PROTECTIVE SUSPENSION PACKAGE

FIELD OF THE INVENTION

[0001] This invention relates to a protective suspension package, and more particularly to a package for storing and transporting load sensitive devices, such as electronics.

BACKGROUND OF THE INVENTION

[0002] Electronic devices are sensitive to physical shocks and therefore can require extra care when being shipped or handled. Such a device is often transported in a protective package. This prevents the device from suffering damage in the event of mishandling. The protective package protects these devices as they travel through uncontrolled environments in a distribution chain, including, for example initial packaging, shipping, handling, sale and end use.

[0003] In known protective packages, the packages are cushioned with foam or sponge on the interior. Such cushion packages which conform to the shape of the article enclosed therein require multiple container shapes for articles of varying size and shape. In other known protective packages, the device is placed in a thin plastic sleeve or hammock and the ends of the hammock are closed and suspended between the opposite walls of an outer container. The outer container is typically provided with

means for tensioning the hammock between the supporting walls to assure that the hammock and device remain suspended in the closed container.

[0004] Another approach used in suspension packages has the device suspended between two layers of plastic film, each of which is supported by an outer frame. The outer frames comprise the edges of an outer enclosing container. Such approaches, though capable of accommodating some range of devices of different shapes and sizes may not provide sufficient control in all directions to adequately protect the device.

[0005] It would be desirable to provide an improved package for holding devices, especially sensitive electronic equipment such as laptops, while using conventional packaging components which are inexpensive, can be easily and quickly assembled, and provide good protection against physical shock.

SUMMARY OF THE INVENTION

[0006] In accordance with a first aspect, a protective suspension package for protecting a device comprises a frame having an upper frame and a lower frame, a plurality of elastomeric bands, wherein each elastomeric band is attached at a pair of attachment locations to one of the upper frame and the lower frame. A tier strap is wrapped around at least a pair of the plurality of elastomeric bands and is adapted to be operatively connected to the device.

[0007] From the foregoing disclosure and the following more detailed description of various embodiments it will be apparent to those skilled in the art that the present invention provides a significant advance in the technology of protective suspension packages. Particularly significant in this regard is the potential the invention affords for providing a high quality and portable protective suspension package. Additional features and advantages of various embodiments will be better understood in view of the detailed description provided below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Fig. 1 is an isometric view of a protective suspension package in accordance with one embodiment.

[0009] Fig. 2 is an isolated view of one embodiment of a frame and support bands.

[0010] Fig. 3 is a cross section view of the protective suspension package shown in a closed position.

[0011] Fig. 4 is an isolated isometric view of one of an upper tier strap and a lower tier strap shown wrapped around a set of bands.

[0012] Fig. 5 is an isolated isometric view of a device strap shown wrapped around a device and also showing the upper tier strap operatively connected to the device strap.

[0013] Fig. 6 is a side view of the frame and support bands shown in the closed position in accordance with one embodiment, showing a plurality of interspaced posts.

[0014] It should be understood that the appended drawings are not necessarily to scale, presenting a somewhat simplified representation of various features illustrative of the basic principles of the invention. The specific design features of the protective suspension package as disclosed here, including, for example, the specific dimensions of the bands, will be determined in part by the particular intended application and use environment. Certain features of the illustrated embodiments have been enlarged or distorted relative to others to help provide clear understanding. In particular, thin features may be thickened, for example, for clarity of illustration. All references to direction and position, unless otherwise indicated, refer to the orientation illustrated in the drawings.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

[0015] It will be apparent to those skilled in the art, that is, to those who have knowledge or experience in this area of technology, that many uses and design variations are possible for the protective suspension package disclosed here. The following detailed discussion of various alternate features and embodiments will illustrate the general principles of the invention with reference to a protective suspension package suitable for use supporting and protecting sensitive electronic equipment such as laptop computers. Other embodiments suitable for other applications will be apparent to those skilled in the art given the benefit of this disclosure.

[0016] Turning now to the drawings, Fig 1 shows an isometric view of a protective suspension package 10 in accordance with one embodiment shown in Fig. 1 in an open position and formed into the shape of a suitcase. The device 20 to be protected can be a laptop, for example. An upper side is connected to a lower side by hinge 30. A foam padding 15 can be positioned on each frame as shown. The foam padding may at least partially circumferentially surround the upper frame 11 and the lower frame 13.

[0017] Fig. 2 shows an isolated view of one embodiment of the package with a skeletal portion where foam and fabric has been removed for clarity of illustration. A frame is defined by upper frame 11 and lower frame 13 connected by hinge 30. Upper tiers 12 and lower tiers 14 each have a plurality of posts 22. The posts 22 define attachment locations. These attachment locations can comprise, for example, pockets 24, as shown in Fig. 2. Each band 16 is attached to a pair of posts 22 at the corresponding pair of attachment locations (pockets 24) in any one of several ways. In Fig. 2, a knot is formed in each band large enough to restrict separation of the band from the post under normal operating conditions. However, if a band is damaged, it may readily be replaced by removal from the corresponding tier 12, 14 by lifting the band 16 out the pocket 24.

[0018] The plurality of elastomeric bands 16 is attached between posts 22 on each of the upper tiers 12 and between posts 22 on each of the lower tiers 14 at the attachment locations 24. In this manner the bands extend across both the upper side and the lower side of the package. The plurality of posts 22 also define spaces 23 between the posts

22. The spaces 23 are offset to allow posts of an opposite tier to nest snugly when the protective suspension package is in a closed position as shown in Fig. 6.

[0019] Tier straps 35, 45 are each wrapped around at least a pair of the plurality of elastomeric bands 16. Tier strap 45 is shown in Fig. 2 to be wrapped around bands 16 mounted on the upper frame 11, and tier strap 35 is wrapped around bands 16 mounted on the lower frame 13. Advantageously, each of the tier straps is adapted to be operatively connected to the device 20. In the embodiment shown in the drawings, the tier straps are not directly attached to the device 20. Rather, each tier strap 35, 45 is operatively connected to a device strap 25 which is in turn operatively connected to the device 20.

[0020] Fig. 3 shows a cross section view of the protective suspension package 10 shown in a closed position. The tier straps 35, 45 are each wrapped around a plurality of elastomeric bands 16, one around the bands on the upper frame 11 and one around the bands on the lower frame 13. As shown in embodiment of the Figs., device strap 25 is wrapped around the device 20. In the closed position, the tier straps 35, 45 sandwich the device strap 25. The tier straps 35, 45 are each attached to the device strap 25. Since the plurality of elastomeric bands 16 are intertwined with the straps 35, 45, the device 20 is advantageously firmly secured in the package 10 in all directions. Optionally a pocket 17 for storing additional items such as computer peripheral devices may be present.

[0021] Fig. 4 shows an isolated isometric view of one embodiment of the strap 45. Strap 35 may be essentially identical, but surrounding a plurality of bands on the lower frame 13. The tier strap 45 comprises an outer surface 36, a first band surface 38, a second band surface 40 and a device surface 42. The first band surface 38 and the second band surface 40 face the plurality of elastomeric bands 16. At least one of the first band surface 38 and the second band surface 40 defines a groove 44 adapted to receive one of the plurality of elastomeric bands 16. In the embodiment of Fig. 4, first band surface 38 defines the groove 44. Optionally both first band surface 38 and second band surface 40 may define part of groove 44 for each band the strap surrounds. The first band surface 38 and the second band surface 40 cooperate to form a hook and loop fastener, sometimes referred to as a Velcro™ fastener. The Velcro™ releasably secures the tier strap 45 around the plurality of elastomeric bands 16. Alternatively, snap buttons can be used to secure the tier strap 45 to itself.

[0022] Fig. 5 shows one embodiment of an isolated isometric view of a device strap 25 wrapped around a device 20. The device strap 25 has an upper side 26 and lower side 28 which are connectable to one another. In accordance with a highly advantageous feature, the device surfaces 42 of the tier straps 35 and 45 are operatively connectable to the device strap 25. A surface on tier strap 35 can be attached to lower side 28, and surface 42 on tier strap 45 can be attached to the upper side 26. The device surfaces can be connected to the corresponding sides 26, 28 by a hook and loop fastener (Velcro™). Other ways of connecting the device surfaces to the lower side and upper side will be readily apparent to those skilled in the art given the benefit of this

disclosure. Use of Velcro™ is advantageous in that it robustly secures the components together yet allows for quick separation of the device 20 from the device strap 25, and also allows for quick separation of the device strap 25 from both tier straps 35, 45.

[0023] Fig 6 shows a cross section side view of the protective suspension package in a closed position. The bands 16 attached to the upper tier 11 are offset from bands 16 attached to the lower tier 13. More particularly, the bands extend in a first direction between the pair of attachment locations (between both the upper tiers 11 or the lower tiers 13), and the bands attached to the upper tier are laterally offset in a second direction perpendicular to the first direction from the bands attached to the lower tier when the package is in a closed position.

[0024] From the foregoing disclosure and detailed description of certain embodiments, it will be apparent that various modifications, additions and other alternative embodiments are possible without departing from the true scope and spirit of the invention. The embodiments discussed were chosen and described to provide the best illustration of the principles of the invention and its practical application to thereby enable one of ordinary skill in the art to use the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly, legally, and equitably entitled.

CLAIMS

What is claimed is:

1. A protective suspension package for protecting a device, comprising, in combination:

a frame having an upper frame and a lower frame;

a plurality of elastomeric bands, wherein each elastomeric band is attached at a pair of attachment locations to one of the upper frame and the lower frame; and

a tier strap wrapped around at least a pair of the plurality of elastomeric bands, and adapted to be operatively connected to the device.

2. The protective suspension package of claim 1 further comprising a pair of upper tiers and a pair of lower tiers, wherein at least a pair of the plurality of elastomeric bands are attached between the upper tiers, and at least another pair of the plurality of elastomeric bands are attached between the lower tiers.

3. The protective suspension package of claim 2 further comprising a device strap adapted to wrap around the device, wherein the tier strap is adapted to be operatively connected to the device strap.

4. The protective suspension package of claim 2 wherein the plurality of elastomeric bands are removable from the corresponding tier.

5. The protective suspension package of claim 2 wherein the tier strap comprises an outer surface, a first band surface, a second band surface and a device surface, wherein the first band surface and the second band surface engage the at least a pair of the plurality of elastomeric bands.

6. The protective suspension package of claim 5 wherein the tier strap is removable from the corresponding tier.

7. The protective suspension package of claim 5 wherein at least one of the first band surface and second band surface define a groove adapted to receive one of the plurality of elastomeric bands.

8. The protective suspension package of claim 5 wherein the first band surface and the second band surface cooperate to form a hook and loop fastener, releasably securing the tier strap around the at least a pair of the plurality of elastomeric bands.

9. The protective suspension package of claim 5 further comprising a device strap adapted to wrap around the device, wherein the tier strap is operatively connectable to the device strap by connection of the device surface to the device strap.

10. The protective suspension package of claim 9 wherein the device strap has an upper side and lower side, and the device surface is operatively connectable to one of the upper side and the lower side.

11. The protective suspension package of claim 10 wherein the device surface is operatively connectable to one of the upper side and the lower side by a hook and loop fastener.

12. The protective suspension package of claim 9 wherein the upper side and the lower side are connectable to one another.

13. The protective suspension package of claim 2 wherein the upper tier and the lower tier each have a plurality of posts, wherein the posts define the attachment locations.

14. The protective suspension package of claim 13 wherein one of the elastomeric bands is attached to a pair of posts.

15. The protective suspension package of claim 13 wherein the plurality of posts define spaces between posts.

16. The protective suspension package of claim 13 wherein the attachment locations are a pocket, and each band is attached to one of the posts at the pocket.

17. The protective suspension package of claim 1, wherein the package is pivotable between an open position and a closed position.

18. The protective suspension package of claim 17, wherein the upper frame and the lower frame are connected by a hinge.

19. The protective suspension package of claim 2, wherein the bands extend in a first direction between the pair of attachment locations, and the bands attached to the upper tier are laterally offset in a second direction perpendicular to the first direction from bands attached to the lower tier when the package is in a closed position.

20. The protective suspension package of claim 1, further comprising foam padding at least partially circumferentially surrounding the upper frame and the lower frame.