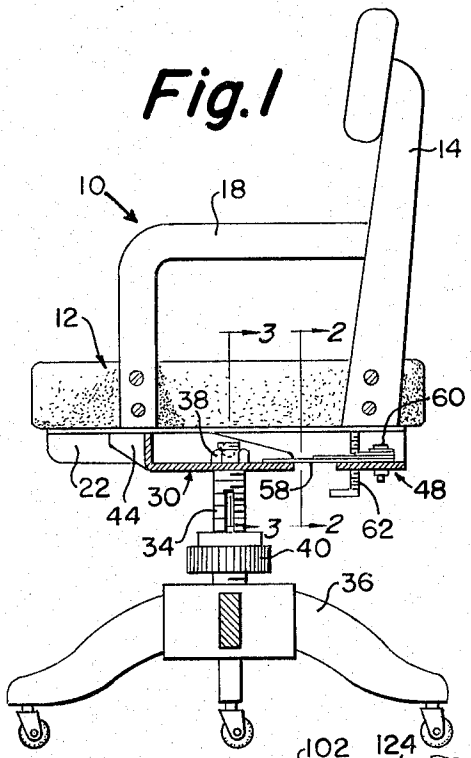
Dec. 6, 1966 R. GOODMAN 3,290,091

CHAIRS WITH TILTABLE PORTIONS

Filed Jan. 14, 1966

Fig. 1



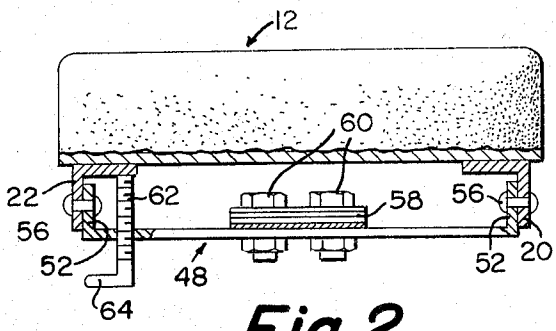


Fig. 2

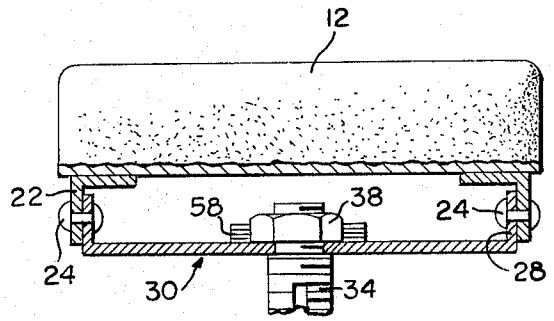


Fig. 3

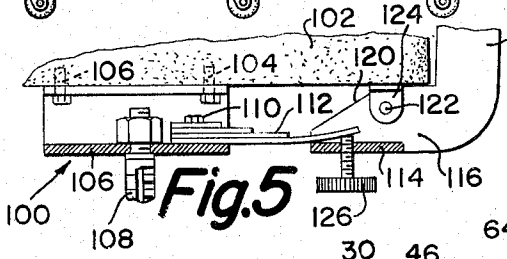


Fig. 5

Fig. 4

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CHAIRS WITH TILTABLE PORTIONS

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9 Claims. (Cl. 297—302)

This invention relates to chairs wherein either the seat portion or the back rest is mounted for rearward tilting, and it particularly relates to such chairs wherein the tiltable portions are tilted against a flexible biasing force.

Many different types of chairs with tiltable portions have heretofore been produced, some of which utilized coil springs, other flat springs and still others torsion bars as the flexible biasing element. However, all these prior devices which were sufficiently sturdy and effective for their intended purpose were unduly complex and involved many interrelated parts. If any one of these parts malfunctioned or broke down, the entire biasing mechanism became inoperative. Furthermore, the cost of producing these mechanisms was unduly high and added considerably to the total cost of the chair.

Another disadvantage of prior type chairs with tiltable portions was that an excessive amount of the tilting and biasing mechanism depended below the plane of the chair seat and created an unsightly appearance.

It is one object of the present invention to overcome the above and other disadvantages of prior type chairs with tiltable portions by providing a chair of such type that utilizes a tilting and biasing assembly which contains relatively few parts and is not only simply constructed but relatively inexpensive to produce.

Another object of the present invention is to provide chairs of the aforesaid type wherein the biasing means is easily adjustable.

Another object of the present invention is to provide chairs of the aforesaid type that are pleasing in total appearance and wherein the tilting and biasing mechanism occupies a minimum of space below the seat portion.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following description when read in conjunction with the accompanying drawings wherein:

FIG. 1 is a side view, partly in elevation and partly in section, of a tiltable chair embodying the present invention.

FIG. 2 is a cross-sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view taken on line 3—3 of FIG. 1.

FIG. 4 is a top perspective view of the biasing assembly used in the chair of FIG. 1.

FIG. 5 is a fragmentary, side elevational view of an alternative embodiment of the present invention.

Referring now in greater detail to the various figures of the drawing wherein similar reference characters refer to similar parts, there is shown a chair, generally designated **10**, comprising a seat portion **12**, a back rest **14** connected to the sides of the seat portion **12** and arm rests **18** extending between the back rest **14** and the seat portion **12**.

Connected in any desired manner to the undersurface of the seat portion **12** are a pair of spaced angle irons **20** and **22**, one adjacent each side of the seat portion. The vertical portions of the angle irons **20** and **22** are parallel to each other and each angle iron is pivotally supported by rivets or the like, such as shown at **24**, that are provided in holes **26** in the opposed parallel side walls **28** of a front bracket **30**. This bracket **30** is provided with a central aperture in its bottom wall **32**, and through this aperture extends a standard screw spindle **34** mounted

on a base **36**. A nut **38** secures the spindle **34** to the bracket **30** and a height-adjusting nut **40** is provided on the spindle between the bracket and the base.

The bracket **30** is provided with a front wall **42**. The side walls **28** have front extensions **44** projecting forwardly of the wall **42**. Each of these front extensions has a straight upper edge. At their rear portions, the side walls are provided with inclined upper edges **46**. The extensions **44** serve as stops to limit forward pivoting of the chair portion **12**, the straight upper edges of these extensions maintaining the seat portion in a straight horizontal plane. The inclined upper edges **46** serve as stops to limit the rearward pivoting movement of the seat portion, these inclined edges limiting this rearward position to an inclined plane.

Also pivotally secured to the underside of the seat portion **12**, in spaced relation to the front bracket **30**, is a rear bracket **48**. This rear bracket **48** comprises a transverse strip **50** having an upstanding flange **52** at each end. Each flange **52** is provided with an aperture **54** to receive a rivet or the like **56** pivotally connected to the corresponding angle irons **20** and **22** to form a pivotal connection between the bracket **48** and the seat portion **12**.

Extending between the brackets **30** and **48** is a flat spring device **58**. Although a single flat spring strip may be used, it is preferred to use a leaf spring, as illustrated, consisting of a plurality of individual leaves. The leaf spring **58** is preferably pre-loaded and its front end rests on the bottom **32** of the bracket **30** while its rear end is connected to the strip **50** of the bracket **48** by means of bolts, rivets or the like, shown at **60**.

A tapped hole is provided adjacent one end of the strip **50** of the bracket **48**. An adjusting screw **62**, having a handle **64** at its lower end, extends through the tapped hole and its upper end bears against the horizontal flange of the angle iron **22**.

The leaf spring **58** extends in a flat horizontal plane from front to rear of the seat portion. Because it extends in this direction from front to rear, it absorbs the full tilting force of the chair along its entire length, and thereby provides the maximum amount of spring support. This is of prime importance. It is also important that the spring lies in the flat, horizontal plane because it can be made as wide as desirable to provide the utmost strength without occupying any additional space below the seat portion. In addition, the use of a leaf spring and a simple mouning therefor, such as is here provided, not only holds the cost of production to a minimum but keeps the assembly relatively free of maintenance problems.

The spring tension of the leaf spring **58** is easily adjusted by turning the handle **64** of the screw whereby the bracket **48** is pivoted in one direction to apply additional pressure of the spring as it bears against the bracket **30**, and is pivoted in the opposite direction to decrease the pressure of the spring on the bracket **30**.

In FIG. 5 there is illustrated an alternative embodiment of the invention that comprises a chair, generally designated **100**, that includes a seat portion **102** rigidly connected, as by screws **104** or the like, to a front bracket **106** that is, in turn, mounted on a screw spindle **108** in the ordinary manner.

Connected to the bottom wall of the bracket **106**, as by means of a rivet **110** or the like, is one end of a leaf spring **112**. The opposite end of the leaf spring **112** bears on a lateral flange **114** of a bracket portion **116** integral with an upstanding back rest **118** that is only partially shown but which is of standard construction.

The bracket portion **116** has an inclined upper edge **120** at its forward end, and is pivotally connected at **122** to ears **124**. With such construction, when rearward pres-

sure is applied against the back rest **118**, the bracket portion **116** pivots at **122**, against the bias of the spring **112**, until stopped by the abutment of the edge **120** against the underside of the seat portion **102**.

In order to adjust the biasing tension of the spring **112**, an adjusting screw **126** threadedly extends through a tapped hole in the flange **114** and bears against the underside of the corresponding end of the spring.

Obviously, many modifications of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

The invention claimed is:

1. A chair comprising a base, a spindle on said base, a first bracket mounted on said spindle, a seat portion mounted on said first bracket, a second bracket pivotally connected to the underside of said seat portion, said brackets being spaced from each other from front to rear of said seat portion, a flat spring means extending between said first and second brackets, an adjusting means to adjust the biasing tension of said spring means.

2. The chair of claim **1** wherein said first bracket is connected to said seat portion by a pivotal connection.

3. The chair of claim **1** wherein said first bracket is rigidly connected to said seat portion, and said second bracket is provided with a back-rest portion that is pivotally movable with said second bracket.

4. The chair of claim **1** wherein said spring means is a leaf spring having a plurality of leaves.

5. The chair of claim **1** wherein said spring means is positioned in a flat plane that is substantially parallel to the plane of said seat portion.

6. The chair of claim **1** wherein said adjusting means is a screw member threadedly connected to said second bracket.

7. The chair of claim **6** wherein said screw member bears against a bearing means on said seat portion and is constructed and arranged to move said second bracket around its pivot upon being threadedly rotated.

8. The chair of claim **6** wherein said screw member bears against one end portion of said spring means to move said end portion relative to said second bracket upon threaded rotation of said screw member.

9. The chair of claim **1** wherein said first bracket is pivotally connected to said chair portion and is provided with a front stop means having a straight upper edge and a rear stop means having a downwardly inclined upper edge.

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