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(54) Title: INSERT FOR ENCLOSING ELECTRONICS

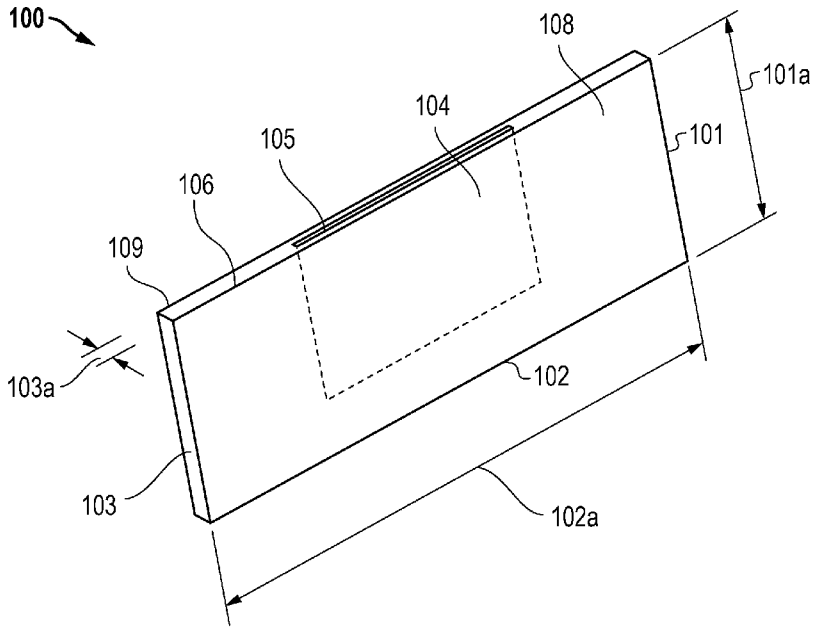


FIG. 1A

(57) Abstract: The present invention may include an insert with a cavity or recess configured to contain electronics. The insert may include shapes, sizes, and configurations such as a disk, envelope, packet, pod, case, casing, shell, cocoon or capsule. The insert may be inserted into a stretchable object. In one embodiment, the insert may be of a shape, size and configuration to contain a RFID device and be inserted into an elastic wristband.

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INSERT FOR ENCLOSING ELECTRONICS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This non-provisional application claims priority based upon prior U.S. Provisional Patent Application Serial No. 61/494,028 filed June 07, 2011 in the name of James Joseph Pedicano and Ron Yuhl, entitled "Bracelet for Storing and Transmitting Information," the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates generally to packaging and, more particularly, to the packaging of electronics into stretchable objects.

[0003] Existing technology is not well suited for combining electronics into stretchable objects. For example, commercially available chips that are designed for use in contactless payment systems are sold in a molded package, similar, if not identical, to the NOA3 package offered by Nedcard Ltd. of Belgium. A representative package size is 5.15mm x 8.0mm x 0325mm. The chip size is typically 2mm X 2mm X 0.015mm though there is significant variation between manufacturers. Because standard molded packaging is designed to protect the integrated circuit during fabrication and is designed for use on a PVC laminated card, traditional molded packaging is typically stiff and very robust and, as a result, not suitable for use in a stretchable object.

[0004] As is apparent to those skilled in the art, there are numerous obstacles to embedding electronics, such as RFID microchips and antennas, into a stretchable object, such as an elastic wristband. With respect to an elastic wristband, for example, the wristband must

possess the requisite elasticity to stretch when drawn over the user's hand, but must also be UV stable enough to protect the RFID chip and antenna. The wristband must be durable enough to withstand the rigors of daily living, including activities such as exercise and bathing, while protecting the integrity of the electronics. To maximize market acceptance, the wristband must be of a size commensurate with currently available wristbands. The size of the wristband may require the electronics to be smaller than otherwise permissible. Also, the electronics must be configured on or in the wristband in such a manner that the stretching of the band during use does not damage elements of the electronics such as a microchip, antenna, or the connection therebetween.

[0005] Other issues related to the combination of stretchable objects and electronics arise in the manufacturing process. During the manufacturing of an elastic wristband that contains an RFID device, for example, the microchip and antenna of the RFID device must be protected so that RFID device is not damaged or destroyed. Similarly, the connection between the microchip and antenna of the RFID device must not be dislodged or compromised. Also, the microchip and antenna package must be properly adhered to the wristband, either temporarily during the molding process if the package is included within the mold, or permanently if the package is adhered to the outside of the wristband. Resins must be selected which match the "skin feel" of currently available wristbands but that are also compatible with the microchip and antenna. In addition, the finished product must be aesthetically pleasing and appear the same as commercially available wristbands, including matching the color, indented lettering and, if the wristband is manufactured in two parts, making the two portions of the wristband indistinguishable. Another concern is that since the wristband must be relatively soft for the

wristband to be sufficiently flexible, the components embedded in the wristband may require additional protection against external pressures in order to avoid damage the wristband is worn on the wrist.

SUMMARY OF THE INVENTION

[0006] A device and method which implements a preferred embodiment of the present invention includes an insert with a cavity configured to contain electronics. The insert may include shapes, sizes, and configurations such as a disk, envelope, packet, pod, case, casing, shell, cocoon or capsule. The cavity may include other shapes, sizes, and configurations such as a pocket, pouch, receptacle, recess, depression, void, groove, channel or indention. The insert may be inserted into a stretchable object. In one embodiment, the insert may be of a shape, size and configuration to contain a RFID device and be inserted into an elastic wristband.

[0007] In one embodiment, an insert for containing electronics within a stretchable object comprises an elongated disk having a width within the range of 0.6 to 0.1 inches and a top surface, a cavity within the elongated disk, and an opening to the cavity on the top surface of the elongated disk.

[0008] In one embodiment, a capsule for containing electronics within a stretchable object comprises a first elongated sheet with a convex inner surface and concave outer surface, a second elongated sheet with a concave inner surface and a convex outer surface, the concave inner surface including a recess, and a hinge connecting the proximal end of the first elongated sheet and the proximal end of the second elongated sheet such that the convex

inner surface of the first elongated sheet may be rotated to contact at least a portion of the concave inner surface of the second elongated sheet.

[0009] In one embodiment, a casing for containing electronics within a stretchable object comprises a first elongated plate and a second elongated plate. The first elongated plate includes a first end, a second end, and an inner surface. In addition, the first elongated plate includes a first connecting mechanism on its inner surface near its first end and a second connecting mechanism on its inner surface near its second end. The second elongated plate also includes a first end, a second end, an inner surface, a first complementary connecting mechanism on its inner surface near its first end, and a second complementary connecting mechanism on its inner surface near its second end. Either the inner surface of the first elongated plate or the inner surface of the second elongated plate includes a recess. In addition, the distance between the first complementary connecting mechanism and the second complementary connecting mechanism is less than the distance between the first connecting mechanism and the second connecting mechanism such that the first complementary connecting mechanism may mate with the first connecting mechanism and the second complementary connecting mechanism may mate with the second connecting mechanism only with the inner surface of the second elongated plate having a convex curvature and the inner surface of the first elongated plate having a concave curvature.

[00010] As may be appreciated by one having ordinary skill in the art, there is a significant need for an insert that will protect electronics, such as an RFID device, from damage in combining the electronics with a stretchable object, from stretching and twisting

as the stretchable object is used, and from wear and tear that will decrease the durability and life span of the stretchable object.

BRIEF DESCRIPTION OF THE DRAWINGS

[00011] Before drawings are presented it is to be understood that the invention is not limited to the details of the assembly and arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of its major components being carried out and assembled in various ways. For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions, taken in conjunction with the accompanying drawings but not limited to represent the whole invention, in which:

[00012] FIG. 1A shows an isometric view of an insert with a cavity in one embodiment of the present invention.

[00013] FIG. 1B shows a top view of an insert with a curve along its length in one embodiment of the present invention.

[00014] FIG. 2 shows an isometric view of an insert with a recess in one embodiment of the present invention.

[00015] FIG. 3 shows a top view of the insert in one embodiment of the present invention.

[00016] FIG. 4 shows a top view of an insert with a hinge in one embodiment of the present invention.

[00017] FIG. 5A shows a top view of an insert comprised of two pieces in one embodiment of the present invention.

[00018] FIG. 5B shows a top view of an insert comprised of two pieces in one embodiment of the present invention.

[00019] FIG. 6 shows a top view of an insert with an opening to a cavity that includes channels in one embodiment of the present invention.

[00020] FIG. 7 shows an isometric view of an elastic wristband in one embodiment of the present invention.

[00021] FIG. 8A shows an isometric view of a first elastic band in one embodiment of the present invention.

[00022] FIG. 8B shows an isometric view of an elastic wristband with a secondary molding in one embodiment of the present invention.

[00023] FIG. 9 shows a side view of an elastic wristband in one embodiment of the present invention.

DETAILED DESCRIPTION

[00024] The present invention may include an insert with a cavity configured to contain electronics. The insert may include shapes, sizes, and configurations such as a disk, envelope, packet, pod, case, casing, shell, cocoon or capsule. The cavity may include other shapes, sizes, and configurations such as a pocket, pouch, receptacle, recess, depression, void, groove, channel or indention. The insert may be inserted into a stretchable object. In one embodiment, the insert may be of a shape, size and configuration to contain a RFID device and be inserted into an elastic wristband.

[00025] Reference is now made to FIG. 1A which shows an isometric view of an insert 100 with a cavity 104 in one embodiment of the present invention. The insert 100 may be in the shape of one or more elongated plates that may be a rectangular, smooth, flat, relatively thin body of uniform thickness with at least some rigidity. In other embodiments, the insert 100 may be in the shape of one or more elongated sheets that may be relatively smooth and thin and may have at least some flaccidity. The insert 100 may include a bottom surface 102, a top surface 106, a left-side surface 103, a right-side surface101, a front surface 108, and a back surface 109. The insert 100 may have a width 103a equal the distance between the front surface 108 and the back surface 109. In one embodiment, the length 102a of the insert 100 may be in the range of 2.0 to 2.5 inches. In one embodiment, the height 101a of the insert 100 may be approximately 0.5 inches. In one embodiment, the width 103a of the insert 100 may be in the range of 0.06 to 0.10 inches. It can be appreciated that other embodiments of the insert 100 may include other shapes, sizes, and configurations such as a disk, envelope, packet, pod, case, casing, shell, cocoon or capsule. In other embodiments, for example, the insert 100 may have one or more rounded corners. In one embodiment, the insert 100 may be curved along its length 102a.

[00026] The insert 100 may also include at least one opening 105 and at least one cavity 104. In one embodiment, the opening 105 may be positioned on the top surface 106 or the bottom surface 102 of the insert 100. The opening 105 may provide access to the cavity 104. The cavity 104 may be configured to hold electronics, such as an RFID device. In one embodiment, for example, an RFID device including a microchip and an antenna may be inserted into the cavity 104 through the opening 105. In one embodiment, the cavity 104 may

be rectangular in shape. In one embodiment, the cavity 104 may be approximately 2.0 inches in length, 0.39 to 0.5 inches in height, and 0.032 to 0.040 inches in width. In one embodiment, the cavity may be approximately centered between the front surface 108 and the back surface 109 of the insert 100. In one embodiment, the cavity 104 may be approximately centered between the left-side surface 103 and the right-side surface 101 of the insert 100. It can be appreciated that other embodiments of the cavity 104 may include other shapes, sizes, and configurations such as a pocket, pouch, receptacle, recess, depression, void, groove, channel or indention. In one embodiment, a lid (not shown) may be placed over the opening 105. In other embodiments, the cavity 104 may be closed by molding over the opening 105.

[00027] The insert 100 may be comprised of material with a hardness that is greater than the hardness of the stretchable object that the insert 100 is to be inserted into. The insert 100 may be comprised of materials with different hardness levels, however. For example, the insert 100 may be comprised of thermal plastic elastomers (TPE), polyvinyl chloride (PVC), poly carbonate, styrene, acrylonitrile butadiene styrene (ABS), polypropylene and/or polyethylene.

[00028] Reference is now made to FIG. 1B which shows a top view of an insert 100 with a curve along its length 102a in one embodiment of the present invention. In this embodiment, the length 102a of the insert 100 is shown in the shape of a portion of the circumference of a circle 110. In one embodiment, the diameter 107 of such a circle may be in the range of 2.25 to 3.0 inches.

[00029] Reference is now made to FIG. 2 which shows an isometric view of an insert 100 with a recess 200 in one embodiment of the present invention. The recess 200 may be included on a portion of the front surface 108 of the insert 100. The recess 200 may also include a lip 201 around all or a portion of the perimeter of the recess 200. In one embodiment, electronics may inserted into the recess 200 below the lip 201 and a lid or cover (not shown) may be inserted in the recess such that the lid or cover rests against the lip 201. In other embodiments, electronics may inserted into the recess 200 and the recess 200 may then be covered by molding a material over the recess 200. The left-side surface 103 and/or the right-side surface 101 may be rounded. The insert 100 may also be curved along its longitudinal axis 202.

[00030] Reference is now made to FIG. 3 which shows a top view of the insert 100 and a lid 300 in one embodiment of the present invention. In this embodiment, the top surface 106 of the insert 100 includes an opening 105. The opening 105 is shown to be elongated and extends along a portion of the top surface 106 of the insert 100. The top surface 106 of the insert 100 also includes mounting mechanisms 301a and 301b. The mounting mechanisms 301a and 302a are each shown to be located between one end of the opening 105 and one end of the insert 100. The lid 300 may be placed over the opening 105. The lid 300 is shown to include mounting mechanisms 301b and 302b which may mate with complementary mounting mechanisms 301a and 302a, respectively, of the insert 100. For example, in one embodiment, the mounting mechanisms 301a and 302a may consist of posts and the mounting mechanisms 301b and 302b may consist of holes which may be snapped over the posts of the mounting mechanisms 301a and 302a. In other embodiments, the

mounting mechanisms 301a and 302a, and 301b and 302b, may consist of other shapes, sizes and configurations for connecting the lid to the insert such as, for example, clasps, Velcro, snaps, clips, fasteners, hooks, or buttons.

[00031] Reference is now made to FIG. 4 which shows a top view of an insert 100 with a hinge 400 in one embodiment of the present invention. In this embodiment, the insert 100 may consist of a first elongated plate 401 with a proximal end that connects to the hinge 400 and a second elongated plate 402 with a proximal end that connects to the hinge 400. The distal end of the first elongated plate 401 may include a connecting mechanism 404a that is configured to mate with a complementary connecting mechanism 404b at the distal end of the second elongated plate 402. In one embodiment, the first elongated plate 401 and the second elongated plate 402 may be curved. The first elongated plate 401 and the second elongated plate 402 may rotate on the hinge 400 towards each other so that the inner or convex surface of the first elongated plate 401 rests against the inner or concave surface of the second elongated plate 402. The inner or concave surface 405 of the second elongated plate 402 may include a recess 403. An RFID device, for example, may be positioned with the recess 403, for example, and sheltered between the first elongated plate 401 and the second elongated plate 402. In other embodiments, the inner or convex surface 406 of the first elongated plate 401 may include a recess 403.

[00032] Reference is now made to FIG. 5A which shows a top view of an insert 100 comprised of two pieces in one embodiment of the present invention. In this embodiment, the insert 100 may consist of a first elongated plate 500 and a second elongated plate 501. The inner surface 505 of the first elongated plate 500 may include a recess 504. In other

embodiments, the inner surface 506 of the second elongated plate 501 may include a recess 504. The first elongated plate 500 may include a first connecting mechanism 502a that is configured to connect to a complimentary first connecting mechanism 502b of the second elongated plate 501. The first elongated plate 500 may include a second connecting mechanism 503a that is configured to connect to a complimentary second connecting mechanism 503b of the second elongated plate 501. In one embodiment, the first connecting mechanism 502a and the second connecting mechanism 503a may be located at opposite ends of the first elongated plate 500 and the first complimentary connecting mechanism 502b and the second complimentary connecting mechanism 503b may be located at opposite ends of the second elongated plate 500. In one embodiment, the first connecting mechanism 502a and the second connecting mechanism 503a may be located along the inner surface 505 of the first elongated plate 500 and the first complimentary connecting mechanism 502b and the second complimentary connecting mechanism 503b may be located along the inner surface 506 of the second elongated plate 500. In one embodiment, the distance between the first connecting mechanism 502a and the second connecting mechanism 503a may be greater than the distance between the first complimentary connecting mechanism 502b and the second complimentary connecting mechanism 503b. In one embodiment, the difference in the distance between the first connecting mechanism 502a and the second connecting mechanism 503a and the distance between the first complimentary connecting mechanism 502b and the second complimentary connecting mechanism 503b may be such that the first connecting mechanism 502a may connect with the first complimentary connecting mechanism 502b and the second connecting mechanism 503a may connect with the second complimentary

connecting mechanism 503b if the first elongated plate 500 and the second elongated plate 501 are curved. For example, the first elongated plate 500 may be curved such that its inner surface 505 is concave and the second elongated plate 501 may be curved such that its inner surface 506 is convex.

[00033] Reference is now made to FIG. 5B which shows a top view of an insert 100 comprised of two pieces in one embodiment of the present invention. In this embodiment, the first elongated plate 500 is shown to be curved such that its inner surface 505 is concave and rests against the inner surface of the second elongated plate 501. The second elongated plate 501 is shown to be curved such that its inner surface 506 is convex. The first connecting mechanism 502a is shown to have connected with the first complimentary connecting mechanism 502b and the second connecting mechanism 503a is shown to have connected with the second complimentary connecting mechanism 503b. When the first elongated plate 500 is connected to the second elongated plate 501, the recess 400 may to be enclosed by the inner surface 506 of the second elongated plate 501.

[00034] Reference is now made to FIG. 6 which shows a top view of an insert 100 with an opening 105 to a cavity 104 that includes a channel 601 in one embodiment of the present invention. The cavity 104 may include one or more compartments 600 and 602 of different shapes, sizes and/or configurations. For example, the cavity 104 may include a first compartment 600 and a second compartment 602. The cavity 104 may also include one or more channels 601 that may be of different shapes, sizes and/or configurations. In one embodiment, the shapes, sizes and configurations of the one or more compartments 600 and 602 may be configured to accommodate the shape of particular electronics, such as an RFID

device that includes a microchip and an antenna. In one embodiment, the channel 601 may have a width in the range of 0.008 to 0.016 inches. In one embodiment, the electronics to be inserted into the cavity 104 may be coated with a thin layer of laminate prior to their insertion into the cavity 104.

[00035] Reference is now made to FIG. 7 which shows an isometric view of an elastic wristband 700 in one embodiment of the present invention. The elastic wristband 700 is one example of a stretchable object that the insert 100 may be inserted into. The elastic wristband 700 may be comprised of a first elastic band 706 and a second elastic band 705. The first elastic band 706 may contain a depression 701 on its outer surface 704. The depression 701 may include one or more edges 702 formed from the thickness of the first elastic band 706. The depression 701 may also include a back wall 703 formed from the recessed portion of the outer surface 704 of the first elastic band 706. The shape of the depression 701 may be configured to contain the insert 100. In one embodiment, the second elastic band 705 may be molded over the all or a portion of the outer surface 704 of the first elastic band 706. The molding of the second elastic band 705 over all or a portion of the outer surface 704 of the first elastic band 706 may enclose the insert 100 within the depression 701. In one embodiment, the second elastic band 705, rather than the first elastic band, may include the depression 701.

[00036] In one embodiment, the insert 100 may include writing on its front surface 108, or on a lid or cover (not shown) covering at least a portion of the insert's 100 front surface. In addition, the elastic wristband 700 and/or at least a portion of the second elastic

band 705 may be transparent so that the writing on the insert 100 may be viewed with the insert 100 contained within the elastic wristband 700.

[00037] Reference is now made to FIG. 8A which shows an isometric view of a first elastic band 800 in one embodiment of the present invention. In this embodiment, the first elastic band 800 includes a depression 802 within the body of the first elastic band 800. The top surface of the first elastic band 800 includes an aperture 801 that is formed from the intersection of the depression 800 with the top surface of the first elastic band 800. The size and shape of the aperture 801 and depression 802 may be configured such that an insert 100 may be inserted through the aperture 801 and into the depression 802. All or a portion of the first elastic band 800 may be comprised of a transparent material.

[00038] Reference is now made to FIG. 8B which shows an isometric view of an elastic wristband 804 with a secondary molding 803 in one embodiment to the present invention. In this embodiment, the secondary molding 803 has been molded to the top surface of the first elastic band 800. In this manner, the secondary molding 803 may cover the aperture 801 and serve to contain the insert 100 within the depression 802.

[00039] Reference is now made to FIG. 9 shows an isometric view of an elastic wristband 900 in one embodiment of the present invention. In one embodiment, the elastic wristband 900 may include a first portion 905 and a second portion 904. The first portion 905 may include an insert 100. The outside diameter 902 of the elastic wristband 900 may be in the range of 2.25 to 3.0 inches. The width 901 of the elastic wristband 900 may be approximately 0.6 inches. In one embodiment, the width 901 of the elastic wristband 900 may be equal to or greater than 0.6 inches. The thickness 903 of the elastic wristband 900

may be in the range of 0.150 to 0.250 inches. In one embodiment, the thickness 903 of the first portion 905 may be greater than the thickness 903 of the second portion 904. In one embodiment, the thickness 903 of the first portion 905 may be in the range of 0.150 to 0.250 inches and the thickness 903 of the second portion 904 may be in the range of 0.060 to 0.120 inches. In one embodiment, the second portion 904 may include holes 907. The holes 907 may extend through the entire thickness 903 of the second portion 904 or may consist of divots that only extend into a portion of the outer surface 906 of the second portion 904. The holes 907 may consist of different shapes, sizes, and configurations including, for example, circles, ovals and/or grooves.

[00040] When a single embodiment is described herein, it will be readily apparent that more than one embodiment may be used in place of a single embodiment. Similarly, where more than one embodiment is described herein, it will be readily apparent that a single embodiment may be substituted for that one device.

[00041] In light of the wide variety of possible devices and methods, the detailed embodiments are intended to be illustrative only and should not be taken as limiting the scope of the invention. Rather, what is claimed as the invention is all such modifications as may come within the spirit and scope of the following claims and equivalents thereto.

[00042] None of the description in this specification should be read as implying that any particular element, step or function is an essential element which must be included in the claim scope. The scope of the patented subject matter is defined only by the allowed claims and their equivalents. Unless explicitly recited, other aspects of the present invention as described in this specification do not limit the scope of the claims.

CLAIMS

What is claimed is:

1. An insert for containing electronics within a stretchable object comprising:

   an elongated disk having a width within the range of 0.6 to 0.1 inches and having a top surface;

   a cavity within said elongated disk; and

   an opening to said cavity on said top surface of said elongated disk.

2. The insert of claim 1 wherein the height of said elongated disk is approximately 0.5 inches.

3. The insert of claim 1 wherein the length of said elongated disk is within the range of 2.0 to 2.5 inches.

4. The insert of claim 1 wherein the length of said elongated disk is curved to approximate a portion of the circumference of a circle with a diameter within the range of 2.25 to 3.0 inches.

5. The insert of claim 1 wherein said elongated disk includes a front surface and a back surface and wherein said cavity is approximately centered between said front surface and said back surface.

6. The insert of claim 1 wherein said elongated disk includes a left side and a right side and wherein said cavity is approximately centered between said left side and said right side.

7. The insert of claim 1 wherein the length of said cavity is approximately 2.0 inches.

8. The insert of claim 1 wherein the height of said cavity is within the range of 0.39 to 0.5 inches.

9. The insert of claim 1 wherein the width of said cavity is within the range of 0.032 and 0.040 inches.

10. The insert of claim 1 further comprising a lid configured to cover said opening.

11. The insert of claim 1 further comprising a lid with at least one mounting mechanism, said at least one mounting mechanism being configured to mate with a complementary mounting mechanism of said elongated disk.

12. The insert of claim 1 wherein said elongated disk includes a front surface with a proximal end and a back surface with a proximal end and wherein said proximal end of said front surface is hinged to said proximal end of said back surface.

13. The insert of claim 1 said elongated disk includes a front surface with a distal end and a back surface with a distal end and wherein said distal end of said front surface includes a connecting mechanism that is configured to connect to a complementary connecting mechanism at said distal end of said back surface.

14. The insert of claim 1 wherein said cavity includes one or more compartments and at least one channel connecting said compartments.

15. The insert of claim 1 wherein said elongated disk is comprised of one or more of the following materials: thermal plastic elastomers, polyvinyl chloride, poly carbonate, styrene, acrylonitrile butadiene styrene, polypropylene and polyethylene.

16. A capsule for containing electronics within a stretchable object comprising:

a first elongated sheet with a proximal end, a convex inner surface, and concave outer surface;

a second elongated sheet with a proximal end, a concave inner surface and a convex outer surface, said concave inner surface including a recess; and

a hinge connecting said proximal end of said first elongated sheet and said proximal end of said second elongated sheet such that said convex inner surface of said first elongated sheet may be rotated about said hinge to contact at least a portion of said concave inner surface of said second elongated sheet.

17. The capsule of claim 16 wherein said first elongated sheet includes a distal end and said second elongated sheet includes a distal end and wherein said distal end of said first elongated sheet includes a connecting mechanism that is configured to mate to a complementary connecting mechanism at said distal end of said second elongated sheet.

18. The capsule of claim 16 wherein the height of said first elongated sheet is approximately 0.5 inches, the length of said first elongated sheet is within the range of 2.0 to 2.5 inches.

19. The capsule of claim 16 wherein the length of said first elongated sheet is curved to approximate a portion of the circumference of a circle with a diameter within the range of 2.25 to 3.0 inches.

20. The capsule of claim 16 wherein the length of said recess is approximately 2.0 inches and the height of said recess is within the range of 0.39 to 0.5 inches.

21. The capsule of claim 16 wherein the width of said recess is within the range of 0.032 and 0.040 inches.

22. A casing for containing electronics within a stretchable object comprising:

a first elongated plate including a first end of said first elongated plate, a second end of said first elongated plate, and an inner surface of said first elongated plate, said first elongated plate including a first connecting mechanism on said inner surface of

said first elongated plate near said first end of said first elongated plate and a second connecting mechanism on said inner surface of said first elongated plate near said second end of said first elongated plate;

a second elongated plate including a first end of said second elongated plate, a second end of said second elongated plate, and an inner surface of said second elongated plate, said second elongated plate including a first complementary connecting mechanism on said inner surface of said second elongated plate near said first end of said second elongated plate and a second complementary connecting mechanism on said inner surface of said second elongated plate near said second end of said second elongated plate;

wherein either said inner surface of said first elongated plate or said inner surface of said second elongated plate includes a recess; and

wherein the distance between said first complementary connecting mechanism and said second complementary connecting mechanism is less than the distance between said first connecting mechanism and said second connecting mechanism such that said first complementary connecting mechanism may mate with said first connecting mechanism and said second complementary connecting mechanism may mate with said second connecting mechanism only with said inner surface of said second elongated plate having a convex curvature and said inner surface of said first elongated plate having a concave curvature.

23. The casing of claim 22 wherein the height of said first elongated plate is approximately 0.5 inches.

24. The casing of claim 22 wherein the length of said elongated plate is within the range of 2.0 to 2.5 inches.

25. The casing of claim 22 wherein said concave curvature of said first elongated plate approximates a portion of the circumference of a circle with a diameter within the range of 2.25 to 3.0 inches.

26. The casing of claim 22 wherein said recess is approximately centered between either said first end of said first elongated plate and said second end of said first elongated plate or said first end of said second elongated plate and said second end of said second elongated plate.

27. The casing of claim 22 wherein the length of said recess is approximately 2.0 inches.

28. The casing of claim 22 wherein the height of said recess is within the range of 0.39 to 0.5 inches.

29. The casing of claim 22 wherein the width of said recess is within the range of 0.032 and 0.040 inches.

30. The casing of claim 22 wherein said first connecting mechanism and said first complementary mechanism include a hinge.

31. The casing of claim 22 wherein said recess includes one or more compartments and at least one channel connecting said compartments.

32. The casing of claim 22 wherein said first elongated disk is comprised of one or more of the following materials: thermal plastic elastomers, polyvinyl chloride, poly carbonate, styrene, acrylonitrile butadiene styrene, polypropylene and polyethylene.

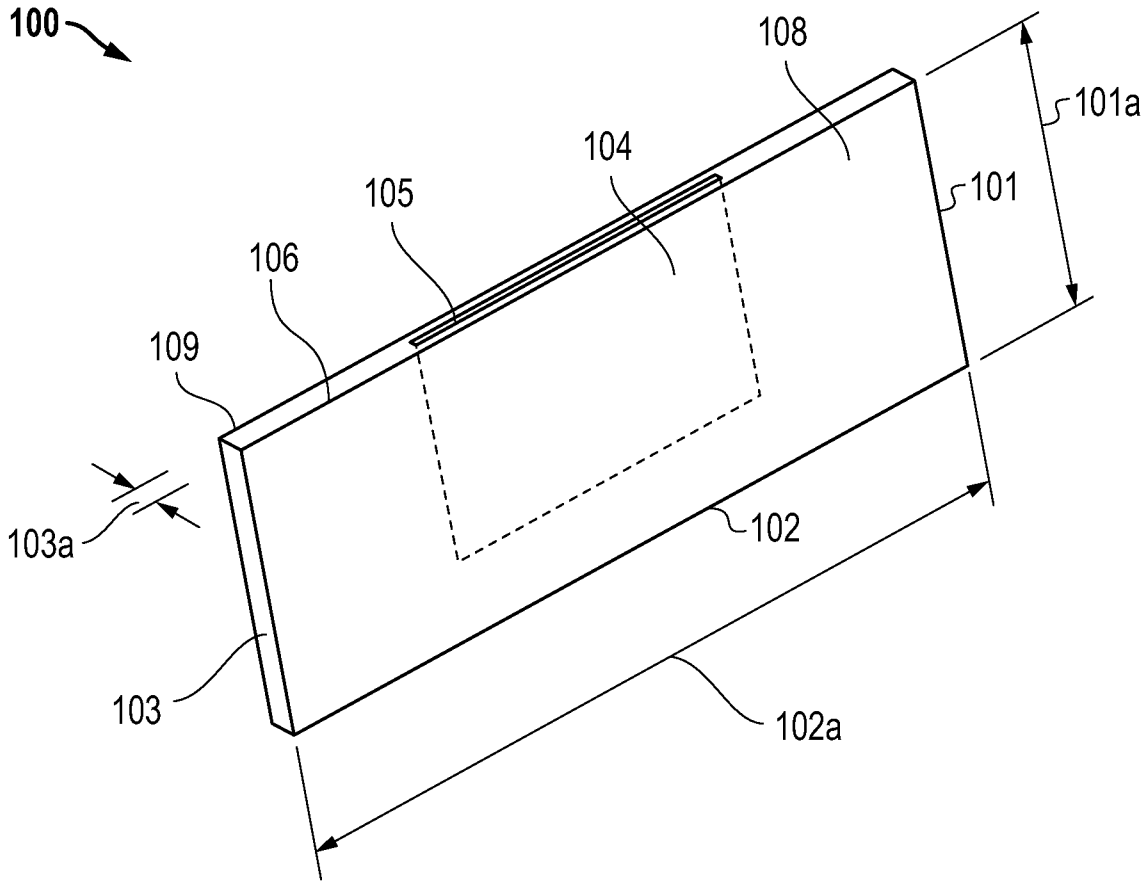


FIG. 1A

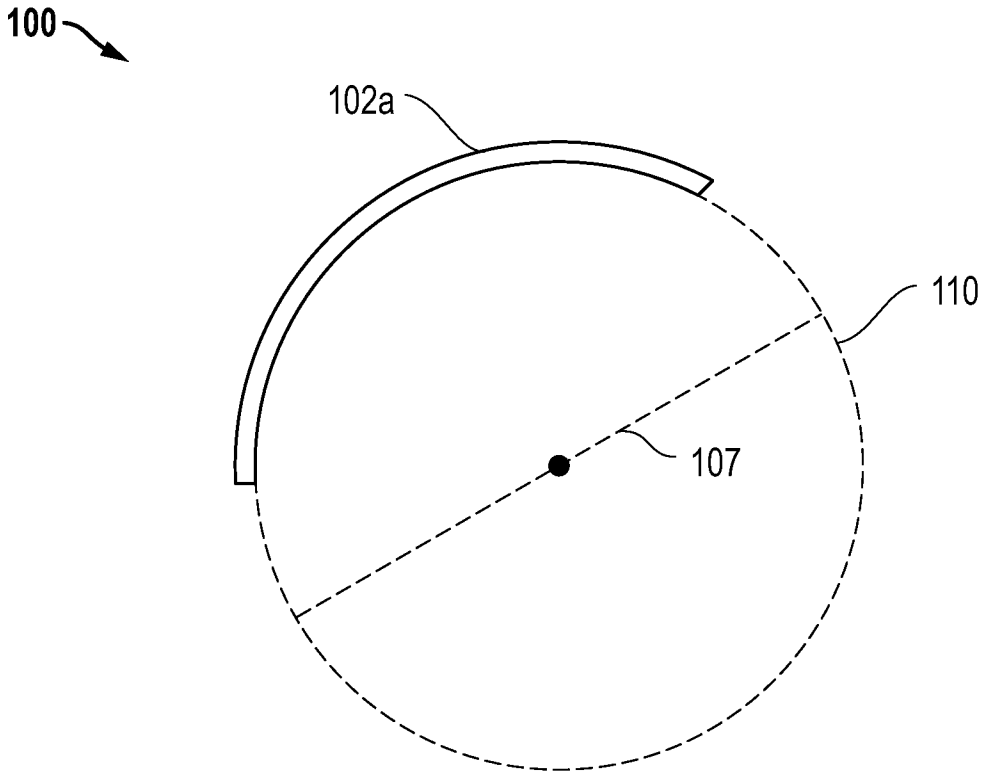


FIG. 1B

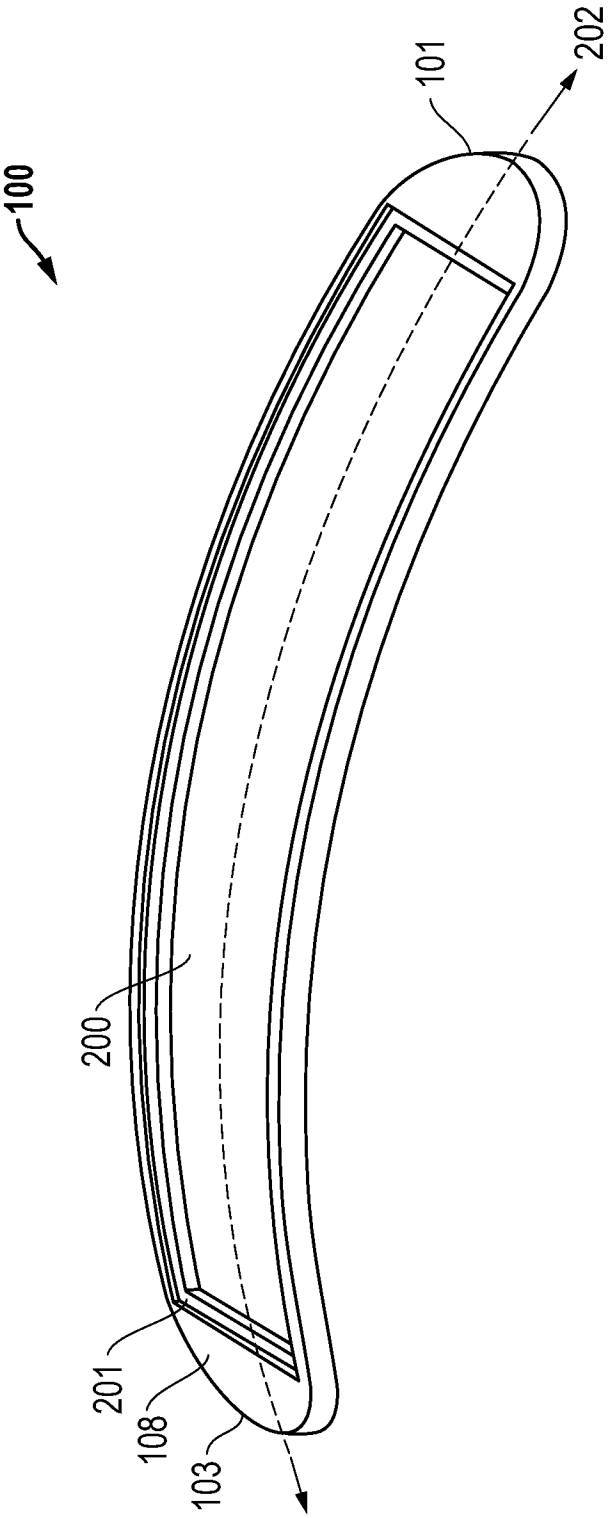


FIG. 2

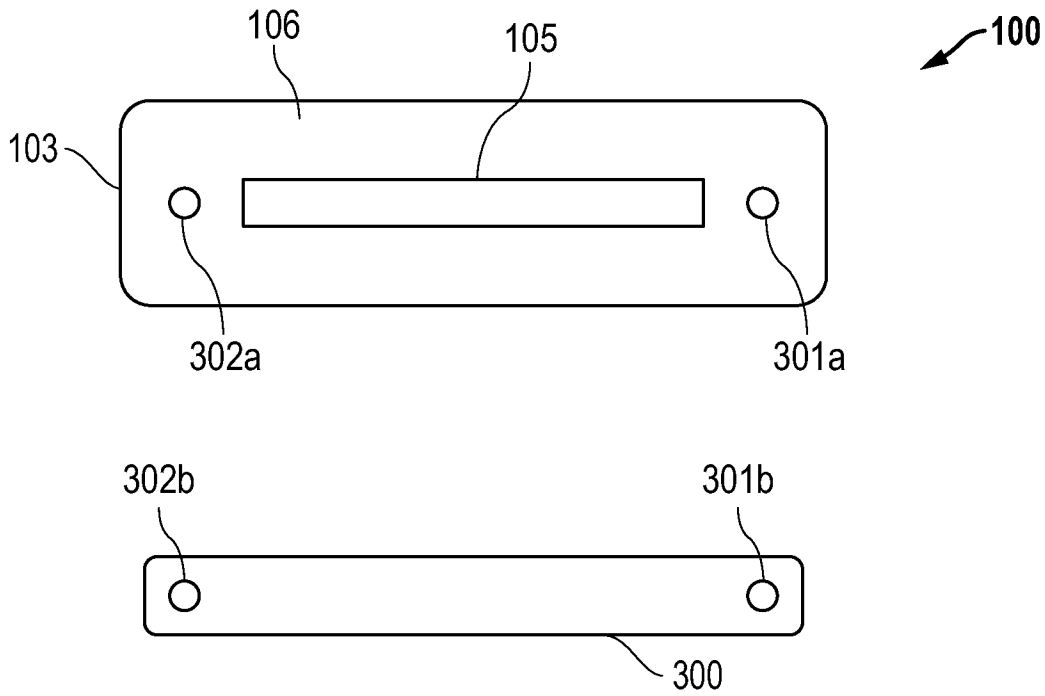


FIG. 3

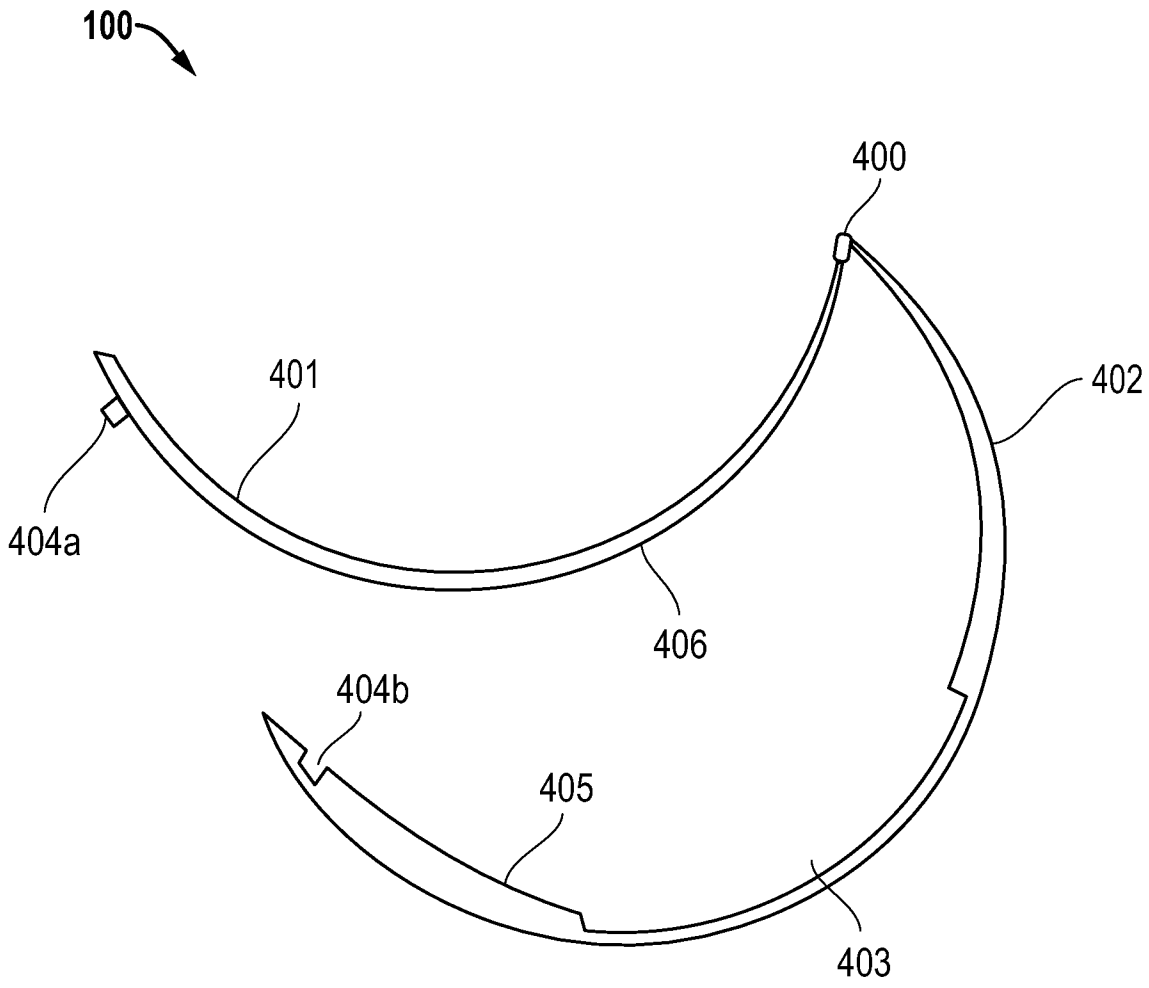


FIG. 4

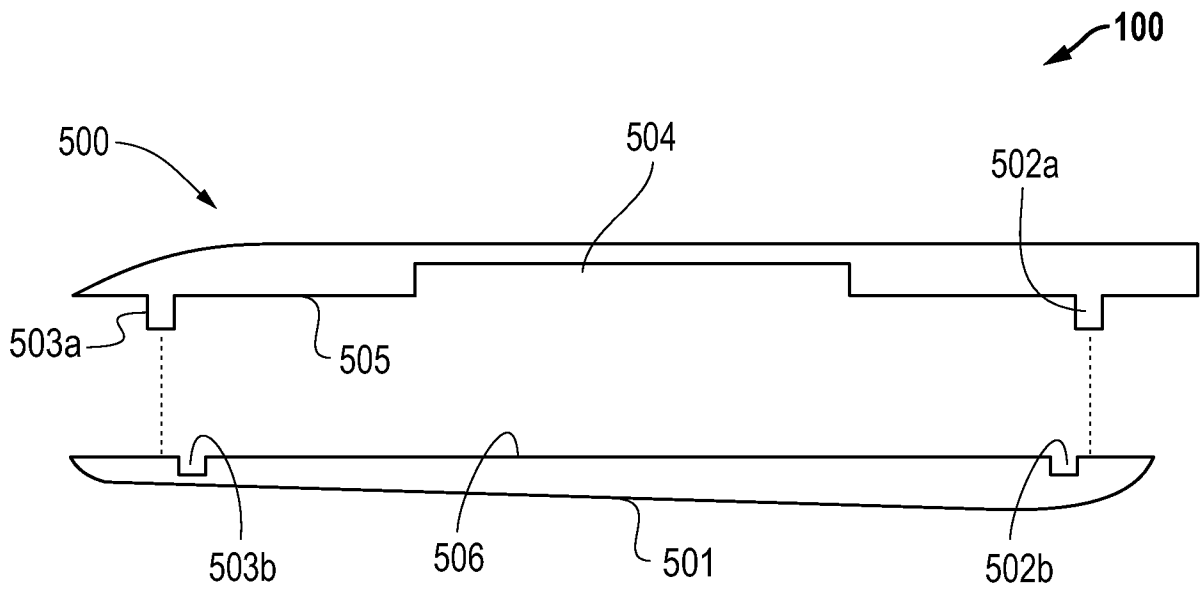


FIG. 5A

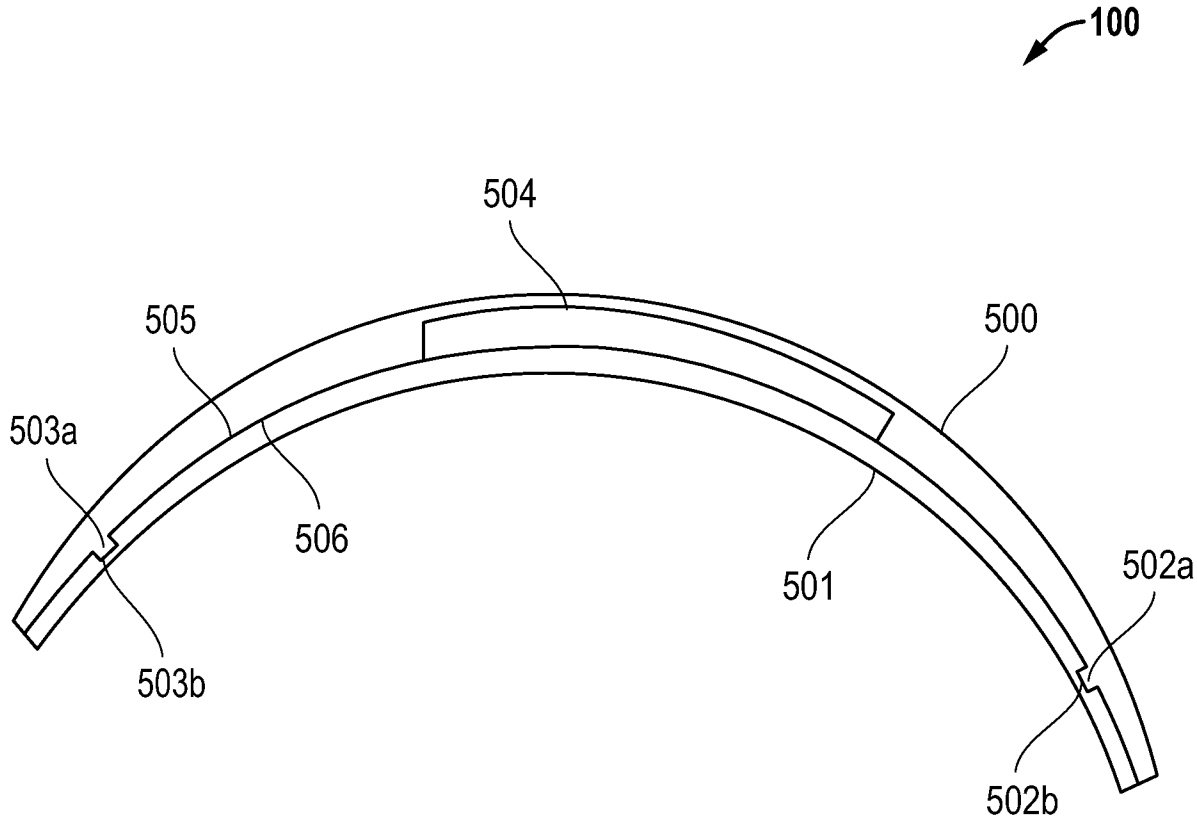


FIG. 5B

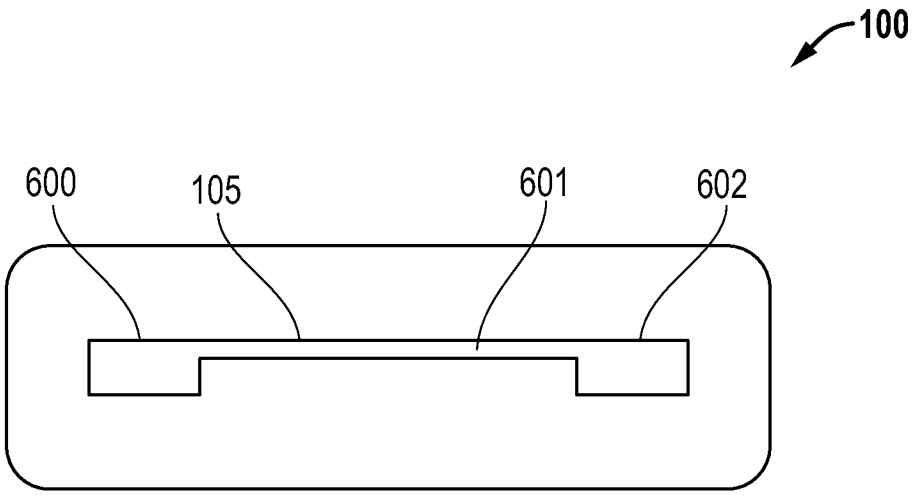


FIG. 6

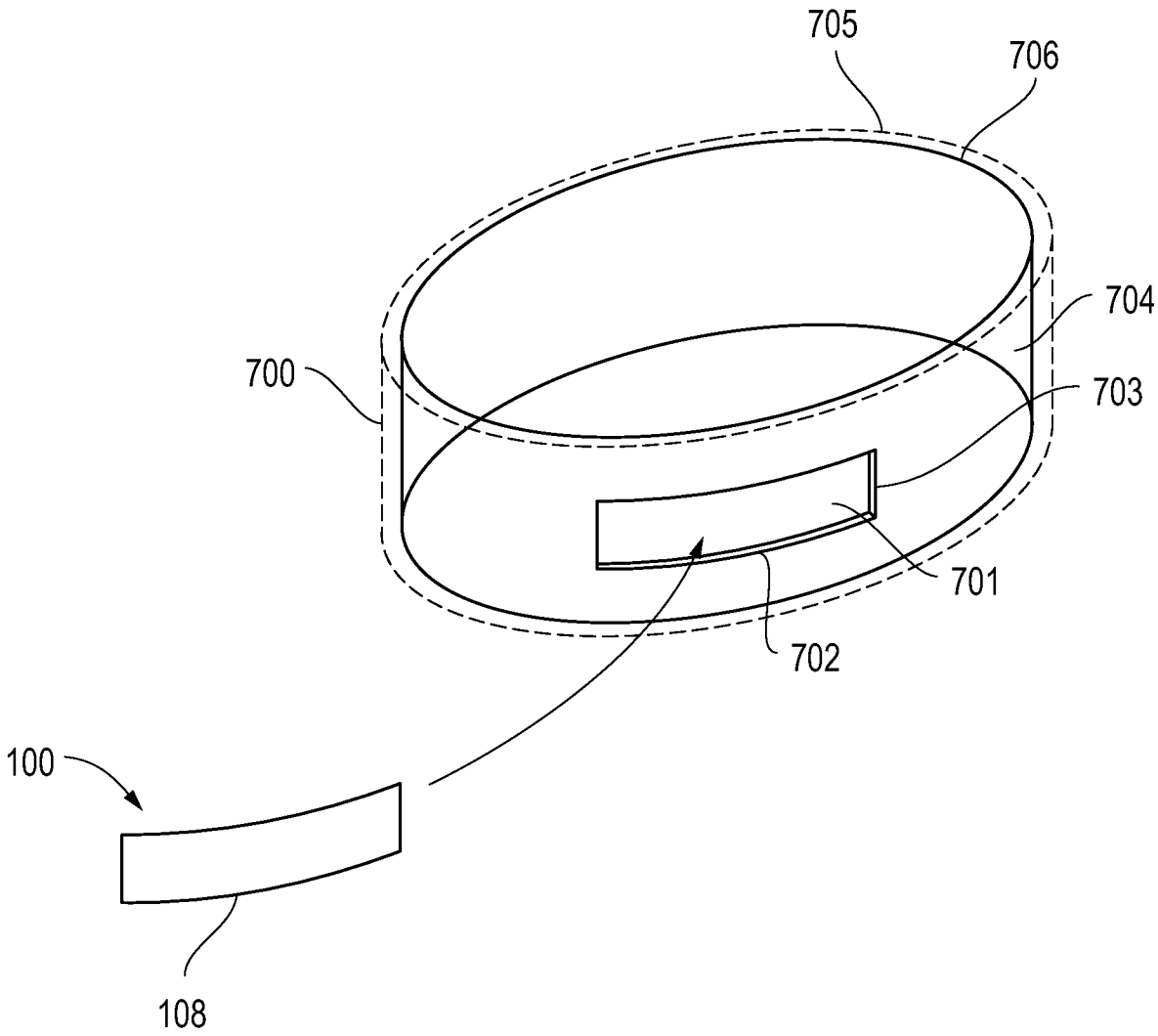


FIG. 7

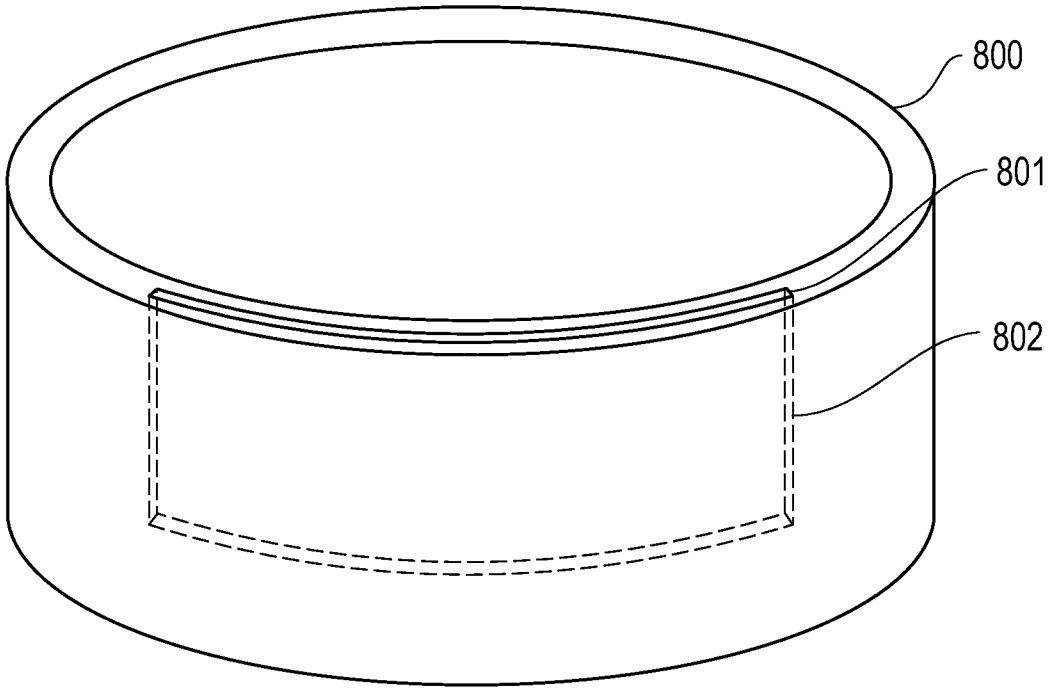


FIG. 8A

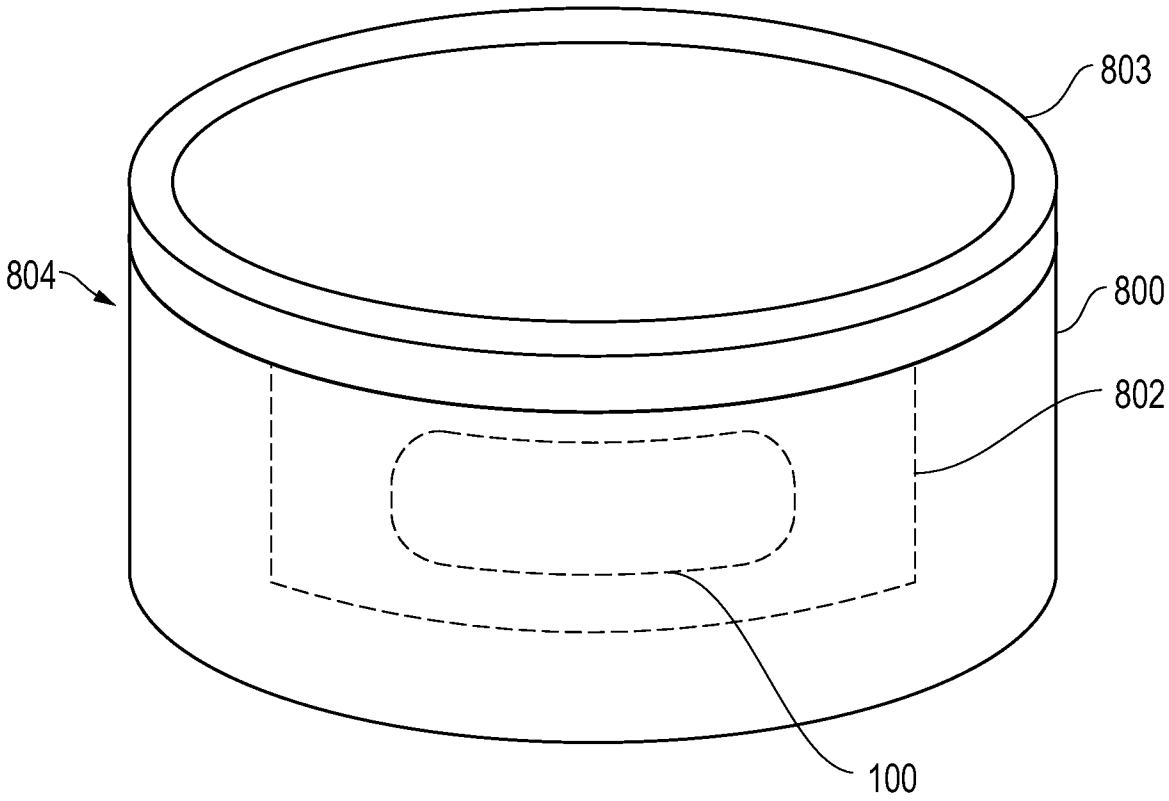


FIG. 8B

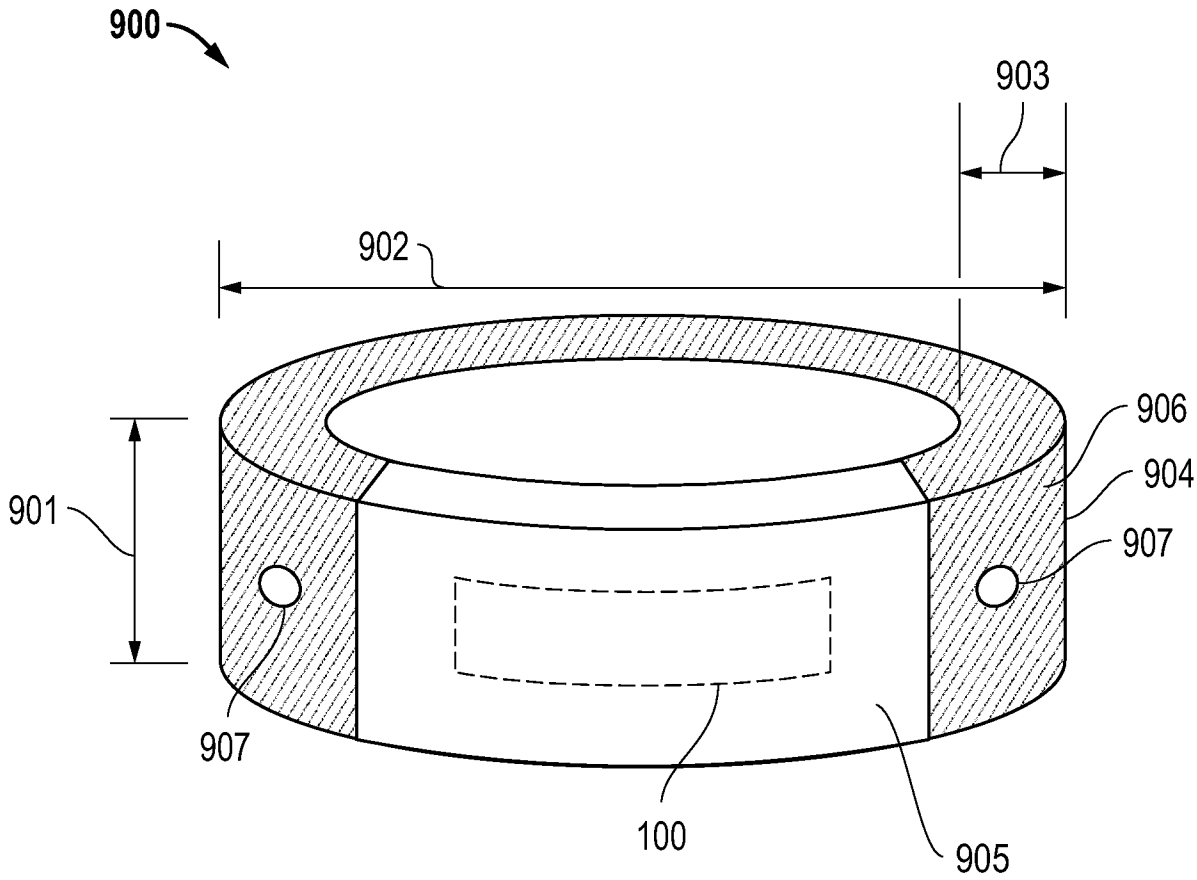


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/041051

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G09F 3/14 (2012.01)
USPC - 40/665
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A61B 5/117; G09F 3/14 (2012.01)
USPC - 40/632,633,634,642.02,660,661,665; 206/39.5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent, Google Patents

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,716,669 A (FAST) 05 January 1988 (05.01.1988) entire document	22-32
X	US 1,657,250 A (FETTERS) 24 January 1928 (24.01.1928) entire document	1-15
X	US 7,604,176 B2 (BATES et al) 20 October 2009 (20.10.2009) entire document	16-21

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 July 2012	07 AUG 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)