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(54) **BACKPACK WITH SEGMENTED CONSTRUCTION BODY PROTECTING FEATURES**

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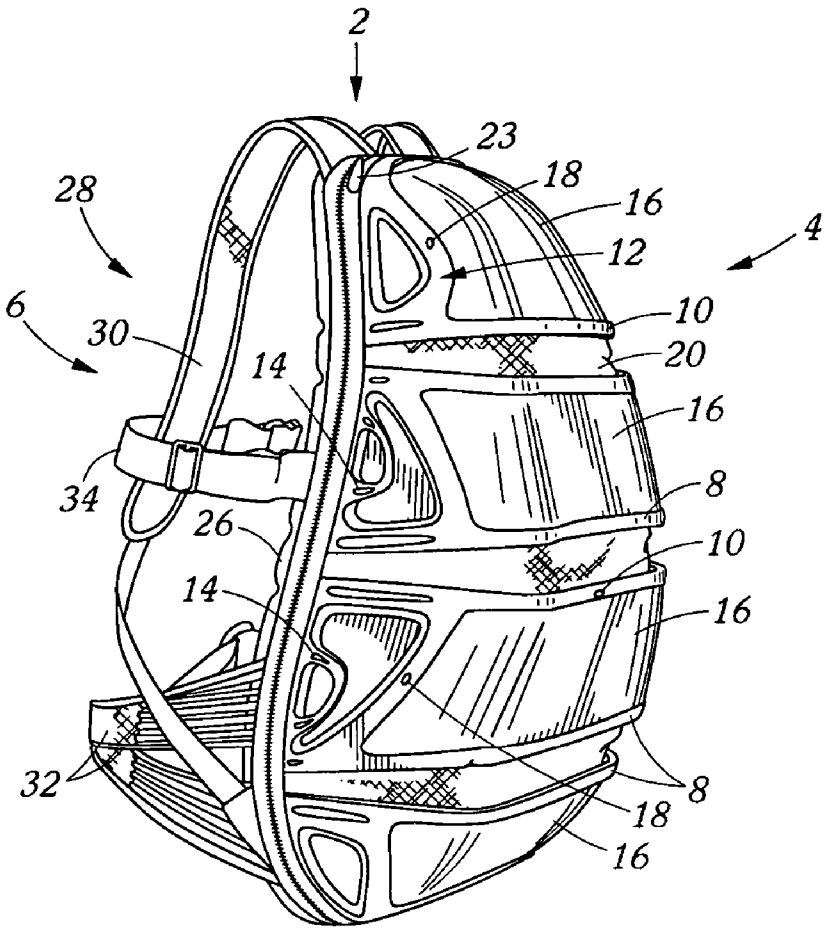
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A45F 3/10 (2006.01)

(52) **U.S. Cl.** **224/629**; 224/644

(57) **ABSTRACT**

Backpacks, even those for outdoors sports, generally comprise an envelope of relatively flaccid textile material attached to a structured back-engaging frame, board or pad. Extreme sports such as skiing, motorbike racing, snow boarding, heli-skiing and such would benefit from greater protection to the person's back, as well as to the contents of the backpack. The disclosed backpack **2** includes a segmented and shaped back board **40** which permits limited flexing in certain directions to help protect the user's back from overextension. The container or packing portion **24** of the backpack **2** has corresponding rigid segments **16** interconnected by flexible textile portions **20**. The segmented packing portion **24** and the segmented safety board **40** work together to protect both the contents of the backpack **2** and the back of the user.



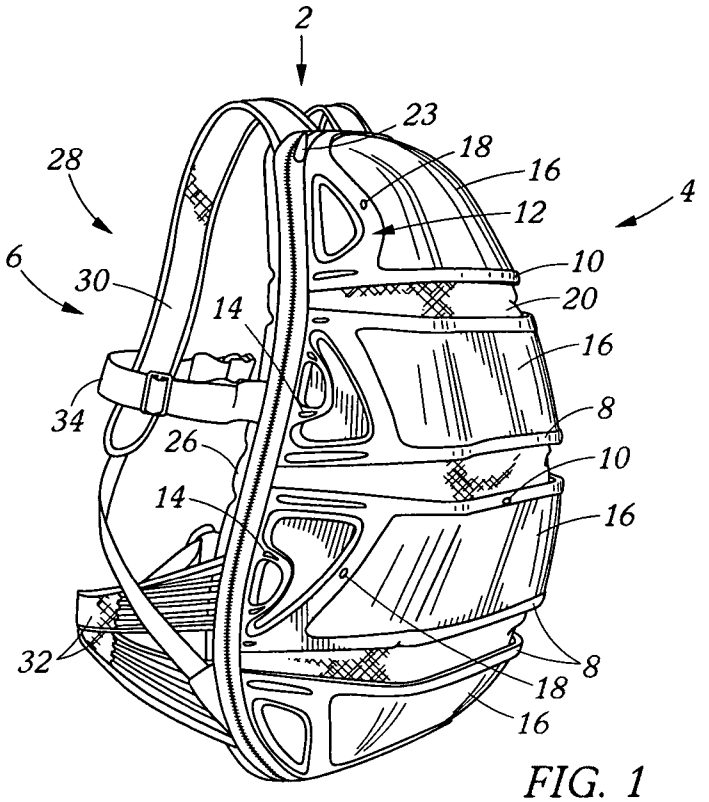

2
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18
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FIG. 1

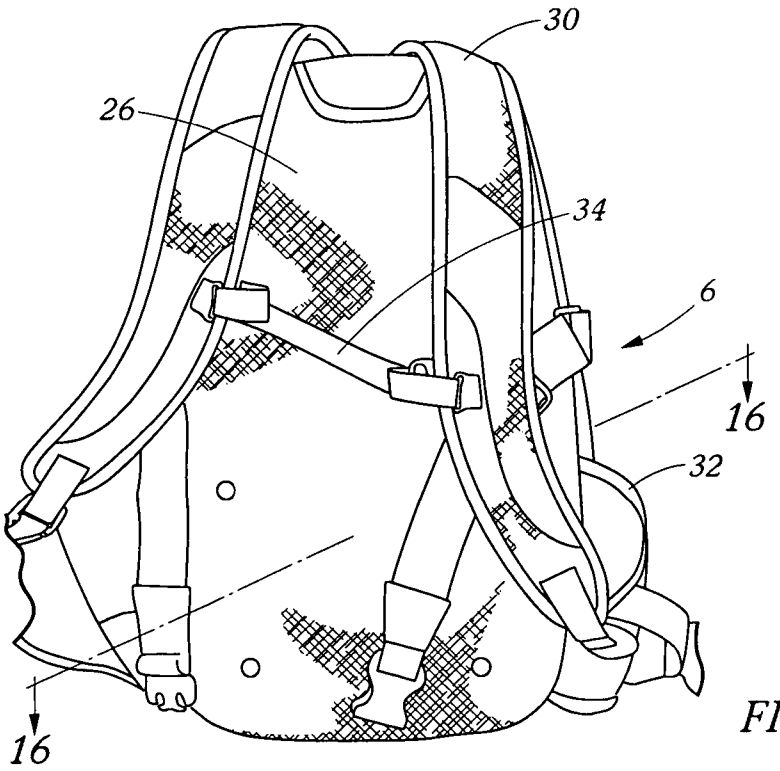

30
26
34
6
16
32
16

FIG. 2

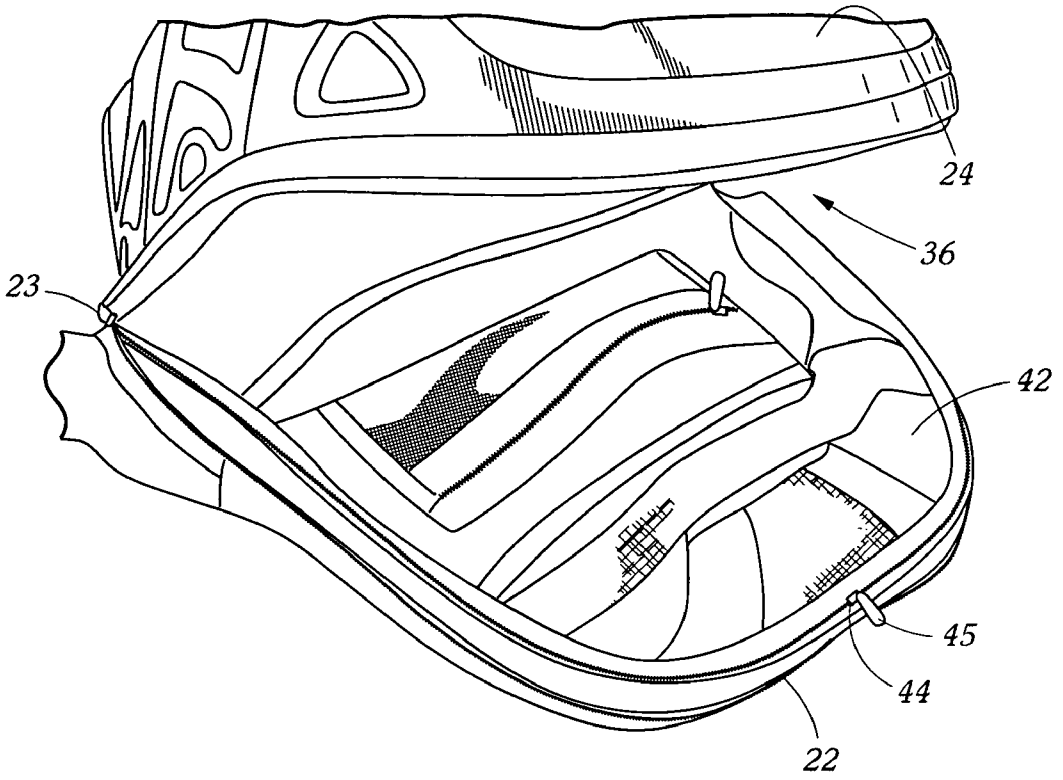


FIG. 3

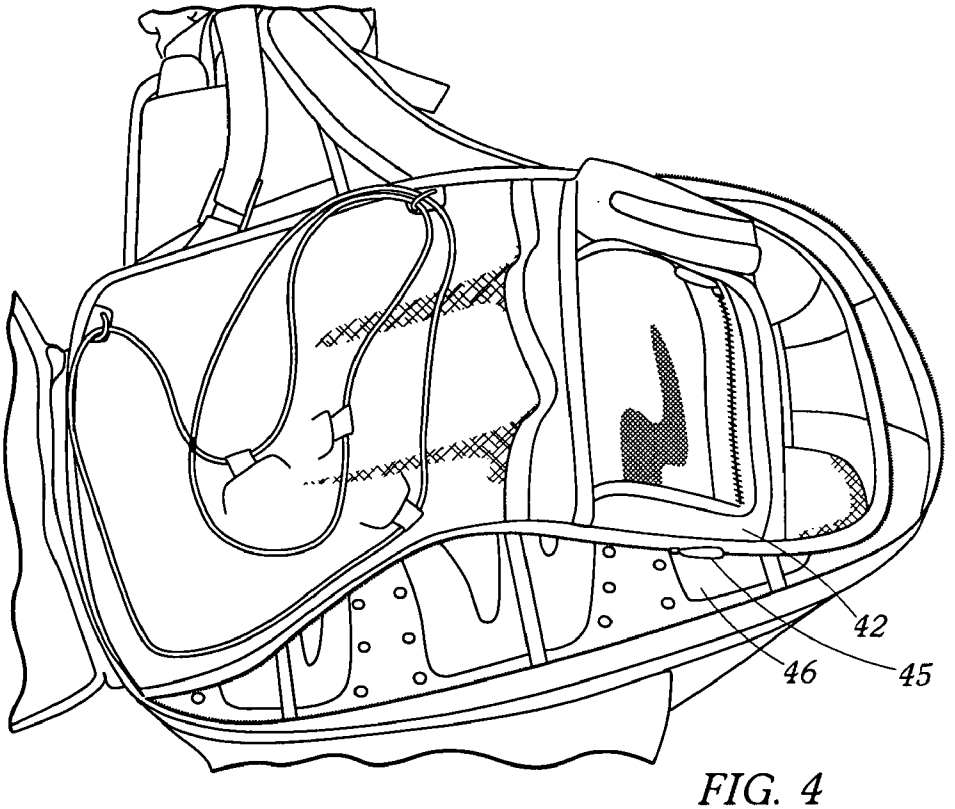


FIG. 4

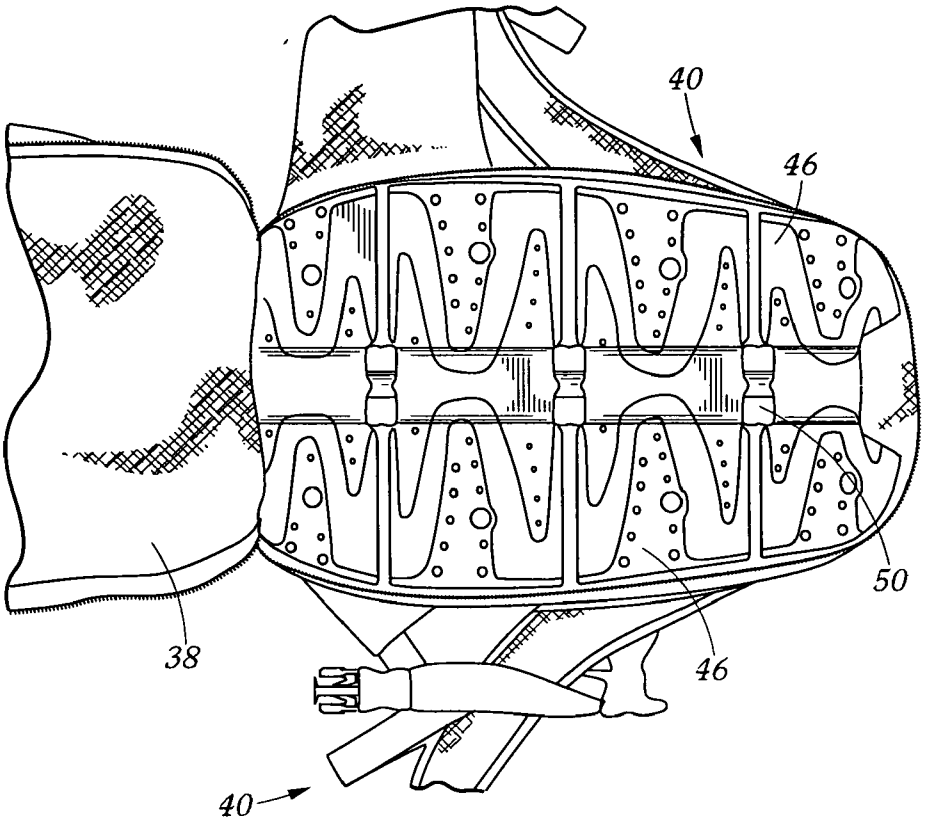


FIG. 5

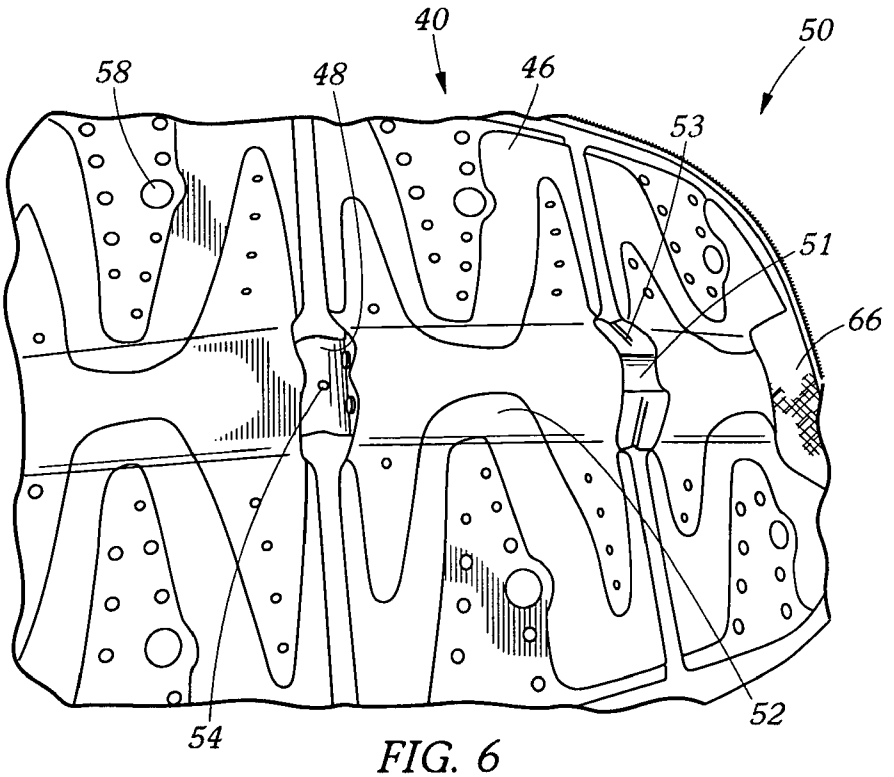


FIG. 6

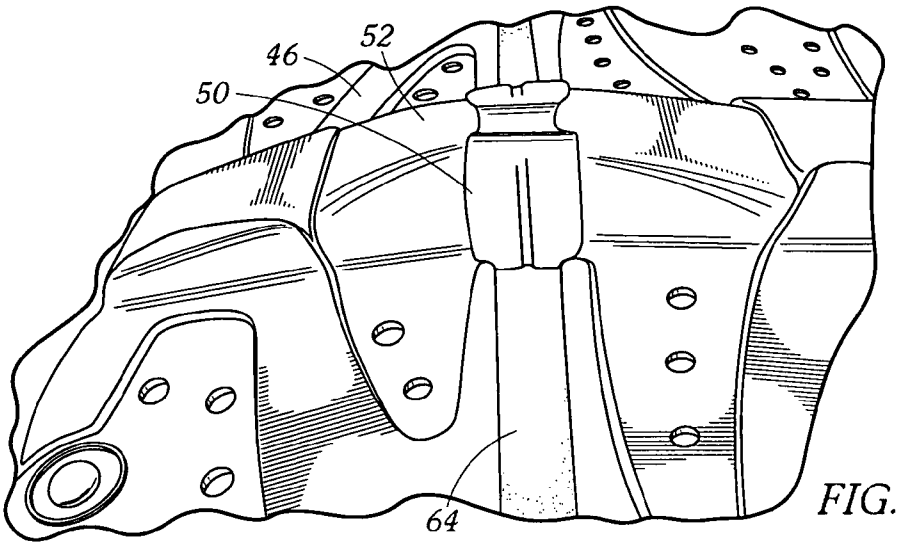


FIG. 7

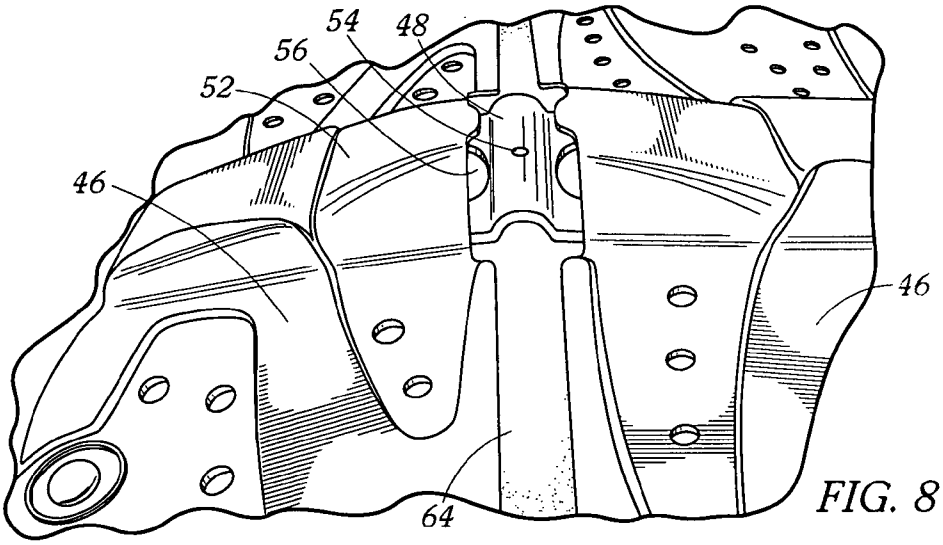


FIG. 8

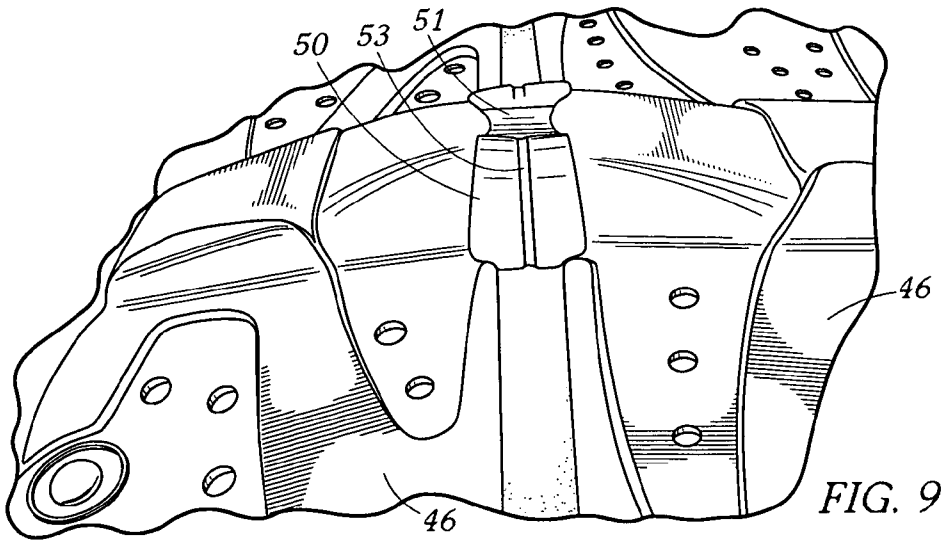


FIG. 9

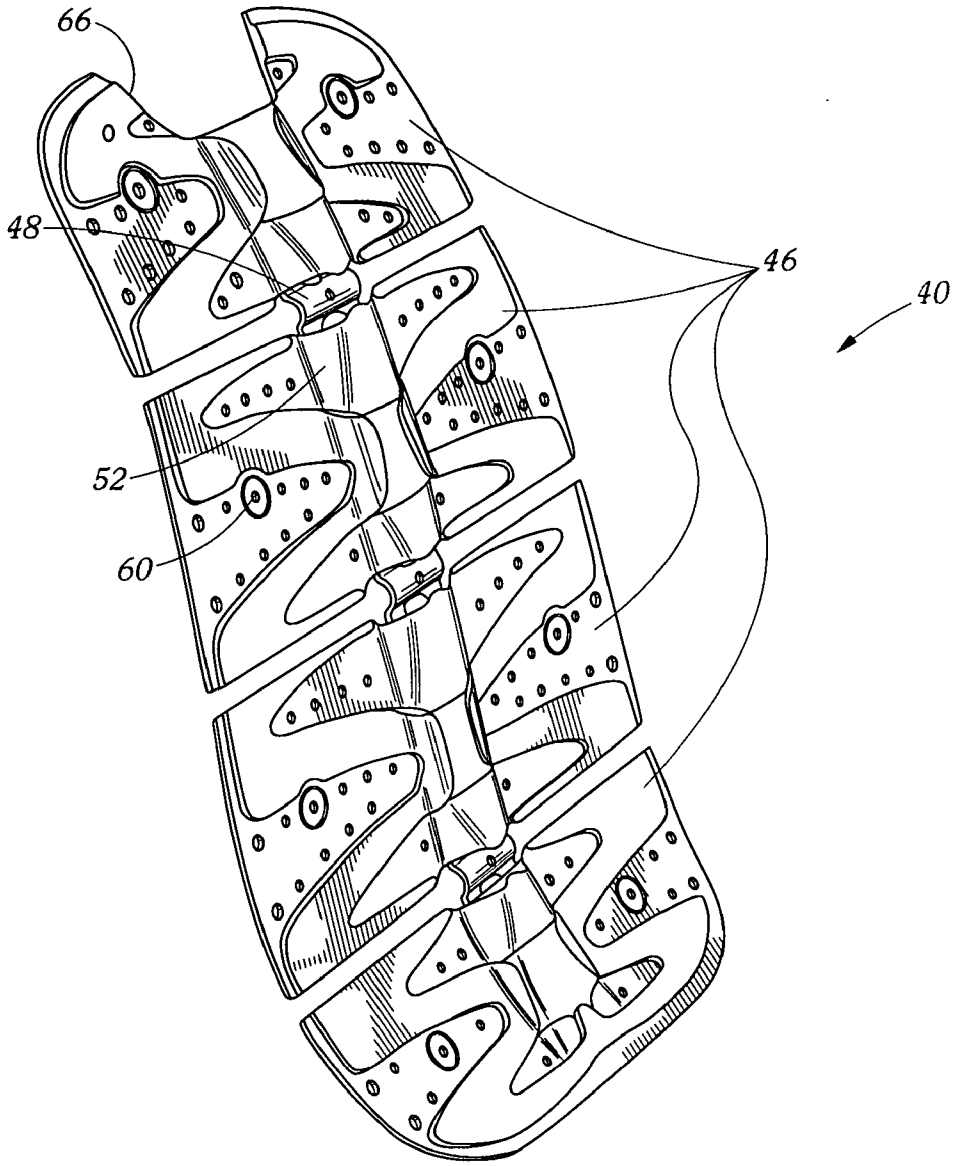


FIG. 10

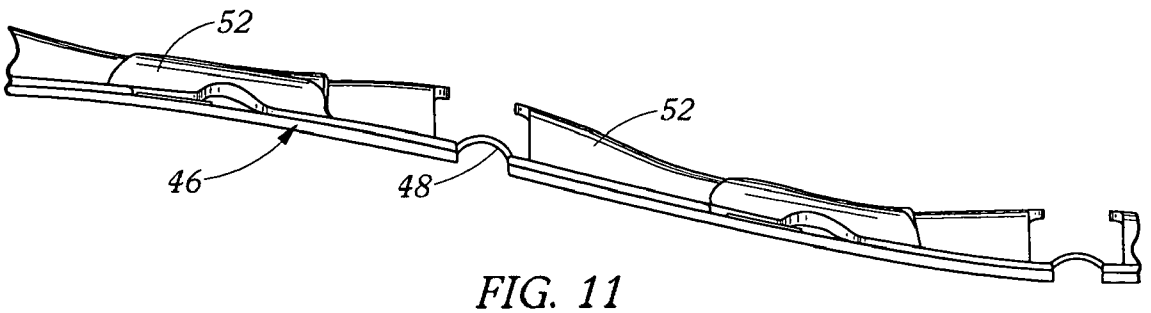


FIG. 11

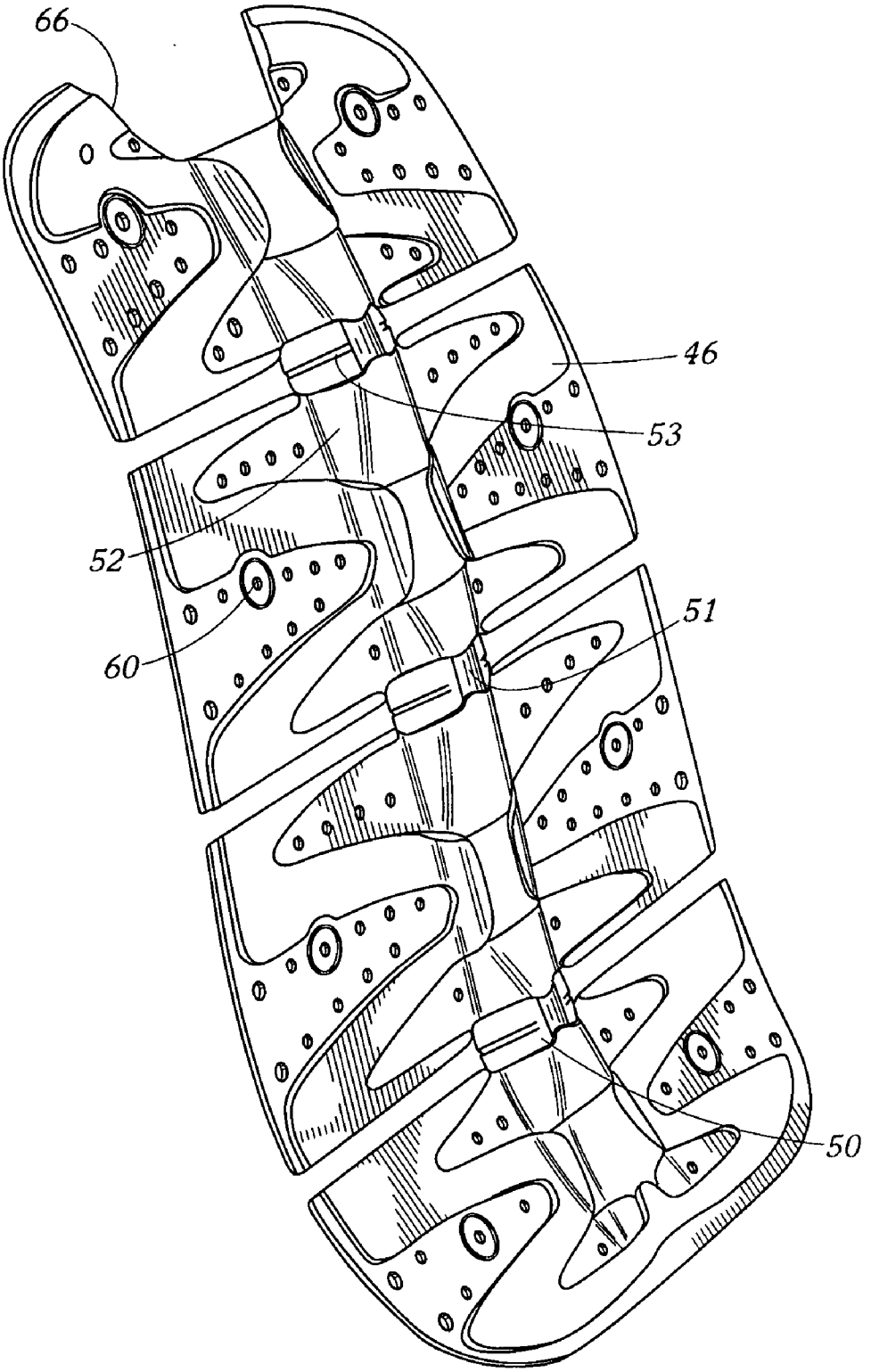


FIG. 12

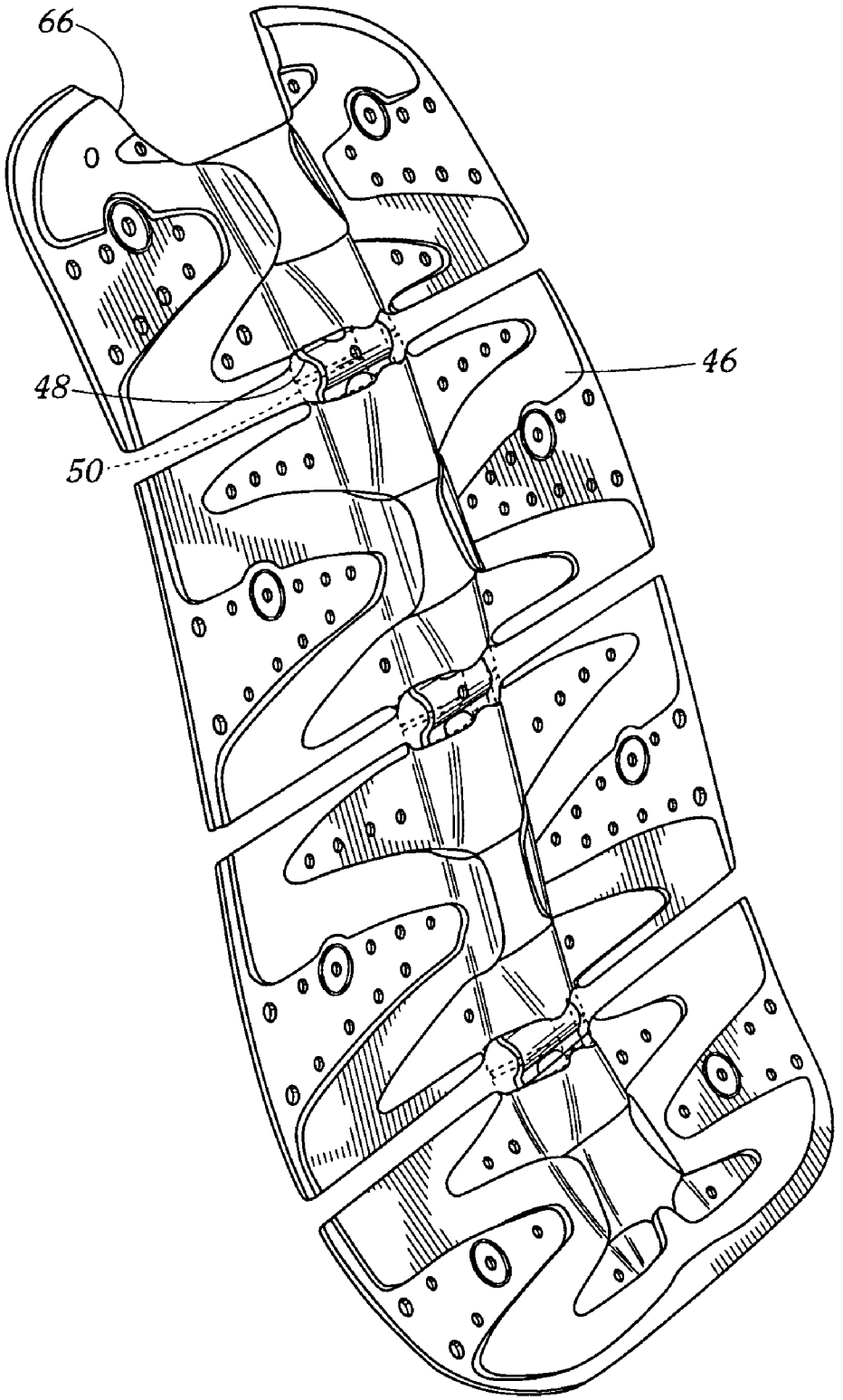


FIG. 13

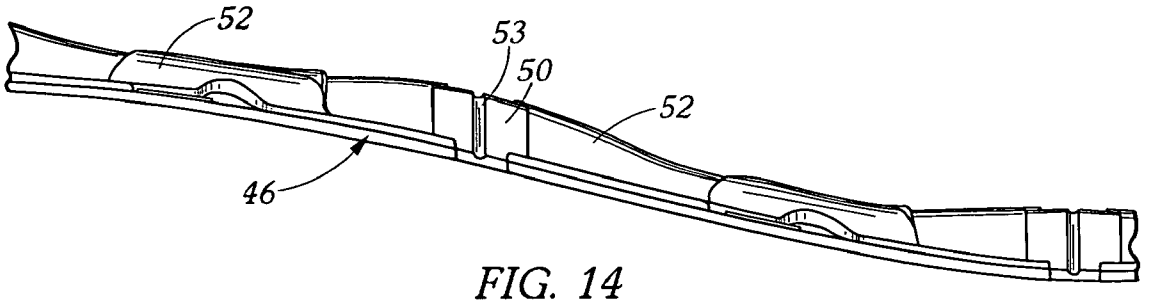


FIG. 14

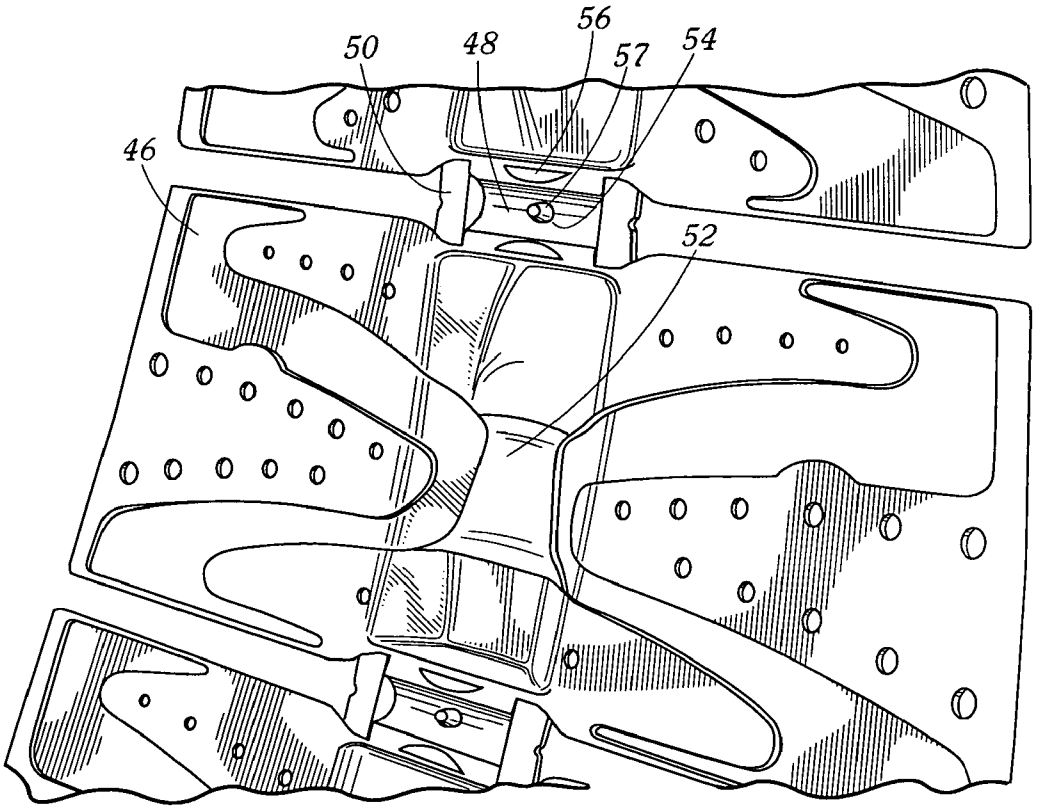


FIG. 15

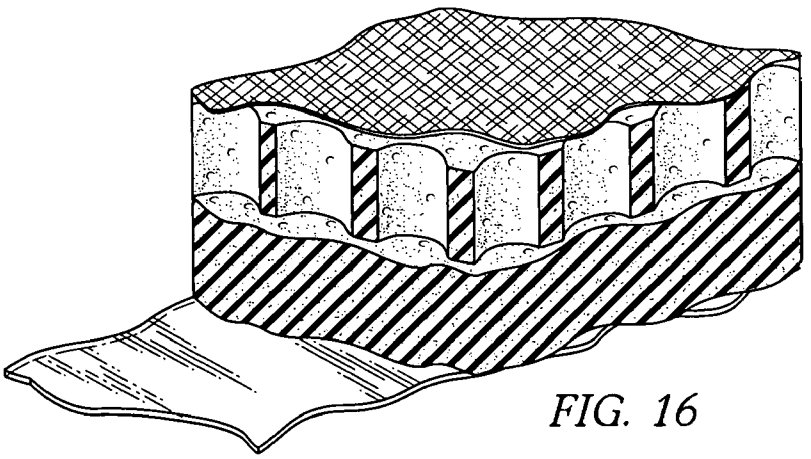


FIG. 16

BACKPACK WITH SEGMENTED CONSTRUCTION BODY PROTECTING FEATURES

[0001] This application claims the benefit of U.S. provisional patent application 60/636,224 entitled "Backpack with Segmented Construction Body Protecting Features", filed Dec. 15, 2004.

BACKGROUND

[0002] This invention relates to shoulder carried luggage cases called backpacks specifically designed for outdoor sports like skiing, snowboarding, trekking and the like. The preferred embodiment of this backpack is especially designed for such sports where hyperextension (bending backward) of the wearer's back is a real possibility. Motor sports have embraced the use of polymer body armor to protect vulnerable portions of the participant's body from injury. However, no one has combined the features of controlled flexibility body protection, in particular back protection, with a fully functional backpack.

BRIEF DESCRIPTION OF THE INVENTION

[0003] This invention comprises a backpack system that includes a harness to intimately hold the backpack construction against the back of the wearer. The backpack construction includes a foam covered support board that has limited flexibility both laterally as well as in the bilateral plane of symmetry of the wearer. This support board preferably consists of a series of controllably, preferably elastically, connected segments. This support board is covered with at least one layer of material on the wearer side for comfort and/or ventilation, which may include neoprene, mesh textile, any other type of textile, foam, or any other kind of material, and one or more layer of impact absorbing foam or other material on the other side (facing the content packing portion of the backpack.) Of course, the back board may be covered completely by any material, it may be partially covered, or the back board may remain entirely exposed. Any material could be used in the covering of the back board. For example, the backboard could be covered with a lamination consisting of two foam types, as will be discussed further with regard to the descriptions of **FIGS. 2 and 16**.

[0004] The main content packing portion of the backpack consists of two or more, preferably four, molded segments interconnected, or at least overlapping, at adjacent edges with extensible or ordinary textile membrane or membranes. The resulting jointed shell and the limited flexibility support board connect to one another at a peripheral seam, which preferably includes zipper access to the main packing compartment. The segmented shells, in combination with the limited flexibility support board, serve to help dissipate and redirect impact forces away from the wearer's back if and when the wearer should fall off a snowboard, fall while skiing, participating in motor-cross sports, etc. Also, the support board, in combination with the rest of the backpack construction, helps prevent hyperextending the user's back and helps reduce or eliminate the resulting injury to the musculature, the spine, and the nerves that could have resulted from such hyperextension.

BRIEF DESCRIPTION OF THE FIGURES

[0005] **FIG. 1** is a line drawing of a perspective view of the present embodiment.

[0006] **FIG. 2** is a back view of the present embodiment showing the harness and protective foam barrier worn against the wearer's back.

[0007] **FIG. 3** is a view of the main packing compartment of the present embodiment, with the main zipper access open and showing an interior panel for storing items, and its relation to the shell portion.

[0008] **FIG. 4** is a partially exploded, perspective view of the interior panel of **FIG. 5** and its relation to a back board.

[0009] **FIG. 5** is a top view of the back board with the organizational panel that has been unzipped and peeled back.

[0010] **FIG. 6** is a close up view of the back board shown in **FIG. 5**, illustrating a knuckle and an exposed flexible bridge portion.

[0011] **FIG. 7** is a partial view of the back board knuckle undergoing flexure and portion of a longitudinal concave portion.

[0012] **FIG. 8** is a close-up view of the portion of the back board shown in **FIG. 7** with the knuckle removed.

[0013] **FIG. 9** illustrates flexing of the knuckle of the portion of the back board shown in **FIG. 7** in the opposite direction to that shown in **FIG. 7**.

[0014] **FIG. 10** is perspective view of the back board configuration in its entirety.

[0015] **FIG. 11** is a side view of a portion of the back board configuration shown in **FIG. 10**.

[0016] **FIG. 12** is a view of the back board shown in **FIG. 10** with three knuckles installed.

[0017] **FIG. 13** is an illustration of the back board shown in **FIG. 12** with the knuckles shown in dashed lines to reveal the connective bridge portions.

[0018] **FIG. 14** is a side view of a portion of **FIG. 12**.

[0019] **FIG. 15** is a detailed back view of a portion of the back board and of a knuckle.

[0020] **FIG. 16** is a cross-sectional view of the foam panel shown in **FIG. 2**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] **FIGS. 1 and 2** show respectively a pictorial view of an outer side **4** and a wearer's side **6** of the preferred embodiment of the backpack **2**. The backpack **2** comprises two components central to the preferred embodiment: shell **24**, protruding from the outer side **4** and providing a rigid and stable structure to protect contents therein, and a structural, supportive "back board" portion **40**, designed to conform to the shape of the human spine when worn directly adjacent to a user's back, providing comfort and protection to the user while maintaining overall stability of the backpack **2**. Back board **40** provides the user with controlled flexibility, resisting the backward bending of the user's back, thereby helping prevent hyper-extension of the back.

[0022] A frame **8** is constructed of injection-molded polymer, forming a structural basis for the outer side **4** of the pack **2**. Frame **8** may be of a one-piece contiguous construc-

tion or may comprise separate pieces. In the preferred embodiment, frame **8** includes rib portions **10** and spacer portions **12**. Looped portions **14** are provided for opening of the shell **24** to reveal an inner packing compartment **36** of the backpack **2**. The frame **8** is of semi-rigid construction and is provided additional structure by shell segments **16** therebetween. Preferably the shell segments **16** are made of a light, strong polymer material, preferably polyethylene, polypropylene, or a self-reinforcing polypropylene composite such as that available from BP Amoco under the trademark "Curv." These segments **16** are preferably sewn to a peripheral zipper track **22** with a self-hinging portion on the bottom or one side of the perimeter of the backpack **2**. This permits access to the contents of the backpack **2** when necessary. Segments **16** also provide a measure of limited flexibility, lending to the user's wearability, mobility, and necessary flexibility of the backpack **2** while performing vigorous sporting activities. Of course, the material used for production of frame **8** and shell segment **16** can vary depending upon the design and intended use of the backpack **2**. For example, frame **8** could be produced by any manufacturing methods including any molding method, stamping, forging, cutting method, or other conventional industrial or manual method. Segment **16** could be made of any material including flexible material, soft material, any rigid or semi-rigid material including other types of polymers, metal, composite, or other material. An advantage of using SRP in the construction of the shell segments **16** is substantial weight reduction while maintaining structure to and protection of the contents of the backpack **2** as well as the wearer.

[**0023**] The frame **8** and shell segments **16** are affixed to one another by fasters **18**, shown by example as rivets in **FIG. 2**. Of course, other methods of attachment could be used for connecting the shell segments **16** to the frame **8** including glue, staples, snaps, pins, catches, sewing, etc. The shell **24** could conversely be manufactured as a solid piece, or as a combination of other types of components including polymer joints and sheets, or composite portions, for example. The overall shape of the shell is that of a streamlined tortoise shell.

[**0024**] Shell segments **16** of the shell **24** correspond substantially to the segments **46** of the safety board **40**. For example, note that there are four molded segments **16** shown in **FIG. 1**, which correspond in sequence, overall width, longitudinal dimensions, and placement to the four segments **46** of the safety board **40**. The bottom segment **16** comprises a recess. This recessed area of bottom segment **16** houses an external pocket that is separated from the main packing compartment **36** by a barrier, creating a convenient storage area for items meant to remain separate from the contents of compartment **36**, such as matches, keys, or items that may become dirty or wet such as soiled gloves, etc.

[**0025**] Each of these molded shell segments **16** is attached, preferably by sewing around its edges near access zipper **22**, to a flexible textile portion **20**. Textile portion **20** is preferably made of a tough woven textile such as a ballistic nylon. Textile portions **20** provide breathability to the backpack **2** as well as flexibility, allowing the backpack **2** to bend in any direction, facilitating comfortable mobility of the wearer, but only to a certain degree, such that hyperextension of the back becomes less likely to occur. Textile portions **20** could also be of a knit material to give even more flexible strength and to help restore the shape of the segmented shell **16** when a stress or bending movement by the wearer is terminated. Of course, other materials could be used in the construction of the portions between rigid portions **16** and **8**. Such materials may include mesh, thin sheets of foam, fabric having waterproof properties, a slightly more rigid material, or any other material. Access to the main packing compartment **36** of the backpack **2** is achieved by the peripheral zipper **22** track but conversely could be achieved by other methods that may include the use of Velcro portions, snaps, buttons, straps, molded mating frame portions, tongue and groove mechanisms, reinforced, "hefty" zippers that may comprise backing of an extra layer of textile or other material to act as a rigid hinge, or other methods. An advantage of zipper track **22** is that shell portion **24** can be opened on at least one side up to all four sides while maintaining a secure closure.

[**0026**] Looking again to **FIG. 2**, a panel of foam **26** is sewn onto the wearer's side **6** of the backpack **2** for the wearer's added protection and comfort. Foam panel **26** may include specifically designed contours so as to mimic the individual characteristics of a wearer's back resulting in a snug fit against the wearer's body. Of course, panel **26** could comprise any material appropriate for providing comfort to the wearer, including neoprene, etc, but materials with a knit breathable, textile surface of conventional types are preferred. A foam layer adjacent to the back board (seen in **FIG. 8** for example), may be selected from known, impact absorbing lamina to further isolate the back board from the body of the wearer.

[**0027**] Referring to **FIG. 16**, foam panel **26** may comprise a lamination of two types of foam with a mesh textile on the outside (facing the wearer's back). One or both of the foam layers may be perforated to provide ventilation. Perforations through both layers of foam would reveal the back board **40** from the outside to provide an aesthetically pleasing and sporty appearance. A transparent film may then be laminated to the foam layer adjacent to the support board. Conversely, only one layer of foam may be perforated, leaving the first layer of foam solid.

[**0028**] As shown in **FIGS. 2 and 3**, backpack **2** is carried by the wearer via a harness **28**. Harness **28** can comprise a series of adjustable components including shoulder straps **30**, an elastic waist-belt **32** and an elastic sternum strap **34**. Waist belt **32** may comprise wide elastic bands that overlap each other in a "criss-cross" fashion, increasing the snugness of the fit to the wearer. The shoulder straps **30**, waist-belt **32** with multiple elastic webbings for a firm fit, and sternum strap **34** can be individually and collectively adjusted to according to the user's body size to ensure a snug fit to the user's body. This has two primary benefits. First is to assure that the backpack **2** remains centered on the back of the user and will not thus hinder the balance and motion of the user in high speed outdoor sports, such as skiing and snow boarding. Secondly, this intimate cinching assures that the backpack **2**, with its segmented safety board **40** and segmented shell-like packing portion **24**, can reduce impact and overextension to which the person's back would normally be subject.

[**0029**] Of course, it should be understood by one of ordinary skill in the art that other combinations of straps, buckles, elastics, and/or other materials or mechanisms could be used in construction of harness **28** in order to

achieve snug conformation of the backpack **2** to the wearer's body. Such materials and mechanisms could include neoprene, nylon straps, bungee cords, hooks, or other methods. Backpack **2** may also be outfitted with a series of additional external straps, including buckled straps or bungee cords attached to loop **14** for example, that would permit the user to attach ropes, blankets, emergency equipment like shovels and ice picks to the outside of the backpack **2**. These accessory attachments can be done without unduly hindering the controlled flexing of the shell segments **16** and the attached portions of the back board **40**. This helps protect the relatively less robust textile portions **20** from abrasion, even when packed items within the main packing compartment **36** would tend to push these textile portions **20** outwardly. The textile segments **20** may be sized and tensioned when being attached to the segmented shell **24** to provide an inwardly directed biasing force against such packed items. This would prevent such items from interfering with the opening and closing of the shell **24** during controlled flexing of the back board **40**.

[**0030**] **FIG. 3** shows the relationship between shell **24** and back board **40**. Main packing compartment **36** may include provisions for secure storage of items such as zippered pockets, compartments with snaps, Velcro, or other closure devices, open pockets, dedicated pockets for items such as keys, phones, flashlights, first aid necessities, etc. As such, a structured interior panel **42** is provided, which can be constructed of any material typical to liner construction in the art, including waterproof textile material. As shown in **FIG. 3**, the shell **24** is joined to back board **40** by zipper **22**, operated by zipper sliders **23**. Back board **40** is surrounded by organizational panel **38**. The interior surface of organizational panel **38** comprises interior panel **42** in which personal items may be stored. Organizational panel **38** surrounds back board **40** and can be peripherally zippered on by inner zipper **44**, operated by inner zipper sliders **45**. Of course other mechanisms can be provided to surround and/or protect back board **40** including layers of foam and other textiles typical of the art. A benefit of providing inner zipper **44** is that the organizational panel **38** can be unzipped and interior panel **42** peeled back, exposing back board **40** for inspection, removal and repair, as well as to help instruct the user in the proper functioning of the inventive backpack **2**. This open construction also enhances convective ventilation. Of course, organizational panel **38** may be constructed of any material, including textile panels, mesh textile, a combination of both textile and mesh textile wherein mesh textile may be used to reveal and/or ventilate portions of the back board **40** such as the center portions of the panels **42** and knuckles **50**, neoprene, foam, or any other material.

[**0031**] Referring to **FIGS. 4 and 5** respectively, back board **40** is shown as being partially exposed by interior panel **42** and shown as being entirely exposed. **FIG. 6** shows a close-up view of back board **40**. Back board **40** comprises a contiguous plate or board having at least one flexible segment **46**. In the present embodiment, back board comprises four back board segments **46**. The top segment **46**, that rests against the upper portion of the user's back below the neck, includes a cut-out **66**. This cutout **66** provides an opening for the wiring associated with headphones, cell phone accessories, or the like. As shown in **FIG. 6**, back board **40** is mounted over a layer of material **64** added to provide additional comfort and protection to the wearer while maintaining breathability and air flow. Backboard **40** may be attached to at least the inner layer of material **64** by many methods, including fastener **58** that protrudes through aperture **60** as shown by example in **FIGS. 6 and 10**. Back board segments **46** are semi-rigid yet adequately flexible in nature for the purpose of maintaining mobility while the user engages in rigorous sports. The segments **46** are shown as solid polymer sheets with formed contours for shape and comfort. Of course, apertures **60**, holes, and thickened edges, such as those shown in **FIG. 10**, would benefit this embodiment but can vary depending upon the design and/or intended use of the present embodiment. The apertures in each of the segments **46** lighten the overall construction but are not necessary to the present embodiment.

[**0032**] It should be understood by one of ordinary skill in the art that many methods of manufacturing can be used to produce the back board **40** and other components of the backpack **2**, depending upon the nature of the materials used in its construction. For example, any plastic molding method can be used including thermoplastic and thermoset injection molding, blow molding, rotational molding, thermoforming, structural foam molding, compression molding, resin transfer molding (RTM), and so on.

[**0033**] Each of the segments **46** of the support board **40** interconnects with its adjacent neighbor by a flexible hinge or "bridge portion"**48**. Flexible bridge portion **48** is covered by a flexible rubber knuckle **50**. This rubber knuckle **50** comprises indentations or slots and has a T-shaped cross-section (shown in **FIG. 14**) to give flexing ability as outlined above with regard to **FIG. 6**. Bending along the plane of the back board **40** is further illustrated by **FIGS. 7 and 9**. As shown in **FIG. 7**, the wearer can perform forward bending, provided by the flexible nature of the knuckle **50** and the back board components. Looking to **FIG. 9**, hyperextension or backward bending of the back is limited but allowed by slots **53** and indentations **51** of knuckles **50**. These rubber knuckles **50** are firmly attached to each of the adjacent segments **46** by an extension **57**, shown in **FIG. 15**, which protrudes through apertures **54** of the bridge portions **48**. Of course, other methods could be used for attaching the knuckles **50** to back board **40**, including tapering slotted extensions that grip the bridge **48**. Conversely, knuckles **50** could be attached to the back board **40** by separate penetrating fasteners (not shown), by adhesives, or by being overmolded to adjacent segments **46** which have apertures to receive the molten knuckle material. Mechanical attachment using interengaging ribs or slots may be used as well, thus permitting easy after market replacement of individual damaged knuckles **50** or back board segments **46**. The knuckles comprise thermoplastic elastomer injection molding compounds of known composition and physical characteristics.

[**0034**] The rubber knuckle **50** has a butterfly wing shape which has indentations molded substantially, but not entirely through its cross section to enhance its flexing ability. These rubber knuckles **50** are firmly attached to each adjacent flexible back board segment **46** by overlapping bridge portions **48** having slots and a concave shape as well as an aperture through which the extension **57** of the flexible knuckle **50** protrudes (see **FIG. 15**). An advantage of the present embodiment of the rubber knuckles **50** is that knuckles **50** permit limited flexing of the segments **46** towards one another in the plane substantially containing the back board **40**[that is at a right angle to the bilateral symmetrical plane of the back board **40**]. The construction

of the knuckles **50** permits relatively easy bending towards the user's back [as for example might stoop over or roll into a ball] but elastically resists being compressed by bending in the other direction, that is in the direction which could lead to hyperextension of the wearer's back. **FIGS. 7 and 9** show an example of bending allowed by the design and construction of knuckle **50** and semi-cylindrical indentation **52** and back board segments **46**. As shown in **FIG. 8**, a close up view of a flexible bridge portion **48** is shown with knuckle **50** removed. Shown in **FIG. 8** and **FIG. 15** are apertures **54** and semi-cylindrical cut-outs **56**. Semi-cylindrical cut-outs **56** allow flexibility of bridge **48**. Again, bridge portion **48** allows limited movement of the back board segments **46** relative to one another. This creates allowance for adequate motion of the user's back in three planes, yet limits the motion such that the back is less likely to be hyper-extended.

[**0035**] Of course, it should be understood by one of ordinary skill in the art that the exact placement of holes and structure of back board **40** and its components can vary, provided that the structurally semi-rigid/semi-flexible design of the back board **40** remains intact.

[**0036**] An advantage of the present embodiment is that each of the segments **46** can bend relative to one another in a path parallel with the line of symmetry to a controlled amount and can also flex at right angles to this plane of symmetry by being squeezed towards one another at their longitudinal edges. In the preferred embodiment, back board **40** has four polymer segments **46** interconnected by the three elastomeric or rubber knuckles as described above. Of course, any number of segments **46** can be used, for example, in the construction of a backpack **2** for use by a petite person or by a child.

[**0037**] Note how the terminal corners of the back board segments **46** and the corners of the shell segments **16** are held adjacent to one another by textile **20**, knuckles **50**, and the zippered closure **22** which attaches the main portions of the backpack **2** together. In this way the back board **40** and segments **46** can easily flex together, giving the user a sense of freedom of movement. However, the shell segments **16** help limit hyperextension, primarily by engaging one another when the back board **40** bends towards the shell segments **16**.

[**0038**] Functionally, one can see that the knuckles **50** act as means for permitting limited flexing of the segments **46** towards one another in the plane substantially containing the backboard **40** (that is at a right angle to the bilateral symmetrical plane of the back board **40**). Also, the slots in each of the knuckles **50** permits relatively easy bending towards the user's back (as for example when the user might stoop over or roll into a ball) but elastically resists bending in the other direction, that is in the direction which could lead to hyperextension of the user's back.

[**0039**] As seen in **FIGS. 7 through 15**, back board segments **46** each comprise a semi-cylindrical indentation **52**, running lengthwise along the entire length of the mid-portion of each segment, and **46** facing the user's back. Indentation **52** is designed to mimic the structure of and therefore provide allowance for outward protrusion of the human spine. Indentation **52** helps further isolates the delicate musculature in and surrounding the spinal column from impacts to the backpack **2**. Note that the indentation **52** includes contouring that varies from a slightly less degree of indentation (a shallower indentation) at the end portions of each segment **46** to a greater degree of indentation (a deeper indentation) at the center portion of each segment **46**. This contouring helps the end portions of the segments **46** firmly engage the associated knuckles **50**. Of course, indentation **52** could consist of other types of contouring or none at all.

[**0040**] Although the present invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made by way of example, and changes in detail or structure may be made without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A method for toting, storing, maintaining security, and protecting items within a piece of luggage, backpack, or the like comprising: providing a durable, protective, rigid and shaped outer portion, while protecting the back of a user carrying said backpack by providing a protective back portion against which the user's back rests, designed to help prevent hyperextension of the user's back and to provide protection to the user's back from other external sources including the contents of the backpack.

2. The method of claim 1 wherein the step of protecting the contents of the backpack includes providing a hard shell on the outside of the backpack.

3. The method of claim 2 wherein the step of providing a hard shell comprises providing a hard shell in the shape of a tortoise shell.

4. The method of claim 1 wherein the step of protecting the user's back and protecting the contents of the backpack comprises providing a protective hard outer shell in combination with a back board onto which the user's back is adjacent which prevents hyperextension of the user's back.

5. The method of claim 4 wherein the step of providing a back board further includes providing a back board comprising at least one segment.

6. The method of claim 5 wherein said step of providing at least one segment further includes providing at least one additional segment to which said at least one segment is joined and wherein said segments are connected in a manner that allows said segments to bend in a controlled manner, allowing the wearer to experience forward bending, backward bending and side bending without bending to a point that is dangerous to the health of the spine and back.

7. A system for toting, storing, maintaining security, and protecting items within a piece of luggage, backpack, or the like while providing protection to a user's back.

8. The system of claim 7 further comprising a back board, that is worn adjacent to the back of the user, and an outer shell portion through which access to the backpack is granted.

9. The system of claim 8 wherein the shell and the back board are adjoined.

10. The system of claim 9 wherein the shell and the back board are adjoined permanently.

11. The system of claim 8 wherein the shell and the back board are connected along at least one peripheral edge.

12. The system of claim 11 wherein the shell and the back board are connected to each other by conventional connecting mechanisms.

13. The system of claim 12 wherein said conventional mechanisms include an openable access to a packing compartment.

14. The system of claim 12 wherein said conventional mechanisms include a zipper.

15. The system of claim 7 wherein said backpack is worn by said user in a snug fashion so that said user fully takes advantage of the design of said backpack in that said backpack conforms snugly to the back of the user such that the user is restricted in movement therefore limiting or helping the user from hyper-extending said user's back.

16. The system of claim 15 wherein the snug fit is achieved by a system of adjustable portions sized to extend around said user's body.

17. The system of claim 16 wherein said adjustable portions comprise straps.

18. The system of claim 17 wherein said adjustable portions comprise bands.

19. The system of claim 8 wherein said back board further comprises at least one segment.

20. The system of claim 19 wherein said at least one segment is joined to at least one other segment.

21. The system of claim 20 wherein said segments are connected by a flexible member in a manner that permits controlled bending of said segments including forward bending, backward bending and side bending whereby said bending is limited to help prevent danger the user's spine and back.

22. The system of claim 8 wherein said shell portion comprises segments.

23. The system of claim 22 wherein said rigid segments form a rounded, protective cover that can be opened to reveal contents of the backpack.

24. The shell portion of claim 7 further comprising a frame.

25. The frame of claim 24 further comprising rib, spacer and loop portions.

26. The system of claim 22 wherein said segments are separated by portions of fabric.

27. The system of claim 8 wherein said back board is lined with foam for adjacent placement against the user's back.

28. The back board of claim 8 further comprising a backing of foam between said back board and said foam that lies adjacent to the user's back.

29. The system of claim 22 wherein said segments are of rigid construction.

30. The system of claim 24 wherein said frame is constructed of rigid material.

31. The system of claim 8 wherein said protection to the user's back further comprises features that are protective of the human spine.

32. The spine protective features of claim 31 further comprising a semi-cylindrical longitudinal indentation, located along the length of said back board and facing the user's back, that accommodates the spine.

33. The indentation of claim 32 further comprising contours suited to conform conform to the area of the back corresponding to the spine.

34. A backpack having a back board of at least two interconnected, relatively rigid segments, means for mechanically interconnecting those segments, a packing compartment at least partially defined by a shell made of at least two relatively rigid shell segments, and straps for attaching and holding the backpack on the back of a user, the segments of the back board and the segments of the relatively rigid shell interconnected to one another to permit controlled forward bending, back bending and side bending of the backpack when the backpack is being carried on the back of a user.

35. The foam of claim 27 further comprising at least one layer of foam and a layer of mesh textile.

36. The system of claim 35 wherein said foam is perforated.

37. The foam of claim 27 further comprising at least one layer of foam and a layer of transparent material.

38. The system of claim 37 wherein said foam is perforated.

39. The system of claim 16 wherein said system of adjustable portions further comprises overlapping elastic bands.

40. The system of claim 8 wherein said back board is surrounded by a layer of material including an organizational portions on an inner surface.

41. The system of claim 12 wherein said conventional mechanisms include straps.

42. The system of claim 12 wherein said conventional mechanisms include molded portions.

43. The system of claim 12 wherein said conventional mechanisms include mating frame portions.

44. The system of claim 12 wherein said conventional mechanisms include tongue and groove mechanisms.

45. The system of claim 12 wherein said conventional mechanisms include reinforced zippers.

46. The system of claim 45 wherein said zipper is reinforced with an additional layer of textile, thereby acting as a rigid hinge.

47. The system of claim 23 wherein at least one of said shell segments includes a recess.

48. The system of claim 47 wherein said recess houses an external pocket.

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