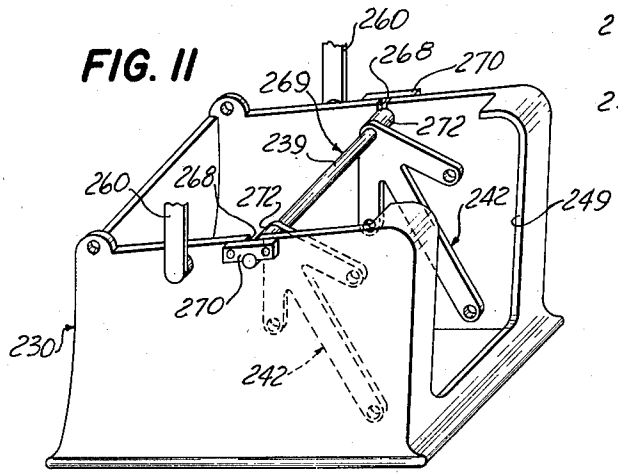


FIG. 12

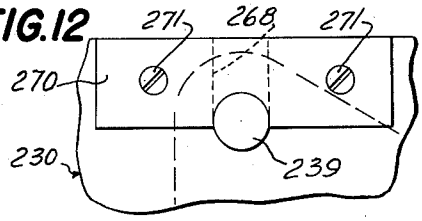


FIG. 13

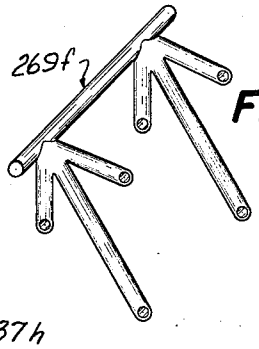


FIG. 14

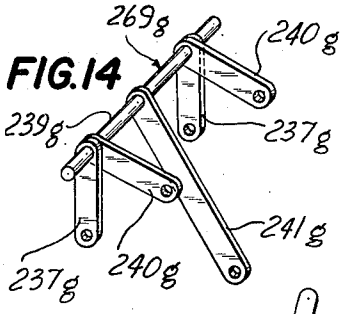


FIG. 15

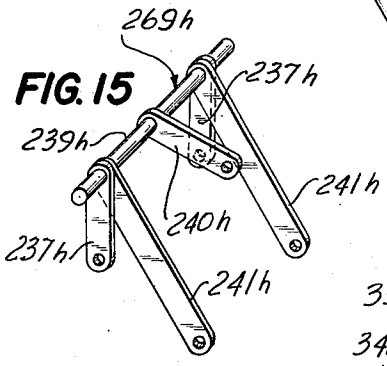


FIG. 17

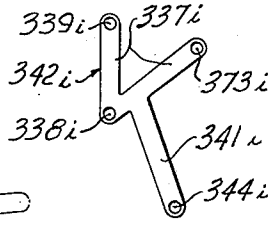


FIG. 16

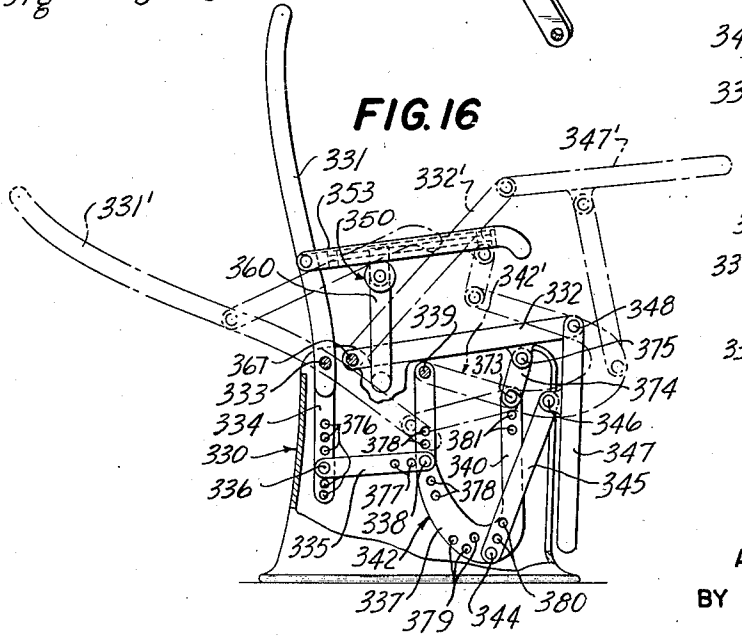
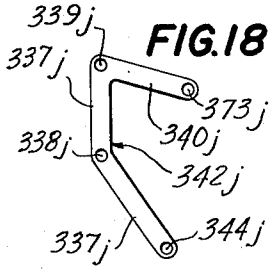


FIG. 18



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FIG. 19

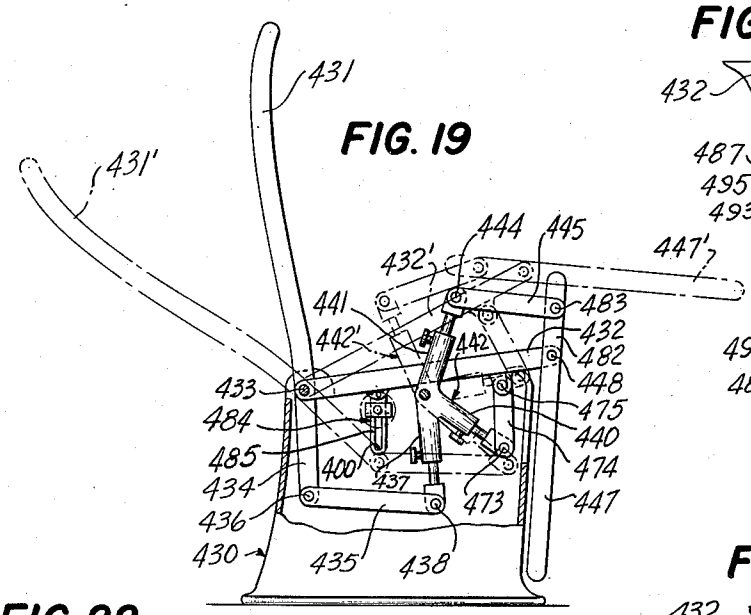


FIG. 20

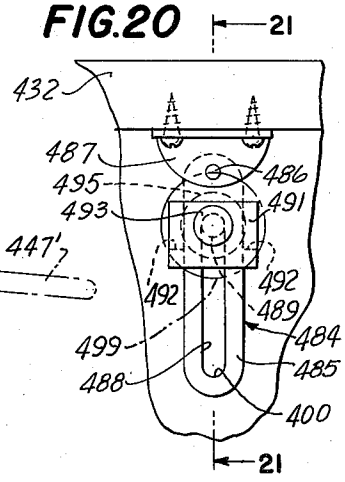


FIG. 21

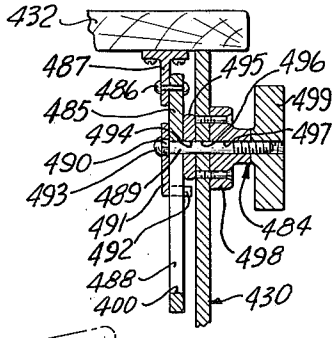


FIG. 22

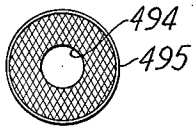
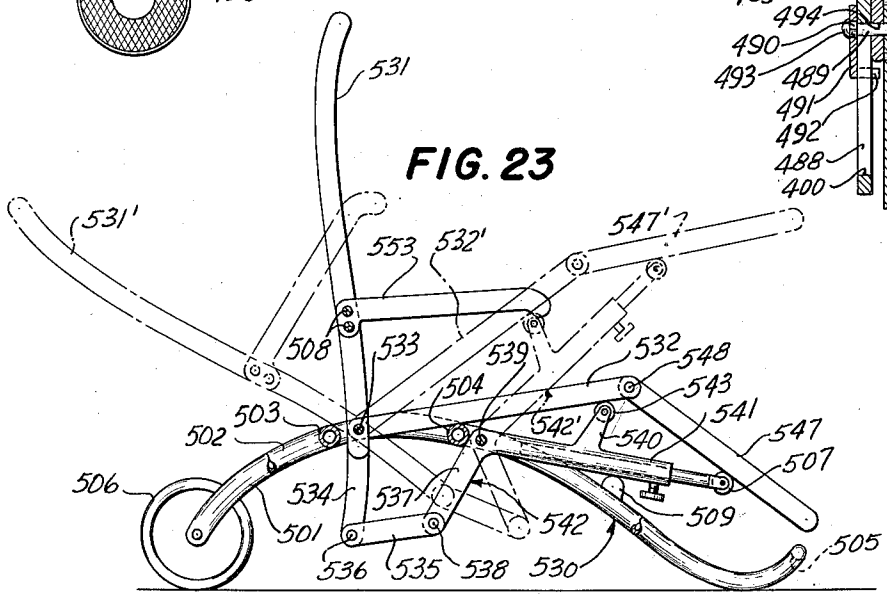


FIG. 23



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FIG.27

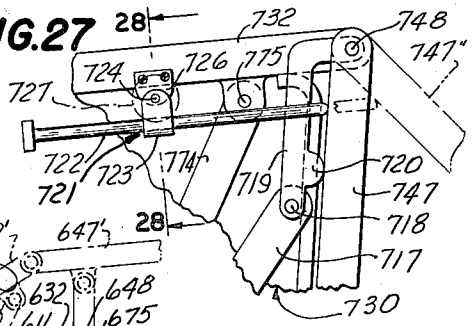


FIG.24

FIG.25

FIG.28

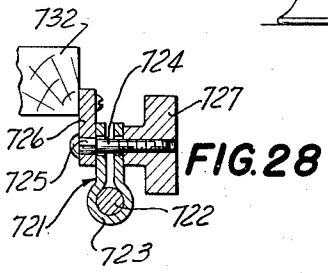


FIG.29

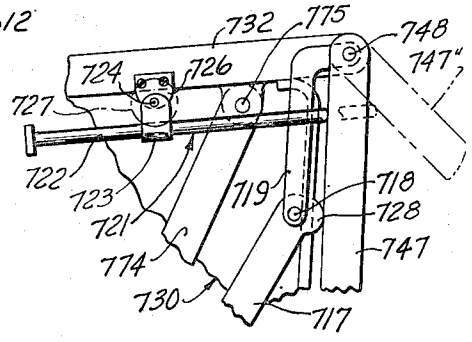
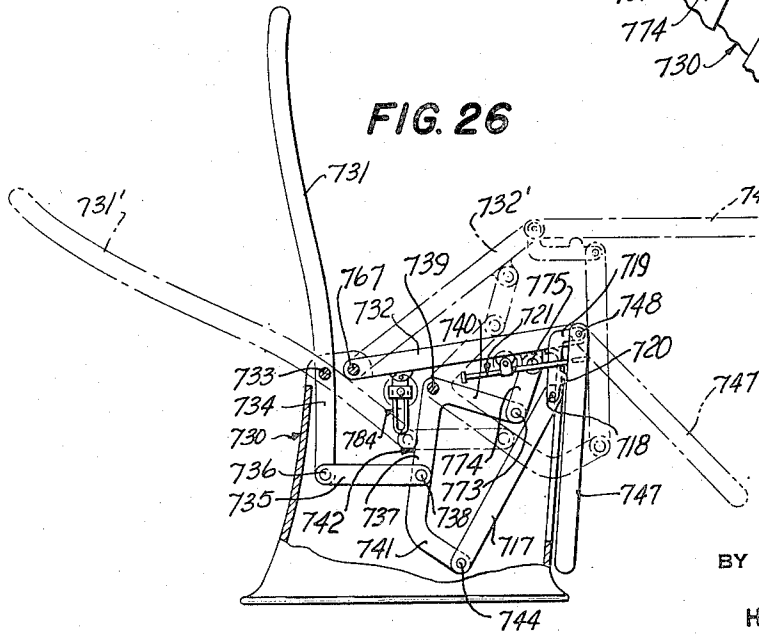


FIG. 26



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Patented Dec. 18, 1951

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UNITED STATES PATENT OFFICE

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RECLINING ARTICLE OF FURNITURE

Anton Lorenz, Buffalo, N. Y.

Application February 26, 1946, Serial No. 650,247

22 Claims. (Cl. 155—106)

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The present invention relates to articles of furniture, and more particularly to a reclining article of furniture, wherein the seat and the back-rest are swingably mounted on a support, and wherein a leg-rest is swingably mounted on the seat.

An object of the present invention is to provide an article of furniture of above described type with a mechanism, simple in construction, for controlling the movements of the seat and the leg-rest in dependence on movements of the back-rest.

Another object of the present invention is to improve on the construction of articles of furniture of above described type as now ordinarily made.

With the above and other objects of the invention in view, the invention consists in the novel construction, arrangement and combination of various devices, elements and parts, as set forth in the claims hereof, certain embodiments of the same being described in the specification and being illustrated in the accompanying drawings forming part of this specification, wherein:

Fig. 1 is a side elevational view of a reclining chair according to the invention, a portion of the side wall of the support being broken away,

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1,

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2,

Fig. 4 is an elevational view of another embodiment of a controlling member, which may be used instead of the controlling member of the chair shown in Fig. 1,

Fig. 5 is an elevational view of a further embodiment of a controlling member which may be substituted for the controlling member of the chair shown in Fig. 1,

Fig. 6 is an elevational view of another embodiment of a controlling member, which may be used in the chair shown in Fig. 1,

Fig. 7 is a side elevational view of another embodiment of a chair according to the invention, a portion of the side wall of the support being broken away,

Fig. 8 is an elevational view of another embodiment of a controlling member, which may be substituted for the controlling member of the chair shown in Fig. 7,

Fig. 9 is an elevational view of a further embodiment of a controlling member which may be used in the chair shown in Fig. 7,

Fig. 10 is a side elevational view of another

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embodiment of a reclining chair according to the invention, a portion of the side wall of the support being broken away,

Fig. 11 is a perspective view of the support of the chair shown in Fig. 10, the controlling unit of the chair being mounted in said support,

Fig. 12 is a fragmentary elevational view illustrating a safety device for holding the controlling unit of the chair shown in Figs. 10 and 11 in its place,

Fig. 13 is a perspective view of a different embodiment of a controlling unit, which may be used in the chair shown in Fig. 10,

Fig. 14 is a perspective view of another embodiment of a controlling unit which may be substituted for the controlling unit of the chair shown in Fig. 10,

Fig. 15 is a perspective view of another embodiment of a controlling unit, which may be used in the chair shown in Fig. 10,

Fig. 16 is a side elevational view of another embodiment of a reclining chair according to the invention, a portion of the side wall of the support being broken away,

Fig. 17 is an elevational view of another embodiment of a controlling member which may be substituted for the controlling member of the chair shown in Fig. 16,

Fig. 18 is an elevational view of a further embodiment of a controlling member, which may be used in the chair shown in Fig. 16,

Fig. 19 is a side elevational view of a further embodiment of a reclining chair according to the invention, a portion of the side wall of the support being broken away,

Fig. 20 is an elevational view of the locking device of the chair shown in Fig. 19,

Fig. 21 is a sectional view of the locking device taken on line 21—21 of Fig. 20,

Fig. 22 is an elevational view of a detail of the locking device shown in Figs. 20 and 21,

Fig. 23 is a side elevational view of a lounget according to the invention, a portion of the side frame of the support being broken away,

Fig. 24 is a side elevational view of another embodiment of a reclining chair according to the invention,

Fig. 25 is a view of a detail of the chair shown in Fig. 24, taken on line 25—25 of Fig. 24,

Fig. 26 is a side elevational view of another embodiment of a reclining chair according to the invention, a portion of the side wall of the support being broken away,

Fig. 27 is a fragmentary side elevational view of the front portion of the chair shown in Fig. 26,

illustrating the holding device of the chair in an enlarged scale,

Fig. 28 is a sectional view of the holding device shown in Fig. 27 taken on line 28—28 of Fig. 27, and

Fig. 29 is an elevational view of a different embodiment of the controlling mechanism for the leg-rest which may be used in the chair shown in Fig. 26.

Referring now to Fig. 1, 30 generally indicates a casing-like support. The back-rest 31 and the seat 32 are coaxially pivoted to said support 30 at 33. The back-rest 31 has a downward extension 34 substantially arranged in the center of the chair. The rear end of a connecting link 35 is pivoted to said downward extension 34 of the back-rest 31 at 36, and the front end of said connecting link 35 is pivoted to the lower end of a controlling link 37 at 38. The upper end of said controlling link 37 is swingably mounted on a transverse rod 39 carried by the support 30. One end of a first controlling arm 40 is rigidly connected with the controlling link 37 adjacent its swingable mounting 39, so that said first controlling arm 40 positively participates in the movements of the controlling link 37. Likewise, one end of a second controlling arm 41 is rigidly connected with the controlling link 37 adjacent its swingable mounting 39 for positive participation in the movements of the controlling link. According to the embodiment shown in Fig. 1 the controlling link 37, the first controlling arm 40, and the second controlling arm 41 form a controlling member generally indicated by 42, which consists of an integral piece of material. If desired, however, the controlling link 37, the first controlling arm 40, and the second controlling arm 41 could be made of separate pieces of material, which are rigidly connected with each other in any suitable manner.

The first controlling arm 40 is provided with a controlling surface in the shape of a rotatable roller 43 for displaceable engagement with the lower surface of the seat 32.

The lower end of the second controlling arm 41 is pivotally connected at 44 with one end of a controlling bar 45, the other end of which is pivoted at 46 to a leg-rest 47 swingably mounted on the front portion of the seat 32 at 48. The front wall of the support 30 is provided with a slot 49 for the passage of said controlling bar 45 and the second controlling arm 41 during movements thereof.

When the occupant of the chair leans the weight of his body against the back-rest 31, the latter may be swung about its pivot 33 into a reclined position, for example the extreme reclined position 31'. Said swinging movement of the back-rest 31 causes a corresponding swinging movement of the controlling member 42 into the position 42' through the medium of the connecting link 35 connecting the downward extension 34 of the back-rest with said controlling member 42. During said swinging movement of the controlling member 42 into the position 42', the roller 43 of the controlling arm 40 rolls along the lower surface of the seat 32 which is brought into the position 32'. Furthermore, during said movement of the controlling member 42 into the position 42', the leg-rest 47 is swung into the position 47' through the medium of the controlling bar 45 connecting the leg-rest 47 with the second controlling arm 41 of the controlling member 42. When the movable members of the chair are in the reclined position 31', 32', 47' shown in dash and dot lines, and the occupant of the chair leans the weight of his body forward and/or exerts with his legs a slight pressure on the legs, the movable members of the chair will be returned into the sitting position shown in full lines through the positive control of the mechanism described above. Thus, as will be readily understood, the controlling element 42 operatively connected with the seat 32 and the leg-rest 47 controls the movements of said seat and said leg-rest in dependence on movements of the back-rest 31.

The movable members of the chair may be held in any desired position by means of a locking device generally indicated by 50. As best shown in Figs. 1–3, said locking device 50 includes a clamping sleeve 51 slideaby engaged with a rod 52 attached to an arm-rest 53 swingably mounted on the back-rest 31 at 54. The threaded end 55 of the rod 52 passing through a bore of a block 56 secured to the arm-rest 53 is threaded into a threaded bore of another block 57 secured to the arm-rest 53. A bolt 58 having a head 64 resting against a surface of a member 60 rigidly and immovably connected at 61 (for example by welding) with a side wall of the support 30 and having a square portion 59 engaged with a corresponding square aperture of said members 60 is engaged with bores 62 of the clamping sleeve 51, so that the latter may swing about said bolt 58 when a locking knob 63 screwed on the threaded end of the bolt 58 is loosened. Thus, when said locking knob 63 is loosened, the clamping sleeve 51 and the rod 52 form cooperating sliding means for guiding the arm-rest 53, so that the latter may be brought into the position 53', for example, when the back-rest 31 is brought into the reclined position 31'. When, however, the locking knob 63 is tightened on the bolt 58 prevented from rotation by its square portion 59, the head 64 of the bolt is pressed against the surface of the member 60 and the clamping sleeve 51 is tightly pressed on the rod 52, so that the arm-rest 53 and the other movable members of the chair connected with said arm-rest are held in a predetermined position.

The sitting position of the movable members of the chair, which is shown in full lines in Fig. 1, is limited by the upper edge of the support 30 on which the seat 32 comes to a rest. The extreme reclined position of the movable members of the chair, which is shown in dash and dot lines in Fig. 1, is limited by an abutment of the clamping sleeve 51 against the surface 65 of the block 57 secured to the arm-rest 53 (see Fig. 3).

Fig. 4 illustrates a different embodiment of a controlling member 42*a* which may be used in the chair shown in Fig. 1 instead of the controlling member 42. According to Fig. 4 the controlling member 42*a* is in the shape of a plate having a bore 38*a* for a pivotal connection with the connecting link, having a bore 39*a* for engagement with the transverse rod, having a bore 43*a* for receiving the shaft carrying the roller, and having a bore 44*a* for pivotal connection with the controlling bar.

Furthermore, a recess may be cut along the dash and dot lines 66*a* into the plate 42*a* shown in Fig. 4, whereby another embodiment of a controlling member for use in the chair shown in Fig. 1 is obtained.

Fig. 5 illustrates another embodiment of a plate-like controlling member 42*b*, which may be used instead of the controlling member 42

of the chair shown in Fig. 1. The controlling member 42b shown in Fig. 5 may be obtained by cutting two recesses into the plate 42a shown in Fig. 4. The full plate is indicated in Fig. 5 by dash and dot lines.

Fig. 6 illustrates a further embodiment of a plate-like controlling member 42c, which may be substituted for the controlling member 42 shown in Fig. 1. The controlling member 42c shown in Fig. 6 may be obtained by cutting a recess into a plate of the shape shown in Fig. 4. The full plate is indicated in Fig. 6 by dash and dot lines.

Fig. 7 illustrates a further embodiment of a reclining chair according to the invention. According to said Fig. 7 the back-rest 131 is pivoted to the support 130 at 133, and the rear portion of the seat 132 is pivoted to the support 130 at 167 at a point spaced from the pivotal connection 133 between the back-rest 131 and the support 130. The remaining mechanism of the chair shown in Fig. 7 is substantially the same as the mechanism of the chair shown in Fig. 1 with the exception, that the second controlling arm 141 is rigidly connected with an intermediate point of the first controlling arm 140. 134 indicates the downward extension of the back-rest 131, 135 is the connecting link, 137 is the controlling link of the controlling member 142 swingably mounted on the support 130 at 139. The first controlling arm 140 carries the roller 143 for displaceable engagement with the seat 132. 145 is the controlling bar connecting the second controlling arm 141 with the leg-rest 147 swingably mounted on the seat 132 at 148.

When the back-rest 131 is swung into the extreme reclined position 131', the seat 132 and the leg-rest 147 are brought into the reclined positions 132' and 147' respectively, by means of the controlling mechanism described in detail in connection with Fig. 1.

Fig. 8 illustrates a different embodiment of a controlling member 142d, which may be substituted for the controlling member 142 of the chair shown in Fig. 7. According to Fig. 8, the second controlling arm 141d is rigidly connected with an intermediate point of the controlling link 137d.

Fig. 9 illustrates a further embodiment of a controlling member 142e, which may be substituted for the controlling member 142 of the chair shown in Fig. 7. According to Fig. 9, the first controlling arm 140e and the second controlling arm 141e are rigidly connected with intermediate points of the controlling link 137e.

According to the embodiment of a reclining chair shown in Fig. 10 the back-rest 231 and the seat 232 are coaxially pivoted to the support 230 at 233. On each side of the chair one end of a connecting link 235 is pivoted to the downward extension 234 of the back-rest 232 at 236. The other end of each connecting link 235 is pivoted at 238 to a controlling link 237 forming a part of a controlling member 242 including the first controlling arm 240 and the second controlling arm 241. As best shown in Fig. 11, both controlling members 242 are rigidly connected with a transverse rod 239 rotatably arranged in recesses 268 of the side walls of the support 230. The two controlling members 242 and the transverse rod 239 rigidly connected with each other form a controlling unit generally indicated by 269. When the parts of the chair are assembled, said controlling unit 269 may be readily inserted into the recesses 268 from above. The controlling unit 269 is held in its position by means of safety blocks 270 attached to the side walls of the support 230 by screws 271 as best shown in Fig. 12. Collars 272 mounted on the transverse rod 239 as shown in Fig. 11 prevent the controlling unit 269 from axial displacement.

As best shown in Fig. 10, the first controlling arm 240 of each controlling member 242 is pivoted at 273 to one end of a controlling rod 274, the other end of which is pivoted at 275 to the seat 232. Furthermore, the second controlling arm 241 of each controlling member 242 is pivoted at 244 to one end of a controlling bar 245, the other end of which is pivoted at 246 to a leg-rest 247 swingably mounted on the seat 232 at 248. The front wall of the support 230 is provided with a slot 249 for the passage of both controlling bars 245 and second controlling arms 241.

When the back-rest 231 is swung into the extreme reclined position 231', the controlling unit 269 is swung into the position 269' by means of the two connecting links 235. Said swinging movement of the controlling unit 269 causes a lifting of the seat 232 into the position 232' by means of the two controlling rods 274 and a displacement of the leg-rest 247 into the position 247' by means of the two controlling bars 245.

The movable members of the chair may be held in any desired position by means of the locking device 250, which is arranged on the member 260 and is of the same construction as the locking device 50 described above in connection with Figs. 1–3. The sitting position of the movable members of the chair is limited by an abutment of the seat 232 against the upper edge of the support 230, and the extreme reclined position of the movable members of the chair is limited by an element of the locking device 250 in cooperation with a member of the arm-rest 253 as described above in connection with Figs. 1–3.

Fig. 13 illustrates a different embodiment of a guiding unit 269f, which may be substituted for the guiding unit 269 of the chair shown in Figs. 10 and 11. According to Fig. 13, the guiding unit 269f is made of an integral piece of material.

Fig. 14 illustrates a further embodiment of a guiding unit 269g, which may be substituted for the guiding unit 269 of the chair shown in Figs. 10 and 11. According to Fig. 14 two controlling links 237g and two first controlling arms 240g are rigidly connected with the rod 239g. Furthermore, a single second controlling arm 241g is rigidly connected with said rod 249g substantially at the center thereof. Of course, if the guiding unit 269g shown in Fig. 14 is used, there will be only a single controlling bar for connecting same with the leg-rest.

Fig. 15 illustrates a further embodiment of a controlling unit 269h, which may be substituted for the controlling unit 269 of the chair shown in Figs. 10 and 11. According to Fig. 15, two controlling links 237h and two second controlling arms 241h are rigidly connected with the rod 239h. Furthermore, a single first controlling arm 240h is rigidly connected with said rod 239h substantially at the center thereof. Of course, if the controlling unit 269h shown in Fig. 15 is used, there will be only a single controlling rod connecting the first controlling arm 240h with the seat.

According to the embodiment of a chair shown in Fig. 16 the back-rest 331 pivoted to the sup-

port 330 at the point 333 has a downward extension 334 substantially in the center of the chair. The rear portion of the seat 332 is pivoted to the support 330 at 367 at a point spaced on the pivotal connection 333 between the back-rest 331 and the support 330. The upper end of a controlling link 337 being in the form of a bent link is swingably mounted on the support 330 at 339. One end of a connecting link 335 is pivotally connected with the controlling link 337 by means of a pin 338, and the other end of said connecting link 335 is pivotally connected with the downward extension 34 of the back-rest 331 at 336. The lower end of a controlling bar 345 is pivotally connected with said bent controlling link by means of a pin 344. The other end of said controlling bar 345 is pivoted at 346 to the leg-rest 347 swingably mounted on the seat 332 at 348. A controlling arm 340 integral with or rigidly connected with the bent controlling link 377 is pivotally connected with one end of a controlling rod 374 by means of a pin 373. The other end of said controlling rod 374 is pivoted to the seat 332 at 375. When the backrest 331 is swung into the extreme reclined position 331', the controlling element 342 formed by the controlling link 337 and the controlling arm 340 is swung into the position 342'. Said swinging movement of the controlling element 342 causes a lifting of the seat 332 into the position 332' by means of the controlling rod 374 and a displacement of the leg-rest 347 into the position 347' by means of the controlling bar 345.

The movable members of the chair may be held in any desired position by means of the locking device 350 which is arranged on the member 360 and is of the same construction as the locking device 50 described above in connection with Figs. 1–3. The sitting position of the movable members of the chair, which is shown in full lines in Fig. 16, is limited by an abutment of the seat 332 on the upper edge of the support 330. The extreme reclined position of the movable members of the chair shown in dash and dot lines in Fig. 16 is limited by a member of the locking device 350 in cooperation with a member of the arm-rest 353 as described above in connection with Figs. 1–3.

According to Fig. 16 the downward extension 334 of the back-rest is provided with a series of holes 376 for selective engagement with the pin 336. Likewise, the connecting link 335 and the controlling link 337 are provided with series of holes 377 and 378 respectively for selective engagement with the pin 338. Moreover, the controlling link 337 and the controlling bar are provided with a series of holes 379 and 380 respectively for selective engagement with the pin 344. Furthermore, the controlling arm 340 is provided with a series of holes 381 for selective engagement with the pin 373. As will be readily understood, the effective lengths of the various elements of the mechanism may be varied and adjusted by inserting the pins 336, 338, 344, 373 in one or the other hole of the series of holes 376, 377, 378, 379, 380, 381, whereby variations of the relative positions between the back-rest, seat, and/or leg-rest may be obtained.

Fig. 17 illustrates a different embodiment of a controlling member 342*i*, which may be used in the chair shown in Fig. 16 instead of the controlling element 342. According to Fig. 17 a controlling arm 341*i* having a bore 344*i* for pivotal connection with the controlling bar is rigidly connected with one arm of the bent controlling link 337*i* having a bore 373*i* for pivotal connection with the controlling rod, having a bore 338*i* for pivotal connection with the connecting link and having a bore 339*i* for the swingable mounting on the support.

Fig. 18 illustrates a further embodiment of a controlling member 342*j* which may be substituted for the controlling member 342 of the chair shown in Fig. 16. According to Fig. 18 the arm 340*j* having a bore 373*j* for pivotal connection with the controlling rod is rigidly connected with the upper end of a bent controlling link 337*j* having a bore 339 for the swingable mounting on the support of the chair, having a bore 338*j* for pivotal connection with the connecting link, and having a bore 344*j* for pivotal connection with the controlling bar.

According to the embodiment of a reclining chair shown in Fig. 19 the back-rest 431 and the seat 432 are coaxially pivoted to the support 430 at 433. On each side of the chair one end of a connecting link 435 is pivoted to the downward extension 434 of the back-rest 431 at 436. The other end of each connecting link is pivoted at 438 to a telescopic controlling link 437. Each telescopic controlling link 437 forms a part of a controlling member 442 comprising a first telescopic controlling arm 440 and a second telescopic controlling arm 441.

One end of a controlling rod 474 is pivoted to each first controlling arm 440 at 473, the other end of said controlling rod 474 is pivoted to the seat 432 at 475.

A leg-rest 447 swingably mounted on the seat 432 at 448 has an upward extension 482 on each side of the chair. Furthermore, on each side of the chair one end of a controlling bar 445 is pivoted to said extension 482 at 483, the other end of such a controlling bar 445 being pivoted to the second controlling arm 441 at 444.

When the back-rest 431 is swung into the extreme reclined position 431', each controlling member 442 is swung into the position 442'. Said swinging movement of the controlling member into the position 442' causes a lifting of the sheet 432 into the position 432' by means of the controlling rods 474 and a displacement of the leg-rest 447 into the position 447' by means of the controlling bars 445.

The movable members of the chair may be held in any desired position, for example above described extreme reclined position or any other intermediate reclined position, by means of a locking device generally indicated by 484. As best shown in Figs. 20 and 21, said locking device 484 comprises a member 485 swingably mounted at 486 on a lug 487 secured to the seat 432. The member 485 is provided with a longitudinal slot 488 engaged with a bolt 489 having a square portion 490 engaged with a corresponding square aperture of an element 491. Said element 491 has a lug 492 on each side for abutting engagement with the member 485, which is in slidable engagement with said element 491. The head 493 of the bolt 489 rests against a surface of the element 491. The bolt 489 passes through the bore 494 of a disk 495, through a bore 496 of a side wall of the support 430, and through a bore 497 of a member 498 attached to the side wall of the support 430 by screws. A locking knob 499 is screwed on the threaded end of said bolt 489. The square portion 490 of the bolt 489 prevents the latter from rotation when the locking knob 499 is turned. As best shown in Fig. 22, the surface of the disk 495 is knurled, so as

to increase the friction between said disk 495 and the member 485 when the locking knob 499 is tightened for pressing the various members and elements of the locking device against each other so as to hold the seat 432 and the other movable members of the chair in a predetermined position. When the locking knob 499 is loosened, the member 485 may freely slide along the bolt 489, so that the movable members of the chair may be readily moved from one position into another one.

The sitting position of the movable members of the chair shown in full lines in Fig. 19 is limited by the upper edge of the support 430, on which the seat 432 comes to a rest. The extreme reclined position 431', 432', 447' of the back-rest, seat, and leg-rest shown in dash and dot lines in Fig. 19 is limited by an abutment of the edge 490 of the slot 488 of the member 485 against the bolt 489 of the locking device 484. The telescopic construction of the controlling link 437 and the two controlling arms 440, 441 permits an easy adjustment of the effective length of said controlling link and controlling arms, if desired.

Fig. 23 illustrates a reclining lounget according to the invention. The tubular side frames 501, 502 of the support 530 are connected with each other by tubular bracing members 503, 504, 505. The support 530 may be rolled along the ground by means of wheels 506 journalled in suitable bearings of the support.

The back-rest 531 and the seat 532 are coaxially pivoted to the support 530 at 533. The downward extension 534 of the back-rest 531 is pivoted to one end of the connecting link 535 at 536. The other end of said connecting link 535 is pivoted at 538 to the controlling link 537 forming a part of the controlling member 542 swingably mounted on the support 530 at 539. The first controlling arm 540 of said controlling member 542 is rigidly connected with an intermediate point of the second and telescopic controlling arm 541 of said controlling member. The first controlling arm 540 is provided with a controlling surface in the shape of a rotatable roller 543 for displaceable engagement with the seat 532. Likewise, the second controlling arm 541 is provided with a controlling surface in the shape of a rotatable roller 507 for displaceable engagement with the leg-rest 547 swingably mounted on the seat 532 at 548.

When the back-rest 531 is swung into the extreme reclined position 531', the controlling member 542 is swung into the position 542' by means of the connecting link 535. Said swinging movement of the controlling member 542 causes a lifting of the seat 532 into the position 532' and a displacement of the leg-rest 547 into the position 547' by means of the rollers 543 and 507 rolling along the seat and leg-rest respectively.

A different position of the leg-rest 547 relative to the seat 532 may be obtained by an adjustment of the effective length of the telescopic controlling arm 541.

The sitting position of the movable members shown in full lines is limited by the bracing member 504 cooperating with the seat 532, and the extreme reclined position of the movable members is limited by the bracing member 503 cooperating with the back-rest.

The rollers 543 and 507 of the controlling element 542 are in loose engagement with the seat 532 and the leg-rest 547 respectively. In order to prevent a collapsing of the mechanism including the back-rest 531, the extension 534 of the back-rest, the connecting link 535, and the controlling element 542 in a forward direction, when the seat 532 is in its sitting position and the user of the chair gets up from the chair supporting himself on the arm-rests 553 rigidly connected with the back-rest by screws 508, a stop 509 is arranged on the support 530 for abutting engagement with the second controlling arm 541 of the controlling member 542, when the seat 532 is in said sitting position. Of course, said stop 509 could be arranged at another place of the support for cooperation with another member of the mechanism 534, 535, 542, and furthermore, said stop could be arranged at a member of said mechanism 534, 535, 542 for cooperation with another member of said mechanism.

According to Fig. 24 the back-rest 631 having a downward extension 634 is pivoted to the support 630 at 633. The seat 632 is pivoted to the support 630 at 667 at a point spaced from the pivotal connection 633 between the back-rest 631 and the support 630. One end of a connecting link 635 is pivoted to the extension 634 of the back-rest at 636. The other end of said connecting link 635 is pivoted at 638 to a controlling member 642 swingably mounted on the support 630 at 639. Said controlling member 642 comprises the controlling link 637, the first controlling arm 640 and the second controlling arm 641 being integral with each other. One end of a controlling rod 674 is pivoted to the first controlling arm 640 at 673. The other end of said controlling rod 674 is pivotally connected with a lug 610 of the seat 632 by means of a pin 675. The seat 632 is provided with additional lugs 611 having bores 612. If desired, the pin 675 may be disengaged from the bore of the lug 610 and may be inserted into one of the bores 612 of one of the lugs 611, whereby the relative position between the seat 632 and the back-rest 631 may be changed.

The leg-rest 647 swingably mounted on the seat 632 at 649 is pivoted at 646 to one end of a controlling bar 645. The other end of said controlling bar 645 is pivoted at 612 to one end of an adjusting element or bar 613 (see Figs. 24 and 25), the other end of which is swingably mounted on the second controlling arm 641 at 614. A stop 615 secured to the controlling arm 641 by screws is arranged for engagement with the swingable adjusting bar 613 so as to hold same in alignment with the controlling arm 641 as shown in full lines in Fig. 24.

When the back-rest 631 is swung about its pivot 633 into the extreme reclined position 631' shown in dash and dot lines, above described mechanisms cause a movement of the other movable members of the chair into the positions likewise shown in dash and dot lines, i. e. the seat and the leg-rest are brought into the positions 632' and 647'.

The movable members of the chair may be held in any desired position by means of the locking device 650 which is mounted on the element 660 and is of the same construction as the locking device 50 described above in connection with Figs. 1–3.

The sitting position of the movable members of the chair is limited by an abutment of the seat 632 against the upper edge of the support, and the extreme reclined position of the movable members of the chair is limited by a member of the locking device 650 in cooperation with

an element of the arm-rest 653 as described above in connection with Figs. 1–3.

As mentioned above, the adjusting bar 613 is swingable about the pivot 614. If the back-rest and seat are held in a predetermined position, for example the sitting position shown in full lines in Fig. 24 by means of the locking device 650, the leg-rest 647 may be swung by hand about its pivot 648 into the position 647'', wherein the controlling bar and the adjusting bar are in the positions 645'', 613'' in alignment with each other. Now, when a slight pressure is exerted on the leg-rest, for example by the legs of the occupant resting in the chair, the controlling bar and the adjusting bar are moved beyond said straight line, until a stop 616 secured to the adjusting bar 613 by screws abuts against the controlling bar, whereby said elements are locked and held in a predetermined position relative to each other.

According to the embodiment of a reclining chair shown in Fig. 26, the back-rest 731 is pivoted to the support 730 at 733. The rear portion of the seat 732 is pivoted to the support at 767 at a point spaced from the pivotal connection 733 between the back-rest 731 and the support 730. On each side of the chair one end of a connecting link 735 is pivoted to the downward extension 734 of the back-rest 731 at 736. The other end of each connecting link 735 is pivoted at 738 to a controlling link 737, the upper end of which is swingably mounted on the support 730 at 739. One end of a first controlling arm 740 is rigidly connected with each controlling link 737 at the upper end thereof, and the other end of each first controlling arm 740 is pivoted at 773 to a controlling rod 774 pivoted to the seat 732 at 775. A leg-rest 747 is swingably mounted on the seat 732 at 748. One end of a first controlling bar 717 is pivoted at 744 to a second controlling arm 741 being integral with the controlling link 737. The other end of said first controlling bar 717 is pivoted at 718 to one end of a second controlling bar 719. The other end of said second controlling bar 719 is pivoted to the seat 732 at the pivot point 748 between the leg-rest 747 and the seat. The second controlling bar 719 is provided with a controlling surface 720 of cam-like shape (see Figs. 26 and 27). Said controlling surface 720 is arranged for loose contact with a leg-rest 747, which may be held against said controlling surface by means of a spring (not shown). When the leg-rest is in contact with said controlling cam surface 720, the movements of the leg-rest are controlled by said controlling surface 720 of the controlling bar mechanism 717, 719 connected with the second controlling arm 741 of the controlling element 742, which is formed by the second controlling arm 741, the controlling link 737 and the first controlling arm 740, and which, in turn, is controlled by the connecting link 735 associated with the downward extension 734 of the back-rest 731. Thus, when the back-rest 731 is swung about its pivot 733 into the reclined position 731', the leg-rest 747 will be brought into the position 747', and the seat 732 will be brought into the position 732', the latter through the medium of the controlling rod 774 connected with the first controlling arm 740 of the controlling element 742.

The movable members of the chair may be held in any desired position by means of the locking device 784 of the type shown in Figs. 20 and 21 which also serves to limit the extreme reclined position of the chair as described above. The sitting position of the movable members of the chair is limited by an abutment of the seat 732 against the upper edge of the support 730. If desired, the leg-rest 747 may be moved independently of the second controlling bar 719 relative to the seat 732, as the leg-rest 747 is in loose engagement with the controlling surface 720. For example, the leg-rest 747 may be brought into the position 747'', while the other members of the chair remain in the position shown in full lines. The leg-rest may be held in said position 747'' by means of a holding device generally indicated by 721. As best shown in Figs. 27 and 28, said holding device 721 comprises a rod 722 slideably arranged in a clamping sleeve 723 engaged with a bolt 724 inserted with its square portion 725 into a square aperture of a lug 726 mounted on the seat 732. Said square portion 725 prevents the bolt 724 from rotation when an adjusting knob 727 threaded on the threaded end portion of the bolt 724 is turned. When the adjusting knob 727 is loosened, the rod 722 may be displaced for engagement with the leg-rest in its elevated position 747''. Upon a tightening of the adjusting knob 727, the clamping sleeve 723 is tightened on the rod 722 for holding same and the leg-rest in its position. When the movable members of the chair are brought from the sitting position into a reclined position, the leg-rest will remain in the adjusted position 747'' relative to the seat 732, until the controlling cam 720 of the second controlling bar 719 abuts against the leg-rest 747, whereupon the controlling cam 720 controls the movements of the leg-rest and displaces same relative to the seat.

Fig. 29 illustrates a different embodiment of a control of the leg-rest 747, which may be substituted for the leg-rest control shown in Figs. 26 and 27. According to Fig. 29, the first controlling bar 717 is provided with a cam-like control surface 728 in loose contact with the leg-rest pivoted to the seat 732 at 748 for controlling the movements of the leg-rest. Of course, the leg-rest 747 may be disengaged from said controlling surface 728 and may be held in a predetermined position 747'' relative to the seat 732 by the holding device 721, which is of the construction described above in connection with Figs. 27 and 28.

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

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

What I claim is:

1. A reclining article of furniture comprising: a support, a back-rest pivotally mounted on said support, said back-rest having a downward extension, a seat, the rear portion of said seat being swingably mounted on said support, a controlling member, said controlling member being swingably mounted on said support at a point spaced from the pivotal connection between the back-rest and the support, a connecting link, said connecting link being pivoted at its rear end to said extension of the back-rest below the pivotal con-

nection between the back-rest and the support and being pivoted at its front portion to said controlling member, a leg-rest swingably mounted on the front portion of said seat, first means positioned between said controlling member and said seat and in operative engagement with each to effect movement of said seat in coordination with said controlling member, and second means positioned between said controlling member and said leg-rest and in operative engagement with each to effect movement of said leg-rest in coordination with said controlling member.

2. A reclining article of furniture comprising: a support, a back-rest pivotally mounted on said support, said back-rest having a downward extension, a seat, the rear portion of said seat being swingably mounted on said support, a controlling link, said controlling link being swingably mounted on said support at a point spaced from the pivotal connection between the back-rest and the support, a connecting link, said connecting link being pivoted at its rear end to said extension of the back-rest below the pivotal connection between the back-rest and the support and being pivoted at its front portion to said controlling link, a leg-rest swingably mounted on the front portion of said seat, a first controlling arm, one end of said first controlling arm being fixedly connected with said controlling link, a second controlling arm, one end of said second controlling arm being fixedly connected with said controlling link, first means positioned between the other end of said first controlling arm and said seat and in operative engagement with each to effect movement of said seat in coordination with said first controlling arm, and second means positioned between the other end of said second controlling arm and said leg-rest and in operative engagement with each to effect movement of said leg-rest in coordination with said second controlling arm.

3. In a reclining article of furniture as claimed in claim 1, said second means including a controlling bar, one end of said controlling bar being pivoted to said controlling member, the other end of said controlling bar being pivoted to said leg-rest.

4. In a reclining article of furniture as claimed in claim 1, said first means including a controlling rod, one end of said controlling rod being pivoted to said controlling member, the other end of said controlling rod being pivoted to said seat, said leg-rest having an upward extension projecting beyond the connection between the leg-rest and the seat, and said second means including a controlling bar, one end of said controlling bar being pivoted to said controlling member above the connection between the latter and the support, the other end of said controlling bar being pivoted to said upward extension of the leg-rest.

5. In a reclining article of furniture as claimed in claim 2, said first means including a controlling rod, one end of said controlling rod being pivoted to said first controlling arm, the other end of said controlling rod being pivoted to said seat, said leg-rest having an upward extension projecting beyond the connection between the leg-rest and the seat, said second controlling arm extending upwardly above the connection between the controlling link and the support, and said second means including a controlling bar, one end of said controlling bar being pivoted to said second controlling arm, the other end of said controlling bar being pivoted to said upward extension of the leg-rest.

6. In a reclining article of furniture as claimed in claim 1, said first means including a controlling rod, one end of said controlling rod being pivoted to said controlling member, the other end of said controlling rod being pivoted to said seat.

7. In a reclining article of furniture as claimed in claim 1, said second means including a controlling rod, one end of said controlling rod being pivoted to said controlling member, the other end of said controlling rod being pivoted to said seat, and a controlling bar, one end of said controlling bar being pivoted to said controlling member, the other end of said controlling bar being pivoted to said leg-rest.

8. In a reclining article of furniture as claimed in claim 2, said second means including a controlling bar, one end of said controlling bar being pivoted to said second controlling arm, the other end of said controlling bar being pivoted to said leg-rest.

9. In a reclining article of furniture as claimed in claim 2, said first means including a controlling rod, one end of said controlling rod being pivoted to said first controlling arm, the other end of said controlling rod being pivoted to said seat, and said second means including a controlling bar, one end of said controlling bar being pivoted to said second controlling arm, the other end of said controlling bar being pivoted to said leg-rest.

10. A reclining article of furniture comprising: a support, a back-rest pivotally mounted on said support, said back-rest having a downward extension, a seat, the rear portion of said seat being swingably mounted on said support, a controlling member, said controlling member being swingably mounted on said support at a point spaced from the pivotal connection between the back-rest and the support, a connecting link, said connecting link being pivoted at its rear end portion to said extension of the back-rest below the pivotal connection between the back-rest and the support and being pivoted at its front end portion to said controlling member, a leg-rest swingably mounted on the front portion of said seat, cooperating abutting surfaces on said controlling member and said seat movably engaged with each other to effect movement of said seat in coordination with said controlling member, and means positioned between said controlling member and said leg-rest to effect movement of said leg-rest in coordination with said controlling member.

11. In a reclining article of furniture as claimed in claim 10, said last named means including additional cooperating abutting surfaces on said controlling member and said leg-rest movably engaged with each other so as to effect the movement of the leg-rest in coordination with said controlling member.

12. A reclining article of furniture comprising: a support, a back-rest pivotally mounted on said support, said back-rest having a downward extension, a seat, the rear portion of said seat being swingably mounted on said support, a controlling member, said controlling member being swingably mounted on said support at a point spaced from the pivotal connection between the back-rest and the support, a connecting link, said connecting link being pivoted at its rear end portion to said extension of the back-rest below the pivotal connection between the back-rest and the support and being pivoted at its front end portion to said controlling member, a leg-rest swing-

ably mounted on the front portion of said seat, means positioned between said controlling member and said seat to effect movement of said seat in coordination with said controlling member, and cooperating abutting surfaces on said controlling member and said leg-rest movably engaged with each other so as to effect movement of said leg-rest in coordination with said controlling member.

13. A reclining article of furniture comprising: a support, a back-rest pivotally mounted on said support, said back-rest having a downward extension, a seat, the rear portion of said seat being swingably mounted on said support, a controlling member, said controlling member being swingably mounted on said support at a point spaced from the pivotal connection between the back-rest and the support, a connecting link, said connecting link being pivoted at its rear end portion to said extension of the back-rest below the pivotal connection between the back-rest and the support and being pivoted at its front end portion to said controlling member, a leg-rest swingably mounted on the front portion of said seat, a first roller arranged on said controlling member and movably engaged with said seat to effect movement of said seat in coordination with said controlling member, and a second roller arranged on said controlling member and movably engaged with said leg-rest to effect movement of said leg-rest in coordination with said controlling member.

14. A reclining article of furniture comprising: a support, a back-rest pivotally mounted on said support, said back-rest having a downward extension, a seat, the rear portion of said seat being swingably mounted on said support, a controlling member, said controlling member being swingably mounted on said support at a point spaced from the pivotal connection between the back-rest and the support, a connecting link, said connecting link being pivoted at its rear end portion to said extension of the back-rest below the pivotal connection between the back-rest and the support and being pivoted at its front end portion to said controlling member, a leg-rest swingably mounted on the front portion of said seat, controlling means positioned between said controlling member and said seat to effect movement of said seat in coordination with said controlling member, an adjusting bar swingably mounted on said controlling member, a controlling bar pivoted at one of its end portions to said adjusting bar and at its other end portion to said leg-rest, and means associated with said controlling member and said adjusting bar for holding the latter in a predetermined position relative to said controlling member.

15. In a reclining article of furniture as claimed in claim 14, means associated with said adjusting bar and said controlling bar for holding said adjusting bar in a predetermined position relative to said controlling bar.

16. In a reclining article of furniture as claimed in claim 14, said controlling means including a controlling rod pivoted at one of its ends to said controlling member and at its other end to said seat.

17. A reclining article of furniture comprising: a support, a back-rest pivotally mounted on said support, said back-rest having a downward extension, a seat, the rear portion of said seat being swingably mounted on said support, a controlling member, said controlling member being swingably mounted on said support at a point spaced from the pivotal connection between the back-rest and the support, a connecting link, said connecting link being pivoted at its rear end portion to said extension of the back-rest below the pivotal connection between the back-rest and the support and being pivoted at its front end portion to said controlling member, a leg-rest swingably mounted on the front portion of said seat, controlling means positioned between said controlling member and said seat to effect movement of said seat in coordination with said controlling member, a pair of pivotally connected first and second controlling bars, the lower end portion of said first controlling bar being piovted to said controlling member, the upper end portion of said second controlling bar being pivoted to said seat, and cooperating abutting surfaces on one of said controlling bars and said leg-rest to effect movement of said leg-rest in coordination with said controlling member.

18. In a reclining article of furniture as claimed in claim 17, the abutting surface of the leg-rest being disengageable from the associated abutting surface of the controlling bar for independent movements of the leg-rest relative to the seat.

19. In a reclining article of furniture as claimed in claim 17, the abutting surface of the leg-rest being disengageable from the associated abutting surface of the controlling bar for independent movements of the leg-rest relative to the seat, and a holding device associated with said seat for cooperation with said leg-rest so as to hold the latter in a predetermined position relative to the seat during a disengagement of its abutting surface from the abutting surface of the controlling bar.

20. In a reclining article of furniture as claimed in claim 17, said abutting surfaces being arranged on said first controlling bar and said leg-rest.

21. In a reclining article of furniture as claimed in claim 17, said abutting surfaces being arranged on said second controlling bar and said leg-rest.

22. In a reclining article of furniture as claimed in claim 17, the pivotal connections of the second controlling bar and of the leg-rest with the seat being in coaxial alignment with each other.

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