

Sept. 1, 1953

W. F. HEROLD ET AL

2,650,646

RESILIENTLY MOUNTED TILTABLE SEAT AND BACK REST

Filed Aug. 23, 1949

5 Sheets-Sheet 1

Fig. 1.

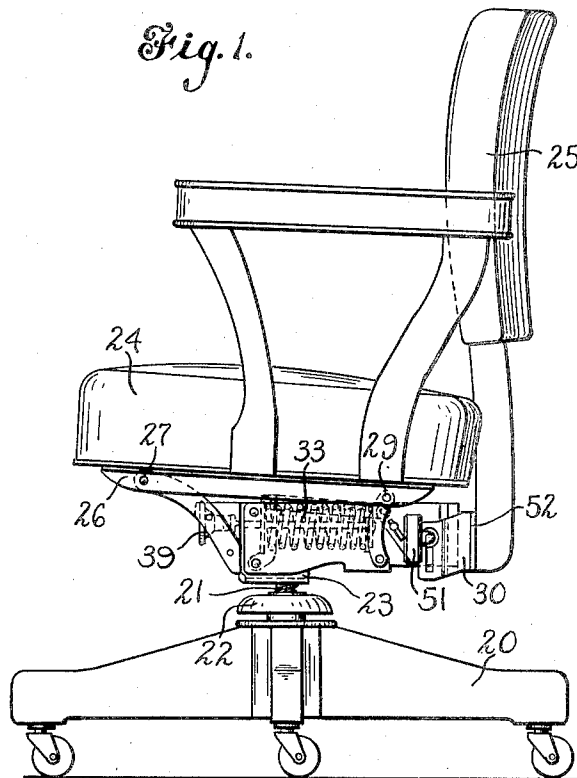
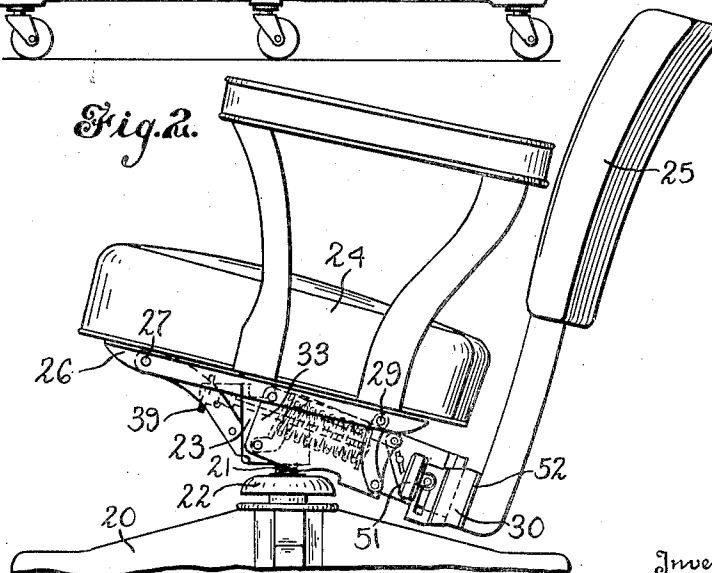


Fig. 2.



Inventors

By

Walter F. Herold
Henry Walter Parrott
Rochester Bartholomew

ATTORNEYS

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Fig. 3.

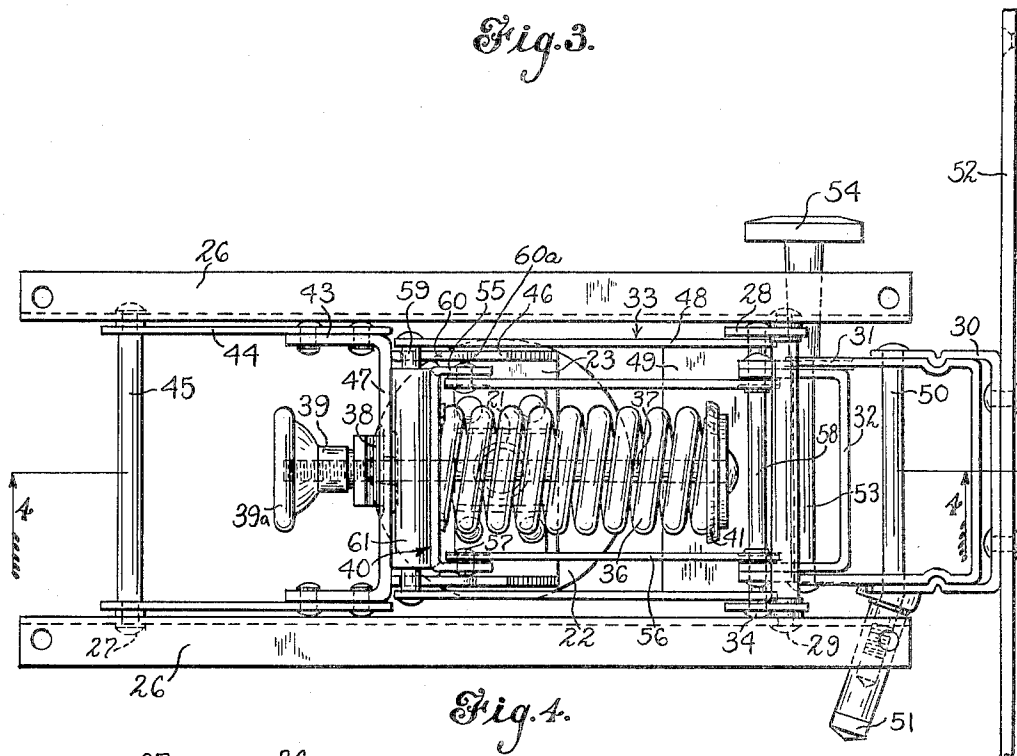


Fig. 4.

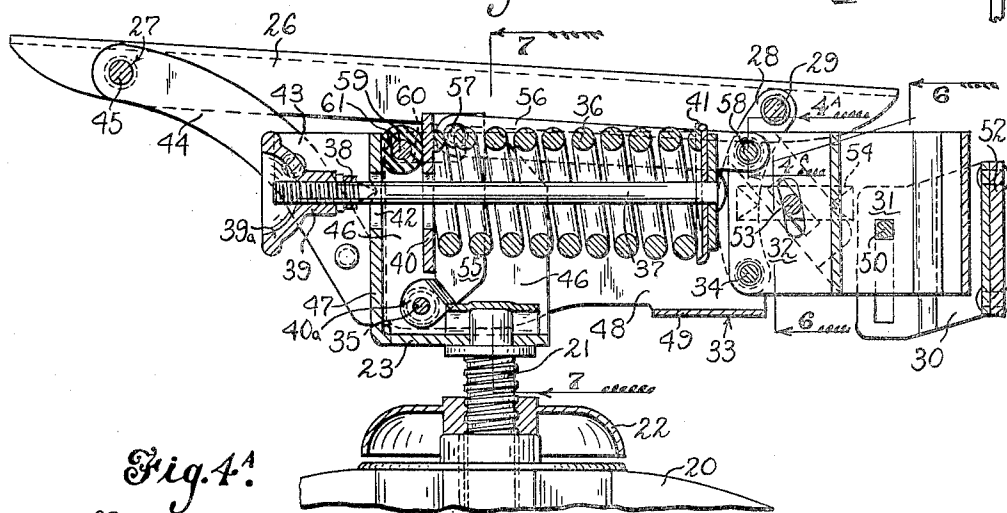
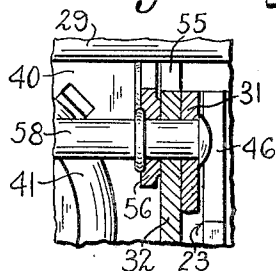


Fig. 4A.



Inventors

Walter F. Herold
Henry Wheeler Parrott
By *Rockwell & Bartholomew*

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Fig. 5.

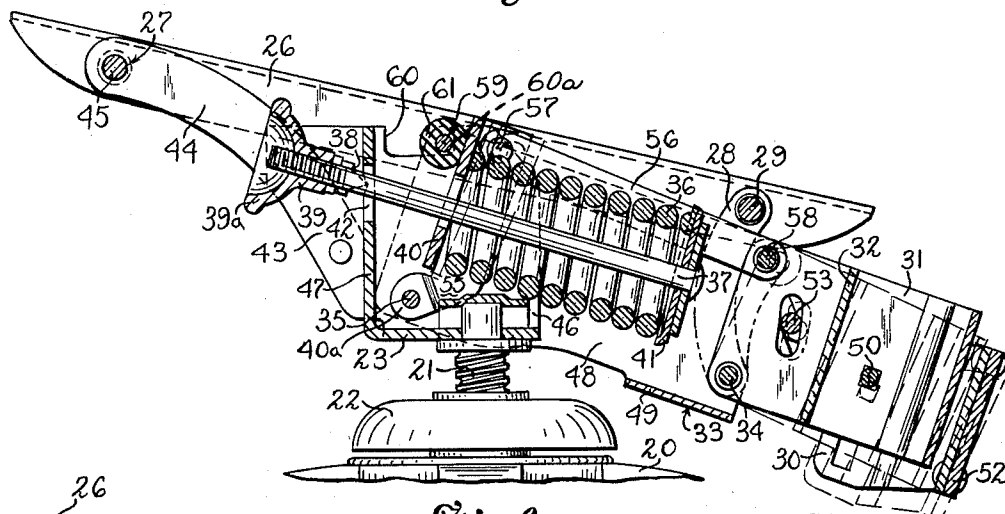
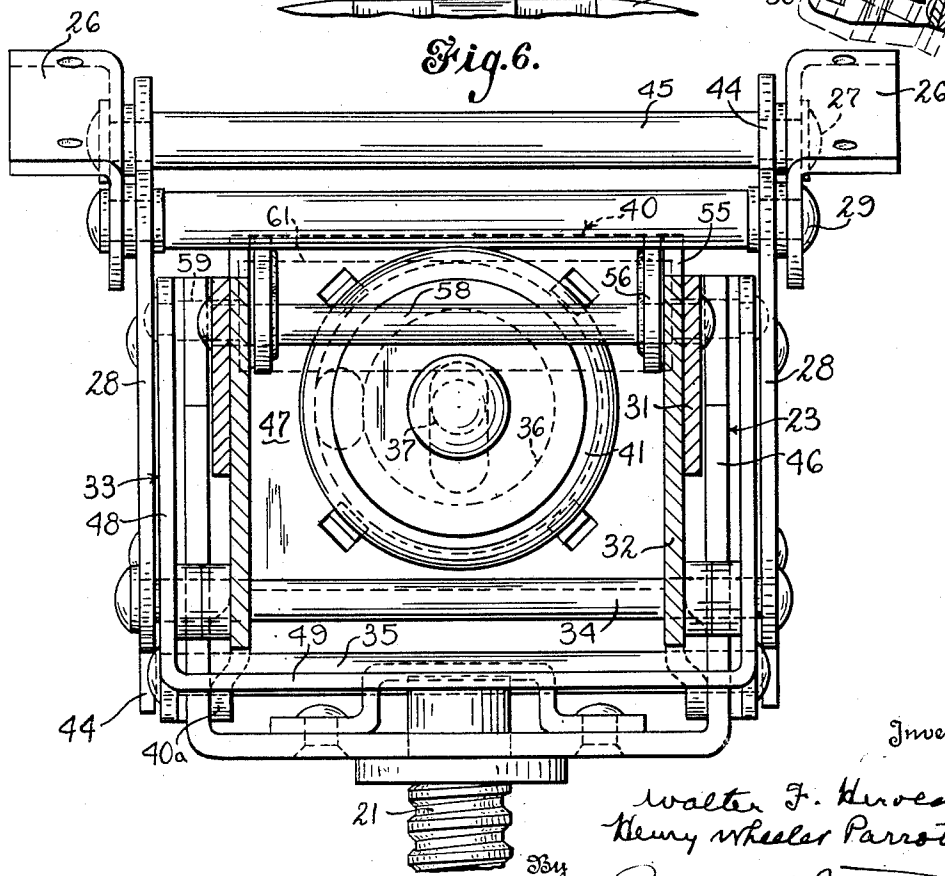


Fig. 6.



Inventors

Walter F. Herold
Henry Wheeler Parrott
Rockwell & Bartholomew

ATTORNEYS

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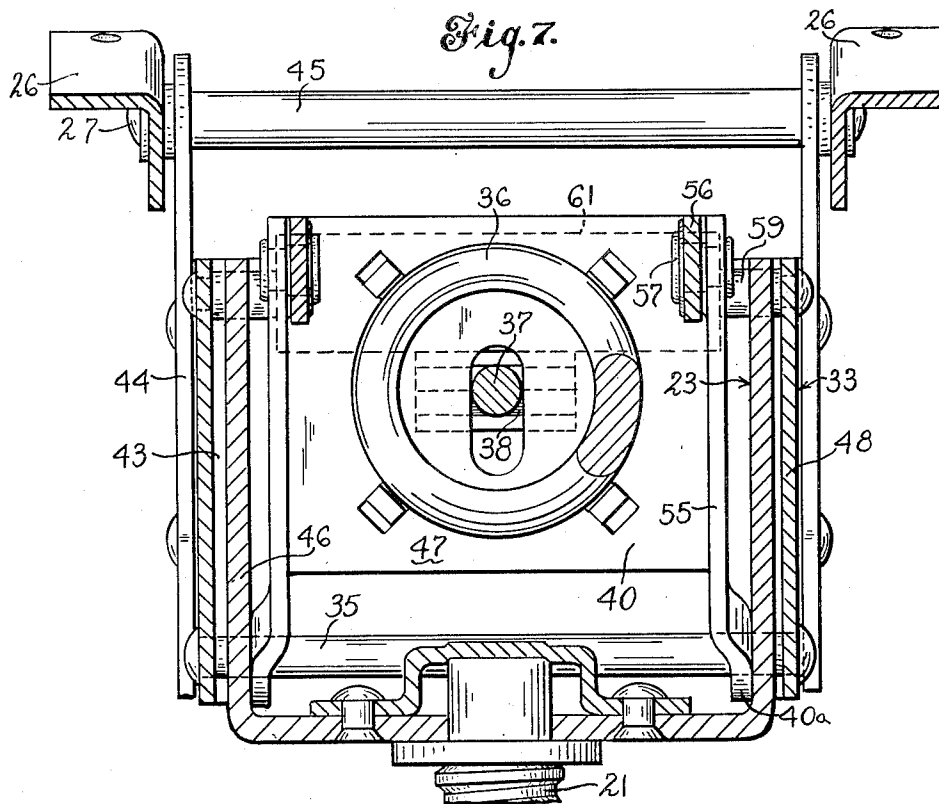
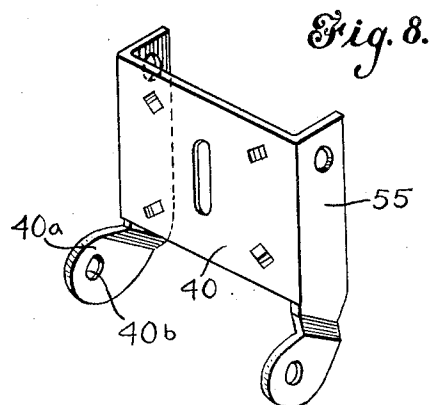
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Inventors

Walter F. Herold
Henry Wheeler Parrott
By *Rockwell Bartholomew*

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Fig. 3^A

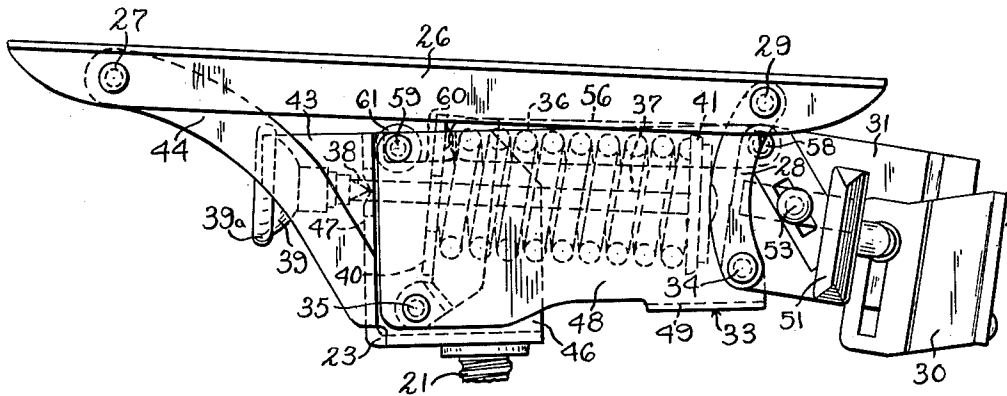


Fig. 9.

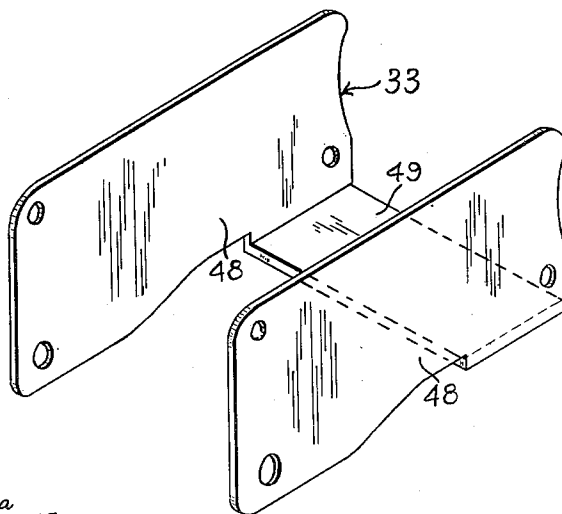
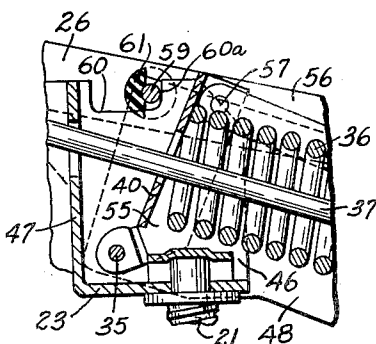


Fig. 10.



Inventors

Walter F. Herold
Henry Wheeler Parrott
By Rockwell B. Barlow

ATTORNEYS

UNITED STATES PATENT OFFICE

2,650,646

RESILIENTLY MOUNTED TILTABLE SEAT
AND BACK REST

Walter F. Herold, Easton, and Henry Wheeler
Parrott, Shelton, Conn., assignors to The Bas-
sick Company, Bridgeport, Conn., a corporation
of Connecticut

Application August 23, 1949, Serial No. 111,898

33 Claims. (Cl. 155-77)

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This invention relates to posture chairs, and more particularly to those known in the trade as executive-type posture chairs, although not limited to that application.

While the present invention comprehends variations from and important improvements in the posture chair disclosed in Herold Patent No. 2,374,350, of April 24, 1945, the present chair structure embodies principles and features of the prior chair, as will appear as the description proceeds.

One of the objects of the present invention is to provide a posture chair of the general type shown in the said prior patent, in which a single resilient means is used to control and coordinate the movements of the seat and chair back, the coordination of the movements of the two being in the present case produced by a novel structure whereby certain novel and very beneficial results are obtained.

Another object is to provide a very comfortable and generally satisfactory posture chair of the executive type.

Another object is to provide a chair of the type having a tilting seat and a back in pivotal relation to the seat, in which the seat and back are under improved resilient control, in which there is an elimination of rigid stops, such as have been previously used in some cases, which have a jarring or disturbing effect upon the occupant.

Another purpose of the invention is to provide a posture chair having a tilting seat and a tilting back in pivotal relation to the seat, in which, when the back is swung rearwardly, the seat remains in close proximity vertically to the back, there being an entire absence of a "dropping away" effect of the seat at this point which disturbs or causes discomfort to the occupant.

In the accompanying drawings:

Fig. 1 is a side elevation of a posture chair embodying our invention, the chair being in the normal or untilted position;

Fig. 2 is a fragmentary view of the chair shown in Fig. 1, illustrating the chair in a backwardly tilted position;

Fig. 3 is a top plan view of the chair iron employed in the chair, the element intended to be attached to the chair back being broken away;

Fig. 3^A is a side elevation of the chair iron, showing the back-supporting bracket tilted rearwardly to a certain extent;

Fig. 4 is a section on line 4—4 of Fig. 3;

Fig. 4^A is a section on line 4^A—4^A of Fig. 4;

Fig. 5 is a section similar to Fig. 4, showing a position occupied by the parts when the seat and back are tilted rearwardly;

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Fig. 6 is an enlarged section on line 6—6 of Fig. 4;

Fig. 7 is an enlarged section on line 7—7 of Fig. 4;

Fig. 8 is a perspective view of the pivoted spring follower or head;

Fig. 9 is a perspective view of the yoke member; and

Fig. 10 is a detail sectional view of certain parts in the position they assume when the chair back support has the position shown in dotted lines in Fig. 5.

In the drawings, there is shown by way of example an office chair of the executive posture type, in which a supporting pedestal or base carries a screw post adjustable up and down by means of an adjusting nut, the upper end of the screw post having rigidly attached thereto a chair iron, said chair iron comprising a frame rigid with the screw post, a pivoted or hinged element in the form of a yoke adapted to swing in a vertical plane against the action of resilient counterbalancing means, to control the position of the seat, and a yieldably mounted chair back adapted to have a substantially upright position when the chair is in the so-called working position. The resilient counterbalancing means provided at the under portion of the seat is connected to the seat and to the chair back to control and coordinate their movements, there being a certain amount of lost motion provided between the chair back and the seat. The seat and the back are swung rearwardly in opposition to the resilient counterbalancing means when the person occupying the chair assumes a reclining position. The chair is provided with an angle-adjusting bracket by means of which the initial angularity of the back relative to the seat can be adjusted, and it is further provided with means whereby the height of the chair back can be adjusted.

The frame, previously mentioned, which is rigid with the screw post at the upper end of the latter, is located toward the front of the chair seat, and in this instance provides adjacent the front edge of the seat a pivotal support for spaced parallel seat-supporting angle irons attached to the seat. Pivotally supported from the rear end portions of the angle irons are depending links, the lower ends of which are pivoted to the chair-back-carrying bracket or element, and also to a yoke member disposed outside of the frame and pivoted to swing up and down, this yoke member being acted upon by a coil spring, and the coil spring being subject to the action of a pivoted follower or spring compressor, in the

manner hereinafter more particularly described.

In the drawings, the base or pedestal is indicated at 20, the screw post at 21, the adjusting nut at 22, the frame carried by the post at 23, the chair seat at 24, the chair back at 25, the angle irons carried by the seat at its under portion, at 26, the pivotal connection between the frame and the forward ends of the angle irons at 27, and the links depending from the rear end portions of the angle irons at 28, the pivotal connection between the angle irons and these links being indicated at 29. The height-adjusting bracket of the chair back is indicated at 30, the main chair-back-carrying bracket at 31, and the angle-adjusting bracket of the chair back at 32, the swinging or pivoted yoke member previously mentioned at 33, the pivotal connection of bracket 32 with yoke 33, at 34, and the pivotal connection of yoke 33 with the frame 23, at 35. The coil spring, previously mentioned, is indicated at 36, the tension rod extending through the spring at 37, the pivoted knife edge member supporting the tension rod against the frame 23, at 38, and the tension-adjusting nut on the rod at 39. The pivoted follower or spring compressor acting on the coil spring is indicated at 40, said follower or spring compressor having the same pivot 25 on which the yoke 33 swings. Upon the rear end of the rod 37 is a cap 41, against which the rear end of the spring 36 bears.

The frame 23, in vertical longitudinal section, is L shaped, as shown in Fig. 4, the lower leg of the L being suitably fastened to the top of the screw post, and the vertical part of the frame being disposed toward the front and having a slot 42 through which the rod 37 passes. The knife edge member 38 engages the frame at opposite sides of this slot in suitable recesses. The nut 39 has a generally round forward end portion 39^a for manual manipulation, this being conveniently accessible at the forward part of the chair iron between forwardly reaching walls 43 of the frame. Suitably attached to the walls 43, as by riveting, are upwardly and forwardly curved arms 44, which extend to the pivotal connection of the frame with the angle irons. In this particular case the pivotal connection is provided by a rigid tie rod 45 interconnecting the angle irons and engaging perforations in the arms 44.

In addition to the forwardly extending walls 43, the frame 23 has rearwardly extending side walls 46 extending from the vertical transverse wall 47 in which the slot 42 is provided. The pivoted follower or spring compressor 40 is located between the walls 46. The pivotal connection 35, common to the follower 40 and to the yoke member 33, comprises a rod which in this instance is journaled in perforations in the walls 46, these perforations being at the lower part of the frame, and the follower pivot being at the lower part of the follower. The yoke or pivoted supporting member 33 is arranged to swing in a vertical plane on portions of the pivot rod that are extended outwardly beyond the walls 46. The pivot rod engages perforations in the yoke adjacent the forward lower ends of side walls 48 that are parts of the yoke, the yoke also being provided with a bottom wall or cross web 49 adjacent the lower rear end thereof. The walls 48 of the yoke are provided adjacent their lower rear parts with perforations in which are received the ends of a rod which provides the pivotal connection 34, previously mentioned.

Exteriorly of the yoke the ends of the rod 34, which rod is arranged to turn in the yoke, are connected to the lower ends of the links 28, previously mentioned. The upper ends of these links are arranged to turn on a tie rod which inter-connects the angle irons and provides the pivotal connection 29, previously mentioned.

The main chair-back-carrying bracket 31 is in this instance of U shape with forwardly projecting side arms, and has the height-adjusting bracket 30 vertically adjustable with reference thereto, the height-adjusting bracket being clampable in the desired adjustment by means including a cross rod 50 and a clamping nut 51 which are of the usual construction. The bracket 30 is attached to a cross bar 52 that is suitably attached to the lower end of the chair back. The angle-adjusting bracket 32 is another U-shaped member with forwardly projecting side arms, this being nested in the bracket 31 at the forward part of the latter, and being clamped in the desired angular position by means including a cross rod or shaft 53 and a clamping nut 54. The particular adjusting connection between brackets 32 and 31 is preferably of the kind disclosed in Patent No. 2,093,319, of September 14, 1937. The bracket 32 is pivoted to the yoke or tilting mounting member 33 at the lower forward portion of the bracket by means of the pivot rod 34.

The spring follower 40 is provided at the sides with rearwardly turned walls 55, and adjacent the upper ends of these walls, links 56 are pivoted to swing in vertical planes, said links extending rearwardly and approximately horizontally toward the upper parts of the bracket 32 so as to be operably connected therewith. The links 56 are pivoted to the spring follower at 57, and are pivoted to the bracket 32 by a pivot rod 58. The links 56 extend within the bracket 32 at the upper part. The pivot rod 58 passes through perforations in the rear ends of the links and perforations in the upper forward parts of the side walls of brackets 31, 32. The spring follower 40 has at its lower part pivot lugs 49^a that are provided with perforations 49^b engaging pivot rod 35.

At the upper forward corners of the side walls of the yoke 33, a cross rod 59 interconnects these side walls in a region between the spring follower 40 and the forward wall 47 of the frame, and the end portions of this rod are movable in a forward and rearward direction in recesses or notches 60 in the side walls of the frame at the upper edges of the walls. The rod 59 carries a suitable cushioning means located in the space between the frame and the spring follower adapted to make contact with the frame and follower in a yielding manner. This cushioning member may conveniently be constituted by a rubber element 61 in the form of a tube embracing the rod 59. When the chair parts are in the normal position shown in Fig. 4, the rubber cushion is held by the spring follower against the forward wall of the frame.

From the foregoing description it will be apparent that the chair seat is tiltably mounted adjacent its forward end, and that adjacent the rear end of the seat the same is connected to the rear end of the vertically swingable yoke member and the forward end of the bracket structure for the chair back, the yoke and the said bracket structure, in this particular instance, being pivoted to the lower ends of the links 28 at a common pivot point by means of the pivot

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rod 34. It will be evident, of course, that upon downward movement of the rear portion of the seat under the weight of the occupant the yoke will swing downwardly against the resistance offered by the coil spring, the chair-back bracket structure moving downwardly also, this being due to the connection by way of the links 28 or equivalent connection with the rear part of the seat. As the rear end of the yoke swings downwardly, the member comprising the tube 61 and the cross rod 59 is pulled rearwardly, as shown in Fig. 5, thereby swinging the spring follower 40 and compressing the spring from the front end.

It is to be noted that there is provision in this structure for a certain amount of independent movement between the seat and the back. This is illustrated in Fig. 3A, which shows that the back can be moved rearwardly to a certain extent without causing any change in the position of the seat. In moving to this position, the back swings by means of its angle-adjusting bracket with respect to the pivot 34, which remains at the same elevation, and the pressure-controlling connecting member 56, connected to the angle-adjusting member 32 at the upper part thereof, pulls on the follower 40 to compress the spring from the forward end, the yoke member 33 remaining stationary, the spring being compressed by the follower movement only.

Usually, however, when the chair is occupied, the rear part of the seat will be depressed to a certain extent by the weight of the occupant, and the condition shown in Fig. 3A for explanatory purposes will not obtain in these circumstances. Upon downward movement of the rear part of the seat, which depresses the rear part of the yoke, the lower end of the chair back moves downwardly with the yoke. If now the occupant assumes a reclining position so as to exert rearward push upon the back, the back can have a spring-controlled movement which is or is not independent of the seat movement, depending on the conditions. An independent movement of the back is shown in Fig. 5, in which the dotted lines show additional backward swinging movement of the back-supporting bracket structure after the seat has been tilted to the position shown in Fig. 5. In this Fig. 5 position the cross rod 59 engages the rear end surfaces 60^a of the recesses 60 in the frame, as shown in Fig. 10, and this prevents further dropping of the seat although permitting some further downward movement of the chair back.

In the normal position shown in Fig. 4, there is a slight backward tilt of the seat, say of 3°, which is usual in chairs of this character. When the seat comes to the end of its downward tilting movement, it may have an angle of, say, 13° to the horizontal. The back, however, in this instance can have a rearward swing of approximately 20° to a vertical plane.

The tension of the spring 36 should be adjusted to the weight of the occupant, but no precise or close adjustments are required by the described construction. As the person sitting in the chair changes his position with respect to the chair, or moves his body, the chair seat and chair back closely follow the changes in a manner to give full and comfortable support without disturbing shocks or jars, and to an extent the back movement can be independent of the seat movement. When the seat tips downwardly at the rear, it does not drop vertically with respect to the back to an extent which would cause discomfort to the occupant or disarrange his clothing,

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which is a defect of some prior chair structures of this general type. On downward and rearward movement of the seat and chair back, these parts do not come into contact or cause contact with a solid stop. This is obviated by the described construction, in which, when the back has been swung rearwardly to a certain extent, there arises an upward counterpressure against the rear part of the seat by way of the links 28. Assuming that the parts are in the full-line position in Fig. 5, it will be understood that, in this position, there is a certain downward pressure upon the rear part of the seat due to the weight of the occupant, and that there is a certain downward pressure upon the chair-back-bracket structure owing to the weight of the occupant or push against the chair back. When the effective pressure against the back is greater than that against the seat, and the chair-back-bracket assumes the dotted-line position shown in this view, the bracket, through the link connection with the angle irons, presses upwardly on the rear portion of the seat, and this tends to restore the balance and to arrest further movement of the seat and back structure and to bring the seat and back structure to rest gradually and in a cushioned manner, with total absence of a shock or jar incident to the use of a fixed stop. On the other hand, when the chair and back structure moves again to the forward position, there is no shock or jar at this point owing to the fact that the yielding member or cushion 61 interposed between the spring follower and the frame comes into action, as above described.

It will be seen that, in the example herein disclosed, the chair iron is characterized by a frame member having a forwardly and upwardly directed part providing a pivot for the chair seat adjacent the forward edge of the seat, there being pivoted to the frame adjacent the lower front portion of the frame proper a supporting member illustrated as a yoke having a pivotal connection at its lower rear part to a back-carrying bracket, and having between the rear part of the yoke and the rear part of the chair seat a link connection. It will also be apparent that the yoke is subject to the action of a spring tending to hold the yoke in an approximately horizontal position, as shown in Fig. 4, the spring action being exerted against a follower, which in this case is pivoted to the frame, the follower exerting pressure against the yoke through the cross rod 59 to hold the yoke in the normal position, and the follower also being connected to the chair-back-carrying bracket at a point above the pivot of said bracket in a manner to swing the bracket on its pivot.

Considering the cross bar 52 as being substantially in the plane that may be described as the plane of the chair back, it is apparent from Fig. 4, and also from Fig. 1, that in the erect position of the chair the angle between the chair seat and the chair back is slightly less than a right angle, and it will be evident from Figs. 2 and 5 that, when the seat and back are tilted rearwardly, the angle is increased. It will also be evident that in the dotted-line position of Fig. 5 the chair back will have an even greater angle with respect to the seat than in the full-line position.

Various modifications and changes in the organization of parts as well as in the details may be made without departing from the principles of the invention or the scope of the claims.

What we claim is:

1. In a posture chair, the combination of a post, a stationary frame carried thereby having

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a forwardly extending part extending into adjacency to the forward edge of the chair seat, a chair seat carrying spaced parallel angle irons pivoted to said frame part adjacent the forward edge of the seat, a supporting member having a forward part pivoted to said frame and extending rearwardly from its pivot, spring means normally holding said supporting member in a substantially horizontal position, a chair back carrying a height-adjusting member at its lower part and an angle-adjusting member to which the height-adjusting member is clamped in the desired height adjustment, said angle-adjusting member being pivoted at its lower forward part to the rear part of said supporting member, link connections between the rear part of said supporting member and the rear parts of said angle irons, and a pressure-link connection between the upper part of said angle-adjusting bracket and said spring means.

2. In a posture chair, the combination of a post, a stationary frame carried thereby having a forwardly extending part extending into adjacency to the forward edge of the chair seat, a chair seat carrying spaced parallel angle irons pivoted to said frame part adjacent the forward edge of the seat, a supporting member having a forward part pivoted to said frame and extending rearwardly from its pivot, spring means normally holding said supporting member in a substantially horizontal position, a chair back carrying a height-adjusting member at its lower part and an angle-adjusting member to which the height-adjusting member is clamped in the desired height adjustment, said angle-adjusting member being pivoted at its lower forward part to the rear part of said supporting member, link connections between the rear part of said supporting member and the rear parts of said angle irons, and a pressure-link connection between the upper part of said angle-adjusting bracket and said spring means, said spring means being maintained under compression, and said pressure-link connection being adapted to increase the compression as the back is pushed rearwardly.

3. In a posture chair, a stationary frame, a chair seat carrying spaced parallel angle irons pivoted to said frame adjacent the forward edge of the seat, a supporting member having a forward part pivoted to said frame and extending rearwardly from its pivot and link connected for supporting purposes to the rear parts of said angle irons, spring means normally holding said supporting member and the chair seat in a substantially horizontal position, a chair back having a bracket member at the lower end of the back pivoted at the lower forward part of said bracket member to said supporting member so that the back can have a rearward swinging movement, and a pressure-link connection extending forwardly from said bracket member to said spring means through which said spring means resists the rearward swinging movement of the back.

4. In a posture chair, a stationary frame, a chair seat carrying spaced parallel angle irons pivoted to said frame adjacent the forward edge of the seat, a supporting member for the rear part of the seat pivoted to said frame and extending rearwardly from its pivot and movably connected at its rear end to the rear part of the seat to support the seat, a compression spring means normally holding said supporting member and the seat in a substantially horizontal

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position, a chair back movably connected to the seat and to said supporting member so as to swing with reference thereto, and an operative connection between the chair back and said spring means whereby on rearward push of the chair back said spring means is further compressed.

5. In a posture chair, a stationary frame, a chair seat pivoted to said frame adjacent the forward edge of the seat, a supporting member having a forward part pivoted to said frame and extending rearwardly from its pivot and movably connected to the rear part of the seat to support the same, spring means acting on said supporting member to hold it normally in a substantially horizontal position, a chair back bracket having a pivotal connection at its lower part with said supporting member, and means of operative connection between the upper part of said chair back bracket and said spring means whereby the chair back in its rearward swing is resiliently supported from said spring means.

6. In a posture chair, a stationary frame, a chair seat pivoted to said frame adjacent the forward edge of the seat, a supporting member having a forward part pivoted to said frame and extending rearwardly from its pivot and movably connected to the rear part of the seat to support the same, spring means acting on said supporting member to hold it normally in a substantially horizontal position, a chair back movably connected to the seat and to said supporting member so as to swing with reference thereto, and means of operative connection between the lower part of said chair back and said spring means whereby the chair back in being pushed rearwardly is resiliently supported from said spring means, said chair back having a certain amount of rearward movement independent of the seat movement.

7. In a posture chair, a stationary frame, a chair seat pivoted to said frame adjacent the forward edge of the seat, a supporting member having a forward part pivoted to the frame and extending rearwardly from its pivot and movably connected to the rear part of the seat to support the latter, spring means normally holding said supporting member and the seat in a substantially horizontal position, a chair back having at the lower end a forwardly projecting bracket pivoted at its forward lower part to said supporting member, and means of operative connection between the upper part of said bracket member and said spring means whereby on rearward push of the back said spring means is compressed.

8. In a posture chair, a tiltable seat pivoted adjacent its forward edge to a supporting frame, a back connected to said frame to be supported thereby and pivoted to swing with respect to the seat, balancing means comprising a substantially horizontal spring which is compressed from one end by the backward tilting of the seat, and an operative connection from said back to said spring whereby on rearward push of the back said spring is compressed from the same end.

9. In a posture chair, a tiltable seat pivoted adjacent its forward edge to a supporting frame, a back connected to said frame to be supported thereby and pivoted to swing with respect to the seat, balancing means comprising a seat-supporting member and a spring which is compressed by the backward tilting of the seat, and an operative direct connection from said back to said spring whereby on rearward push of the back said spring is compressed, said seat and said back being capable of a certain amount of independent movement under the control of said spring.

10. In a posture chair, a seat pivotally mounted adjacent its forward edge on a fixed frame, a seat-supporting member pivoted to said frame and connected to the rear portion of the seat, spring means comprising a compression spring acting on said support member and normally holding said seat in substantially horizontal position, a chair back having a lower forwardly projecting bracket member pivoted to said support member, and a pressure-link connection between said bracket and said spring whereby swinging rearward movement of the chair back in relation to said support member causes compression of said spring.

11. In a posture chair, a post-supported frame, spaced parallel angle irons extending substantially across the under portion of a chair seat and pivoted to said frame adjacent the forward edge of the seat, a seat-supporting member pivotally connected to said frame and movably connected to the rear end portions of said angle irons, spring means acting on said supporting member to hold the seat normally in a substantially horizontal position, a chair back having a forwardly projecting bracket at its lower part pivoted to said supporting member, and means comprising a pressure link connected at one end to said bracket and at the other end to said spring means whereby the back is subjected to control from said spring means.

12. In a posture chair, a frame, a seat, spaced parallel angle irons attached to the under portion of the seat and pivoted to the frame adjacent the forward edge of the seat, a tilting mounting member for the rear part of said seat movably connected to the rear parts of said angle irons and pivoted to the frame, resilient means imparting resilient support to said tilting mounting member, and a chair back carrying a height-adjusting member at its lower part and an angle-adjusting member to which the height-adjusting member is clamped in the desired height adjustment, said angle-adjusting member being pivoted to said tilting mounting member, said resilient means being operatively connected to said angle-adjusting member for control of its movement relatively to said tilting mounting member.

13. In a posture chair, a seat, a tilting supporting member movably connected to the rear part of the seat and pivoted to a fixed frame, a back movably connected to the supporting member adjacent the lower end of the back, and a common resilient support means for said supporting member and the back permitting independent movement of the back after the seat has reached the limit of its rearward tilt.

14. In a posture chair, a frame, a seat pivoted to the frame, and balancing means comprising a tiltable seat-supporting member pivotally connected to said frame and link-connected to said seat and a spring compressor pivoted to said frame, said means also comprising a coil spring engaged by said spring compressor, said seat-supporting member carrying a part engageable with said spring compressor to compress said spring upon downward movement of the seat-supporting member.

15. In a posture chair, a seat having a stationary pivot adjacent the forward edge portion thereof connected to a fixed frame, a tilting supporting member connected to the rear part of said seat and pivoted to said frame, a back movably connected to said supporting member adjacent the lower end of the back, and a common resilient support means for said member and

back permitting independent movement of the back, said back being provided with a forwardly projecting bracket pivoted at its lower part to said supporting member and connected at its upper part to said resilient support means in a manner to cause compression of the resilient support means when the back is pressed rearwardly.

16. In a posture chair, a seat having a stationary pivot adjacent its forward edge connected to a fixed frame, a tilting mounting member connected to the rear portion of the seat and pivoted to said frame, a back having a forwardly projecting bracket pivoted to said tilting mounting member, spring means comprising a coil spring approximately horizontally disposed normally holding said mounting member and said seat in substantially horizontal position, and means including a pressure link extending forwardly from said bracket and connected to said spring whereby the spring is compressed on rearward push of the chair back at its upper part.

17. In a posture chair, a seat having a stationary pivot adjacent the forward edge thereof connected to a fixed frame, a tilting mounting member connected to the rear portion of the seat and pivoted to the frame, a back having a forwardly projecting bracket pivoted to said tilting mounting member, a spring compressor pivoted to said frame, spring means comprising a coil spring approximately horizontally disposed and engaged by said spring compressor, said tilting member carrying a part engageable with said spring compressor to compress said spring upon downward movement of the tilting member, and means including a pressure link extending forwardly from said bracket and connected to said spring compressor whereby said spring is compressed on rearward push of the chair back independently of movement of said tilting member.

18. In a posture chair, the combination of a frame having a forwardly extending part, a chair seat carrying spaced parallel angle irons pivoted to said frame part adjacent the forward edge of the seat, a supporting member for the rear portion of the seat in the form of a yoke embracing a portion of the frame and having a forward part pivoted to the frame, said supporting member being extended rearwardly from its pivot and link-connected to said angle irons, a coil spring under compression within said frame and extending lengthwise thereof, a cap at the rear end of the spring, a tension rod extending through an aperture in said frame part and extending through the spring, said tension rod being secured to the cap and having a nut forwardly of the frame for adjustment of the compression of said spring, a spring follower and compressor within the frame adapted to compress the spring from its forward end by independent action of the follower, said follower acting in the opposite direction against a member carried by said yoke so as normally to hold the seat in a substantially horizontal position, a chair-back bracket having pivotal relationship to said yoke, and a link connection between said bracket and said follower.

19. In a posture chair, the combination of a frame having a forwardly extending part, a chair seat carrying spaced parallel angle irons pivoted to said frame part adjacent the forward edge of the seat, a supporting member for the rear portion of the seat in the form of a yoke embracing a portion of the frame and having a forward part pivoted to the frame, said supporting member being extended rearwardly from its pivot and

link-connected to said angle irons, a coil spring under compression within said frame and extending lengthwise thereof, a cap at the rear end of the spring, a tension rod extending through an aperture in said frame part and extending through the spring, said tension rod being secured to the cap and having a nut forwardly of the frame for adjustment of the compression of said spring, a spring follower and compressor within the frame adapted to compress the spring from its forward end by independent action of the follower, said follower acting in the opposite direction against a member carried by said yoke so as normally to hold the seat in a substantially horizontal position, a chair-back bracket having pivotal relationship to said yoke, and a link connection between said bracket and said follower, the member carried by said yoke which is acted on by said follower being a cushioning member which in the normal position of the chair is engaged between the follower and a part of said frame.

20. In a posture chair, the combination of a frame having a forwardly extending part, a chair seat carrying spaced parallel angle irons pivoted to said frame part adjacent the forward edge of the seat, a supporting member for the rear portion of the seat in the form of a yoke embracing a portion of the frame and having a forward part pivoted to the frame, said supporting member being extended rearwardly from its pivot and link-connected to said angle irons, a coil spring under compression within said frame and extending lengthwise thereof, a cap at the rear end of the spring, a tension rod extending through an aperture in said frame part and extending through the spring, said tension rod being secured to the cap and having a nut forwardly of the frame for adjustment of the compression of said spring, a spring follower and compressor within the frame adapted to compress the spring from its forward end by independent action of the follower, said follower acting in the opposite direction against a member carried by said yoke so as normally to hold the seat in a substantially horizontal position, a chair-back bracket having pivotal relationship to said yoke, and a link connection between said bracket and said follower, said follower and said yoke having a common pivoting point.

21. In a posture chair, a tiltable seat provided adjacent its forward edge to a fixed frame, a back connected to said frame to be supported thereby and pivoted to swing with respect to the seat, balancing means comprising a spring which is compressed by the backward tilting of the seat, an operative connection from the back to said spring whereby on rearward push of the back said spring is compressed, said seat and said back being capable of a certain amount of independent movement under the control of said spring, said chair having resilient cushioning means arresting the upward movement of the rear portion of the seat and the forward movement of the back.

22. In a posture chair, a frame, a seat, balancing means comprising a seat-supporting member connected to said frame and said seat and comprising a resilient member compressed by backward tilting of the seat, and means pivotally connecting said balancing means and said chair back and supporting the latter from said balancing means independently of said seat, said last-mentioned means permitting rearward movement of the back independently of the seat

against the compression of said resilient member.

23. In a posture chair, a tiltable seat pivoted adjacent its forward edge to a fixed frame, a back for connection with said frame to swing with respect to the seat, resilient counterbalancing means comprising a substantially horizontally disposed spring which is compressed by the backward tilting of the seat and also comprising a pivoted supporting member which is link-connected to the rear part of the seat, and an operative connection from said back to said spring whereby on rearward push of the chair back said spring can be compressed without shifting said supporting member, said operative connection including a bracket carried by the chair back pivoted to said supporting member.

24. In a posture chair, a tiltable seat pivoted adjacent its forward edge to a fixed frame, a back for connection with said frame to swing with respect to the seat, resilient counterbalancing means comprising a spring which is compressed by the backward tilting of the seat and also comprising a pivoted supporting member which is link-connected to the rear part of the seat, and an operative connection from said back to said spring whereby on rearward push of the chair back said spring can be compressed without shifting said supporting member, said chair back carrying a bracket pivoted to said supporting member, the said operative connection acting on the bracket at a point remote from its pivot with respect to the supporting member, and the chair back when pushed rearwardly to a certain degree having the effect of raising the rear portion of the seat.

25. In a posture chair, a frame, a seat pivoted to the frame, and balancing means comprising a tiltable seat-supporting member pivotally connected to said frame and link-connected to said seat and a spring compressor pivoted to said frame, said means also comprising a coil spring engaged by said spring compressor, said seat-supporting member carrying a part fixed with respect to the seat-supporting member and engageable with said spring compressor to compress said spring upon downward movement of the seat-supporting member, and said part carried by said seat-supporting member comprising stop movable with the seat-supporting member and engageable with said frame to limit tilting movement of said seat-supporting member.

26. In a posture chair, the combination of a supporting frame, a tiltable seat pivoted adjacent its forward edge to said frame, a seat-supporting member pivoted to said frame and extending rearwardly therefrom and movably connected at its rear end to the seat, a back pivotally connected to said seat-supporting member to swing with respect to the seat, a tension rod extending rearwardly through a portion of said frame and adjustable from its forward end, a spring encircling said tension rod at the rear end portion of said rod, means for compression said spring from the forward end as the rear of the seat is moved downwardly, and an operative connection from said back to the forward end portion of the spring whereby on rearward push of the back said spring is compressed.

27. In a posture chair, the combination of a supporting frame, a tiltable seat pivoted adjacent its forward edge to said frame, a seat-supporting member pivoted to said frame and extending rearwardly therefrom and movably connected at its rear portion to the rear portion of the seat to support the seat, a back pivotally

connected to said seat-supporting member to swing with respect to said seat, a substantially horizontal spring extending through a portion of the length of said supporting member, a spring compressor at the forward end of the spring operatively connected to the chair back to be retracted by a rearward push on the chair back, and a member carried by said pivoted seat-supporting member adapted to push rearwardly on said compressor to compress the spring as the rear portion of the seat is moved downwardly.

28. In a posture chair, the combination of a supporting frame, a tiltable seat pivoted adjacent its forward edge to said frame, a seat-supporting member pivoted to said frame and extending rearwardly therefrom and movably connected at its rear portion to the rear portion of the seat to support the seat, a back pivotally connected to said seat-supporting member to swing with respect to said seat, a substantially horizontal spring extending through a portion of the length of said supporting member, a spring compressor at the forward end of the spring operatively connected to the chair back to be retracted by a rearward push on the chair back, a member carried by said pivoted seat-supporting member adapted to push rearwardly on said compressor to compress the spring as the rear portion of the seat is moved downwardly, and means for limiting the movement of said pivoted supporting member so as to limit the downward movement of the rear portion of the seat, the chair back having an additional rearward movement after the seat has reached the limit of its movement.

29. In a posture chair, a seat having a stationary pivot adjacent the forward part thereof connected to a fixed frame, a chair back having a lower forwardly projecting bracket member by which it is movably related to the rear part of the seat so as to be capable of swinging movement with reference thereto and connected to the frame to be supported thereby, and a common resilient supporting means comprising a substantially horizontally disposed spring operatively connected at the forward end to the seat to control them so that after the seat has completed its rearward tilt the back is capable of an independent rearward movement.

30. In a posture chair, a seat having a stationary pivot adjacent the forward part thereof connected to a fixed frame, a chair back having a lower forwardly projecting bracket member by which it is movably related to the rear part of the seat so as to be capable of swinging movement with reference thereto and connected to the frame to be supported thereby, and a common resilient supporting means comprising a substantially horizontally arranged spring operatively connected at the forward end to the bracket and at the same end to the seat so that the chair back can have independent spring-controlled movement in a rearward direction and when the chair back reaches a certain point in such movement raising pressure is exerted on the rear portion of the seat.

31. In a posture chair, a tiltable seat pivoted adjacent its forward edge to a supporting frame, a back connected to said frame to be supported thereby and pivoted to swing with respect to the seat, and balancing means comprising a forwardly and rearwardly extending spring which is compressed from the forward end by the backward tilting of the seat and can be further compressed by rearward push on the back, said balancing means comprising also a pivoted seat-supporting yoke and a pivoted spring-compressing follower which under the spring action normally holds the yoke in an elevated position, said back having an operative connection with said follower acting to pull it rearwardly independently of the yoke.

32. In a posture chair, a tiltable seat pivoted adjacent its forward edge to a supporting frame, a back connected to said frame to be supported thereby and pivoted to swing with respect to the seat, and balancing means comprising a forwardly and rearwardly extending spring which is compressed from the forward end by the backward tilting of the seat and can be further compressed by rearward push on the back, said balancing means comprising also a pivoted seat-supporting yoke and a pivoted spring-compressing follower which under the spring action normally holds the yoke in an elevated position by engagement with a transverse member carried by the yoke, said back having an operative connection with said follower acting to pull it rearwardly independently of the yoke, said transverse member being engageable with the frame, and said transverse member being cushioned to cushion the yoke from the frame when the yoke is in elevated position.

33. In a posture chair, the combination of a supporting frame, a tiltable seat pivoted adjacent its forward edge to said frame, a back connected to said frame to be supported thereby and pivoted to swing with respect to said seat, a seat-supporting member pivoted to said frame and extending rearwardly therefrom and movably connected at its rear portion to the rear portion of the seat to support the seat, a spring associated with said frame and said seat-supporting member and disposed in a generally forward and rearward direction and compressible from its forward end, and spring-compressing and seat-tilt-limiting mechanism adjacent the forward end of the spring and movably connected to said back whereby the spring is compressible by the downward tilting of the seat and the back has rearward spring-controlled movement after the seat has reached its fully tilted position.

WALTER F. HEROLD.

HENRY WHEELER PARROTT.

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