Nov. 30, 1937. H. C. FLINT 2,100,475

SPRING SEAT CONSTRUCTION

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Fig. 3.

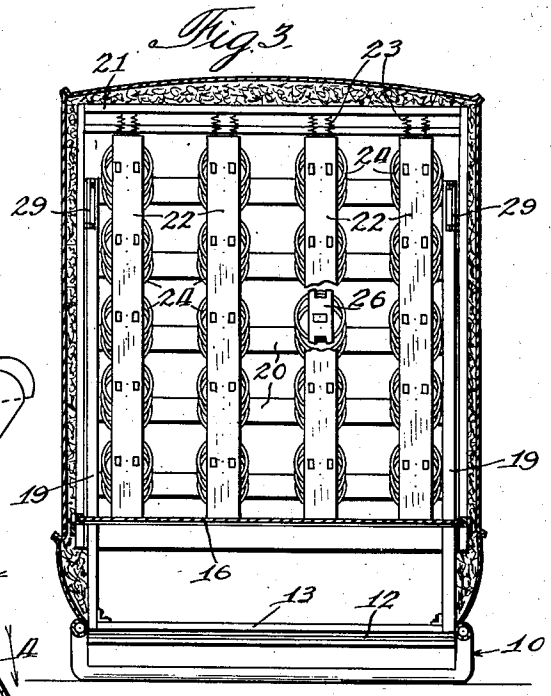


Fig. 7.

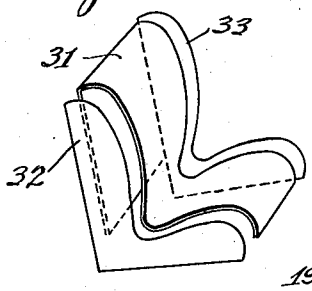


Fig. 1

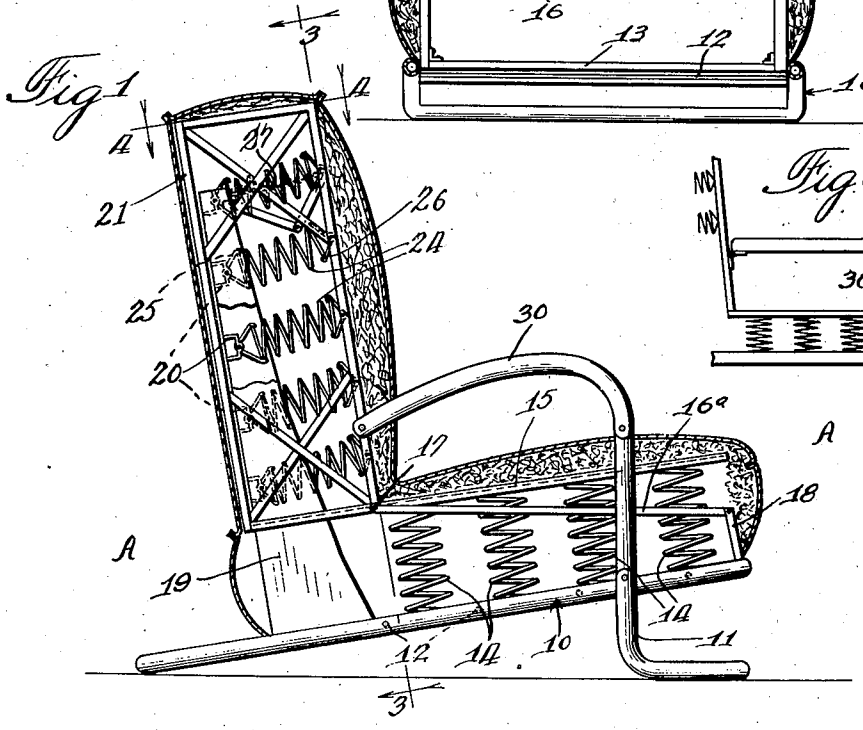


Fig. 8.

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Fig. 4.

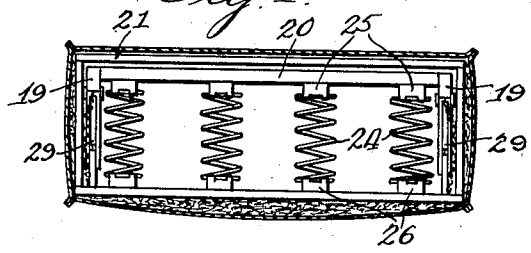


Fig. 5.

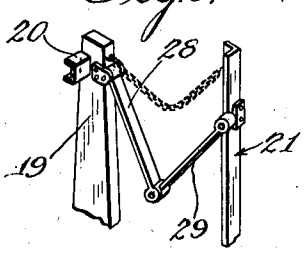


Fig. 2.

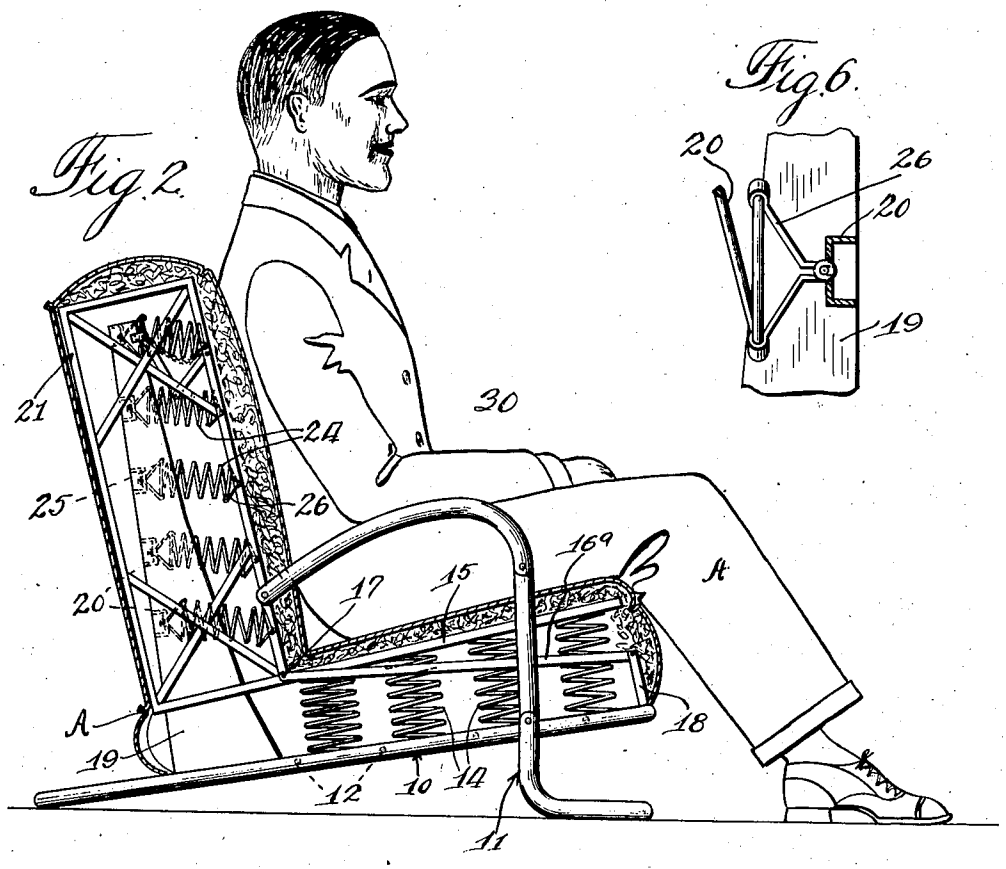


Fig. 6.

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UNITED STATES PATENT OFFICE

2,100,475

SPRING SEAT CONSTRUCTION

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Application August 9, 1934, Serial No. 739,144

9 Claims. (Cl. 155—53)

This invention relates to a spring seat construction and has special reference to a spring unit for use in chairs, davenports, vehicle seats, or furniture or other constructions wherein it is desired to provide a synchronization of the movable members thereof in order to effect a floating support for the user.

More particularly, this invention relates to a spring seat construction comprising a base having a horizontally extending seat frame supported thereby and capable of vertical movement relative thereto and a back rest preferably pivotally connected with said seat frame for vertical movement therewith and for horizontal movement relative thereto, the seat frame and back rest being adapted to be upholstered by a continuous strip.

In furniture employing spring seat constructions, in so far as applicant is aware, there is no complete insulation from shock, since it is the usual practice to stretch upholstery on the back rest tightly around a nest of springs or padding and fasten the upholstery rigidly to the immovable portion of the seat construction. There is no provision for vertical movement of the back that provides unbroken upholstery, and in some cases braces are provided to prevent the springs or padding from being vertically displaced when the weight of the person moves into the seat. Thus, upon being seated in the usual type of construction the most tender, sensitive, and the least protected part of the body strikes or moves against an immovable back rest, while the weight of the person is rested on a part of the seat capable of substantial vertical movement. When the person shifts about in the seat, the immovable back rest causes discomfort by rubbing against the body of the person and by disarranging the clothing thereof, and, further, in the event that the seat construction is employed in a moving vehicle, the discomfort will, of course, be greatly magnified by the added movement of the vehicle.

When one is seated in a chair or other article of furniture with deep padding or springs or other shock absorbing material, there are two directions of movement made by the body, one being vertically on the seat frame and the other being horizontally against the back rest. It is contemplated by the present invention to provide a synchronization of the movable members so that the back rest member may float freely and move vertically with the seating of the person so as to cause no discomfort such as disarrangement of the clothing or friction on the least protected portion of the body.

One of the objects of this invention is to provide a spring seat construction as above characterized having a back rest entirely surrounding and enclosing a fixed supporting member and vertical actuating means, said back rest being capable of floating in synchronization with the vertical movement of the seat and permitting the back rest and seat to be upholstered in one continuous piece in all directions and completely enclosing all of the parts of both the seat and back rest with all functional parts thereof without subjecting the upholstery or fabric to distortion or tearing when partaking of substantial vertical movement.

Another object of this invention is to provide a spring seat construction as hereinabove noted, in which an arm rest is so constructed and arranged as to synchronize with the vertical and horizontal movements of the back rest and the seat frame.

A further object of this invention is to provide a spring seat construction of the character indicated above, in which the floating back rest thereof is prevented from side sway.

It is also an object of this invention to provide a spring seat construction of the type above noted, in which the forward position of the back rest and the tension of the springs of the back rest are predetermined when the seat has no load.

Again, it is an object of this invention to provide a spring seat construction of the character above noted, in which means are so constructed and arranged as to fix the plane of vertical movement of the pivotal connection between the back rest and seat frame.

Other objects and advantages will hereinafter be more particularly pointed out, and for a more complete understanding of the characteristic features of this invention reference may now be had to the following description when taken together with the accompanying drawings, in which latter:

Figure 1 is a side elevational view of a spring seat construction embodying the features of this invention, with the upholstery thereof shown in section;

Fig. 2 is a view similar to Figure 1 showing a changed position of the movable portions of the seat construction when a person is seated thereon;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Figure 1;

Fig. 4 is a plan sectional view taken on the line 4—4 of Figure 1;

Fig. 5 is a perspective view of one of the stabilizing devices attached to a fragmentary portion of the back rest;

Fig. 6 is a fragmentary elevational view partial-

ly in section of a rocker and its supporting portions;

Fig. 7 is a perspective view of the portions of the upholstery when the front and back of the back rest and the top of the seat frame is enclosed by a single strip, as well as the sides of the back rest and seat frame; and

Fig. 8 is a diagrammatic view of a fragmentary portion of seat construction showing a modified form of arm rest embodying the features of this invention.

Referring now to the drawings, and more particularly to Figs. 1 to 6, inclusive, thereof, the construction of this invention is shown as comprising a base 10, the particular base illustrated being of tubular metal stock and of rectangular shape, having one side thereof resting on the floor and the opposite side spaced from the floor and held in that spaced relation by a vertically extending support 11. The base 10 is provided with a plurality of cross braces or other supports intermediate the ends thereof, upon which may rest a platform 13 formed of wood or other rigid material. It is, of course, to be understood that the base illustrated may be of any desired shape or construction without departing from the spirit of this invention, since any type of base may be employed that is suitable for receiving a spring seat construction.

A plurality of compression springs 14 are mounted on the platform 13 in any desired manner, the compression springs 14 supporting a seat frame 15. The seat frame preferably comprises a rectangular angle iron construction, across which may be stretched the usual fabric or burlap 16 for enclosing and positioning the compression springs and for limiting the extended vertical movement thereof. The shape and construction of the seat frame, of course, may be varied with the usual practices, since the present showing of the seat frame is merely for illustrative purposes. The seat frame 15, therefore, is capable of vertical movement against the compression of the springs 14.

However, the present invention contemplates the fixing of the plane of vertical movement of the seat frame 15 so that substantial horizontal movement is prevented and, as a means for so fixing the vertical plane, a pair of links 16a are provided, one for each side of the frame. Each of the links has one end pivotally connected to the seat frame 15 as at 17, the other end of each of the links being pivotally connected preferably to an upright support 18, the support 18 being fixed to the base and extending upwardly therefrom. Thus, a vertical movement of the seat frame 15 is limited in its plane of travel and has substantially no horizontal movement except for the slight amount obtained in the radius of the link.

A vertically extending support 19 is fixed to the base 10 and is fixed against any movement, the support comprising preferably a pair of spaced uprights connected together by a plurality of channel members 20, although, of course, it is to be understood that strips of wood or any other crossing supports of any material may be so employed. The vertically extending support is surrounded by a box-like frame 21, preferably formed of angle irons, suitably cross-braced for added strength. One side of the box-like frame is provided preferably with a plurality of vertically extending flexible strips 22, the strips being fixed at the lower ends thereof to the lower angle iron extending across the frame and the upper ends of the strips being secured to the upper cross member by tension springs 23. The flexible strips 22, therefore, are resiliently connected between the ends of the front face of the frame, and this front face is the portion of the box-like construction against which the passenger leans. Extending at right angles backwardly from the front face and outside of the fixed support 19, are the two side faces comprised of angle iron members and cross braces. These two side faces connect at their rear edges with similar angle iron members running at right angles thereof and outside of the fixed support 19 and comprise the rear face. Thus is formed the box-like frame 21 which entirely surrounds and encloses the fixed member 19 except at the bottom where said member reaches down to the base 10, said member 19, however, remaining inside the confines of the four angle members comprising the perimeter of the bottom face of the box-like frame 21 but passing through the plane formed by said angle members.

The strips 22 are held against horizontal movement in one direction by a plurality of compression springs 24, one end of each of the compression springs being fixed to a rocker 25 pivotally connected to the cross supports 20 and the other end of each of the compression springs 24 being fixed to a rocker 26 connected for pivotal movement to the flexible strips 22. The members 25 and 26 are thus free to partake of a limited rocking movement without allowing the compression springs or coils 24 to buckle or the convolutions thereof to become displaced to any marked degree from their common axes when movement is had of the frame 21 in a vertical direction. Such a construction showing the use of flexible strips and rockers for the support of coils is shown and described in a patent issued to the inventor hereof on December 26, 1933, Patent No. 1,940,853. However, the coil spring mounting of the patent is shown herein for illustrative purposes only, and it is to be understood that the present invention is not to be limited to that particular type of support.

The box-like frame 21 of the back rest is pivotally connected to the seat frame 15, preferably at the point of connection of the links 16a with the seat frame, so that a vertical movement of the seat frame 15 will move the box-like frame 21 in synchronization therewith. Being pivoted at 17 to the seat frame, when a load is placed on the seat frame and the springs 14 are compressed, the same movement is had on the box-like frame 21. However, the back rest also receives a horizontal movement when the back of the person seated on the frame 15 is urged against the box-like frame, although this horizontal movement need merely be a tilting of the frame 21.

As the person is seated in the article of furniture employing the present seat construction, he subjects the article to two motions—namely, a vertical and a horizontal motion—and the point of pivot of the body of the person will correspond to the point of pivot of the back rest and the seat frame at 17. Therefore, it is not necessary for the back rest at 17 to partake of any horizontal movement, since only that portion of the back rest above the pivotal point is subjected to any horizontal movement by the person seated in the chair. The line A—A indicates the line of change or the point below which horizontal movement ceases. The links 16a, therefore, fix or limit the horizontal movement of the seat frame 15.

It can be seen, therefore, that a new and un-

usual method of upholstering a seat or chair is the result of using surrounding and enclosing means to cover the fixed support and all actuating means of the back rest in one preformed continuous strip with all parts of the seat and permit substantial vertical movement of both. It can be further understood that this method lends itself to more rapid assembly resulting in a complete one piece cover wherein the various pieces comprising it are first sewn together to form a glove-like continuous strip and then slipped over the whole assembly of the seat and tacked or buttoned around the bottom edges of the base 10. Although the box-like frame is shown as comprising metal angle strips to form a rectangular box large enough in length, breadth and depth to completely surround and enclose the fixed upright supporting member 19 and actuating means above the line of change A—A, it is to be understood that this box can be of various shapes and can be made of solid wood or metal sides except at the bottom where the member 19 reaches down to connect with the base 10, but still remains inside the confines of the solid upholstery which also reaches down to the base 10 in unbroken continuity.

Thus in a finished state the upholstery may be applied to the construction without distortion or tearing of the fabric in the application thereof or in the use thereof on the article, since the box-like frame is of fixed dimensions surrounding the immovable vertical support and able to partake of vertical and horizontal movement above the line of change and in complete unison with the seat.

Since the box-like frame 21 is free and, in effect, floats about the upright support 19, means are provided to check the forward movement occasioned by the compression springs 24, the means in the present instance being illustrated as comprising a chain 27 extending for connection between the frame 21 and the vertical support 19. When there is no load in the article of furniture, the chain is taut as shown in Fig. 1, although, when not in use, the chain is slack as shown in Fig. 2.

As a means of preventing side sway of the frame 21 relative to the support 19, a stabilizing device is shown more particularly in Fig. 5, the stabilizing means comprising an arm 28 having one end pivotally secured to the upright fixed support 19 and the other end pivotally secured to a second bar 29, the other end of which latter is pivotally secured to the vertically extending angle iron of the box-like frame 21. A stabilizing device is provided for each side of the frame, and these devices are preferably secured at the upper end of the upright support.

The furniture or article incorporating the seat construction may be provided with arm rests 30, and, in order to accommodate a vertical and horizontal movement therein for synchronization with the other movable portions of the article, the arm rest is provided with double hinge points. In the form shown in Fig. 2, the arm is pivoted intermediate its length and at each end thereof, one end being pivoted to the box-like frame of the back rest and the other end being pivoted to the stationary base. Referring, however, to Fig. 8, the arm rest shown therein may comprise a vertically extending portion 30—*a* secured to one end of a horizontally extending portion 30—*b* by the double acting hinge 30—*c*, the other end of the horizontally extending portion 30—*b* being hinged to the frame 21 of the back rest.

In the construction illustrated in Figs. 1 to 6, inclusive, the covering for the upholstery is shown as being in a continuous piece, although made up of several individual lengths. Referring now more particularly to Fig. 7, the top and front of the seat and the back, top and front of the back rest are shown as being covered by a single piece 31, the sides of the back rest and seat being suitably enclosed by the single strips 32 and 33. These individual lengths are shown in position ready to be sewn together to form a continuous strip in all directions except for the opening at the bottom so that the finished inverted sack-like cover can be slipped over the entire seat assembly and thereby entirely surround and enclose it in unbroken line except for the bottom under the base 10 which does not require closing to be a finished product.

Thus it will be noted that applicant has provided a free floating seat construction having substantially universal movement in which the body of the user is relieved of shock and discomfort ordinarily attendant upon constructions in which the elements thereof are limited in their movements. The covering for the upholstery may be preformed and applied to the furniture in a finished state to minimize expense and labor in installation. The construction is sanitary since there are no creases into which foreign matters may collect, and a wholly novel and attractive appearance may be had thereby.

While several embodiments of this invention are herein shown and described, it is to be understood that further modifications will be apparent to those skilled in the art and it is desired, therefore, that my invention be limited only by the prior art and the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a device of the character described, a base, a horizontally extending seat frame supported by said base and capable of vertical movement, a vertically extending support on said base fixed against movement, a back rest including a frame adjacent said support and connected to said seat frame for vertical movement therewith, rockers pivotally mounted on said support and on said back rest frame, and a compression spring between cooperating pairs of rockers between said support and frame whereby said back rest may have horizontal movement against the compression of said springs, said back rest frame including portions enclosing said vertically extending fixed support and projecting rearwardly thereof whereby said seat frame and back rest frame being adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

2. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame for vertical movement thereof, a substantially vertically extending support fixed relative to said base, a substantially vertically extending back rest supported by one end of said seat frame for vertical movement therewith, and resilient means pivotally connected between said fixed substantially vertically extending support and said back rest for resiliently resisting movement of said back rest during horizontal movement thereof and for permitting free floating movement with respect to said fixed support responsive to the movement of said seat frame, said back rest including por-

tions enclosing said vertically extending fixed support and projecting rearwardly thereof whereby said seat frame and back rest are adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

3. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame for vertical movement thereof, a substantially vertically extending support fixed relative to said base, a substantially vertically extending back rest supported by one end of said seat frame for vertical movement therewith, and a plurality of pivotally mounted springs engaging between said fixed substantially vertically extending support and said back rest for resiliently resisting movement of said back rest during horizontal movement thereof and for directing vertical movement with respect to said fixed support responsive to the movement of said seat frame, said back rest including portions enclosing said vertically extending fixed support and projecting rearwardly thereof whereby said seat frame and back rest are adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

4. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame for vertical movement thereof, a substantially vertically extending support fixed relative to said base, a box-like frame enclosing said fixed support and carried by one end of said seat fame for vertical movement therewith, and means engaging between said fixed substantially vertically extending support and said box-like frame for resiliently resisting horizontal movement of said box-like frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said seat, said seat frame and said box-like frame being adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

5. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame for vertical movement thereof, a substantially vertically extending support fixed relative to said base, a box-like frame enclosing said fixed support and pivotally connected to said seat frame for vertical movement therewith, and resilient means engaged between one face of said box-like frame and said fixed support to permit tilting movement in a horizontal direction against the action of said resilient means, said seat frame and said box-like frame being adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

6. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame for vertical movement thereof, a substantially vertically extending support fixed relative to said base, and a substantially vertically extending back rest cooperating with said seat frame for vertical movement therewith, means engaging said back rest and said fixed support for resisting rearward movement of said back rest and for permitting vertical movement with respect to said fixed support responsive to the movement of said seat frame, and stabilizing means connected between said fixed substantially vertically extending support and said back rest for preventing side sway of the latter, said back rest including portions enclosing said vertically extending fixed support and projecting rearwardly thereof whereby said seat frame and back rest are adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

7. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame for vertical movement thereof, a substantially vertically extending support fixed relative to said base, and a substantially vertically extending back rest cooperating with said seat frame for vertical movement therewith, means engaging said back rest and said fixed support for resisting rearward movement of said back rest and for permitting vertical movement with respect to said fixed support responsive to the movement of said seat frame, and stabilizing means comprising a bar pivoted to said fixed substantially vertically extending support and another bar pivoted to said back rest frame with the free end of said bars pivoted together for preventing side sway of said back rest frame, said back rest including portions enclosing said vertically extending fixed support and projecting rearwardly thereof whereby said seat frame and back rest are adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

8. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame and for permitting vertical movement thereof, a substantially vertically extending support fixed relative to said base, and a substantially vertically extending back rest cooperating with said seat frame for vertical movement therewith, means engaging said back rest and said fixed support for resisting rearward movement of said back rest and for permitting vertical movement with respect to said fixed support responsive to the movement of said seat frame, means for limiting the forward movement of said back rest frame, and stabilizing means connected between said fixed substantially vertically extending support and said back rest frame for preventing side sway of the latter, said back rest including portions enclosing said vertically extending fixed support and projecting rearwardly thereof whereby said seat frame and back rest are adapted to be upholstered by a preformed continuous strip entirely enclosing the same.

9. In a device of the character described, a base for resting on a supporting surface, a horizontally extending seat frame, means on said base for movably supporting said seat frame for vertical movement thereof, a substantially vertically extending support fixed relative to said base and a substantially vertically extending back rest connected to said seat frame for vertical movement therewith, means engaging said back rest and said fixed support for resisting rearward movement of said back rest and for permitting vertical movement with respect to said fixed support responsive to the movement of said seat frame, and an arm rest pivotally connected to said back rest and pivotally connected to said base for obtaining vertical and horizontal movement relative thereto.

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