

Oct. 16, 1951

A. LORENZ

2,571,463

FOLDABLE RECLINING ARTICLE OF FURNITURE

Filed May 22, 1945

5 Sheets-Sheet 1

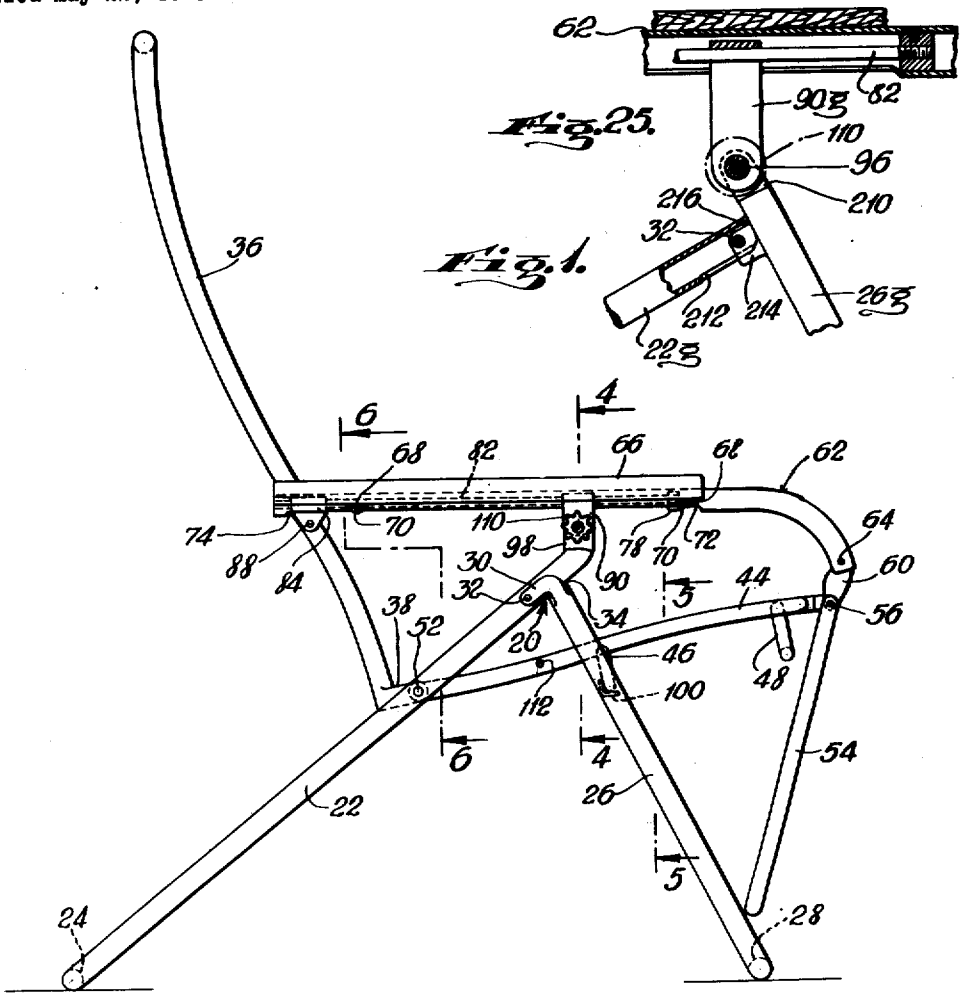
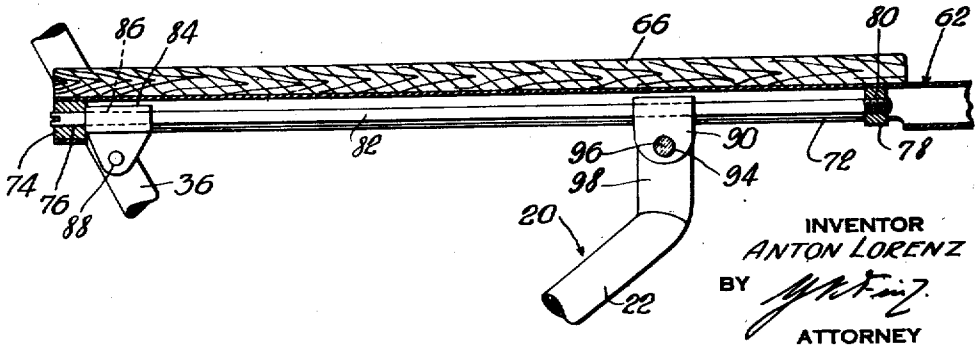


Fig. 2.



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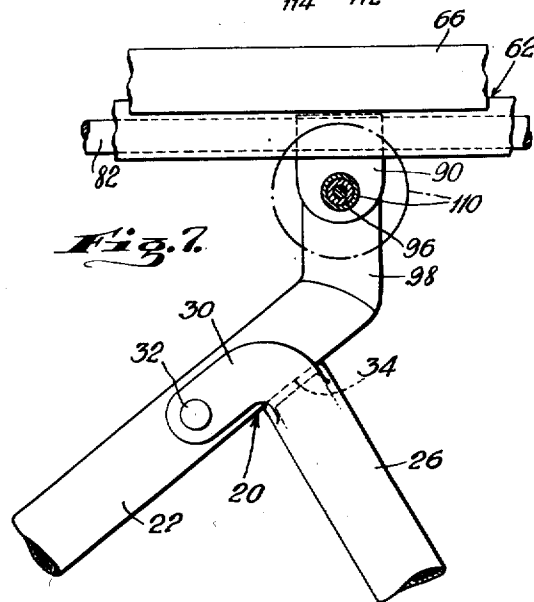
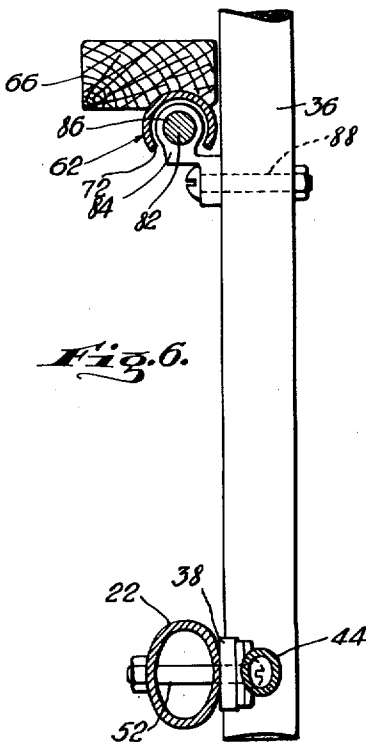
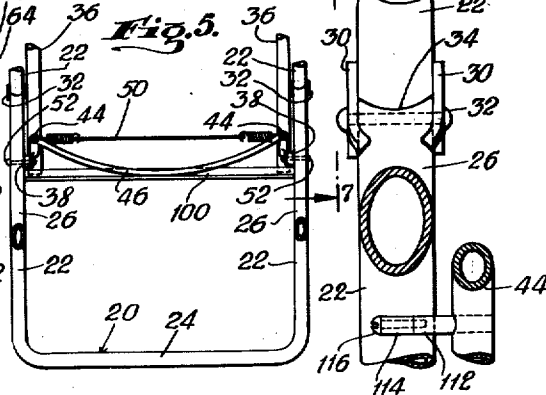
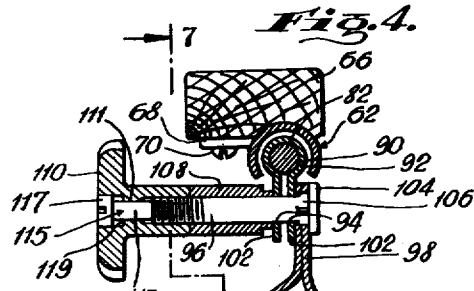
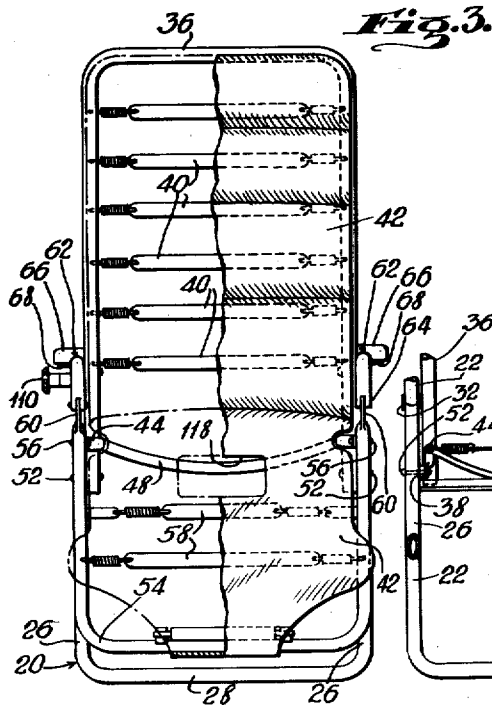
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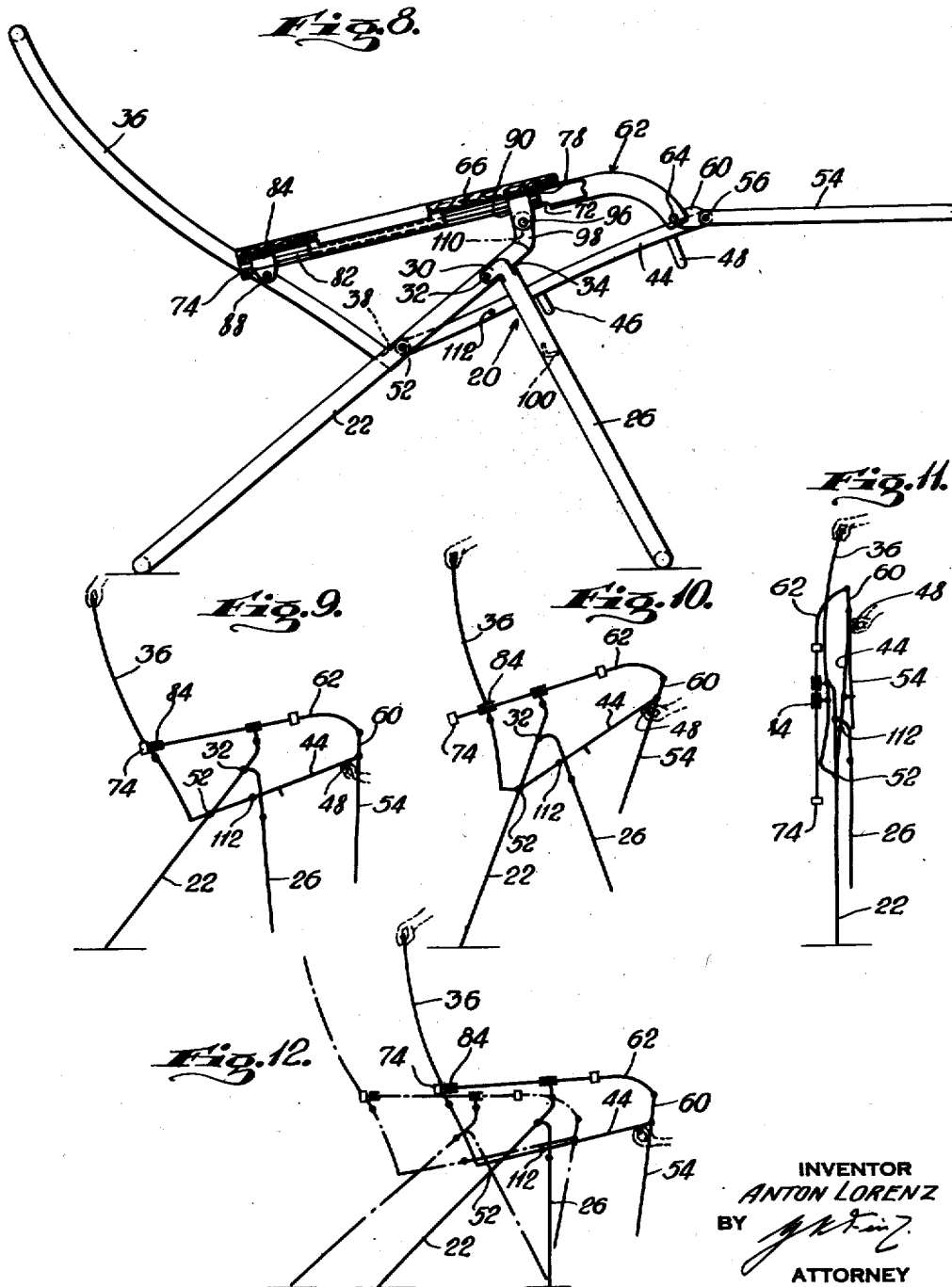
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FOLDABLE RECLINING ARTICLE OF FURNITURE

Filed May 22, 1945

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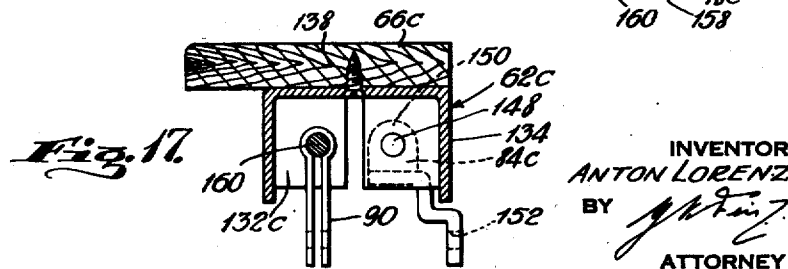
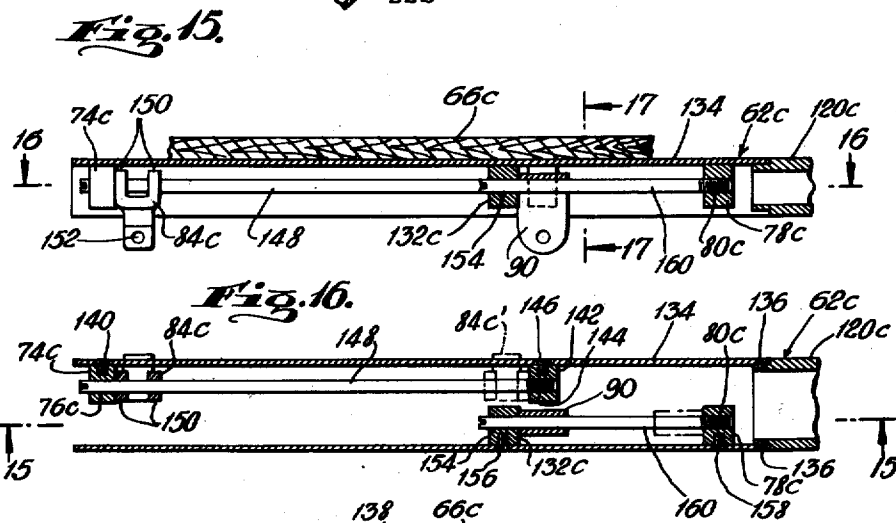
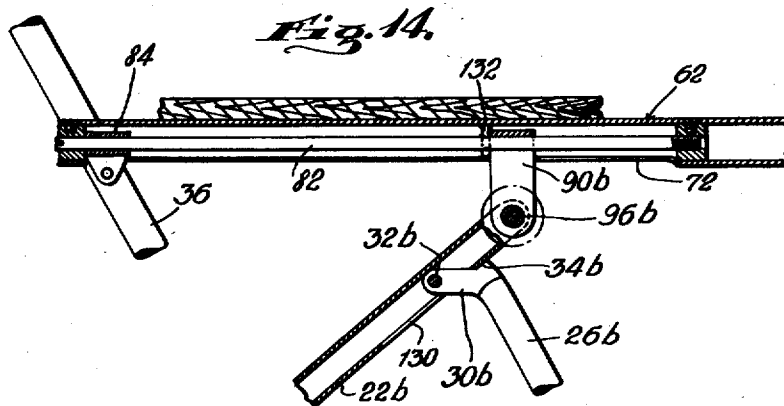
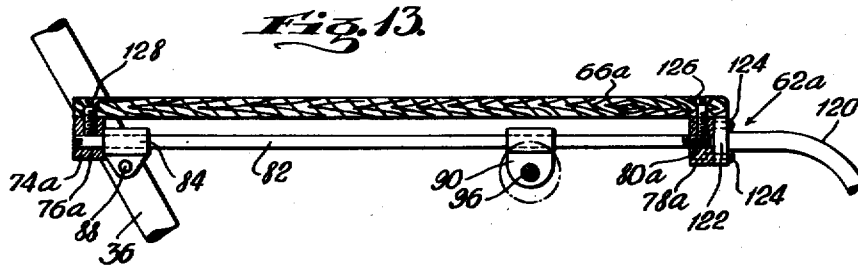
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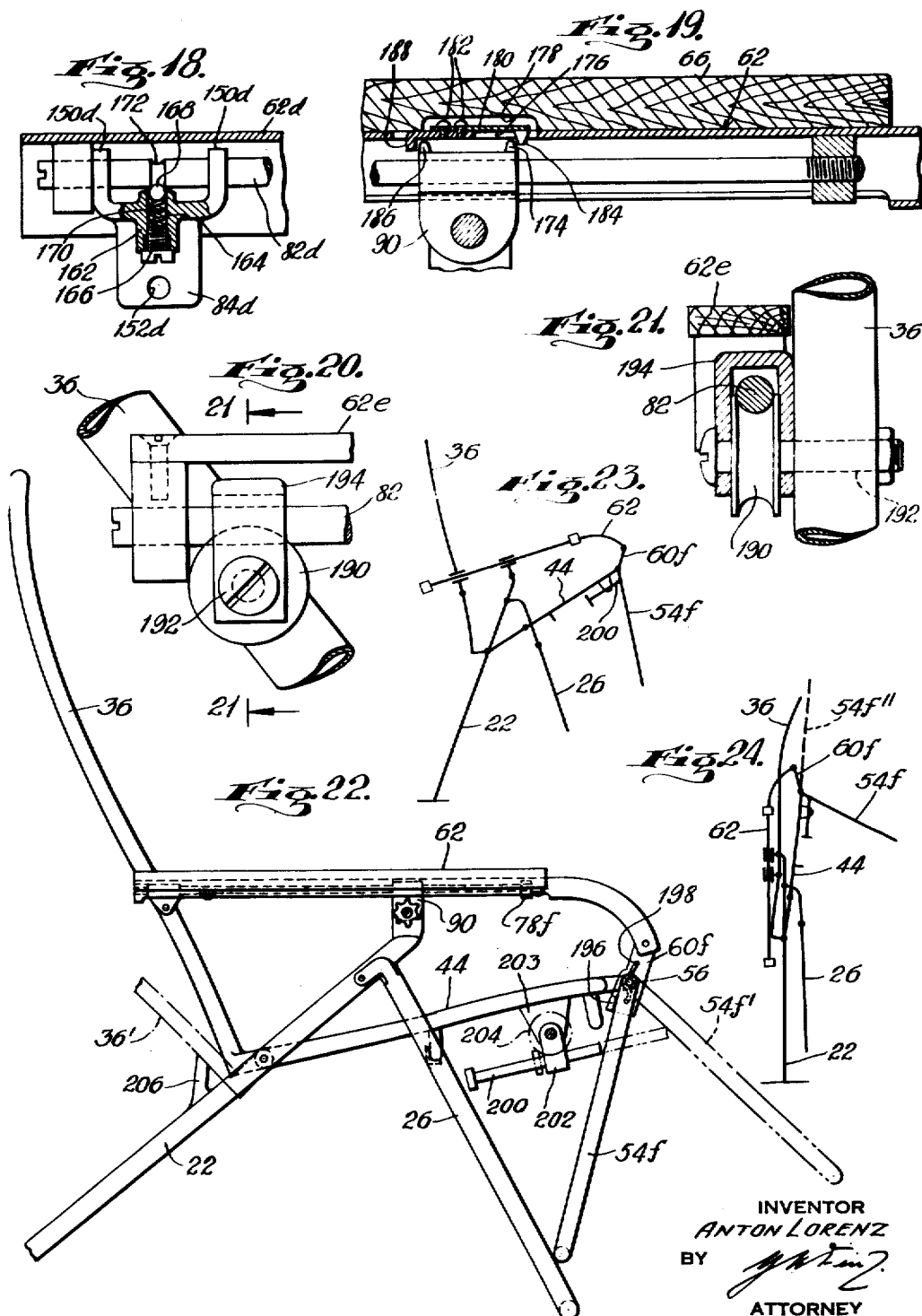
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FOLDABLE RECLINING ARTICLE OF FURNITURE

Filed May 22, 1945

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UNITED STATES PATENT OFFICE

2,571,463

FOLDABLE RECLINING ARTICLE OF FURNITURE

Anton Lorenz, Buffalo, N. Y.

Application May 22, 1945, Serial No. 595,115

9 Claims. (Cl. 155-105)

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My invention relates to chairs, and more particularly to foldable reclining chairs, wherein the back-rest and the seat form two members of a polygonal link-system swingably mounted on a support, wherein a controlling mechanism is provided for controlling the movements of the pivotally interconnected members of the polygonal link-system during a movement from one position into another one when the chair is set up, and wherein said polygonal link-system and said support are foldable, so that the chair may be collapsed.

An object of my invention is to provide a foldable reclining chair of above described type, which may be readily collapsed or set up in its entirety by gripping the back-rest and the seat and does not require any separate manipulation for collapsing or setting up the support.

A further object of my invention is to provide a foldable reclining chair of above described type, wherein the principal elements of the mechanism controlling the movements of the members of the polygonal link-system are concealed by other parts of the chair.

Another object of my invention is to provide a foldable reclining chair of above described type, wherein the movable members of the chair are very well balanced, so that an occupant resting in the chair may bring the movable members of the chair from one position into another position without great effort.

Still another object of my invention is to improve upon foldable reclining chairs 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 foldable reclining chair according to the invention,

Fig. 2 is a fragmentary vertical sectional view of an arm-rest or top connecting link of the chair shown in Fig. 1, in an enlarged scale,

Fig. 3 is a front elevational view of the chair shown in Fig. 1, a portion of the cushion shown in said Fig. 3 being broken away,

Fig. 4 is a fragmentary sectional view of the chair shown in Fig. 1, taken on line 4-4 of Fig. 1, in an enlarged scale,

Fig. 5 is a fragmentary sectional view of the

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chair shown in Fig. 1, taken on line 5-5 of Fig. 1,

Fig. 6 is a fragmentary sectional view of the chair shown in Fig. 1, taken on line 6-6 of Fig. 1, in an enlarged scale,

Fig. 7 is a fragmentary sectional view taken on line 7-7 of Fig. 4,

Fig. 8 is a side elevational view of the chair, partly in section, similar to that shown in Fig. 1, wherein, however, the movable members of the chair are in the extreme reclined position,

Figs. 9-12 are diagrammatical illustrations of the chair shown in Fig. 1, illustrating various steps during the collapsing and setting up of the chair,

Fig. 13 is a fragmentary vertical sectional view of a different embodiment of an arm-rest or top connecting link of a chair according to the invention,

Fig. 14 is a fragmentary vertical sectional view of an arm-rest and a different embodiment of the upper portion of the uprights of a chair according to the invention,

Fig. 15 is a fragmentary vertical sectional view of another embodiment of an arm-rest of a chair according to the invention, taken on line 15-15 of Fig. 16,

Fig. 16 is a sectional view taken on line 16-16 of Fig. 15,

Fig. 17 is a sectional view taken on line 17-17 of Fig. 15,

Fig. 18 illustrates a different embodiment of a connecting slide element of the chair provided with a spring stop for holding the back-rest in its position, partly in section,

Fig. 19 is a fragmentary vertical sectional view of a modification of the arm-rest and the controlling slide element shown in Fig. 2,

Fig. 20 is a fragmentary side elevational view of a roller connection between the arm-rest and the back-rest of a chair according to the invention,

Fig. 21 is a sectional view taken on line 21-21 of Fig. 20,

Fig. 22 is a side elevational view of a different embodiment of a foldable reclining chair, according to the invention,

Figs. 23 and 24 are diagrammatical illustrations of two steps during the collapsing of the chair shown in Fig. 22, and

Fig. 25 is a fragmentary vertical sectional view of a different embodiment of the upper portion of the uprights of a chair according to the invention.

Referring now to Figs. 1, 2, 3, 7 and 8, 20 gen-

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erally indicates the foldable support of a foldable reclining chair according to the invention. Said support 20 comprises a rear upright or leg 22 on each side of the chair, said rear uprights or legs being rigidly connected with each other by a bracing element 24. In the embodiment shown in the drawings, said rear uprights 22 and bracing element 24 are of a U-shaped member made of tubular material, but it is understood that the rear uprights may be built and may be connected with each other in a different manner. Furthermore, said support 20 comprises a front upright or leg 26 on each side of the chair, said front uprights or legs being connected with each other by a bracing element 28. In the embodiment shown in the drawings, said front uprights 26 and bracing element 28 are made of a U-shaped member of tubular material, but it is understood that the front uprights may be built and may be connected with each other in a different manner. Each of the front uprights 26 has a pair of extensions 30 at its upper end, said extensions forming a fork. The extensions 30 are bent at an angle to the longitudinal axis of the front upright 26 and are pivoted to the rear upright 22 at 32, so that the front upright 26 may swing about the axis 32. A shoulder 34 is formed at the upper end of the front upright 26 between the extensions or arms 30. Said shoulder 34 forms an abutment for engagement with the rear upright 22 when the rear and front uprights are in the spread position shown in Figs. 1, 7 and 8, so that the rear and front uprights are automatically stopped in said spread position, when the chair is set up. On the other hand, as will be readily understood, said stop means 34 do not require a separate unlocking manipulation, when the chair is to be collapsed.

36 indicates the frame of tubular material of a back-rest having a lug 38 at its lower end on each side of the chair. As best shown in Fig. 3 a series of spring loaded steel bands 40 or the like is stretched between the side frames of the back-rest 36 for supporting a cushion 42 (shown in said Fig. 3 but not shown in the other figures of the drawings).

44 indicates a seat comprising two side bars of tubular material connected with each other by a stirrup 46 and a cross-bar 48 forming a handle for an operation to be described hereinafter. As shown in Fig. 5, spring-loaded steel bands 50 are stretched between the side bars of the seat to support the cushion 42 shown in Fig. 3. The rear end of the seat 44 is pivoted to the lugs 38 of the back-rest and to the rear uprights 22 at 52.

54 indicates the U-shaped frame of tubular material of a leg-rest, pivoted to the front end of the seat 44 at 56. As shown in Fig. 3, spring-loaded steel bands 58 stretched between the side bars of the leg-rest 54 serve to carry the cushion 42.

According to the embodiment shown in the drawings, the leg-rest 54 has on each side of the chair a flattened extension 60 rigidly connected with the frame of the leg-rest. Said flattened extension 60 forms a front connecting link pivoted at its lower portion to the front portion of the seat 44 at 56 and operatively connected with the leg-rest 54 for controlling the movements thereof about the pivot 56 in a manner to be described hereinafter.

A top connecting link generally indicated by 62 is arranged on each side of the chair. The front end of said top connecting link is bent

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downwardly, and pivoted to the upper end of the front connecting link 60 at 64. As best shown in Figs. 1, 2, 4, 6, 7 and 8, each top connecting link 62 is made of a hollow tubular material. A wooden bar 66 resting on top of the top connecting link and providing the chair with an arm-rest is secured to brackets 68 of the top connecting link 62 by screws 70. A portion of the top connecting link 62 is provided with a longitudinal slot 72 at its lower part. As best shown in Figs. 1, 2, and 8, a ring 74 having a bore 76 is inserted into the rear end of the top connecting link 62. Said ring 74 forming a stop or abutment for a purpose to be described hereinafter is secured to the wall of the top connecting link by any suitable means (not shown). Likewise, a ring or stop 78 having a threaded bore 80 is placed into and secured to the top connecting link 62 near the end of the longitudinal slot 72. A guiding element or guiding rod 82 passing through the bore 76 of the ring 74 is threaded into the threaded bore 80 of said ring 78. Thus, said guiding rod 82 is arranged within the hollow portion of the top connecting link and is concealed by the wall of the top connecting link. A rear connecting link 84 has a bore 86 for slidable engagement with said guiding rod 82. The main portion of said rear connecting link 84 is concealed, but a part of said rear connecting link passes through the slot 72 of the top connecting link and is pivoted to the back-rest 36 at 88. Thus, the axis of said bore 86 or shiftable connection between the rear connecting link and the guiding rod of the top connecting link is eccentric to the pivotal connection 88 between the rear connecting link and the back-rest.

Above described back-rest 36, seat 44, and pair of connecting links 60, 62 form a quadrilateral link-system on each side of the chair. Said quadrilateral link-system is swingably mounted on the rear uprights 22 for movement about the axis of the pivot 52 on each side of the chair.

When the chair is set up as shown in Figs. 1 and 8, the movements of the members 36, 44, 60, 62 of said quadrilateral link-system are controlled by the following controlling mechanism: On each side of the chair a controlling slide element 90 having a bore 92 (see Fig. 4) receiving the guiding rod 82 slidably receives said guiding rod. The main portion of said controlling slide element or controlling link 90 is concealed by the wall of the top connecting link 62. A portion of said slide element or controlling link 90 passing through and projecting from the slot 72 has a bore 94 for swingable engagement with a pivot 96 or the like mounted on a flattened upward extension 98 of the rear upright 22. When the chair is set up, on each side of the chair the rear connecting link or connecting slide block 84 is in engagement with the stop 74 as shown in Fig. 1. When the occupant, resting in the chair, leans the weight of his body against the back-rest 36, the latter swings about the pivot 52 and at the same time the guiding rod 82 operatively connected with the back-rest 36 through the connecting slide block 84, ring 74, top connecting link 62, and ring 78 is drawn through the bore of the controlling slide block 90. Said controlling slide block 90 swings about the pivot 96 and controls at the same time the movements of the members of the quadrilateral link-system, so that said members may be brought into the extreme reclined position limited by the engagement of the stop 78 with the front edge of the

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controlling slide block 90 as shown in Fig. 8. At the same time, the front connecting link 60 rigidly connected with the leg-rest 54 swings the latter about its pivot 56 from the position shown in Fig. 1 into the substantially horizontal position shown in Fig. 8. The movable members of the chair may be readily returned from the extreme reclined position shown in Fig. 8 into the sitting position shown in Fig. 1 by a slight pressure of the legs of the occupant against the leg-rest 54. The sitting position is limited by the engagement of the stirrup 46 with a cross angle bar 100 arranged between the front uprights 26. As shown in Fig. 5, the stirrup 46 contacts the cross angle bar 100 substantially in the center of the chair, so that the clothes of the occupant cannot be caught in between the elements limiting the sitting position. During the movement of the movable members of the chair from the sitting position into a reclined position and vice versa, the connecting slide block or rear connecting link 84 remains in engagement with the stop or abutment 74, so that the top connecting link 62 is positively coupled with said rear connecting link 84.

The above described concealed arrangement of the guiding rod 82 and the main portions of the connecting slide block 84 and controlling slide blocks 90 on each side of the chair makes a nice and attractive appearance of the chair.

In order to hold the movable members of the chair in any desired comfortable position, the following locking device is arranged on the chair. As best shown in Figs. 1 and 4, one of the controlling slide elements 90 is in the shape of a clip. The pivot 96 passing through the bores 94 of the ends 102 of the clip 90 has a head 104 resting against the extension 98 of the rear upright 22. The pivot 96 is prevented from rotation by its square portion 106 engaged with a corresponding square opening of the extension 98. A bushing 108 surrounding the pivot 96 is interposed between one end 102 of the clip 90 and a locking knob 110 screwed on the threaded end of the pivot 96. Said locking knob 110 has a bore 111 in engagement with the cylindrical portion 113 of a screw 115 threaded into a threaded bore of said threaded end of the pivot 96. When the locking knob 110 is in the locking position shown in Fig. 4, the head 117 of said screw 115 is at a distance from the shoulder 119 formed in the bore 111 of the locking knob 110. When the locking knob 110 is loosened, so that the shoulder 119 is moved to the left hand as viewed in Fig. 4, the shoulder 119 may come into engagement with the head 117 of the screw 115, whereby an undesired removal of the locking knob 110 from the pivot 96 is prevented. When the locking knob 110 is loosened and the shoulder 119 engages the head 117 of the screw as mentioned above, the clip 90 may be freely moved relative to the guiding rod 82, so that the movable members of the chair may be brought from one position into another one. When the locking knob 110 is tightened, the bushing 108 is pressed against the end 102 of the clip 90, whereby the latter is tightened on the guiding rod 82, so that, in turn, the movable members of the chair are held in their position.

As best shown in Figs. 1 and 4 an actuating element or pin 112 secured to the seat 44 projects therefrom for a temporary engagement with the front upright 26 in a manner to be described hereinafter. Preferably, said actuating element 112 is provided with a roller 114 rotatably

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mounted on a screw 116 screwed into a threaded bore of the actuating element 112. When the chair is set up, said pin 112 is disengaged from the front upright 26 so as to prevent free swinging movements of the seat 44 from the position shown in Fig. 1 into the position shown in Fig. 8 and vice versa.

When it is desired to collapse the chair, the following operations are carried out: The locking device 110 is loosened, and the movable members of the chair are brought into the sitting position shown in Fig. 1. Then, the chair is gripped by hand at the upper end of the back-rest and at the handle 48, which may be reached through an opening 118 in the cushion (see Fig. 3). When, after gripping the chair at the back-rest and the handle 48 the chair is moved into the position shown in Fig. 9 by swinging the chair about the lower end of the rear upright 22 which remains in contact with the ground, the front upright 26 swings automatically by its own weight from the position shown in Fig. 1 into the position shown in Fig. 9, wherein it comes in contact with the actuating pin 112, while the connecting slide block 84 remains in contact with the stop 74. During a further folding of the chair, the back-rest 36 starts to swing about the pivot 52 while the connecting slide block 84 is disengaged from the stop 74 and moves along the guiding rod of the top connecting link 62, as shown in Fig. 10. When the folding of the chair is continued, the back-rest 36 is further swung about the pivot 52 and the seat 44 starts to swing about the pivot 52, whereby the actuating pin 112 slides along the front upright 26 and permits a further swinging of the latter by its own weight about the pivot 32, until the members of the chair reach the collapsed position shown in Fig. 11. As will be readily understood, there is no separate manipulation necessary for bringing the rear and front uprights 22 and 26 of the support into the collapsed position. The above described gripping of the back-rest and seat at the two specified points causes an automatic collapsing of all elements of the chair including the rear and front uprights of the support.

In order to set up the chair, the collapsed chair is gripped at the upper end of the back-rest and at the handle 48 as shown in Fig. 11. The lower end of the rear upright 22 is placed on the ground, and the seat 44 is swung downward about the pivot 52. During this swinging movement of the seat 44, the actuating pin 112 contacts the front upright 26 and brings same automatically into the spread position shown in Fig. 10. Furthermore, the back-rest 36 is swung about the pivot 52 into the position shown in said Fig. 10. Then, the entire chair is swung about the lower end of the rear upright 22 until the front upright 26 hits the ground as shown in full lines in Fig. 12. Furthermore, the back-rest 36 is swung about the pivot 52 whereby the connecting slide block 84 comes into engagement with the stop 74 as shown in Fig. 12. Now, the weight of the chair or a slight pressure down on the back-rest 36 causes a sliding of the lower end of the rear upright 22 along the ground with a simultaneous swinging of the front upright 26 about its lower end contacting the ground, so that the rear and front uprights of the chair are brought automatically into the fully spread position shown in dash and dot lines, which corresponds to the spread position shown in Fig. 1 and is limited by the shoulder 34 of the front upright 26 contacting the rear upright 22. As will be readily

understood, the setting up of the chair does not require any other manipulation in addition to the gripping of the chair at the two points specified above.

Moreover, as will be apparent from above, the shiftable connection between the top connecting link 62 and the rear connecting link 84 permits a collapsing and setting up of the link-system of the chair. The stop 74 mounted on the rear end of the top connecting link 62 forms means associated with said shiftable connection for converting same into a positive coupling when the link-system of the set-up chair is under load, whereby a constrained link-mechanism with controlled movements of its movable links is formed.

Fig. 13 illustrates a different embodiment of the top connecting link, which may be substituted for the top connecting link shown in Figs. 1, 2 and 8. According to Fig. 13 the top connecting link generally indicated by 62a comprises a front portion 120, the front end of which is pivoted to the front connecting link (not shown) and the rear end of which is provided with a flange 122. A block or limiting element 78a having a threaded bore 80a is secured to said flange 122 by screws 124, and the front end of an arm-rest 66a is secured to said block 78a by a screw 126. A block or limiting element 74a having a bore 76a is secured to the rear end of said arm-rest 66a by a screw 128. The threaded end of the guiding rod 82 passing through the bore 76a is screwed into the threaded bore 80a of the block 78a. In the same manner as described above in connection with Figs. 1, 2 and 8 the connecting slide block 84 slidably engaged with the guiding rod 82 is pivoted to the back-rest 35 at 88. Furthermore, the controlling slide block 90 pivoted at 96 to the extension of the rear upright (not shown) is slidably engaged with said guiding rod 82. As will be readily understood, according to the embodiment shown in Fig. 13, the guiding rod 82 and the slide blocks engaged therewith are not concealed.

Fig. 14 illustrates a different embodiment of the upper portion of the rear upright 22b and front upright 26b, which may be substituted for the rear and front uprights of the chair shown in Figs. 1 and 7. According to Fig. 14 the upper end of the rear upright 22b has a longitudinal slot 130, and the upper end of the front upright 26b has a single extension or arm 30b passing through said slot 130 and extending into the hollow portion of the rear upright 22b. The extension or arm 30b is pivoted to the rear upright 22b at 32b. The flattened end of the front upright 26b forming said arm 30b is provided with a shoulder 34b abutting against the rear upright 22b when the rear and front uprights are in the spread position. Furthermore, contrary to the embodiments shown in Figs. 1 and 7, the upper end of the rear upright 22b shown in Fig. 14 is straight and has no upward extension arranged at an angle to the longitudinal axis of the rear upright. Instead of such an upward extension of the rear upright, the portion of the controlling slide element 90b projecting from the slot 72 of the top connecting link 62 is of a larger dimension than the corresponding portion of the controlling slide element 90 shown in Figs. 1 and 7. According to Fig. 14, the controlling slide element 90b slidably engaged with the guiding rod 82 is pivoted to the upper end of the rear upright 22b and 96b.

Moreover, Fig. 14 illustrates a pin or stop 132

inserted into a bore of the guiding rod 82 for abutting engagement with the rear edge of the controlling slide element 90b when the movable parts of the chair are in the sitting position, so as to limit said sitting position. Such a stop 132 may be arranged in the chair, when the dimensions thereof are designed in such a way that, during the collapsing of the chair, the extreme right-hand position of the connecting slide block 84 slidably mounted on the same guiding rod 82 as the controlling slide element 90b is at the left hand side of the stop 132. Of course, if the stop 132 is arranged in the chair, the limiting means 46, 100 shown in Fig. 1 may become unnecessary.

Figs. 15-17 illustrate a different embodiment of the top connecting link generally indicated by 62c, which may be used, if it is desired to have a stop 132c cooperating with the controlling slide element 90 for limiting the sitting position, when the dimensions of the chair are such that, during the collapsing of the chair, the connecting slide block 84c reaches a position 84c' (see Fig. 16) which is farther to the right than the rear edge of the stop 132c. According to Figs. 15-17, the top connecting link 62c comprises a member 134 substantially in the shape of an inverted U, which is connected with the front portion 120c of the top connecting link by screws 136. A wooden bar 66c forming the arm-rest of the chair is screwed to the upper surface of said member 134 by screws 138. A block 74c having a bore 76c and forming a stop is arranged within the member 134 at the rear end thereof and is secured to said member 134 by a screw 140. Furthermore, a block 142 provided with a threaded bore 144 and arranged within the member 134 is secured to the latter by a screw 146. The threaded end of a first guiding rod 148 passing through the bore 76c of the block 74c is threaded into the threaded bore of the block 142. A connecting slide block 84c having two lugs 150 with bores for engagement with said first guiding rod 148 is slidably mounted on said first guiding rod 148. Said connecting slide block 84c is provided with a bore 152 for a pivotal connection with the back-rest (not shown). Furthermore, a block 132c provided with a bore 154 and arranged within the member 134 is secured thereto by a screw 156; likewise, a block 78c provided with a threaded bore 80c and arranged within the member 134 is secured thereto by a screw 158. Said blocks 132c and 78c form stops for the controlling slide element 90 slidably mounted on a second guiding rod 160 passing through the bore 154 and screwed into the threaded bore 80c. Thus, according to Figs. 15-17, the connecting slide element 84c and the controlling slide element 90 are arranged on different guiding rods 148 and 160 respectively in such a manner, that they cannot interfere with each other during any movement of the movable elements of the chair. Furthermore, according to Figs. 15-17, the two guiding rods 148 and 160 as well as the main portions of the slide elements are concealed by the wall of the member 134.

Fig. 18 illustrates a different embodiment of a rear connecting link or connecting slide element 84d which may be used instead of the connecting slide element 84c shown in Fig. 15 or instead of the connecting slide element 84 shown in Fig. 1. According to Fig. 18, the element 84d has two arms 150d provided with bores for slidable engagement with the guiding element or

guiding rod 82d of the top connecting link 82d. Furthermore, said element 84d has a bore 162d for receiving the pivot connecting the element 84d with the back-rest (not shown in Fig. 18). Moreover, the element 84d is provided with a housing 162 provided with a longitudinal bore 164 having a threaded end for receiving a screw 166. A ball 168 is arranged at the open end of the housing 162 opposite the screw 166, and a spring 170 interposed between said screw 166 and said ball 168 tends to urge said ball into a circular groove 172 arranged on the guiding rod 82d. As will be readily understood, the elements 166, 170, 168, and 172 form a spring stop tending to hold the back-rest in its position relative to the top connecting link, when the chair is set up. On the other hand, of course, the action of the rather weak spring 170 may be readily overcome, when, for the collapsing of the chair, the back-rest and the connecting slide element 84d connected therewith are to be moved in right-hand direction as viewed in Fig. 18.

According to the embodiment shown in Fig. 19 illustrating a top connecting link 62 and a controlling slide element 90 substantially corresponding to the arrangement and construction of these members shown in Fig. 2, a nose 174 is arranged at the front edge of said controlling slide element 90. The top connecting link 62 is provided with a slot 176, and the arm-rest 66 has a recess 178. One end of a spring 180 is secured to the top connecting link 62 by means of screws 182, and a stop 184 mounted on the other end of said spring 180 projects through said slot 176 into the path of the nose 174 on the controlling slide element 90. Fig. 19 illustrates the members of the chair in the sitting position corresponding to the sitting position shown in Fig. 1. The elements 174, 184, 180 form a spring stop which prevents an automatic movement of the movable members of the chair from the sitting position shown in Fig. 1 into the reclined position shown in Fig. 8 by the action of the weight of the back-rest 36, when the user of the chair gets up from the chair and overlocks to hold the members of the chair in the sitting position by means of the locking knob 110 described above. Of course, the action of the rather weak spring 180 of the spring stop may be readily overcome, when the user of the chair resting in the chair leans the weight of his body against the back-rest, so as to bring the members of the chair from the sitting position shown in Fig. 1 into the reclined position shown in Fig. 8.

Fig. 19, furthermore, illustrates limiting means 186, 188 for limiting the sitting position, which may be used instead of the stirrup 46 and the cross angle bar 100 shown in Fig. 1. Said limiting means comprise a nose 186 mounted on the rear end of the controlling slide block 90 for co-action with a stop 188 formed on the top connecting link 62. When the members of the chair are in the sitting position, the nose 186 abuts against said stop 188.

It is understood, that a controlling slide element 90 according to the invention must not necessarily be equipped with both the spring stop 174, 184, 180 and the limiting means 186, 188 as shown in Fig. 19. If desired, only one of said two devices may be arranged on the controlling slide element 90.

Figs. 20 and 21 illustrate a roller 190 cooperating with the guiding rod 82 of the top connecting link 82e, which may be used instead of the slide elements shown and described in other

figures, except for a slide element equipped with a locking device 110 as described above. According to Figs. 20 and 21, a screw 192 passing through bores of a clip or guide 194 partly surrounding the roller 190 and passing through the bore of said roller 190 is secured to the back-rest 36. When the chair is under load, the guiding rod 82 is pressed against the groove in the roller 190, so that the roller may roll along the guiding rod 82 during movements of the movable members of the chair. The upper portion of the clip or guide 194 embracing the guiding rod 82 prevents an undesired disengagement of the connecting element formed by said clip 194 from the guiding rod 82, if for example the chair is lifted by gripping the top connecting link.

The foldable reclining chair shown in Fig. 22 substantially corresponds to the foldable reclining chair shown in Figs. 1 and 8, so that it is unnecessary to describe the chair in detail insofar as the elements and their operations are the same as in the chair shown in said Figs. 1 and 8. Hereinafter, only those parts will be described, which are not shown in Figs. 1 and 8 or differ from corresponding elements shown in Figs. 1 and 8.

According to Fig. 22, the front connecting link 60f and the leg-rest 54f form separate members, which are not rigidly connected with each other. The front connecting link 60f and the leg-rest 54f are pivoted to the front end of the seat 44 at 56. According to Fig. 22, the front connecting link 60f is provided with a controlling surface in the shape of a controlling lug 196, and the leg-rest 54f is urged against said lug 196 by means of a spring 198. Thus, when the movable members 36, 44, 60f, 62 of the chair are brought from one position into another one, the movements of the leg-rest 54f are controlled by the front connecting link 60f through the medium of the lug 196. If desired, however, the leg-rest 54f may be disengaged from said lug 196 and may be brought, for example, into the position 54f' shown in Fig. 22, wherein it may be held by means of a lifting rod 200 slidably and adjustably arranged in the holding device 202 mounted on a lug 203 secured to the seat 44. The lifting rod 200 may be held in its adjusted position by means of a locking knob 204. The operation and construction of the holding device 202, 204 substantially corresponds to the locking device 90, 110 described above in connection with Fig. 4. The arrangement of a disengageable leg-rest controlled by a controlling surface in the shape of a controlling lug on the front connecting link is described in detail in my co-pending U. S. patent application Ser. #559,752 filed on October 21, 1944, for "An Adjustable Reclining Chair," which case is now abandoned.

The collapsing of the foldable reclining chair shown in Fig. 22 may be carried out substantially in the same manner as described above in connection with Figs. 9-11 for the chair shown in Figs. 1 and 8.

Fig. 23 illustrates an intermediate position of the various members of the chair shown in Fig. 22 during the collapsing thereof. Said Fig. 23 corresponds to Fig. 10. According to Fig. 23, however, the leg-rest 54f abutting against the lifting rod 200 is at an angle to the front connecting link 60f. During the further collapsing of the chair, the members thereof are brought from the position shown in Fig. 23 into the position shown in full lines in Fig. 24. Thereafter, the leg-rest 54f may be gripped by hand and

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raised into the position 54'' shown in dash lines, whereupon the collapsed chair may be placed against the wall with the leg-rest contacting the wall, so that the spring 198 shown in Fig. 22 cannot return the leg-rest into the position shown in full lines in Fig. 24. If desired, however, holding means of any kind may be arranged on a suitable member of the chair for holding the leg-rest in the position shown in dash lines in Fig. 24, when the chair is collapsed.

When the foldable reclining chair shown in Fig. 22 is to be set up, at first the leg-rest is brought from the position 54'' shown in Fig. 24 into the full line position 54f shown in said Fig. 24, whereupon the setting up of the chair is carried out in the same manner as described above in connection with Figs. 11 and 12 for the chair shown in Figs. 1 and 8.

Under certain circumstances the dimensions of the chair may require, that the element 18f (see Fig. 22) is at such a distance from the controlling slide element 90, that it cannot be used as a stop for limiting the extreme reclined position of the movable members of the chair. In such a case, for example, a stop 206 may be arranged on the rear upright 22 as shown in Fig. 22, against which the back-rest abuts, when it reaches the extreme reclining position 36'.

According to the embodiment shown in Fig. 25 the controlling element 90g slidably arranged on the guiding rod 82 of the top connecting link 32 is pivoted at 96 to the flattened end 210 of the front upright 26g. 110 indicates the locking knob as described above. According to Fig. 25 the rear upright 22g is provided with a slot 212 at its lower side, and a lug 214 secured to the front upright 26g is inserted into said slot 212 and pivoted to the rear upright 22g at 32. A shoulder 216 arranged at the end of the rear upright 22g for engagement with the front upright 26g serves to limit the extreme spread position of the uprights as shown in Fig. 25. As will be readily understood, the front upright 26g may be swung about the pivot 32 for collapsing the chair. The embodiment shown in Fig. 25 may be arranged in the chair shown in Fig. 1 or in the chair shown in Fig. 22.

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 or arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described, may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A foldable reclining article of furniture, comprising: a foldable support, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a shiftable and pivotal connection between said top connecting link and said support at a point spaced from said pivotal connection between the link of the pair of links and the support, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a rear connecting link, the lower portion of said rear connecting link being pivoted to an intermediate point of said back-rest, a shiftable connection between the upper portion of said rear connect-

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ing link and said top connecting link so as to render possible a relative movement between said top connecting link and said rear connecting link during a setting-up of the article, the axis of said last-mentioned shiftable connection being eccentric to the pivotal connection between the rear connecting link and the back-rest, and an abutment arranged on said top connecting link for engagement with said rear connecting link when the back-rest of the set-up article is moved rearwardly.

2. A foldable reclining article of furniture, comprising: a foldable support including a pair of connected front legs and a pair of connected rear legs pivotally connected with each other, limiting means arranged on a leg of one of said pairs of legs for abutting engagement with a leg of the other pair of legs so as to limit the extreme spread position of said legs, a pair of links, including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a shiftable and pivotal connection between said top connecting link and said support at a point spaced from said pivotal connection between the link of the pair of links and the support, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a rear connecting link, the lower portion of said rear connecting link being pivoted to an intermediate point of said back-rest, a shiftable connection between the upper portion of said rear connecting link and said top connecting link so as to render possible a relative movement between said top connecting link and said rear connecting link during a setting up of the article, the axis of said last mentioned shiftable connection being eccentric to the pivotal connection between the rear connecting link and the back-rest, an abutment arranged on said top connecting link for engagement with said rear connecting link when the back-rest of the set-up article is moved rearwardly, and an actuating element mounted on said seat, said actuating element being capable of temporary cooperation with a front leg so as to move same automatically from a collapsed position into a spread position, and said actuating element being arranged for disengagement from said front leg when in the set-up article the front leg is in its extreme spread position so as to permit free swinging movements of said seat.

3. A foldable reclining article of furniture, comprising: a foldable support, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a shiftable and pivotal connection between said top connecting link and said support at a point spaced from said pivotal connection between the link of the pair of links and the support, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a rear connecting link, the lower portion of said rear connecting link being pivoted to an intermediate point of said back-rest, a shiftable connection between the upper portion of said rear connecting link and said top connecting link so as to render possible a relative movement between said top

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connecting link and said rear connecting link during a setting-up of the article, the axis of said last mentioned shiftable connection being eccentric to the pivotal connection between the rear connecting link and the back-rest, an abutment arranged on said top connecting link for engagement with said rear connecting link when the back-rest of the set-up article is moved rearwardly, and a leg-rest pivoted to the front portion of said seat, said front connecting link being operatively connected with said leg-rest for controlling the movements thereof.

4. A foldable reclining article of furniture, comprising: a foldable support including a pair of connected front legs and a pair of connected rear legs pivotally connected with each other, limiting means arranged on a leg of one of said pairs of legs for abutting engagement with a leg of the other pair of legs so as to limit the extreme spread position of said legs, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a shiftable and pivotal connection between said top connecting link and said support at a point spaced from said pivotal connection between the link of the pair of links and the support, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a rear connecting link, the lower portion of said rear connecting link being pivoted to an intermediate point of said back-rest, a shiftable connection between the upper portion of said rear connecting link and said top connecting link so as to render possible a relative movement between said top connecting link and said rear connecting link during a setting-up of the article, an abutment arranged on said top connecting link for engagement with said rear connecting link when the back-rest of the set-up article is moved rearwardly, an actuating element mounted on said seat, said actuating element being capable of temporary cooperation with a front leg so as to move same automatically from a collapsed position into a spread position, and said actuating element being arranged for disengagement from said front leg when in the set-up article the front leg is in its extreme spread position so as to permit free swinging movements of said seat, and a leg-rest pivoted to the front portion of said seat, said front connecting link being operatively connected with said leg-rest for controlling the movements thereof.

5. A foldable reclining article of furniture, comprising: a foldable support including a pair of connected front legs and a pair of connected rear legs pivotally connected with each other, limiting means arranged on a leg of one of said pairs of legs for abutting engagement with a leg of the other pair of legs so as to limit the extreme spread position of said legs, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a first shiftable and pivotal connection between said top connecting link and said support, at a point spaced from said pivotal connection between the link of the pair of links and the support, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being piv-

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oted to said top connecting link, a second shiftable and pivotal connection between said top connecting link and said back-rest so as to render possible a relative movement between said top connecting link and said back-rest during a setting up of the article, an abutment arranged on said top connecting link for abutting engagement with shiftable means of said first shiftable connection when the back-rest of the set-up article is moved rearwardly, and an actuating element mounted on said seat, said actuating element being capable of temporary cooperation with a front leg so as to move same automatically from a collapsed position into a spread position, and said actuating element being arranged for disengagement from said front leg when in the set-up article said front leg is in its extreme spread position so as to permit free swinging movements of said seat.

6. A foldable reclining article of furniture, comprising: a foldable support including a pair of connected front legs and a pair of connected rear legs pivotally connected with each other, limiting means arranged on a leg of one of said pairs of legs for abutting engagement with a leg of the other pair of legs, so as to limit the extreme spread position of said legs, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a first shiftable and pivotal connection between said top connecting link and said support at a point spaced from said pivotal connection between the link of the pair of links and the support, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a second shiftable and pivotal connection between said top connecting link and said back-rest so as to render possible a relative movement between said top connecting link and said back-rest during a setting up of the article, an abutment arranged on said top connecting link for abutting engagement with shiftable means of said first shiftable connection when the back-rest of the set-up article is moved rearwardly, and an actuating element mounted on said seat, said actuating element being capable of temporary cooperation with a front leg so as to move same automatically from a collapsed position into a spread position, and said actuating element being arranged for disengagement from said front leg when in the set-up article said front leg is in its extreme spread position so as to permit free swinging movements of said seat, and a leg-rest pivoted to the front portion of said seat, said front connecting link being operatively connected with said leg-rest for controlling the movements thereof.

7. A foldable reclining article of furniture, comprising: a foldable support, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a guiding rod, on said top connecting link, a controlling link, a pivotal connection between the lower portion of said controlling link and said support at a point spaced from said pivotal connection between the link of the pair of links and said support, the upper portion of said controlling link being slidably connected with said guiding rod on the top connecting link, a front connecting link, the lower

portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a rear connecting link, the lower portion of said rear connecting link being pivoted to an intermediate point of said back-rest, a shiftable connection between the upper portion of said rear connecting link and said top connecting link so as to render possible a relative movement between said top connecting link and said rear connecting link during a setting-up of the article, the axis of said last mentioned shiftable connection being eccentric to the pivotal connection between the rear connecting link and the back-rest, an abutment arranged on said top connecting link for engagement with said rear connecting link when the back-rest of the set-up article is moved rearwardly, and cooperating resilient stopping means arranged on said top connecting link and said controlling link for holding the movable members of the set-up article in the sitting position.

8. A foldable reclining article of furniture, comprising: a foldable support, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a first guiding rod on said top connecting link, a controlling link, a pivotal connection between the lower portion of said controlling link and said support at a point spaced from said pivotal connection between the link of the pair of links and said support, the upper portion of said controlling link being slidably connected with said first guiding rod on the top connecting link, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a second guiding rod on said top connecting link, a rear connecting link, the lower portion of said rear connecting link being pivoted to an intermediate point of said back-rest, a shiftable connection between the upper portion of said rear connecting link and said second guiding rod on the top connecting link so as to render possible a relative movement between said top connecting link and said rear connecting link the axis of said last mentioned shiftable connection being eccentric to the pivotal connection between the rear con-

necting link and the back-rest, and an abutment arranged on said top connecting link for engagement with said rear connecting link when the back-rest of the set-up article is moved rearwardly.

9. A foldable reclining article of furniture, comprising: a foldable support, a pair of links including a seat and a back-rest pivotally connected with each other, a pivotal connection between a link of said pair of links and said support, a top connecting link, a guiding rod on said top connecting link, a controlling link, a pivotal connection between the lower portion of said controlling link and said support at a point spaced from said pivotal connection between the link of the pair of links and said support, the upper portion of said controlling link being slidably connected with said guiding rod on the top connecting link, a front connecting link, the lower portion of said front connecting link being pivoted to the front portion of said seat, the upper portion of said front connecting link being pivoted to said top connecting link, a roller rotatably mounted on an intermediate point of said back-rest, said roller being capable of rolling along said guiding rod, an abutment arranged on said top connecting link for engagement with said roller when the back-rest of the set-up article is moved rearwardly, and a guide securing the engagement of said roller with said guiding rod.

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Certificate of Correction

Patent No. 2,571,463

October 16, 1951

ANTON LORENZ

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 9, line 45, strike out "overlocks to hold" and insert instead *overlooks to hold*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

/ Signed and sealed this 13th day of May, A. D. 1952.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.