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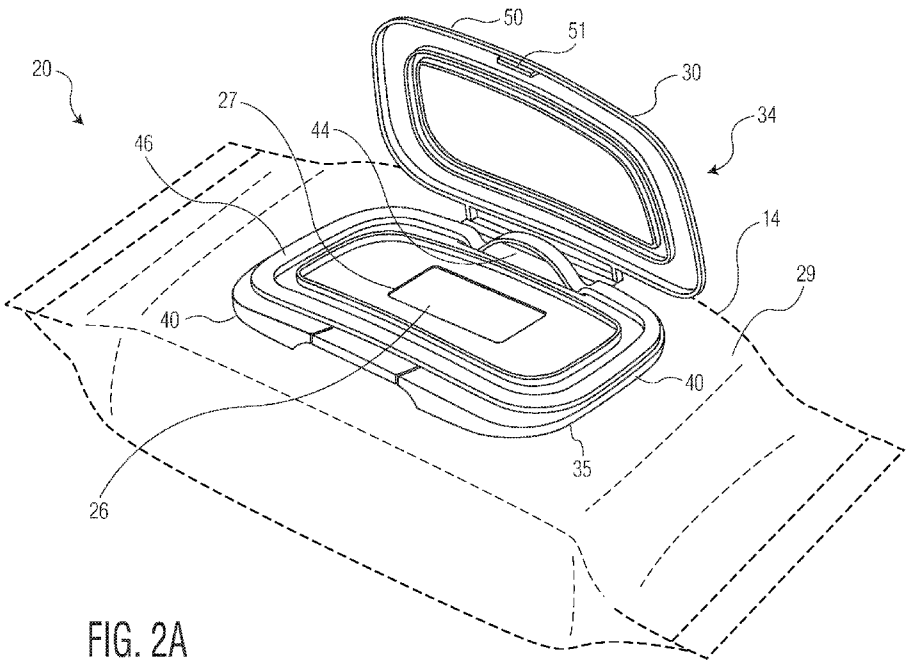

FIG. 2A

(57) Abstract: A lid assembly, adapted to form part of a dispensing container, includes a closed-loop flange, and a lid is joined to and pivots about the flange via a hinge. A spring is joined to the flange at the first and second ends. The flange, the spring, the lid, and an opening button can all be integrally formed together. In a closed position, the lid is stacked above the flange in a height dimension. The spring forms a convex arc whose convexity extends away from the flange in the height dimension when the lid is in the open position. The spring can be curvilinear and have two, three, four, or more points of inflection, such as by being m- or w-shaped.

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LID ASSEMBLY HAVING A CURVILINEAR SPRING ACTIVATED, POP-OPEN LID, AND CONTAINER HAVING SAME

BACKGROUND OF THE INVENTION

Consumer products, such as disposable wipes, are often sold in packages designed to both store and dispense the products. For example, disposable moist wipes are often sold in rigid tubs or flexible pouches that include a dispensing orifice through which to extract the wipes from the interior of the tub or pouch. A movable and resealable flap or lid typically covers the dispensing orifice, so that when a wipe is not being dispensed, the tub or pouch can be sealed to the outside environment to prevent moisture loss from the plurality of moist wipes housed therein.

Mechanisms for opening the flap or lid vary. In a common "push button" design, the lid is held closed via a latching mechanism. In the closed position, a compressed spring lies in tension against an undersurface of the lid. When an opening button is pressed, the latching mechanism releases the lid, and the compressed spring unloads its tension to throw the lid to an open position. Such "push button" opening mechanisms are a desirable and elegant design, delivering intuitive, simple, and reliable operation to a user of the moist wipes dispenser.

However, conventional spring-based push-button mechanisms suffer from a key deficiency. Most moist wipe dispensing packages having a push-button opening feature on the market today are formed from rigid or flexible recyclable plastics, and the inclusion of a rubber, silicone, or metal spring component in the package structure complicates efforts to easily recycle the package material. It is not practical to rely on the consumer to dissemble the dispenser lid assembly and remove the non-integral spring component prior to recycling. Furthermore, the separate spring component made of rubber, silicone, metal or similar material adds undesirable expense to the package.

As a result, there is a need for an improved push-button storage and dispensing package for consumer products.

SUMMARY OF THE INVENTION

A first embodiment of the invention includes a lid assembly adapted to form part of a dispensing container, the assembly having a longitudinal dimension, a transverse dimension, and a height dimension. The assembly includes a flange that forms a closed loop; a lid joined to the flange via a hinge, the lid adapted to pivot about the hinge between a closed position and an open position; a spring in the flange positioned proximate the hinge, the spring having first and second ends, the spring joined to the flange at the first and second ends; and an opening button in the flange positioned longitudinally opposite

the spring on the closed loop. The flange, the button, the spring, and the lid are all integrally formed together. The lid in the closed position is stacked above the flange in the height dimension. The spring forms a convex arc whose convexity extends away from the flange in the height dimension when the lid is in the open position. The arc is at least partially deformed toward the flange in the height dimension when the lid is in the closed position, the spring having stored potential energy when the lid is in the closed position, and having no stored potential energy when the lid is in the open position. If the lid is in the closed position, the lid is held in the closed position until the button is pressed. When the button is pressed, the spring urges the lid toward the open position.

A second embodiment of the invention includes the first embodiment, further wherein the lid includes a catch and the button includes a latch, the catch adapted to engage the latch when the lid is in the closed position, and wherein when the button is pressed, the latch releases the catch, allowing the spring to urge the lid toward the open position.

A third embodiment of the invention includes either of the first or the second embodiments, wherein the flange is hollow under an entirety of the arc.

A fourth embodiment of the invention includes any of the first through the third embodiments, wherein the spring has a width extending in the longitudinal dimension, and wherein under the spring in the height dimension the flange defines a hole having a hole width that is at least as wide as the spring width, the hole extending from the first end of the spring to the second end of the spring.

A fifth embodiment of the invention includes any of the first through the fourth embodiments, wherein the convex arc is flanked by a pair of concave arcs, each of whose concavity extends away from the convex arc in the height dimension.

A sixth embodiment of the invention includes any of the first through the fifth embodiments, wherein the assembly consists of a substantially homogenous polymeric structure.

A seventh embodiment of the invention includes any of the first through the sixth embodiments, wherein the assembly consists of a single polymer selected from the group of polyethylene terephthalate, polyethylene, polypropylene, polyamide, polystyrene, polyvinyl chloride, poly acrylo nitrile, and poly carbonate.

An eighth embodiment of the invention includes any of the first through the seventh embodiments, wherein the lid defines a top side and an underside, and wherein the spring exerts force against the underside of the lid in the height dimension when the lid is in the closed position.

A ninth embodiment of the invention includes any of the first through the eighth embodiments, wherein the spring exerts substantially no force against the lid in the longitudinal dimension when the lid is in the closed position.

A tenth embodiment of the invention includes any of the first through the ninth embodiments, wherein the assembly includes no component made of rubber, silicone, elastomer, or metal.

An eleventh embodiment of the invention includes a lid assembly adapted to form part of a dispensing container, the assembly having a longitudinal dimension and a transverse dimension. The assembly includes a flange; a lid joined to the flange via a hinge, wherein the hinge extends in the transverse dimension, the lid adapted to pivot about the hinge between a closed position and an open position; and a curvilinear spring disposed proximate to the hinge and interposed between the flange and the lid, the spring having at least two points of inflection when the lid is an open position. The hinge is a living hinge and the lid, the hinge, and the curvilinear spring are integrally formed with one another. The flange has an upper surface lying in a first plane and the curvilinear spring has an arced portion having an upper surface lying in a second plane that is above the first plane when the lid is in an open position.

A twelfth embodiment of the invention includes the eleventh embodiment, wherein the curvilinear spring is integrally formed with the flange.

A thirteenth embodiment of the invention includes either of the eleventh or the twelfth embodiments, further comprising an opening button disposed on the flange.

A fourteenth embodiment of the invention includes any of the eleventh through the thirteenth embodiments, wherein the curvilinear spring has at least three points of inflection when the lid is in the open position.

A fifteenth embodiment of the invention includes any of the eleventh through the fourteenth embodiments, wherein the flange is annular.

A sixteenth embodiment of the invention includes any of the eleventh through the fifteenth embodiments, wherein the curvilinear spring has a first and a second end joined to the flange and the at least two points of inflection lie between the first and the second ends when the lid is in the open position.

A seventeenth embodiment of the invention includes any of the eleventh through the sixteenth embodiments, wherein the curvilinear spring has an m-shape or a w-shape when the lid is in the open position.

An eighteenth embodiment of the invention includes a dispensing container, the container having a housing for storing product, the housing defining an interior space, the housing having an outer surface generally facing away from the interior space, the housing having a dispensing orifice for withdrawing product from the interior space. The container includes the lid assembly of any of the first through the seventeenth embodiments.

A nineteenth embodiment of the invention includes the dispensing container of the eighteenth embodiment, wherein the housing is a flexible film pouch, and wherein the product comprises disposable personal care tissues or moist wipes.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1A representatively illustrates a perspective view of one embodiment of the lid assembly of the invention, shown with the lid shut, and affixed to a flexible package, and with a portion cut away to show underlying features.

Fig. 1B representatively illustrates a top view of the lid assembly of Fig. 1A.

Fig. 1C representatively illustrates a front view of the lid assembly of Fig. 1A.

Fig. 1D representatively illustrates a side view of the lid assembly of Fig. 1A.

Fig. 2A representatively illustrates a perspective view of the lid assembly of Fig. 1A, shown with the lid partially open, and affixed to a flexible package.

Fig. 2B representatively illustrates a top view of the lid assembly Fig. 2A.

Fig. 2C representatively illustrates a front view of the lid assembly of Fig. 2A.

Fig. 2D representatively illustrates a side view of the lid assembly of Fig. 2A.

Fig. 2E representatively illustrates a front perspective view of the lid assembly of Fig. 1A, with the lid fully open and showing the inside surfaces of the flange and lid components.

Fig. 2F representatively illustrates a top view of the flange component of the lid assembly of Fig. 2A.

Fig. 2G representatively illustrates a front view of the flange component of the lid assembly of Fig. 2A.

Fig. 3A representatively illustrates a front perspective view of the spring and hinge region of the lid assembly embodiment of Figs. 1-2, showing the spring in an uncompressed condition.

Fig. 3B representatively illustrates the spring and hinge region shown in Fig. 3A, but with the spring shown in a compressed condition.

DETAILED DESCRIPTION OF PARTICULAR EMBODIMENTS

In particular embodiments, a dispensing container 20 (Fig. 1A) is adapted to store and dispense product, such as a stack of moist wipes (not shown). Other examples of product suitable for use in conjunction with the present invention include facial tissues, sanitizing wipes, paper towels, feminine hygiene products, candy, snacks, or the like. The container 20 includes a housing 14. The housing 14 can be rigid, such as a plastic container (not shown). Alternatively, the housing 14 can be flexible, such as a flexible pouch 15, as representatively illustrated in Fig. 1A. The flexible pouch can be made of any suitable flexible substrate, including a polymeric film, a nonwoven fabric, cloth, rubber, foil, or the like. The housing 14 defines an interior space 26, and an outer surface 29 generally facing away from the interior space 26. The housing 14 defines a dispensing orifice 27 (Fig. 2A) through which the wipes can be individually extracted from the interior space 26. In particular embodiments, the housing 14 is formed of a substantially moisture-impervious material, such as when the housing 14 is used to house pre-moistened wipes.

Referring to Figs. 1 and 2, the container includes a lid assembly 30. The assembly 30 has a longitudinal dimension 31, a transverse dimension 32, and a height dimension 33. The assembly 30 includes a flange 40. In particular embodiments, the flange forms a closed loop 35 (such as an annular ring), as representatively illustrated in Figs. 2A and 2E. In particular embodiments, the flange 40 is disposed on the outer surface 29 of the housing 14, such as by being affixed to the outer surface 29 of the housing 14 (Figs. 1A and 2A), such as via adhesive. Alternatively, the flange 40 can be integrally formed with the housing.

The assembly 30 includes a lid 50. The lid 50 is joined to the flange 40 at a hinge 42. The hinge 42 extends in the transverse dimension 32. The lid 50 is adapted to pivot about the hinge 42 between a closed position 52 and an open position 54. In particular embodiments, the hinge 42 is a living hinge. When the lid 50 is in the closed position 52, the lid 50 is stacked above the flange 40 in the height dimension 33 (Figs. 1A-1D), and is interposed between the flange 40 and the lid 50. When the assembly 30 forms part of a container 20, the lid 50 covers the dispensing orifice 27 when the lid is in a closed position 36 (Fig. 1A), and the lid 40 exposes the dispensing orifice 27 when the lid 50 is in an open position 34 (Fig. 2A). The lid 50 can optionally include at least one lid moisture retention ridge 35.

The assembly 30 includes a spring 60. The spring 60 is positioned proximate the hinge 42. The spring 60 is curvilinear. The spring has a first end 61 and a second end 62, and is in particular

embodiments joined to the flange 40 at its first and second ends 61, 62. The assembly further includes an opening button 70 in the flange 40. The opening button 70 is positioned opposite the spring 60 on the closed loop 35, as shown in Figs. 2A, 2B, and 2F. The spring 60 has a spring width 63 that in particular embodiments extends in the longitudinal dimension 31, and has a spring length 65 that extends in the transverse dimension 32 from the first end 61 to the second end 62. In other embodiments, the spring length 65 extends from the first end 61 to the second end 62 in the longitudinal dimension 31, and the spring width 63 extends in the transverse dimension 32 (not shown). Furthermore, the assembly 30 can include two or more springs 60, each of which could have the features described herein.

The flange 40, the lid 50, the spring 60, and the button 70 are all integrally formed together, such as by all being part of the same unitary plastic structure. This is in contrast to conventional push-button lid structures, which typically rely on joining together two or more separate components, one of which is typically a discrete spring made of rubber, silicone, elastomer, or metal. Polymeric injection molding is one example of a suitable technology with which to form the integral structure of particular embodiments of the present invention. In particular embodiments, the assembly 30 consists of a homogenous polymeric composition. In particular embodiments, the assembly 30 consists of a single polymer selected from the group of polyethylene terephthalate, polyethylene, polypropylene, polyamide, polystyrene, polyvinyl chloride, poly acrylo nitrile, and poly carbonate. The ability of particular embodiments of the invention to deliver “pop-open” action via a push-button using the herein-described simple one-piece construction, devoid of a separately produced spring component, can provide an elegant, more easily recycled design having reduced raw material and assembly cost. In particular embodiments, the lid assembly 30 includes no component made of rubber, silicone, elastomer, or metal.

In particular embodiments, the lid assembly 30 is made entirely of material having a flex modulus of 100,000 PSI or greater, such as between 100,000 and 450,000 PSI, as measured by ASTM D 790A. In particular embodiments, the lid assembly 30 is made entirely of material having a tensile modulus of between 0.1 GPa to 12 GPa, and more particularly from 0.3 GPa to 4.5 GPa. In particular embodiments, the lid assembly 30 includes no material having a tensile modulus less than 0.1 GPa. In particular embodiments, the lid assembly 30 is made only of polyolefins, such as polypropylene, with an elastic moduli of about 2000 MPa (such between 1800 MPa and 2200 MPa), and a yield strength of about 20 MPa (such as between 15 MPa and 25 MPa). Elastic modulus and yield strength can be measured using ASTM D 638.

Referring to Figs. 2A-2G and 3A, the spring 60 is curvilinear, and forms at least one convex arc 66 whose convexity extends away from the flange 40 in the height dimension 33 when the lid is in the open position 34. When the lid 50 is in the closed position 36, the arc 66 is at least partially deformed

toward the flange 40 in the height dimension 33, as representatively illustrated in Fig. 3B. In this deformed condition, the spring 60 possesses stored potential energy (that is, when the lid 50 is in the closed position 36). Conversely, when the lid 50 is in the open position 34, the convex arc 66 returns, and the spring 60 has no stored potential energy. If the lid 50 is in the closed position 36, the lid 50 is held in the closed position 36 until the button 70 is pressed. When the button 70 is pressed, the spring 60 urges the lid 50 toward the open position 34. In particular embodiments, the convex arc 66 is flanked by a pair of concave arcs 37A, 37B. The concavity of each concave arc 37A, 37B extends away from the convex arc 66 in the height dimension 33. In particular embodiments, the spring 60 has at least two, and more particularly at least three, and more particularly at least four, points of inflection when the lid is in the open position 34. In particular embodiments, the flange 40 has an upper surface 46 lying in a first plane and the convex arc 66 of the spring 60 has an upper surface 68 lying in a second plane, and the second plane is above the first plane when the lid 50 is in the open position 34. In particular embodiments, the spring 60 has a c-shape, an s-shape, an m-shape, or a w-shape. “Convex” means having an outline or surface curved like the exterior of a circle or sphere. “Concave” means having an outline or surface that curves inward like the interior of a circle or sphere.

The lid 50 defines a top side 55 and an underside 56. In particular embodiments, the spring 60 exerts force against the underside 56 of the lid 50 in the height dimension 33 when the lid 50 is in the closed position 36. Furthermore, in particular embodiments, the spring 60 exerts substantially no force against the lid 50 in the longitudinal dimension 31 when the lid is in the closed position 36.

In particular embodiments, the lid 50 includes a catch 51 and the button 70 includes a latch 71, as representatively illustrated in Figs. 2A-2E. The latch 71 is adapted to engage the catch 51 when the lid 50 is in the closed position 36, and to restrain the lid 50 in such closed position 36. When the button 70 is pressed, the latch 71 is moved so as to release the catch 51, allowing the spring 60 to convert potential energy to kinetic energy and thereby urge the lid 50 toward the open position 34.

In particular embodiments, the flange 40 is hollow under an entirety of the convex arc 66. In other words, there is no material in the flange 40 directly under (under in the height dimension 33) the convex arc 66. In particular embodiments, the flange 40 is hollow under an entirety of the convex arc 66, and under an entirety of each concave arc 67A, 67B. In other words, there is no material in the flange 40 directly under (under in the height dimension 33) the convex arc 66 and the concave arcs 67A, 67B. In particular embodiments, the flange 40 defines a hole 44 under the spring 60 (under in the height dimension 33). The hole 44 has a hole width 45 (Fig. 2F) that is at least as wide as the spring width 63. The hole 44 extends from the first end 61 of the spring 60 to the second end 62 of the spring 60. By having such a “hole” in the area “underneath” the spring, the lid assembly 30 can in particular

embodiments be readily manufactured in conventional injection-molding or blow-molding equipment. If the assembly were created with another “layer” of material underneath the spring, it could be impractical or impossible to manufacture certain embodiments of the push-button lid of the present invention.

While the invention has been described in detail with respect to the specific aspects thereof, it will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing, may readily conceive of alterations to, variations of, and equivalents to these aspects.

WHAT IS CLAIMED IS:

1. A lid assembly adapted to form part of a dispensing container, the assembly having a longitudinal dimension, a transverse dimension, and a height dimension, the assembly comprising:

a flange that forms a closed loop;

a lid joined to the flange via a hinge, the lid adapted to pivot about the hinge between a closed position and an open position;

a spring in the flange positioned proximate the hinge, the spring having first and second ends, the spring joined to the flange at the first and second ends; and

an opening button in the flange positioned longitudinally opposite the spring on the closed loop,

wherein the flange, the button, the spring, and the lid are all integrally formed together,

wherein the lid in the closed position is stacked above the flange in the height dimension,

wherein the spring forms a convex arc whose convexity extends away from the flange in the height dimension when the lid is in the open position,

wherein the arc is at least partially deformed toward the flange in the height dimension when the lid is in the closed position, the spring having stored potential energy when the lid is in the closed position, and having no stored potential energy when the lid is in the open position,

wherein if the lid is in the closed position, the lid is held in the closed position until the button is pressed,

wherein when the button is pressed, the spring urges the lid toward the open position.

2. The assembly of claim 1, wherein the lid includes a catch and the button includes a latch, the catch adapted to engage the latch when the lid is in the closed position, and wherein when the button is pressed, the latch releases the catch, allowing the spring to urge the lid toward the open position.

3. The assembly of claim 1, wherein the flange is hollow under an entirety of the arc.

4. The assembly of claim 1, wherein the spring has a width extending in the longitudinal dimension, and wherein under the spring in the height dimension the flange defines a hole having a hole width that is at least as wide as the spring width, the hole extending from the first end of the spring to the second end of the spring.

5. The assembly of claim 1 wherein the convex arc is flanked by a pair of concave arcs, each of whose concavity extends away from the convex arc in the height dimension.

6. The assembly of claim 1 wherein the assembly consists of a substantially homogenous polymeric structure.

7. The assembly of claim 6 wherein the assembly consists of a single polymer selected from the group of polyethylene terephthalate, polyethylene, polypropylene, polyamide, polystyrene, polyvinyl chloride, poly acrylo nitrile, and poly carbonate.

8. The assembly of claim 1 wherein the lid defines a top side and an underside, wherein the spring exerts force against the underside of the lid in the height dimension when the lid is in the closed position.

9. The assembly of claim 1 wherein the spring exerts substantially no force against the lid in the longitudinal dimension when the lid is in the closed position.

10. The assembly of claim 1, wherein the assembly includes no component made of rubber, silicone, elastomer, or metal.

11. A dispensing container, the container comprising:

a housing for storing product, the housing defining an interior space, the housing having an outer surface generally facing away from the interior space, the housing having a dispensing orifice for withdrawing product from the interior space;

a lid assembly having a longitudinal dimension, a transverse dimension, and a height dimension, the assembly comprising:

a flange that forms a closed loop that surrounds the dispensing orifice;

a lid joined to the flange via a hinge, the lid adapted to pivot about the hinge between a closed position and an open position;

a spring in the flange positioned proximate the hinge, the spring having first and second ends, the spring joined to the flange at the first and second ends; and

an opening button in the flange positioned longitudinally opposite the spring on the closed loop,

wherein the flange, the button, the spring, and the lid are all integrally formed together,

the flange being affixed to the outer surface of the housing, the lid covering the dispensing orifice when the lid is in the closed position,

wherein the lid in the closed position is stacked above the flange in the height dimension,

wherein the spring forms a convex arc whose convexity extends away from the flange in the height dimension when the lid is in the open position,

wherein the arc is at least partially deformed toward the flange in the height dimension when the lid is in the closed position, the spring having stored potential energy when the lid is in the closed position, and having no stored potential energy when the lid is in the open position,

wherein if the lid is in the closed position, the lid is held in the closed position until the button is pressed,

wherein when the button is pressed, the spring urges the lid toward the open position.

12. The container of claim 11, wherein the lid includes a catch and the button includes a latch, the catch adapted to engage the latch when the lid is in the closed position, and wherein when the button is pressed, the latch releases the catch, allowing the spring to urge the lid toward the open position.

13. The container of claim 11, wherein the flange is hollow under an entirety of the arc.

14. The container of claim 11 wherein the spring has a width extending in the longitudinal dimension, and wherein under the spring in the height dimension the flange defines a hole that is at least as wide as the spring width, the hole extending from the first end of the spring to the second end of the spring.

15. The container of claim 11 wherein the convex arc is flanked by a pair of concave arcs, each of whose concavity extends away from the convex arc in the height dimension.

16. The assembly of claim 11 wherein the assembly consists of a substantially homogenous polymeric structure.

17. The assembly of claim 16 wherein the assembly consists of a single polymer selected from the group of polyethylene terephthalate, polyethylene, polypropylene, polyamide, polystyrene, polyvinyl chloride, poly acrylo nitrile, and poly carbonate.

18. The container of claim 11 wherein the lid defines a top side and an underside, wherein the spring exerts force against the underside of the lid in the height dimension when the lid is in the closed position.

19. The container of claim 11 wherein the spring exerts substantially no force against the lid in the longitudinal dimension when the lid is in the closed position.

20. The container of claim 11 wherein the housing is a flexible film pouch, and wherein the product comprises disposable personal care tissues or moist wipes.

21. A lid assembly adapted to form part of a dispensing container, the assembly having a longitudinal dimension and a transverse dimension, the assembly comprising:

a flange;

a lid joined to the flange via a hinge, wherein the hinge extends in the transverse dimension, the lid adapted to pivot about the hinge between a closed position and an open position; and

a curvilinear spring disposed proximate to the hinge and interposed between the flange and the lid, the spring having at least two points of inflection when the lid is an open position,

wherein the hinge is a living hinge and wherein the lid, hinge and the curvilinear spring are integrally formed with one another,

wherein the flange has an upper surface lying in a first plane and the curvilinear spring has an arced portion having an upper surface lying in a second plane that is above the first plane when the lid is in an open position.

22. The assembly of claim 21 wherein the curvilinear spring is integrally formed with the flange.

23. The assembly of claim 21 further comprising an opening button disposed on the flange.

24. The assembly of claim 21 wherein the curvilinear spring has at least three points of inflection when the lid is in the open position.

25. The assembly of claim 21 wherein the flange is annular.

26. The assembly of claim 21 wherein the curvilinear spring has a first and a second end joined to the flange and the at least two points of inflection lie between the first and the second ends when the lid is in the open position.

27. The assembly of claim 26 wherein the curvilinear spring has an m-shape or an s-shape when the lid is in the open position.

AMENDED CLAIMS
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WHAT IS CLAIMED IS:

1. A lid assembly adapted to form part of a dispensing container, the assembly having a longitudinal dimension, a transverse dimension, and a height dimension, the assembly comprising:

a flange that forms a closed loop;

a lid joined to the flange via a hinge, the lid adapted to pivot about the hinge between a closed position and an open position;

a spring in the flange positioned proximate the hinge, the spring having first and second ends, the spring joined to the flange at the first and second ends; and

an opening button in the flange positioned longitudinally opposite the spring on the closed loop,

wherein the flange, the button, the spring, and the lid are all integrally formed together,

wherein the lid in the closed position is stacked above the flange in the height dimension,

wherein the spring forms a convex arc flanked by a pair of concave arcs, each of whose concavity extends away from the convex arc in the height dimension, wherein the convexity of the convex arc extends away from the flange in the height dimension when the lid is in the open position,

wherein the arc is at least partially deformed toward the flange in the height dimension when the lid is in the closed position, the spring having stored potential energy when the lid is in the closed position, and having no stored potential energy when the lid is in the open position,

wherein if the lid is in the closed position, the lid is held in the closed position until the button is pressed,

wherein when the button is pressed, the spring urges the lid toward the open position.

2. The assembly of claim 1, wherein the lid includes a catch and the button includes a latch, the catch adapted to engage the latch when the lid is in the closed position, and wherein when the button is pressed, the latch releases the catch, allowing the spring to urge the lid toward the open position.

3. The assembly of claim 1, wherein the flange is hollow under an entirety of the arc.

4. The assembly of claim 1, wherein the spring has a width extending in the longitudinal dimension, and wherein under the spring in the height dimension the flange defines a hole having a hole width that is at least as wide as the spring width, the hole extending from the first end of the spring to the second end of the spring.

5. The assembly of claim 1 wherein the assembly consists of a substantially homogenous polymeric structure.

6. The assembly of claim 5 wherein the assembly consists of a single polymer selected from the group of polyethylene terephthalate, polyethylene, polypropylene, polyamide, polystyrene, polyvinyl chloride, poly acrylo nitrile, and poly carbonate.

7. The assembly of claim 1 wherein the lid defines a top side and an underside, wherein the spring exerts force against the underside of the lid in the height dimension when the lid is in the closed position.

8. The assembly of claim 1 wherein the spring exerts substantially no force against the lid in the longitudinal dimension when the lid is in the closed position.

9. The assembly of claim 1, wherein the assembly includes no component made of rubber, silicone, elastomer, or metal.

10. A dispensing container, the container comprising:

a housing for storing product, the housing defining an interior space, the housing having an outer surface generally facing away from the interior space, the housing having a dispensing orifice for withdrawing product from the interior space;

a lid assembly having a longitudinal dimension, a transverse dimension, and a height dimension, the assembly comprising:

a flange that forms a closed loop that surrounds the dispensing orifice;

a lid joined to the flange via a hinge, the lid adapted to pivot about the hinge between a closed position and an open position;

a spring in the flange positioned proximate the hinge, the spring having first and second ends, the spring joined to the flange at the first and second ends; and

an opening button in the flange positioned longitudinally opposite the spring on the closed loop,

wherein the flange, the button, the spring, and the lid are all integrally formed together,

the flange being affixed to the outer surface of the housing, the lid covering the dispensing orifice when the lid is in the closed position,

wherein the lid in the closed position is stacked above the flange in the height dimension,

wherein the spring forms a convex arc flanked by a pair of concave arcs, each of whose concavity extends away from the convex arc in the height dimension, wherein the convexity of the convex arc extends away from the flange in the height dimension when the lid is in the open position,

wherein the arc is at least partially deformed toward the flange in the height dimension when the lid is in the closed position, the spring having stored potential energy when the lid is in the closed position, and having no stored potential energy when the lid is in the open position,

wherein if the lid is in the closed position, the lid is held in the closed position until the button is pressed,

wherein when the button is pressed, the spring urges the lid toward the open position.

11. The container of claim 10, wherein the lid includes a catch and the button includes a latch, the catch adapted to engage the latch when the lid is in the closed position, and wherein when the button is pressed, the latch releases the catch, allowing the spring to urge the lid toward the open position.

12. The container of claim 10, wherein the flange is hollow under an entirety of the arc.

13. The container of claim 10 wherein the spring has a width extending in the longitudinal dimension, and wherein under the spring in the height dimension the flange defines a hole that is at least as wide as the spring width, the hole extending from the first end of the spring to the second end of the spring.

14. The assembly of claim 10 wherein the assembly consists of a substantially homogenous polymeric structure.

15. The assembly of claim 14 wherein the assembly consists of a single polymer selected from the group of polyethylene terephthalate, polyethylene, polypropylene, polyamide, polystyrene, polyvinyl chloride, poly acrylo nitrile, and poly carbonate.

16. The container of claim 10 wherein the lid defines a top side and an underside, wherein the spring exerts force against the underside of the lid in the height dimension when the lid is in the closed position.

17. The container of claim 10 wherein the spring exerts substantially no force against the lid in the longitudinal dimension when the lid is in the closed position.

18. The container of claim 10 wherein the housing is a flexible film pouch, and wherein the product comprises disposable personal care tissues or moist wipes.

19. A lid assembly adapted to form part of a dispensing container, the assembly having a longitudinal dimension and a transverse dimension, the assembly comprising:

a flange;

a lid joined to the flange via a hinge, wherein the hinge extends in the transverse dimension, the lid adapted to pivot about the hinge between a closed position and an open position; and

a curvilinear spring disposed proximate to the hinge and interposed between the flange and the lid, the spring having at least two points of inflection when the lid is an open position,

wherein the hinge is a living hinge and wherein the lid, hinge and the curvilinear spring are integrally formed with one another,

wherein the flange has an upper surface lying in a first plane and the curvilinear spring has an arced portion having an upper surface lying in a second plane that is above the first plane when the lid is in an open position.

20. The assembly of claim 19 wherein the curvilinear spring is integrally formed with the flange.

21. The assembly of claim 19 further comprising an opening button disposed on the flange.

22. The assembly of claim 19 wherein the curvilinear spring has at least three points of inflection when the lid is in the open position.

23. The assembly of claim 19 wherein the flange is annular.

24. The assembly of claim 19 wherein the curvilinear spring has a first and a second end joined to the flange and the at least two points of inflection lie between the first and the second ends when the lid is in the open position.

25. The assembly of claim 24 wherein the curvilinear spring has an m-shape or an s-shape when the lid is in the open position.

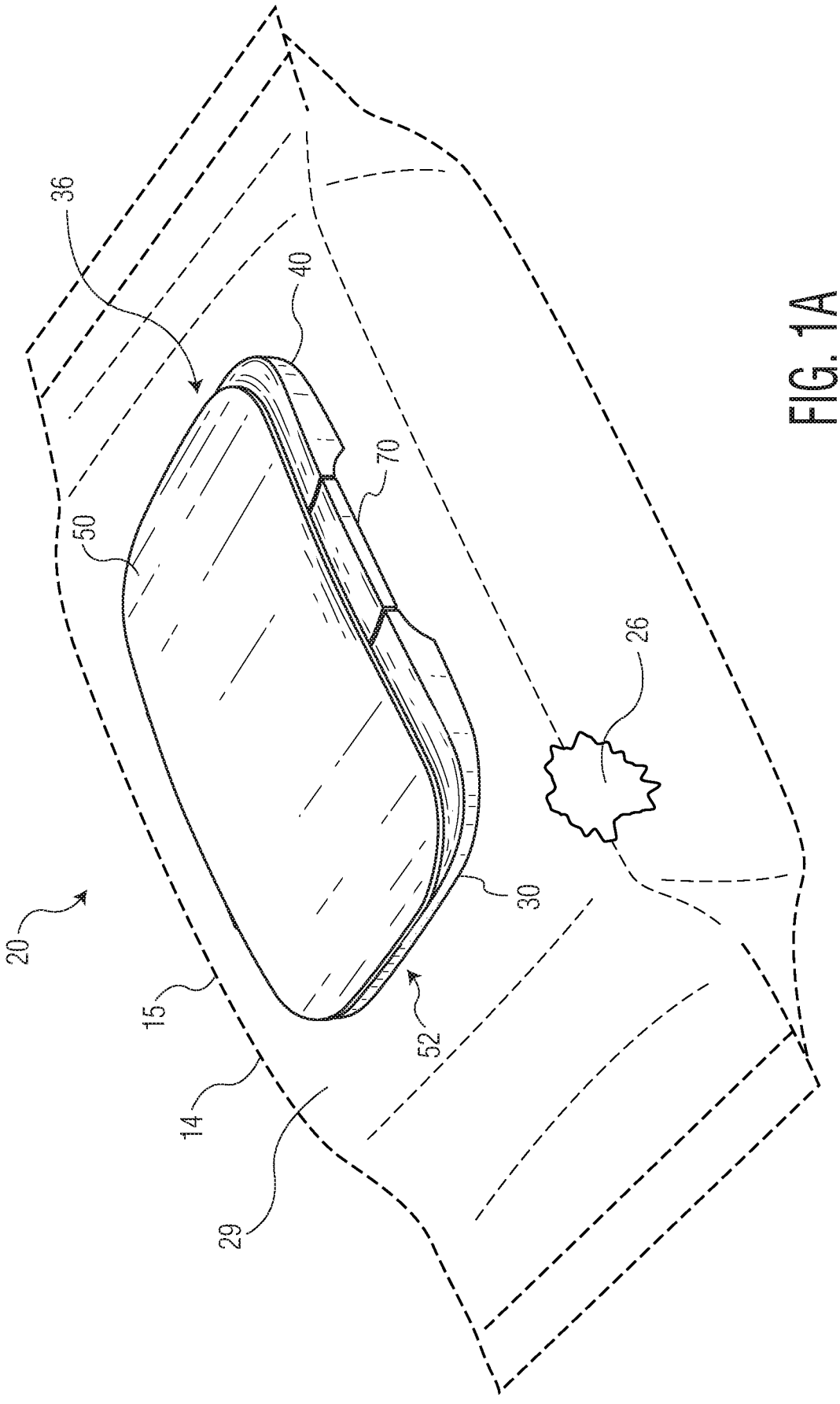

FIG. 1A

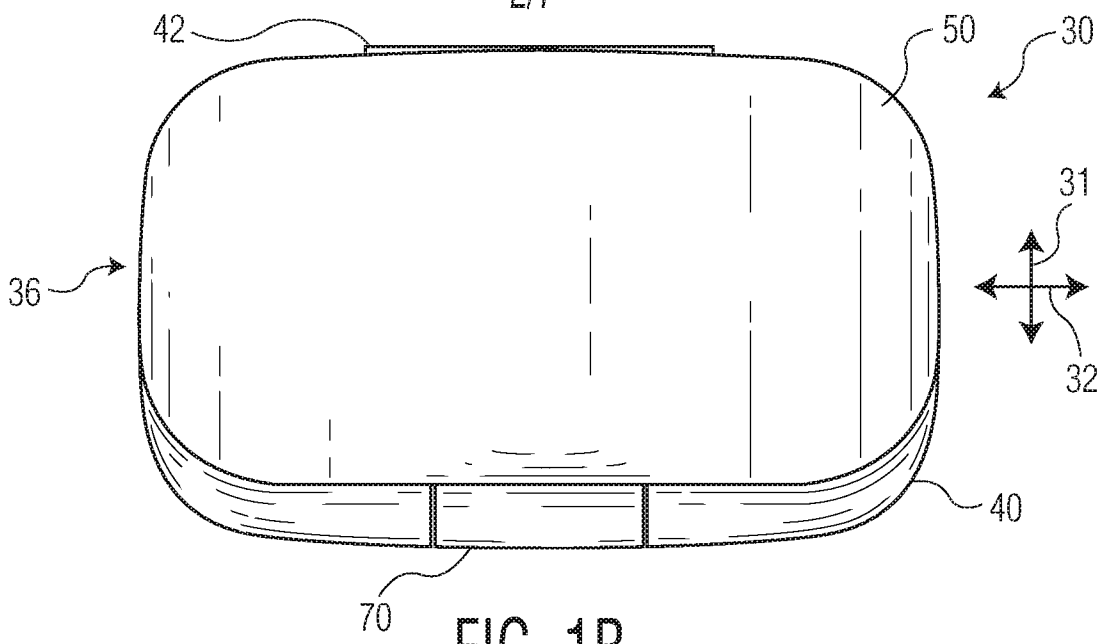

FIG. 1B

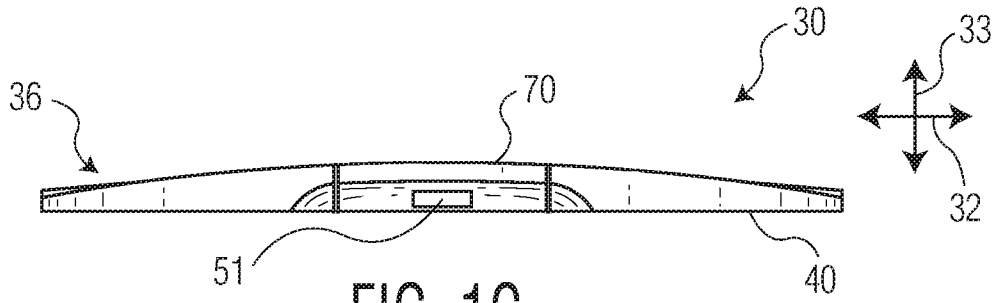

FIG. 1C

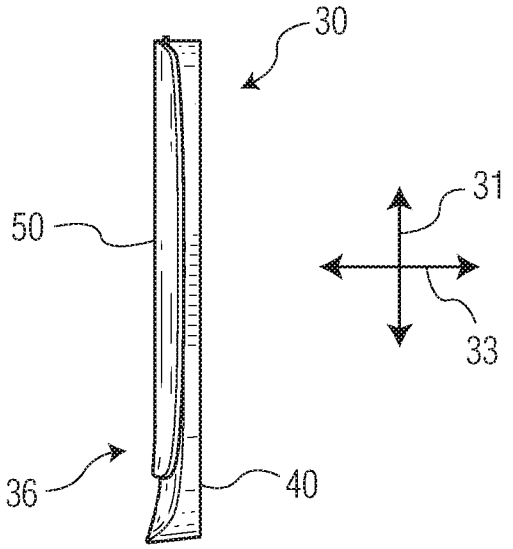

FIG. 1D

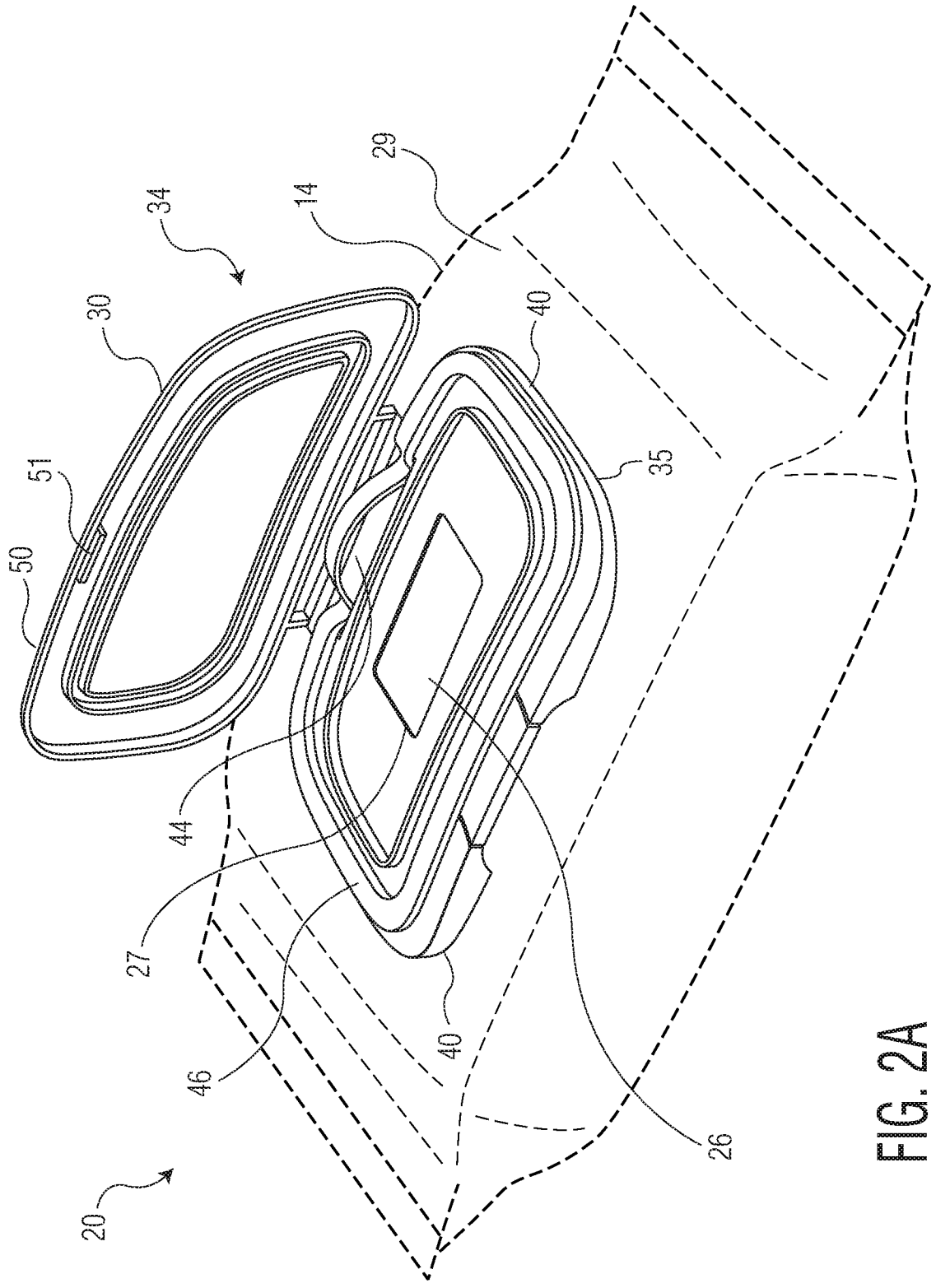

FIG. 2A

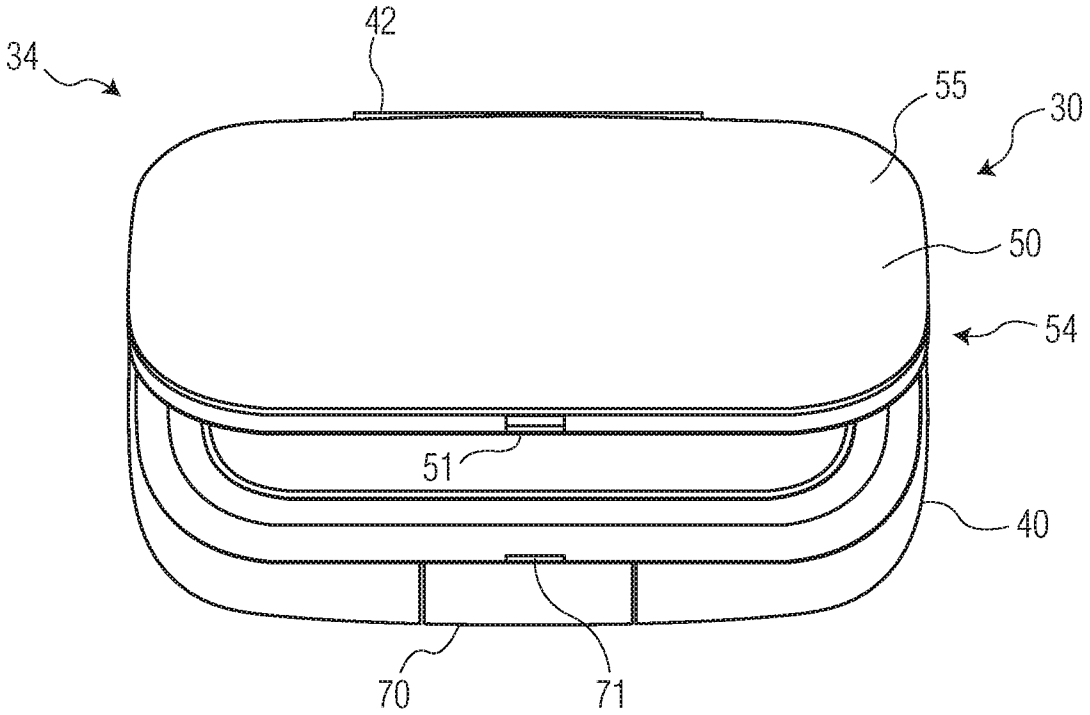

FIG. 2B

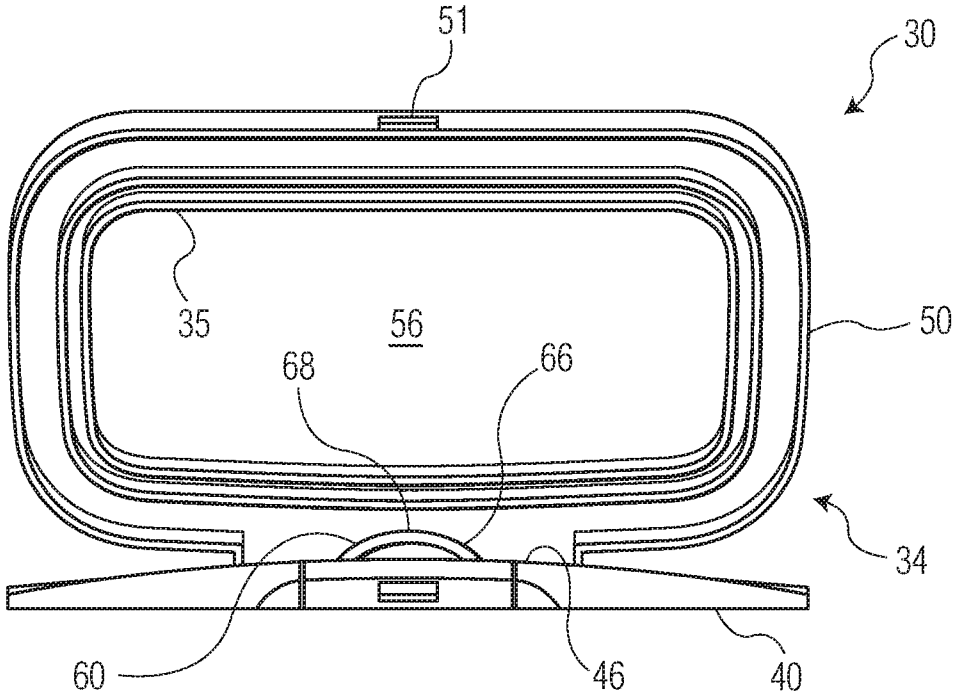

FIG. 2C

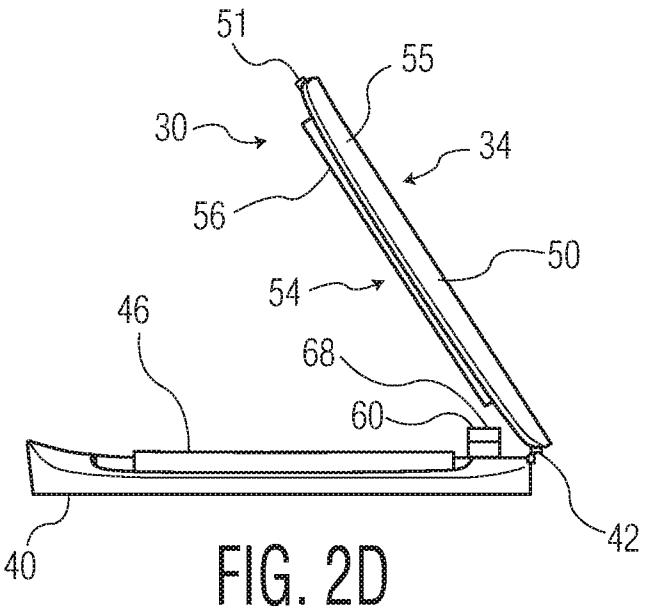

FIG. 2D

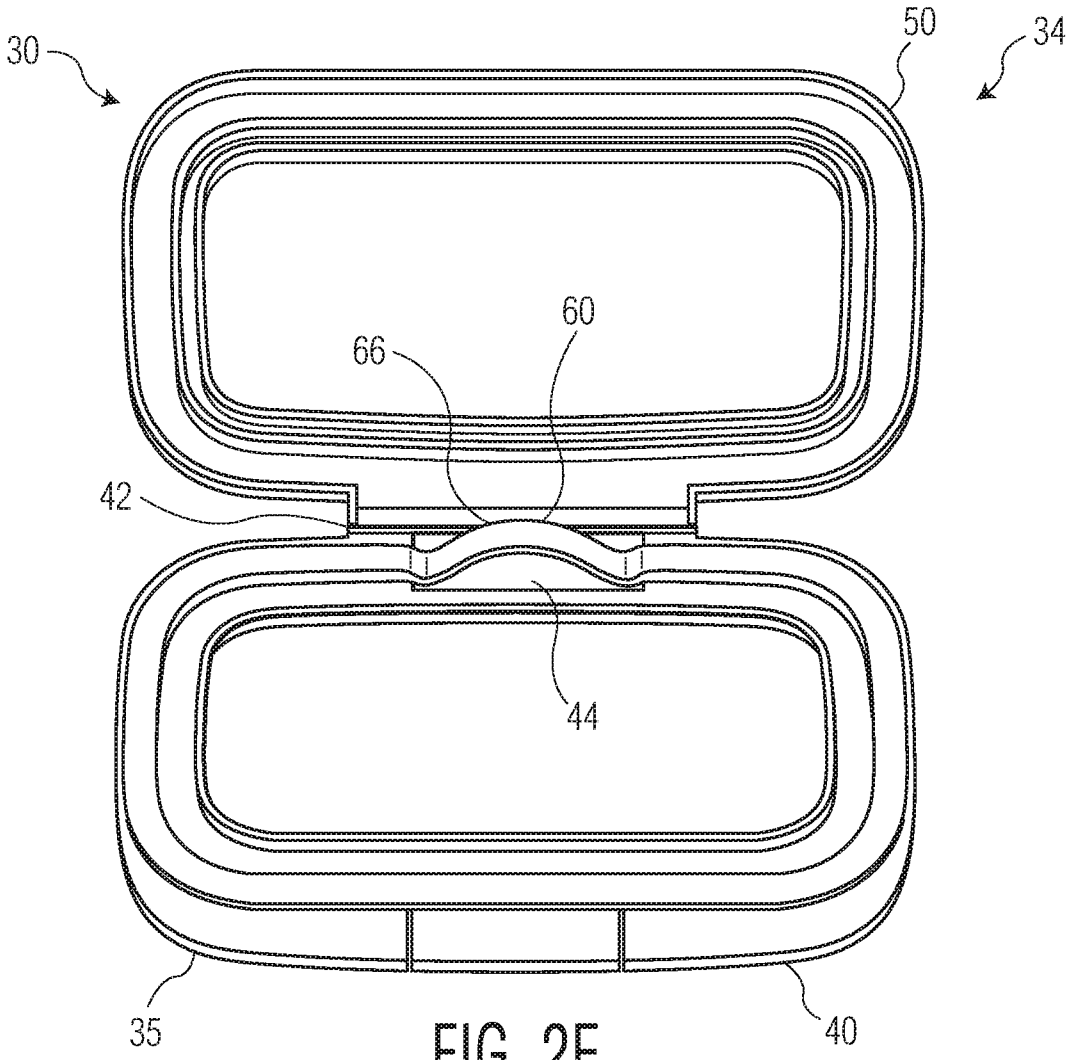

FIG. 2E

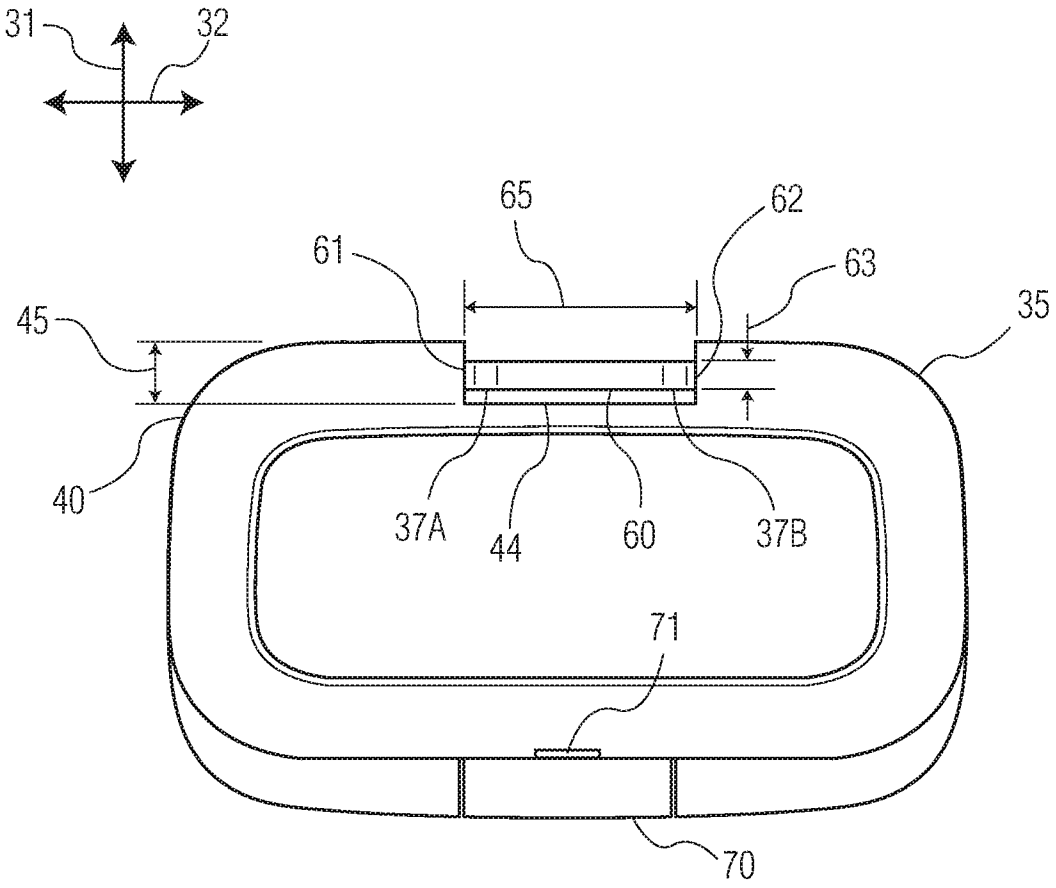

FIG. 2F

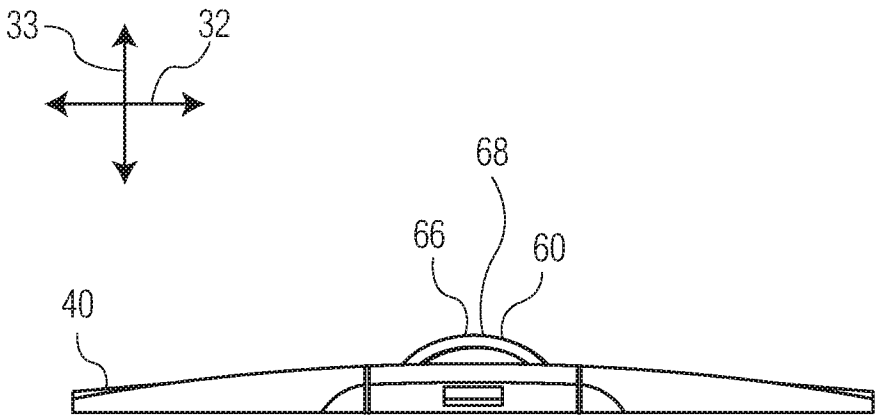

FIG. 2G

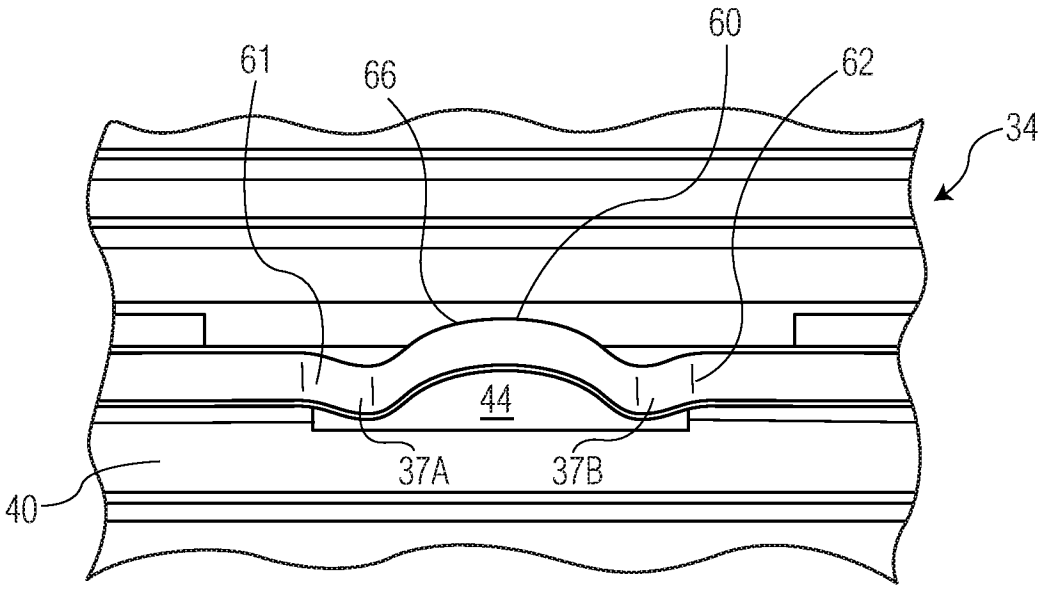

FIG. 3A

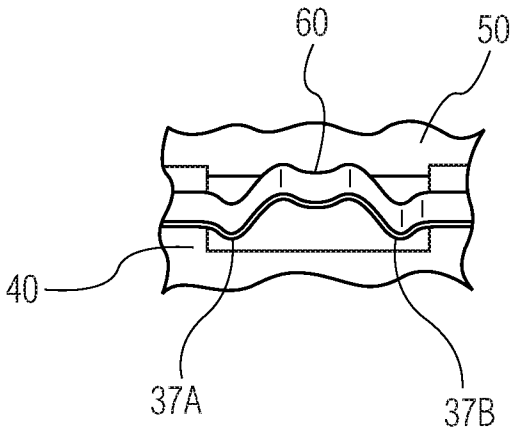

FIG. 3B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2018/040216

A. CLASSIFICATION OF SUBJECT MATTER

B65D 43/16 (2006.01) *A47K 10/32 (2006.01)* *B65D 83/08 (2006.01)*

According to International Patent Classification (IPC)

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D, A47K

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)

FAMPAT: dispenser, lid, cover, closure, flange, rim, hinge, pivot, button, spring, elastic, curvilinear, point of inflection, molding, integrally formed, 盖, 盖子, 凸缘, 枢, 弹簧, 曲线, 拐点, 按钮, 整体形成, 注塑, 成型 and related search terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2008/0128451 A1 (KRAUTH, M. N., ET AL.) 5 June 2008 paragraphs [0001], [0019] [0023], [0027]; figures 1 and 5	1-4, 6-14, 16-20 5, 15, 21-27
A	US 2017/0096265 A1 (KIEFFER, G. J., ET AL.) 6 April 2017 the whole document	-
A	CN 201260644 Y (YONYU PLASTICS CO LTD) 24 June 2009 the whole document of the original non-English language document (a machine translation is enclosed **only** for your reference)	-

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

*Special categories of cited documents:

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"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
16/10/2018 *(day/month/year)*	*19/10/2018* *(day/month/year)*

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2018/040216

Note: This Annex lists known patent family members relating to the patent documents cited in this International Search Report. This Authority is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008/0128451 A1	05/06/2008	CA 2669889 A1	05/06/2008
		US 7614519 B2	10/11/2009
US 2017/0096265 A1	06/04/2017	NONE	
CN 201260644 Y	24/06/2009	NONE	