CHAIR HAVING ELASTIC BANDS FOR SUPPORT SURFACES AND DEVICE FOR SECURING THE BANDS TO THE CHAIR

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Appl. No.: 12/471,043
Filed: May 22, 2009

Related U.S. Application Data
Provisional application No. 61/055,698, filed on May 23, 2008.

Publication Classification
Int. Cl.
A47C 7/14 (2006.01)

U.S. Cl. ................................................. 297/452.63

ABSTRACT
A chair uses multiple elastic bands to form the seating surfaces. The elastic bands are held in place with a mounting bracket which facilitates easy assembly of the chair and reduces the likelihood of breakage or improper assembly of the elastic bands. The elastic bands are positioned nearly level with the chair side rails and mounting bracket, and the elastic bands cover the mounting screws to provide a chair which is more comfortable and more aesthetically pleasing.
FIG. 1
CHAIR HAVING ELASTIC BANDS FOR
SUPPORT SURFACES AND DEVICE FOR
SECURING THE BANDS TO THE CHAIR

PRIORITY

[0001] The present application claims the benefit of 61/055,698, filed May 23, 2008, which is herein incorporated by reference in its entirety.

THE FIELD OF THE INVENTION

[0002] The present invention relates to chairs. More specifically, the present invention relates to a chair having elastic bands for the seating surfaces and mounting brackets for attaching the elastic bands to the chair frame.

BACKGROUND

[0003] Chairs are commonly used for a variety of activities. Many persons will sit in a chair while working, spending approximately eight hours per day in the chair. It is thus important that the chair provides good support, as a poorly designed chair can adversely affect a person's circulation, muscles, and skeletal structure. In some cases, poorly designed chairs may cause or promote long term health problems.

[0004] A variety of different approaches have been taken in making a comfortable chair. Many chairs use foam padding beneath a cloth or leather seating surface to support persons sitting on the chair. While these chairs are often more comfortable than non-padded chairs, the foam padding does not completely conform to a person's body and often applies uneven pressure. Other chairs use a mesh surface to support a person sitting on the chair. The mesh surface allows air flow around the person's body and may reduce the discomfort associated with heat build up, but does not conform well to the person's body. The mesh is relatively inelastic, limiting the ability of the mesh to conform to a person's body. Additionally, the mesh is directly tied to adjacent areas of the mesh such that when weight is applied to one area of the mesh adjacent areas of the mesh move in the same similar direction and are tightened, losing their ability to conform to the person's body.

[0005] There has been some attempt to construct chairs which use individual bands of elastic for the seating surface. The elastic bands stretch laterally across the chair and stretch to accommodate the weight of a person sitting in the chair. It has, however, been difficult to attach the elastic strips in a secure manner which does not adversely affect the appearance of the chair or which does not interfere with sitting on the chair. In a prior art chair as shown in FIG. 10, elastics 1 are attached to a housing 2 by being inserted through an opening 3, doubled over and held with a clamp 4. The housing 2 includes a flange 5 which extends over a chair rail 6 and is held in place by a screw 7.

[0006] The housing 2 is disposed so that it partially covers the chair rail 6. Some people do not like the appearance of the (usually plastic) housing 2 on the chair rail 6. Others may find the housing uncomfortable, as the housing extends inwardly from the chair rail and intrudes into the seating area of the chair. Additionally the flange 5 of the housing 2 is exposed, making it easier to damage the housing.

[0007] There is thus a need for a chair which uses elastic strips to better conform to a person's body and which provides improved aesthetic appeal and increased comfort for persons sitting in the chair. There is a need for an attachment system which connects the elastic strips to the chair in a manner which does not interfere with sitting on the chair and which does not adversely affect the appearance of the chair.

SUMMARY OF THE INVENTION

[0008] It is an object of the present invention to provide an improved chair.

[0009] According to one aspect of the invention, a chair is provided which uses elastic bands as the seating surface and which provides an improved method of mounting the bands. The elastic bands are secured to the side rails of the chair in such a way that the method of securing the bands is not apparent to a user. The bands are secured within a small housing that is attached to the side of the chair rail. The housing intrudes less into the seating area of the chair, and thus does not interfere with the use of the chair and is less likely to be broken while in use.

[0010] This and other aspects of the present invention are realized in a chair as shown and described in the following figures and related description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Various embodiments of the present invention are shown and described in reference to the numbered drawings wherein:

[0012] FIG. 1 shows a perspective view of a chair according to the present invention;

[0013] FIG. 2 shows a front view of a portion of the seat of the chair of FIG. 1;

[0014] FIG. 3 shows a perspective view of the outside of the mounting bracket of the chair of FIG. 1;

[0015] FIG. 4 shows a perspective view of the inside of the mounting bracket of FIG. 3;

[0016] FIG. 5 shows a perspective view of the end of the mounting bracket of FIG. 3;

[0017] FIG. 6 shows another perspective view of the inside of the mounting bracket of FIG. 3;

[0018] FIG. 7 shows an elastic band and retaining clip of the chair of FIG. 1;

[0019] FIG. 8 shows another elastic band and retaining clip of the chair of FIG. 1;

[0020] FIG. 9 shows a series of cut-away views of the mounting bracket of FIG. 3, illustrating assembly of the mounting bracket; and

[0021] FIG. 10 shows a method of attaching elastic bands to a chair rail in accordance with the prior art.

[0022] It will be appreciated that the drawings are illustrative and not limiting of the scope of the invention which is defined by the appended claims. The embodiments shown accomplish various aspects and objects of the invention. It is appreciated that it is not possible to clearly show each element and aspect of the invention in a single figure, and as such, multiple figures are presented to separately illustrate the various details of the invention in greater clarity. Similarly, not every embodiment need accomplish all advantages of the present invention.

DETAILED DESCRIPTION

[0023] The invention and accompanying drawings will now be discussed in reference to the numerals provided therein so as to enable one skilled in the art to practice the present invention. The drawings and descriptions are exem-
Turn now to FIG. 1, a perspective view of a chair according to the present invention is shown. The chair typically includes feet and arms as may be desired according to the particular type of chair. The chair includes a seat and a back which extend between left and right lower side rails and left and right upper side rails. It will be appreciated that, according to the particular type or style of chair, some of the particular components such as the arms may be omitted. Alternatively, the lower side rails and upper side rails may be combined together into a single piece side rail for each side.

FIG. 2 shows a front view of a portion of the seat, illustrating how the chair is constructed. The back is constructed in a similar manner. The seat is formed from a plurality of elastic bands which are stretched between the left and right lower side rails and held in place by mounting brackets. As can be seen, the elastic bands are supported at the ends and are not supported in the middle, allowing the bands to stretch and deflect under the weight of a person sitting in the chair. The elastic bands provide comfortable seating as each particular elastic band is able to stretch and deflect to a different degree according to the weight placed upon it and independent of the adjacent elastic bands. The mounting brackets are advantageous as they securely hold the elastic bands while not encumbering the surface of the chair. The mounting brackets extend above the elastic bands by only a minimal amount, increasing the comfort of the chair and not interfering with the movement of a person using the chair. Additionally, most of the bracket is hidden by the elastic bands, and the fasteners used to attach the brackets to the side rails are hidden by the elastic bands, improving the appearance of the chair.

Turning now to FIG. 3 a perspective view of the outside of the mounting bracket of the chair of FIG. 1 is shown. The mounting bracket is sized to mount a plurality of elastic bands to the chair. The mounting bracket includes a plurality of openings through which the elastic bands pass. A number of screws or bolts are used to attach the mounting bracket to the chair side rails and. It will be appreciated that the mounting brackets may be made to varying lengths as is desired. Thus, a single bracket may be made which extends along the entire length of the seat or back. Alternatively, multiple smaller brackets may be made such that a number of brackets are used to extend along the length of the seat or back. If multiple smaller brackets are used, the brackets may be designed with interlocking ends. Thus, the brackets may include an interlocking post and corresponding recess such that adjacent brackets are interlocked for rigidity and appearance. The use of multiple brackets along the chair is advantageous as it creates a modular bracket system. A few brackets, such as a straight and a curved bracket, may be interchanged to fit a variety of different chair shapes, and thus allow for greater variety in chair design without overly increasing the manufacturing cost.

One advantage of the configuration of the bracket shown in FIG. 3 is that multiple screws are used to secure the bracket to the chair rail. If one or even two screws were to come loose, the bracket is still adequately supported. In some prior art configuration a single screw is used to hold one side of a pair of elastics. If the screw comes loose, the elastics may no longer be held properly.

Turning now to FIG. 4, a perspective view of the inside of the mounting bracket of FIG. 3 is shown. It can be seen how the screws or bolts extend through the bracket to secure the side rails. The recess can also be better seen, illustrating how the adjacent brackets may interlock together if desired.

Turning now to FIG. 5, a perspective view of the end of the mounting bracket of FIG. 3 is shown. The inside side of the bracket, which is mounted against the side rail, is contoured to match the contour of the side rail and to allow the bracket to fit more closely to the side rails. Thus, the mounting bracket shown has a curved cross section as shown at to fit against a round side rail. Other shaped brackets could be used with oval, rectangular or square chair rails, etc.

Turning now to FIG. 6, a more detailed perspective view of the inside of the mounting bracket of FIG. 3 is shown. The mounting bracket includes triangular or wedge shaped projections formed adjacent to each of the holes. The projections are angled across the holes so as to push the elastic bands sideways as they extend through the holes, and thus bend the portion of the elastic bands which extends inwardly through the holes sideways. Bending the elastic bands sideways makes it less likely that the elastic bands will pull out of the mounting bracket, and makes the mounting bracket more compact. The projections move the elastic bands into the proper mounting position when the mounting bracket and elastic bands are secured to the side rails. Thus, the projections properly position the elastic bands during installation, making it easier to install the brackets, and also support the elastic bands and ensuring a strong and reliable connection.

FIGS. 7 and 8 show elastic bands and retaining clip used in the chair of FIG. 1. FIG. 7 shows a perspective view of an elastic band and a clip. The exemplar elastic band is approximately 0.25 inch thick and 0.5 inch wide. The elastic band may be a single strand or multiple strands of elastic material, and is typically enclosed within a cloth tube to protect the elastic and make it more comfortable for a user. The clip may be a wire which is wrapped around the elastic as is shown. FIG. 8 shows an alternate clip which is formed by bending a small piece of metal around the elastic band. The clip provides an inexpensive and reliable method of securing the elastic band inside of the mounting bracket.

Turning now to FIG. 9, a sequence of cut-away views illustrating the mounting bracket of FIG. 3 and the assembly of the bracket to the side rails is shown. The leftmost drawing illustrates the shape of the bracket, hole, and projection. The projection has a curved surface which faces the hole and which begins parallel to the hole and curves downwardly. The second drawing illustrates how the elastic band is placed through the hole and a clip is placed on the end of the elastic band. The clip is bigger than the hole and prevents the elastic band from being pulled back through the hole.

The next drawing shows how the elastic band is then moved until the clip is pulled somewhat into the mounting bracket. The projection pushes the clip downwardly and bends the elastic band as shown. The rightmost drawing shows how the mounting bracket is then
placed against a side rail 30 (or the upper side rail 34) and secured to the side rail 30 with screws or bolts 50. Because the projection 70 has already bent the elastic band 38, placing the mounting bracket 42 against the side rail 30 continues to bend the elastic band 38 and presses the clip 74 into the position shown. The projection 70 prevents the clip 74 from moving too far upwardly where the elastic band 38 would be overly bent or pinched against the hole 46, helping to reduce the failure of the elastic band 38. It can be seen how the mounting bracket 42 positions the elastic band at nearly the same height as the side rail 30, making the chair more comfortable. It will also be appreciated that the mounting screws 50 and most of the mounting bracket 42 will be located beneath the elastic bands 38, proving a chair which is more aesthetically pleasing. The mounting bracket also makes assembly of the chair easier and reduces the likelihood of improperly positioning the elastic bands, reducing the risk of an elastic band breaking during use.

There is thus disclosed an improved chair. It will be appreciated that numerous changes may be made to the present invention without departing from the scope of the claims. The appended claims are intended to cover such modifications.

What is claimed is:
1. A chair comprising:
   a first side rail;
   a second side rail;
   a mounting bracket, the mounting bracket having a plurality of holes therethrough and being attached to a side of the first side rail; and
   a seating surface formed of a plurality of elastic bands, the elastic bands extending between the first and second side rails and each of the plurality of elastic bands passing through one of the plurality of holes.
2. The chair of claim 1, wherein the plurality of holes in the mounting bracket are disposed along the top thereof, and wherein the mounting bracket comprises a projection formed adjacent the top of each of the holes, the projection curving downwardly from the top of the mounting bracket so as to force the elastic bands to bend downwardly.
3. The chair of claim 1, wherein the chair comprises a plurality of mounting brackets, and wherein the plurality of mounting brackets are interlocking when placed end to end.
4. The chair according to claim 1, further comprising a plurality of screws and wherein the mounting bracket comprises a plurality of holes configured for receiving the plurality of screws such that the mounting bracket is held to the first side rail by a plurality of screws.
5. The chair according to claim 1, further comprising a second mounting bracket having a plurality of holes therethrough and being attached to a side of the second side rail.
6. The chair according to claim 1, wherein the first side rail and the second side rail each have an upper surface disposed in a substantially common horizontal plane, and wherein the mounting bracket is attached so as to remain below the upper surfaces of the first side rail and the second side rail.
7. The chair according to claim 1, wherein the elastic bands comprise an elongate length of elastic material having a covering thereon and having a clip located on the ends thereof, the clips being placed inside of the mounting brackets.
8. The chair according to claim 1, wherein the mounting brackets have an inside side configured for mounting against chair side rail, and wherein the inside side is contoured to match the contour of the side rail.
9. A chair comprising:
   a first side rail;
   a second side rail;
   a first mounting bracket attached to the first side rail so as to be positioned between the first side rail and the second side rail;
   a second mounting bracket attached to the second side rail so as to be positioned between the first side rail and the second side rail;
   elastic bands extending between the first and second mounting brackets, the elastic bands being attached to the first and second side rails via the first and second mounting brackets.
10. The chair of claim 9, wherein the elastic bands pass horizontally through the first and second mounting brackets and are bent vertically adjacent the first and second side rails.
11. The chair of claim 9, wherein the first and second mounting brackets have a plurality of holes therethrough for receiving the elastic bands, and wherein the mounting brackets have projections disposed adjacent the holes and extending at an angle across the openings so as to bend the elastic bands adjacent the openings.
12. The chair of claim 9, wherein the first and second mounting brackets comprise:
   a first side configured for mounting against a chair side rail;
   a recess extending through the first side and into the body of the mounting bracket;
   an opening whereby an elastic band may pass into the recess; and
   wherein the elastic band bends adjacent said opening so as to be held adjacent a chair side rail.
13. The chair of claim 12, wherein the first and second mounting brackets comprise a projection formed inside of the recess and configured for bending the elastic band so as to be adjacent the chair side rail.
14. The chair of claim 12, wherein the opening is formed in a second side of the mounting bracket opposite the first side of the mounting bracket.
15. The chair of claim 14, wherein the first and second mounting brackets comprise a projection formed inside of the recess adjacent the opening and configured for bending the elastic band.
16. A method for forming an elastic chair comprising:
   selecting a plurality of pieces of elastic;
   inserting the plurality of pieces of elastic into a plurality of holes in a mounting bracket;
   selecting a chair having first side rail and a second side rail; and
   attaching the mounting bracket and plurality of pieces of elastic to the side of the first side rail so as to be between the first and second side rails.
17. The method according to claim 16, wherein the method comprises attaching the mounting bracket to the side of the first side rail so as to bend and hold a portion of the elastic between the first side rail and the mounting bracket.
18. The method of claim 16, wherein the method comprises attaching the mounting bracket to the side rail so that the pieces of elastic extend into openings in a side of the mounting bracket facing the second side rail and bend approximately 90 degrees so as to be located along the first side rail.
19. The method of claim 18, wherein the method comprises selecting a mounting bracket having a projection located adjacent a hole therethrough, the projection being configured for bending a piece of elastic as it passes through the hole.

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