Sept. 1, 1970 J. B. ELDON III 3,526,430

BACK HEIGHT ADJUSTMENT MECHANISM

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Fig. 1.

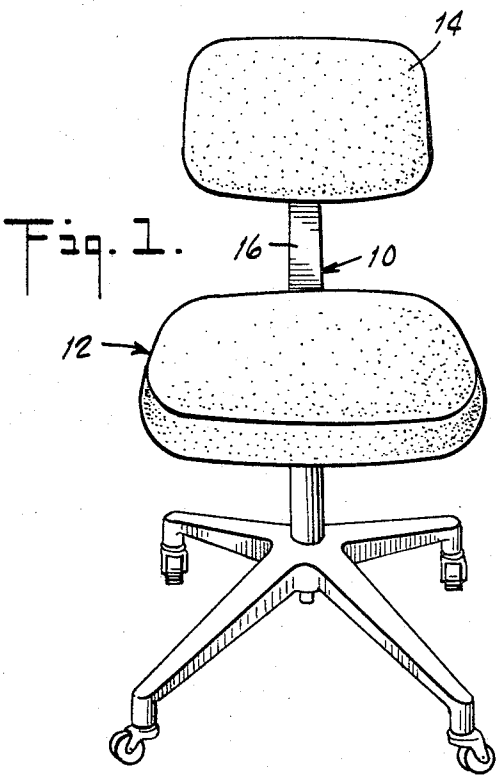
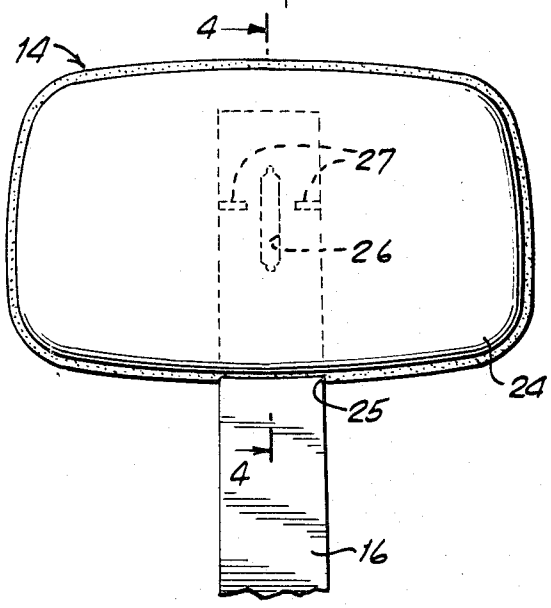


Fig. 2.



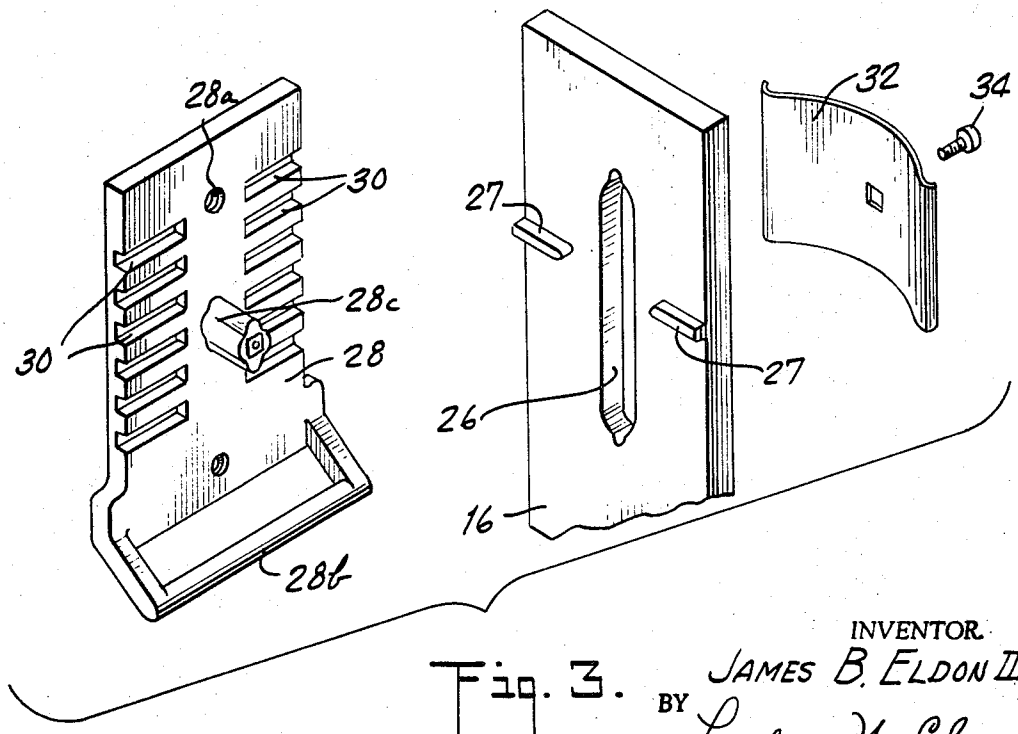


Fig. 3.

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Fig. 6.

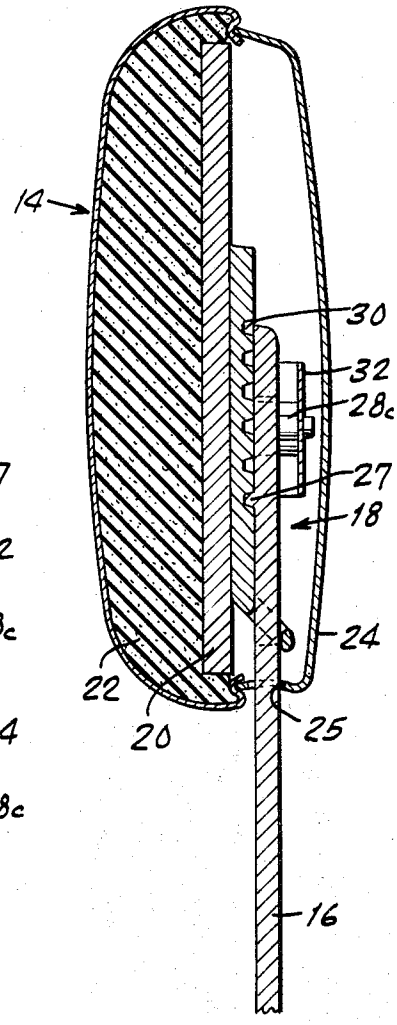


Fig. 4.

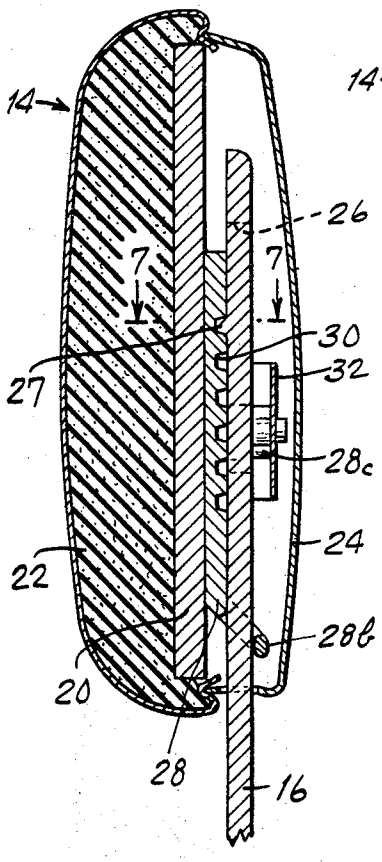
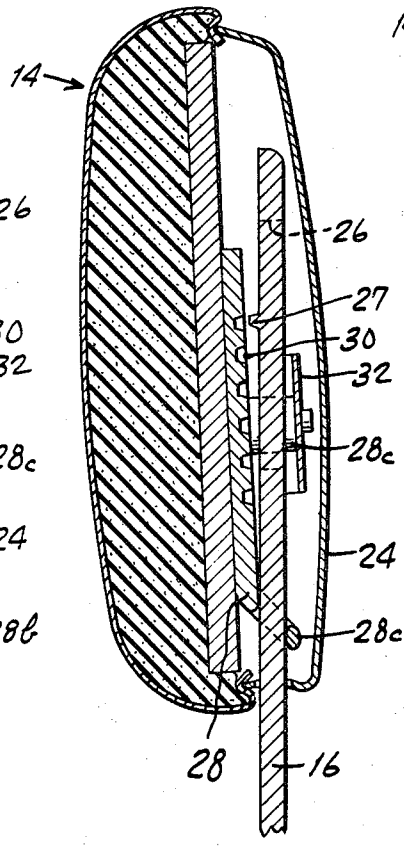


Fig. 5.



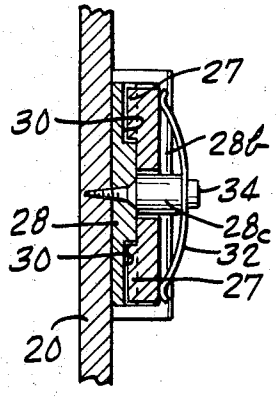


Fig. 7.

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BACK HEIGHT ADJUSTMENT MECHANISM

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Int. Cl. A47c 7/40
U.S. Cl. 297—353 11 Claims

ABSTRACT OF THE DISCLOSURE

A height adjustment mechanism for adjusting the back of a chair or like article. The mechanism is completely capable of being concealed within the chair back since it requires no external adjusting elements such as a screw, lever or the like. The mechanism includes a back plate, preferably furnished with a series of spaced slots which are adapted to receive a fixed pair of projections provided on a back support. The back plate is urged against the back support by a spring mounted on a stud formed on and projecting from the back plate, the stud extending through an opening in the back support.

In the operation of the adjustment mechanism, the chair back is simply pulled forward from its top edge so as to pivot the back plate away from the back support, thereby disengaging the projections from their receiving slots and permitting vertical movement of the chair back. When the forward pressure is released the spring bias pulls the mechanism back into its new locked position.

BACKGROUND, OBJECTS AND SUMMARY OF THE INVENTION

This invention relates to the construction of chairs and like furniture, and more particularly, to a posture type of chair generally in use by secretaries, and in which frequent and simple adjustment of the back or back rest is a highly desirable feature.

Posture chairs of the type to which this invention is particularly applicable have, in the past, been provided with various forms of adjustment mechanisms such that the back or back rest may be easily and quickly accommodated to the particular needs of the individual user. Since individual users have different requirements with respect to the suitable positioning of the back or back rest, it is highly desirable that such adjustment be very easily accomplished and be so accomplished that the wear and tear on the parts of the chair back is kept to a minimum. Also, once adjusted, the chair back should remain in the newly set position and not be subject to being returned to its original position.

In whatever way the objectives of facile adjustment and convenience have been fulfilled in prior art mechanisms, there are a number of difficulties which have presented themselves and which are not properly taken care of by known arrangements in this field. One of these resides in the fact that the adjustable elements, such as the screw, lever or like element which have been traditionally employed to change the height of the back are unsightly. Furthermore, they constitute a source of danger and soilage to the clothing or to parts of the body and of damage to surrounding furniture.

Accordingly, it is a fundamental object of the present invention to avoid the unsightly character of the back height adjustment mechanisms known in the art, and to provide a mechanism that can be completely concealed.

The above object is fulfilled by an important feature of the present invention which resides in the construction of the back height mechanism in such wise that it does not have any element or means that must be manually

contacted and manipulated by the user. While attaining the fundamental object of eliminating such elements or means, and thereby making the mechanism concealable, the invention further provides that the mechanism is very simply adjusted with very slight pressure by the user, and once placed into position at the required height, remains in such position and does not yield to the forces to which it is normally subjected, so as to return to its original position. Even subject to unusual forces, such as a casual blow that would upset or derange a conventional mechanism, the mechanism of the present invention is immune and is susceptible to adjustment only by properly applied pressure and release of pressure. In other words, the chair back moves easily only when the user wants to change the height or level, and not willy-nilly.

Briefly described then, a broad feature of the present invention resides in the provision of a centrally located mechanism for adjusting the height of a chair back, this mechanism being so configured as to be concealable within the chair back. In one embodiment, such centrally located mechanism comprises a movable back plate which is affixed to one of the panels constituting the chair back. Another panel fits with this first panel and functions to conceal the height adjustment mechanism. This other panel has a suitably disposed opening for receiving the vertically extending back support. Also, in accordance with one embodiment, the chair back is selectively engaged with the back support in any one of a plurality of elevated positions by virtue of the fact that the back plate is provided with a series of vertically spaced slots; more specifically, pairs of slots are provided at different levels which are adapted to receive a pair of fixed projections on the back support.

In accordance with a specific feature of the present invention, the height adjustment mechanism is so constructed that the aforesaid back plate includes a lower end portion in the form of a loop which is adapted to surround the back support. This loop portion holds the back support in close contact with the back plate, thereby preventing disengagement of the aforenoted projections from the cooperating slots in the plate when pressure is rearwardly applied to the top of the back, as when one leans back in the chair. In addition to the above-noted purpose, another function is served by the loop portion in that the sides of the loop contain the back support when sliding up and down to assure alignment of the slots and projections. Also, the sides of the loop, in cooperation with a center stud, maintain proper alignment of the back and back support at all times, thus preventing the edges on the projections from becoming round.

Another specific feature of the present invention resides in the inclusion of a spring for the adjustment mechanism, the spring serving as a means for retaining the chair back in a selected position against a force forwardly applied to the top edge. In particular, the spring is designed to resist the tendency for the chair back to drop down from a selected position in response to a casual blow. The spring is composed of heavy steel and is provided so as to apply a positive bias urging the back plate against the back support to hold the chair back in a selected position. The spring is shaped so as to span the opening provided in the back support and to bear against the rear surface thereof. The spring is held in place by a bolt secured to a stud which is formed as an integral part of the back plate.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a chair in which the back height adjustment mechanism of the present invention is incorporated.

FIG. 2 is a fragmentary view of the chair back illustrating the disposition of the adjustment mechanism.

FIG. 3 is an exploded view of the several parts of the adjustment mechanism.

FIG. 4 is a vertical sectional view taken on the line 4—4 of FIG. 2, and illustrating the chair back at one selected locked position.

FIG. 5 is an other sectional view illustrating the chair back pivoted away from the back support in the process of being adjusted to another locked position.

FIG. 6 is another sectional view illustrating another locked position for the chair back.

FIG. 7 is a horizontal sectional view taken on the line 7—7 on FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the figures, the adjustment mechanism according to the principles of the present invention is illustrated in the environment of a posture-type of chair **10**, having a conventional seat **12**, and a back **14**. The back **14** is mounted for adjustable retention on a back support **16**, the back being so configured as to surround the upper portion of the back support, thereby permitting concealment of an adjustment mechanism **18**. The chair back is normally made up of several panels, a first, forwardly located plywood panel **20**, whose forward surface is covered over with a cushion **22** of latex foam rubber or the like. Fitted together with the plywood panel **20** is another panel **24**, typically of plastic, rearwardly situated and adapted to conceal the adjustment mechanism **18**.

Referring now to the unique aspects of the adjustment mechanism, it will be noted that the back support **16** extends through an opening **25** in the panel **24**. The back support is provided with a centrally located longitudinally extended opening **26**, which is designed to receive a stud-like portion of a back plate, as will be described. Two forward projections **27** on the back support are located adjacent the respective longitudinal edges of the back support.

The other principal part of the adjustment mechanism of the present invention is the back plate **28** which is furnished with a series of slots **30** which are adapted to receive the forward projections **27**. The back plate **28** is affixed to the back panel **20** by means of screws or the like extended through the apertures **28***a* in the back plate. The back plate is typically constructed of cast aluminum and has an integral part of the back plate there is provided a downwardly and rearwardly extending loop portion **28***b*. This portion **28***b* frictionally engages with the rear surface of the back support **16** and in so doing acts to prevent any movement of the back plate from the back support when pressure is applied to the top of the back. The back plate **28** also includes a stud-like portion **28***c*, also formed as an integral cast member.

In the specific embodiment illustrated, a series of slots **30** are spaced vertically, the spacing between pairs of slots at one level and the next being of the order of ½ inch. This particular arrangement provides six levels of adjustment, thus enabling suitably fine adjustment of the height of the chair fack for different users' requirements.

When the parts are to be placed in assembled relationship, the back plate **28** is moved down at an angle with respect to the support **16**, and thence is brought into parallel relationship so that the stud **28***c* extends through the opening **26** in the back support. Thence, the steel spring **32** is disposed in its proper position by means of a self-tapping bolt **34** or the like, which is received in a suitable bore in the stud **28***c*. The spring **32** in its normal

state bears against the rear surface of the support **16**. Thus, there is a positive bias urging the back plate **28** in any of its set positions against the support **16**.

A typical elevated position for the chair back is illustrated in FIG. 4 and this is the lowermost locked position that can be selected. At this juncture the projections **27** are received in the uppermost of the pairs of slots **30**. However, when it is desired to raise the chair back, it is simply pulled forward from its top edge so as to pivot the back plate **28** away from the back support **16**, Thereby disengaging the projections **27** from their receiving slots and permitting vertical movement of the chair back. FIG. 5 illustrates this condition of disengagement.

Thence, the chair back is raised against the natural frictional forces due to the lower edge of back plate **28***b* and the spring **32**, to the new position such as the highest position obtainable, as depicted in FIG. 6. At this point, the stud **28***c* abuts against the upper end of the slot **26**, thereby restraining the chair back from any further movement. When the forward pressure which has been maintained is now released, the spring bias pulls the mechanism back into its new locked position. For the particular case depicted in FIG. 6, the projections **27** are now received by the lowermost pair of slots **30**.

It will be appreciated that in the typical situation, for example, where the chair back has been placed into its highest position, as shown in FIG. 6, the chair back is immune from casual blows that might cause the chair back to drop down to a lower position. In other words, once set into an elevated position, the chair back is not susceptible to disengagement from that position. Thus, a casual blow to the top edge of the chair back will not allow the chair back to move downwardly unless the user is applying sufficient pressure to overcome the inherent frictional forces provided by the spring **32** and the lower edge of the back plate.

What has been disclosed is a unique mechanism for adjusting the height of a chair back which is readily concealed within the chair back. The mechanism allows for very fine adjustment in the height of the chair back, and once raised to a required height, the chair back remains in this position and is not subject without proper application of pressure to being returned to a lower position.

While there have been shown and described and pointed out the fundamental novel features of the invention is applied to the preferred embodiments, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a chair construction including a chair back and a back support, a concealable mechanism for adjusting the height of said chair back comprising:

means associated with said chair back and said back support for selectively engaging said chair back with said back support in any one of a plurality of elevated positions including means for retaining the chair back in a selected position against a force forwardly applied to the top edge thereof;

said first means including a back plate affixed to the chair back at a central location thereon, said back plate being pivotable from the back support so as to disengage the chair back from the back support.

2. A mechanism as defined in claim **1**, further including a panel defining said chair back, and in which said back plate is affixed at a central location in the rear surface of the panel.

3. A mechanism as defined in claim 1, in which said back plate is provided with a stud-like portion and said back support is provided with a longitudinally extended opening for receiving said stud-like portion.

4. A mechanism as defined in claim 3, in which said means for retaining the chair back includes a spring mounted on said stud-like portion of the back plate, adapted to bear against the rear surface of said back support.

5. A mechanism as defined in claim 4, in which said back plate further includes a downwardly and rearwardly projecting loop which surrounds the back support so as to prevent disengagement of the back plate from the back support due to backwardly applied force.

6. A mechanism as defined in claim 1, in which said back plate and back support have a plurality of cooperating slots and projections such that said chair back may be selectively locked at a plurality of different heights.

7. A mechanism as defined in claim 6, in which vertical spaced pairs of slots are provided in the back plate and a pair of projections are provided on the back support.

8. A chair construction comprising a chair back mounted on a back support, said chair back comprising two panels, said back support extending vertically through an opening in one of said panels, and itself

being provided with a longitudinally extended opening; a back plate affixed to one of the panels of said chair back, said back plate and back support having cooperating slots and projections such that said chair back may be selectively locked at a plurality of different heights.

9. Apparatus as defined in claim 8, in which said back plate is affixed at a central location on the rear surface of said one panel.

10. Apparatus as defined in claim 8, in which said back plate is provided with a stud-like portion adapted to project through said longitudinally extended opening in said back support.

11. Apparatus as defined in claim 10, further including means for retaining the chair back in a selected position against a force forwardly applied to the top edge thereof, said means including a spring, mounted on said stud-like portion of the back plate, adapted to bear against the rear surface of said back support.

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