A furniture construction and a method of placing a section of fabric in tension on the furniture construction includes providing a pair of rigid members each having a slot extending along one side. A rigid edge portion is provided on opposite sides of the section of fabric. Each rigid edge portion is then inserted into the slot of each rigid member such that the fabric overlies an adjacent side surface of each rigid member. The rigid members are then moved in opposing directions thereby placing the fabric in tension. The edge portion of the fabric is sufficiently rigid to retain the fabric within the slot and thereby retain the fabric in tension. The rigid members are then secured to the furniture construction.
FURNITURE CONSTRUCTION WITH TENSIONED FABRIC

BACKGROUND OF THE INVENTION

[0001] The present invention relates to furniture construction, in particular, it relates to tensioning fabric in furniture construction.

[0002] Furniture having strips of flexible material or entire sheets of flexible material stretched over a framework are popular. Some methods of stretching flexible sheets of material over chair frames are described in U.S. Pat. Nos. 4,371,142, 4,456,301, 4,592,126, 6,341,822 and 6,345,482.

SUMMARY OF THE INVENTION

[0003] The present invention includes a furniture construction and a method of placing a section of fabric in tension on the furniture construction. The section of fabric is placed in tension between two spaced apart rigid members, each of the rigid members having a slot extending along one side. A sufficiently rigid edge portion is provided on opposite sides of the section of fabric. Each sufficiently rigid edge portion is then inserted into the slot of each rigid member such that the fabric overlies an adjacent side surface of each rigid member. The edge portion of the fabric is sufficiently rigid to retain the fabric within the slot. The rigid members are then moved in opposing directions thereby placing the fabric in tension. The rigid members are then secured to the furniture construction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is a perspective view of the present invention.
[0005] FIG. 2 is an enlarged perspective view of a portion of the chair construction illustrated in FIG. 1.
[0006] FIG. 3a is a sectional view of rigid member with fabric attached thereto.
[0007] FIG. 3b is a sectional view of an alternative embodiment of the rigid member with fabric attached thereto.
[0008] FIG. 4 is a plan view illustrating a method of placing the fabric section in tension.

DETAILED DESCRIPTION

[0009] A chair construction of the present invention is generally indicated at 10 in FIG. 1. Like reference characters will be used to indicate like elements in the drawings. Although a chair construction is specifically illustrated, it is understood that the present invention is applicable to other furniture constructions. The present invention also includes a method of placing a section of fabric 12 in tension between two rigid seat members 14 and 16. As specifically illustrated, the section of fabric 12 and the rigid seat members 14 and 16 form a seat portion 18 of the chair construction 10. The method of the present invention is also used to form a back portion 34 of the chair construction. Although a single seat chair is illustrated, the method of the present invention may be used for chairs providing for more than single occupancy or which have more than one seat and back portion.

[0010] The chair construction 10 includes a framework 20 that can be made of plastic, aluminum or steel. The framework includes legs 22, 24, 26 and 28. A front crossbrace 25 and a rear crossbrace 27 extend between and connect the legs 26 and 28 and the legs 22 and 24, respectively. In the embodiment illustrated, the legs 26 and 28 have upper portions 30 and 32 which serve as arms and which are integrally conjoined behind the back portion 34. The particular construction of the framework 20 is not especially important to the present invention, and is described herein as one exemplary type of framework for which the present invention is suitable.

[0011] To form the seat portion 18, the rigid seat members 14 and 16 are provided with a downwardly facing slot 36 as best illustrated in FIGS. 2 and 3. The slot 36 runs the length of the rigid members. The section of fabric 12 includes a semi-rigid or rigid edge portion 38 that extends along the length of opposing edge portions. The fabric section 12 overlies the seat member 16 along an outwardly facing side 31 adjacent to the slot 36 and extends over an upwardly facing side 41, as illustrated in FIG. 3. Although only the seat member 16 is specifically illustrated in FIG. 3, the seat member 14 is similar as a mirror image in both construction and how the fabric section 12 overlies the seat member 14.

[0012] An alternative embodiment of the seat member 16 is illustrated in FIG. 3a. In FIG. 3a, the fabric section 12 overlies a seat member 16'. The semi-rigid or rigid edge portion 38 is positioned in an upwardly facing slot 36'. The fabric 12 covers the edge portion 38. Similarly, as with respect to member 16, a mirror image member (not illustrated) of member 16' receives a similar opposing edge portion 38 of the fabric 12.

[0013] The semi-rigid or rigid edge portion 38 is made sufficiently rigid to secure the section of fabric 12 to the seat member 16 by engagement with the slot 36. Preferably, the edge portion 38 is made of a section of plastic 40 that is attached to an edge portion 42 of the section of fabric 12 by a method that is well known such as sewing, gluing or thermo welding using ultrasonic or electronic means. For example, such rigid edge portions are provided to canvas tops for Jeep Wrangler vehicles made by Chrysler-Daimler to secure the canvas in certain places along the vehicle by engaging selectively positioned slots. It should be understood that other constructions and methods are included within the present invention to make the edge portion 38 sufficiently rigid to secure the fabric to either seat member 14 or 16. By sufficiently rigid is meant that once the edge portion is positioned within the slot and the fabric is placed along the adjacent side 31, the edge portion is retained within the slot since the edge portion cannot slide out due to its rigidity.

[0014] The edge portion 38 is also retained within slot 36 of FIG. 3b since the edge portion 38 cannot slide out due to its rigidity and that the tension on the fabric 12 is essentially perpendicular to the longitudinal axis of fabric 12.

[0015] The section of fabric 12 is made of a fabric normally used in the construction of outdoor furniture of a stretch fabric woven from an all-weather, vinyl-coated, flexible and elastic polyester yarn, such as PHIFERTEX® fabric made by Phifer Wire Products, Inc. of Tuscaloosa, Ala. An example of a stretchable fabric useful in this invention is described in U.S. patent application Ser. No. 10/369,444, entitled Chair Seat With Firm But Resilient Front Edge, filed on Feb. 19, 2003, which is herein incorporated by reference in its entirety.

[0016] The section of fabric 12 of the seat portion 18 is placed in tension by initially inserting the rigid edge portions 38 into the slots 36 of the rigid seat members 14 and 16. In one example of the method of construction of the present invention, rigid seat members 14 and 16 each have two sets of apertures 46 and 47 with one set of aperture positioned near the front crossbrace and one set of apertures positioned near the rear crossbrace, as best illustrated in FIGS. 2 and 4.

[0017] The apertures 46 and 47 are engaged by spreader tools 48 and 50. Referring to FIG. 4, the spreader tool 50 is illustrated with respect to the fabric 12, and in relation to the
front crossbrace 25. Both spreader tools 48 and 50 are essentially the same, and therefore only spreader tool 50 will be described. The spreader tool 50 includes a pneumatic or hydraulic cylinder 52 which provides a force to move the seat members 14 and 16 in the direction of arrows 54. The spreader tool 50 at each end includes pins 56 and 58 which engage apertures 46 and 47 of the rigid seat members 14 and 16, respectively. Each pin 56 and 58 engages both the apertures 46 and 47 to prevent the seat members 14 and 16 from rotating about their axis when the section of fabric is placed in tension. Both spreader tools 48 and 50 are used to move the seat members 14 and 16 away from each other to place the section of fabric 12 in tension.

[0018] To retain the seat members 14 and 16 in position on the frame 20, the front crossbrace 25 includes retainer tabs 64 and 66. Similarly, the rear crossbrace 27 includes similar retainer tabs, only one of which is shown (68). The retainer tabs of the front and rear crossbraces are positioned from each other at a distance which matches a selected distance which seat members 14 and 16 are to be spread apart for the selected tension of the section of fabric 12.

[0019] The spreader tools 48 and 50 spread the seat members 14 and 16 sufficiently far enough so that inside faces 60 and 62 of the seat members 14 and 16 extend beyond the retaining tabs 64 and 66. The retaining tabs are preferably permanently secured to the respective crossbraces such as by welding.

[0020] Once the seat members 14 and 16 are positioned beyond the retaining tabs of the front and rear crossbraces, the spreader tools 48 and 50 may be drawn in and the pins disengaged from apertures 46 and 47. Just prior to the disengagement of the spreader tools or directly thereafter, the seat members 14 and 16 are secured to the retaining tabs by screws 70 and 72 which extend through apertures 74 and 75 and into the seat members 14 and 16. The seat members 14 and 16 are similarly attached to the retaining tabs of the rear crossbrace 27. The screws 70 and 72 are exemplary of fasteners that may be used to secure the seat members 14 and 16 in position. Other fasteners or other fastening systems such as adhesives or welding are included within the present invention. Detachable fasteners such as screws have the advantage that the section of fabric may be easily replaced by detaching the seat members 14 and 16 from the frame 20.

[0021] The back portion 34 is similarly constructed. The back portion 34 is also made of a section of fabric 76 that is in tension between back rigid members 78 and 80, as best illustrated in FIG. 1. The back members 78 and 80 are similar in construction and have the same cross-section as the seat members 14 and 16 illustrated in FIG. 3a. The section of fabric 76 also includes rigid end portions similar to the edge portions of fabric 12 that are placed within the slots of the back members 78 and 80. The slots of back members 78 and 80 may face rearwardly, or rearwardly. If facing rearwardly, the back member 78 and 80 are of a similar construction as illustrated in FIG. 3a. If they face forwardly, the back members 78 and 80 are of a cross-sectional construction similar to what is shown in FIG. 3b. The section of fabric 76 is also placed into tension in a similar manner using spreader tools 48 and 50. The back members 78 and 80 are spread sufficiently far apart to extend beyond retaining tabs 82 and 80 that extend from the rear crossbrace 27 and retaining tabs 84 and 85 which extend from arm sections 30 and 32 that extend behind the back portion 34 of the chair. The retaining tabs are preferably fixedly attached to the crossbrace and arm sections such as by welding.

[0022] Once the back members 78 and 80 are moved beyond the retaining tabs 81, 84 and 82, 85, the back members 78 and 80 are attached to the retaining tabs, and the spreader tools are disengaged from the back members 78 and 80. Screws (not illustrated) are used in the same manner as screws 70 and 72 to attach the back members 78 and 80 to the retaining tabs 81, 82, 84 and 85.

[0023] Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.

1-4. (canceled)
5. A furniture construction including a ground engaging framework, the construction comprising:
   a pair of spaced apart rigid members attached to the framework, each rigid member being longitudinal in length and having a slot extending longitudinally along one side;
   a section of fabric having opposing end portions, each end portion being rigid and disposed within a slot of the rigid members;
   and
   a portion of the section of fabric extending out of the slot and overlying a side of the rigid member adjacent to the slot wherein the section of fabric between the rigid members is in tension.

6. The construction of claim 5 and further comprising:
   two sets of tabs extending from the framework, the sets being spaced from each other and within each set the tabs being spaced from each other and wherein the rigid members are secured to the tabs.

7. A chair construction comprising:
   a framework having four ground engaging legs;
   a seat portion attached to the framework and comprising a section of fabric in tension attached to two rigid substantially horizontal seat members, each rigid seat member having a slot extending along the length thereof, and wherein the sections of fabric having opposing rigid edge portions are disposed within the slots of the rigid members; and
   a back portion extending substantially vertically from the framework.

8. The chair construction of claim 7 wherein the slots of the rigid seat members are downwardly facing.

9. The chair construction of claim 7 wherein the slots of the rigid seat members are upwardly facing.

10. The chair construction of claim 7 wherein the back portion includes a second section of fabric in tension attached to two rigid substantially vertically disposed back members, each rigid vertically disposed back member having a longitudinal slot extending along the length thereof, and wherein the second section of fabric has opposing rigid edge portions disposed within the slots of the rigid substantially vertically disposed members.

11. The chair construction of claim 1 wherein the slots of the back members are rearwardly facing.

12. The chair construction of claim 10 wherein the slots of the back members are forwardly facing.

13-22. (canceled)

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