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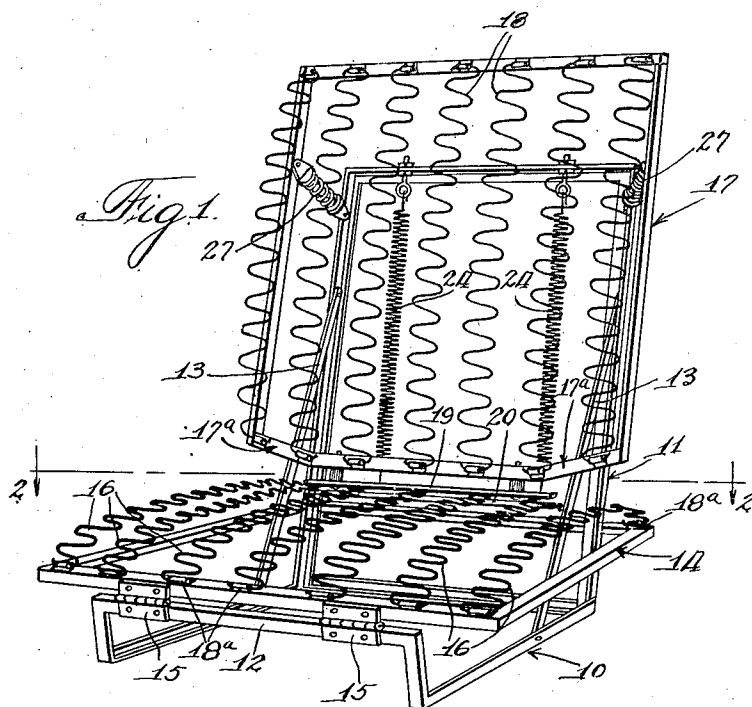
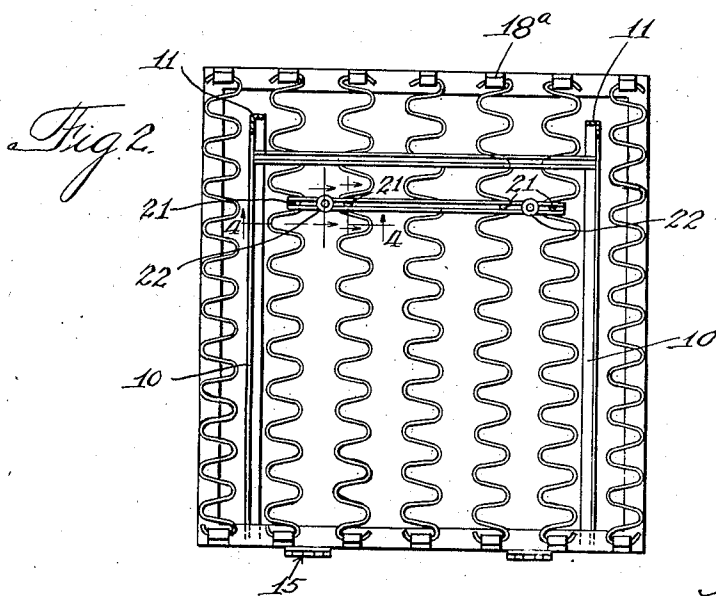
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2,177,363

SEAT CONSTRUCTION

Filed March 18, 1938

2 Sheets-Sheet 1



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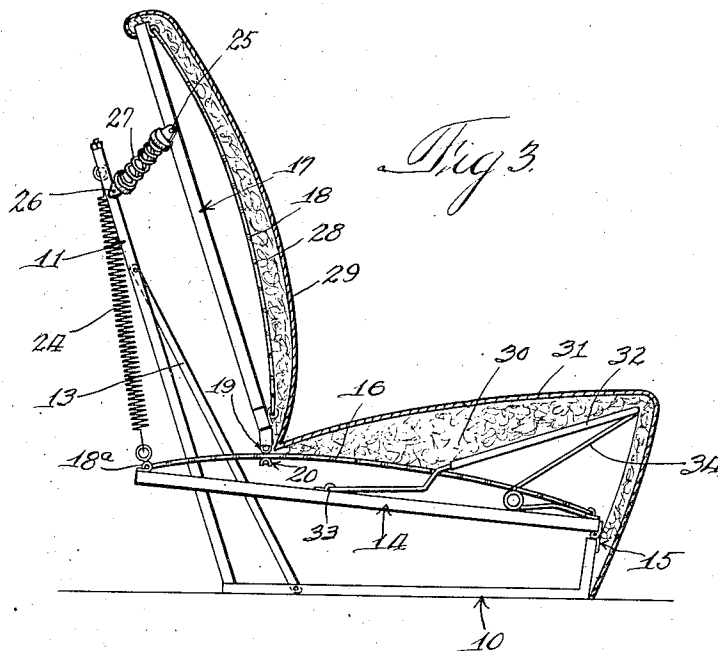
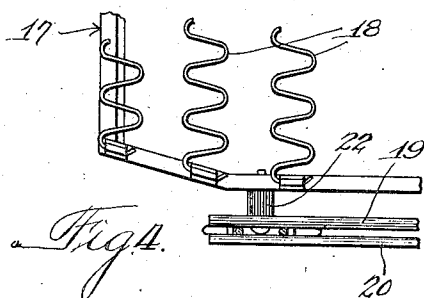
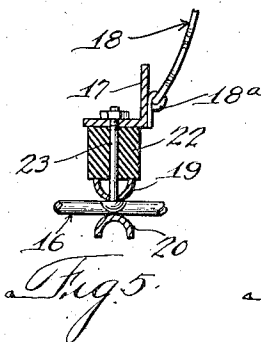
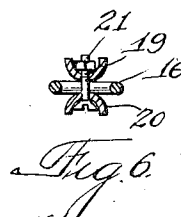
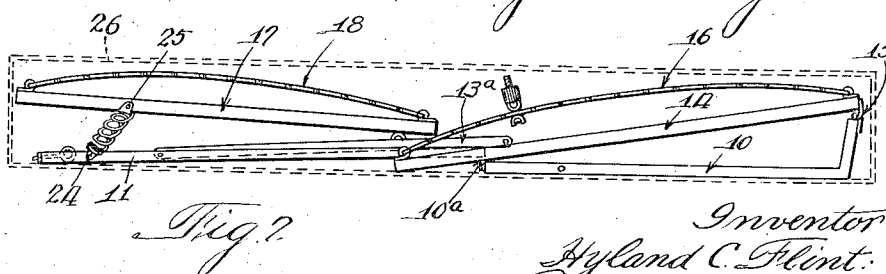
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2,177,363

SEAT CONSTRUCTION

Filed March 18, 1938

2 Sheets-Sheet 2



10a
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UNITED STATES PATENT OFFICE

2,177,363

SEAT CONSTRUCTION

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Application March 18, 1938, Serial No. 196,585

13 Claims. (Cl. 155—53)

This invention relates to a seat construction and has special reference to a seat of the so-called unison type for use in chairs, davenport, vehicle seats or other constructions wherein it is desired to provide a synchronization of the substantially vertical movement of the back rest with the seat in order to effect a somewhat floating support for the user.

More particularly, this invention relates to a seat construction having a rigid support including an upright for resting on a supporting surface with a substantially horizontally extending seat frame secured adjacent one end thereof to the rigid support, the seat having a plurality of yielding strips for resisting a vertically disposed weight and for connection between opposed sides of the seat frame with a substantially vertically extending back rest frame supported by the yielding strips adjacent the other end of the seat frame for vertical movement therewith. The back rest frame is also permitted a substantially horizontal movement through resilient means engaged between the back rest and the upright, and other resilient means may be secured between the upright and the end of the seat frame opposite to the pivotally secured end for resisting pivotal movement of the seat frame in one direction in such construction where the seat frame is pivotally secured to the rigid support.

The present invention contemplates the use of a plurality of yielding strips disposed between opposed sides of the seat frame for resisting a vertically disposed weight with the back rest frame supported directly on the yielding strips to follow the vertical movement of the strips in their function of resisting the weight of a person or thing disposed thereupon.

The yielding strips are preferably of a type which have a maximum flexibility, the strips being capable of flexing universally in any direction. Such strips may comprise wires having substantially horizontally extending undulations to form the strips with the strips being normally upwardly arched. In breaking down the arch to conform to the outline of the person or object seated or disposed thereupon the spacing of the undulations is reduced as the strip approaches a straight line from its normal arched position. The normally substantially horizontal position of the undulations may likewise be disturbed which by reason of this construction is readily accommodated, thus affording a universal flexibility.

Since the back rest frame is supported by or connected directly to preferably a major num-

ber of these strips, the weight of a person or object upon the strips to deflect them from their normally arched position will cause a movement of the back rest frame downwardly therewith. The connection between the back rest frame and the strips is preferably afforded by a detachable connection comprising a pair of opposed bars having their opposed surfaces of arcuate shape, the wire forming the yielding strips being preferably round and being disposed in engagement therebetween for presenting a minimum contact area.

The opposed bars are preferably detachably connected to the back rest frame, and resilient spacing means are disposed between the opposed bars and the back rest frame for permitting relative flexibility therebetween. When the angle between the back rest frame and seat frame changes, the resilient spacing means takes up whatever play may be occasioned by such changed positions. For example, if the back rest frame has a substantial pressure exerted thereagainst, it moves rearwardly relative to the seat, and the angle which normally may approach a right angle tends toward an obtuse angle. Where the seat receives pressure and pressure is relieved from the back rest frame the angle therebetween may be changed from that approaching a right angle toward an acute angle. Thus the resilient spacing means permits such relative flexibility and yet at all times obtains a substantially stable or fixed relation therebetween with resultant elimination of noise and rattling.

Resilient means are secured between the upright of the rigid support and the end of the seat frame opposite to that which is secured to the rigid support so that, when a person or object is disposed thereon, a double suspension is afforded thereto to resist the vertical action thereof. The yielding strips afford one means of suspension and the resilient means just recited afford a second suspension means and each thereof is different in character, action and results from the other.

It is also contemplated by this invention to provide a seat frame which is pivotally secured to the rigid support and extends angularly therefrom above a horizontal position so that when the weight of a person or object is disposed thereon the seat frame will assume a normally substantially horizontal position. Any further exertion of force or weight in addition to the weight of the person or object as, for example, by means of irregularities on the surface over which a vehicle is traveling, permits a further movement

of the seat frame from the horizontal on a very small arc in a substantially vertical relation so that such movement is substantially unnoticeable. This also results in the ability to use a softer spring in a construction where the space afforded for vertical movement is limited. The initial force exerted on the springs normally will move the seat to a substantially horizontal position with subsequent movement of the seat extending the springs at a low rate of recoil.

One of the objects of this invention is to provide a seat construction of the character indicated above wherein the imposed weight is afforded a double suspension.

Another object of this invention is to provide a seat construction of the type hereinabove described wherein the seat frame extends angularly above a horizontal position from the rigid support to which it is secured.

A still further object of this invention is to provide a seat construction of the character noted above which has a comparatively long initial drop when force or a weight is exerted on the seat frame to provide a low rate of recoil of the resilient means thereof.

It is also an object of this invention to provide a seat construction of the type hereinabove noted wherein the seat frame thereof has a plurality of normally upwardly arched yielding strips disposed between opposed sides thereof.

It is another object of this invention to provide a seat construction which is so constructed and arranged as to facilitate packaging for storage and handling.

Other objects and advantages of this invention 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 read together with the accompanying drawings, in which latter:

Figure 1 is a perspective view of a seat construction embodying the features of this invention;

Fig. 2 is a plan sectional view taken on the line 2-2 of Fig. 1;

Fig. 3 is an end elevational view of the construction shown in Fig. 1 showing the seat upholstered and in section;

Fig. 4 is an enlarged detailed view of a fragmentary portion of the seat construction taken on the line 4-4 of Fig. 2;

Fig. 5 is an enlarged detailed view of the connection between the back and seat frames taken on the line 5-5 of Fig. 2;

Fig. 6 is an enlarged detailed view of the seat construction taken on the line 6-6 of Fig. 2; and

Fig. 7 is a side elevational view of the seat construction shown in Fig. 3 with the back rest occupying a horizontal position in alignment with the seat for packaging.

Referring now more particularly to the drawings, the seat construction of the present invention is illustrated in a form which is particularly adapted for use in automotive vehicles although the construction may be readily adapted for various other uses which will be apparent from a further consideration thereof.

A rigid support is provided for resting on a supporting surface, the support comprising a substantially rectangular base portion 10 with an upright 11 extending from a rear side thereof, the front side of the base being offset to provide a raised bar 12. The upright 11 is likewise pref-

erably rectangular in shape and both the base support and the upright are preferably formed of metal of angular cross section. The upright is shown as being rigidly secured to the base portion of the rigid support although for purposes of convenience in packaging for storage or shipment the upright may be pivotally secured to the base portion as will hereinafter more particularly be described. In the rigid construction, a pair of braces 13 are disposed between the upright and the base portion of the support and are fixedly connected therebetween.

The seat frame 14 preferably comprises a substantially rectangular channel member, the forward edge of which is preferably pivotally mounted to the raised cross bar 12 as by means of a pair of hinges 15.

For resisting a vertically disposed weight on the seat a plurality of yielding strips 16 are connected between opposed sides of the seat frame, each of the strips, in the instance of the drawings, being shown as comprising a wire of circular cross section having substantially horizontally extending undulations. The strips are normally upwardly arched with the ends of the wire being preferably permanently secured in brackets welded or otherwise secured to the ends of the channel frame. In the manufacture of the yielding strips the wire undulations are given a permanent arcuate set of comparatively small radius, which forming may be done on a mandril, and thereafter the strips are extended from the normal small radius to that of a larger radius to conform to the desired arch to be formed on the seat frame. Thus, when a weight is disposed on the yielding strips a further enlarging of the radius is obtained which is resisted by the normally smaller radius of set. The resistance afforded by the yielding strips is thus obtained by the enlarging of the radius from the initial position of set originally formed in the strip to which the strip seeks to return.

The back rest frame 17 is likewise preferably formed of angular cross section in a substantially rectangular form, the width of the back rest being preferably substantially the same as that of the width of the seat frame. A plurality of yielding strips 18 are connected between the opposed sides of the rectangular frame and are preferably permanently connected thereto. The yielding strips 18 are of the same structural elements as those strips previously described with reference to the seat frame and are connected in the same manner. There is possibly a difference merely in the weight of the material employed in order to afford perhaps a softer resistance to the weight of the person or thing resting thereagainst.

The back rest frame 17 is preferably connected directly to the yielding strips 16 of the seat frame, the connection comprising a pair of opposed bars 19 and 20 between which the yielding strips 16 are clampingly engaged. The opposed faces of the cross bars 19 and 20 are preferably of arcuate cross section as shown more particularly in Fig. 6 and engage opposite sides of the wire forming the yielding strip 16. By reason of this construction a minimum of frictional contact is obtained and no undue or unnatural stress will be placed upon the yieldable strip. A nut and bolt 21 holds the opposed bars 19 and 20 in position for clamping the wire therebetween and by reference to Fig. 2 are preferably so positioned with respect to the undula-

tions that the bar is prevented from lateral displacement.

The back rest frame is spaced from the yielding strips by means of a resilient spacing collar 22 preferably formed of rubber or composition, a bolt 23 passing through the apertures in the bar 19 and collar 22 for extension through an aperture in the cross bar of the back rest frame 17. The head of the bolt is disposed between the cross bars 19 and 20 with the nut being disposed on the threaded free end adjacent the cross bar of the frame 17 to prevent displacement. The resilient spacing means permits angular flexibility of the back rest frame with respect to the seat frame and also cushions the connected members against shock and noise.

The cross bars 19 and 20 extend to engage preferably at least a major portion of the intermediate strips 16 leaving an end strip on each side to form a yieldable border and trim line on the seat. The back rest frame 17 has its lower edge offset as at 17a at the ends thereof in a direction upwardly over the non-connected strips so that upon a flexing of the connected strips the back rest frame will not engage the non-connected strips.

In order to afford a double suspension means to accommodate the vertical resistance to the weight of an object or person supported on the seat, a resilient means is disposed between the upper cross bar of the rigid upright 11 and the free end of the seat 14. This resilient means is shown in the form of two coil springs 24 equidistantly spaced from the center of the frame although of course it will be understood that any number of springs as desired may be employed. The coil springs 24 normally hold the seat frame 14 in the aforesaid position of angularity above the horizontal whereafter when a weight is disposed on the seat, a normal weight will extend the coil springs to a position such that the seat is substantially horizontal and further force or weight disposed thereon will vary the position of the seat from its substantially horizontal position. Such above mentioned normal weight may be predetermined for determining the number of springs or correct rate of spring resistance.

Resilient means are also disposed between the rigid upright 11 and the back rest frame 17 for resisting rearward movement of the back rest frame and for permitting vertical movement with respect to the fixed support responsive to the movements of the yielding strips or the coil springs 24. Such resilient means are shown and described in my copending application Serial No. 59,265, filed January 15, 1936, and comprises a pair of rockers 25 and 26 pivotally secured respectively to the back rest frame 17 and the rigid support 11, a coil spring 27 being disposed between the rocker members. A pair of such resilient members are shown and for the purposes of this application are all that is necessary for affording the resilient action desired. However, it is of course apparent that other equivalent means may be substituted for these means and also that a greater number of units may be employed as desired.

Referring now more particularly to Fig. 3, the seat construction is shown as being upholstered in a usual manner. A padding 28 or usual upholstery material is rested against the yielding strips 18 of the back rest frame and is covered by any desired fabric or other material 29. Similarly, a padding of upholstery material 30 may rest against the yielding strips 16 and be covered

with a fabric, leather, or other covering material 31. However, in the construction shown in the drawings, an auxiliary frame 32 of substantially U-shape is provided, the arms of the U-shape frame being connected as at 33 to the main seat frame and extending angularly therefrom above a horizontal position in the opposite direction to the angular inclination of the main seat frame with a resilient member or members 34 shown in the form of torsion springs being disposed between the main frame and the auxiliary frame to afford a soft front edge.

As shown more particularly in Fig. 7, the rigid upright 11 is shown as being pivotally secured as at 10a to the base portion of the rigid support 10 with the braces 13a being pivotally secured to the upright 11 for detachable connection with the base portion of the rigid support 10 so that the seat frame and back rest may occupy a substantially horizontal position for disposal in a cardboard container or the like 26. In this condition the connection between the back rest and seat frames should be detached as well as one end of the coil springs 24, the construction in its entirety being thus readily packaged for convenience and economy in storage and handling, and readily and quickly assembled for use.

While but a single embodiment of this invention is herein shown and described, it is to be understood that various modifications thereof may be apparent to those skilled in the art without departing from the spirit and scope of this invention and, therefore, the same is only to be limited by the scope of the prior art and the appended claims.

I claim:

1. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame secured adjacent one end thereof to said rigid support, a plurality of yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame supported by said yielding strips adjacent the other end of said seat frame for vertical movement therewith, and means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips.

2. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame secured adjacent one end thereof to said rigid support, a plurality of normally upwardly arched yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame supported by said normally upwardly arched yielding strips adjacent the other end of said seat frame for vertical movement therewith, and means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips.

3. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame secured adjacent one end

thereof to said rigid support, a plurality of normally upwardly arched wires having substantially horizontally extending undulations to form yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame supported by said normally upwardly arched yielding strips adjacent the other end of said seat frame for vertical movement therewith, and means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips.

4. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame secured adjacent one end thereof to said rigid support, a plurality of normally upwardly arched yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame supported by a plurality of the intermediate normally upwardly arched strips adjacent the other end of said seat frame for vertical movement therewith, said back rest frame having end portions overlying the non-supporting strips offset in a direction away from said strips, and means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips.

5. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame pivotally secured adjacent one end thereof to said rigid support, a plurality of yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame supported by said yielding strips adjacent the other end of said seat frame for vertical movement therewith, means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips, and resilient means secured between said upright and the end of said seat frame opposite said pivotally secured end for resisting pivotal movement of said seat frame in one direction.

6. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a frame pivotally secured adjacent one end thereof to said rigid support and extending angularly therefrom to swing from a position slightly above a horizontal plane to a position slightly below a horizontal plane, a plurality of yielding strips connected between opposed sides of said seat frame, a substantially vertically extending back rest frame supported by said yielding strips adjacent the other end of said seat frame for vertical movement therewith, means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips, and resilient means se-

cured between said upright and the end of said frame opposite said pivotally secured end for resisting pivotal movement of said seat frame in one direction and for holding said seat frame in said position of angularity during non-use thereof.

7. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame pivotally secured adjacent one end thereof to said rigid support, a plurality of normally upwardly arched wires having substantially horizontally extending undulations to form yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame supported by said normally upwardly arched yielding strips adjacent the other end of said seat frame for vertical movement therewith, means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips, and resilient means secured between said upright and the end of said frame opposite said pivotally secured end for resisting pivotal movement of said seat frame in one direction.

8. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a main seat frame pivotally secured adjacent one end thereof to said rigid support and extending angularly therefrom to swing from a position slightly above a horizontal plane to a position slightly below a horizontal plane, a plurality of normally upwardly arched yielding strips connected between opposed sides of said seat frame, an auxiliary frame having one end connected to said main seat frame and extending angularly therefrom above a horizontal position in the opposite direction, resilient means for supporting said auxiliary frame on said main frame, a substantially vertically extending back rest frame supported by said normally upwardly arched yielding strips adjacent the other end of said seat frame for vertical movement therewith, and means supported between said upright and said back rest frame 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 resilient strips, and resilient means secured between said upright and the end of said frame opposite said pivotally secured end for resisting pivotal movement of said seat frame in one direction and for holding said seat frame in said position of angularity during non-use thereof.

9. In a device of the character described, a rigid support including a pair of spaced uprights for resting on a supporting surface, a substantially horizontally extending seat frame pivotally secured adjacent one end thereof to said rigid support, a plurality of spaced yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, said spaced uprights extending upwardly within the confines of said seat frame in the space between adjacent pairs of yielding strips, a substantially vertically extending back rest frame supported by said normally upwardly arched strips adjacent the other end of said seat frame for vertical movement therewith, means supported between said upright and said

back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said yielding strips, and resilient means secured between said upright and the end of said frame opposite said pivotally secured end for resisting pivotal movement of said seat frame in one direction and for holding said seat frame in said position of angularity during non-use thereof.

10 In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame secured adjacent one end thereof to said rigid support, a plurality of yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame connected to said yielding strips adjacent the other end of said seat frame for vertical movement therewith, said connection comprising a pair of opposed bars extending across at least a majority of said strips with said strips disposed therebetween, means for detachably connecting said opposed bars to said back rest frame, and means supported between said upright and said back rest frame 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 resilient strips.

11. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame secured adjacent one end thereof to said rigid support, a plurality of yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame connected to said yielding strips adjacent the other end of said seat frame for vertical movement therewith, said connection comprising a pair of opposed bars extending across at least a majority of said strips with said strips disposed therebetween, means for detachably connecting said opposed bars to said back rest frame, resilient spacing means between said opposed bars and said back rest frame, for permitting relative flexibility therebetween, and

means supported between said upright and said back rest frame 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 resilient strips.

12. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame secured adjacent one end thereof to said rigid support, a plurality of normally upwardly arched wires having substantially horizontally extending undulations to form yielding strips for resisting a vertically disposed weight and for connection between opposed sides of said seat frame, a substantially vertically extending back rest frame connected to said yielding strips adjacent the other end of said seat frame for vertical movement therewith, said connection comprising a pair of bars having opposed arcuate faces for receiving in engagement therebetween wires of said yielding strips, means for detachably connecting said opposed bars to said back rest frame, and means supported between said upright and said back rest frame 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 yielding strips.

13. In a device of the character described, a rigid support including an upright for resting on a supporting surface, a substantially horizontally extending seat frame pivotally secured adjacent one end thereof to said rigid support, resilient means carried by said seat frame for resisting a vertically disposed weight, a substantially vertically extending back rest frame connected to said resilient means of said seat frame for vertical movement therewith, means supported between said upright and said back rest frame for resisting rearward movement of said back rest frame and for permitting vertical movement with respect to said fixed support responsive to the movement of said resilient means of said seat frame, and resilient means depending from said upright for connection with the end of said seat frame opposite said pivotally secured end for resisting pivotal movement of said seat frame in one direction.

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