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**Mason et al.**

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(54) **APPLICATOR FOR APPLYING PROTECTIVE COVERINGS TO ELECTRONIC DEVICE DISPLAYS**

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#### **Related U.S. Application Data**

(63) Continuation of application No. 17/521,071, filed on Nov. 8, 2021, now Pat. No. 11,772,321, which is a continuation of application No. 16/877,845, filed on May 19, 2020, now Pat. No. 11,167,470, which is a continuation of application No. 14/484,625, filed on Sep. 12, 2014, now Pat. No. 10,688,712.

(60) Provisional application No. 61/876,935, filed on Sep. 12, 2013.

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(52) **U.S. Cl.**

CPC ..... **B29C 63/02** (2013.01); **B29C 63/0004** (2013.01); **C09J 7/22** (2018.01); **B29C 2063/027** (2013.01); **B32B 2037/109** (2013.01); **B32B 2037/268** (2013.01); **Y10T 156/17** (2015.01); **Y10T 428/1471** (2015.01)

(58) **Field of Classification Search**

CPC ..... **B32B 2037/109**; **B29C 2063/027**  
See application file for complete search history.

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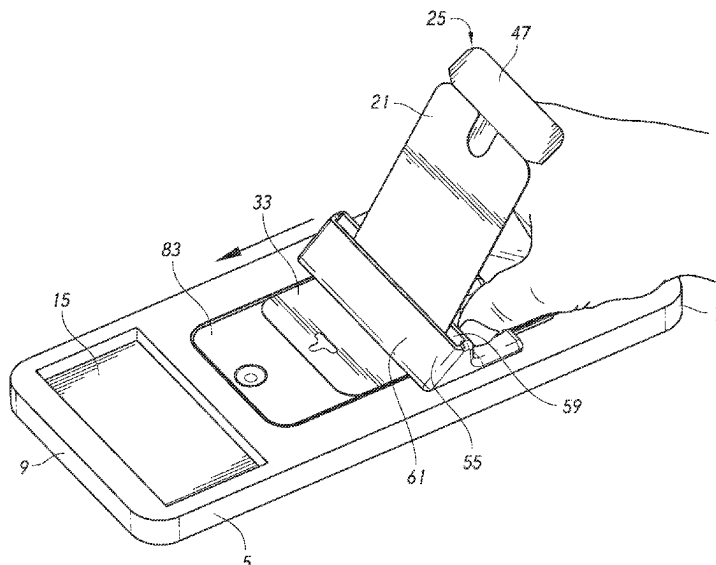
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(57) **ABSTRACT**

An applicator is provided for applying protective films to electronic device displays. The applicator includes a base, a screen protector, and a squeegee. The base includes a pocket for receiving an electronic device. The screen protector is affixed to the base so as to overlie an electronic device. The screen protector preferably includes three layers including a protective film, cap sheet, and back liner. The squeegee is provided for removing the back liner and for simultaneously affixing the protective film to an electronic device.

**5 Claims, 14 Drawing Sheets**



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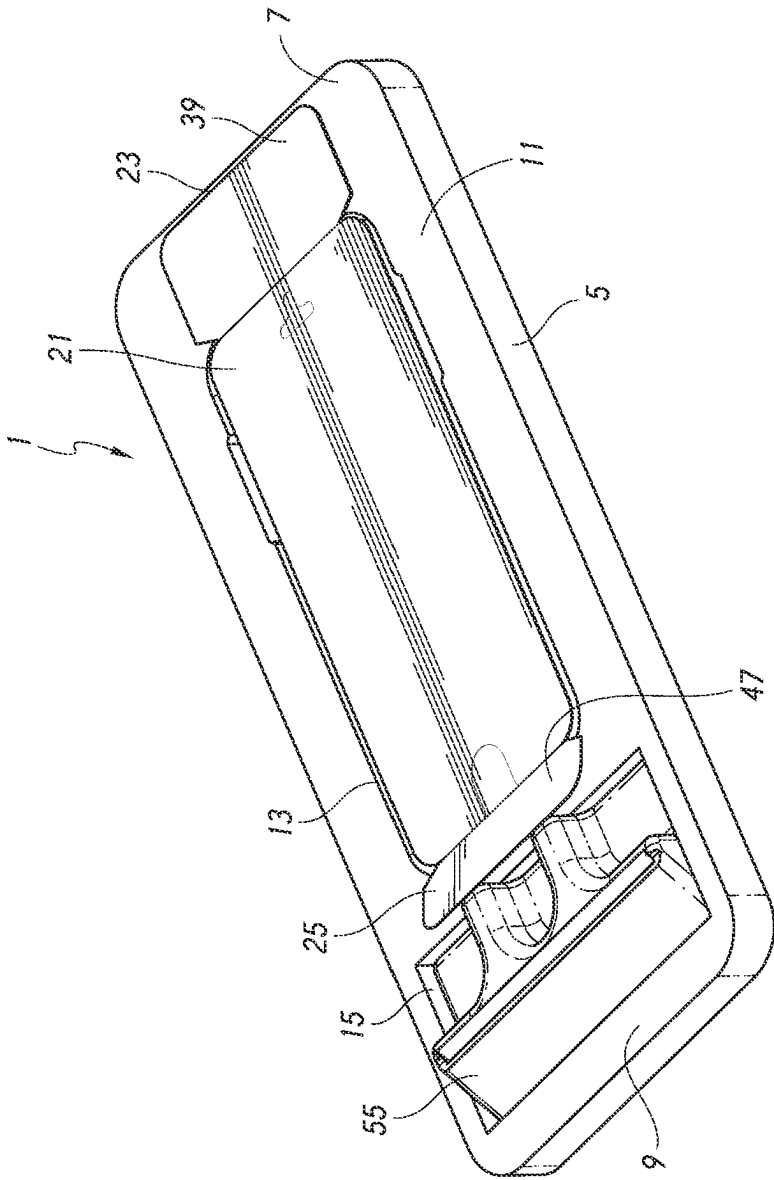
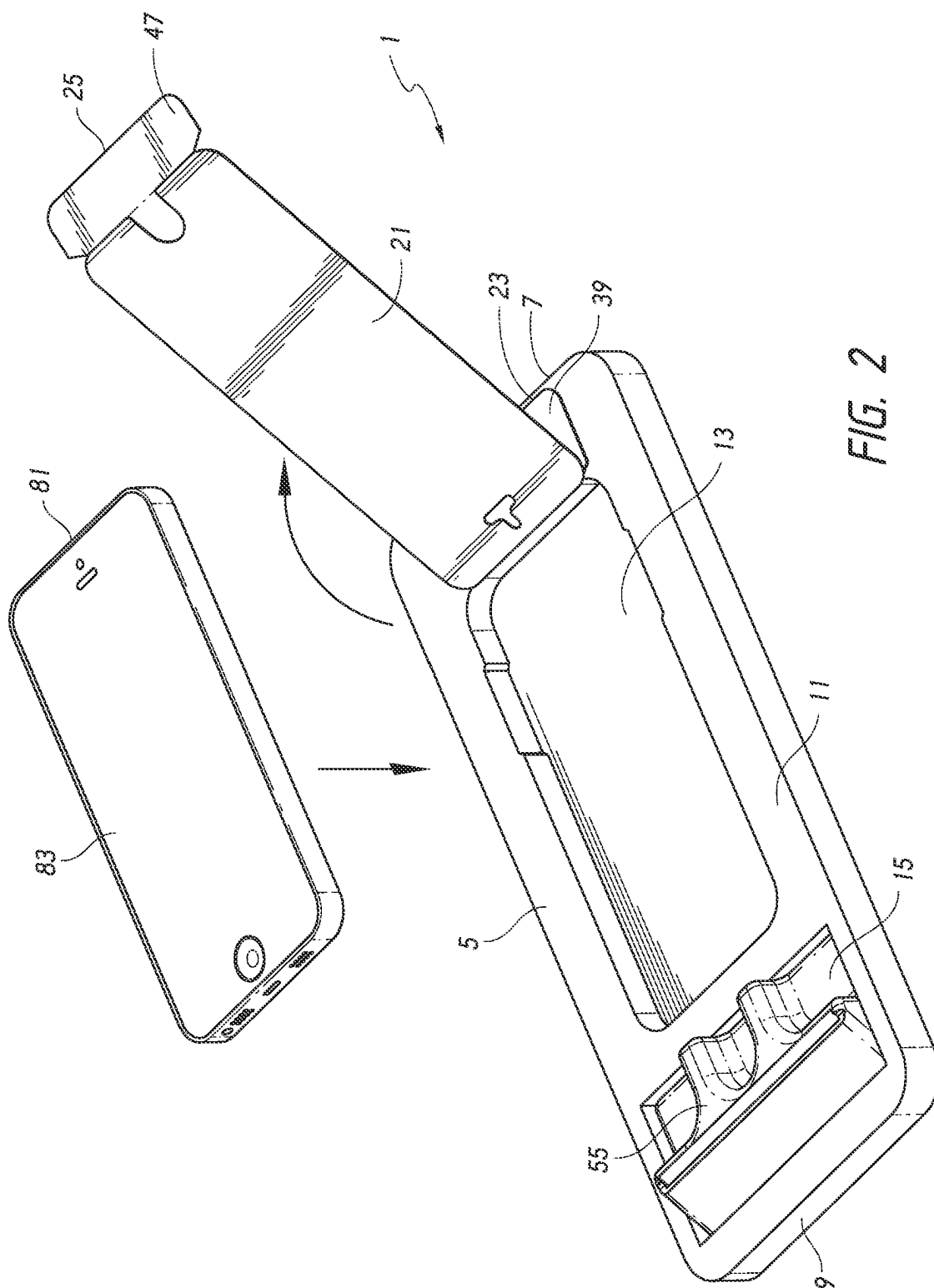
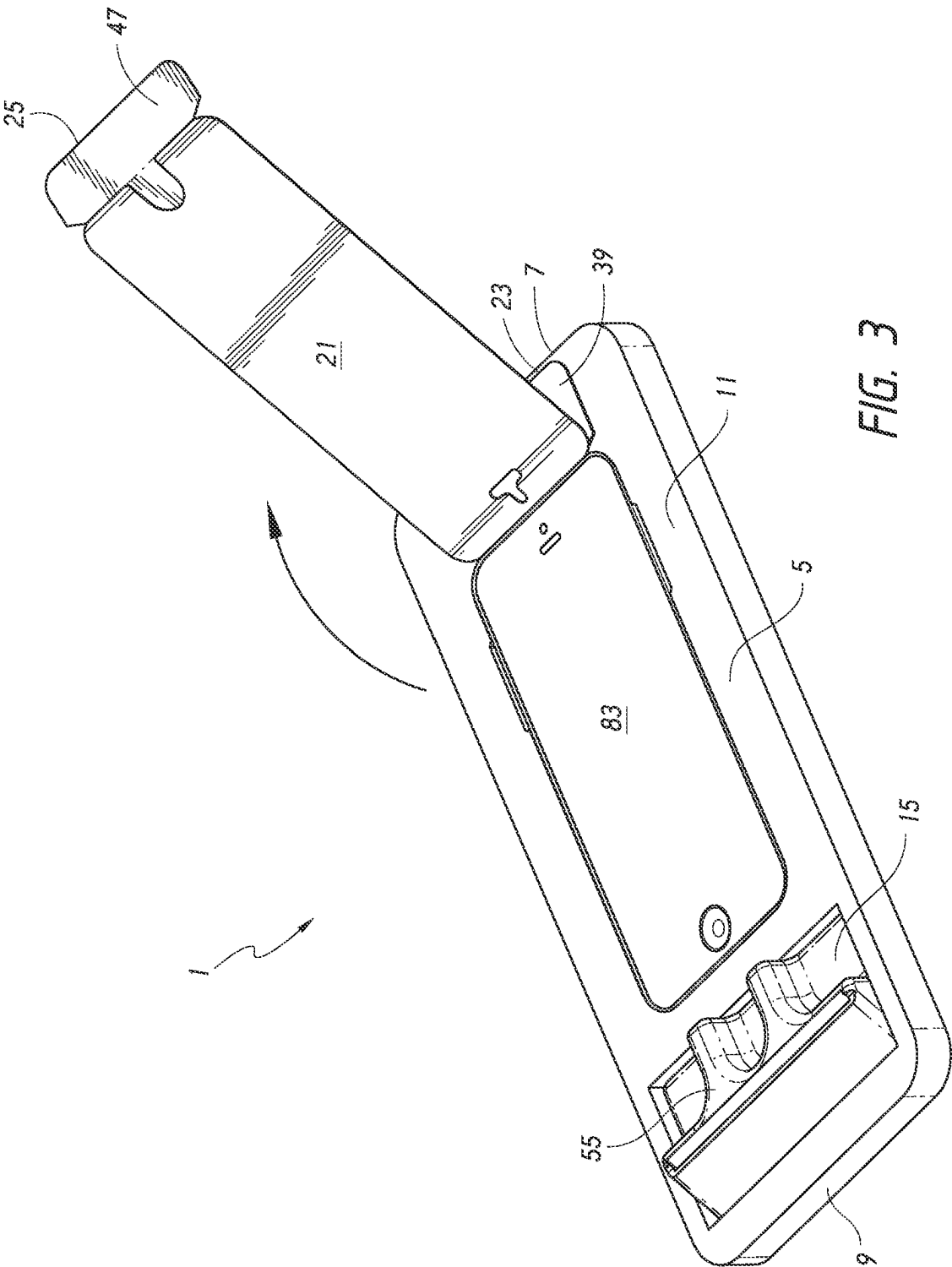
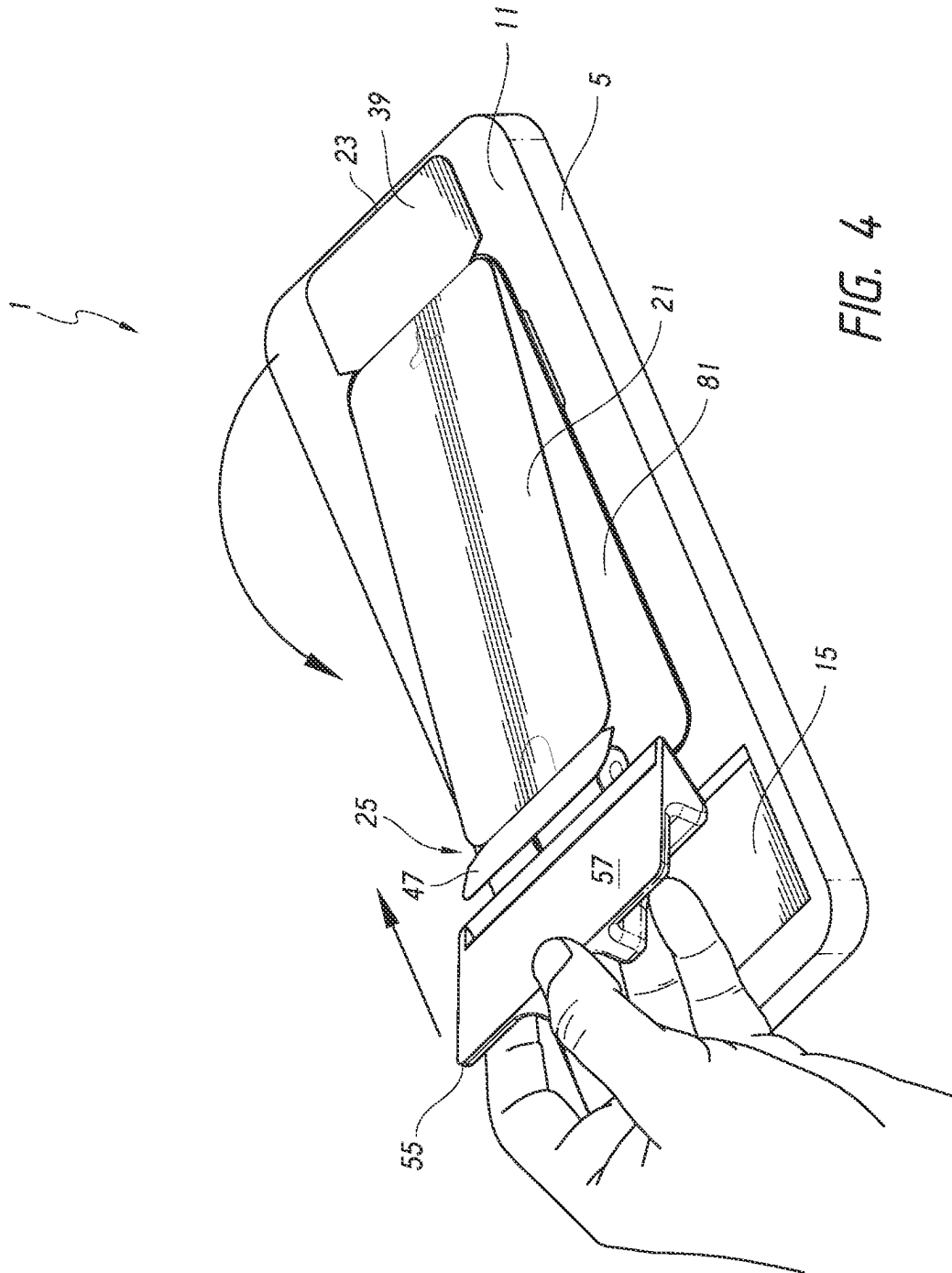


FIG. 1







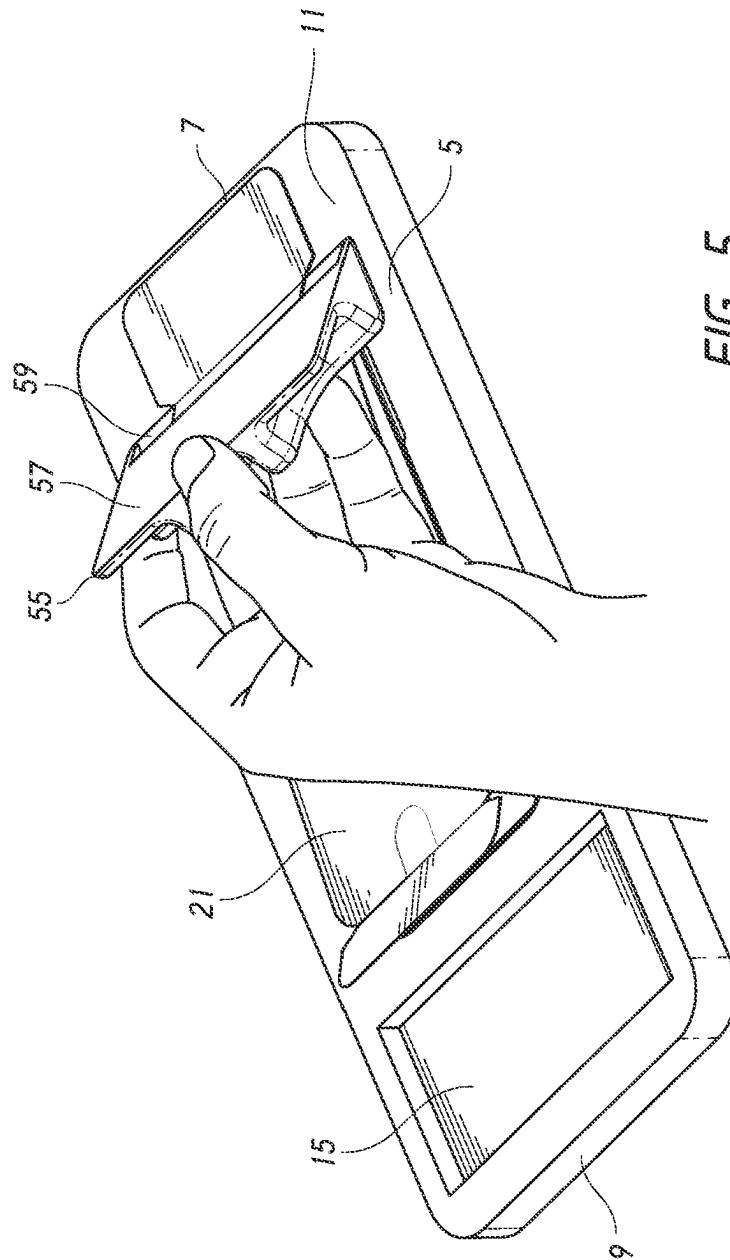


FIG. 5

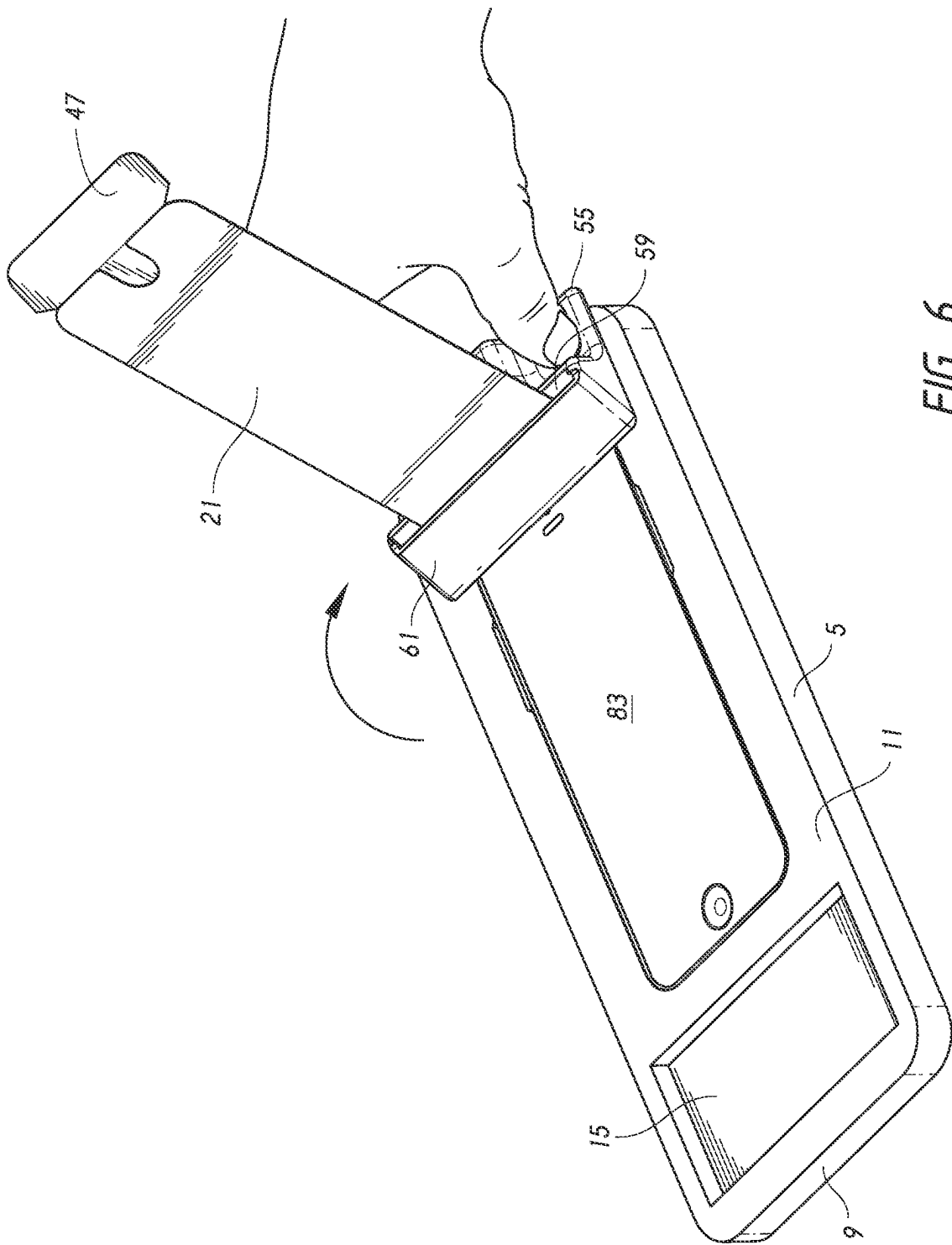
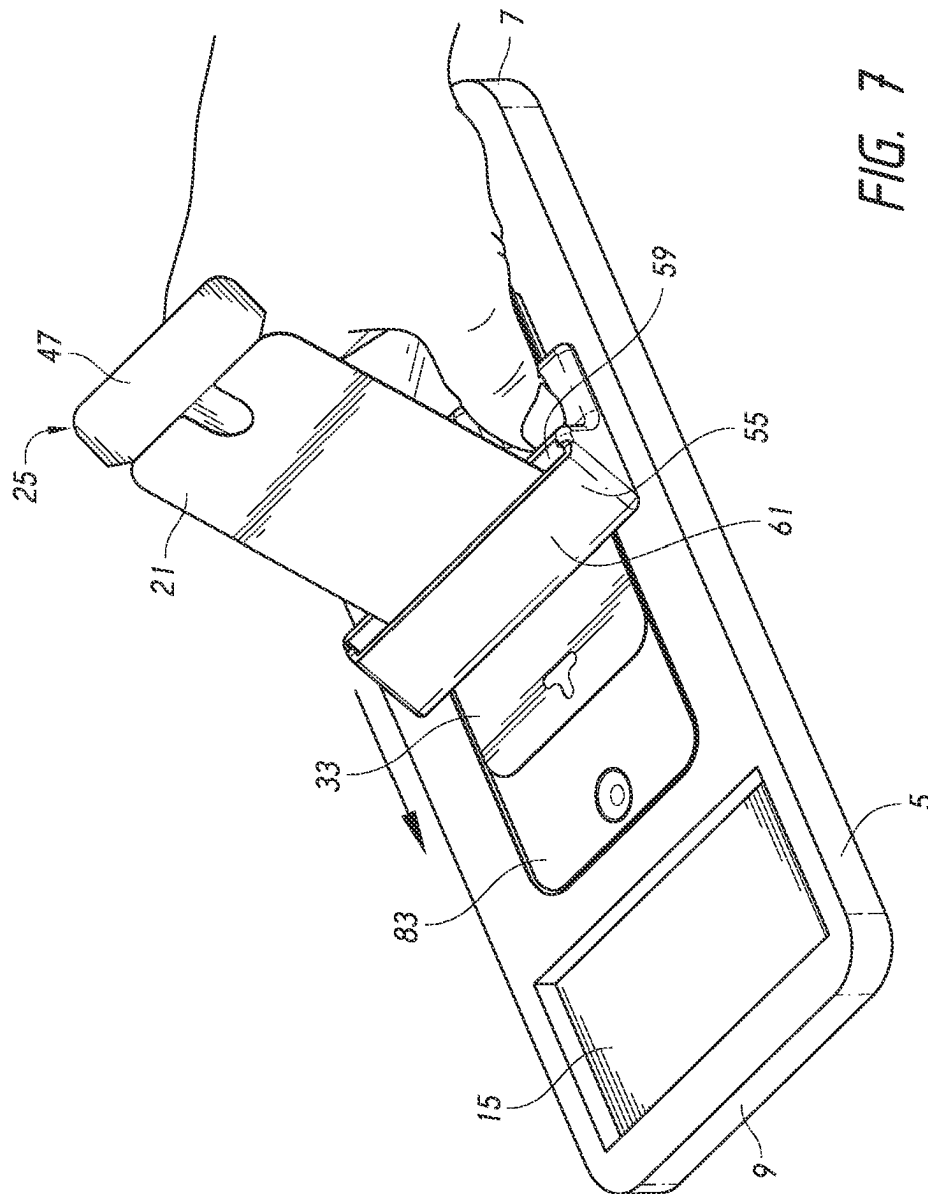
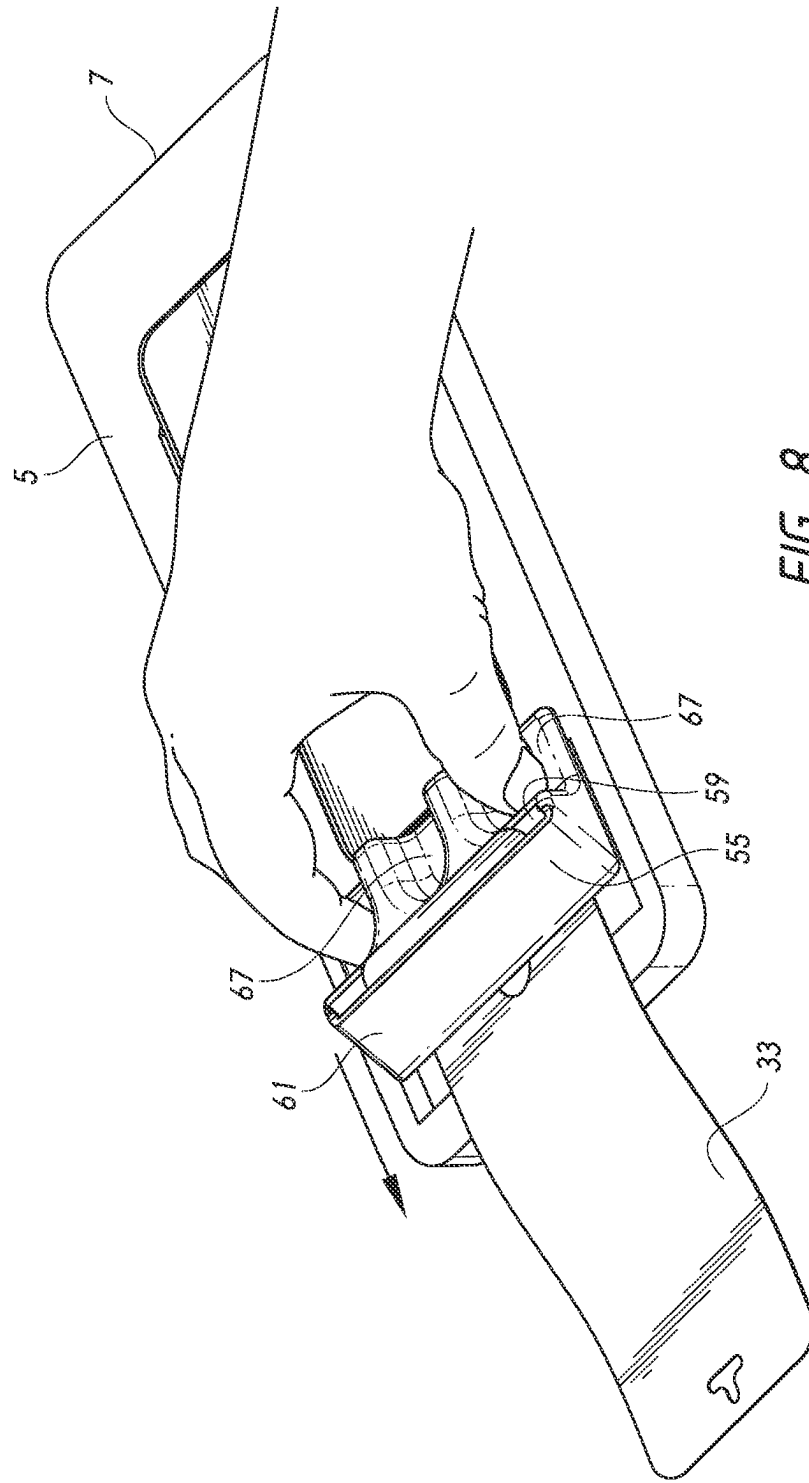
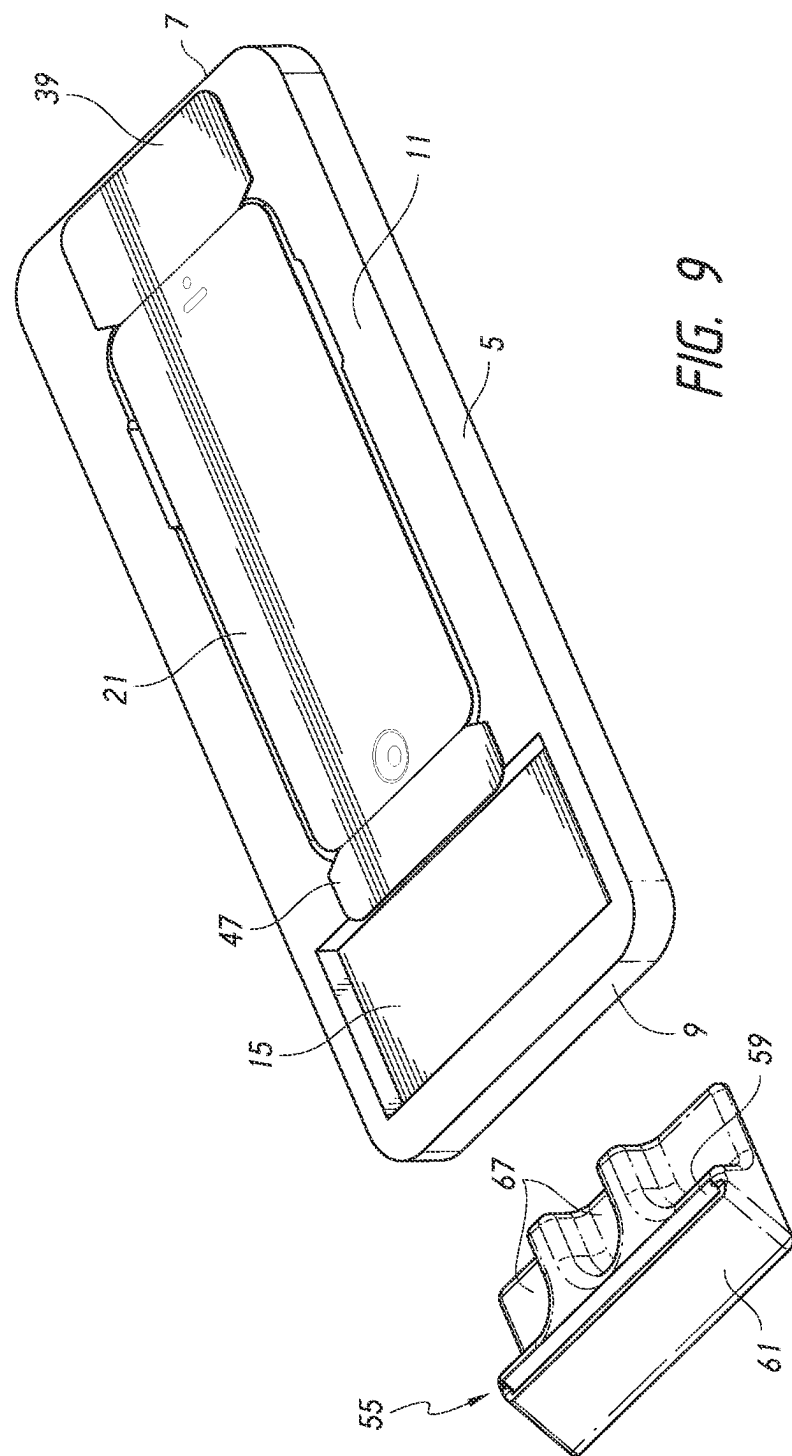


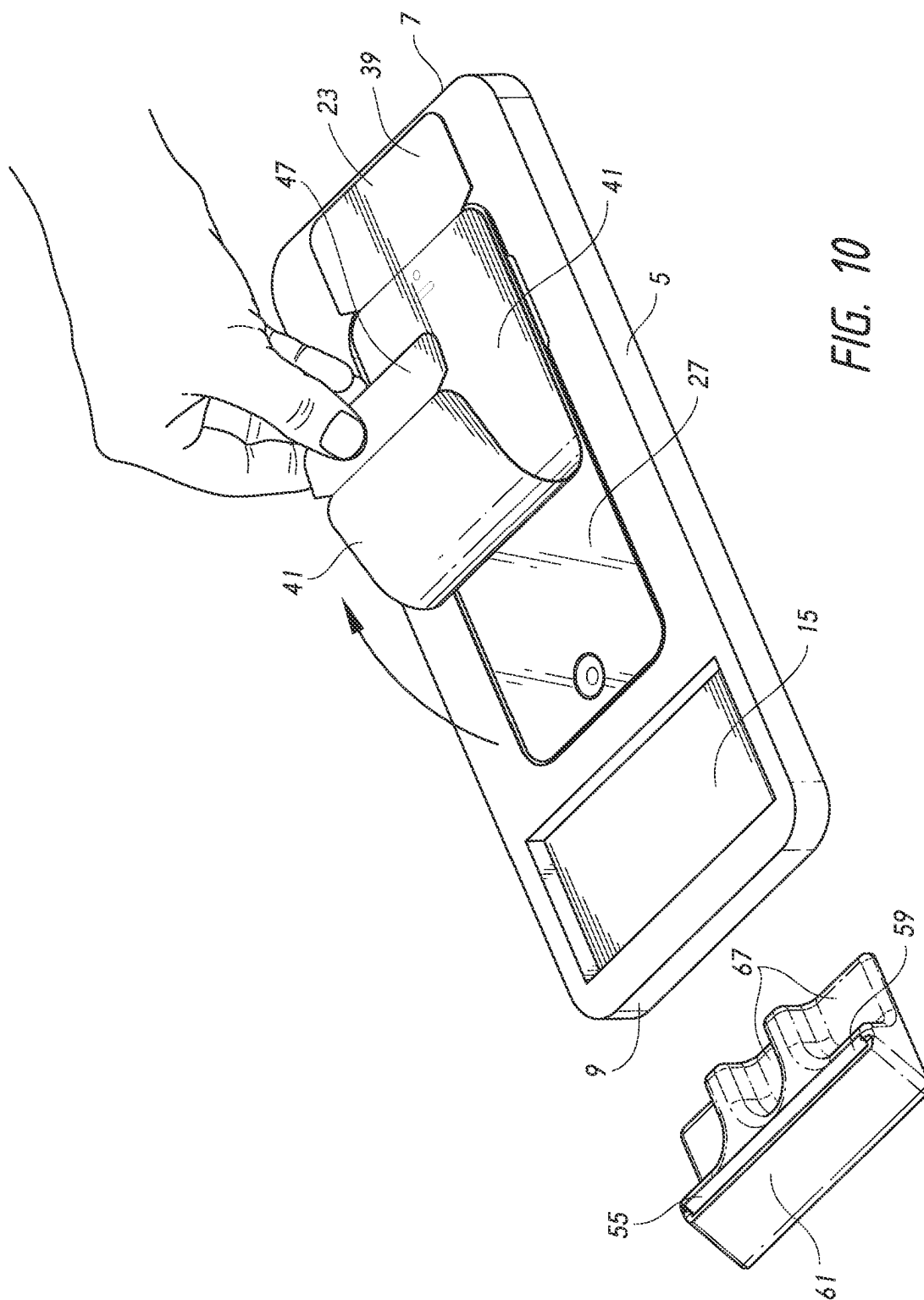
FIG. 6

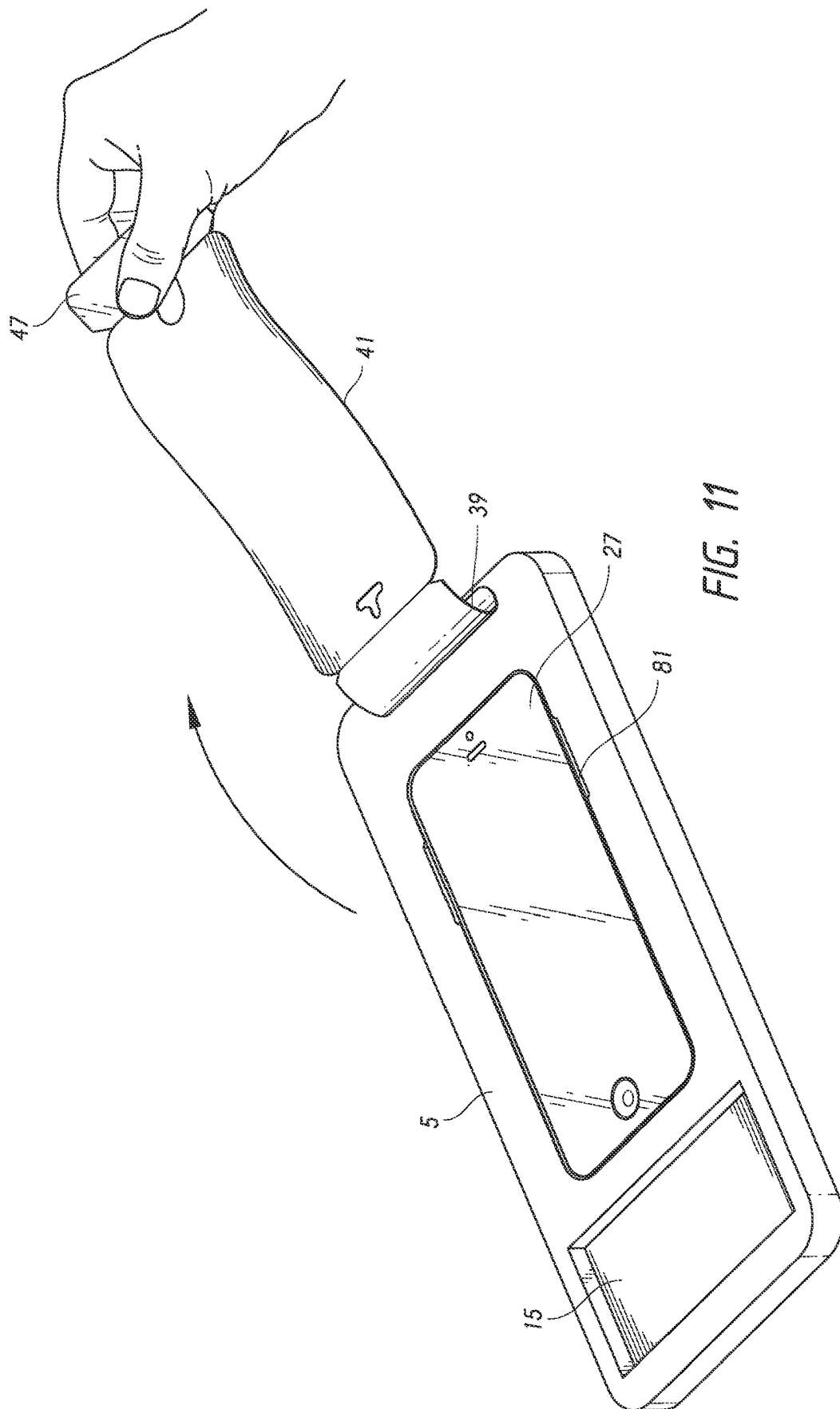












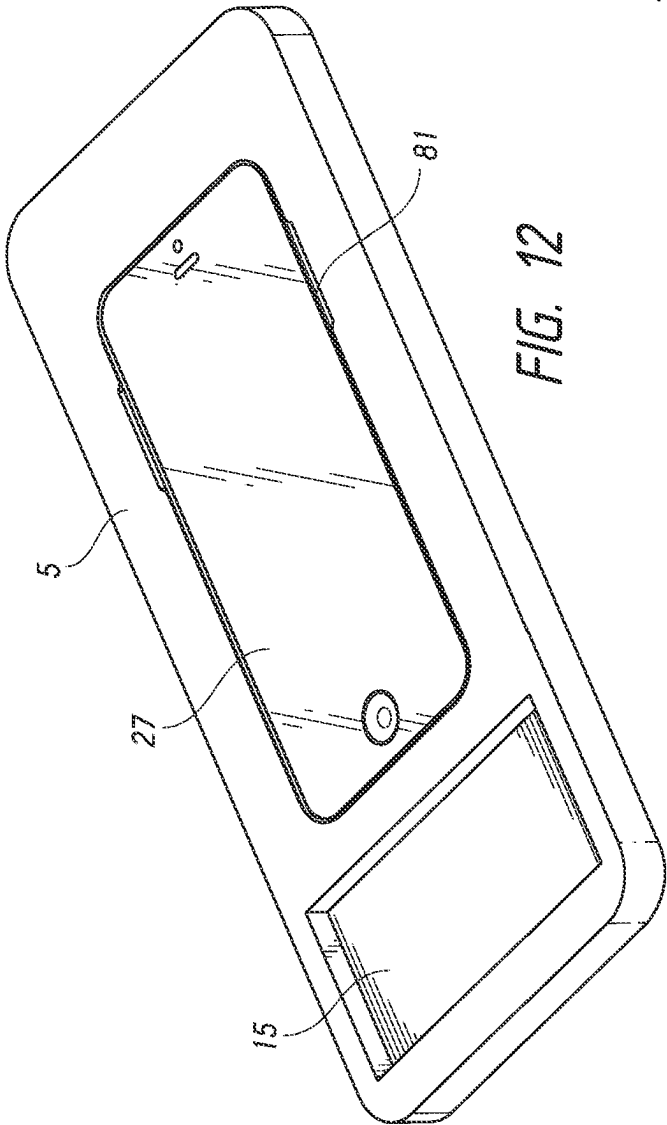


FIG. 12

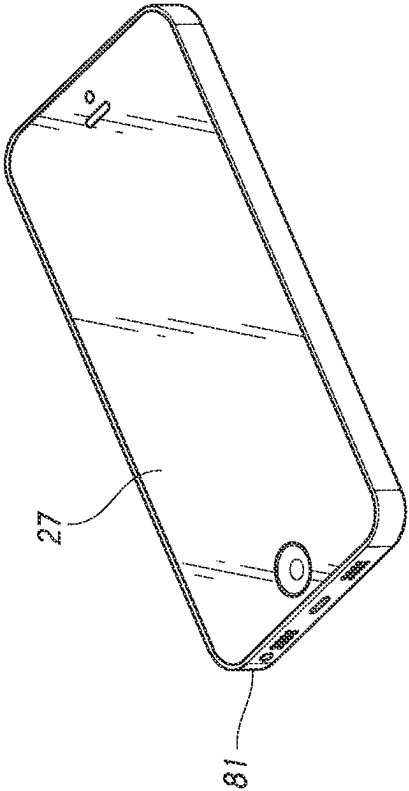


FIG. 13

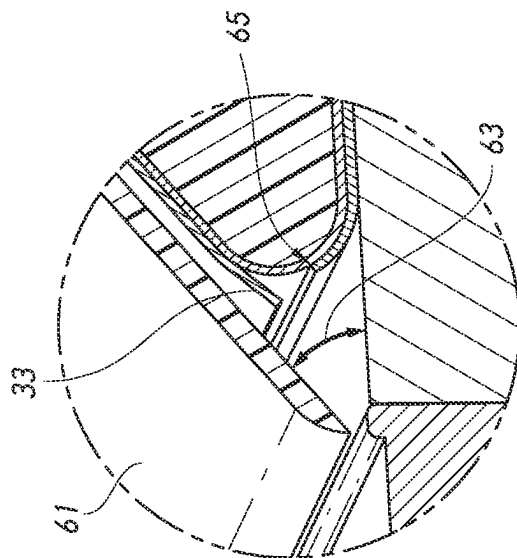
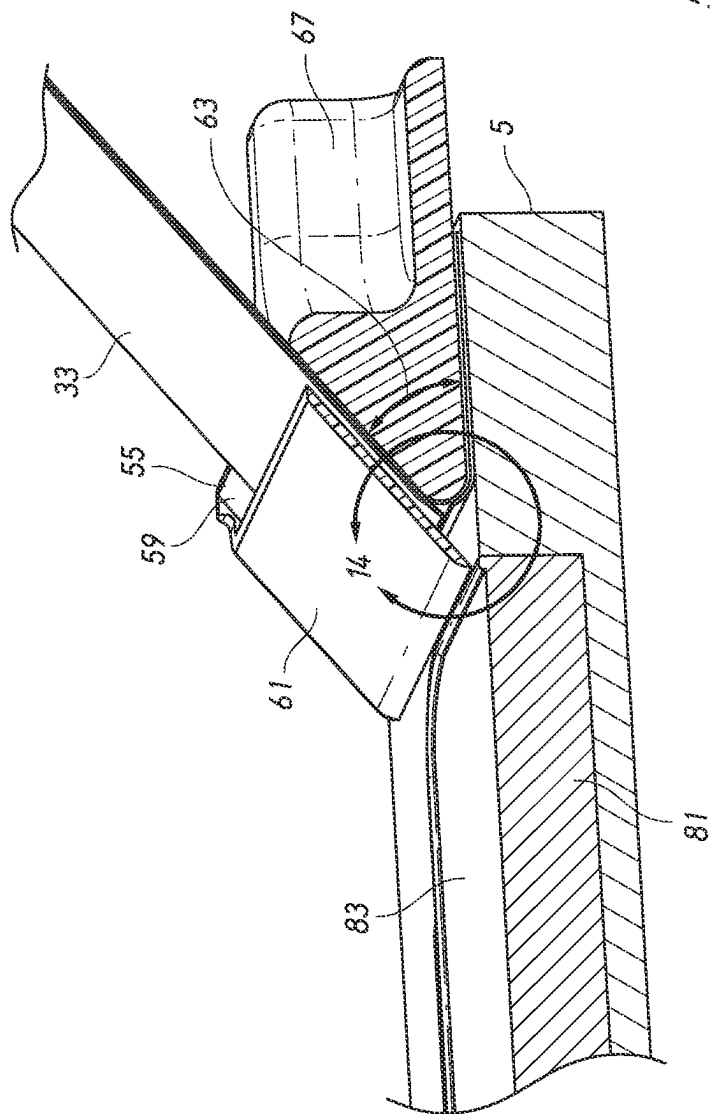


FIG. 15

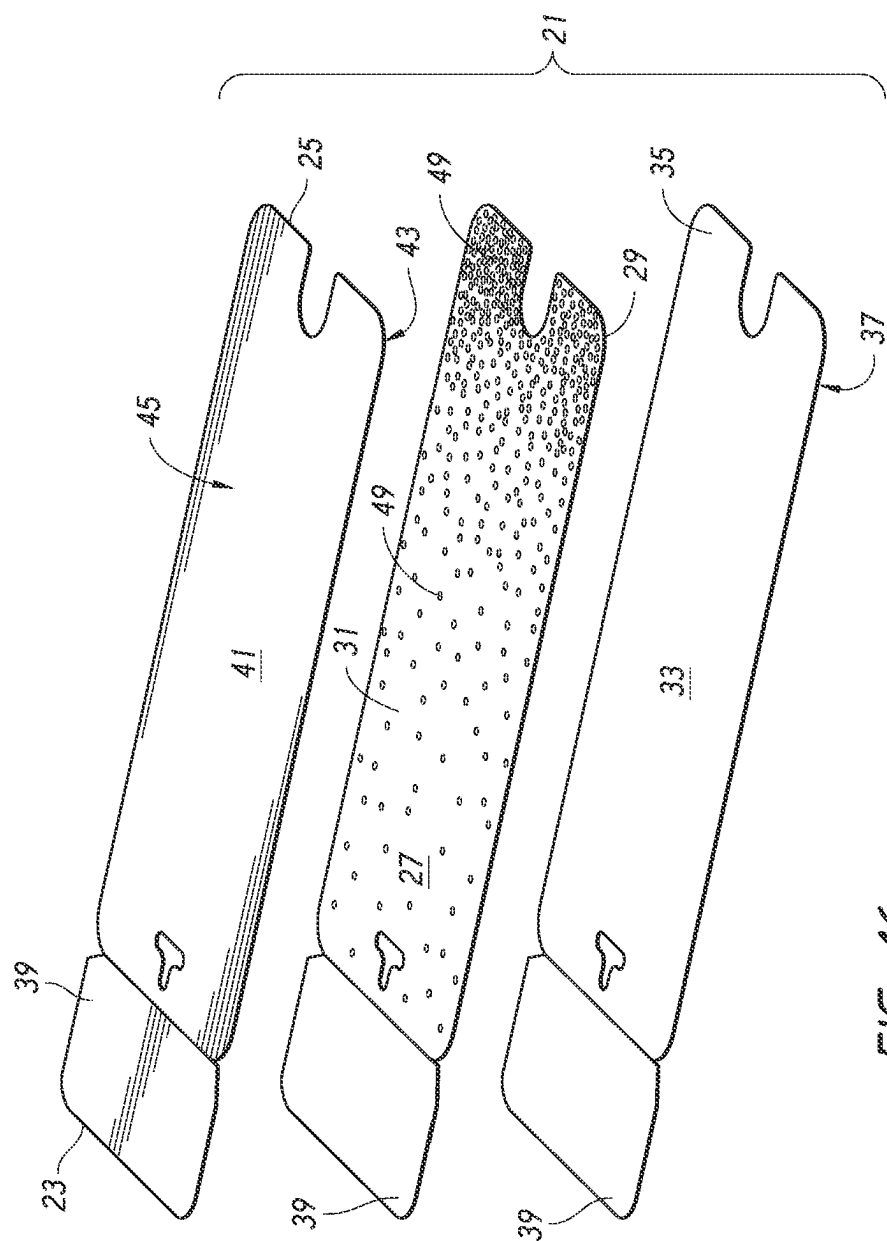


FIG. 16



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# **APPLICATOR FOR APPLYING PROTECTIVE COVERINGS TO ELECTRONIC DEVICE DISPLAYS**

## **BACKGROUND OF THE INVENTION**

The present invention relates to protective coverings. More particularly, the present invention relates to protective coverings for the screen displays of electronic devices. Even more particularly, the present invention relates to an applicator for applying protective coverings to electronic device screens.

Portable electronic devices have proliferated in modern society. These devices include cellular telephones, digital music players, tablet computers, personal digital assistants, notebook computers and even electronic watches. Each of these devices typically has an electronic display in the form of a screen for displaying information. Often these screens are "touch" screens which act as a graphical interface.

Various attempts have been made to protect the electronic displays. For example, phone covers have been developed for covering all surfaces of a phone except for the display. The edges of the phone are protected from shock, scratches or the like. Moreover, these covers provide some protection to the screen by extending beyond the edge of the screen. Gorilla Glass® is a hardened glass which provides some additional protection compared to traditional glass. However, even this type of glass can break or scratch.

Translucent films have been developed for protecting an electronic display. An example of such a film protector is disclosed in U.S. Pat. No. 7,957,524 which describes a kit including a film, squeegee and liquid for applying the film to the screen of an electronic device such as a cellular telephone. These films provide excellent protection for the screen against scratching and impact shock. More recently, films have been developed which provide anti-bacterial properties.

Unfortunately, application of the translucent film to the display can be troublesome. Earlier films required that a liquid solution be applied to the screen prior to application of the film. The liquid solution activated the adhesive on the film by allowing the film to slide into its proper position and allow air bubbles to escape. Unfortunately, the use of the liquid solution was messy, annoying, and could void manufacturers warranties on the cellular telephones as the manufacturers were concerned that the liquid could interfere with the operation of the electronic device.

More recently, "dry" films have been developed which do not require a liquid solution to squeeze out bubbles. Unfortunately, even these dry films are difficult to install and prone to fingerprints forming under the shield adjacent to the electronic display.

U.S. Patent Application No. 2012/0211170 and U.S. Patent Application No. 2012/0211171 disclose applicators for applying shields to electronic displays. Unfortunately, even these applicators are difficult to use and prone to failure.

Accordingly, there is a need for an improved applicator for applying protective films to the displays of electronic devices.

Preferably, the improved applicator would be inexpensive to manufacture and easy to use.

Preferably, the improved applicator would firmly hold an electronic display in place while applying a protective film to the device's electronic display.

## **SUMMARY OF THE INVENTION**

The present invention addresses the aforementioned disadvantages by providing an improved applicator for apply-

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ing protective films to electronic device displays. Preferably, the applicator is provided in a kit form which is packaged to include each of the elements for applying a protective film. The applicator includes a screen protector. The term "screen protector" is often used to refer to a single sheet of film which has been applied to an electronic device's display. However, herein the term "screen protector" is intended to refer to the protective film to be applied to an electronic device, as well as a back liner which covers the protective film's adhesive prior to application of the protective film to a display. More preferably, the preferred screen protector of the present invention includes three layers including a protective film, a back liner and a cap sheet.

The protective film is made of a clear plastic, preferably polyurethane, which is precut to cover the display of an electronic device such as a cellular telephone. The screen protector's back liner is a flexible sheet of material, preferably also clear plastic, which covers the adhesive surface of the protective film. The back liner may be adhered to the protective film using various adhesives known to those in the art. However, the back liner is loosely adhered to the protective film so as to allow the back liner to easily peel from the film layer while maintaining sufficient adhesive upon the protective film for the protective film to adhere to an electronic display. Meanwhile, the cap sheet loosely adheres and covers the protective film's upper surface so as to provide protection to the protective film. Again, the cap sheet is loosely adhered to the protective film so as to allow one to peelably remove the cap sheet from the protective film. In a preferred embodiment, the cap sheet is adhered to the protective film in a manner so as to have lesser adherence to the protective film at the end wherein the cap sheet is intended to first peel away from the protective film than at the opposite end of the protective film.

The applicator of the present invention further includes a base having an upper surface and a pocket formed into the base's upper surface. The pocket is sized to receive an electronic device and maintain the electronic device in a predetermined position and alignment with the electronic display positioned to face upwardly. Maintaining the electronic device in a proper position can be accomplished by sizing and shaping the pocket so as to snugly receive the electronic device. Alternatively, various constructions such as pins or shoulders may be incorporated into the base's pocket to maintain the electronic device in a proper position and alignment. Preferably, the base includes a second pocket for receiving a squeegee.

The screen protector and its layers are described herein as having first and second ends. Furthermore, the applicator's base is described herein as having first and second end. The applicator is constructed so that the screen protector's first end is affixed to the base's first end in a manner that positions the screen protector to overly the base's pocket with the back liner adjacent to pocket; the protective film positioned above the back liner; and the cap sheet affixed above the protective film so as to sandwich the protective film between the back liner and cap sheet. Moreover, the cap sheet affixes to the base so as to position the protective film to overly and align with the display of an electronic device that has been positioned within the base's pocket. In a preferred embodiment, the protective film and cap sheet include an edge portion which extends beyond the electronic display so as to also adhere to the base.

The applicator includes a squeegee having a substantially flat bottom surface and a laterally extending bore which forms a slot. The slot is sized for receipt of the screen protector. The slot is constructed to angle relative to the

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squeegee's bottom surface at an angle of less than 90°. Preferably, the squeegee slot is angled relative to the squeegee's bottom surface at between 28° and 48°. The preferred angle between the squeegee's slot and the squeegee's bottom surface **20** is 380.

Preferably, the applicator's base, screen protector and squeegee are prepackaged within traditional packaging such as a box, sleeve or plastic wrapping. Within the packaging, the screen protector is affixed to the base, and the squeegee is positioned with the base's second pocket.

To apply the protective film to an electronic device, the base is removed from the packaging. The squeegee is removed from the base's second pocket. The screen protector, which overlies the base's first pocket, is folded backwardly more than 90° and an electronic device is placed within the base's first pocket with the electronic device's display positioned to face upwardly. While folded back, the screen protector is projected into the squeegee's slot in a manner that maintains the squeegee's bottom surface parallel to the electronic device, and the squeegee is slid downwardly while receiving the screen protector until the squeegee's bottom surface engages the base. As a result of the screen protector bending backwardly, the protective film peels away from the screen protector's back liner. Thereafter, the squeegee is slid across the base's upper surface and the electronic device's display so as to cause the back liner to peelably disengage from the protective film while simultaneously forcing the protective film to engage and adhere to the electronic device's display. Advantageously, the squeegee will also simultaneously squeeze out air bubbles between the protective film and electronic device display. Once the squeegee has completely slid across the electronic device, the base liner has been caused to peel away from the protective film.

Thereafter, an individual removes the cap sheet from the protective film by simply peeling the cap sheet from the protective film which has been affixed to an electronic device. Preferably, the cap sheet is peeled away from the protective film at an end wherein the adhesive provides less adhesion than the other end. This change in adhesion can be accomplished those skilled in the art. For example, lesser or more adhesive may be applied between the cap sheet and protective film at their respective ends so as to cause a greater adhesion at one end of the cap sheet than the other. Alternatively, different adhesives having different adhesive properties may be employed to vary the adhesion between the protective film and cap sheet. Once the cap sheet has been removed, the electronic device can be removed from the base's pocket for use with a now protected display.

Thus, it is an object of the present invention to provide an applicator for applying protective films electronic devices.

Moreover, it is an object of the present invention to provide an applicator which can be packaged in kit form for use by non-professionals to apply electronic devices at their homes or businesses.

It is still an additional object of the present invention for providing an applicator which properly aligns and applies a protective film upon an electronic device display which simultaneously removes bubbles.

Other features and advantages of the present invention will be appreciated by those skilled in the art upon reading the detailed description which follows with reference to the attached drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the applicator of the present invention;

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FIG. **2** is a perspective view of the applicator of the present invention illustrating insertion of an electronic device into the base's pocket;

FIG. **3** is a perspective view of the applicator of the present invention illustrating the folding back of the screen protector;

FIG. **4** is a perspective view of the applicator of the present invention illustrating the insertion of the screen protector into the squeegee's slot;

FIG. **5** is a perspective view of the applicator of the present invention illustrating the insertion of the screen protector into the squeegee's slot until the squeegee has engaged the applicator's base;

FIG. **6** is a perspective view of the applicator of the present invention illustrating the squeegee and screen protector having been folded back away from the face of an electronic device and upper surface of the base;

FIG. **7** is a perspective view of the applicator of the present invention illustrating the squeegee being slid across the face of an electronic device and upper surface of the base to remove the screen protector's back liner;

FIG. **8** is an additional perspective view of the applicator of the present invention illustrating the squeegee being slid across the face of an electronic device and upper surface of the base to remove the screen protector's back liner;

FIG. **9** is a perspective view of the applicator of the present invention illustrating the back liner having been removed from the protective film;

FIG. **10** is a perspective view of the applicator of the present invention illustrating the cap sheet being removed from the protective film;

FIG. **11** is a perspective view of the applicator of the present invention illustrating the cap sheet having been removed from the protective film;

FIG. **12** is a perspective view of the applicator of the present invention illustrated holding an electronic device with a newly applied protective film;

FIG. **13** is a perspective view an electronic device with a newly applied protective film;

FIG. **14** is a cut away view illustrating the back liner peeling from the protective film;

FIG. **15** is a close-up cut away view of the applicator in FIG. **14** illustrating the back liner peeling from the protective film; and

FIG. **16** is a perspective view of screen protector of the present invention illustrating its three components including a cap sheet, protective film, and back liner.

#### DETAILED DESCRIPTION OF THE INVENTION

While the present invention is susceptible of embodiment in various forms, as shown in the drawings, hereinafter will be described the presently preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the invention, and it is not intended to limit the invention to the specific embodiments illustrated.

With reference to FIGS. **1-16**, the present invention is an applicator **1** for applying a protective film **27** to an electronic device's display **83**. Preferably the applicator **1** is provided in a kit form including each of the components in a pre-packaged format. The applicator's primary components include a base **5**, a screen protector **21**, and a squeegee **55**.

As illustrated in FIGS. **1-12**, the base **5** is preferably elongate to form a first end **7**, a second end **9**, and an upper surface **11**. The base **5** further includes a first pocket

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**13** formed into the base's upper surface **11**. The first pocket **13** may be constructed in various shapes and sizes depending on the electronic device **81** intended to be placed in such pocket. Preferably, the base also has a second pocket for receiving a squeegee **55**. The base **5** is preferably made of foam which is sufficiently soft to accept an electronic device **81** into its first pocket **13** without scratching, marring or otherwise damaging the electronic device while also affixing an electronic device in place so as to prevent movement of the phone. To this end, preferably the base's first pocket **13** is sized to provide a slight press-fit to an electronic device within the pocket. The base may be manufactured by various manufacturing techniques known to those skilled in the art. In a preferred embodiment, the base is manufactured in three layers including a bottom layer of foam, a second middle layer of dye cut foam wherein cavities have been created to form the first pocket **13** and second pocket **15**. Preferably, the base has an upper layer of polyvinyl chloride to provide a smooth rigid surface.

The applicator's screen protector **21** preferably includes three layers of clear plastic. As illustrated in FIG. **16**, the screen protector **21** includes a protective film **27** sandwiched between a back liner **33** and a cap sheet **41**. The protective film **27** is preferably made of polyurethane which may include various additives such as for ultraviolet (UV) protection or bactericidal capabilities. The protective film **27** has a lower adhesive side **29** intended to affix to an electronic device display **83** and an upper exterior surface **31** for protecting an electronic device. The screen protector's back liner **33** has a lower side **37** and an adhesive side **35** which loosely adheres to the protective films adhesive side **29**. The third layer of the protective film **27** is the cap sheet **41**. The cap sheet **41** has a lower adhesive side **43** which loosely adheres to the protective films upper exterior surface **31**. The cap sheet **41** also includes an exterior side **45**.

The screen protector's first end **23** is affixed to the base's first end **7** to allow the screen protector to overlie the base's first pocket **13**. As illustrated in FIGS. **1-12**, the screen protector **21** is affixed to the base by providing one or more layers of the screen protector with an edge portion **39** which extends to cover and adhere to the base's upper surface **11** at its first end **7**. Where the back liner **33** or protective film **27** extends to engage and adhere to the base **5** at the base's first end **7**, preferably each of these layers include "kiss cuts". The kiss cut through the protective film allows the portion of protective film, which is intended to adhere to an electronic device display **83**, to separate from the protective film's tab **39**. Similarly, the back liner **33** includes a kiss cut so as to allow the back liner to crack and tear from the screen protector's tab **39**. As understood by those skilled in the art, a "kiss cut" is a cutting of material, typically through a dye cut, to extend partially but not all the way through a material. Here, it is preferred that the protective film **27** include a kiss cut which extends 95% of the way through the protective film layer. However, it is preferred that the back liner **33** is cut completely from the screen protector's edge portion **39** so as to allow it to more easily separate and peel from the protective film **27**. Furthermore, the screen protector's tab **39** may include alignment holes for properly aligning the screen protector upon the base **5** during the manufacturing process.

With reference to FIGS. **14** and **15**, the applicator **1** of the present invention further includes a squeegee **55** which is preferably positioned within the base's second pocket **15**. The squeegee **55** has a substantially planar bottom surface **57**. In addition, the squeegee **55** includes a bore which laterally extends to form a slot **59**. The squeegee's slot **59** is

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angled relative to the squeegee's bottom surface **57**. Furthermore, preferably the squeegee **55** includes an angled front side **61** forming the front side of the slot **59**. Moreover, preferably the bottom surface **57** includes a rounded edge where the squeegee's bottom surface interfaces with the slot **59**. As illustrated in FIGS. **14** and **15**, the squeegee slot **59** is angled relative to the squeegee's bottom surface **57** at an angle **63** of less than 90°. Preferably, the squeegee slot is angled relative to the squeegee's bottom surface at between 28° and 48°, with the presently preferred angle at 38°. The squeegee **55** may include finger recesses **67** sized for receiving a person's fingers to facilitate manipulation of the squeegee.

As illustrated in FIG. **2**, to apply a protective film **27** to an electronic device display **83**, the screen protector **21** is folded backwardly to allow insertion of an electronic device **81** into the base's first pocket **13**. The electronic device is positioned within the first pocket **13**. Thereafter, as illustrated in FIGS. **4** and **5**, the screen protector's second end is inserted and made to pass through the squeegee's slot **59**. Importantly, the screen protector must be inserted into the squeegee's slot **59** to allow the squeegee's bottom surface **57** to engage the base's upper surface **11**. For example, the screen protector **21** can be folded backwardly to not cover the electronic device **81** and the squeegee can be slid downwardly with the slot receiving the screen protector until the squeegee's bottom surface engages the base's upper surface **11** (see FIG. **6**). Alternatively, as illustrated in FIGS. **4**, the screen protector may be positioned to overlie the base's first pocket **13**, and the squeegee slot is made to receive the screen protector **21** with the squeegee positioned upside down with its bottom surface **57** facing upwardly. As illustrated in FIGS. **5-6**, once the squeegee **55** has slid the length of the screen protector **21** so as to engage the base at its first end **7**, the screen protector **21** is folded backwardly. As illustrated in FIGS. **14** and **15**, when the screen protector **21** has been folded back in accordance with the angle **63** between the squeegee's bottom surface **57** and slot **59**, the screen protector's back liner **33** is made to crack and peel from the protective film **27**. Thereafter, as illustrated in FIGS. **7** and **8**, the squeegee **55** is slid across the base's upper surface **11** and the electronic device's display **83** so as to cause the back liner **33** to peel away from the protective film **27**. Advantageously, the squeegee also forces out any bubbles between the protective film **27** and the electronic device's display **83**. Once the squeegee has completely slid across the electronic device, the base liner **33** has been forced to peel away completely from the protective film **27** leaving the protective film securely adhered to the electronic device **81**.

With reference to FIGS. **10-12**, once the back liner has been removed from the protective film, the cap sheet **41** is removed from the protective film by simply peeling one end of the cap sheet **41** away from the protective film **27** until the cap sheet has been completely removed. To facilitate its removal, preferably the cap sheet **41** includes a tab **47** located at the screen protector's second end **25** which provides one with the ability to firmly grip the cap sheet for its removal. As illustrated in FIG. **16**, preferably the cap sheet **41** is adhered to the protective film **27** with an adhesive **49** which provides less adhesion between the cap sheet **41** and protective film **27** at the end where one first grasps the cap sheet **41** to affect its removal from the protective film. The change in adhesion may be accomplished by various means known to those skilled in the art including the use of lesser or more adhesive at different locations or the use of different adhesives between the protective film and cap

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sheet. (See FIG. 16). Preferably, the adhesion, as measured by pull strength between the protective film 27 and cap sheet 41, is between 10%-90% at one end of the screen protector as compared to the other end. More preferably, the adhesion is 30%-50% at one end of the screen protector as compared to the other. Moreover, it is preferred that the difference in adhesion changes in at least one gradient, and more preferably in a plurality of gradients, and still more preferably gradually and uniformly from one end of the screen protector to the other. This difference in adhesion is advantageous so that adhesion is reduced at the end wherein the cap sheet is first peeled away from the protective shield so as to prevent pulling the protective film 27 away from the electronic device 81.

As one skilled in the art will appreciate, different persons may refer to the same feature or component by different names. For example, any reference to “up” or “down”, or reference to a “first end” or “second end” is made for purposes of clarity.

While several particular forms of the invention have been illustrated in described, it will be apparent that various modifications can be made without departing from the spirit and scope of the invention. Therefore, it is not intended that the invention be limited except by the following claims.

What is claimed is:

1. An applicator kit for applying a protective film to a screen of an electronic device, the applicator comprising:
  - a base comprising a first pocket accessible via a hole disposed in a base upper surface;
  - a squeegee comprising an angled front side, a bottom surface, and a slot comprising a front wall formed by

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the angled front side, a back wall disposed parallel to the front wall, the back wall terminating in a rounded edge at an opening in the bottom surface, and parallel sidewalls joining the front wall and the back wall, wherein the slot is oriented at an angle relative to the bottom surface; and

a screen protector comprising:

a protective film shaped to conform to the screen of the electronic device;

a cap sheet adhered to a first side of the protective film, the cap sheet comprising a cap sheet edge portion that is affixed to an upper surface of the base; and

a back liner adhered to a second side of the protective film, wherein the back liner is adapted to separate from the protective film when the screen protector is inserted into the slot and the bottom surface is brought into contact with the base upper surface and the squeegee is translated from a first position where the squeegee is proximate to a first end of the base to a second position where the squeegee is proximate to a second end of the base.

2. The applicator kit of claim 1, wherein the angle is less than 90 degrees.

3. The applicator kit of claim 1, wherein the angle is between 28-48 degrees.

4. The applicator kit of claim 1, wherein said angle is 38 degrees.

5. The applicator kit of claim 1, wherein said base further comprises a second pocket adapted to accommodate said squeegee.

\* \* \* \* \*