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Miller et al.

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(54) **RUGGEDIZED PROTECTIVE CASE WITH EXTENDABLE EASEL/KICKSTAND FOR MOBILE DEVICE**

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(21) Appl. No.: **15/454,605**

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(63) Continuation-in-part of application No. 15/441,660, filed on Feb. 24, 2017.

(60) Provisional application No. 62/305,885, filed on Mar. 9, 2016, provisional application No. 62/299,360, filed on Feb. 24, 2016.

(51) **Int. Cl.**

H04B 1/38	(2015.01)
H05K 5/02	(2006.01)
G06F 1/16	(2006.01)
H05K 5/06	(2006.01)

(52) **U.S. Cl.**
CPC ***H05K 5/0234*** (2013.01); ***G06F 1/1616*** (2013.01); *G06F 1/1626* (2013.01); *G06F 1/1681* (2013.01); *H05K 5/069* (2013.01)

(58) **Field of Classification Search**
CPC H05K 5/0234; H05K 5/069; G06F 1/1616; G06F 1/1626; G06F 1/1681
See application file for complete search history.

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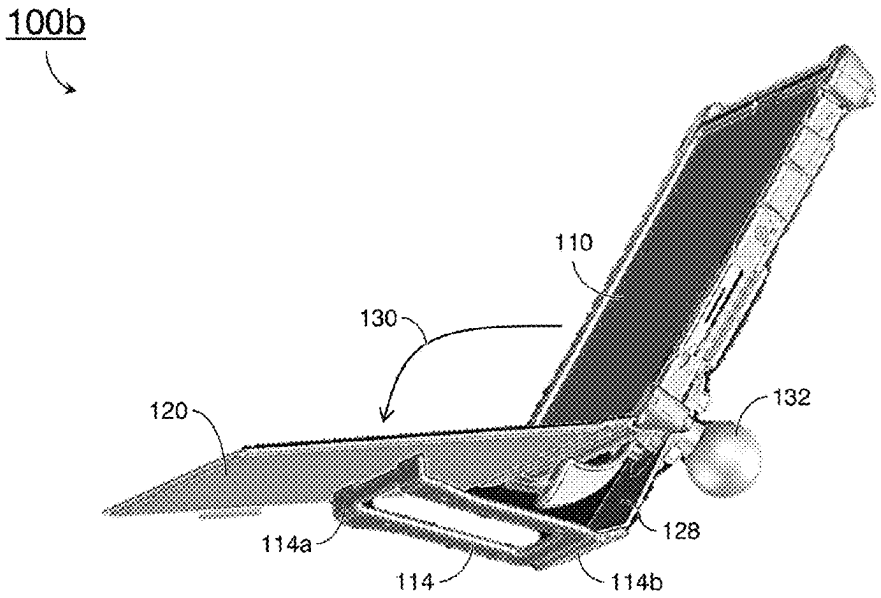
(57) **ABSTRACT**

A ruggedized protective case for a laptop, tablet, smartphone, or other like mobile communications or computing device may include a rigid inner housing shielding the reverse face of the mobile device and a flexible, rubberized outer housing including reinforced impact-absorbing corners. The case may include a kickstand/easel hingedly attached to the rear inner housing, positionable by a user for holding the mobile device at any desired angle to a substantially horizontal surface. The kickstand may be extended by an easel bracket to support a portable keyboard of the mobile device for vehicular use.

8 Claims, 9 Drawing Sheets



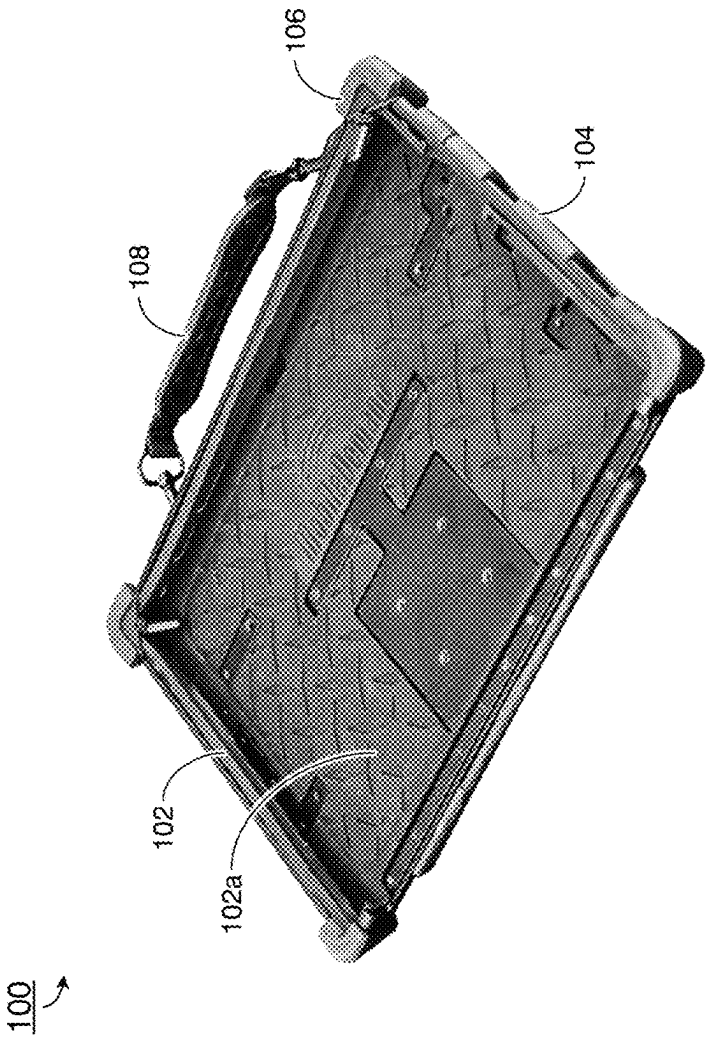


FIG. 1A

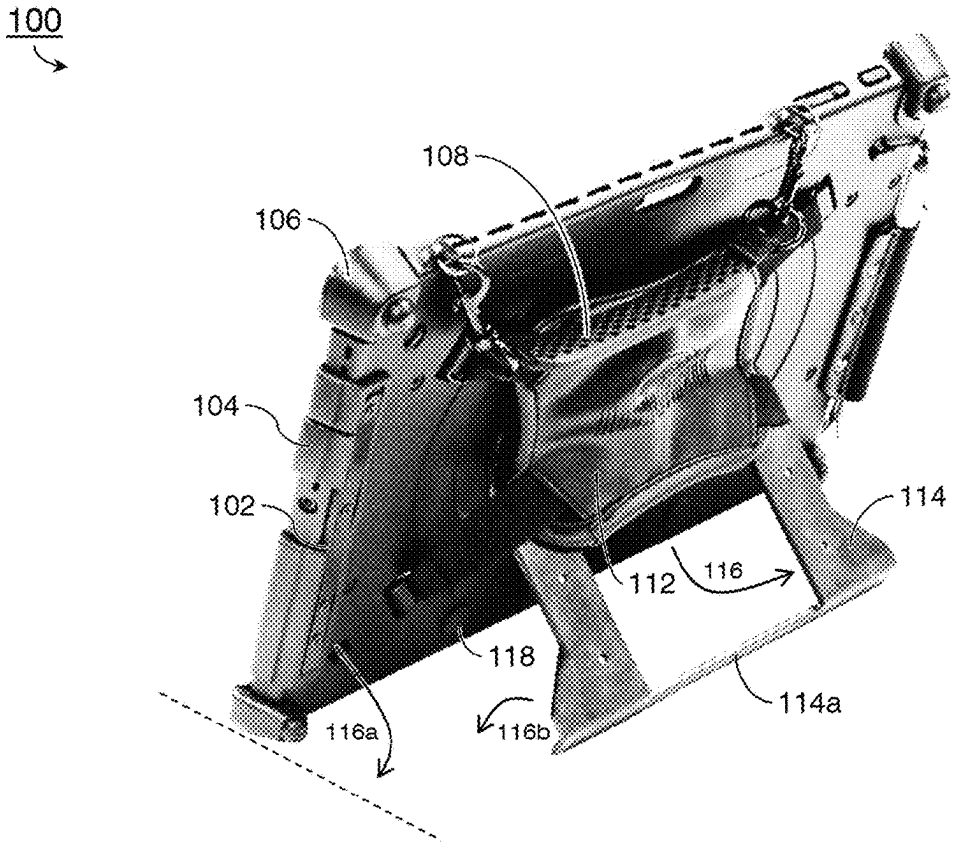


FIG. 1B

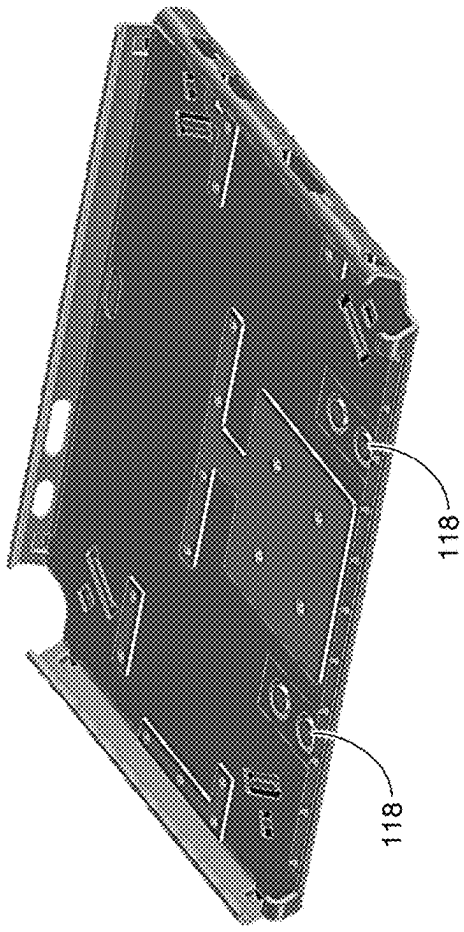


FIG. 1C

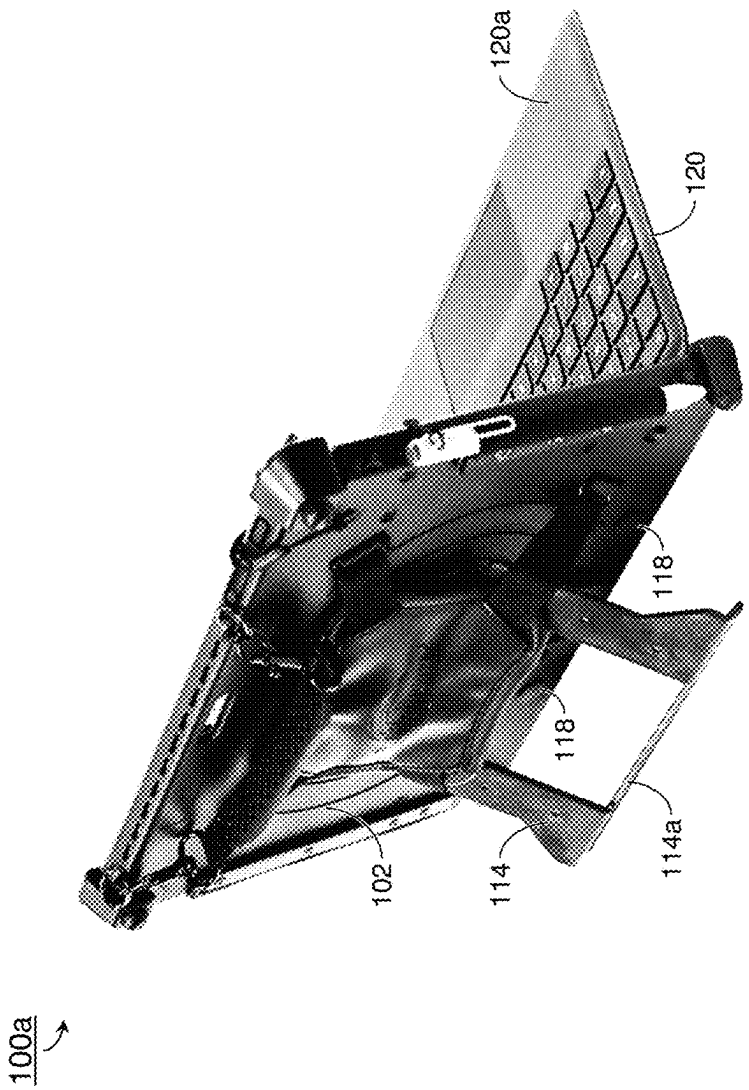


FIG. 2A

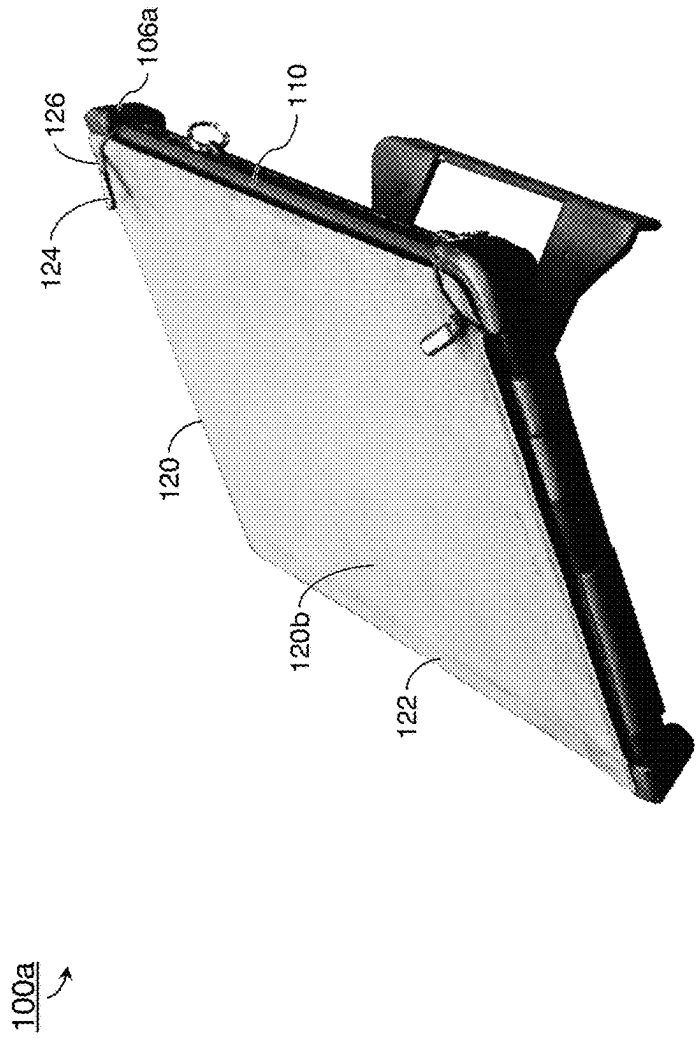


FIG. 2B

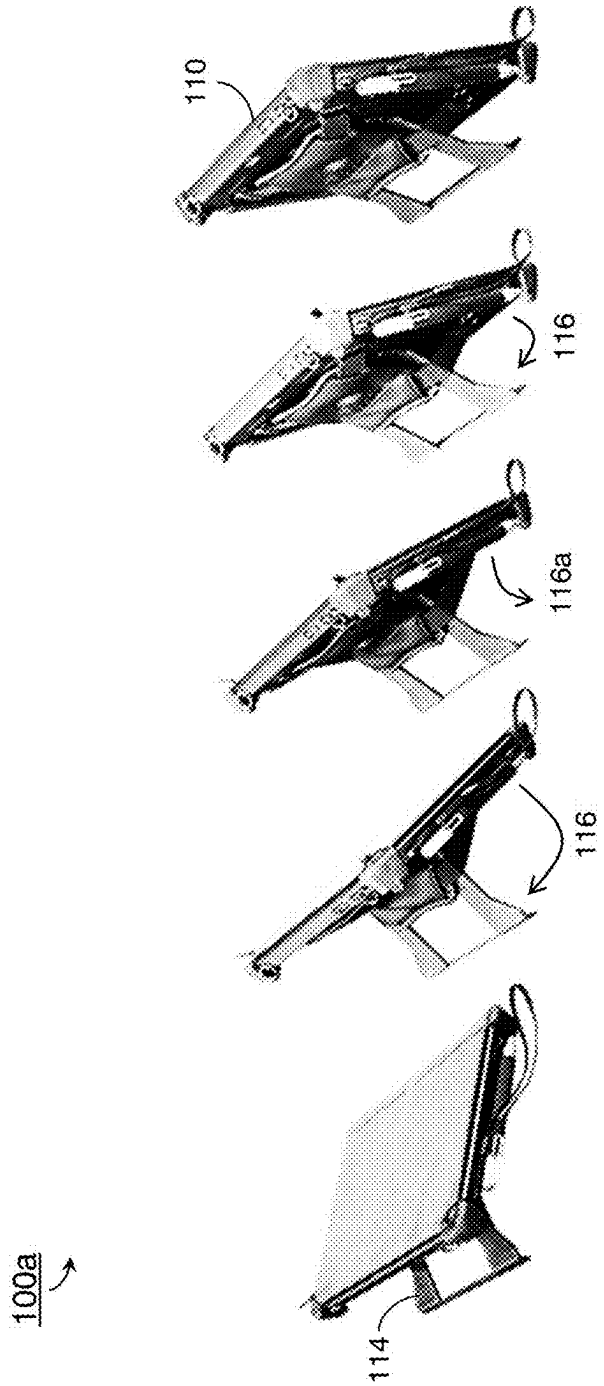


FIG. 3

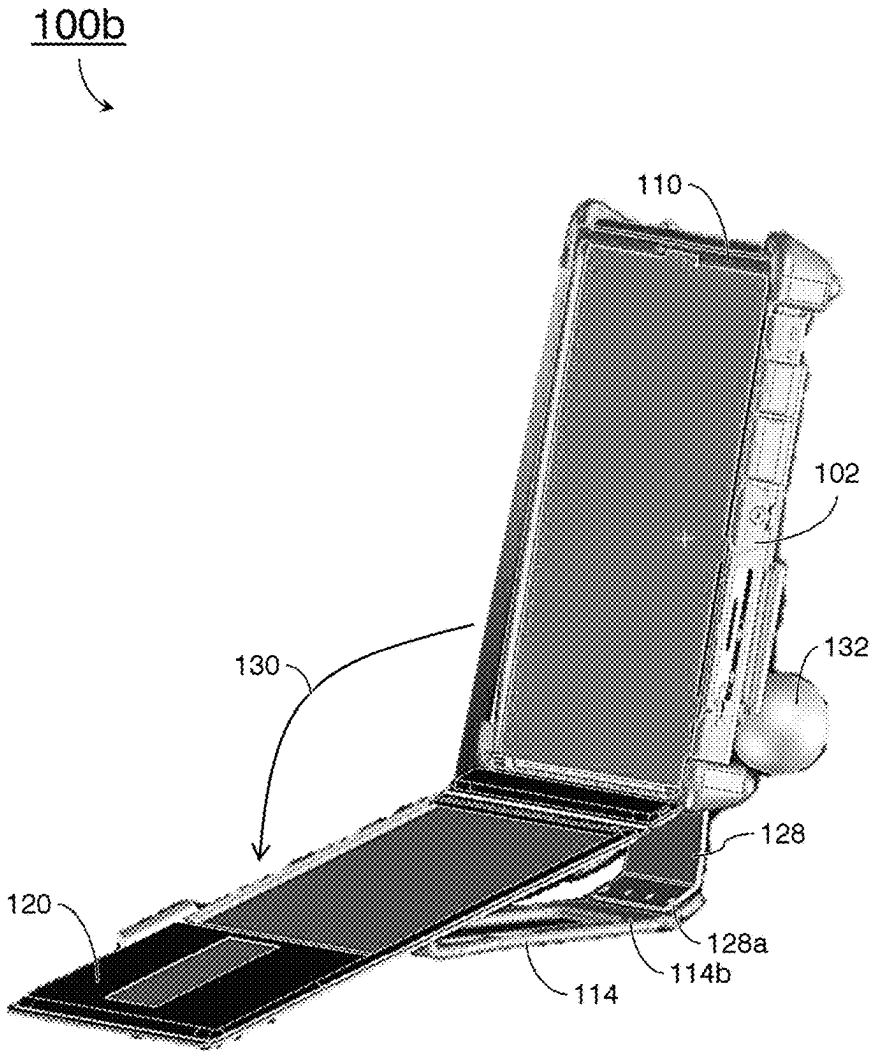


FIG. 4

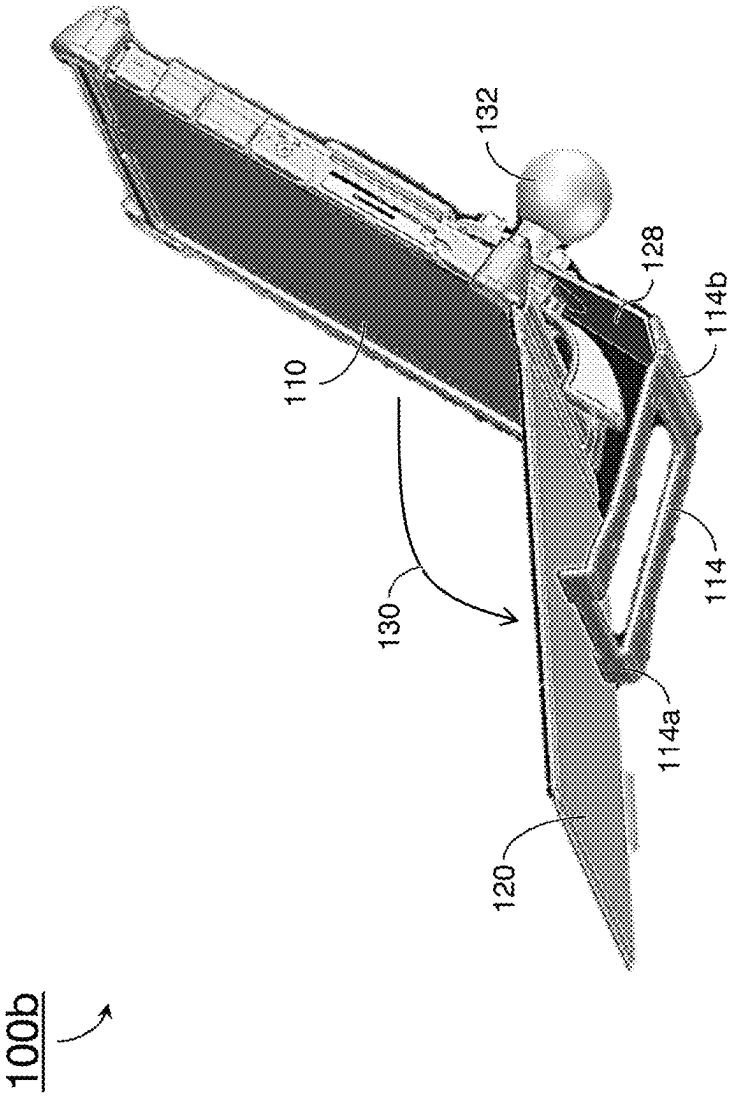


FIG. 5

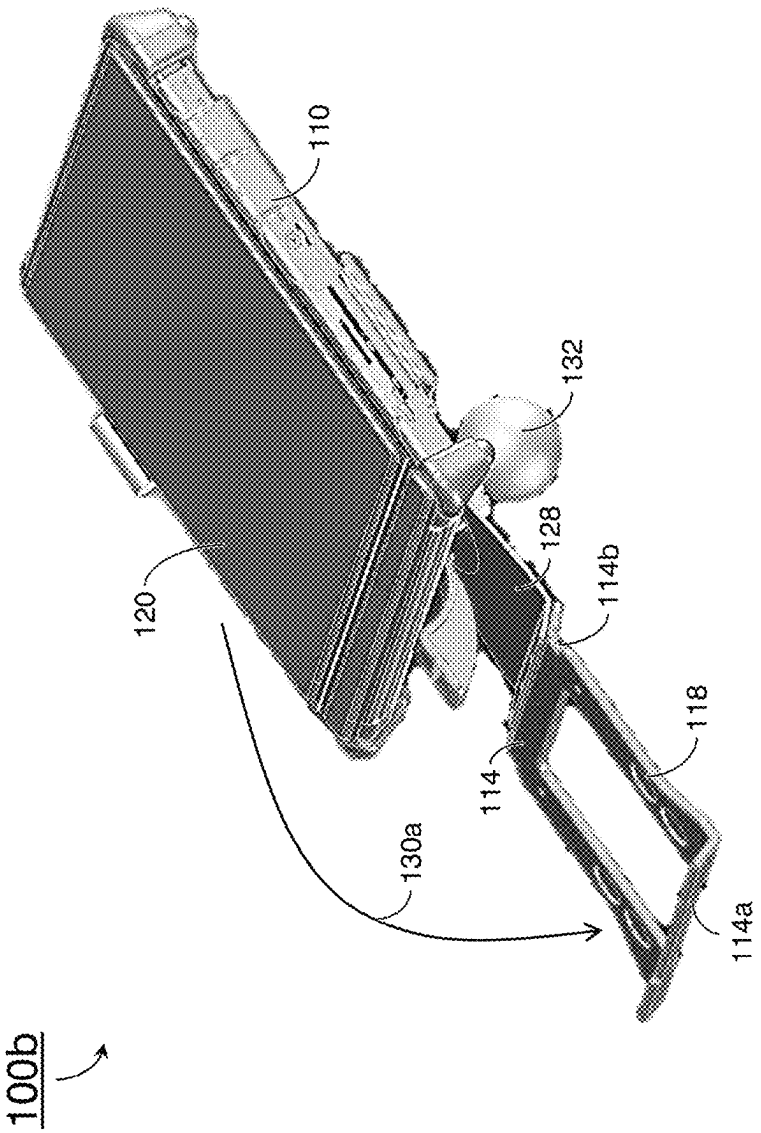


FIG. 6

RUGGEDIZED PROTECTIVE CASE WITH EXTENDABLE EASEL/KICKSTAND FOR MOBILE DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

The instant application claims priority under 35 U.S.C. §120 as a continuation-in-part of U.S. patent application Ser. No. 15/441,660 filed Feb. 24, 2017, entitled RUGGEDIZED PROTECTIVE CASE WITH INTEGRATED EASEL KICKSTAND FOR MOBILE DEVICE. The instant application claims priority under 35 U.S.C. §119(e) to provisional U.S. Patent Application Ser. No. 62/299,360, filed on Feb. 24, 2016, and Ser. No. 62/305,885, filed Mar. 9, 2016. Said U.S. patent application Ser. No. 15/441,660, 62/299,360, and 62/305,885 are herein incorporated by reference in their entirety.

SUMMARY

Said U.S. patent application Ser. No. 14/137,502 is herein incorporated by reference in its entirety.

BRIEF DESCRIPTION OF THE DRAWINGS

Implementations of the inventive concepts disclosed herein may be better understood when consideration is given to the following detailed description thereof. Such description makes reference to the included drawings, which are not necessarily to scale, and in which some features may be exaggerated and some features may be omitted or may be represented schematically in the interest of clarity. Like reference numerals in the drawings may represent and refer to the same or similar element, feature, or function. In the drawings:

FIG. **1**A is an overhead view of an exemplary embodiment of a ruggedized protective case according to the inventive concepts disclosed herein;

FIG. **1**B is a rear view of the protective case of FIG. **1**A;

FIG. **1**C is an overhead view of the inner housing of FIG. **1**C;

FIGS. **2**A and **2**B are side views of the protective case of FIG. **1**A, including a mobile device;

FIG. **3** illustrates operations of the protective case of FIG. **2**B; and

FIGS. **4** through **6** illustrate the addition of an easel bracket to the ruggedized protective case of FIG. **1**.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Referring to FIGS. **1**A through **1**C, a ruggedized protective case **100** for a mobile device is shown. The protective case **100** may be sized to a particular mobile device or class thereof; for example, the protective case **100** may be configured to partially or fully enclose the rear face (e.g., the face opposite the screen or display surface) of a tablet or smartphone, protecting the mobile device from shock or from the elements. The protective case **100** may include a rigid inner housing **102** molded from enterprise-grade high impact plastic or a similar lightweight, durable, rigid material. The inner housing **102** may contact the rear face of the mobile device via an inner surface **102***a*. The protective case **100** may include a flexible or rubberized outer housing **104** removably attachable to, and partially enclosing, the inner housing **102**. For example, the outer housing **104** may include protective coverings corresponding to gaps in the inner housing **102** and hingedly attached to the outer housing, the protective coverings insulating ports or drives (e.g., USB ports, power inputs) positioned in the edges of the mobile device. Further, the outer housing **104** may include reinforced rubberized bumpers (**106**) providing added impact protection to the corners of the mobile device; it is contemplated that the bumpers **106** may provide sufficient protection to meet MIL-STD-810G testing standards. The protective case **100** may include one or more carrying handles **108** for transport of the mobile device. The protective case **100***a* may include an adjustable carrying strap **112** attached to the inner housing **102**.

The protective case **100** may include a kickstand **114** comprised of a rigid metal core overmolded in rubber or a like synthetic rubberized material. The kickstand **114** may be attached to the exterior of the inner housing **102** by one or more friction hinges, incorporating hinge knuckles and pivot pins to create tension forcing the outer end (**114***a*) of the kickstand away from the inner housing **102** in a radial fashion, separating the kickstand **114** from the inner housing **102**. The kickstand **114** may be manipulated by a user to hold the kickstand at any desired angle (**116**) from the inner housing **102** to which it is positioned (as opposed to being positionable to one of a finite set of detent positions) through a rotational angle of substantially 170-180 degrees, thus positioning the mobile device **110** at an angle (**116***a*) to a substantially flat, horizontal working surface. For example, should the kickstand **114** be extended to the maximum desired angle, both the kickstand **114** and the mobile device **110** (e.g., the screen or display surface of the mobile device) would be substantially parallel to the flat surface against which the mobile device **110** is positioned. It may be noted that the angle **116** between the kickstand **114** and the inner housing **102**, the angle **116***a* between the mobile device **110** and the working surface, and the angle **116***b* between the kickstand **114** and the working surface may define a triangle, and thus total 180 degrees between the three angles **116**, **116***a-b*. The rubberized outer end **114***a* of the kickstand **114** may serve to hold the kickstand **114**, and thus the mobile device **110**, in the desired orientation to which it has been positioned on the working surface. As the metal core of the kickstand **114** may include a passive magnetic material, the inner housing **102** may include one or more magnets **118** for holding the kickstand **114** in place when repositioned to a substantially flush position against the inner housing **102**. The magnets **118** may be appropriately shielded to insulate the mobile device **110** and its components from magnetic corruption.

Referring now to FIGS. **2**A and **2**B, the protective case **100***a* may be implemented and may function similarly to the protective case **100** of FIG. **1**, except that the protective case **100***a* may include a mobile device **110**. The mobile device **110** may include a portable keyboard **120** for use with the mobile device. For example, the portable keyboard **120** may comprise electronics housed within a flexible, rubberized sheet, the electronics connected to keys and touch-sensitive surfaces situated within an inner surface (**120***a*). Referring in particular to FIG. **2**B, the portable keyboard **120** may be magnetically attachable (**122**) to the mobile device **110** and have an outer surface (**120***b*) serving as a protective cover for the mobile device **110** and its display surface. One or more reinforced rubberized bumpers (**106***a*) may include corner tabs **124** attached to the reinforced rubberized bumpers by spring-loaded cables (**126**). For example, when the outer surface **120***b* is positioned to cover the mobile device **110** (as shown by FIG. **2**B), the corner tabs **124** may be

extended from the reinforced rubberized bumpers **106***a*, retracting automatically to secure the portable keyboard **120** to the mobile device **110**.

Referring to FIG. **3**, the kickstand **114** may be repositioned to any desired angle **116** to the outer housing **102** in order to position the mobile device **110** at a desired angle (**116***a*) to a working surface.

Referring to FIGS. **4-6**, the protective case **100***b* may be implemented and may function similarly to the protective cases **100**, **100***a*, except that the protective case **100***b* may incorporate a kickstand **114** extended by an easel bracket **128** attached to the rigid inner housing **102**. For example, the easel bracket **128** may connect to the hinged end (**114***b*) of the kickstand **114** via tabs configured to fit a matching set of holes (**128***a*) in the easel bracket. The hinged end **114***b* of the kickstand **114** may be positioned at any desired angle to the easel bracket **128**, such that the rubberized outer end **114***a* of the kickstand **114** may engage and support a portable keyboard **120** of the mobile device **110** (e.g., whether the mobile device **110** is a laptop computer or tablet-type device including a detachable portable keyboard). Referring in particular to FIGS. **4** and **5**, the mobile device **110** and portable keyboard **120** may be supported by the kickstand **114** and easel bracket **128** at a substantially obtuse angle (**130**) for use, e.g., when the mobile device **110** is mounted for hands-free vehicular use via a ball mount **132**. Referring in particular to FIG. **6**, the kickstand **114** may be positioned at a substantially horizontal angle (**130***a*) to the easel bracket **128** in order to support the portable keyboard **120** at a near horizontal angle to the mobile device **110**.

We claim:

1. A ruggedized protective case for a mobile computing device, comprising:

an inner housing configured to partially enclose a mobile computing device, the inner housing fashioned of a rigid material;

an outer housing configured to partially enclose the inner housing, the outer housing fashioned of a flexible material and including one or more reinforced corners, each reinforced corner configured to provide impact protection to a corner of the mobile computing device;

a kickstand having an inner portion coupled to the inner housing and an outer portion comprising a rigid core overmolded with the flexible material, the outer portion coupled to the inner portion by a hinged end and having a rubberized end opposite the hinged end and configured to engage and support a keyboard of the mobile device at a first angle to the mobile device, the outer portion positionable at a second angle of at most 180 degrees to the inner portion.

2. The ruggedized protective case of claim **1**, wherein the mobile computing device includes at least one of a tablet, a laptop computer, and a smartphone.

3. The ruggedized protective case of claim **1**, wherein the rigid core is at least partially fashioned of a passive magnetic material.

4. The ruggedized protective case of claim **3**, wherein the inner housing includes at least one magnet configured to secure the kickstand to the inner housing by engaging with the passive magnetic material.

5. The ruggedized protective case of claim **4**, wherein the at least one magnet is at least partially enclosed in a shield configured to insulate the mobile computing device from the at least one magnet.

6. The ruggedized protective case of claim **1**, wherein the one or more reinforced corners include at least one corner tab coupled to the reinforced corner by a flexible cable, the corner tab configured to secure a covering to the mobile computing device.

7. The ruggedized protective case of claim **1**, wherein:

the rigid material includes a high impact plastic; and

the flexible material includes a synthetic rubber.

8. The ruggedized protective case of claim **1**, wherein the rubberized end is configured to conform to an edge of the inner housing when the kickstand is secured to the inner housing.

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