United States Patent

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[54] **UNISON ACTION RECLINER**
9 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **297/300,** 297/88
[51] **Int. Cl.** **A47c 3/00**
[50] **Field of Search** ..... 297/300-—306, 88

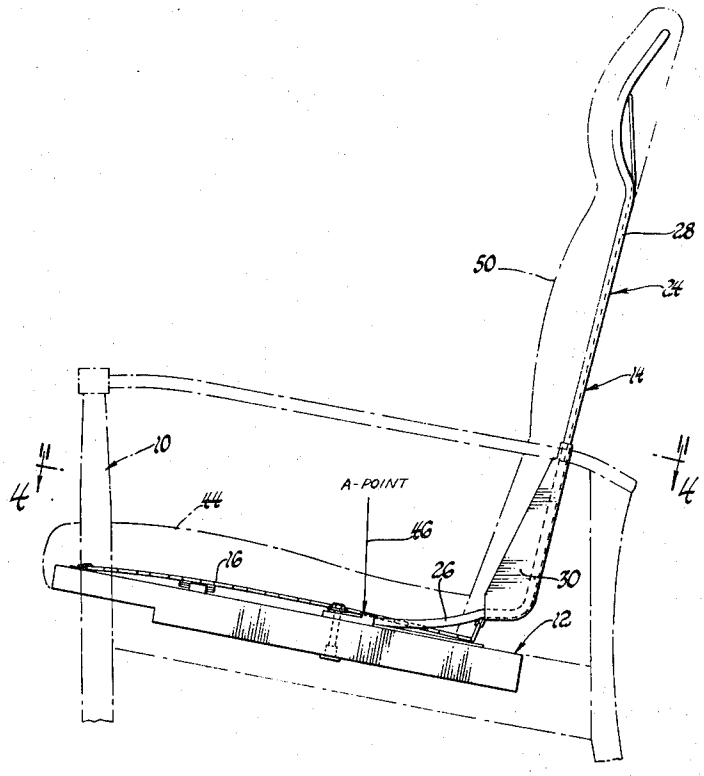
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ABSTRACT: In a preferred form, the present invention relates to reclining type seating structures wherein a resilient backrest is utilized both to absorb some of the seating load as well as to resiliently support the back of a person when the recliner is either in an upright or in a reclined position. A formed spring wire member provides a border frame for the backrest and has an intermediate rigid portion between two resilient areas, the rigid portion having attached thereto a portion of the seating structure so that one resilient area of the backrest serves to resiliently support the seating load and another resilient area resiliently supports the back of a person sitting in the chair.



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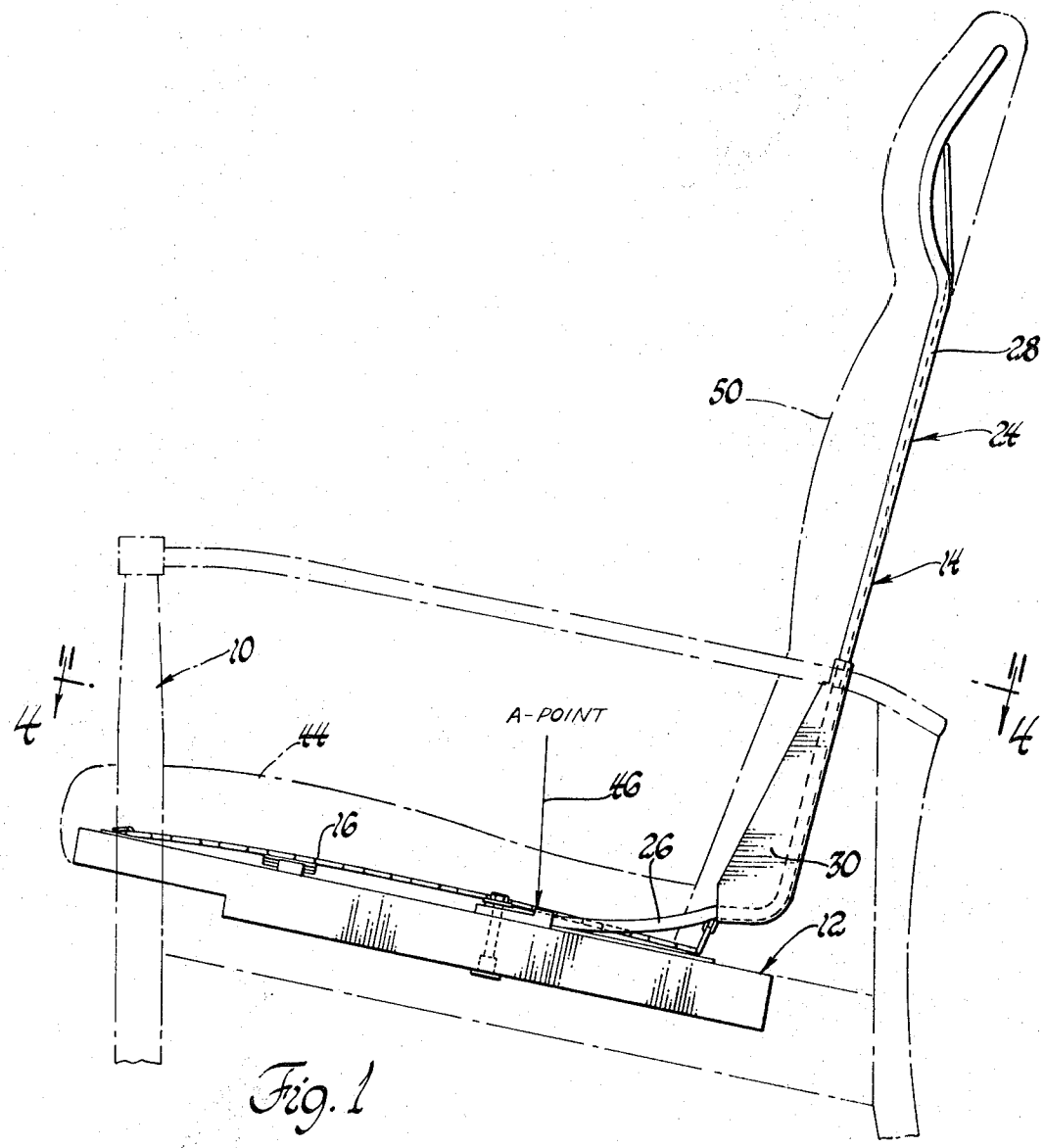


Fig. 1

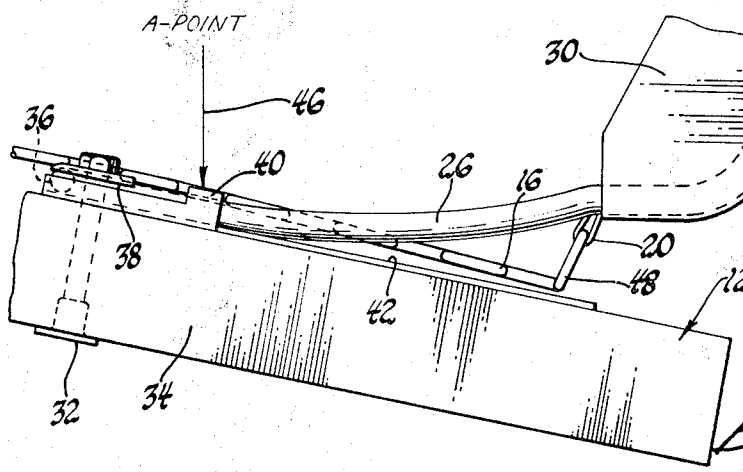


Fig. 2

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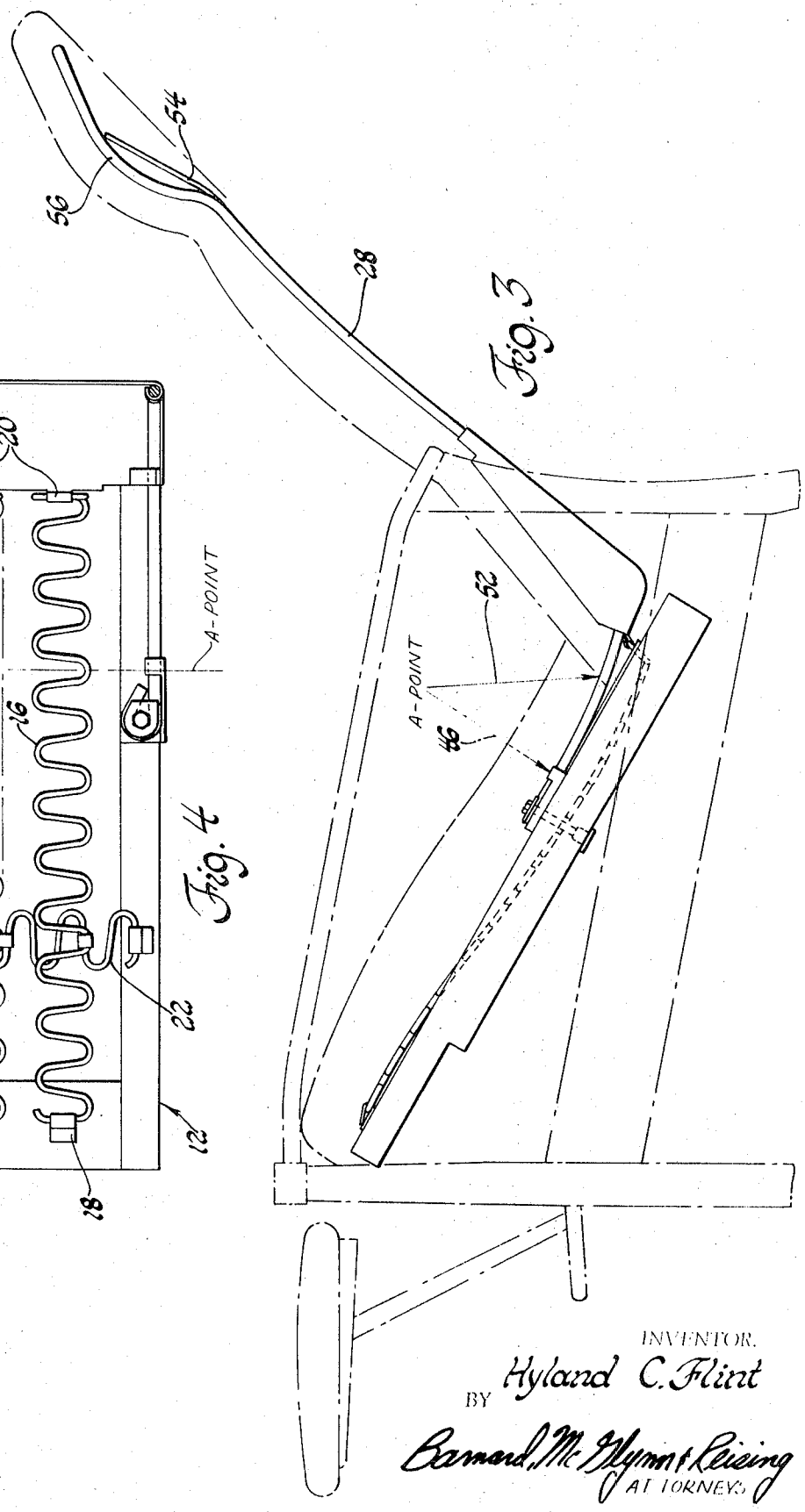


Fig. 3

Fig. 4

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UNISON ACTION RECLINER

The present invention relates to seating structures and, more particularly to a unison action type recliner.

The prime consideration in the construction of seating structures is to provide a comfort level which is acceptable in the particular environment in which the seating structure is to be used. For example, a seat designed for use in a theater or in a public place has different comfort requirements than a seating structure designed for use in the living room of a home. Whereas in the theater or public place a high comfort is desirable, the environment is such that a great many seating structures must be provided in a limited area and, therefore, a compromise between the comfort level desired and the limitations of the environment takes place. However, in a living room of a home, for example, the space limitations are not the same as in the public place and, in addition, the seat is generally occupied for a greater length of time than in a theater where the seat is occupied only for the time of the performance. Therefore, the type of seating structure designed for the home must necessarily be of a higher comfort level than the seat designed for use in a public place.

Additionally, seating structures designed for use in the home are of different types, and these different types likewise require different levels of comfort. For example, a chair for use at a kitchen table has a different requirement for comfort than a lounging chair. It becomes clear, therefore, that when designing a lounging chair, and more particularly a reclining lounging chair, the highest degree of comfort attainable in a chair must be provided. A reclining lounging chair poses additional problems in that a chair can be designed to have a high comfort level when a person is situated in the chair in an upright position, for example, but then must accommodate a shifting of loads and weights in the chair when the chair is placed in a reclined position. Therefore, the problem of comfort is compounded in a recliner or lounging type chair, and special provisions must be made to achieve the level of comfort that is necessary.

It is true that comfort is an elusive quality in a seating structure and in some respects is a subjective thing. However, it is known that the comfort attainable in a chair is usually a function of the resiliency that can be provided for the load concentration areas. The main load concentration area in a chair is generally termed the "A" point. The "A" point is the area in a chair defined by a line between the two tuberosities of a person and is a term of art used to describe the point of the heaviest load concentration relative to a seated person. Therefore, the maximum amount of comfort in a seating structure is achieved when the seating structure is yieldable but when firm support is provided for the portion of a person's body contacting the chair at the "A" point with other areas of a person's body resiliently supported to a degree commensurate with the load concentrations. The "A" point of a typical seating structure is located approximately 5 inches from the backrest of the seat and inboard from the side rails. Of course, the exact location varies with the stature of the person involved, but an average is sufficient for chair designers in view of the fact that it cannot be predicted with accuracy what the stature of a person will be who will use the chair or seating structure. It is clear that in a reclining chair two conditions of operation are anticipated and, therefore, a load shift will inevitably take place when the seating structure is shifted from an upright position to a reclined position. Therefore, another factor enters into the design of such chairs in that the angle at which the load is applied to the seating structure will vary, and this shift in load direction must be accommodated.

It should be noted that some weight shifts take place in a chair that is not a reclining chair, but chair designers of the prior art have not been particularly concerned with the weight shift that occurs as a person leans back in a chair except for those chairs of the type shown in U.S. Pat. No. 3,372,955, also filed in the name of the present inventor. However, the chair of U.S. Pat. No. 3,372,955 is not adapted to be used in the environment of a recliner type seating structure because the backrest of a recliner must be comfortable when the chair is upright and then must become firm when the chair is reclined. No provision is made in the aforementioned patent to control backrest deflection to the extent that resilience, and consequently comfort, is had when the chair is upright and then some limiting means operates to prevent further backrest deflection or change the rate of backrest deflection when the chair is reclined. In other words, the same backrest that is comfortable when used in an upright type chair ordinarily will be too resilient when used in a recliner type chair and will not adequately and comfortably support the load that shifts onto the backrest in a reclined mode.

The present invention contemplates the solution to the foregoing problems and the shortcomings of the prior art structures by providing a seating structure having support means, seating means and backrest means. The backrest means, as above-referenced, is carried by a seating means and pivots therewith. The seating means includes a portion attached to the backrest means for deflecting the backrest means to a first position in response to a load on the seating means. The backrest means is further deflectable from the first position independently of the load on the seating means. More specifically, in a recliner type structure, having a seat and a backrest, the present invention provides an improvement is a backrest wherein the support structure therefor is entirely formed of an integral spring wire member. The spring wire member is formed in such a manner that one portion thereof provides a resilience for the seat and another portion provides resilience for the backrest. In addition, the seat and backrest move in unison as a load is applied to the seating structure thereby providing a unison action type seating structure.

Accordingly, it is an object of the present invention to provide an improved seating structure comprising support means, seating means pivotally supported by the support means, and backrest means carried by the seating means and pivotal therewith, the seating means including a portion attached to the backrest means for deflecting the backrest means to a first position in response to a load on the seating means, the backrest means being further deflectable from the first position independently of the load on the seating means.

It is another object of the present invention to provide an improved seating structure according to the previous object wherein the seating means is tiltable and pivotable relative to the support means.

It is still another object of the present invention to provide an improved seating structure of the recliner type having a backrest with the support structure therefor formed of a spring wire member.

It is a further object of the present invention to provide an improved recliner type seating structure having a backrest formed of a spring wire member, wherein the spring wire member is formed in such a manner that one portion thereof provides resilience for the seat, and another portion provides resilience for the backrest.

It is still a further object of the present invention to provide an improved recliner type seating structure wherein the seat and backrest move in unison as a load is applied to the seat portion of the structure.

Other objects and attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a side elevational view of the reclining chair of the subject invention shown in the upright position.

FIG. 2 is an enlarged elevational view of the connection between the backrest and the seat portion of the subject invention.

FIG. 3 is a side elevational view of the recliner chair of the subject invention shown in a reclined position.

FIG. 4 is a sectional view taken along line 4–4 of FIG. 1.

Referring to FIG. 1, a recliner type chair is shown in the upright position. Support means generally designated by nu-

meral 10 is the basic structural support for the remainder of the seating structure. A seating means generally designated by numeral 12, is pivotally supported by support means 10. The backrest generally designated by numeral 14 is carried by seating means 12 and is pivotable therewith. The seating means includes a portion including a series of sinuous spring members 16 attached at one end by means of clips 18 to seating means 12 and at another end to the backrest means by clips 20 thereby allowing a transferring of a part of the seating load to the backrest means when a load is placed on the sinuous spring members 16. A sinuous spring member 22 is attached at either end to the seating means and extends transversely of the series of sinuous spring members 16 at a point forward of the "A" point of the seating structure shown by the arrow. The arrangement of the sinuous spring members relative to the seating structure and backrest means is better seen in FIG. 4.

Referring to FIG. 1, the backrest means includes a resilient wire member 24 which forms a border frame for the backrest means, wire member 24 having portions 26 and 28 of different resiliency separated by a nonresilient member 30. Resilient member 30 is a pan type bracket extending transversely of the seating means 12 and is normally spaced therefrom and carries clips 20 to which the sinuous wire members 16 are attached.

Referring to FIG. 2, nonresilient member 30 is more clearly shown, and portion 26 of spring wire member 24 is shown as being rearwardly extending from the point designated as the "A" point and inclined upwardly from seating means 12 into member 30. Also shown in FIG. 2 is the connection of sinuous spring member 16 through the clip 20 to nonresilient member 30. The sole connection of wire member 24 to seating means 12 is through the bolt 32 which passes through the support member 34 of seating means 12 and is drawn into engagement with the backturned portion 36, wire member 34 being contained between washer 38 and support member 34 and maintained in alinement by bracket 40. It is understood there are two support members 34 on either side of the seating structure each of which carry a contact plate 42 which is formed of any well known material such as plastic or metal and is adapted to be engaged by portion 26 as a load is placed on the seating means 12.

Referring to FIG. 1, a load applied to seating means 12 is first exerted against cushioning 44 and acts therethrough to the sinuous spring members 16. As more clearly seen in FIG. 2, a load is applied to the sinuous spring members 16 in a direction parallel to the directional indication of arrow 46. As the sinuous spring members 16 deflect, force is exerted through link 48 and bracket 20 to draw nonresilient member 30 downwardly. As this occurs, portion 26 more progressively engages contact plate 42. It should be noted that the force acting against nonresilient member 30 is at the end of portion 26 thereby utilizing the maximum lever arm of portion 26 against contact plate 42. It is obvious that the degree of engagement of portion 26 with plate 42 will depend on the weight imposed on cushion 44. The weight concentration in the above-described loading is at the "A" point, and "A" point is therefore the point of load concentration. Referring to FIG. 2, when portion 26 is deflected to its fullest extent commensurate with the load placed on the seating means 12, a person can lean back against the backrest means 14 transmitting a force through cushioning 50 and against wire member 24 which provides a resilience for the backrest. It is understood that as portion 26 deflects downwardly, a slight backward movement of backrest means 14 takes place but this is negligible and does not drastically affect its deflection which does not occur until reception of the back load of a person.

Referring to FIG. 3, the subject seating structure is shown in a reclined position. Reclining takes place through appropriate linkage connecting seating means 12 with support means 10 and is not shown in detail as it constitutes no part of the present invention. Suffice it to say that seating means 12 is tiltable and pivotable relative to support means 10. When the seating structure is shifted into the position shown at FIG. 3, arrow 46, designating the location of the "A" point, is no longer coextensive with the actual line of force of the load applied to the portion 26. In this instance, a load shift is taking place into the direction of arrow 52. Whereas there is no appreciable change in the amount of deflection of portion 26 due to the fact that the load on the seat is still transmitted to support means 10 through sinuous strips to member 30 and portion 26, the component of force of the weight of the back of the person is changed considerably thereby further utilizing the resilience of portion 28 of wire member 24. Portion 28 is deflected in much the same manner as shown in FIG. 3. It is understood that the deflection is not great, as the resilience of portion 28 is not very great but a certain comfort level is provided in the reclined position in a manner heretofore not known in the art. It is likewise obvious that as more weight is placed against portion 28, some of the load shifts from portion 26 and portion 28 can move upwardly slightly. If portion 26 had not been completely deflected prior to this time, the effect is negligible. If portion 26 had been deflected completely into engagement with contact plate 42 then an added resilience is had for the seating means 12 while still taking advantage of the resilience of portion 28. In short, a comfort increase has taken place. The differential in deflection relatively between portion 26 and portion 28 when different weight persons assume a position in a seating structure, herein disclosed, is automatically adjusted by the various resiliencies of wire member 24. In addition, referring to FIG. 3, wire member 24 forms a border frame for backrest means 14, and resilient members 54 are contained within the area encompassed by the border frame and provide a different resilience for the center portion of the backrest relative to the edges thereof. Additionally, wire member 24 is preformed in area 56 into a forwardly directed contour providing the base for a headrest to be integrally formed with backrest means 14 by the extension of cushioning 50 thereover.

From the foregoing, therefore, it is obvious that a recliner type seating structure having a backrest and a seat has been provided wherein an improvement exists in that a backrest has a support structure therefore formed of a spring wire member alone. The spring wire member is formed in such a manner that one portion thereof provides resilience for the seat portion of the structure and another portion of the backrest provides resilience for the backrest itself. In addition, the seat and backrest move in unison as a load is applied to the seating structure thereby taking advantage of unison action type seating principles. Therefore, a unique recliner has been provided which has the resilience of a seat heretofore only provided for seats to be operated in an upright position. Additionally, the resilient means provided for the subject recliner is such that when a load shift occurs in the seat during passage into the reclined mode, the resilient member automatically compensates for the shift in the load from the "A" point to limit further backrest deflection while in the reclined mode but retains a high comfort level for operation in the upright position. Therefore, the adaptations of the subject seat to the different types of load, both as to quantity and as to direction relative to the seat, are carried out in an unexpected manner when using a resilient backrest member that would ordinarily be unusable in an environment of a recliner type seat.

The invention has been described in an illustrative manner, and it is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

I claim:

1. A seating structure comprising: support means; seating means pivotally supported by said support means; means defining a seating surface attached forwardly to the seating means; and backrest means carried by said seating means and pivotal therewith, said backrest means including a resilient support member extending upwardly and rearwardly from the seating means laterally adjacent the point of maximum load concentration on the seat surface, the seating surface includ-

ing a portion attached to the backrest means for deflecting the backrest means downwardly in unison therewith in response to a load on said seating surface, the resilient support member permitting deflection of the backrest rearwardly under load applied thereto independently of the load on said seating means.

2. A seating structure according to claim 1 wherein said seating means is tiltable and pivotable relative to said support means.

3. A seating structure according to claim 1 wherein said seating structure is a recliner chair.

4. A seating structure according to claim 1 wherein said seating surface includes a series of sinuous spring members.

5. A seating structure according to claim 4 wherein at least one sinuous spring member extends transversely of said series of sinuous spring members at a point forward of the "A" point of said seating structure.

6. A seating structure according to claim 1 wherein said resilient support member is a resilient wire member forming a border frame for said backrest means, said wire member having portions of different resiliency separated by a nonresilient member.

7. A seating structure according to claim 6 wherein said backrest means further includes a plurality of resilient members carried by said nonresilient member and extending into an area surrounded by said border frame to provide a resilience for the center area of said backrest means different from the border thereof.

8. A seating structure according to claim 6 wherein a headrest is formed integrally with said border frame.

9. A seating structure according to claim 1 wherein said seating means includes means adapted to be engaged by said backrest means as a load is placed on said seating means.