A support and protect device for portable electronic device, comprising a main portion, at least one return portion, and at least one intermediate portion. The at least one intermediate portion connects the at least one return portion to the main portion such that at least one storage gap is defined by the main portion and the at least one return portion. When the support and protect device is in a support configuration, the portable electronic device rests on the main portion. When the support and protect device is in a protect configuration, the portable electronic device is held within the at least one storage gap.
DEVICES AND METHODS FOR SUPPORTING AND PROTECTING PORTABLE ELECTRONICS

TECHNICAL FIELD

[0001] The present invention relates to accessories for portable electronics such as laptop computers and, more specifically, to systems and methods for storing and protecting portable electronics in one use configuration and supporting portable electronics in another use configuration.

BACKGROUND OF THE INVENTION

[0002] Conventional electronic devices are often configured to be arranged on a dedicated work surface such as the top of a desk or the like. A dedicated work surface is typically flat and hard. Electronic devices typically comprise foot members defined to space a main housing of the device from the dedicated work surface. The space between the device housing and the work surface allows air flow that can be employed to cool the electronic circuits within the device housing.

[0003] Portable electronic devices are often used in settings where no such defined work surface exists. For example, as its name suggests a laptop computer may be arranged on a non-dedicated work surface such as the user’s lap. Many non-dedicated work surfaces are not hard and flat and may not allow air flow to be established between the device housing and the non-dedicated work surface. The use of portable electronic devices on non-dedicated work surfaces may thus result in overheating of the device electronics. Overheating of the device electronics can cause temporary or permanent damage to the electronics within the electronic device. The need thus exists for improved systems and methods of supporting portable electronic devices on non-dedicated work surfaces.

[0004] Portable electronic devices are also often transported from one work location to another. Although designed to be small and lightweight, portable electronic devices are typically delicate. Accordingly, portable electronic devices are often used with transportation systems such as cases, bags, and the like. The transportation systems typically both protect the portable electronic device and facilitate gripping of the device. The need thus also exists for systems and methods for protecting portable electronic devices during transportation.

SUMMARY OF THE INVENTION

[0005] The present invention may be embodied as a support and protect device for portable electronic device, comprising a main portion, at least one return portion, and at least one intermediate portion. The at least one intermediate portion connects the at least one return portion to the main portion such that at least one storage gap is defined by the main portion and the at least one return portion. When the support and protect device is in a support configuration, the portable electronic device rests on the main portion. When the support and protect device is in a protect configuration, the portable electronic device is held within at least one storage gap.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 is a perspective view illustrating a first embodiment of a support and protect system of the present invention being used in a support configuration;

[0007] FIG. 2 is a side elevation view of the support and protect system of the first embodiment;

[0008] FIG. 3 is a top plan view of the support and protect system of the first embodiment;

[0009] FIG. 4 is a bottom plan view of the support and protect system of the first embodiment;

[0010] FIGS. 5A and 5B are cutaway views taken along lines 5-5 in FIG. 2;

[0011] FIG. 6 is a top plan view of a core member of the support and protect system of the first embodiment;

[0012] FIG. 7 is a side elevation view depicting the use of the support and protect system of the first embodiment in a support configuration;

[0013] FIG. 8 is a side elevation view depicting the use of the support and protect system of the first embodiment in conjunction with an external carrying case;

[0014] FIG. 9 is a front elevation view of a supporting and carrying system of a second embodiment of the present invention in a protect configuration;

[0015] FIG. 10 is a side elevation view of the supporting and carrying system of the second embodiment in a support configuration;

[0016] FIG. 11 is a front elevation view of a supporting and carrying system of a third embodiment of the present invention in a protect configuration;

[0017] FIG. 12 is a side elevation view of the supporting and carrying system of the third embodiment in a support configuration; and

[0018] FIG. 13 is a top plan view of a core member of a support and protect system of a fourth embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] Referring initially to FIG. 1 of the drawing, depicted at 20 therein is a support and protect system constructed in accordance with, and embodying, a first embodiment of the present invention. The device 20 is illustrated in FIG. 1 in a support configuration supporting an example portable electronic device 22.

[0020] The example portable electronic device 22 is a laptop computer comprising a main portion 24 connected to a screen portion 26 by one or more hinges 28. The screen portion 26 is thus movable between an open configuration (FIG. 1) and a closed configuration (FIGS. 2, 7, and 8) relative to the main portion 24. The present invention is of particular importance when used in conjunction with laptop computers, and that application of the invention will be described in detail herein. However, the principles of the present invention may be applied to portable electronic devices other than laptop computers, such as cell phones, portable media players, and the like.

[0021] As perhaps best shown in FIGS. 2 and 4, the example support and protect device 20 comprises a main portion 30, an intermediate portion 32, a return portion 34, and a stop portion 36. The intermediate portion 32 extends between the main portion 30 and the return portion 34. The lip portion 36 extends from the main portion 30. The support and protect device 20 further defines first and second surfaces 40 and 42 and also defines first and second side edges 50 and 52, a stop edge 54, and a return edge 56.

[0022] Referring now to FIG. 2 of the drawing, the example main portion 30 defines a support plane A and, except as noted below, is substantially flat. The example return portion 34 is
also substantially flat and defines a return plane B. The example stop portion 36 extends from the main portion 30 and defines a stop plane C.

[0023] In the example device 20, an angle between the support plane A and the return plane B is approximately 15°, should be within a first range of from approximately 5° to 20°, and in any event should be within a second range of from approximately 0° to 30°. If the example stop portion 36 is used, an angle between the support plane A and the stop plane C is approximately 75°, should be within a first range of from approximately 60° to 90°, and in any event should be within a second range of from approximately 20° to 110°.

[0024] As shown in FIG. 1 and 2, when the device 20 is in the support configuration, the portable electronic device 22 rests on a portion of the first surface 40 corresponding to the main portion 30. A portion of the first surface 40 corresponding to the return portion 34 engages a work surface 60. The work surface 60 is shown as substantially flat, but the work surface 60 need not be flat and, to the contrary, may take many shapes and be formed of many different material types. A portion of the second surface 42 corresponding to a juncture between the main portion 30 and the stop portion 36 also engages the example work surface 60. A portion of the first surface 40 corresponding to the stop portion 36 may engage the electronic device 22 to inhibit movement of the device 22 relative to the device 20.

[0025] The return portion 34 and juncture between the main portion 30 and the stop portion 36 thus define a surface plane D that, in FIG. 2, is contiguous with the work surface 60. The dimensions of the intermediate portion 32 determine a support angle at which the surface plane D extends relative to the support plane A. The support angle defined by the example support and protect device is approximately 15°, should be within a first range of from approximately 5° to 20°, and in any event should be within a second range of from approximately 0° to 30°.

[0026] Typically, the intermediate portion 32 is arranged away from the user such that the main portion 30 slants up and away from the user. Some users may prefer the intermediate portion 32 arranged towards the user such that the main portion 30 slants down and away from the user. The orientation of the work surface 60 may also influence the decision of where to arrange the intermediate portion 32 relative to the user.

[0027] When the device 20 is in a protect configuration, at least a portion of the electronic device 22 is inserted into a storage gap 62 (FIG. 2) between the return edge 56 and the second surface 42 of the device 20. As shown in FIG. 7, the return edge 56 holds the electronic device 22 against the second surface 42 and thus inhibits relative movement between the device 20 and the electronic device 22.

[0028] In this protect configuration, the support and protect device 20 covers a substantial portion of the electronic device 22. With the support and protect device 20 in the protect configuration, user may thus grip the intermediate portion 32 of the device 20 with the storage gap 62 facing up to transport the electronic device 22. Damage to the electronic device 22 is thus less likely during transportation when received within the storage gap 62 defined by the support and protect device 20.

[0029] FIG. 4 illustrates that an optional resilient strap 64 may be connected between the edges 50 and 57 across the second surface 42. The strap 64 allows relatively thin, flat items such as papers, booklets, and the like to be stored adjacent to the second surface 42. Dotted lines in FIG. 4 illustrate a sheet of paper 66 that is stored adjacent to the second surface 42.

[0030] Referring now to FIG. 3, it can be seen that the example support and protect device 20 defines first, second, and third grooves 70, 72, and 74. These example grooves 70, 72, and 74 are formed in the main portion 30 and are parallel to the side edges 50 and 57 of the device 20. When the electronic device 22 is supported by the first surface 40 in the support configuration, the grooves 70, 72, and 74 facilitate air flow under the electronic device 22 to facilitate the cooling of the device 22. While the example device 20 uses three parallel grooves as described above, the use of these grooves 70, 72, and 74 is optional. In addition, fewer or more grooves may be used, these grooves need not be straight, and any provided grooves may be oriented in different directions.

[0031] FIGS. 5A and 5B illustrate that the example support and protect device 20 comprises a core member 80, first and second intermediate layers 82 and 84, and first and second cover layers 86 and 88. The example core member 80 is substantially rigid to the shape of the support and protect device 20 and to provide a stable support structure when the device 20 is used in the support configuration. The core member 80 should, however, be sufficiently resilient to deflect slightly to allow the electronic device 22 to be placed into the storage gap 62 as described above. The example core member 80 is a molded plastic part and is shown without the intermediate layers 82 and 84 and cover layers 86 and 88 in FIG. 6.

[0032] The example first and second intermediate layers 82 and 84 are thin sheets of foam that are adhered to the core member 80. The intermediate layers 82 and 84 may be formed of open- or closed-cell foam. The example intermediate layers 82 and 84 are compressible; the surface 40 and 42 of the device 20 are thus relatively soft to the touch. The compressibility of the intermediate layers 82 and 84 also inhibits transmission of external blows to the electronic device 22 when the device 22 is stored in the storage gap 62.

[0033] The example cover layers 86 and 88 are formed by cloth or fabric sheets that are adhered to or stretched over the intermediate layers 82 and 84. The cover layers 86 and 88 define a matrix of interconnected passageways that allow air flow to the intermediate layers 82 and 84 from the first and second surfaces 40 and 42, respectively. The cover layers 86 and 88 also protect the intermediate layers 82 and 84 by limiting access of dirt and the like to the intermediate layers 82 and 84. The example cover layers 86 and 88 are washable to facilitate cleaning of the surfaces 40 and 42 of the device 20.

[0034] FIGS. 5A and 5B further illustrate that the example grooves 70, 72, and 74 are formed in the core member 80. In particular, the example grooves 70, 72, and 74 are formed by ribs 70a, 72a, and 74a that extend from the second surface 42 of the core member 80. In addition to establishing grooves in the first surface 40 of the core member 80, the ribs 70a, 72a, and 74a strengthen the main portion 30 of the core member 80.

[0035] FIG. 8 illustrates that the protecting device 20 and electronic device 22 transported thereby may both be located within a bag 90. In particular, the support and protect device 20 is shown in the protect configuration with the electronic device 22 partly within the storage gap 62, and the device 20 and device 22 are arranged with a bag compartment 92 defined by the bag 90. The bag 90 may be any structure or made of any material suitable for transporting the device 20.
and device 22. The bag 90 may also be provided with handles, other compartments or pockets, flaps, and/or closure devices such as zippers.

[0036] Referring now to FIGS. 9 and 10 of the drawings, depicted therein is another example support and protect device 120 of the present invention. The example support and protect device 120 also operates in a support configuration (FIG. 10) and a storage configuration (FIG. 9). The support and protect device 120 is or may be constructed in the same manner as the device 20 described above and will be described herein primarily to the extent that the device 120 differs from the device 20.

[0037] The supporting device 120 comprises a main portion 130, first and second intermediate portions 132 and 134, and first and second return portions 136 and 138. The intermediate portions 132 and 134 extend between the main portion 130 and the return portions 136 and 138. In the example device 120, the return portions 136 and 138 are substantially parallel to the main portion 130.

[0038] In the support configuration, the return portions 136 and 138 are adapted to engage a work surface, such as the work surface 60 described above, to space the main portion 130 above the work surface. The electronic device 22 may then be placed on the main portion 130 and used in a conventional manner. In one typical use scenario, the intermediate portions 132 and 134 are arranged parallel to each other and to the user's thighs. The main portion 130 is typically substantially parallel to the work surface.

[0039] In the protect configuration, the electronic device 22 is arranged within first and second storage gaps 140 and 142 defined between the return portions 136 and 138 and the main portion 130. The return portions 136 and 138 may be configured to deflect slightly when the electronic device 22 is arranged within the storage gaps 140 and 142 to apply a clamping force on the device 22 that inhibits movement of the device 22 relative to the device 130.

[0040] Referring now to FIGS. 11 and 12 of the drawings, depicted therein is yet another example support and protect device 150 of the present invention. The example support and protect device 150 also operates in a support configuration (FIG. 12) and a storage configuration (FIG. 11). The support and protect device 150 is or may be constructed in the same manner as the device 20 described above and will be described herein primarily to the extent that the device 150 differs from the device 20.

[0041] The supporting device 150 comprises a main portion 160, first and second intermediate portions 162 and 164, and first and second return portions 166 and 168. The intermediate portions 162 and 164 extend between the main portion 160 and the return portions 166 and 168. In the example device 150, the return portions 166 and 168 are arranged with respect to the main portion 160.

[0042] In the support configuration, the return portions 166 and 168 are adapted to engage a work surface, such as the work surface 60 described above, to space the main portion 160 above the work surface. The electronic device 22 may then be placed on the main portion 160 and used in a conventional manner. Typically, the intermediate portions 162 and 164 are arranged parallel to each other and to the user's thighs. The angling of the return portions 166 and 168 with respect to the main portion 160 allows the electronic device 122 to be arranged at an angle (in either direction) as is comfortable for the user.

[0043] In the protect configuration, the electronic device 22 is arranged within first and second storage gaps 170 and 172 defined between the return portions 166 and 168 and the main portion 160. The return portions 166 and 168 may be configured to deflect slightly when the electronic device 22 is arranged within the storage gaps 170 and 172 to apply a clamping force on the device 22 that inhibits movement of the device 22 relative to the device 150.

[0044] Referring now to FIG. 13 of the drawings, depicted at 220 therein is another example core member that may be used in place of the core member 80 described above. The core member 220 is similar to the core member 80 and defines a main portion 222. The core member 220 comprises, in addition to optional grooves 230, 232, and 234, an array of openings 240 is formed in the main portion 222. The openings 240 allow the flow of air through the support and protect device incorporating the core member 220 and not just along the surfaces of the support and protect device. The openings 240 thus facilitate the cooling of the electronic device 22.

[0045] The present invention may be embodied in forms other than those described above. The scope of the present invention should be determined by the scope of the claims appended hereto and not the foregoing detailed description of the invention.

1. A support and protect device for portable electronic device, comprising:
   a main portion;
   at least one return portion;
   at least one intermediate portion that connects the at least one return portion to the main portion such that at least one storage gap is defined by the main portion and the at least one return portion; whereby
   when the support and protect device is in a support configuration, the portable electronic device rests on the main portion; and
   when the support and protect device is in a protect configuration, the portable electronic device is held within at least one storage gap;
   the main portion, the return portion, and the intermediate portion are defined by a core member, where the core member is sufficiently rigid to protect the portable electronic device when the support and protect device is in the protect configuration; and
   the core member is sufficiently resilient to allow the return portion to deflect relative to the main portion to allow the portable electronic device to be placed within at least one storage gap.

2. A support and protect device as recited in claim 1, comprising:
   one return portion; and
   one intermediate portion; whereby
   the intermediate portion is arranged such that the main portion is angled with respect to the return portion.

3. A support and protect device as recited in claim 1, in which:
   the main portion defines a support plane;
   the return portion defines a return plane; and
   the return plane is angled with respect to the support plane.

4. A support and protect device as recited in claim 1, in which:
   the main portion defines a support plane;
   the support and protect device defines a surface plane; and
   the surface plane is angled with respect to the support plane.
5. A support and protect device as recited in claim 1, further comprising a stop portion that extends from the main portion to inhibit movement of the electronic device relative to the main portion.

6. A support and protect device as recited in claim 5, in which:
   - the main portion defines a support plane;
   - the stop portion defines a stop plane; and
   - the stop plane is angled with respect to the support plane.

7. A support and protect device as recited in claim 1, further comprising:
   - at least one intermediate layer attached to the core member; and
   - at least one cover layer arranged to cover the at least one intermediate layer.

8. A support and protect device as recited in claim 7, in which at least one intermediate layer is resilient.

9. A support and protect device as recited in claim 7, in which at least one intermediate layer defines a matrix of interconnected passageways that allow air flow along at least one surface of the main portion.

10. A support and protect device as recited in claim 7, in which at least one intermediate layer comprises a sheet of foam.

11. A support and protect device as recited in claim 1, in which at least one groove is formed in the main portion to facilitate air flow to the electronic device in the support configuration.

12. A method of supporting and protecting a portable electronic device, comprising the steps of:
   - providing a supporting and protecting device comprising a substantially rigid core member defining a main portion, at least one return portion, and at least one intermediate portion that connects the at least one return portion to the main portion such that at least one storage gap is defined by the main portion and the at least one return portion;
   - arranging the portable electronic device on the main portion in a support configuration, where the core member is sufficiently rigid to support the portable electronic device when the portable electronic device is in the support configuration; and
   - arranging the portable electronic device within the at least one storage gap in a protect configuration, where the core member is sufficiently resilient to allow the return portion to deflect relative to the main portion to allow the portable electronic device to be placed within the at least one storage gap.

13. A method as recited in claim 12, in which the step of providing the supporting and protecting device comprises the step of arranging the intermediate portion such that the main portion is angled with respect to the user.

14. A method as recited in claim 12, in which:
   - the main portion defines a support plane;
   - the return portion defines a return plane; and
   - the return plane is angled with respect to the support plane.

15. A method as recited in claim 12, in which:
   - the main portion defines a support plane;
   - the support and protect device defines a surface plane; and
   - the surface plane is angled with respect to the support plane.

16. A method as recited in claim 12, in which the step of providing the support and protect device further comprises the step of providing a stop portion that extends from the main portion, where the stop portion inhibits movement of the electronic device relative to the main portion in the support configuration.

17. A method as recited in claim 16, in which:
   - the main portion defines a support plane;
   - the stop portion defines a stop plane; and
   - the stop plane is angled with respect to the support plane.

18. A method as recited in claim 12, in which the step of providing the support and protect device comprises the steps of:
   - attaching at least one intermediate layer to the core member; and
   - attaching at least one cover layer to the at least one intermediate layer to cover the at least one intermediate layer.

19. A method as recited in claim 18, in which the at least one intermediate layer defines a matrix of interconnected passageways that allow air flow along at least one surface of the main portion.

20. A method as recited in claim 12, further comprising the step of forming at least one groove in the main portion to facilitate air flow to the electronic device in the support configuration.

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