Oct. 4, 1960 H. H. MOHLER 2,954,819

ARTICLE OF ADJUSTABLE FURNITURE

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FIG. 1.

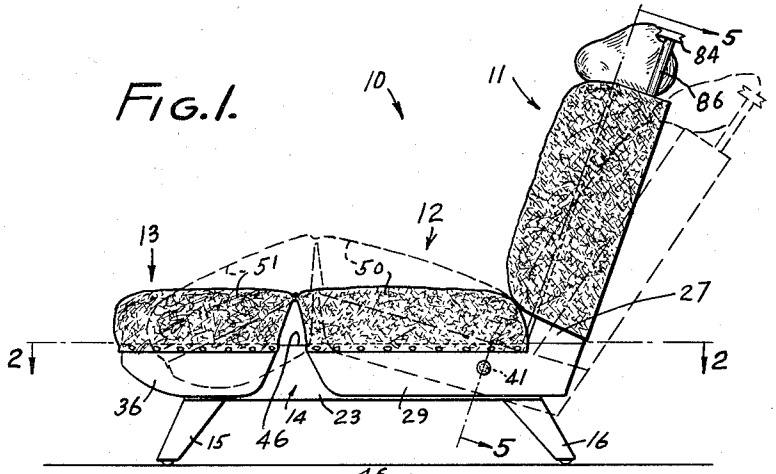


FIG. 2.

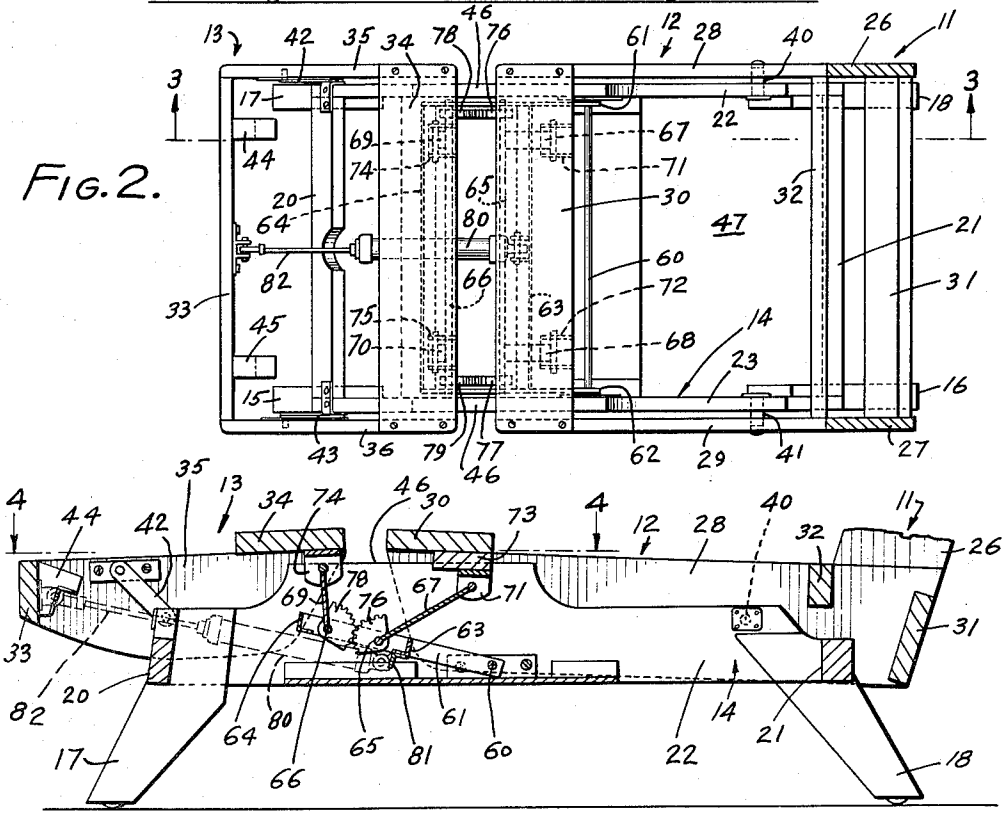


FIG. 3.

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FIG. 6.

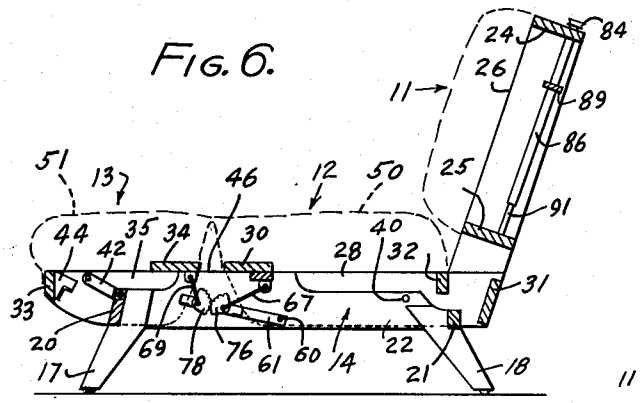


FIG. 8.

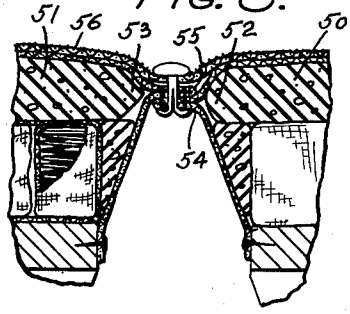


FIG. 7.

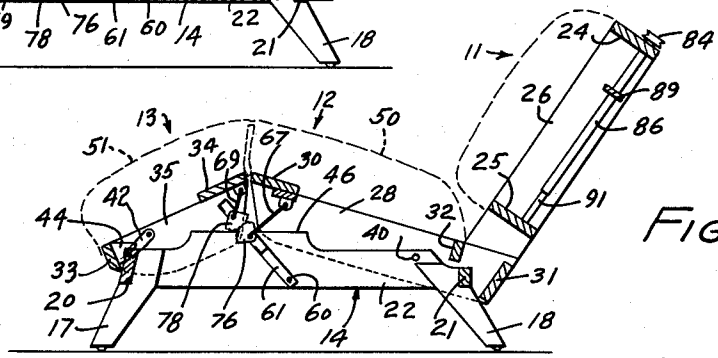


FIG. 4.

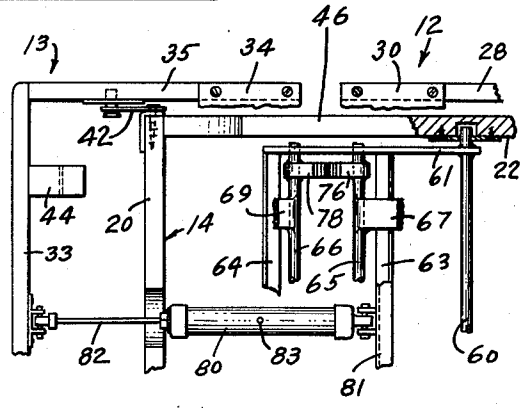
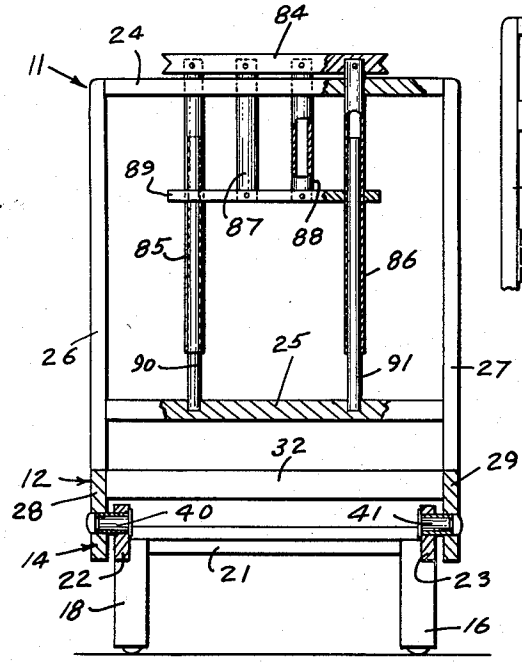


FIG. 5.



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ARTICLE OF ADJUSTABLE FURNITURE

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9 Claims. (Cl. 155—106)

This invention relates to furniture generally, and particularly relates to furniture of the adjustable chair type.

In the current picture of available furniture one will find adjustable chairs and those of the so-called "contour" type. Some of those of the adjustable type are characterized by adjustable backs wherein the back frame is adjustable to varying degrees between sitting and reclining positions. These and others may be further characterized by movable members disposed adjacent the front edge of the seat which, in their extended position, are intended to raise the lower part of the leg so that the calf of the leg rests thereon with the feet off the floor. A distinct disadvantage of such chairs is their massive appearance together with complicated and heavy mechanisms needed to achieve the purpose. The massiveness and inherent weight of such chairs inveigh against their use in the modern decorative schemes prevalent in the homes of today's functional living.

Chairs of the contour type represent a further attempt to add to living room comfort principally by configuration. In a chair of this type a person must raise his lower legs for resting on an elevated portion of the chair in a more horizontal position and at a level with his heart. The theory of such a chair is that the heart then has less work to do in pumping the blood from the feet and lower legs. But by the very virtue of their configuration such chairs must have dimensions which preclude their use in the more modestly sized living room. Too, this type chair is not favored by the feminine sex by reason of the possible embarrassment arising out of the need to independently raise or lower the legs and the elevated position of the legs when at rest on the chair.

The present invention overcomes many of the problems of living room chair comfort with a different approach. It is an object of this invention to provide an article of furniture, namely a chair having a seat and back frame member and an ottoman frame member, the seat portion and ottoman including surfaces lying in a common horizontal plane when the members are in a normal position with the back in substantially upright position. The novelty of the invention resides in the positive cooperation of the various members when the seat member is caused to be moved from its normally horizontal disposition on its pivotal connection with the article's base to an inclined rest position, the ottoman member being caused to follow to an inclined angle substantially opposite to the inclination of the seat.

The cooperative action of the various parts is such that a person sitting in the chair can cause it to move to the normally horizontal position from the inclined rest position or vice versa with the very light application of forces to the back or seat with the back or legs of the person's body.

A particular feature of the chair embodying the invention is the moderate stretching force exerted between the upper and lower legs at the knee joint when the chair is moved from normal to rest positions, thereby

contributing materially to the relaxation of the lower body members. A moderate stretching also occurs at the ankle joint between the feet and lower legs by the inclination of the ottoman member.

Referring to the drawings wherein a preferred embodiment is shown, it being apparent that there will be other embodiments coming within the scope and spirit of the invention:

Fig. 1 shows a side elevation view of a chair constructed according to the invention, the normal and rest positions being shown respectively in full and dashed lines;

Fig. 2 shows a sectional plan view taken on the line 2—2 of Fig. 1;

Fig. 3 shows a sectional elevation view taken on the line 3—3 of Fig. 2 with the seat and ottoman members displaced slightly upwardly;

Fig. 4 shows a fragmentary view partly cut away, taken on the line 4—4 of Fig. 3;

Fig. 5 shows a sectional front elevation view taken on the line 5—5 of Fig. 1;

Fig. 6 shows a sectional side elevation view with the chair in the normal position;

Fig. 7 is similar to Fig. 6 but with the members moved to the rest position; and

Fig. 8 is an enlarged fragmentary detail view of the joinder of the seat and ottoman cushions.

Referring to Fig. 1, the chair **10** is shown as provided with a back frame member **11**, a seat frame member **12**, and an ottoman frame member **13**, all of which may be suitably cushioned and upholstered as shown. The members **11**, **12**, and **13** are cooperatively arranged on the base member **14** which is provided with legs **15**, **16**, **17**, **18**. While the chair **10** is illustrated without arms, it is apparent that suitable arm members may be provided secured to the back or seat as desired.

It will be apparent at once that all of the operative mechanism to be described is confined within the frame members, thereby doing away with the requirement for bulky arms or side panels to conceal operative parts from view.

The base member **14** comprises front and back rails **20**, **21** and side rails **22**, **23**, respectively, to which the feet are secured. The back frame member **11** includes a top frame rail **24** and an intermediate rail **25** separating the side frame rails **26**, **27**, which latter are secured to the side frame rails **28**, **29**, respectively, of the seat **12** in a manner well known in the art. The forward ends of the side rails **28**, **29** of the seat frame **12** are secured to the front cross rail **30** while a rear cross rail **31** joins the back ends of the rails **28**, **29**. A corner reinforcing rail **32** is disposed as shown to serve as a rest member for the back member of the seat cushion frame (not shown) and to reinforce the joint of the back and seat side rails, all of which is standard practice in the furniture art.

The ottoman member **13** comprises front and back rails **33**, **34** and side rails **35**, **36**, joined together in like manner to the other members.

The back and seat members **11**, **12**, working together as an integral assembly, are arranged for pivotal movement with respect to the base member **14** about the pintles **40**, **41** secured on the base member **14**.

The ottoman member **13** has a moving connection with the base member **14** comprising the links **42**, **43** which are swivelly connected to the ottoman and base members, all as clearly shown. Movement of the ottoman member **13** with respect to the base member **14** is restricted by a pair of stops **44**, **45** glued or otherwise secured to the front rail **33** of the ottoman member and adapted to contact the front cross rail **20** of the base member, as best shown in Fig. 7. The front cross rail **30** and back rail

34 of the seat and ottoman members, respectively, will rest on the top surface 46 of the side rails 22, 23 of the base member 14 when the chair is in its normal horizontal position.

The cushions which are mounted on the various members are of standard construction and mounted in a manner that is well known. In general, it may be stated that the cushions comprise a wood frame having webbing strips secured thereto to support springs, foam rubber, cotton batting, hair, and other filler materials, all enclosed in an under cover material. Upholstering material of choice is then tacked or otherwise secured over the under cover.

It will be noted in the present invention that there is no mechanism or other frame member parts disposed within the zone designated by the numeral 47 in Fig. 2. This zone 47 is under that portion of the seat member 12 which takes the greatest weight of a person sitting or reclining in the chair, hence the seat cushion may be provided with deep springs which extend below the top sides of the base and seat member side rails. The construction may be such that the cushion frame is disposed on the seat rails but overhangs inwardly to allow clearance for the base side rails 22, 23.

As will be noted hereinafter, the ends of the side rails 28 and 35 and of the side rails 29 and 36 of the seat and ottoman members, respectively, approach each other when the members move from their normal horizontal position to the angularly disposed inclined rest position. The approach is angularly, hence the bottom edges of the rails execute the greater dimensional linear movement. Therefore, it is preferred that the seat and ottoman cushions 50, 51 overhang their adjacent ends 52, 53, as more particularly shown in Fig. 8. The aforesaid under covers of the cushions are likewise preferably constructed with lips 54, 55 disposed as shown.

These lips are joined as by sewing, after which the material 56 with which the cushions are to be covered is laid on the cushions and the sides tacked to the cushion frames. The material 56 may be in one piece for both the cushions and cut in such a manner that inverted V-shaped cutouts appear at the overhang of the cushions. In that event the V-shaped cutout may be closed with a gusset sewn to the edges thereof. It is also preferred that the material 56 be secured to the lips 54, 55, desirably with a row of buttons extending transversely and along the lips. The V-shaped cutouts and the preferred gusset construction are, however, not essential to the practice of the invention.

This type of construction results in a bend or "break" line in an unbroken length of upholstering material. That is, when the frame members are moved there is a virtual or imaginary hinge line existing adjacent the line of joinder, and this "break" or hinge line may be described as movable parallelwise about the axis of pivotal movement of the seat member 12 about the pintles 40, 41. It is readily seen that by providing the upholstery material for both ottoman and seat cushions in a single piece the possibility of pinching trouser or dress material between the cushions is obviated.

Another feature of the invention is the means for providing cooperative action between the seat and ottoman members. To this end the seat and ottoman members are interconnected with links and, in the preferred embodiment shown, the interconnection includes actuator arms pivotally mounted on the base member 14, all of which will now be described.

Extending from side to side of the base and pivotally mounted therein is an actuator arm shaft 60. Secured thereon, as by brazing, are the actuator arms 61, 62. The arms may have braces secured thereto and comprising angle irons 63, 64 for providing rigidity. Spaced apart and located between the brace irons 63, 64 are disposed the link shafts 65, 66 arranged to be freely rotatable in journal bores provided in the arms 61, 62. The axes of

the actuator arm shaft 60 and of the link shafts 65, 66 are all substantially parallel to each other and to the axis of the pintles 40, 41.

Secured, as by brazing, to the link shaft 65 are the seat links 67, 68, while the ottoman links 69, 70 are similarly secured to the link shaft 66. The seat links 67, 68 have a swivel connection with the brackets 71, 72 mounted on a block member 73 secured to the under side of the front rail 30 of the seat frame member 12. Likewise, the ottoman links 69, 70 have a swivel connection with the brackets 74, 75 secured to the under side of the back rail 34 of the ottoman frame member 13.

From the construction thus far described, and referring particularly to Figs. 6, 7, and 8, it is now seen that when the seat member is moved clockwise, for example, about its pivot pintles 40, 41, the links 67, 68 will exert a pull on the actuator arms 61, 62 and cause them to pivot clockwise around the axis of the arm shaft 60. At the same time (and absent further interconnecting mechanism) the seat cushion 50 will exert a pull on the ottoman cushion 51 through the joined lips 54, 55, respectively, causing the ottoman member to follow the upward movement of the seat member. The following movement of the ottoman is assisted by the action of the arms 61, 62 manifested through the ottoman links 69, 70, with the swivel links 42, 43 contributing to the overall integrated action of ottoman member with respect to the seat member. As the ottoman links 42, 43, and 69, 70 travel "over center" the ottoman member tends to position itself in the final rest position without any substantial pull force being exerted by the seat on the ottoman through the cushion lips 54, 55. The positioning action is thus positively accomplished.

However, it is desirable that the various members position themselves without forces being exerted through the cushion lips 54, 55, and to this end the preferred embodiment includes interconnecting means through which such actuating forces are applied and whereby a line through the lips constitutes merely a virtual hinge line.

There are thus provided sector gears 76, 77, brazed or otherwise secured to the link shaft 65, in mesh with similar sector gears 78, 79 secured to the link shaft 66. Since the meshed gears 76 and 78 have a secured connection with the links 67 and 69, respectively, and the gears 77 and 79 with the links 68 and 70, respectively, it is seen that the ottoman member 13 is positively moved in cooperation with and upon the movement of the seat member 12. The cooperative movement, as occasioned by the geometrical location of the axes of pivotal movements of the various links, arms, and other members is such that the adjacent top edges of the overhung ends 52 and 53 of the cushions 50 and 51, respectively, remain substantially adjacent each other in all positions of movement of the seat and ottoman members 12 and 13 between the normal and rest positions regardless of whether or not the cushions have lips 54 and 55 joined to each other.

Indeed, such coordinated action is quite necessary if the lips are joined. Otherwise the members might become locked in one position.

Another feature provided in the article of this invention is the provision for cushioning the action. To this end there is provided a piston and cylinder type dashpot means 80 hingedly secured to a crossbar 81 fastened to the angle iron brace 63. The piston rod 82 is swivelly connected to the front rail 33 of the ottoman member 13. The piston (not shown) within the dashpot means is of the double-acting type tending to compress the air at each end of the cylinder. In order to provide dashpot action the piston may be provided with a calibrated orifice providing a passageway from face to face of the piston. The structure briefly described is well known in the art and requires no further detailed analysis.

The dashpot means 80 may be further characterized by an air passage hole 83 through the cylinder wall intermediate the ends thereof so as to allow relatively free

movement of the piston during the first half of its movement from either end of the cylinder. By this construction the ottoman and seat members move smoothly and quickly through the first half of the movement from normal to rest positions (or vice versa), and with cushioned dashpot action during the last half of the movement so as to not cause a discomforting jar to the person occupying the chair.

A further feature distinguishing the chair is the provision for a disappearing pillow rest at the top of the back member (Figs. 1 and 5). A fashioned top slat **84** has secured to it two outer slides **85**, **86** and a pair of shorter intermediate slides **87**, **88** arranged to slide through holes provided in the top frame rail **24** of the back member **11**. The lower slat **89** is secured to the lower ends of the intermediate slides **87**, **88** below the rail **24**. Preferably, the outer slides **85**, **86** are tubular and arranged to receive therewithin the guide rods **90**, **91** which are secured to the intermediate rail **25** of the back **11**. The tubes **85**, **86** are slidable over the rods **90**, **91** with just enough friction that the pillow rest is easily raised by hand and yet will stay in position once raised.

I claim:

1. An article of lounge-type furniture arranged for movement of members thereof to a plurality of positions, comprising: a base member; a seat and back first frame member provided with a seat surface portion and pivotally mounted with respect to said base member; an ottoman second frame member provided with a leg surface portion and including a link connection with said base member, said frame members being disposed on said base member with their surface portions substantially coextensive; an actuator arm pivotally mounted on said base member; link means connecting said frame members to said actuator arm; and gear means interconnecting said frame members for providing positive cooperative action therebetween through said link means and said actuator arm, whereby when said frame members are in one position with respect to said base member a plane is defined by the surface portions of said frame members with edges of the respective surface portions engaging adjacent a break line on said plane, the break line being substantially parallel to the axis of pivotal movement of said first frame member on said base member, and when said frame members are moved to another position the planes defined by the respective frame member surface portions intersect at an angle along the break line, the break line remaining substantially parallel to the aforesaid pivotal axis during movement of the members.

2. An article of lounge-type furniture arranged for movement of members thereof to a plurality of positions, comprising: a base member; a seat and back first frame member provided with a seat surface portion and pivotally mounted with respect to said base member; an ottoman second frame member provided with a leg surface portion and including a link connection with said base member, said frame members being disposed on said base member with their surface portions substantially coextensive; an actuator arm pivotally mounted on said base member; first link means connecting said first frame member to said actuator arm, and including a first gear means secured to said first link means and pivotally mounted on said actuator arm; and second link means connecting said second frame member to said actuator arm, and including a second gear means secured to said second link means and pivotally mounted on said actuator arm in mesh with the first gear means, the first and second gear means thereby providing positive cooperative action between said frame members through said first and second link means and said actuator arm, whereby when said frame members are in one position with respect to said base member a plane is defined by the surface portions of said frame members with edges of the respective surface portions engaging adjacent a break line on said plane, the break line being substantially parallel to the axis of pivotal movement of said first frame member on said base member, and when said frame members are moved to another position the planes defined by the respective frame member surface portions intersect at an angle along the break line, the break line remaining substantially parallel to the aforesaid pivotal axis during movement of the members.

3. An article of lounge-type furniture arranged for movement of members thereof to a plurality of positions, comprising: a base member; a seat and back first frame member provided with a seat surface portion and pivotally mounted with respect to said base member; an ottoman second frame member provided with a leg surface portion and including a link connection with said base member, said frame members being disposed on said base member with their surface portions substantially coextensive; resilient movement resisting means connected between two of said members for cushioning and resisting at least a portion of the movement therebetween; an actuator arm pivotally mounted on said base member; first link means connecting said first frame member to said actuator arm, and including a first gear means secured to said first link means and pivotally mounted on said actuator arm; and second link means connecting said second frame member to said actuator arm, and including a second gear means secured to said second link means and pivotally mounted on said actuator arm in mesh with the first gear means, the first and second gear means thereby providing positive cooperative action between said frame members through said first and second link means and said actuator arm, whereby when said frame members are in one position with respect to said base member a plane is defined by the surface portions of said frame members with edges of the respective surface portions engaging adjacent a break line on said plane, the break line being substantially parallel to the axis of pivotal movement of said first frame member on said base member, and when said frame members are moved to another position the planes defined by the respective frame member surface portions intersect at an angle along the break line, the break line remaining substantially parallel to the aforesaid pivotal axis during movement of the members.

4. A chair including seat and ottoman members arranged for movement from a normal position, comprising: means on said seat member including a top surface thereof defining a substantially horizontal plane when said seat member is in its normal position; means on said ottoman member including a top surface thereof defining a substantially horizontal plane when said ottoman member is in its normal position, the planes so defined being congruent in the normal position of said members, an edge of each of said top surface means being arranged substantially adjacent each other and thereby defining a break line lying on said congruent planes; a base member arranged to support said seat and ottoman members; movable connecting means including pivotal and link means between said seat and ottoman members and said base member, for providing movement including rocking motion of said seat and ottoman members with respect to said base member; and interconnecting means linking said seat and ottoman members, the arrangement of said movable connecting means and of said interconnecting means being such that the defined planes of said seat and ottoman members assume an angle to each other along the break line when said seat and ottoman members are moved from their normal position, with the edges of each of said top surface means retaining substantially the same adjacent relationship to each other in all positions of said chair, the break line thereby constituting a virtual hinge line between said edges of said top surfaces of said seat and ottoman members.

5. A chair including seat and ottoman members arranged for movement from a normal position, compris-

ing: means on said seat member including a top surface thereof defining a substantially horizontal plane when said seat member is in its normal position; means on said ottoman member including a top surface thereof defining a substantially horizontal plane when said ottoman member is in its normal position, the planes so defined being congruent in the normal position of said members, an edge of each of said top surface means being arranged in joined relation to each other and thereby defining a break line lying on said congruent planes; a base member arranged to support said seat and ottoman members; means providing a pivotal connection between one of said members and said base member; means providing a movable connection between the other of said members and said base member; and interconnecting means including at least two pivoted link means arranged in series and linking said seat and ottoman members, the arrangement of said pivotal and connection means and of said interconnecting means being such that the defined planes of said seat and ottoman members assume an angle to each other along the break line when said seat and ottoman members are moved from their normal position, the break line thereby constituting a virtual hinge line between said edges of said top surfaces of said seat and ottoman members.

6. Mechanism for providing cooperative movement between the base member and first and second frame members of an article of furniture, comprising: an actuator arm provided with pivotal means at one end thereof adapted to pivotally secure said one end of said arm to one of said members; first link means having a pivotal connection at one end with said arm and adapted at the other end to be pivotally secured to another of said members; second link means having a pivotal connection at one end with said arm and adapted at the other end to be pivotally secured to the remaining one of said members; and interconnecting means including gear means between said link means arranged to provide cooperative action between said link means and the members to which they are pivotally secured, said actuator arm being adapted to provide further cooperative action between said one of said members and the others of said members.

7. An article of furniture arranged for movement of members thereof to a plurality of positions, comprising: a base member; a first frame member provided with a surface portion and pivotally mounted on said base member; a second frame member provided with a surface portion and provided with a single link connection having one end pivoted thereto and the other end pivotally mounted on said base member, said frame members being disposed on said base member with their surface portions substantially coextensive; first link means having a pivotal connection with one of said members; second link means having a pivotal connection with another of said members; arm means having a pivotal connection with the remaining one of said members and pivotal connections with both said link means; and interconnecting means between said first and second frame members and providing positive cooperation therebetween solely through the agency of said link and arm means, whereby when said frame members are in one position with respect to said base member a plane is defined by the surface portions of said frame members with edges of the respective surface portions engaging adjacent a break line on said plane, the break line being substantially parallel to the axis of pivotal movement of said first frame member on said base member, and when said frame members are moved to another position the planes defined by the respective frame member surface portions intersect at an angle along the break line, the break line remaining substantially parallel to the aforesaid pivotal axis during movement of the members.

8. An article of furniture arranged for movement of members thereof to a plurality of positions, comprising: a base member; a first frame member provided with a surface portion and pivotally mounted on said base member; a second frame member provided with a surface portion and provided with a single link connection having one end pivoted thereto and the other end pivotally mounted on said base member, said frame members being disposed on said base member with their surface portions substantially coextensive; an actuator arm pivotally mounted on one of said members; link means connecting the others of said members to said actuator arm; and interconnecting means providing positive cooperation between two of said members solely through the agency of said link means and said actuator arm, whereby when said frame members are in one position with respect to said base member a plane is defined by the surface portions of said frame members with edges of the respective surface portions engaging adjacent a break line on said plane, the break line being substantially parallel to the axis of pivotal movement of said first frame member on said base member, and when said frame members are moved to another position the planes defined by the respective frame member surface portions intersect at an angle along the break line, the break line remaining substantially parallel to the aforesaid pivotal axis during movement of the members.

9. An article of furniture arranged for movement of members thereof to a plurality of positions, comprising: a base member; a first frame member provided with a surface portion and pivotally mounted on said base member; a second frame member provided with a surface portion and provided with a single link connection having one end pivoted thereto and the other end pivotally mounted on said base member, said frame members being disposed on said base member with their surface portions substantially coextensive; an actuator arm pivotally mounted on said base member; link means connecting said frame members to said actuator arm; and interconnecting means providing positive cooperation between said frame members solely through the agency of said link means and said actuator arm, whereby when said frame members are in one position with respect to said base member a plane is defined by the surface portions of said frame members with edges of the respective surface portions engaging adjacent a break line on said plane, the break line being substantially parallel to the axis of pivotal movement of said first frame member on said base member, and when said frame members are moved to another position the planes defined by the respective frame member surface portions intersect at an angle along the break line, the break line remaining substantially parallel to the aforesaid pivotal axis during movement of the members.

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