March 5, 1929. J. G. V. ASTRUC 1,704,585

RECLINING ARMCHAIR

Filed Feb. 12, 1926 4 Sheets-Sheet 1

Fig. 2

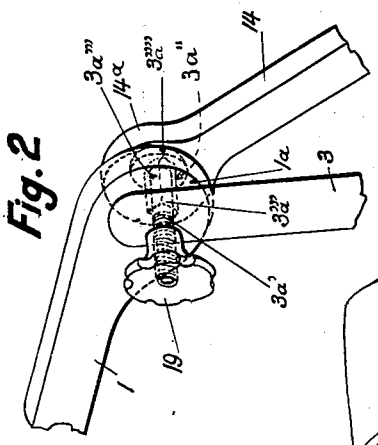


Fig. 1

J. G. V. Astruc
INVENTOR

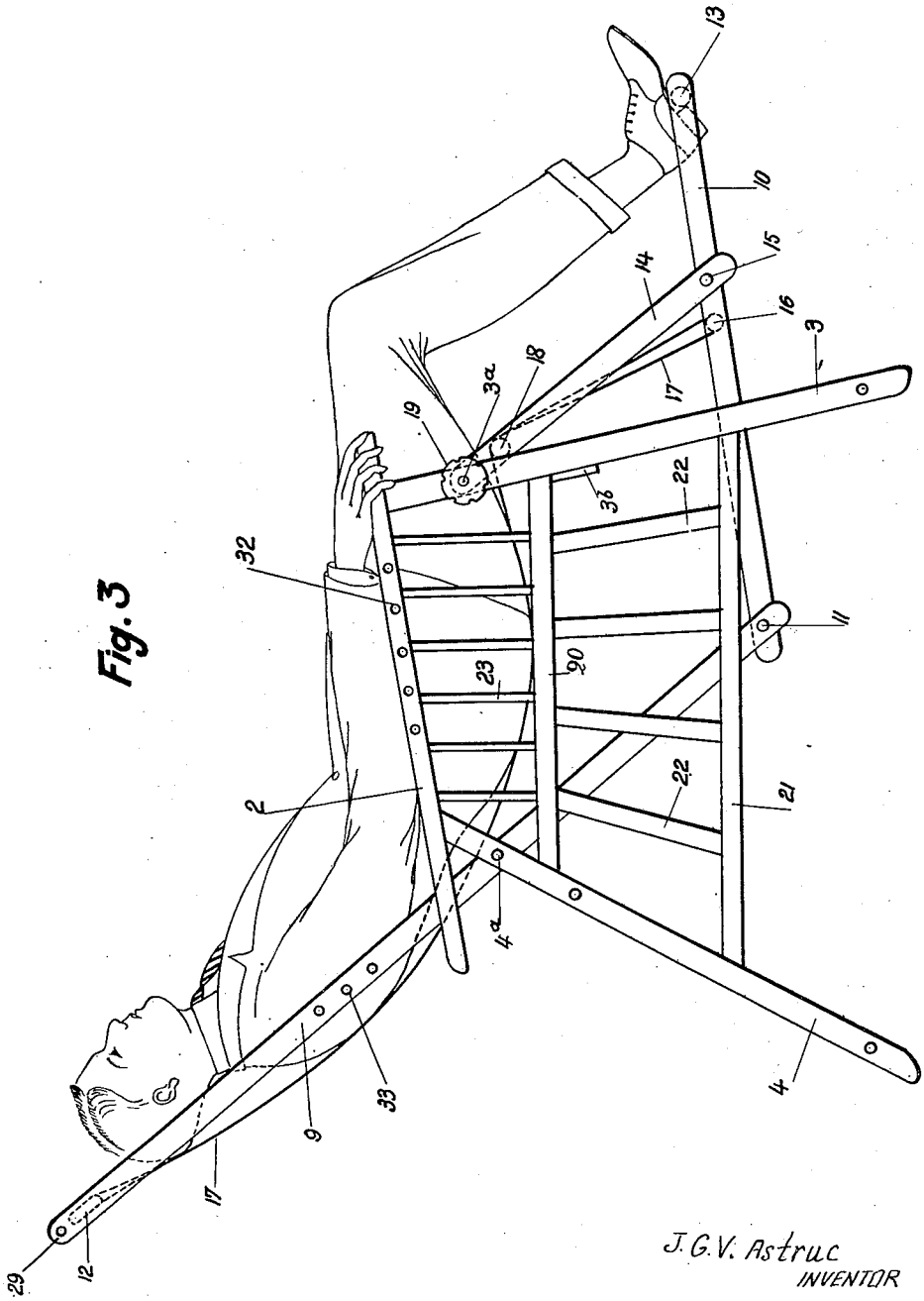
By: Marks & Clerk
Attys

March 5, 1929. J. G. V. ASTRUC 1,704,585

RECLINING ARMCHAIR

Filed Feb. 12, 1926 4 Sheets-Sheet 2

Fig. 3



J. G. V. Astruc
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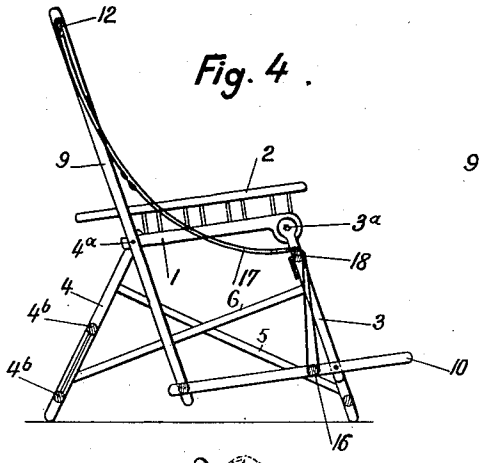
By: Marks & Clark
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March 5, 1929. J. G. V. ASTRUC 1,704,585

RECLINING ARMCHAIR

Filed Feb. 12, 1926 4 Sheets-Sheet 3

Fig. 4.



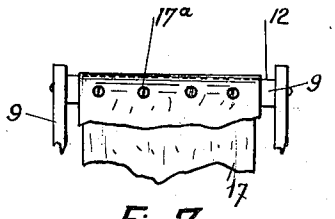


Fig.7

Fig. 5

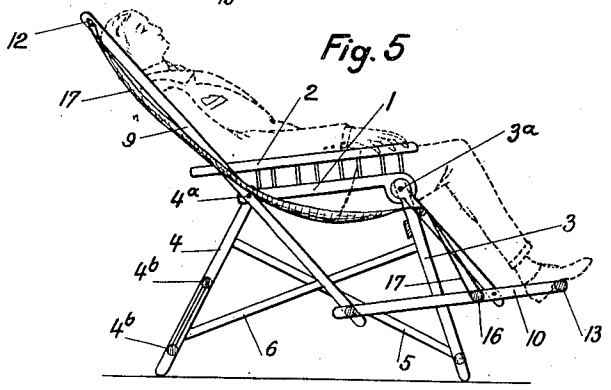
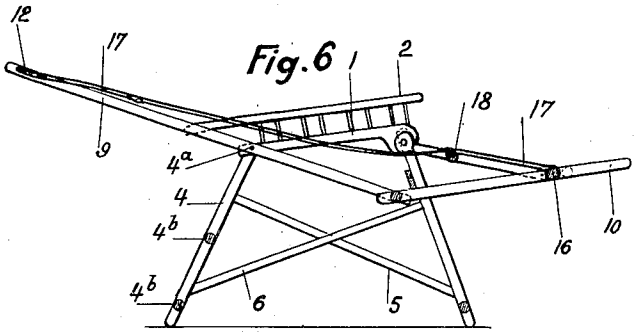


Fig. 6



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March 5, 1929. J. G. V. ASTRUC 1,704,585

RECLINING ARMCHAIR

Filed Feb. 12, 1926 4 Sheets-Sheet 4

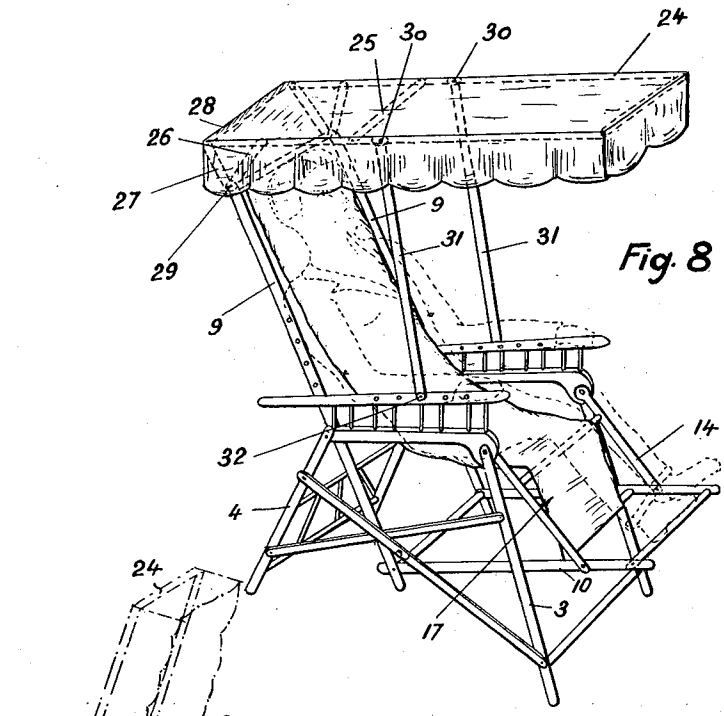


Fig. 8

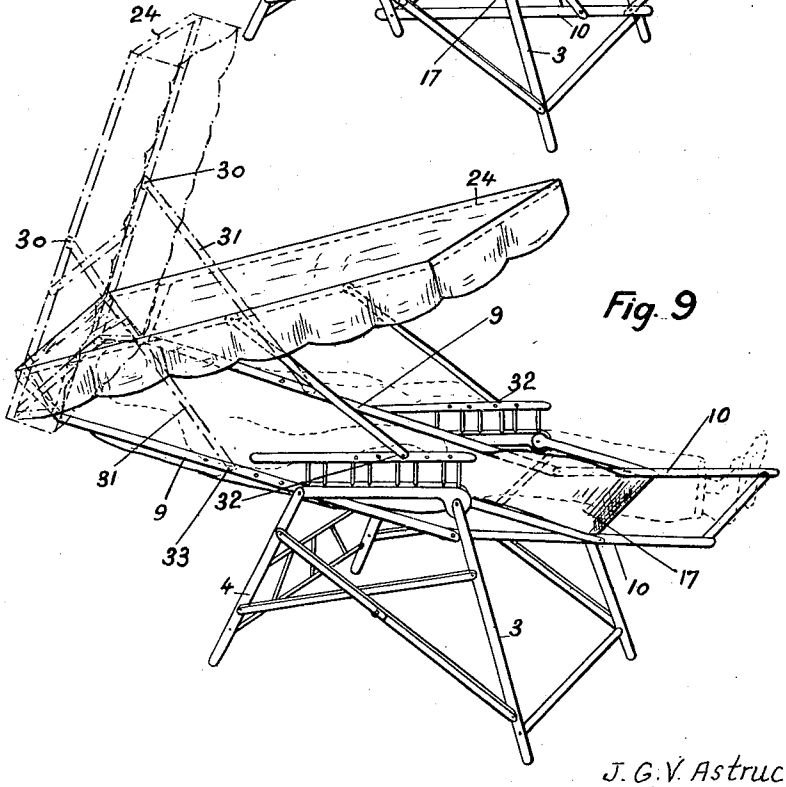


Fig. 9

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Patented Mar. 5, 1929. 1,704,585

UNITED STATES PATENT OFFICE.

JEAN GABRIEL VICTOR ASTRUC, OF CASTRES, FRANCE.

RECLINING ARMCHAIR.

Application filed February 12, 1926. Serial No. 87,902.

This invention relates to arm-chairs of the type comprising in combination a supporting frame of rigid or collapsible structure and a swinging or rocking frame pivotally mounted upon the former and provided with cross-bars carrying between them a loose piece of canvas or the like forming back and seat portions adapted to afford a certain sag so as to permit the user to comfortably occupy the arm-chair and by tilting the position of said swinging frame with respect to said supporting frame by a mere motion of his body to utilize said arm-chair in different positions whereby it can play the part of a lounge arm-chair, of a deck arm-chair or even of a cot or hammock when completely extended.

Various reclining arm-chairs appertaining to the above-cited type have already been proposed but they all present very objectionable disadvantages the chief ones of which are their lack of stability and the impossibility that the user when seated in the arm-chair experiences for maintaining at all times the relative positions of the stationary and swinging frames particularly when he partly or wholly loses the control of the equilibrium or movements of his body when for instance he slumbers or falls asleep.

The present invention has for its primary object to overcome the aforesaid disadvantages by the provision of improved automatic braking means which once applied to the reclining arm-chairs of the above-mentioned type give them a much greater stability whilst permitting to automatically maintain the swinging frame in any angular position in which it has been rocked by the user occupying the arm-chair with relation to the stationary frame whereby as long as said user does not intentionally rock or tilt said swinging frame backward or forward to modify the angular position of rest of his body, said relative positions of the two frames remain unchanged irrespective of the time during which the occupier is seated therein, i. e. even if he naps or falls asleep.

A further object of the invention resides in the provision of improved additional controllable braking means which when applied to the above-cited reclining arm-chairs make it possible for the occupier to regulate the rocking or tilting movement of the swinging frame with respect to the stationary frame regardless of the action of the automatic braking means, whereby the latter action may be left free to operate by itself or may be assisted to any desired extent.

A still further object of the invention resides in the provision upon the said arm-chairs of an automatically rocking roof or tester of readily removable structure adapted for affording the required sheltering position and for following the rocking or reclining motions of the swinging frame once it has been secured thereon.

Briefly stated, the improvements according to the present invention consist primarily in so arranging to one another the members making up the swinging frame and particularly the cross-bars between and upon which is loosely held the piece of canvas or the like forming the seat proper as to cause the lower portion of said canvas extending from the lower cross-bar to an intermediate cross-bar to be in use constantly stretched taut therebetween and thus to frictionally engage said intermediate cross-bar whilst the remainder of the length of canvas sags more or less to comfortably fit and support the body of the occupier according to the very position of rest that he has selected, said frictional engagement producing an automatic braking effect which is the bigger as the occupier's body is heavier and needs it more, which braking effect ensures that regardless of the occupier's position the relative positions of the two frames will be maintained without requiring any attention or effort whatever on his part, the swinging frame being nevertheless readily rockable by said occupier with only a small stress if he wishes to do so at any time. Secondarily and subsidiarily the improvements according to the present invention consist to provide each pivotal axis embodied in the swinging frame, i. e. each spindle on which said frame may be rocked or tilted with respect to the stationary frame or alternatively only some of said spindles with braking members adapted to act in conjunction with companion braking members on the stationary frame and placed within easy reach of the occupier so as to be at all times under his dependency, whereby as a supplementary precaution he can at will enhance the action of the automatic braking means and thus still more invariably maintain to each other in the relative angular positions that he has selected the said two frames. Tertiarily the improvements according to the present invention consist in so removably associating an articulated

rockable roof or tester with the upper part of the swinging frame as to provide at all times an efficient self-adjusting shelter for the occupier of the arm-chair thus greatly adding to the comfort of said arm-chair.

In order that the invention may be more readily understood and carried into effect, it will now be described more in details with reference to the accompanying drawings wherein are shown by way of examples several arm-chairs of the aforesaid type embodying the improvements according to the present invention.

Figure 1 is a side elevational diagrammatic view of a reclining arm-chair of a collapsible structure having a part of the said improvements applied thereto, illustrating the position of rest of the occupier.

Figure 2 is an isometric view of an embodiment of the auxiliary braking device whereby the two frames may be firmly maintained in their relative angular positions.

Figure 3 is a similar view to Figure 1 but showing a reclining arm-chair of a rigid structure also having a part of the said improvements applied thereto.

Figures 4, 5 and 6 are diagrammatic sectional views drawn to a smaller scale illustrating three different positions that the swinging frame of an arm-chair of collapsible structure according to the invention may take with respect to its stationary frame.

Figure 7 is a detached view of a constructional detail.

Figures 8 and 9 are perspective views also drawn to a smaller scale illustrating two different positions of the swinging frame with respect to the stationary frame and the corresponding positions occupied by the articulated tester carried by said swinging frame, the chain lines in Figure 9 showing an alternative position of said tester.

Like reference characters designate like parts throughout the several views.

Reference being first had to Fig. 1 wherein is shown the preferred collapsible structure of arm-chair to which the improvements are to be applied, assuming the tester to be omitted, the supporting frame preferably of wood is made up of two substantially horizontal or slightly inclined bars 1 carrying suitably shaped arm-rests 2 and two pairs of legs 3 and 4 respectively pivoted to said bars at points 3^a and 4^a adjacent their ends, the fore legs 3 being braced transversely by a tie-bar 3^b whilst the rear legs 4 are braced transversely by similar tie-bars 4^b, said legs 3 and 4 being moreover braced longitudinally on each side by slightly flexible crossed stays 5 and 6 pivotally mounted upon them at 3^c, 3^d and 4^c, 4^d to render said supporting frame collapsible and thus more easily transportable, each stay 6 being provided substantially midway of its length with a safety wedge 7 adapted for engaging the side edge of the other stay 5 to lock same in the extended position as shown and thus prevent accidental collapse, such stay 5 being in turn in two jointedly connected sections and provided with a knob 8 for angularly displacing its sections.

The swinging frame mounted within the supporting frame that has just been described is also preferably made of wood and comprises two pairs of arms 9 and 10 articulated at their inner ends as at 11, said points 11 being advantageously connected by a cross-rod (not shown) and connected in pairs at their outer ends by cross-bars 12 and 13, the cross-bar 12 serving to support one end of the canvas 17 whereas the cross-bar 13 acts as a foot-rest. Each arm 9 is furthermore pivoted intermediate its ends upon the pin or spindle 4^a so as to swing about same as will be further described hereafter. Upon each of the pins or spindles 3^a and advantageously against the inner face of the arm 1 is pivotally secured one end of a strut 14 having its other end pivotally secured to a pin 15 so positioned intermediate the ends of the arm 10 as to maintain such strut 14 substantially parallel to the arm 9 and thus to give the swinging frame pivotally supported upon the stationary frame at the two points 3^a and 4^a a parallelogrammic structure. To the rear of the pins 15, i. e. between the latter and the pins 11 and at a distance from said pins 15 which may for example vary from one to three inches is arranged at right angles to the pair of arms 10 a cross-bar 16 preferably of rounded section which is firmly secured to the said arms 10. Upon this cross-bar is secured or carried one end of the loose piece of canvas 17 which forms the seat proper and is secured or carried at its other end upon the cross-bar 12 uniting the upper ends of the upwardly extending arms 9. Intermediate its ends the canvas 17 is slidably supported upon another cross-bar 18 also of rounded but preferably circular or elliptic section which is rigidly secured to and transversely braces the struts 14. As illustrated, the piece of canvas may be single or double. When it is single, it has one of its ends attached to the cross-bar 12 (see Fig. 7) by any suitable fastening members such as screws 17^a or preferably folded over this cross-bar and stitched to the back of the canvas at a few inches from said cross-bar; it has its opposite end similarly attached direct to the cross-bar 16 or looped and stitched over same. When it is double, it forms so to speak an endless loop which passes around the cross-bars 12 and 16 and upon the intermediate cross-bar 18; in this case said loop may have its two adjacent ends connected to each other by any suitable means such as by a tape passing through eyelets formed in said ends whereby the total length of the loop may be kept constant since any stretching or

shrinking of the canvas may be taken up and moreover said canvas may be removed, particularly for cleaning or disinfecting purposes, this being of great value when for instance such arm-chairs have to be used on board ships or in such places as sanatoria.

As will be readily seen from the drawings, whereas when the arm-chair is at rest (Fig. 4) the canvas 17 loosely "floats" so to speak between the cross-bars 12 and 16 and upon the intermediate cross-bar 18, as soon as a person occupies the arm-chair and regardless of the incline of the swinging frame relatively to the stationary frame, the portion of the canvas 17 (either single or double) extending between the upper cross-bar 12 and the intermediate cross-bar 18 affords a certain downward sag as clearly shown in Figs. 1, 3 and 5 in which sag or depression is comfortably supported the back of the occupier who at the same time can put his arms or hands upon the arm-rests 2 and abut his feet against the lower cross-bar 13. By this arrangement, the shorter portion of the canvas 17 extending between the cross-bars 16 and 18 is kept taut at all times due to the sag of its remaining longer portion extending between the cross-bars 12 and 18 and owing to this tightness the said canvas frictionally engages the intermediate cross-bar 18 and produces a braking effect which dampers the tilting or reclining motion of the swinging frame. The frictional engagement of the canvas 17 upon the cross-bar 18 can be accounted for by the fact that the length of said canvas extending between the cross-bars 16 and 18 necessarily varies according to its greater or lesser obliquity (such length being maximum when it occupies a substantially vertical position as in Fig. 4) since the curvilinear paths followed by the centres of the cross-bars 16 and 18 are eccentric to each other and accordingly the distance between such centres constantly varies when they move along their paths, i. e. when the swinging frame is being tilted whereby a length of said canvas frictionally passes beyond the cross-bar 18 and thus modifies the ratio of the respective lengths of the sagging and taut portions whilst slightly increasing or decreasing said sagging portion of the canvas according to the swinging frame being tilted off or toward the vertical. As self-explanatory, the resistance offered by the canvas 17 to frictionally pass beyond the intermediate cross-bar 18 of adequate contour in the one or the other direction when the occupier tends to tilt the swinging frame in the corresponding direction produces the automatic breaking effect which has to be wantonly overcome by said occupier to actually tilt said frame and thus modify his position of rest. It will be noted that whereas the frictional engagement of the canvas with the cross-bar 18 is very small when there is nobody in the arm-chair (as in the case of Fig. 4), said frictional engagement considerably increases when the arm-chair is occupied by a person the more so as the latter is heavier and requires a more powerful braking action. Thus the amplitude of such automatic braking action is automatically rendered proportionate to the requirements as enforced by the weight of the occupier.

Furthermore, according to the invention, additional braking means also adapted to take up the wear or play between the parts of the arm-chair adjacent its pivotal connections are provided. As clearly illustrated by way of example in the fragmentary view of Fig. 2, the adjacent end portions of the bars 1 and struts 14 are made of increased width so as to provide two juxtaposed lugs 1^a and 14^a. Such lugs and the upper part of each of the fore legs 3 are traversed by a pin or spindle 3^a which preferably has its outer end $3^{a'}$ of circular cross section and screw-threaded, its inner end $3^{a''}$ engaging the lug 14^a also of circular cross section and smooth and its middle portion $3^{a'''}$ engaging the lug 1^a of square cross section so as to be prevented from rotating. Upon the outer end of said spindle 3^a protruding out of the leg 3 is screwed up an actuating knob 19 whereas its inner end is provided with an integral enlargement or with a separate nut or washer $3^{a''''}$. Between the knob 19 and the leg 3 may be advantageously provided a spring cup or a resilient washer fitting the pin 3^a and adapted to render the braking effect more gentle and more progressive. The peripheral edge of the knob 19 is preferably milled, crenelated or otherwise formed to permit a good grip. As clearly shown in Fig. 1, the knobs 19 are positioned within easy reach of the occupier's hands so that they can be readily actuated with only a small stress for loosening or tightening the pivotal connection between the two frames.

Although this is not represented, it will be readily understood that, if desired, similar additional braking devices of similar structure may be associated with the pivotal axis 4^a by which each of the rear arms 9 of the swinging frame is carried upon the arm 1 and the rear leg 4. When thus associated with each spindle 4^a, these additional braking means are also within easy reach of the occupier's hands and can therefore be readily actuated by him if he wishes to still more assist the action of the automatic braking means or to take up the wear or play as above described. This arrangement will be readily understood by anyone skilled in the art and need not be further described.

Reference being now had to the modification shown in Fig. 3 wherein the structure of the reclining arm-chair is rigid instead of being collapsible, the bars 1 are dispensed with and the legs 3 and 4 are longitudinally braced by stays 20 and 21 connected together by columns 22, the upper stay being

connected to the arm-rest 2 by columns 23. In this embodiment, the pin 3^a that goes through the fore leg 3 may also be fitted with an actuating knob 19 and the upper part of the strut 14 may be a flattened enlargement also traversed by said pin 3^a and adapted for contacting with a corresponding flattened part of the inner face of the leg 3 so as to permit the same additional braking action as in the previous embodiment. This modification might also involve additional braking means associated with the pivotal axis 4^a. The automatic braking action of the canvas 17 upon the intermediate cross-bar 18 takes place identically as in Fig. 1 and need not be further described.

It will be appreciated that there is no limitation of the scope of the invention in applying the additional braking means as above described to the pivots 3^a and 4^a and that, where desirable, similar braking means may be mounted upon the pivots 11 and 15 so as to loosen or tighten the articulability of the parallelogrammic swinging frame formed by the arms 9 and 10 and by the associated struts 14.

Reference being now had to Figures 8 and 9 showing the improved roof or tester as applied to a collapsible arm-chair having the above-described structure and illustrated in perspective in two different reclined positions of its swinging frame, the tester comprises a frame 24 preferably made of wood and of rectangular shape on which is stretched and removably or fixedly attached a piece of canvas, tarpaulin or like material preferably weather-proof and around which hangs the brim of such piece of canvas or the like or a separate border of canvas or the like which may be either narrow, as represented, or much wider to provide two depending flaps or aprons for side sheltering purposes. The longitudinal sides of the tester frame 24 are preferably braced by a cross-rod 25 to have a more rigid structure. They are moreover supported by the one leg 26 of a square the other leg 27 of which is connected to the rear side 28 of the frame 24, the apex 29 of said two-legged square 26—27 being provided with means for pivotally connecting same to the top part of the upwardly extending arm 9 of the swinging frame, such connection of the square and arm 9 being preferably of a readily removable type and consisting for instance of a pressure pin and socket arrangement. At a suitable point 30 intermediate its ends each of the longitudinal sides of the tester frame 24 is provided with a similar pivotal connection upon which is mounted the upper end of a downwardly extending link 31 the lower end of which is similarly pivotally and removably connected at one of a series of pivoting points 32 to the outer edge of the arm-rest 2, a series of alternative pivotal connections being provided at 33 on the arm 9 for a purpose that will presently appear. All the pivotal connections 29, 30, 32 and 33 are of any readily removable type such as a pressure pin and socket type so as to render the tester structure entirely removable to make it possible to use the reclining arm-chair with or without a tester. No limitation is however involved in this and the said connections might be either permanent or less easily removable as for instance constituted by screw-threaded pins and nuts or washers.

When in position upon the arm-chair as illustrated in Fig. 8, the roof or tester is adapted owing to its articulated supporting means as have just been described to follow the forward and backward reclining motions of the swinging frame so as to efficiently shelter the occupier in any position that he may occupy as will be understood from Fig. 9. By this arrangement, the occupier need not worry about the adjustment of the tester since merely by tilting or rocking the swinging frame as above described he causes the said tester to take the proper sheltering position over his body. It will be observed that whereas in the particular position shown in Fig. 8 the links 31 are not parallel to the arms 9 but are upwardly diverging therefrom, they may easily be rendered parallel or downwardly diverging to said arms 9 according to the relative positions of the pivotal points 30 and 32 whereby it will be possible to modify to the extent permitted by the series of pivotal connections 32 the general obliquity of the tester with respect to the swinging frame and to shelter the occupier more or less closely.

As above stated, a series of lower pivotal connections 33 for each link 31 are provided on each arm 9. Owing to this alternative connection, each link may have its lower end pivotally supported at the point 33 instead of at the point 32 so as to occupy the non-collapsible position shown in chain lines in Fig. 9 which is particularly valuable when the occupier wishes for instance to be protected from the wind blowing from the rear whilst remaining exposed to the sun shining forwardly above his head, the position of the tester then adjusting itself automatically when the swinging frame is tilted forward or backward inasmuch as its two pivotal connections 29 and 33 cause same to follow all the movements of said frame.

When supported in its normal position, i. e. when its links 31 have their lower ends pivoted at any of the points 32 on the arm-rests 2, the tester is readily collapsible with the remainder of the arm-chair whereby same even provided with its tester can be brought together under a relatively small volume which makes it a very handy implement for transportation purposes.

Thus whilst being, according to its most

practical embodiments, adapted for being entirely separate from the arm-chair proper so as to permit the latter to be used, if desired, without same, the collapsible roof or tester that has just been described actually partakes of the utility of said arm-chair since it follows each of the reclining motions imparted thereto by the occupier for attaining the required comfort.

Whilst, in accordance with the patent statutes, the preferred constructional embodiments of the invention have been described with reference to the accompanying drawings, it will be appreciated that numerous minor details might be modified without departing from the spirit and scope of the invention as are determined by the subjoined claims.

What I claim and desire to secure by Letters Patent is:—

1. A reclining arm-chair comprising in combination a stationary stable supporting frame, a swinging frame, means pivotally supporting said frame, at two spaced axes upon said supporting frame, said swinging frame comprising articulated members and transverse members, a flexible member secured at its ends to the swinging frame and extending at an intermediate point over a transverse member of said swinging frame to form respective back and seat portions and in loose frictional contact therewith, one of said points of attachment of said flexible member being offset from both of said pivotal axes of the swinging frame whereby movement of said swinging frame on said pivotal axes causes the said point of attachment to approach and recede from said intermediate member and thereby permitting said flexible member to slide frictionally over said intermediate member, said frictional contact acting as a brake to the tilting of said swinging frame.

2. A reclining arm-chair comprising in combination a stationary stable supporting frame, a swinging frame composed of a pair of transversely braced rear arms pivotally supported at the rear of the supporting frame, of a pair of transversely braced fore arms terminally articulated to said rear arms and of a pair of struts pivotally supported at their upper ends to the front of the supporting frame and at their lower ends to opposite points intermediate the length of said fore arms, said struts being parallel to said rear arms, a transverse member connecting said struts adjacent the pivotal axes thereof on said supporting frame, a flexible member forming back and seat portions carried by said swinging frame and passing over said transverse member, means to secure said flexible member at the ends thereof to said swinging frame, one of the ends of said flexible member being secured to the pair of fore arms of said swinging frame at a point off set from the pivotal axes of said strut and fore arm.

3. A reclining arm-chair as claimed in claim 2 in which said transverse member consists of a round cross-bar of substantial cross-section.

4. A reclining arm-chair as claimed in claim 2 in which the point of attachment of the end of the flexible member to the pair of fore-arms is intermediate the pivotal axes of said fore-arm and the rear arms and the struts.

In testimony whereof I affix my signature.

JEAN GABRIEL VICTOR ASTRUC.