United States Patent

[11] 3,596,990

[72] Inventors **Louis Gottfried**
515 West End Ave., New York, N.Y. 10024;
Jacob Berger, 600 West 246th St., New York, N.Y. 10013

[21] Appl. No. 788,547
[22] Filed Jan. 2, 1969
Division of Ser. No. 609,942, Jan. 17, 1967, Pat. No. 3,464,754.
[45] Patented Aug. 3, 1971

[54] **ORTHOPEDIC CHAIR**
6 Claims, 5 Drawing Figs.

[52] U.S. Cl. 297/284
[51] Int. Cl. A47c 3/00
[50] Field of Search 297/284, 452, 458

[56] **References Cited**

UNITED STATES PATENTS

855,656	6/1907	McNamara et al.	297/284
1,264,265	4/1918	Brusius	297/284
2,756,809	7/1956	Endresen	297/284
3,288,525	11/1966	Cerf	297/284

FOREIGN PATENTS

762,304	11/1956	Great Britain	297/284

Primary Examiner—James T. McCall
Attorney—Ernest G. Montague

ABSTRACT: The orthopedic chair has a seat including a positioning member and an elastomer layer disposed between a bottom rigid member and a top layer. A vertically movable bolt means is disposed through an opening in the bottom rigid member for moving a positioning member upwardly thereby causing the elastomer layer to be moved upwardly and producing a curvature in the seat.

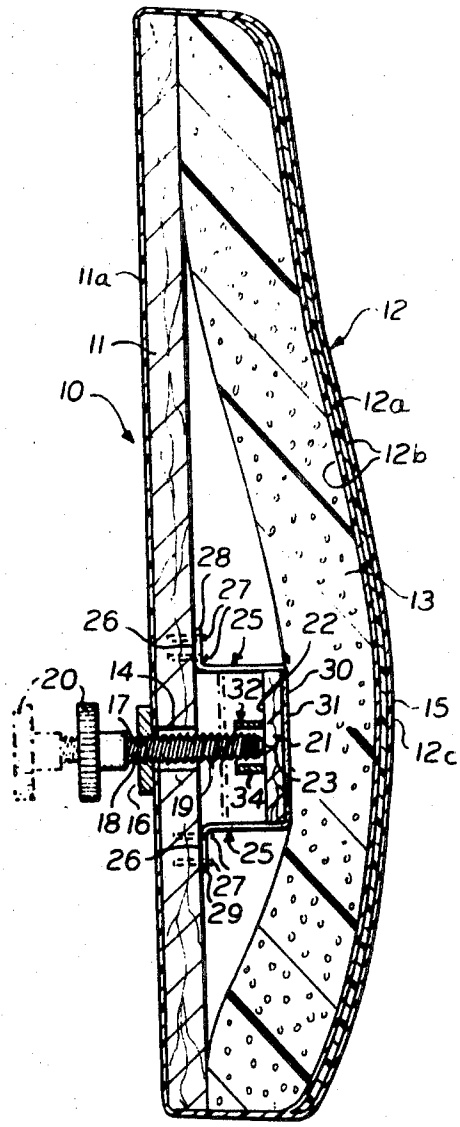


FIG. 1.

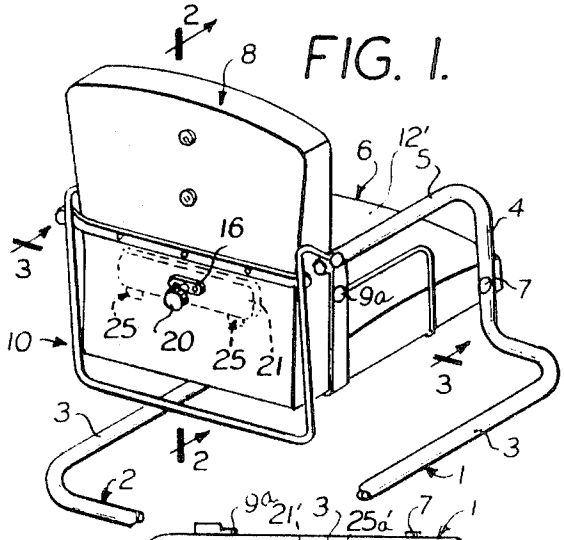


FIG. 2.

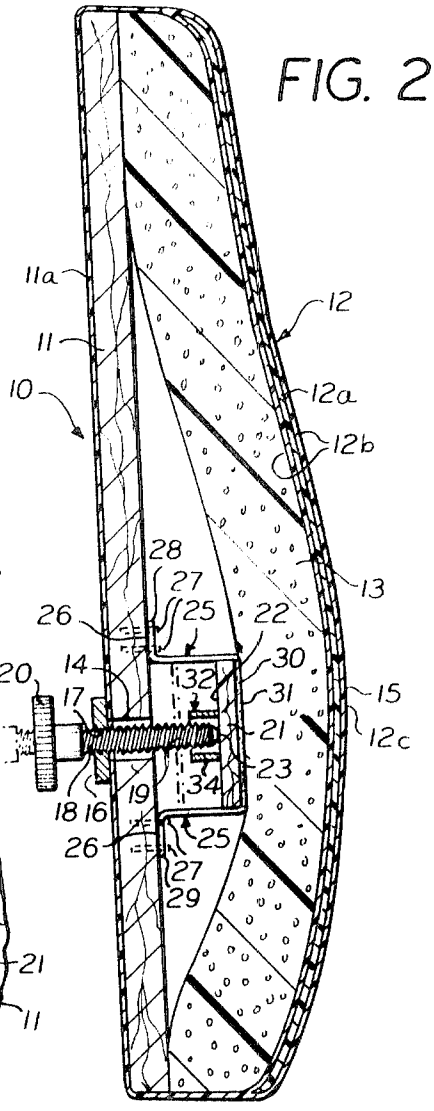
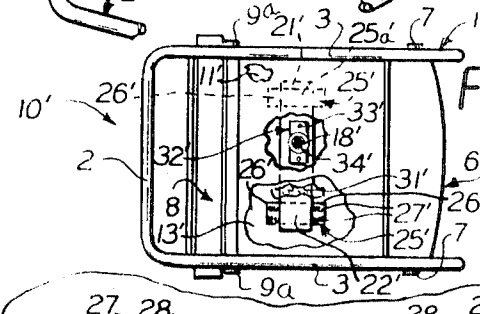


FIG. 5.



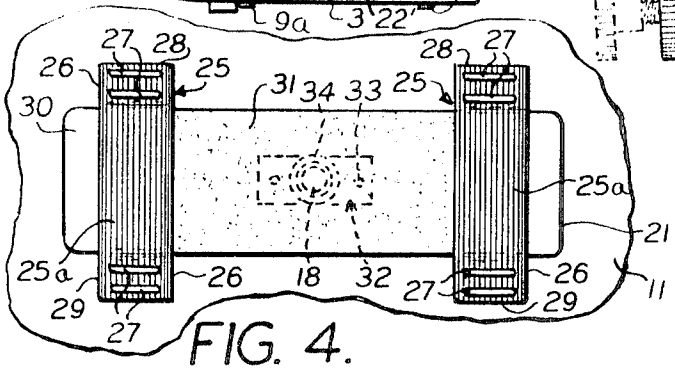
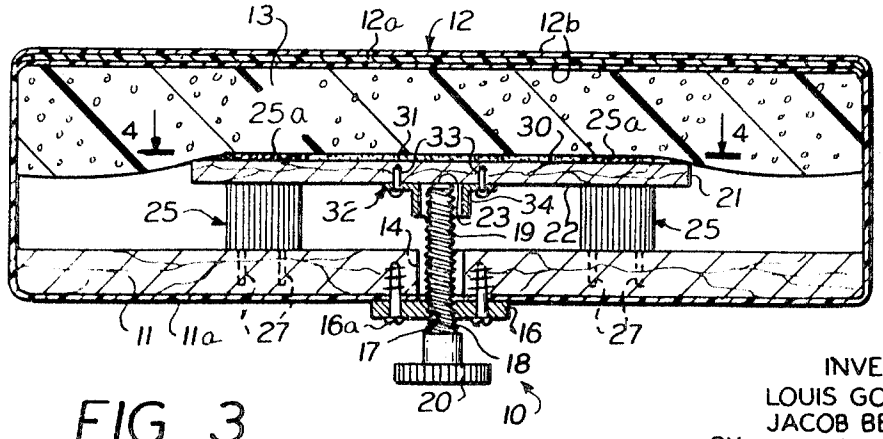


FIG. 4.

FIG. 3.



INVENTORS
LOUIS GOTTFRIED
JACOB BERGER
BY Brumbaugh Kaintaque
ATTORNEY.

ORTHOPEDIC CHAIR

This is a divisional application of the copending U.S. Pat. application Ser. No. 609,942, filed Jan. 17, 1967, now U.S. Pat. No. 3,464,754.

The present invention relates to orthopedic chairs, in general, and to orthopedic baby, youth or adult chairs or high chairs, or the like, having a contour adjustable device comprising a positioning member disposed between an elastomer layer and a rigid backing board, for positioning the chair in a plurality of variable contour positions, in particular.

Such an orthopedic chair is adjusted by a positioning member, which is moved forwardly by a bolt movably connected to a rigid backing board, which causes the positioning member to be pushed forwardly and which in turn pushes the elastomer layer forward causing a convex curvature in the chair. The positioning member is not connected to the bolt, simplifying the structure and permitting the bolt to turn without turning the positioning member.

It is one object of the present invention to provide, in an orthopedic chair of the above-mentioned type, an improved, economical and sturdy structure whereby the curvature of the chair may be changed by adjustment of the bolt without connecting the bolt to the positioning member.

It is another object of the present invention to provide an orthopedic chair comprising a backrest and seat, the backrest and/or seat including a rigid member having at least one opening therein, an upholstery layer, an elastomer layer disposed between the rigid member and the upholstery layer, a rigid positioning member disposed between the elastomer layer and the rigid member and having its rear or bottom face opposite the opening, the rigid positioning member having a front or upper face facing the elastomer layer and substantially parallel to the upholstery layer, a movable bolt disposed through the opening of the rigid member for moving the positioning member forwardly or upwardly thereby causing the elastomer layer to be moved forwardly or upwardly and producing a curvature in the upholstery layer and a resilient means for continuously urging the rear or bottom face of the positioning member against the movable bolt.

It is yet another object of the present invention to provide an orthopedic chair in accordance with the above-mentioned objective further comprising a means for securing the front or upper face of the positioning member to the elastomer layer.

It is still another object of the present invention to provide an orthopedic chair in accordance with the previously mentioned objective, wherein the resilient means comprises an elastic band and is connected to and between the positioning member and the rigid board.

It is yet another object of the present invention to provide an orthopedic chair in accordance with the previously mentioned objective, wherein the elastic band is secured at its ends to the rigid board forming loops therebetween, and the elastic band and the loops are aligned on both lateral sides of the movable bolt. The positioning member is disposed in the loops, the loops abutting the front face of the positioning member.

It is yet another object of the present invention to provide an orthopedic chair in accordance with the second-mentioned objective, further comprising a positioning sleeve means centrally located on the bottom or rear face of the positioning member and having a diameter greater than the diameter of the movable bolt. The movable bolt is freely disposed in the positioning sleeve means providing centralizing of the positioning member and preventing misalignment thereof during movement.

With these and other objects in view which will become apparent in n the following detailed description, the present invention will be clearly understood in connection with the accompanying drawing, in which:

FIG. 1 is a perspective rear view of an orthopedic chair adapted in accordance with the present invention;

FIG. 2 is a section along the lines 2–2 of FIG. 1;

FIG. 3 is a section along the line 3–3 of FIG. 1;

FIG. 4 is a fragmentary section along the lines 4–4 of FIG. 3; and

FIG. 5 is a bottom plan view of the chair, partly broken away for better demonstration.

Referring now to the drawing, and in particular to FIG. 1, it will be seen that the chair comprises a tubular frame 1 comprising a U-shaped base 2 including lateral leg members 3, upwardly extending members 4 and horizontally disposed members 5 extending rearwardly from the upper end of the upwardly extending members 4. A seat 6 is disposed between and intermediate to the ends of the upwardly extending members 4 and secured to the latter by any suitable means, such as a screwbolt 7. A backrest 8 is secured to the rear end of the seat 6 by conventional means and can be arranged adjustable relative to the seat 6 for instance by a structure disclosed in applicants' own prior U.S. Pat. No. 3,069,202, dated Dec. 18, 1962.

Referring now against to the drawing, and in particular to FIGS. 1—4, it will be seen that an adjustable back contour device 10 is shown which comprises a rearward rigid board 11, preferably a wooden board, located at the backmost portion of the backrest 8, and constituting the entire back portion of the chair. The rigid board 11 is covered by a plastic sheet 11*a*. A front layer 12 which may comprise any flexible upholstery, such as foam rubber 12*a*, heat sealed between plastic sheet 12*b* or a simple plastic sheet, is located at the front portion of the backrest 8. Disposed between rigid board 11 and the front layer 12 is an elastomer layer 13 of conventional materials, such as, for example, rubber, foam rubber or polyurethane elastomers, or the like.

The rearward rigid board 11 is formed with preferably a single opening 14 at a height above the top 12 of the seat 6 at approximately the position of the small of the back of a person of general height for which the chair is suited, through more than one such opening can be provided.

Secured to the rearward rigid board 11 at the back thereof by screws 16*a* is a guide piece 16 of metal, plastic or any other suitable material, having a threaded opening 17 aligned with the single opening 14 of the rearward rigid board 11, through which 19 engaging the inner threads of the threaded which opening 14 is inserted a bolt 18 having threads 19 engaging the inner threads of the threaded opening 17 of the guide piece 16.

At one end of the bolt 18 extending beyond the rearward rigid board 11 is a knob 20 rigidly secured to the bolt for turning the bolt 18 in the threaded opening 17 of the guide piece 16, the threads 19 thereby causing the bolt 18 to move forward or backward relative to the rearward rigid board 11, depending upon the direction in which the knob 20 is turned.

An elongated rigid positioning member 21, made preferably of wood, plastic, or the like, extends horizontally across the backrest 8 (as shown in FIGS. 1 and 4) adjacent the single opening 14 and substantially parallel to the upholstered front layer 12, as well as substantially parallel to the rearward rigid board 11. The rear face 22 of the positioning member 21 is disposed adjacent and contiguous to the inner free end 23 of the bolt 18, but is not connected thereto. A positioning sleeve 32 preferably made of metal or the like is affixed to the center of the rear face 22 of the positioning member 21 by nails 33 or any other suitable means. The positioning sleeve 32 includes a cylinder 34 which has an inner diameter sufficiently larger than the outer diameter of the free end 23 of the bolt 18 into which cylinder 34 the bolt 18 is freely disposed. The sleeve 32 simply insures that the positioning member 21 does not slip or misalign out of position prior to and during the movement of the bolt 18. The cylinder 34 or the positioning sleeve 32 may be formed with outwardly extending sloping edges to promote insertion of the bolt 18 therein, thereby aiding alignment. Preferably the cylinder 34 is so of sufficient length, that once inserted, the bolt 18 is never removed from the cylinder 34 during normal operation. Such a sleeve provide a distinct improvement in the structure and performance the thereof of our U.S. Pat. application Ser. No. 598,733, entitled

"Orthopedic Chair," filed on Dec. 2, 1966. The positioning member is enabled to be displaced and a perfect alignment is achieved, by the positioning sleeve which may be a bore. Preferably two parallel and vertically oriented elastic bands **25** stapled at their ends **26**, respectively, to the rearward rigid board **11**, are looped around the ends of the positioning member **21**, biasing the positioning member **21** rearwardly against the free end **23** of the bolt **18** at all times. The elastic bands **25** may comprise rubber bands or any other resilient means, including springs or the like, connected between the rigid board **11** and the position member **21**.

The elastic bands **25** are laterally disposed on both sides of the bolt **18** and stapled to the rigid board **11** in very simple fashion by conventional staples **27** or other securing means forming loops **25***a* between the stapled ends **26** through which the positioning member **21** is disposed. Further the corresponding upper ends **28** of the elastic bands **25** (FIG. **4**) and the corresponding lower ends **29** of the elastic bands are located above and below the bolt **18**, respectively, and together with the lateral disposition of the elastic bands **25** provide a sturdy, elastic and stapled connection encompassing the bolt **18**.

Between the loops **25***a*of the two elastic bands **25** in which the positioning member **21** is held, the front face **30** of the positioning member **21** is affixed to the elastomer layer **13**, preferably by a layer of glue **31**, cement or any other suitable means. The securing of the positioning member **21** to the elastomer layer can be omitted without interfering with the proper operation of the backrest **8**. Both the layer of flue **31** and the elastic bands **25** insure that the positioning member **21** is secured laterally in position.

In operation when the bolt **18** is turned by the knob **20**, so as to move forwardly, the front free end **23** of the bolt **18** pushes the positioning member **21** forward thereby stretching the elastic bands **25**, to accommodate forward movement of the positioning member relative to the rearward rigid board **11** (as shown in FIG. **3**). The positioning member **21** accordingly moves forwardly toward the front layer **12***b*, it being held horizontally by the elastic bands **25**, and not being connected to the bolt **18**, does not turn. This causes the elastomer layer **13** also to move forwardly and to establish a convex curvature **12***c* adjacent thereto at the front layer **12** of the chair. At this position an advantageous backrest contour is formed, the size of which can be made as large as desired, the elastic band **25** being sufficient to stretch to all curvatures for which the chair is adapted.

When the knob is turned in the reverse direction, the bolt **18** tends to move backwardly, away from the rear face **22** of the positioning member **21**, since it is not connected thereto, and since the positioning member **21** may be secured at its front face to the elastomer layer; however, the elastic bands **25** exert a rearward force against the positioning member **21**, causing the positioning member **21** to automatically move backward against the free end **23** of the bolt **18**. In this manner at no time does the free end **23** of the bolt **18** leave the rear face **22** of the positioning member. Since the front face **30** of the positioning member **21** may be secured to the elastomer layer **13**, this backward movement of the positioning member **21** causes the elastomer layer **13** to be rearwardly moved in turn, thereby reducing the curvature of the back of the chair automatically.

Structural integrity and simplicity is achieved in that the free end **23** of the bolt **18** does not require engaging structure with the positioning member **21** for automatically producing joint backward movement of the positioning member **21** with the bolt **18**, and no manual movement by a person or by a seated person's back is necessary to reduce the curvature. The mechanism for insuring the automatic contour adjustment is extremely simple and very inexpensive. At the same time complete structural integrity and long-lasting improvement in operation is achieved. In addition, since the elastic bands support the positioning member adjacent the bolt, the positioning member is always adjacent the bolt in a position for adjustment of the curvature of the chair, whether or not the positioning member is secured to the elastomer layer.

Although described in terms of a back of a chair, the attachment and automatic securing means may be utilized with a seat rest.

Further variations are within the scope of the present invention, such as, directly attaching the elastic bands to and between the rearward rigid board and the elastomer layer without contacting the positioning member. In this manner when the belt is moved rearwardly the elastic bands cause the elastomer layer to move backwardly, in turn, pushing the positioning member backwardly towards the bolt.

Also, it is to be understood that the contour adjustable backrest with improvement for the positioning member as herein designed in accordance with the present invention can be applied in the same manner to chair bottoms, sofas, couches or any other seat facilities.

For example, referring now again to the drawing, and more particularly to FIG. **5**, an adjustable seat contour device **10'** identical to that described in detail for the backrest **8** (having like but primed numbers representing similar elements) is provided for adjusting the contour of the seat **6**. The adjustable seat contour device **10'** and the adjustable back contour device **10** may be used independently, or one or the other may be provided alone in a unit.

The adjustable seat contour device **10'** comprises a horizontally extending positioning member **21'** disposed between an elastomer layer **13'** and a bottom or rigid board **11'**. A vertically oriented bolt **18'** is adapted for movement upwardly or downwardly by turning a knob (not shown) extending below the rigid board, thereby providing for vertically moving the positioning member **21'** in the same manner as described in the description of the adjustable back contour device **10**. The bolt **18'** is threaded and secured in a seat guide piece having a threaded opening (also not shown but similar to that described for the back contour device **10**) for providing the vertical movement of the bolt **18'**.

The rear face **22'** of the positioning member **21'** is disposed adjacent and contiguous to the inner free end (not shown) of the bolt **18'**, but is preferably not connected thereto. A positioning sleeve **32'** preferably made of metal or the like is affixed to the center of the rear face **22'** of the positioning member **21'** by nails **33'** or any other suitable means. The positioning sleeve **32'** includes a cylinder **34'** which has an inner diameter sufficiently larger than the outer diameter of the free end of the bolt **18'** into which cylinder **34'** the bolt **18'** is freely disposed, the sleeve **32'** insuring that the positioning member **21'** does not slip or misalign out of position prior to and during the movement of the bolt **18'**. Preferably two parallel elastic bands **25'** stapled at their ends **26'**, respectively, with staples **27'** to the rigid board **11'**, defining loops **25***a'* are looped around the ends of the positioning member **21'**, biasing the positioning member **21'** securely against the free end of the bolt **18'**.

In operation when the bolt **18'** is turned, so as to move upwardly, the free end **23'** of the bolt **18'** pushes the positioning member **21'** upwardly thereby stretching the elastic bands **25'**, to accommodate upward movement of the positioning member relative to the bottom rigid board **11'** and pushing the elastomer layer **13'** upwardly. Reverse movement of the bolt **18'**, causes the elastic bands **25'**, the positioning member **21'** and the elastomer layer **13'** to move downwardly.

While reference has been made above to the rigid board **11** and **11'**, respectively, it is to be understood that said board can be replaced by a frame having a cross or any other suitable member or means constituting an equivalent to said board.

While we have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense.

We claim:

1. An orthopedic chair, comprising

a seat,

said seat including a bottom rigid member having at least one opening therein,

a top layer,

an elastomer layer disposed between said bottom rigid member and said top layer,

a rigid positioning member disposed between said elastomer layer and said bottom rigid member and having its lower face opposite said at least one opening,

said rigid positioning member having an upper face facing said elastomer layer and substantially parallel to said top layer,

a vertically movable bolt means disposed through said at least one opening of said bottom rigid member for moving said positioning member upwardly thereby causing said elastomer layer to be moved upwardly and producing a curvature in said top layer, and

resilient means for continuously urging said lower face of said positioning member against said vertically movable bolt means.

2. The orthopedic chair, as set forth in claim 1, further comprising

means for securing said upper face of said positioning member to said elastomer layer.

3. The orthopedic chair, as set forth in claim 1, wherein said resilient means is connected to said bottom rigid member and engaging said positioning member.

4. The orthopedic chair, as set forth in claim 3, wherein said resilient means comprises elastic band means.

5. The orthopedic chair, as set forth in claim 4, wherein

said elastic band means is secured at its ends to said bottom rigid member forming loops therebetween,

said elastic band means and said loops aligned on both lateral sides of said vertically movable bolt means,

said positioning member being disposed in said loops and said loops abutting said upper face of said positioning member, and

means for securing said upper face of said positioning member to said elastomer layer comprising a layer of glue located on said upper face adjacent said loops, respectively.

6. The orthopedic chair, as set forth in claim 1, further comprising

a positioning sleeve means centrally located on said lower face of said positioning member and having a diameter greater than said vertically movable bolt means, and

said vertically movable bolt means freely disposed in said positioning sleeve means.