A bed made from standard structural parts, detachably connected together, which is adapted to be pivoted about a central pivot axis to permit insertion into a case formed by the mattress cover.

18 Claims, 9 Drawing Figures
The present invention relates to a foldable bed structure, and more particularly to a foldable bed structure which can be folded and packed in a case in such a manner as to form a carrying case providing storage space.

Beds of various types are known as such in the prior art, including those which can be readily assembled and disassembled. However, the beds of the prior art entailed the shortcoming that in the disassembled condition they require a separate box or case to carry the parts of the bed from one place to the other.

Other types of beds, known in the prior art, require a large number of different parts for the assembling thereof, and thus involve considerable manufacturing and assembly costs.

It is the aim of the present invention to avoid the aforementioned shortcomings and drawbacks encountered in the prior art and to provide a bed, adapted to be folded into two halves about a pivot axis so as to constitute a storage space which can serve for the storage and transportation of other structural parts when the thus folded bed is enclosed in a cover serving either as mattress cover or as protective case.

Additionally, the present invention seeks to provide a bed of the aforementioned parts which is composed of standardized parts readily assembleable and disassembleable.

Another object of the present invention resides in a bed which can be readily converted into an emergency stretcher, can be readily connected to structural assemblies utilizing the same standardized parts, and can be folded to reduce its over-all dimension for transportation at which time the folded structure forms a framework for a carrying case.

These and further objects, features and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which shows, the purposes of illustration only, one embodiment in accordance with the present invention, and wherein:

FIG. 1 is a perspective view from above on the assembled bed in accordance with the present invention;

FIG. 2 is a cross-sectional view, taken in the plane of II—II of FIG. 1;

FIG. 3 is an elevation view, on an enlarged scale, showing the pivotal connection for the two bed halves utilizing standard parts;

FIG. 4 is a top plan view on the pivotal connection of FIG. 3;

FIG. 5 is an exploded view, on an enlarged scale, illustrating the assembly of a corner of the bed from standardized parts in accordance with the present invention;

FIG. 6 is an auxiliary handle adapted to be used with the present invention for converting the bed into a stretcher;

FIG. 7 is a plan view on the mattress cover for the bed which serves at the same time as casing when turned inside out;

FIG. 8 is a perspective view illustrating how the folded bed enclosed by cover constitutes a carrying case with large storage space; and

FIG. 9 is a perspective view of a modified construction of a brace member in accordance with the present invention.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, the frame of the bed in accordance with the present invention consists of a suitable number of angular profile members 10 of suitable length, provided with identical, regularly spaced apertures 11, suitably secured together by the use of four plate members 20 provided with similarly spaced apertures 11 and by four right-angle members 30, also similarly apertured. The pivotal connection is realized by two pivotal connecting members generally designated by reference numerals 40 each consisting of two disc-like portions 41 and 43, connected to respective leg portions 42 and 44, respectively. The disc-like portions 41 and 43 are pivotally connected together by any conventional means. In order to assure alignment of the leg portions 42 and 44 in the same longitudinal plane, the disc portion 41 is connected with the leg portion 42 by way of a connecting portion 42a.

Four legs generally designated by reference numeral 50 are detachably connected with the downwardly extending leg portions of each angular profile member 10 at the places indicated in FIG. 1 and FIG. 5 to avoid mutual interference in the folded condition. Additionally, a straight flat structural element 70 also provided with similarly spaced apertures of same dimensions is provided on each side which is adapted to be pivoted about its one connection a in the direction of arrow A so as to form a brace for the frame in the unfolded condition, is, to hold the same in the flat condition when connected with aperture 11a and 11b as shown in FIG. 1.

The connection between the various structural parts including the pivotal connection between the disc portions may be realized in any conventional manner, preferably by means of a two-partite connecting arrangement consisting of a plug-type connector member 90 provided with an annular groove 91 adapted to receive a locking member 92 (FIG. 6) as more fully disclosed in my co-pending application, Ser. No. 872,715 entitled U.S. Pat. No. 3,683,737 “DETACHABLE TWO-PARTITE CONNECTING ARRANGEMENT,” the subject matter of which is incorporated herein by reference to the extent necessary.

A resting surface, properly speaking, generally designated by reference numeral 100 is constituted by a rectangular fabric material, for example, made of nylon or any other sturdy material provided with a suitable number of apertures 111 about its circumference into which may be fastened metallic or plastic rings to prevent tearing out. Coil springs 105 with appropriate hooks or the like at both ends engage into mutually facing apertures 111 in the fabric 110 and apertures 11 in the sectional members 10 as well as in the plates 20 as indicated in the drawing. The springs 105 are relatively strong coil springs installed each with a force of about 10 to 15 kg. As a result of such suspension, the bed surface 100 is tautly suspended from the frame of the bed and is able to adjust itself to the body contour resting thereon only to the extent permissible from an orthopedic point of view to provide optimum rest.

In order to prevent the collapse of the frame of the bed within the area of the pivotal connections, bracing structures generally designated by reference numeral 30 (FIGS. 1 and 2) are secured within the central area.
of the bed at each half thereof. Preferably, the trussing reinforcements 80 are provided with threaded portions at the free ends thereof extending through corresponding apertures 11 and are held in place by conventional bolts.

The bed in accordance with the present invention is made from standard structural parts and may be used in structural assemblies, utilizing the same parts as more fully disclosed in my copending application, Ser. No. 872,554 entitled "STRUCTURAL ASSEMBLIES," the subject matter of which is incorporated herein to the extent necessary.

To convert the bed of the present invention into a stretcher, handle attachments generally designated by reference numeral 200 (FIGS. 1 and 6) are provided which consist of a tubular portion 201 provided with a plastic handle portion 202 at one end (FIG. 6) and with a hook-like extension 203 at the other end. Additionally, the member 200 is provided with a transverse plate 204 extending above and below the tubular member 201 and provided with an aperture 205 in the part thereof extending below the tubular member 201.

The spacing d (FIG. 6) between the extension 203 and the aperture 205 are such as to permit insertion into the corresponding apertures, as indicated in FIG. 6. The auxiliary handle structure 200 may be secured by the use of a detachable connection of any conventional type or preferably of the two-partite type described above, consisting of a plug-type connector 90 and locking member 92 (FIG. 6), as more fully described in my co-pending applications.

Cords 130 are provided on each side of each bed half which are suitably secured to the frame members 10, for example by a sufficiently large knot on the other side of the frame member. These cords 130 in effect constitute carrying handles when extending through the slots 301 (FIG. 7) of the mattress cover generally designated by reference numeral 300. This mattress cover is of plastic material on one side and of suitable fabric or the like on the other so that it can be used as mattress cover, with the fabric exposed, and as case, with the plastic material exposed, within which to accommodate the folded bed. The mattress cover 300 is provided with a central zipper 302 as well as with two zippers 303 and 304 constituted by two conventional complementary halves 303a and 303b as well as 304a and 304b. Additionally, flaps 306a and 306b are provided with snap-action fasteners 308 to engage with complementary snap-fasteners 308' to tie together the case with the folded bed within the case thereof.

In order to convert the mattress cover 300 into a carrying case, it is only necessary to turn the same inside out, fold the bed, thereupon fold the cover 300 over the thus folded bed, extend cords 130 through slots 301 and thereafter close the zippers 303 and 304 and snap-fasteners 308 and 308' in a conventional manner. Folding of the bed is realized about the pivot axis i-i of the pivotal connections 40 in the directions of arrows B and C (FIG. 1).

In the folded position the legs 50 serve as spacer members to maintain the proper alignment of the parts in the folded condition and therewith to maintain the hollow storage space.

In an embodiment in accordance with the present invention, the storage space formed within the folded bed amounted to about 84 liters, sufficient to carry all the structural parts, blankets and covers in the storage spaces of two such beds for a complete tent-like assembly as illustrated, for example, in FIG. 8 of my aforementioned co-pending application entitled "Structural Assemblies." FIG. 8 illustrates the condition of the cover and of the folded bed when folded into a portable storage casing.

Furthermore, by making the cover 300 over-size, it is not only possible to place parts on the inside of the bed, i.e., into the storage space defined by the two halves of the bed surface 100 but also on the outside thereof, for example, using the space for the storage of blankets, canvases, etc.

FIG. 9 illustrates a modified construction of a brace member generally designated by reference numeral 70' which may be used in lieu of the brace member 70. The former differs from the latter in that it has an angular profile with the side 71 containing the apertures 11 being somewhat wider in the dimension w than the corresponding dimension of a profile member 10 while the side 72, angularly disposed thereto, is relatively short and without apertures, the maximum dimension x thereof being such as not to interfere with the bolts anchoring the bracing structures 80. The advantage of the construction of FIG. 9 resides in the fact that it braces the bed more securely in the unfolded condition, for example, when used as a stretcher and at the same time serves as a guide to maintain proper alignment of the parts in the stored condition, assured by the greater dimension w.

While I have shown and described only one embodiment in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to those skilled in the art, and I, therefore, do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are within the scope of those skilled in the art.

I claim:

1. A light-weight, portable foldable bed adapted to be assembled from standard structural parts, characterized by a substantially rectangular detachable frame structure consisting of individual longitudinal and transverse sectional frame members of substantially identical cross sectional profile detachably interconnected at the four corners by identical plate structures to form two frame sections, each including one transverse frame member and two longitudinal frame members, and adapted to pivot relative to each other, pivotal connecting means connecting the two frame sections of the frame structure at the free ends of the longitudinal members to enable pivotal movement about an axis parallel to a transverse frame member, the standard structural parts of the frame including the sectional frame members and the plate structures being provided with regularly spaced apertures along the longitudinal and transverse frame members to serve for the detachable connections, unitary fabric means forming a bed surface which is provided with spaced apertures along the edges thereof, and spring means engaging in mutually opposite apertures of the structural parts and of the fabric means for tautly suspending the bed surface on the longitudinal and transverse frame
members of said frame part so that the entire weight of a human person directly resting on said fabric means is supported at said structural parts by way of said spring means.

2. A bed according to claim 1, characterized by reinforcing frame means extending substantially in the direction of the pivot axis across a respective frame section near the area of the pivotal connection thereof to prevent buckling of the frame structure within that area under the spring forces.

3. A bed according to claim 1, characterized in that a mattress cover adapted to cover the top of the bed when in the unfolded condition, constitutes simultaneously a case enclosing the bed when in the folded condition with the two frame sections folded one over the other.

4. A bed according to claim 3, characterized in that said case is provided with disengageable zipper means along the major portion of the circumference thereof to close the case when the folded bed is stored therein.

5. A bed according to claim 4, characterized in that the case is provided with slots through which may extend cords or the like serving as carrying handles which are suitably secured in apertures of the frame members.

6. A bed according to claim 5, characterized by handle attachment means operable to engage in some of said apertures and adapted to be connected to said frame structure near the four corners thereof to convert said bed into a stretcher case.

7. A bed according to claim 6, characterized by leg means detachably secured to the frame members and serving as spacers for the bed in the folded condition.

8. A bed according to claim 6, characterized in that the frame structure is symmetrical about its pivot axis.

9. A bed according to claim 8, characterized by bracing means formed of substantially flat similarly apertured standard structural parts for holding the bed in the unfolded condition by interconnecting the frame members on both sides of a respective pivotal connection.

10. A bed according to claim 9, characterized in that said case is provided with disengageable zipper means along the major portion of the circumference thereof to close the case when the folded bed is stored therein.

11. A bed according to claim 10, characterized in that the case is provided with slots through which may extend cords or the like serving as carrying handles which are suitably secured in apertures of the frame members.

12. A bed according to claim 11, characterized by leg means detachably secured to the frame members and serving as spacers for the bed in the folded condition.

13. A foldable bed adapted to be assembled from standard structural parts, which comprises a detachable frame consisting of longitudinal and transverse sectional frame members interconnected at the four corners by plate structures to form two frame sections adapted to pivot relative to each other, pivotal connecting means connecting the two frame sections of the frame structure to enable pivotal movement, the standard structural parts inclusive longitudinal and transverse sectional frame members being provided with regularly spaced apertures, fabric means forming a bed surface which is provided with spaced apertures along all the edges thereof, and spring means engaging in mutually opposite apertures of the structural parts and of the fabric means for tautly suspending the bed surface along all sides thereof on said frame, handle attachment means operable to engage in some of said apertures near the four corners thereof to attach handles for converting the bed into a stretcher case, and leg means detachably secured to the frame members and serving as spacers for the bed in the folded condition.

14. A foldable bed according to claim 13, characterized in that the bed in the folded condition forms a carrying case providing a large storage space sufficient to carry all parts for two beds.

15. A light-weight, portable foldable bed adapted to be assembled from standard structural parts, characterized by a substantially rectangular detachable frame structure consisting of longitudinal and transverse sectional frame members of substantially identical cross sectional profile interconnected at the four corners by identical plate structures to form two frame sections, each including one transverse frame member and two longitudinal frame members, and adapted to pivot relative to each other, pivotal connecting means connecting the two frame sections of the frame structure at the free ends of the longitudinal members to enable pivotal movement about an axis parallel to a transverse frame member, the standard structural parts of the frame being provided with regularly spaced apertures along the longitudinal and transverse frame members, fabric means forming a bed surface which is provided with spaced apertures along the edges thereof, and spring means engaging in mutually opposite apertures of the structural parts and of the fabric means for tautly suspending the bed on the longitudinal and transverse frame members of said frame part so that the entire weight of a human person directly resting on said fabric means is supported at said structural parts by way of said spring means, reinforcing frame means extending substantially in the direction of the pivot axis across a respective frame section near the area of the pivotal connection thereof to prevent buckling of the frame structure within that area under the spring forces, and bracing means formed of substantially flat similarly apertured standard structural parts for holding the bed in the unfolded condition by interconnecting the frame members on both sides of a respective pivotal connection.

16. A light-weight, portable foldable bed adapted to be assembled from standard structural parts, characterized by a substantially rectangular detachable frame structure consisting of longitudinal and transverse sectional frame members of substantially identical cross sectional profile interconnected at the four corners by identical plate structures to form two frame sections, each including one transverse frame member and two longitudinal frame members, and adapted to pivot relative to each other, pivotal connecting means connecting the two frame sections of the frame structure at the free ends of the longitudinal members to enable pivotal movement about an axis parallel to a transverse frame member, the standard structural parts of the frame being provided with regularly spaced apertures along the longitudinal and transverse frame members, unitary fabric means forming a bed surface which is provided with spaced apertures along the edges thereof, and
spring means engaging in mutually opposite apertures of the structural parts and of the fabric means for tautly suspending the bed surface on the longitudinal and transverse frame members of said frame part so that the entire weight of a human person directly resting on said fabric means is supported at said structural parts by way of said spring means, reinforcing frame means extending substantially in the direction of the pivot axis across a respective frame section near the area of the pivotal connection thereof to prevent buckling of the frame structure within that area under the spring forces, and the structural parts of the frame being detachable connected to each other.

17. A lightweight, portable foldable bed adapted to be assembled from standard structural parts, characterized by a substantially rectangular detachable frame structure consisting of longitudinal and transverse sectional frame members of substantially identical cross sectional profile interconnected at the four corners by identical plate structures to form two frame sections, each including one transverse frame member and two longitudinal frame members, and adapted to pivot relative to each other, pivotal connecting means connecting the two frame sections of the frame structure at the free ends of the longitudinal members to enable pivotal movement about an axis parallel to a transverse frame member, the standard structural parts of the frame being provided with regularly spaced apertures along the longitudinal and transverse frame members, unitary fabric means forming a bed surface which is provided with spaced apertures along the edges thereof, and spring means engaging in mutually opposite apertures of the structural parts and of the fabric means for tautly suspending the bed surface on the longitudinal and transverse frame members of said frame part so that the entire weight of a human person directly resting on said fabric means is supported at said structural parts by way of said spring means, the standard structural parts of the frame being detachably connected to each other by two-partite connecting means each essentially consisting of a plug member with a head portion and an annular groove in its shank portion and a locking member having an apertured base body portion adapted to engage in said groove and a bent-back part adapted to engage frictionally with the head portion.

18. A lightweight, portable foldable bed adapted to be assembled from standard structural parts, characterized by a substantially rectangular detachable frame structure consisting of longitudinal and transverse sectional frame members of substantially identical cross sectional profile interconnected at the four corners by identical plate structures to form two frame sections, each including one transverse frame member and two longitudinal frame members, and adapted to pivot relative to each other, pivotal connecting means connecting the two frame sections of the frame structure at the free ends of the longitudinal members to enable pivotal movement about an axis parallel to a transverse frame member, the standard structural parts of the frame being provided with regularly spaced apertures along the longitudinal and transverse frame members, unitary fabric means forming a bed surface which is provided with spaced apertures along the edges thereof, and spring means engaging in mutually opposite apertures of the structural parts and of the fabric means for tautly suspending the bed surface on the longitudinal and transverse frame members of said frame part so that the entire weight of a human person directly resting on said fabric means is supported at said structural parts by way of said spring means, and a mattress cover adapted to cover the top of the bed when in the unfolded condition, which constitutes simultaneously a case enclosing the bed when in the folded condition, with the two frame sections folded one over the other.