**ABSTRACT**

A folding quad-style chair has a folding frame including four legs each having a leg tube, and a fabric seating section attached to the frame. An extension is telescopically extendable from each leg tube. A locking device is provided with each extension for releasably locking each extension into a fixed position. The locking device may be designed as a plurality of spaced apart holes and with the locking device including a spring urging a locking pin into one of the holes. A foot plate may be pivotally attached to a lower end of each extension. Since the length of each leg can be individually adjusted, the chair may be configured to provide a level seating surface even on a hillside, incline, or other sloped or irregular surface. All four legs may be fully extended to provide an elevated seating surface.
PORTABLE FOLDING CHAIR WITH ADJUSTABLE LEGS

BACKGROUND OF THE INVENTION

[0001] Portable folding chairs have become increasingly popular for use at the beach and parks, at sporting events, for picnics, camping, and similar uses. Many of these chairs are lightweight and fold into a compact size, with the folded chair conveniently carried in a carrying bag. The so-called quad chair design has been in widespread use for several years. The quad chair has a frame typically formed from diagonal poles, pivotally attached to each other at the front, back, left, and right sides of the frame. This allows the quad chair frame to fold and unfold both in the front to back direction and in the side to side direction. As a result, when folded, the quad chair is highly compact.

[0002] Although quad chairs as a whole offer many advantages, a typical quad has four fixed-length legs. Consequently, the height of the seating surface is fixed, making the chair not well adapted for seating at a bar or cocktail tables, or for other uses where a higher seating surface is needed. Quad chair legs are made all the same length, so that the chair sits level on a flat surface. When used on an inclined surface, the entire chair is necessarily inclined, providing a seating surface that may be tilted too far forward or back. Accordingly, engineering challenges remain in providing a reclining quad chair better designed for a wider range of uses.

[0003] Other and further objects and advantages will become apparent from the following detailed description, which shows one embodiment of the invention. It will be apparent though to persons skilled in the art that various other equivalent embodiments may of course be derived within the scope of the invention.

SUMMARY OF THE INVENTION

[0004] A folding quad-style chair has a folding frame including four legs each having a leg tube, and a fabric seating section attached to the frame. An extension is telescopically extendable from each leg tube. A locking device releasably locks each extension into a fixed position. The locking device may be designed as a plurality of spaced apart holes and with the locking device including a spring urging a locking pin into one of the holes. A foot plate may be pivotally attached to a lower end of each extension. Since the length of each leg can be individually adjusted, the chair may be configured to provide a level seating surface even on a hillside, incline, or other sloped or irregular surface. All four legs may be fully extended to provide an elevated seating surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] In the drawings, the same element number indicates the same element in each of the views.

[0006] FIG. 1 is a perspective view of a new quad-type chair.

[0007] FIG. 2 is a perspective view of the frame of the chair shown in FIG. 1, with the frame in a fully open or erected position, and with the front legs extended further than the back legs.

[0008] FIG. 3 is an enlarged perspective view detail of one of the fittings shown in FIG. 2.

[0009] FIG. 4 is an enlarged perspective view detail of the feet shown in FIG. 1.

[0010] FIG. 5 is a perspective view of the frame of the chair shown in FIG. 1, with the front legs and the rear legs fully retracted.

[0011] FIG. 6 is a perspective view of the frame of the chair shown in FIG. 1, with the front legs and the rear legs fully extended.

DETAILED DESCRIPTION OF THE DRAWINGS

[0012] As shown in FIG. 1, a portable, foldable and reclining chair 10 has flexible material or fabric 14 attached to and/or supported on a frame 12. The material 14 may be a fabric such as polyester or other synthetic or natural material. The material 14 has a seat section 20 and a back rest section 22 ordinarily provided together as a single piece, but optionally provided as two separate pieces. Typically the chair 10 also has arm rests 18 of the same material. The frame 12 may be symmetrical about the front to back centerline. Consequently, the frame elements on the left side may be mirror images of the elements on the right side. Except as described below, the chair 10 may be similar or the same as a standard quad chair, as described for example in U.S. Pat. Nos. 6,926,355 and 8,091,962, and U.S. patent application Ser. No. 13/718,616, each incorporated herein by reference.

[0013] As shown in FIG. 2, the length of each of the four legs of the chair 10 may be individually adjusted. FIGS. 2-6 show the frame 12 alone without fabric 14, for purpose of illustration. In FIG. 2, the front legs are extended out further than the rear legs, so that with the front legs resting on a first ground surface L.I., and the rear legs resting on a second ground surface L.II above L.I., the chair 10 is in a level position. This allows the chair 10 to be comfortably positioned and used e.g., on a hillside or other uneven surfaces. In the same way, the chair 10 may be set up on bleachers, stadium benches, or other structures or surfaces, to provide more comfortable seating.

[0014] FIG. 5 shows the chair 10 with all four legs fully retracted, so that the chair 10 is configured and has the same seat height as a conventional quad chair. FIG. 6 shows the chair 10 with all four legs fully extended. This raises the seat height to a position better suited for use at raised surfaces, such as bars, cocktail tables, beach or stadium railings, etc. With the legs fully extended as shown in FIG. 6, the seated user is also closer to eye level with standing persons, which may be advantageous for use at trade shows, sports events, etc.

[0015] The legs of the chair 10 may be made extendible in various different ways. Generally these may include use of a telescoping leg element on each of the four legs, for example via a leg extension 50 telescoping into or over a leg tube 26, as shown in FIGS. 3 and 4. In this example a fitting 40 is rigidly attached onto or adjacent to the lower end of the leg tube 26. The cross tubes 28 may be pivotally attached to elevis plates 46 on the fitting 40 via cross tube pins 48. The fitting 40 may be molded of high strength plastic or other materials.

[0016] As shown in FIG. 3, the extension 50 includes a series of spaced apart position holes 52. The extension 50 may have a non-round cross section, to allow the extension 50 to telescopically slide into and out of a correspondingly shaped opening in the fitting 40, without rotating. This keeps the position holes 52 at a fixed orientation relative to the fitting 40. In the example of FIG. 3, a D-shaped extension is shown, with the position holes 52 in the flat surface of the extension. Other extension shapes such as triangular, square, hexagonal, etc. may be used, including various other regular or irregular
polygons. Typically the leg tube 26 is round and the upper opening in the fitting 40 is correspondingly round, to accept and attach to the bottom end of the leg tube 26. The lower opening in the fitting 40, however, is made with a cross-sectional shape matching the extension 50.

[0017] As shown in FIGS. 3 and 4, the extension 50 may be moved to a desired position and then securely locked in place via a lock pin 42 extending through a pin block or surface 44 on the fitting 40. The lock pin 42 may be biased inwardly by a spring 54. The spring 54 positively holds the inner end of the lock pin 42 into engagement with the selected position hole 52. The extension 50 may be moved to a different position by pulling and holding the lock pin 42 out while sliding the extension to the new desired position, and then releasing the lock pin 42. The lock pin 42 may be provided with a knob, T-handle, or other grasping surface. Other forms of locking devices may also be used, including pipe clamps, friction clamps, cam and wedge devices, and pins extending through the extensions. The fittings and extensions may alternatively use self locking or anti-back driving dual, tri, or quad lead screw threads.

[0018] Referring to FIG. 4, a foot 60 may have a collar 62 attached onto the bottom end of the extension 50, on each of the four legs. A foot plate 68 may be pivotally attached to the collar 62 via a pin 64 extending through clevis plates 68 on the foot plate 68. This allows the foot 60 to pivot on a lateral (side to side) axis generally parallel to the front edge of the seat section 20, so that the feet 60 will rest flat on an inclined (uphill/downhill) surface. Some designs may optionally include a foot pivotable about the lateral axis and also about a longitudinal (front to back) axis, by including a second pivot pin shown in dotted lines 66. In this design the pins 64 and 66 form a U-joint that allows the foot to rest flat on a surface also having lateral incline or slant.

[0019] Thus, a novel chair has been shown and described. Various changes and substitutions may of course be made without departing from the spirit and scope of the invention. The invention, therefore, should not be limited except by the following claims and their equivalents.

1. A folding chair, comprising:
a folding frame including four leg tubes;
fabric including a seating section attached to the frame;
an extension telescopically extendable from each leg tube; and
a locking device associated with each extension for releasably locking each extension into a fixed position.

2. The chair of claim 1 further comprising a foot plate pivotally attached to a lower end of each extension.

3. The chair of claim 1 each extension comprising a plurality of spaced apart holes and with the locking device including a spring urging a locking pin into one of the holes.

4. The chair of claim 1 with each extension having a non-round cross sectional shape.

5. The chair of claim 4 further including with lower end of each leg tube extending into an upper opening of a fitting, and with the fitting having a lower opening with a shape substantially matching the shape of the extension.

6. The chair of claim 1 with the extension having a length between 40% and 95% of the length of the leg tube.

7. The chair of claim 4 with the fitting further comprising first and second sets of clevis plates, a first cross tube pin extending between the first set of clevis plates to pivotally attach a lower end of a first cross tube to the fitting, and a second cross tube pin extending between the second set of clevis plates to pivotally attach a second cross tube to the fitting.

8. The chair of claim 1 with the extension having a D-shaped cross section.

9. A folding chair, comprising:
a folding frame having four legs, with each leg including a leg tube;
fabric including a seating section attached to the frame;
an extension telescopically extendable into and out of each leg tube;
a fitting rigidly attached to a lower end of each leg tube and having a lower opening with a shape substantially matching the shape of the extension;
a foot plate pivotally attached to a lower end of each extension; and
a locking device on each fitting, with each extension locked in a fixed position when the locking device is in a lock position, and with each extension telescopically movable into or out of the leg tube when the locking device is in a release position.

10. The chair of claim 9 with each extension having a non-round cross section and a plurality of spaced apart holes, and with the locking device comprising a spring-biased pin insertable into one of the spaced apart holes.

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