A backpack frame system having a slotted frame configured to be detachably and interchangeably connected with a backpack is provided. The frame can include a plurality of generally uniformly spaced-apart slats extending between at least two upright members or cross members. Slots are defined between the slats, which are adapted for connection with an attachment system such that one or more objects or cargo may be hung from or otherwise secured to the frame. A looping system is provided for connecting the frame to the backpack. The backpack may be provided with a looping system comprising first and second sets of loops that can be interconnected by a connector and encircle a portion of the frame, such as an upright member, thereby connecting the frame to the backpack.
BACKPACK FRAME SYSTEM WITH SLOTTED FRAME

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from U.S. Provisional Patent Application Ser. No. 61/794,001, filed on Mar. 15, 2013, to Kent Saucedo et al. entitled “Slotted Backpack Frame,” currently pending, the entire disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Backpacks and backpack frame systems have been used for many years to carry a given load of contents on the back of a user. One example of such a frame system is Mystery Ranch, Ltd.’s NICE® frame system provided in U.S. Pat. No. 7,673,777 to Gleason (hereinafter the “777 Gleason patent”). Such frame systems may include a frame comprised of semi-rigid stays housed within sleeves that are fixedly attached to a backpack, as disclosed in the ’777 Gleason patent.

Users often desire to attach a wide variety of cargo of various shapes, sizes and weights to the frame systems, including bags, packs, tactical radios, weaponry systems, holsters, ammunition cans, magazine pouches, canisters, camping gear, hydration systems, medical tools, utility pouches, and the like. The optimal degree of rigidity provided by the frame may vary depending upon the weight of the cargo attached thereto. For example, when a heavier load is carried, a stiffer frame is generally required to support the weight of the load. However, with lighter loads, a more flexible frame may provide greater comfort. Currently known frame systems do not provide such adaptability nor are they configured for interchangeability between one or more backpacks. Additionally, such known frame systems are not generally suitable for retrofitting an existing backpack for use with modular military equipment.

As such, a need exists for a frame system that can accommodate a wide variety of cargo attached thereto. A need also exists for a frame system that can provide rigidity of varying degrees. Additionally, a need exists for a frame system having a frame that is readily replaceable or interchangeable such that the frame system can be adapted for use in a variety of applications. Finally, a need exists for a frame system that is compatible with modular military equipment and can be implemented to retrofit existing backpacks.

SUMMARY OF THE INVENTION

One embodiment of the present invention is directed to a backpack frame system comprising a slotted frame that may be detachably and interchangeably connected with a backpack. The frame can include left and right upright members, a plurality of vertically-spaced slots extending between the left and right upright members, and a plurality of slots defined between the slots. The slots may be adapted for having an attachment system connected thereto and the slots may be adapted for receiving at least a portion of the attachment system therethrough. The slots and slots may be uniformly spaced and may each be approximately one inch in width thereby rendering the frame compatible for use with Modular Lightweight Load-carrying Equipment (MOLLE) attachment systems. In one embodiment, the frame may optionally include multiple frame sheets that can be selectively combined with one another to provide a desired frame stiffness.

The present invention is further directed to a looping system for securing the frame to the backpack. In one embodiment, the looping system comprises a first set of inner loops, a second set of outer loops and a connector adapted for being passed through at least some of the inner and outer loops. The looping system is configured for securing at least one of the frame’s upright members, cross members, slats or other structure to the backpack. The inner loops may each be positioned for being aligned with and passing through a respective slot of the frame. Correspondingly, the outer loops may each be positioned for being aligned with a respective slot and passing over an outer edge of the frame. The inner loops can have a width approximately equal to a width of the frame’s slots and the outer loops can have a width approximately equal to a width of the frame’s slats.

When the connector, which may be in the form of a strap, is alternately passed through corresponding inner and outer loops, the loops generally encircle at least a portion of the frame, such as one of the frame’s upright members, thereby securing the frame to the backpack. In this manner, eyelets or apertures of the inner and outer loops can become at least partially aligned with one another when the connector is passed therethrough. The backpack may optionally include a collar defining a pocket for receiving at least a portion of the frame in order to further secure the frame to the backpack.

A gap may be defined between a rearwardly facing surface of a backpack membrane and a forwardly facing surface of the frame, the gap being adapted for optionally receiving a sling therein. The sling, which may extend from a pack bag or other suitable object, can comprise an attachment device at a distal end thereof that is adapted for attachment to a frame slot for connecting the sling to the frame.

Other aspects and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments and the accompanying drawings.

DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

In the accompanying drawings, which form a part of the specification and are to be read in conjunction therewith in which like reference numerals are used to indicate like or similar parts in the various views:

FIG. 1 is a rear plan view of a frame constructed according to one embodiment of the present invention;
FIG. 2 is a rear perspective view of the frame of FIG. 1;
FIG. 3 is a rear perspective view of a backpack constructed according to one embodiment of the present invention, the backpack being illustrated without a frame connected thereto;
FIG. 4 is a rear perspective view of a backpack frame system constructed according to one embodiment of the present invention illustrating a connector being passed through a portion of the system’s loops;
FIG. 5 is a rear perspective view of the backpack frame system of FIG. 3 illustrating the frame fully installed on the backpack; and
FIG. 6 is a rear perspective view of the backpack frame system having a sling constructed according to one embodiment of the present invention illustrating the sling connected to the frame.
DETAILED DESCRIPTION OF THE INVENTION

[0017] The invention will now be described with reference to the drawing figures, in which like reference numerals refer to like parts throughout. For purposes of clarity in illustrating the characteristics of the present invention, proportional relationships of the elements have not necessarily been maintained in the drawing figures.

[0018] The following detailed description of the invention references specific embodiments in which the invention can be practiced. The embodiments are intended to describe aspects of the invention in sufficient detail to enable those skilled in the art to practice the invention. Other embodiments can be utilized and changes can be made without departing from the scope of the present invention. The present invention is defined by the appended claims and the description is, therefore, not to be taken in a limiting sense and shall not limit the scope of equivalents to which such claims are entitled.

[0019] The present invention is directed generally to a backpack frame system comprising a harness or backpack 12 and a frame 14. As discussed in greater detail below, the frame 14 may be configured for having objects, equipment or cargo hung thereon or otherwise attached, mounted or connected thereto. The backpack 12 may be somewhat similar in nature to that disclosed in the ‘777 Gleason patent and may include one or more shoulder straps 16 and, optionally, a hip belt 18. It will be appreciated that the backpack 12 may or may not include a base frame as disclosed in the ‘777 Gleason patent and that such a base frame may be replaced by, or supplemented with, the frame 14 of the present invention. While the frame 14 of the present invention may be replacably or interchangeably connected to the backpack 12, as described herein, it will be understood that the frame 14 may alternatively be permanently or semi-permanently secured to the backpack 12.

[0020] In one embodiment, the frame 14 comprises left and right upright members 20 and 22 having spaced-apart crossbars or slots 24 extending therebetween. The frame 14 may further include upper and lower cross members 26 and 28 extending between the left and right upright members 20 and 22 as well. As illustrated in FIG. 1, the left and right upright members 20 and 22 define outer side edges 30 and 32 of the frame 14. However, it will be appreciated that one or more of the slots 24, cross members 26 and 28 or other protrusions may extend beyond the side edges 30 and 32.

[0021] As shown, openings or slots 34 are defined between the frame’s slots 24. It will be appreciated that, while the slots 24 and slots 34 are shown extending generally horizontally between the left and right upright members 20 and 22, the slots 24 and slots 34 may alternatively extend generally vertically between the upper and lower cross members 26 and 28 or in any other desired direction or angle. The frame 14 may further include slots 24 and slots 26 extending in more than one direction.

[0022] In one embodiment, the frame 14 is connected to a backpack 12 such that the slots 24 and slots 34 are generally accessible or may be at least partially uncovered in order to gain access thereto. The slots 34 can be adapted for receiving at least a portion of an attachment system or device therethrough and the slots 24 may be adapted for having the attachment system or device hung thereon or otherwise attached or connected thereto. Such attachment systems and devices may include, but are not limited to, hooks, buckles, clamps, hang- ers, clips, tabs, snaps, anchors, clasps, loops, carabiners, rings, connectors, hook and loop fasteners, straps, belts, cables, ties or any other attachment, mounting or fastening systems or devices now known or hereafter developed that are suitable for removably, interchangeably, permanently or semi-permanently hanging or otherwise connecting or attaching objects, equipment or cargo to the frame 14. Such objects, equipment or cargo may include, but are not limited to bags, packs, tactical radios, weaponry systems, holsters, ammuni- tion cans, magazine pouches, mortar base plates, canisters, camping gear, hydration systems, medical tools, utility pouches, and the like.

[0023] The slots 24 and slots 34 may be of any suitable shape and dimension and, in one instance, may have approximately equal widths. In one embodiment, at least a portion of the slots 24 have a width W1 of approximately one inch and at least a portion of the slots 34 also have a width W1 of approximately one inch, which can render the frame 14 compatible for use with Modular Lightweight Load-carrying Equipment (MOLLE) attachment systems for military equipment. The frame 14 may also be configured for compatibility with Pouch Attachment Ladder System (PALS) attachment systems as well. This allows virtually any modular military equipment to be attached to the frame 14. It will be understood that the frame 14 can be attached to an existing system or backpack in order to retrofit the system or backpack and render it MOLLE-compatible or PALS-compatible.

[0024] The frame 14 may be constructed of fiberglass, carbon fiber, composite materials, Kevlar®, polymers, plastics, fiber-reinforced polymers or plastics, metallic materials, combinations thereof or any other suitable material now known or hereafter developed. Depending upon the type of material used to construct the frame 14, the frame 14 may be formed through a number of manufacturing processes including water jet cutting, injection molding, thermoforming, machining, laser cutting, lamination or combinations thereof or any other suitable processes now known or hereafter developed. The frame 14 may comprise a sleeve (not shown) in which one or more of the upright members 20 and 22, slots 24 or cross members 26 and 28 may be housed.

[0025] The strength, stiffness and flexibility of the frame 14 may be controlled by a variety of design factors including the type of material(s) used to construct the frame 14, the thickness of the frame 14, width of the slots 24 and slots 34, along with other various factors that will be appreciated by those of skill in the art. As discussed in more detail below, the frame 14 may be replaceable or interchangeable and a plurality of frames 14 of various designs may be compatible for use with a single backpack 12 design. As such, frames 14 can be swapped with one another in order to adapt a frame system for carrying the cargo necessary for the mission at hand.

[0026] In one embodiment, the frame 14 may be constructed of a plurality of sheets of material that may or may not be laminated together. In cases where the sheets are not laminated together, individual sheets may be stacked together to form a resulting frame 14. In other words, multiple frame sheets may be selectively combined and attached to the backpack in order to provide the desired strength and stiffness. In cases where a heavier load is carried, a stiffer frame 14 is generally desired to support the weight of the load and, therefore, more frame sheets can be added. In cases where a lighter load is carried, a more flexible frame 14 may provide greater comfort and, therefore, not as many frame sheets may be used.

[0027] It will be appreciated that the frame 14 of the present invention may be adapted for attachment to a variety of struc-
tures including, but not limited to, backpacks 12, vehicles, aircraft, marine vessels or any other suitable desired structures.

[0028] The frame 14 can be replacably, interchangeably, permanently or semi-permanently secured to the backpack 12 by any suitable attachment or connection means. In one embodiment, as illustrated in FIG. 4-6, the frame 14 can be attached to the backpack 12 with a facing or looping system 36 comprising at least one first set 38 of loops 40, at least one second set 42 of loops 44 and at least one connector 46 adapted for being passed through at least a portion of the loops 40 and 44.

[0029] The loops 40 and 44 may be affixed to the backpack 12 and may be constructed of nylon, polyester or polypropylene strap material, webbed fabric, rope, wire rope, leather or any other suitable material now known or hereafter developed. The looping system 36 can be configured for securing any one or more of the frame’s left upright member 20, right upright member 22, slats 24, upper cross member 26 or lower cross member 28 to the backpack 12.

[0030] In the embodiment illustrated, loops 40 are in the form of “inner” loops in that they pass through an interior of the frame 14 and loops 44 are in the form of “outer” loops in that they pass over an outer edge 30 or 32 of the frame 14. In other words, loops 40 may each be positioned for being aligned with and passing through a respective slot 34 of the frame 14. Correspondingly, loops 44 may each be positioned for being aligned with a respective slot 24 and passing over an outer edge 30 or 32 of the frame 14. The inner loops 40 may have a width $W_i$ that is less than, approximately equal to or greater than the width $W_o$ of the frame’s slots 34 and the outer loops 44 may have a width $W_o$ that is less than, approximately equal to or greater than the width $W_o$ of the frame’s slots 24. In one embodiment, at least a portion of the inner loops 40 have a width $W_i$ of one inch and at least a portion of the outer loops 44 also have a width $W_o$ of approximately one inch. The inner loops 40 may have spaces 48 defined therebetween of a width $W_s$ approximately equal to the width $W_o$ of the outer loops 44. Similarly, the outer loops 44 may have spaces 50 defined therebetween of a width $W_o$ approximately equal to the width $W_i$ of the inner loops 40.

[0031] As best demonstrated in FIG. 4, the connector 46 may be threaded through the inner and outer loops 40 and 44 in alternating fashion in order to secure the frame 14 to the backpack 12. The loops 40 and 44 can include apertures or eyelets 52 and 54, respectively, that become at least partially aligned when the connector 46 is passed therethrough. However, it will be understood that this need not be the case and that the connector 46 may zigzag back and forth between the inner loops 40 and outer loops 44. The connector 46 may be a strap (as shown in the figures), rod, cable, bar or other suitable device that may be threaded through the eyelets 52 and 54 of the loops 40 and 44. As shown, when the frame 14 is connected to the backpack 12, the inner loops 40 and outer loops 44 each at least partially overlie a respective frame upright member 20 or 22. In that manner, the inner loops 40 and outer loops 44 may, in combination, generally encircle or surround at least a portion of a respective frame upright member 20 or 22 when the connector 46 is passed through the loops 40 and 44 in order to secure the frame 14 to the backpack 12. The connectors 46 may each be generally longitudinally aligned with the frame upright members 20 and 22.

[0032] While the figures illustrate the loops 40 and 44 arranged in generally vertical orientation along left and right sides of the backpack 12, it will be appreciated that the loops 40 and 44 may be arranged in other manners. For example, in one embodiment, the loops 40 and 44 are arranged in a generally horizontal orientation so that the loops 40 and 44 are adapted for encompassing and securing one or more of the frame's slats 24, cross members 26 and 28 or other structure to the backpack 12.

[0033] The looping system 36 can act as a shock absorber to reduce the impact of forces transmitted between the attached cargo and the wearer. It will be appreciated that with the present invention, the frame 14 can be selectively attached to or removed from the backpack 12 in a relatively short period of time.

[0034] As illustrated, an upper end of the frame 14 may be inserted and received within a pocket 56 defined by a collar 58, as best shown in FIG. 3, located at an upper end of the backpack 12. The insertion of at least a portion of the frame 14 within such a pocket 56 further secures the frame 14 to the backpack. In fact, it will be appreciated that a pocket system, comprising for example, upper and lower pockets and/or left and right pockets may be implemented in substitution of the looping system 36.

[0035] It will further be appreciated that other means and methods for attaching the frame 14 to the backpack 12 may be utilized in addition to, or in substitute of, the looping system 36. For example, the frame 14 may be attached to the backpack 12 with rivets, screws, anchors, pins, clamps, other suitable fasteners, straps, sleeves (similar in nature to those disclosed in the ‘777 Gleason patent) or any other suitable attachment means, methods or systems now known or hereafter developed.

[0036] In the embodiment shown, the backpack 12 includes a membrane 60 secured thereto. When the frame 14 is attached to the backpack 12, a gap 62 may be defined between a rearwardly facing surface of the membrane 60 and a forwardly facing surface of the frame 14. Accordingly, the gap 62 is defined between one or more of the frame’s slats 24 and the membrane 60. The gap 60 may receive at least a portion of a strap 64 or other object therein. The sling 64 may be similar in nature to the sling disclosed and denoted as numeral 156 in U.S. Pat. No. 8,348,114 to Gleason (the “Gleason ‘114 patent”). The sling 64 can include an attachment device 66 extending from its distal end 68. The attachment device, as shown in FIG. 6, may include a flap 70 that can be folded back and attached to the sling 64 via a fastener (not shown), such as and including, but not limited to, a hook and loop fastener. The flap 70 may be wrapped around one slot 24 and folded under a second, lower slot 24 as shown. In that manner, the sling’s attachment device 66 can be connected to at least one of the frame’s slats 24. Alternatively, like the sling disclosed in Gleason ‘114 patent, the attachment device 66 of the present invention may include a strap (not shown), at least one buckle (not shown), or other suitable attachment system or device, as discussed above, attached thereto. An opposite end (not shown) of the sling 64 may be attached to an end from a bag, as taught by the Gleason ‘114 patent, another object or cargo, or may be doubled over and connected to an upper end of the frame 14 or backpack 12.

[0037] From the foregoing, it will be seen that this invention is one well adapted to attain all the ends and objects
hereinabove set forth together with other advantages which are obvious and which are inherent to the structure. It will be understood that certain features and sub combinations are of utility and may be employed without reference to other features and sub combinations. This is contemplated by and is within the scope of the claims. Since many possible embodiments of the invention may be made without departing from the scope thereof, it is also to be understood that all matters herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not limiting.

The constructions described above and illustrated in the drawings are presented by way of example only and are not intended to limit the concepts and principles of the present invention. Thus, there has been shown and described several embodiments of a novel invention. As is evident from the foregoing description, certain aspects of the present invention are not limited by the particular details of the examples illustrated herein, and it is therefore contemplated that other modifications and applications, or equivalents thereof, will occur to those skilled in the art. The terms “having” and “including” and similar terms as used in the foregoing specification are used in the sense of “optional” or “may include” and not as “required”. Many changes, modifications, variations and other uses and applications of the present construction will, however, become apparent to those skilled in the art after considering the specification and the accompanying drawings. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

What is claimed is:

1. A backpack frame system, said backpack frame system comprising:
   a frame including at least one of a generally upright member and a cross member; and
   a backpack having at least one shoulder strap and a looping system for securing at least one of said frame upright member and said frame cross member to said backpack, said looping system including:
   a first set of loops;
   a second set of loops; and
   a connector adapted for being passed through at least some of the loops of said first set of loops and at least some of the loops of said second set of loops.

2. The backpack frame system of claim 1, wherein said frame includes:
   a left upright member;
   a right upright member;
   a plurality of slots extending between said left and right upright members; and
   a plurality of slots defined between said slots.

3. The backpack frame system of claim 2, wherein at least some of the loops of said first set of loops are each positioned for passing through a respective said slot of said frame.

4. The backpack frame system of claim 2, wherein at least some of the loops of said second set of loops are positioned for passing over an outer edge of said frame.

5. The backpack frame system of claim 2, wherein at least some of the loops of said first set of loops are each aligned with a respective said slot of said frame and wherein at least some of the loops of said second set of loops are each aligned with a respective said slot of said frame.

6. The backpack frame system of claim 2, wherein at least some of the loops of said first set of loops have a width approximately equal to a width of at least some of said slots and wherein at least some of the loops of said second set of loops have a width approximately equal to a width of at least some of said slots.

7. The backpack frame system of claim 6, wherein the widths of said slots, said slats, said loops of said first set of loops and said loops of said second set of loops are each approximately 1 inch.

8. The backpack frame system of claim 1, wherein at least some of the loops of said first set of loops in combination with at least some of the loops of said first set of loops generally encircle at least a portion of at least one of said frame upright member and said frame cross member when said connector is passed through said loops.

9. The backpack frame system of claim 1, wherein apertures of at least some of the loops of said first set of loops are at least partially aligned with apertures of at least some of the loops of said second set of loops when said connector is passed through said loops.

10. The backpack frame system of claim 1, wherein at least some of the loops of said first set of loops and at least some of the loops of said second set of loops at least partially overlie one of said frame upright member and said frame cross member when said connector is passed through said loops.

11. The backpack frame system of claim 1, wherein said connector passes alternatingly through the loops of said first set of loops and the loops of said second set of loops.

12. The backpack frame system of claim 1, wherein said connector is a strap.

13. The backpack frame system of claim 1, wherein said backpack further includes a collar defining a pocket and wherein said frame is at least partially received in said pocket.

14. The backpack frame system of claim 1, wherein said backpack further includes a membrane and wherein a gap is defined between a rearwardly facing surface of said membrane and a forwardly facing surface of said frame.

15. The backpack frame system of claim 14, wherein said gap is defined between said membrane and at least one of said frame slats.

16. The backpack frame system of claim 14, wherein said gap is adapted for receiving a sling therein.

17. The backpack frame system of claim 14 further comprising a sling wherein at least a portion of said sling is received in said gap.

18. The backpack frame system of claim 17, wherein said sling includes an attachment device extending from a distal end of said sling, said attachment device being connected to at least one slit of said frame.

19. The backpack frame system of claim 17, wherein said sling extends from a pack bag.

20. A frame for connection with a backpack, said frame comprising:
   a left upright member;
   a right upright member;
   a plurality of slats extending between said left and right upright members; and
   a plurality of slots defined between said slots, wherein at least a portion of said slots are adapted for receiving at least a portion of an attachment system therethrough for connecting objects to said frame.

21. The frame of claim 20, wherein said slots each have a width generally equal to a width of said slats.
22. The frame of claim 20, wherein the width of said slots is approximately 1 inch and the width of said slats is approximately 1 inch.

23. The frame of claim 20, wherein said attachment system is a Modular Lightweight Load-carrying Equipment (MOLLE) attachment system.

24. The frame of claim 20, wherein said frame is adapted for being interchangeable with a second frame.

25. The frame of claim 20 further comprising multiple frame sheets, said frame sheets being selectively combined with one another to provide a desired frame stiffness.

26. A connection system for attaching a frame to a backpack, said connection system comprising:
   a first set of loops;
   a second set of loops; and
   a connector adapted for being passed through at least some of the loops of said first set of loops and at least some of the loops of said second set of loops.

* * * * *