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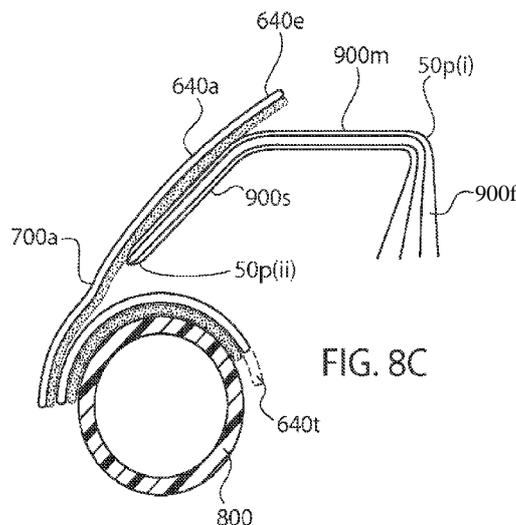
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(54) Title: EXTENDED CONTENT BOOKLET LABELS



(57) Abstract: An extended content booklet label having a substrate, a folded booklet (900s, 900m, 900f) and overlamine (640a). The overlamine (640a) is applied to secure the multi-up book (900s, 900m, 900f) to the substrate. The area between the booklet (900s, 900m, 900f) and the substrate is devoid of adhesive so that the substrate can conform to the shape of a container (800) without interference from the booklet (900s, 900m, 900f). The booklet (900s, 900m, 900f) is held closed against the substrate by the overlamine (640a) which extends beyond the booklet (900s, 900m, 900f) to adhere to the substrate or the container (800). The overlamine (640a) can pivot away from the container (800) to an open position where the booklet (900s, 900m, 900f) can be unfolded to access all of the pages.

EXTENDED CONTENT BOOKLET LABELS

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is a Continuation-In-Part of co-pending U.S. Patent Application Serial No. 13/483,355 entitled Method for Manufacturing Extended Content Booklet Labels filed on May 30, 2012.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The invention relates to an extended content booklet labels (ECBL).

2. The Prior Art

[0003] Frequently product containers are identified by applying an adhesive-backed label to an outer surface of the container. Such labels retain their product-identifying purpose by remaining permanently affixed to the container.

[0004] Certain products which require extensive instructions or which are subject to significant government regulations require additional printed matter which is typically inserted into the product container. In the case of pharmaceuticals, the printed matter may be in the form of printed sheets, printed inserts, or printed outserts. An example of such may be seen in U.S. Pat. No. 5,685,530. While these various forms of printed matter have the benefit of providing a

relatively large amount of information, their overall effectiveness is limited if they become separated from the product container.

[0005] U.S. Patent 5,830,550 entitled Booklets and Self Adhesive Labels Including the Same shows single labels and multi-up booklets adhered to a continuous web. A label product including a release liner having an upper surface and a booklet disposed on the upper surface of the release liner. The booklet includes an outer piece including a top panel and a bottom panel joined by an outer fold, an inner piece disposed between the top and bottom panels having a pair of interior panels joined by an inner fold, attaching means coupling the outer and inner pieces to one another at the outer and inner folds, and a tear line formed in the bottom panel adjacent the outer fold. A layer of adhesive is interposed between the bottom panel and the upper surface of the release liner.

[0006] U.S. Patent 6,576,315 entitled Multi-Ply Resealable Label shows booklets with windows adhered to a continuous web. A label includes a base label having upper and lower opposed surfaces and first and second opposed ends. A base adhesive coats the lower surface of the base label. A top panel overlies the upper surface of the base label and is joined to the base label adjacent the first end. The top panel has an upper surface. A tab having upper and lower opposed surfaces overlies the upper surface of the base label. An adhesive patch is interposed between the base label and the tab adjacent the second end. The adhesive patch secures the lower surface of the tab to the upper surface of the base label. A laminate cover overlies the top panel and the tab. A laminate adhesive secures the laminate cover to the upper surface of the top panel and releasably joins the laminate cover to the upper surface of the tab.

[0007] U.S. Patent 6,432,500 entitled Label with Booklet shows a label with an overlamine that extends beyond the label perimeter. A label with booklet comprises a liner material and a label having an upper and lower surface located on the liner. The label is secured to the liner by an adhesive layer on its lower surface such that the label can be peeled off the liner with the adhesive remaining on the lower surface of the label. A booklet is affixed to the upper surface of the label and comprises a plurality of stacked pages having edges including a top page and a bottom page, each of the pages being coextensive with each other and of smaller dimensions than the label. The booklet further comprises a cover member entirely covering the top page and extending beyond at least two opposing edges of the top page, the cover member having an upper non-adhesive surface, and a lower surface having an adhesive thereon by means of which the lower surface of the cover member is permanently adhered to the upper surface of the top page. The booklet is completely removable from the label by removing at least a portion of the cover member.

[0008] U.S. Patent 6,432,499 entitled Nested Label shows a label with die cut windows applied to a release liner. A nested label includes a liner having a surface release, and a label removably bonded to the liner by an adhesive. The liner and label have respective die cuts spaced apart from each other at a skip in the liner release for obtaining different bond strengths between the label and liner on opposite sides of the label die cut.

[0009] U.S. Patent 6,948,743 entitled Multilayer Label and Method of Making Same shows multi-page labels with staggered sheets to facilitate application to curved containers. A multiple layer label and a method of making the same are provided. Specifically, a label having a base layer for adhering to a container is provided wherein the label has an overcoat layer having an end that is removably adhered to the container. Moreover, the end that is removably adhered to the

container is grasped by a user of the label and pulled, thereby removing the end of the overcoat layer from the container and swinging the layer away from the remainder of the label and exposing sublayers beneath the overcoat layer. The overcoat layer is adhered directly to the base layer, and at least portions of the sublayers. Each of the overcoat layer, sublayers, and the base layer may have indicia printed thereon for communicating information.

[00010] U.S. Patent 6,179,335 entitled Product Label Bearing an Instructional Booklet shows a folded booklet adhered to a portion of a label. A two part identifying and instructional booklet having a label part and a booklet part. The front of the label has a small unvarnished region. The booklet is folded and glued closed with the free edges secured interiorly. An adhesive is printed onto the unvarnished region of the label and the folded booklet is adhered to the unvarnished region. The booklet has a tab portion to facilitate opening of the book during use. The tab portion faces the identifying portion of the label which extends longitudinally outwardly from the unvarnished region. The label may be placed onto a cylindrical container and bent in the longitudinal direction whereby the spine and folds of the booklet remain straight, flat and parallel to each other.

[0001 1] U.S. Patent 6,439,614 entitled Nested Leaflet Label Structure shows a booklet adhered to a label. A nested leaflet label structure having an enhanced information carrying capacity. The nested leaflet label structure includes a base panel having a front face. A first leaflet is adjacent to the front face and comprises a first folded panel having a first fold extending substantially parallel to the first axis of the label structure. The first fold divides the first folded panel into a pair of first leaves each having inner and outer page faces. A second leaflet comprises a second folded panel having a second fold extending substantially parallel to the first

axis of the label structure. The second fold divides the second folded panel into a pair of second leaves each having inner and outer page faces. A laminating layer overlies the base panel and the first leaflet. The second leaflet is nested in the first leaflet. An assembling adhesive adheres the second leaflet to the first leaflet.

[00012] Fold-out labels made from single sheets are shown in U.S. Pat. No. Re. 34,366 and U.S. Pat. No. 5,830,550. An example of a booklet which incorporates certain advantages of a label is disclosed in U.S. Pat. No. 5,324,559. The patent discloses a relatively simple booklet containing four sheets, i.e., eight pages. In all of these patents, the first page contains information which would otherwise be placed on the product label. The entire back page is adhered to the container leaving only the intermediate pages for instructional information. A further drawback of these patents lies in the fact that if their first page becomes detached from the booklet the product container would be unlabeled. U.S. Patent 6,712,398 shows method for making removable inserts. U.S. Patent 6,737,137 describes a method for manufacturing adhesive image transfer labels.

[00013] Accordingly, it would be desirable to provide an identifying and instructional document which combines the permanent nature of an adhesive label with the instructional capacity of a multi-page booklet.

SUMMARY OF THE INVENTION

[00014] Accordingly, it is an object of the present invention to provide compact labels containing large amounts of information.

[00015] It is another object to provide booklets that are compactly mounted to labels.

[00016] It is a further object to provide an extended content booklet that does not interfere with the label conforming to a cylindrical surface when adhered to a container.

[00017] According to a first embodiment of the invention, there is provided an extended content booklet label having a substrate, booklet and overlamine. The substrate has an upper surface devoid of adhesive and a lower surface, wherein the upper surface includes at least a first portion and a second portion. The booklet has a spine and two or more sheets held together at the spine and extending from the spine in a longitudinal direction and including free edges which are spaced from and parallel to the spine. The booklet is divided into three sections along the longitudinal direction including a spine section, a middle section and a free edge section. The free edge section is first folded to overlie the middle section. The spine section is second folded to overlie the free edge section to form a folded booklet having the spine section on top, the middle section on the bottom, and the free edge section sandwiched therebetween. The middle section is placed directly on a first portion of the upper surface of the substrate in a free-sliding arrangement that is devoid of adhesive.

[00018] The overlamine has a lower surface covered with adhesive to adhere to (i) the spine section of the folded booklet and (ii) a second portion of the upper surface of the substrate to hingedly connect the booklet to the substrate to form an extended content booklet label. The

lower surface of the substrate is adapted to conform to the curvature of a cylindrical container without interference from the booklet.

[00019] A release liner and a layer of adhesive is disposed on the lower surface of the substrate.

The substrate includes a label with its lower surface removably adhered to the release liner. The release liner is a continuous web with a multiple extended content booklet labels adhered thereto

in a spaced relationship from one another. The substrate is larger than the folded booklet. The

substrate includes indicia printed on the second portion of the upper surface of the substrate. The

overlaminates is translucent to allow viewing of (i) the indicia printed thereunder and (ii) the spine

section of the booklet. The overlaminates includes a first portion adhered to the folded booklet, a

second portion adhered to the substrate, and a hinge portion disposed between the first and second portions.

[00020] The spine of the booklet is disposed adjacent the hinge portion of the overlaminates. The

overlaminates includes a tab portion which extends beyond the folded booklet. The second fold of

the booklet is disposed adjacent the tab portion of the overlaminates. The substrate includes a third portion that extends beyond the first portion, and wherein the tab is removably adhered to the

third portion of the substrate. The second fold of the booklet is aligned with the edge of the

substrate, and wherein the tab extends beyond the substrate.

[00021] The overlaminates is configured to pivot along its hinge portion between: (i) an open

position in which the first portion of the overlaminates and the adhered folded booklet is pivoted

away from the substrate; and (ii) a closed position in which the folded booklet can conform to the

curvature of a cylindrical container independent of the substrate. In the open position, the second

fold is adapted to swing the middle section of the booklet toward tab. The spine is adjacent the

first fold. The booklet folds form three approximately equal size sections. The booklet folds form three sections of different sizes, wherein the middle section is longer than the free edge section and shorter than the spine section. The spine and middle sections form a ramp up on one side of the booklet leading to the central portion of the booklet which includes the spine, free edge and middle sections, and wherein the spine section forms a ramp down on the other side of the booklet leading from the central portion. The ramp up is two sections thick, and the central portion is three sections thick, and the ramp down is one section thick.

BRIEF DESCRIPTION OF THE DRAWINGS

[00022] The advantages, nature, and various additional features of the invention will appear more fully upon consideration of the illustrative embodiments now to be described in detail in connection with accompanying drawings. In the drawings wherein like reference numerals denote similar components throughout the views:

[00023] FIGs. 1A - 1E are a series of views showing a first embodiment of a booklet used in the label product according to the invention.

[00024] FIGs. 2A - 2F are a series of views showing a second embodiment of a booklet used in the label product according to the invention.

[00025] FIGs. 3A - 3F are a series of views showing a third embodiment of a booklet used in the label product according to the invention.

[00026] FIGs. 4A - 4G are a series of views showing a fourth embodiment of a booklet used in the label product according to the invention.

[00027] FIG. 5 is a side elevational view showing a fifth embodiment of a booklet used in the label product according to the invention.

[00028] FIGs. 6A and 6B are top and side views of the booklet being placed on the substrate.

[00029] FIG. 7 is a top view of the completed labels.

[00030] FIGs. 8A - 8C are bottom views of a label adhered to a plastic bottle with the overlamine in various positions.

[00031] FIG. 8D is a side view of a booklet adhered to the overlamine in an alternate configuration.

[00032] FIG. 8E is a top view of a booklet adhered to the overlamine in yet another configuration.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[00033] In this application a "booklet" means an individual instructional piece having a cover sheet, a back sheet and at least one internal sheet. A sheet is a piece of paper having two opposed pages. The smallest booklet featuring one cover sheet (2 pages), one internal sheet (2 pages) and one back sheet (2 pages) would have a total of six pages. Additional internal sheets can be added. A booklet with two internal sheets would have a total of eight pages.

[00034] Booklets may be formed from one large sheet and one medium sheet by folding the large sheet in half and inserting the medium sheet into the fold. Such a booklet would have three sheets for a total of six pages.

[00035] The booklet may be formed by securing sheets and pages together at the binding by adhesive, glue or other suitable connection means. The booklet may have perforations at various locations on different sheets, to provide pages which can be removed from the book.

[00036] Booklets may be formed from one large sheet folded multiple times. The simplest example would be one sheet folded in half, and then folded in half again in a perpendicular direction. Such a booklet would have four sheets for a total of eight pages. The large sheet is bound together at the binding during the first folding step so that when the first fold is trimmed off the sheets remain connected together. Booklets with a greater number of sheets/pages may be provided by folding the large sheet additional times.

[00037] Booklets may be formed from two large sheets. The simplest example would be two sheets folded in half and then nested together with their fold lines bound together. Such a booklet would have 4 sheets and eight pages. Each additional large sheet added to the book would

contribute another 2 sheets and 4 pages. Alternatively, the two large sheets can be folded in half and stacked together with the fold lines bound together to form a so called perfect bound booklet. Again, each additional large sheet added to the book would contribute another 2 sheets and 4 pages.

[00038] Booklets may be formed from large sheets that are folded end-over-end, for example folded end-over-end twice to form a ribbon that is three sheets thick. The ribbon is then folded in half perpendicular to the end-over-end folds. Binding adhesive may not be required. The end-over-end folds are then trimmed off to form a booklet with six sheets and twelve pages. If the original large sheet is folded end-over-end three times, the resulting booklet would have eight sheets and sixteen pages. Accordingly the final number of sheets can be calculated by taking the number of end-over-end folds, adding 1, and multiplying by 2. For 4 end-over-end folds, the resulting booklet would have 10 sheets, i.e. $(4 + 1) * 2 = 10$.

[00039] Booklets may be formed from large sheets that are accordion folded, for example accordion folded twice to form a ribbon that is three sheets thick. The ribbon is then folded in half perpendicular to the accordion folds. Binding adhesive may not be required. The accordion folds are then trimmed off to form a booklet with six sheets and twelve pages. If the original large sheet is accordion folded three times, the resulting booklet would have eight sheets and sixteen pages. Accordingly the final number of sheets can be calculated by taking the number of accordion folds, adding 1, and multiplying by 2. For 4 accordion folds, the resulting booklet would have 10 sheets, i.e. $(4 + 1) * 2 = 10$.

[00040] The large or medium sheets used to form the booklets are preprinted with indicia before folding. The layout of the printing is designed to provide text in a particular orientation on each

page in the folded booklet. In a preferred embodiment, the indicia includes pharmaceutical information about drugs that are packaged with the booklets. The books can be printed by any suitable industrial printing process, for example sheet offset, web offset, flexographic, rotary letterpress, or gravure.

[00041] In this application the term "book" refers to a printed article having two or more booklets included therein. The booklets are linearly arranged with a common spine. In addition, a book includes a waste zone in between each adjacent pair of booklets. A book may include a top waste zone disposed above the top booklet. The top waste zone includes the upper edge of the book. The top waste zone may include free sheets and/or folds. A book may include a bottom waste zone disposed below the bottom booklet. The bottom waste zone includes the lower edge of the book. The bottom waste zone may include free sheets and/or folds. By cutting and removing the waste zone(s), the various booklets will be formed from the book. Cutting a top or bottom waste zone that includes folds, will allow the sheets of the resulting booklets to be opened.

[00042] The term "multi-up" refers to the orientation of the booklets within the book when the book is disposed onto the web or substrate. The web is a continuous substrate material that is typically wound off a roll and then passes through various manufacturing stations in a longitudinal direction. Therefore, longitudinal is the direction extending along the indefinite length of the web. The width across the web is a direction that is perpendicular to the longitudinal direction. When the book is placed on the web with the booklets oriented one below the other across the width, the book is considered to be multi-up. That is, a discrete longitudinal section of the web contains two or more booklets.

[00043] One form of a multi-up book 10 is illustrated in FIGs. 1A - IE. In the drawings, reference numerals having a 6 or 8 prefix, refer to sheets that are used to construct the book. Reference numerals with a 10 prefix refer to the completed book. Reference numerals with a 12 prefix refer to booklets, while reference numerals with a 14 prefix refer to the waste zones. FIG. 1A shows a large sheet 6a and a medium sheet 8a that are combined to form a book 10. Considering the final configuration of the book, sheets 6a and 8a are pre-printed with indicia to create properly oriented text and images for the various booklets that will be part of the multi-up book. Large sheet 6a is folded in half (or twice folded in thirds or additionally folded in other fraction) to form fold 6f. Glue 10e is applied to secure medium sheet 8a to the inside of fold 6f. The resulting book 10 is shown in FIG. 1B. The large sheet now forms cover sheet 10c and back sheet 10b. The medium sheet now forms internal sheet 10a. The resulting book has six pages: the front of cover sheet 10c, the back of cover sheet 10c, the front of internal sheet 10a, the back of internal sheet 10a, the front of back sheet 10b, and the back of back sheet 10b.

[00044] Glue for the spine of the books may be selected from various adhesives used in paper converting or corrugated applications that are approved for use in pharmaceutical packaging. Such adhesive may be water-based synthetic resins, for example, WB8147M available from H.B. Fuller of St. Paul, Minnesota.

[00045] The resulting book can be increased in size by adding sheets (to create two additional pages per sheet). For example, to increase to an 8 page book, large sheet 6a can be combined with a further large sheet. The two large sheets can be folded like sheet 6a and nested together with a line of glue at the fold line. Alternatively, the two large sheets can be placed on top of each other and glued together at the spine, in a perfect bound arrangement. To further increase

the number of sheets, medium sheets (similar to medium sheet 8a) can be added to form a 10 page book, for example. In this manner, books with increasing number of [paired] pages can be formed by combining 1, 2, 3 or more large sheets and 1 or more medium sheets. In lieu of two medium sheets, one could simply add a folded large sheet.

[00046] The book shown in FIG. 1B is fully assembled and as a multi-up book (or log) it contains two or more booklets, each with a complete set of instructions or indicia. To prepare book 10 for use in the subsequent manufacturing steps, it is desirable to tuck in the free edges to streamline the book for further handling. Book 10 is divided into three sections with two fold locations designated as 10x(i) and 10x(ii). The arrow 10y(i) indicates the fold direction as the book is initially folded at first fold location 10x(i). FIG. 1C shows the resulting configuration with a completed first fold 10z(i). The arrow 10y(ii) indicates the fold direction as the book is subsequently folded at second fold location 10x(ii). FIG. 1D shows the resulting configuration with a completed second fold 10z(ii). Note the free ends of the sheets are tucked inside the book so as to avoid interference with the processing and handling equipment. As will be explained in greater detail below, the folded book 10 includes an upper surface 10r that will be adhered to the overlamine, and a lower surface 10s that will be placed on the web and selectively adhered thereto.

[00047] Referring to a top view of the folded book, FIG. 1E shows book 10 with two booklets 12b, 12d alternating with a top waste zone 14a, a waste zone 14c and a bottom waste zone 14e.

[00048] Multi-up books are an efficient way to print and fold multiple books. The booklet labels described in this application use a single booklet. Booklets for the labels can be produced by

forming a book 10 and trimming off the waste zones. Alternatively, by adjusting the printing and size of the sheets, the resulting item 10 can be a single folded booklet.

[00049] The books are made from paper referred to as offset stock having a paper weight between 22# and 60#. The # designation is a measure of paper density measured in pounds per basis ream of 500 sheets of 17" by 22" paper. Such paper may be obtained from Twin Rivers Paper Company of South Portland, ME or Finch Paper, LLC of Glen Falls, NY. For example Twin Rivers supplies 22# Custom Plus and 27#, 30#, 35#, 40# Pharmopaque - Regular Finish. Finch supplies 40# Finch Opaque - Wove Finish and 60# Finch Opaque - Vellum Finish. The preferred paper is Twin Rivers 27# Pharmopaque - Regular Finish.

[00050] Another form of a multi-up book 20 having 4 sheets and 8 pages made from a single large sheet 16 is shown in FIGs. 2A - 2F. In these drawings, reference numerals having a 16 prefix, refer to sheet(s) that are used to construct the book. Reference numerals with a 20 prefix refer to the completed book. Reference numerals with a 22 prefix refer to booklets, while reference numerals with a 24 prefix refer to the waste zones. FIG. 2A shows a large sheet 16a pre-printed with indicia to create properly oriented text and images for the various booklets that will be part of the multi-up book. Large sheet 16a is folded in half to form fold 16f(i). Glue 20e is applied to secure two linear sections of the folded sheet 16a together. As can be most easily seen in FIGs. 2B and 2C, the glue line 20e will form the spine 20d of the book. The sheet is then folded in half again as indicated by arrow 16f(ii). When the two folds are completed, the large sheet 16a forms cover sheet 20c, internal sheets 20a(i) and 20a(ii), and back sheet 20b. The resulting book has eight pages: the front & back of cover sheet 20c, the front and & back of

internal sheet 20a(i), the front and back of internal sheet 20a(ii), and the front and back of back sheet 20b.

[00051] The resulting book can be increased in size by adding sheets. For example, another one or more large sheet(s) like 16a can be folded and nested within large sheet 16a and/or laid on top of 16a. Using two large sheets like 16a would provide a book with 8 sheets and 16 pages.

Alternatively, a medium sheet which is half the size of large sheet 16a can be tucked into the fold and adhered top and bottom with a pair of glue lines similar to 20e. One large sheet and one medium sheet would provide a book with 6 sheets and 12 pages. In this manner, books with increasing number of [paired] pages can be formed by combining 1, 2, 3 or more large sheets and 1 or more medium sheets. In lieu of two medium sheets, one could simply add a folded large sheet.

[00052] The book shown in FIG. 2C is fully assembled and as a multi-up book it contains two or booklets, each with a complete set of instructions or indicia. In a subsequent step, the top fold 16f(i) will be trimmed off to allow the pages of book 20 to open and separate from each other. To prepare book 20 for use in the subsequent manufacturing steps, it is desirable to tuck in the free edges to streamline the book for further handling. Book 20 is divided into three sections with two fold locations designated as 20x(i) and 20x(ii). The arrow 20y(i) indicates the fold direction as the book is initially folded at first fold location 20x(i). FIG. 2D shows the resulting configuration with a completed first fold 20z(i). The arrow 20y(ii) indicates the fold direction as the book is subsequently folded at second fold location 20x(ii). FIG. 2E shows the resulting configuration with a completed second fold 20z(ii). Note the free ends of the sheets are tucked inside the book so as to avoid interference with the processing and handling equipment. As will be explained in

greater detail below, the folded book 20 includes an upper surface 20r that will be adhered to the overlamine, and a lower surface 20s that will be placed on the web and selectively adhered thereto.

[00053] Referring to a top view of the folded book, FIG. 2F shows book 20 with three booklets 22b, 22d, 22f alternating with a top waste zone 24a, intermediate waste zones 24c, 24e and a bottom waste zone 24g. As mentioned earlier, top waste zone 24a contains fold 16f(i) and will be trimmed off.

[00054] Multi-up books are an efficient way to print and fold multiple books. The booklet labels described in this application use a single booklet. Booklets for the labels can be produced by forming a book 20 and trimming off the waste zones. Alternatively, by adjusting the printing and size of the sheets and trimming off fold 16f(i), the resulting item 20 can be a single folded booklet.

[00055] Another form of a multi-up book 30 having 6 sheets and 12 pages made from a single large sheet 26 is shown in FIGs. 3A - 2F. In these drawings, reference numerals having a 26 prefix, refer to sheet(s) that are used to construct the book. Reference numerals with a 30 prefix refer to the completed book. Reference numerals with a 32 prefix refer to booklets, while reference numerals with a 34 prefix refer to the waste zones. FIG. 3A shows a large sheet 26a pre-printed with indicia to create properly oriented text and images for the various booklets that will be part of the multi-up book. Large sheet 26 is accordion folded twice in thirds to form folds 26f(i) and 26f(ii). Glue 30e is applied within both folds. Each glue line secures two linear sections of the accordion folded sheet 26 together. As can be most easily seen in FIGs. 3B and 3C, the glue line 30e will form the spine 30d of the book. The sheet is then folded in half again as

indicated by arrow 26f(iii). When the three folds are completed, the large sheet 26 forms cover sheet 30c, internal sheets 30a(i) and 30a(ii) and 30a (iii) and 30a(iv), and back sheet 30b. The resulting book has twelve pages: the front & back of cover sheet 30c, the front and & back of internal sheets 30a(i) through 30a(iv), and the front and back of back sheet 30b.

[00056] The resulting book can be increased in size by adding folds. For example, another one or a larger sheet like 26 can be accordion folded three or more times to produce four or more panels, respectively. That is the total number of folds of form 26f(i), can be represented by ii, iii, iv...n. Where the number of panels would be represented by 3, 4, 5...n+1 .

[00057] In this manner, books with increasing number of [paired] pages can be formed by an increasing number of accordion folds.

[00058] The book shown in FIG. 3C is fully assembled and as a multi-up book it contains two or booklets, each with a complete set of instructions or indicia. In a subsequent step, the top fold 26f(ii) will be trimmed off to allow the pages of book 30 to open and separate from each other. If additional folds are present along the top edge of book 30, they will likewise be trimmed off. Similarly, the bottom fold 26f(i) will be trimmed off along with any additional folds present at the bottom edge of book 30. To prepare book 30 for use in the subsequent manufacturing steps, it is desirable to tuck in the free edges to streamline the book for further handling. Book 30 is divided into three sections with two fold locations designated as 30x(i) and 30x(ii). The arrow 30y(i) indicates the fold direction as the book is initially folded at first fold location 30x(i). FIG. 3D shows the resulting configuration with a completed first fold 30z(i). The arrow 30y(ii) indicates the fold direction as the book is subsequently folded at second fold location 30x(ii). FIG. 3E shows the resulting configuration with a completed second fold 30z(ii). Note the free ends of the

sheets are tucked inside the book so as to avoid interference with the processing and handling equipment. As will be explained in greater detail below, the folded book 30 includes an upper surface 30r that will be adhered to the overlamine, and a lower surface 30s that will be placed on the web and be selectively adhered thereto.

[00059] Referring to a top view of the folded book, FIG. 3F shows book 30 with two booklets 32b, 32d alternating with a top waste zone 34a, an intermediate waste zone 34c, and a bottom waste zone 34g. As mentioned earlier, top waste zone 34a contains fold 26f(ii) and will be trimmed off. Bottom waste zone 34e contains fold 26f(i) and will be trimmed off.

[00060] Multi-up books are an efficient way to print and fold multiple books. The booklet labels described in this application uses a single booklet. Booklets for the labels can be produced by forming a booklet and trimming off the waste zones. Alternatively, by adjusting the printing and size of the sheets and trimming off the folds 26f(i) and 26f(ii), the resulting item 30 can be a single folded booklet.

[00061] Another form of a multi-up book 40 having 6 sheets and 12 pages made from a single large sheet 36a is shown in FIGs. 4A - 4G. In these drawings, reference numerals having a 36 prefix, refer to sheet(s) that are used to construct the book. Reference numerals with a 40 prefix refer to the completed book. Reference numerals with a 42 prefix refer to booklets, while reference numerals with a 44 prefix refer to the waste zones. FIG. 4A shows a large sheet 36a pre-printed with indicia to create properly oriented text and images for the various booklets that will be part of the multi-up book. Large sheet 36a is folded end-over-end twice in thirds to form folds 36f(i) and 36f(ii). Glue 40e is applied within both folds. For example, glue is applied in a line down the center of large sheet 36a perpendicular to the folds 36f. The glue line secures two

linear sections of the end-over-end folded sheet 36a together. As can be most easily seen in FIGS. 4B, 4C and 4D, the glue line 40e will form the spine 40d of the book. The sheet is then folded in half as indicated by arrow 36f(iii). Glue line 40e is disposed co-linear to the final fold 36f(iii) which cooperatively form spine 40d. When the three folds are completed, the large sheet 26 forms cover sheet 40c, internal sheets 40a(i) and 40a(ii) and 40a (iii) and 40a(iv), and back sheet 40b. The resulting book has twelve pages: the front & back of cover sheet 40c, the front and & back of internal sheets 40a(i) through 40a(iv), and the front and back of back sheet 40b.

[00062] The resulting book can be increased in size by adding folds. For example, another one or a larger sheet like 36a can be folded end-over-end three or more times to produce four or more panels, respectively. That is the total number of folds of form 36f(i), can be represented by ii, iii, iv...n. Where the number of panels can be calculated as a function of folds as ii+1, iii+1, iv+1 resulting in the number of panels being 3, 4, 5...n+1. In this manner, books with increasing number of [paired] pages can be formed by an increasing number of end-over-end folds.

[00063] The book shown in FIG. 4D is fully assembled and as a multi-up book it contains two or more booklets, each with a complete set of instructions or indicia. In a subsequent step, the top fold 36f(ii) will be trimmed off to allow the pages of book 40 to open and separate from each other. If additional folds are present along the top edge of book 40, they will likewise be trimmed off. Similarly, the bottom fold 36f(i) will be trimmed off along with any additional folds present at the bottom edge of book 30. To prepare book 40 for use in the subsequent manufacturing steps, it is desirable to tuck in the free edges to streamline the book for further handling. Book 40 is divided into three sections with two fold locations designated as 40x(i) and 40x(ii). The arrow 40y(i) indicates the fold direction as the book is initially folded at first fold location 40x(i). FIG.

4E shows the resulting configuration with a completed first fold 40z(i). The arrow 40y(ii) indicates the fold direction as the book is subsequently folded at second fold location 40x(ii). FIG. 4F shows the resulting configuration with a completed second fold 40z(ii). Note the free ends of the sheets (which are opposite spine 40d as shown in FIG. 4D) are tucked inside the book so as to avoid interference with the processing and handling equipment. As will be explained in greater detail below, the folded book 40 includes an upper surface 40r that will be adhered to the overlamine, and a lower surface 40s that will be placed on the web and remain unadhered thereto.

[00064] Referring to a top view of the folded book, FIG. 4G shows book 40 with two booklets 42b, 42d alternating with a top waste zone 44a, an intermediate waste zone 44c, and a bottom waste zone 44e. As mentioned earlier, top waste zone 44a contains fold 36f(ii) and will be trimmed off. If additional top folds are present, they will be trimmed off also. Bottom waste zone 44e contains fold 36f(i) and will be trimmed off. If additional bottom folds are present, they will be trimmed off also.

[00065] As discussed above, FIG. 4F shows a multi-up book that is bi-folded in equal thirds to form folded book 40. An alternative configuration is shown in FIG. 5, where the multi-up book is twice folded in unequal sections to form folded book 50. Folded book 50 shows a ramp-up section 50q(i) of double thickness, a center section of triple thickness, and a ramp-down section 50q(ii) of single thickness. The ramp-up and ramp-down sections are useful in certain applications, for example with thicker books. All of the multi-up books described in this application can be folded to include the ramp-up and/or ramp-down sections. As used herein, a ramp section means a section having fewer than all panels present. The ramp sections are located

at the leading or trailing edges of the multi-up book. As will be described in greater detail below, the lower section 50s will be placed on the web and remain unadhered, while the upper section 50r will be adhered to the overlamine. The ramp sections will allow the overlamine to layer onto the book and web with a smoother transition. That is, the overlamine can transition off the web to a double thickness, before accommodating the triple thickness. The overlamine can then transition to a single thickness before re-attaching to the web. As can be seen in FIG. 4F, if book 40 is very thick, gaps may form on either side as the overlamine transitions from the web to triple thickness and then back down to the web. Books containing ramp sections may be trimmed to form booklets for use in the labels according to the invention.

[00066] Multi-up books are an efficient way to print and fold multiple books. The booklet labels described in this application uses a single booklet. Booklets for the labels can be produced by forming a booklet and trimming off the waste zones. Alternatively, by adjusting the printing and size of the sheets and trimming off the folds 36f(i) and 36f(ii), the resulting item 40 can be a single folded booklet.

[00067] Referring back to FIG. 5, the upper surface 50r will be adhered to the overlamine, with all other sheets being free from the overlamine. The book may be formed with perforation, for example, perforations running in the sheets parallel to the spine of the book. When the booklet is opened, perforation 50p(i) would allow about 1/6 of the sheet to be removed. Such perforations can be included on one or more sheets at similar or different locations. Other perforations 50p(ii) allow about a half sheet to be removed. Where perforation 50p(iii) would allow about 1 full sheet to be removed. The sheet portions that are removed could include coupons, receipts for pharmacists, hand-outs for patients, or other printed or machine-scannable documents. Each

booklet could have multiple perforations on one sheet, or several perforations on different sheets. The hand-outs could be similar to each other or different. As can be appreciated, the original large sheets 6a, 16a, 26a, 36a and the medium sheets 8a can be preprinted and perforated to provide indicia and hand-outs in certain orientations and configurations within the individual booklets.

[00068] The extended content booklet label according to the invention includes a folded extended content booklet that is secured by an overlamine to a substrate. The extended content booklet may be formed by various methods as described above. The extended content booklet is preferably folded 2 times, so as to enclose the free ends within the interior of the completely folded booklet. The substrate is preferably label stock that is adhered to a release liner with adhesive. The release liner may be a continuous web with a series of extended content booklet labels adhered thereto in spaced relation to one another.

[00069] The booklets may be initially formed as books containing two or more booklets. The books are secured by an overlamine to a label stock web and trimmed to leave a series of booklets on their own individual label. The method for securing the books, overlaminating and trimming is described in my co-pending U.S. Patent Application Serial No. 13/483,355 entitled Method for Manufacturing Extended Content Booklet Labels filed on May 30, 2012, the entire contents of which is incorporated herein by reference thereto.

[00070] As a broad overview, the web passes through a printing station, a first die cutting station, an adhesive printing station, a sensor, a book dispensing station, a laminating station, a second die cutting station and a web and label take up station.

[00071] In summary, the web is processed to receive certain printing, first die cutting and adhesive application before reaching the book dispensing station. Book dispenser holds a stack of books as described above. Books are dispensed one at a time on to moving web, with slight spaces between adjacent books. Subsequently, the web carrying the books is processed to receive a laminate, second die cutting, waste laminate removal, and collecting the web-bound completed labels.

[00072] The web may be chosen from various paper or label stock. In a preferred embodiment, web 600 includes a release liner 600a, and a paper layer 600b coated with adhesive 600c, as shown in FIG. 6B. The release liner is a polypropylene substrate having a thickness between 0.5 mil and 4.5 mils.

[00073] Suitable labels include those having between 54# to 60# facestock.

[00074] Such label stock is available from Avery Dennison sold under the tradename Fasson®. For example, Avery Dennison supplies 54# semi-gloss facestock (paper) coated with C2500 rubber based adhesive disposed on 40# bleached, calendered kraft stock liner; and 60# semi-gloss facestock (paper) coated with S246 general purpose permanent rubber based adhesive FDA compliant with 21 CFR 175.105 disposed on 40# bleached, calendered kraft stock liner. The preferred label stock is the latter 60# semi-gloss facestock coated with S246 disposed on 40# stock liner.

[00075] Glue used to secure the waste zones of the books to the web may be selected from various adhesives used in paper converting applications that are approved for use in pharmaceutical packaging. Such adhesive may be permanent acrylic adhesive, for example, clear,

permanent acrylic adhesive S8020 available from Avery Dennison sold under the tradename Fasson®.

[00076] Referring now to FIGs. 8A, 8B and 8C (collectively referred to as FIG. 8), there is shown completed extended content booklet labels. FIG. 8 shows a series of one label being adhered to a container, then fully closed, then in the process of being opened. The booklet labels can be manufactured individually, or in batches, or continuously, or any combination of these manufacturing methods. Individual booklets 12d may be placed on pre-cut labels 622d and covered with a pre-cut section of laminate 640a. The individual placement of booklet and laminate may be run as a two-up or multi-up process.

[00077] FIGs. 6A and 6B illustrate web 600 with three adhesive strips 606a running longitudinally along the web. The adhesive strips 606a are located in the waste rows passing across the cut sections and the label sections 604b. The waste zones 14a, c and e of the books will align with the adhesive strips 606a to temporarily hold the book in place on the web. It should be noted that booklets 12b and 12d will not be adhered to the web. On the right label section 604b, a book 10 has been adhered in place along the right edge of label section 604b. Label section 604b is divided into a printed column 604c and a booklet placement column 604d. The left side of the drawings shows a book 10 being aligned for placement on to the next available label section 604b. This process allows a two-up or multi-up booklets to be placed on the web in one step. Alternatively, individual booklets 12b may be fed in registration to their location on the paper layer and held in place until they contact the overlamine.

[00078] Next the web with adhered books passes to a laminating station where a continuous laminate having a similar width to the web, is fed from a laminate spool and applied over the web

and books. The laminate is may be opaque, translucent or transparent. If an opaque laminate is used, it may be pre-printed with indicia. In such a case, the laminate would need to be applied to the label section and book in registration. In a preferred embodiment the laminate is transparent without indicia. Accordingly, the indicia 602a and any printing on the upper facing surface of the book can be seen through the laminate. The laminate has a lower surface covered with adhesive and protected by a release liner. The release liner is peeled away and discarded as the laminate dispenses off the laminate spool. A press roller insures that the laminate is closely adhered to the web as it encounters the bumps going from the flat web to the books adhered to the label sections.

[00079] Suitable laminate includes facestock between 0.8 to 1 mil thick coated with adhesive disposed on a liner. Suitable laminates are available from Avery Dennison sold under the tradename Fasson®. For example, Avery Dennison supplies 0.8 mil polypropylene facestock coated with clear, permanent acrylic adhesive; and 1 mil clear printed - treated polyester coated with S8020 clear, permanent acrylic adhesive disposed on 40# bleached white glassine liner. The preferred laminate is the latter 1 mil clear printed - treated polyester coated with S8020 clear, permanent acrylic adhesive disposed on 40# bleached white glassine liner.

[00080] Next the laminated web passes through a second die cutting station where a die cutter selectively cuts through portions of the laminate, book and label section 604b. The waste laminate with attached waste zones 14 from book 10 and attached label sections pass a guide roller and on to a laminate take up reel. Above and below each label, the cutting dies slice the laminate, books and labels. By simultaneously slicing the laminate, books and labels, the longitudinal edges of the finished labels have a clean uniform edge. The cutting dies do not cut the web at any point.

[00081] In FIG. 7 the release liner web 600 with completed labels 700 in a two-up configuration is shown in a top view. While a description will be given of the label in the right bottom corner, such description applies to all labels on the web. The D label 622d is shown with an exaggerated thickness to illustrate that the remaining sections of paper 600b have now been removed from the release liner 600a of web 600. The 12d booklet is adhered to the right side of label 622d. The remaining laminate 640 overlies labels 622d and extends further off the right side thereof to form laminate tab 640e. Laminate 640a is adhered to the exposed (left) portion of label 622d and is adhered to booklet 12d. The web may be slit in between the two labels, and each row of labels may be wound onto individual spools, providing several one-up label rolls.

[00082] FIGs. 6A and 6B show the right edge of book 10 aligned with the right edge of label section 604b. In an alternate embodiment the right edge of book 10 is spaced from the right edge of label section 604b to create a label tab. The label tab can be unitary with label section 604b, or a perforation can be provided between the label tab and label section 604b. The perforations can be formed within the first die cutting station. This label tab would extend underneath laminate tab 640e, that is the label tab would reside between laminate tab 640e and release liner 600a. An example of the label tab 604t is shown in dotted line in the bottom, center label of FIG. 7. According to this embodiment, the laminate tab 640e would be peeled from and re-adhered to the label tab, rather than the plastic bottle 800 (as shown in FIGs. 8A-C). If the label tab is perforated, it can be removed if the user prefers to have the laminate tab adhere to the container.

[00083] The completed labels 700 from FIG. 7 are peeled off the release liner and the label 622d is adhered to a container. FIG. 8A shows label 622d adhered to a cylindrical plastic bottle. The section of overlamine where it transitions from label 622d to booklet 12d forms a hinge 700a.

The hinge holds booklet 12d so that label 622d can freely conform to any radius container. In other words, label 622d can be adhered to the container without interference from the multiple pages of booklet 12d.

[00084] The web may wrap around a peel edge to release the completed label. As the label begins to separate from the web, a bottle is introduced. A roller 810 rotates clockwise while pressed against the bottle which rotates counter-clockwise. As the label is progressively adhered the pages within the booklet can shift and slide without effecting the smooth application of the label to the curved surface. Often in prior art booklet labels, the booklet is adhered to the label. This arrangement ties the overlamine, booklet and label together. When this ensemble has many pages or bends around a small radius, the outer pages need to travel a further distance than the inner pages. Since all components are tied together, the ensemble will crease. According to the invention, the label can adhere to the container while the booklet and laminate are free to independently conform to the containers radius. Thus, the booklet and label are being pressed against the container at the same time, but are free to shift and slide without interference from the other.

[00085] After label 622d is completed adhered, the roller then arrives at the laminate tab 640e. The laminate tab wraps the booklet around the bottle and adheres to the bottle in a location that is totally independent from the label, as shown in FIG. 8B. Accordingly, one label configuration can be used on bottles with different radii. In addition, booklets of different styles, sizes and thicknesses can be used in a standard manufacturing set up. The laminate tab is self adjusting to enclose booklets of any thickness and securely hold them closed until needed. Thus, the laminate tab can adhere to the container closer or farther from the label. If label tab 604t is included, as

shown in FIG. 8C in dotted line, it will extend beyond the edge of booklet 12d. When laminate tab 640e is wrapped towards the bottle it will adhere to label tab 640t.

[00086] The bottle with enclosed booklet as shown in FIG. 8B is ready to be packaged, shipped and sold. When the booklet needs to be accessed, the laminate tab 640e is peeled away from the bottle, pivoting at hinge 700a to carry the booklet away from the bottle, to a configuration shown in FIG. 8C. If the laminate tab is large or uses very strong adhesive, it may be desirable to reduce the holding strength to facilitate peeling the tab from the bottle. For this purpose, stripes of release material may be printed on the tab. The print area can be adjusted to determine how much adhesive will remain on the tab, thereby controlling the adhesive strength. The booklet can be unfolded at the two fold locations 10x(ii) and 10x(i). The user is presented with 6 or more pages of information, with all pages connected together at spine 10d. For certain applications, perforations may be provided. For example, a portion of the front page may be ripped off at perforation 50p(i). An entire page, e.g. the back page, may be ripped off at perforation 50p(ii).

[00087] FIG. 8C shows the spine section 900s adhered to the overlamine 640a, with middle section 900m and free edge section 900f being unadhered. The booklet could also have its free edge section 900f adhered to the overlamine. For example, the last page of the booklet within free edge section 900f could be adhered to the overlamine as shown in FIG. 8D. In this configuration, the free edges 900e would be disposed adjacent the hinge 700a of the overlamine. In the event the label is used on a flat surface, or a surface curving perpendicular to the bottle shown in FIG. 8A-8C, the booklet could be secured to the overlamine in an alternate orientation. For example, FIG. 8E shows the booklet with its free edge section 900f opening in a lateral direction from overlamine 640a (and the substrate/label). As a further embodiment, the

free edge section 900f could be adhered to overlamine 640a with the spine section 900s opening in a lateral direction with respect to the overlamine (and the substrate/label). For the orientation of FIG. 8A-8D the booklet opens in a longitudinal direction with respect to the overlamine (and the substrate/label). Other orientations are possible, and would be facilitated if the substrate and overlamine were provided with angular edges, for example, partial or full hexagonal or octagonal shapes.

[00088] The key features of the booklet product according to the invention are a booklet compactly folded, ideally with two or more folds with the free edges tucked inside. The booklet shall remain unconnected to the substrate or label. The overlamine being adhered to the substrate/label and to the folded booklet. The overlamine having a hinge portion to pivot the booklet away from the container/substrate/label so that the booklet can be unfolded to allow the pages to be opened.

[00089] While various forms of books and booklets have been shown and described, it should be understood that additional configurations may be provided within the scope of the application. For example, books with a greater number of pages may be provided. Books having two or more booklets contained therein may be included. Books with different fold locations and directions may be provided. In addition, several embodiments have been shown and described for a manufacturing process. Additional steps, or steps executed in different order are included within the scope of the invention. For example, adhesive and the release liner can be applied to the web before or after the labels are printed.

[00090] Having described preferred embodiments for substrates, booklets, folds, overlaminates and extended content booklet labels (which are intended to be illustrative and not limiting), it is

noted that modifications and variations can be made by persons skilled in the art in light of the above teachings. It is therefore to be understood that changes may be made in the particular embodiments of the invention disclosed which are within the scope and spirit of the invention as outlined by the appended claims. Having thus described the invention with the details and particularity required by the patent laws, what is claimed and desired protected by Letters Patent is set forth in the appended claims.

CLAIMS

What is claimed is:

1. An extended content booklet label comprising:

a substrate having an upper surface devoid of adhesive and a lower surface, wherein the upper surface includes at least a first portion and a second portion;

a booklet having a spine and two or more sheets held together at said spine and extending from said spine in a longitudinal direction and including free edges which are spaced from and parallel to said spine; wherein said booklet is divided into three sections along the longitudinal direction including a spine section, a middle section and a free edge section; said free edge section is first folded to overlie said middle section; said spine section is second folded to overlie said free edge section to form a folded booklet having said spine section on top, said middle section on the bottom, and said free edge section sandwiched therebetween; wherein said middle section is placed directly on a first portion of said upper surface of said substrate in a free-sliding arrangement that is devoid of adhesive; and

an overlamine having a lower surface covered with adhesive to adhere to (i) the spine section of said folded booklet and (ii) a second portion of the upper surface of the substrate to hingedly connect the booklet to the substrate to form an extended content booklet label,

wherein the lower surface of the substrate is adapted to conform to the curvature of a cylindrical container without interference from the booklet.

2. The booklet label of claim 1, further including a release liner and a layer of adhesive disposed on the lower surface of said substrate, wherein said substrate comprises a label with its lower surface removably adhered to said release liner.
3. The booklet label of claim 2, wherein the release liner is a continuous web with a plurality of extended content booklet labels adhered thereto in a spaced relationship from one another.
4. The booklet label of claim 1, wherein said substrate is larger than said folded booklet.
5. The booklet label of claim 4, wherein said substrate includes indicia printed on said second portion of the upper surface of said substrate, and wherein said overlaminant is translucent to allow viewing of (i) the indicia printed thereunder and (ii) the spine section of said booklet.
6. The booklet label of claim 1, wherein said overlaminant includes a first portion adhered to said folded booklet, a second portion adhered to said substrate, and a hinge portion disposed between said first and second portions.
7. The booklet label of claim 6, wherein said spine of said booklet is disposed adjacent said hinge portion of said overlaminant.
8. The booklet label of claim 1, wherein said overlaminant includes a tab portion which extends beyond said folded booklet.
9. The booklet label of claim 8, wherein said second fold of said booklet is disposed adjacent said tab portion of said overlaminant.

10. The booklet label of claim 8, wherein said substrate includes a third portion that extends beyond the first portion, and wherein the tab is removably adhered to said third portion of said substrate.

11. The booklet label of claim 8, wherein said second fold of said booklet is aligned with the edge of said substrate, and wherein said tab extends beyond said substrate.

12. The booklet label of claim 8, wherein said overlamine is configured to pivot along its hinge portion between

an open position in which said first portion of said overlamine and said adhered folded booklet is pivoted away from said substrate; and

a closed position in which said folded booklet can conform to the curvature of a cylindrical container independent of the substrate.

13. The booklet label of claim 12, wherein in said open position, the second fold is adapted to swing the middle section of said booklet toward tab.

14. The booklet label of claim 1, wherein said spine is adjacent said first fold.

15. The booklet label of claim 1, wherein the booklet folds form three approximately equal size sections.

16. The booklet label of claim 1, wherein the booklet folds form three sections of different sizes, wherein the middle section is longer than said free edge section and shorter than said spine section.

17. The booklet label of claim 16, wherein the spine and middle sections form a ramp up on one side of the booklet leading to the central portion of the booklet which includes the spine, free edge and middle sections, and wherein the spine section forms a ramp down on the other side of the booklet leading from the central portion.

18. The booklet label of claim 17, wherein the ramp up includes two sections, and wherein the central portion includes three sections, and wherein the ramp down includes one section.

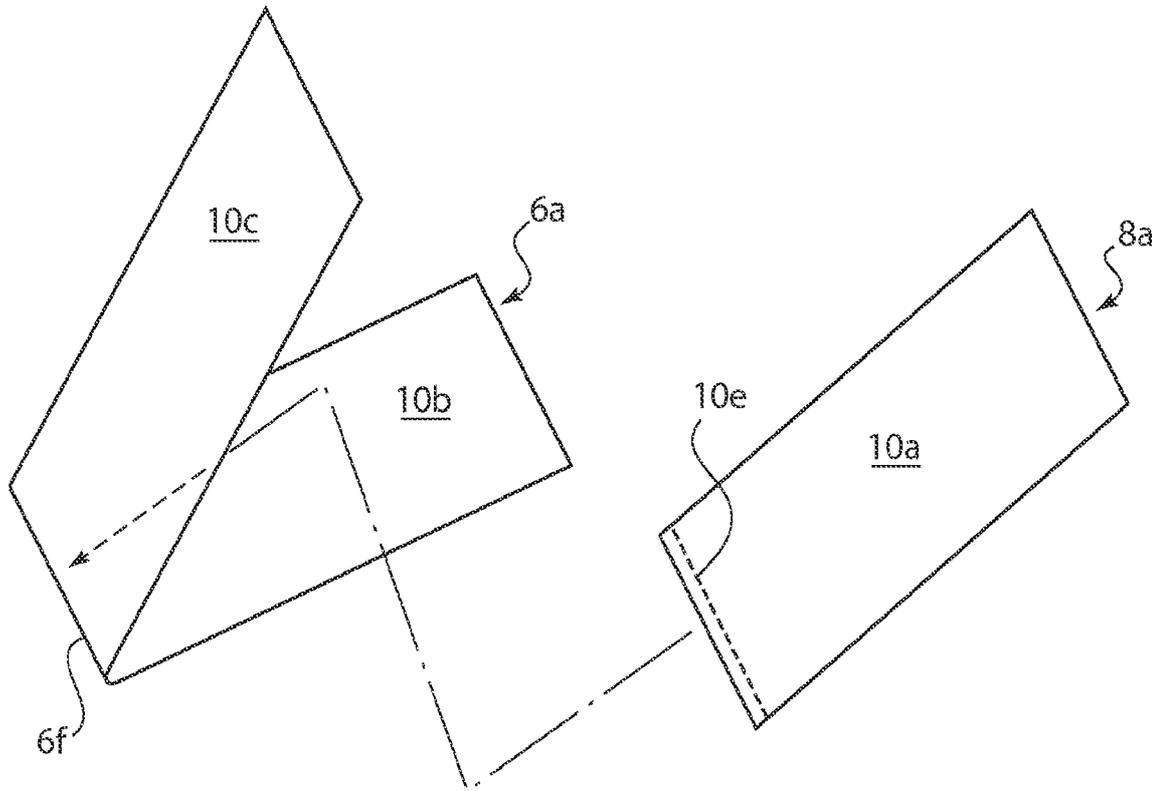


FIG. 1A

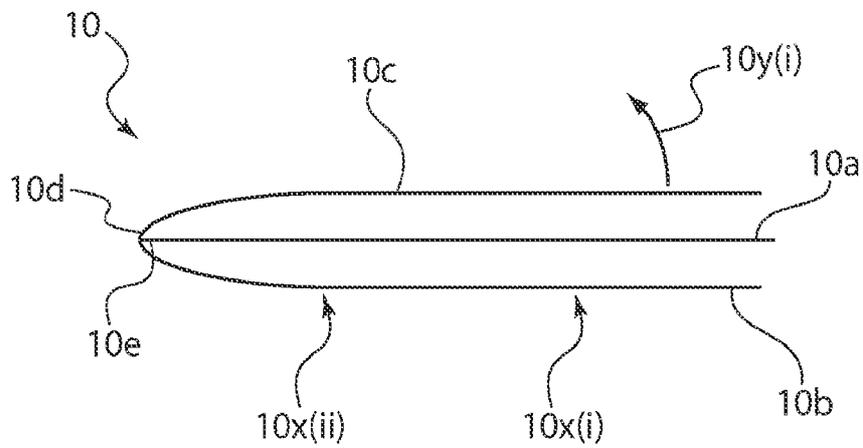


FIG. 1B

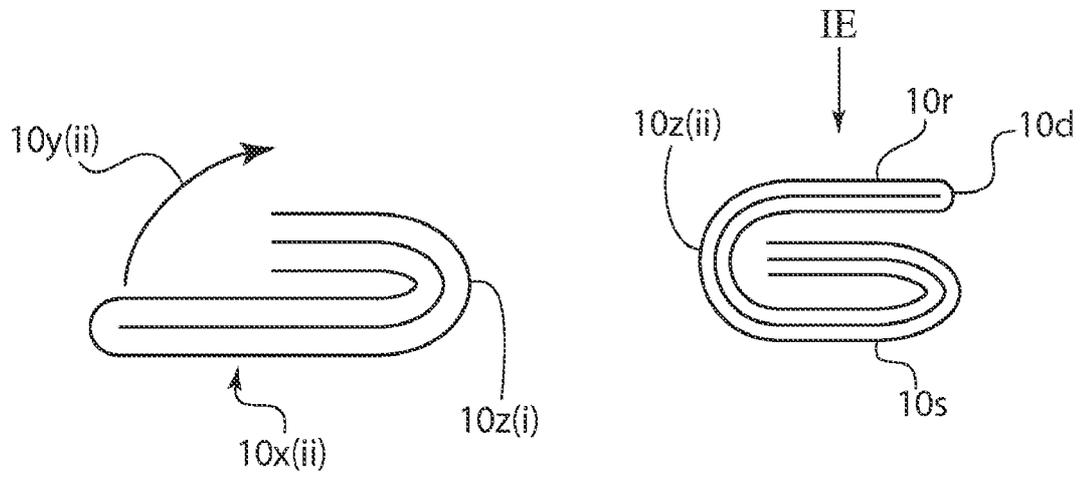


FIG. 1C

FIG. 1D

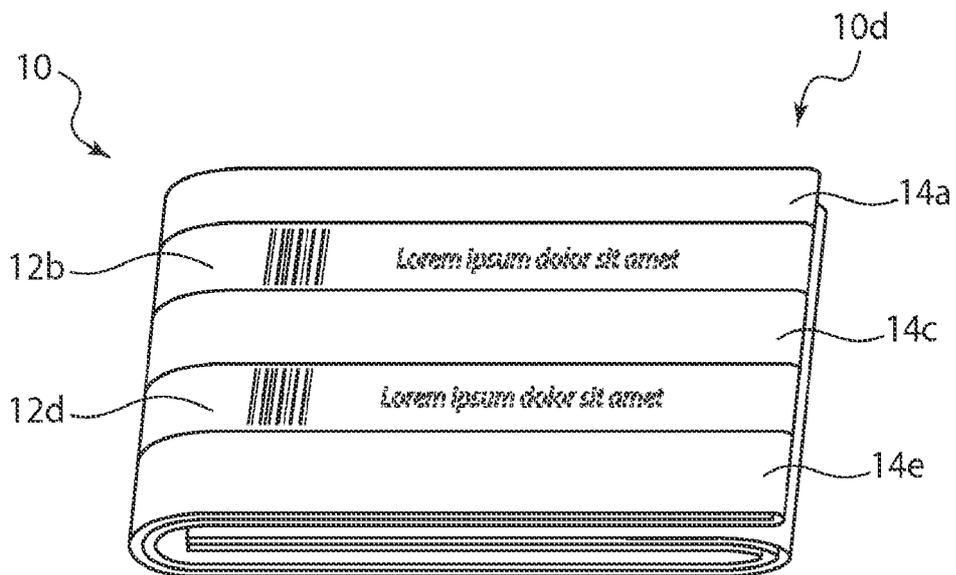


FIG. 1E

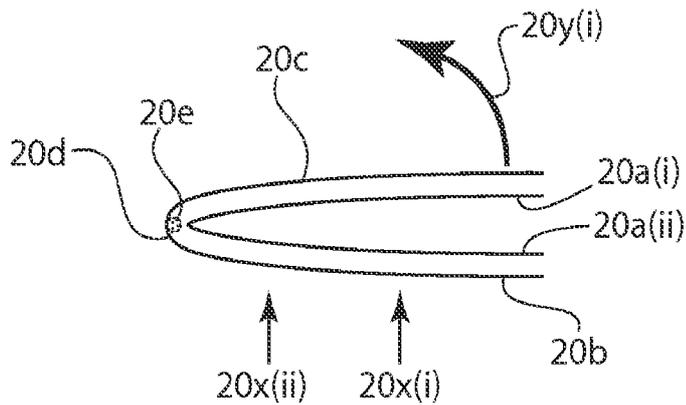
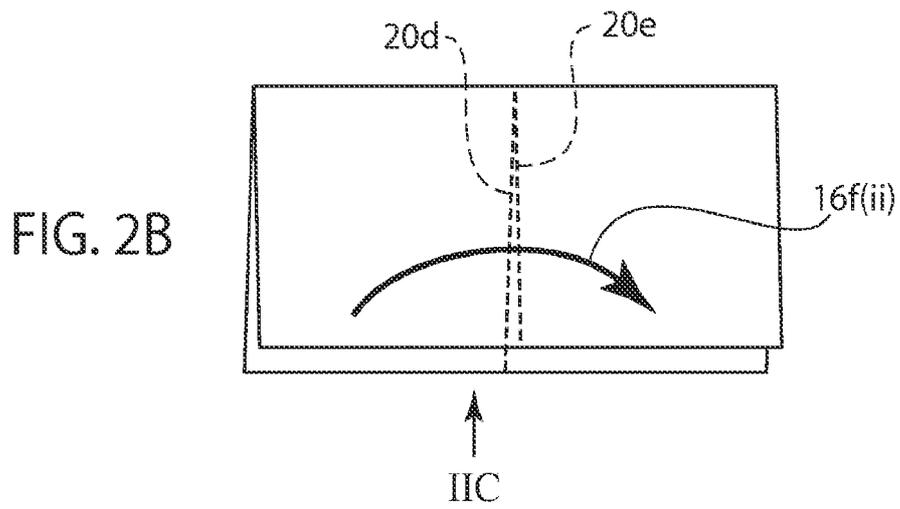
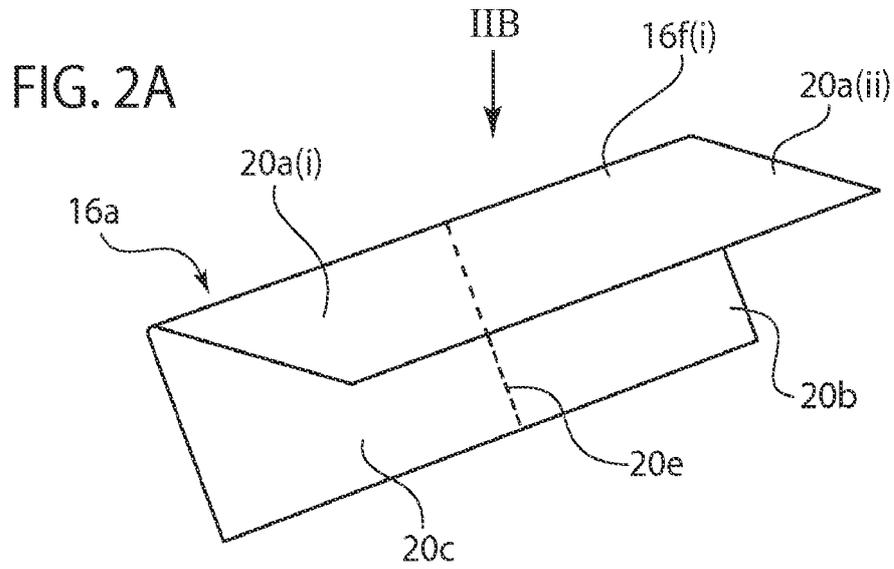
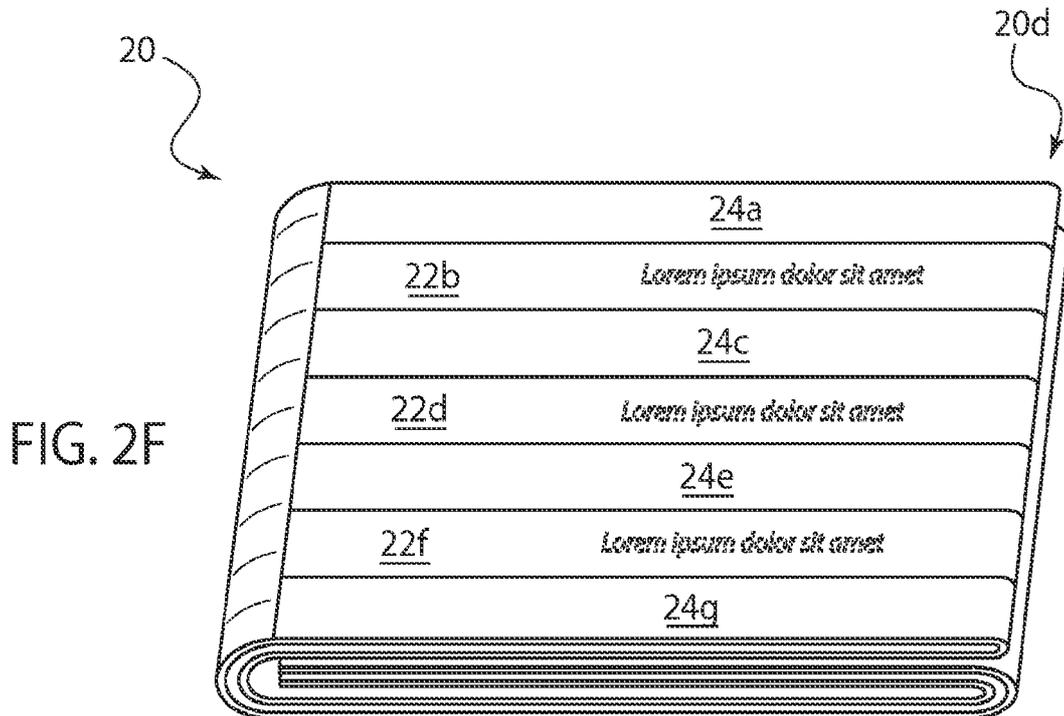
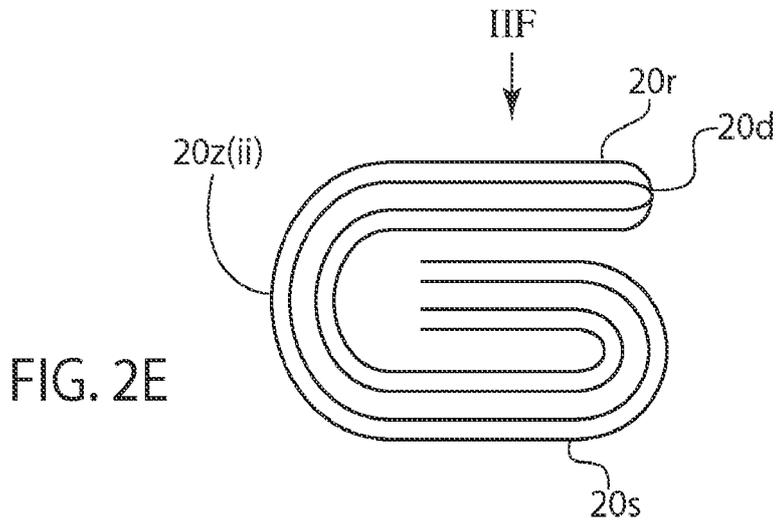
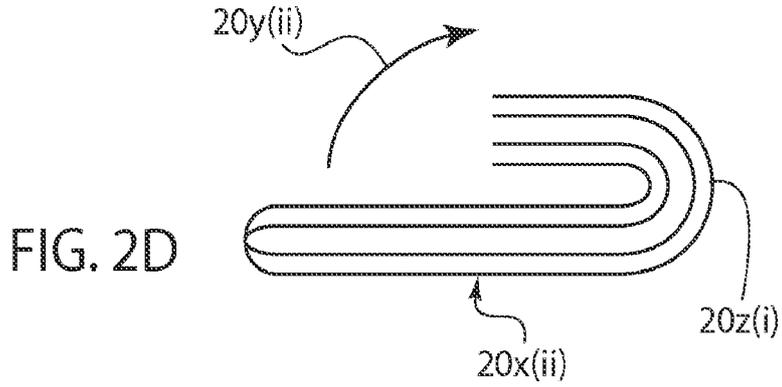


FIG. 2C



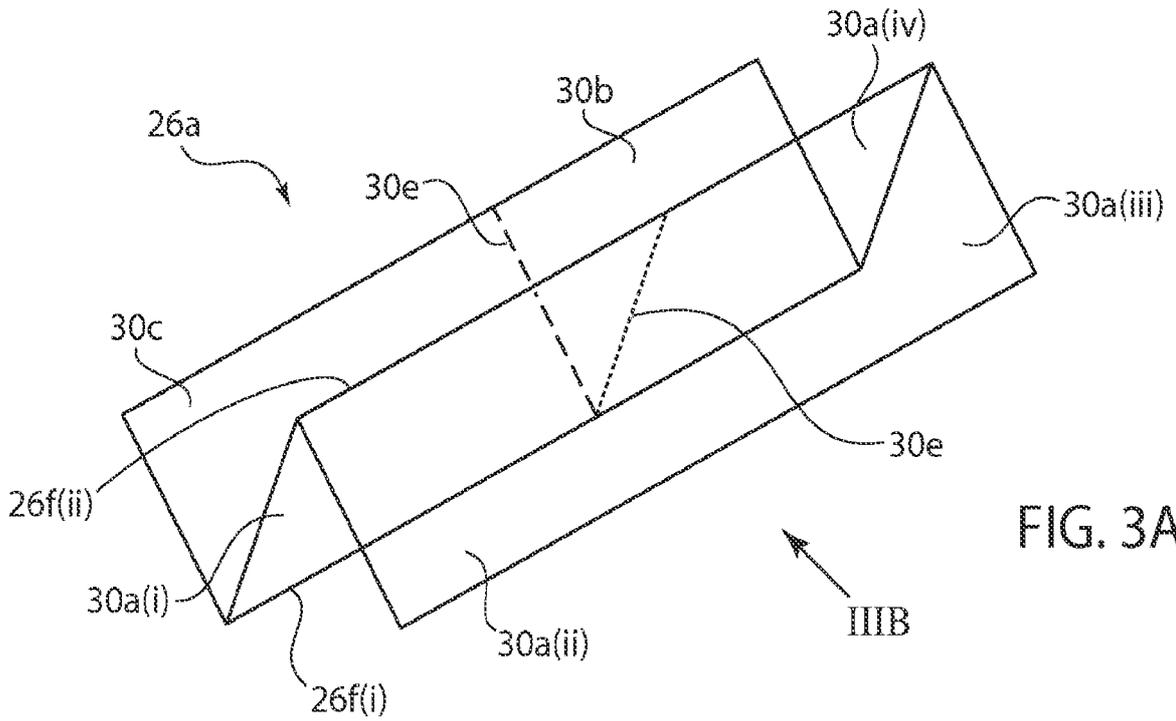


FIG. 3A

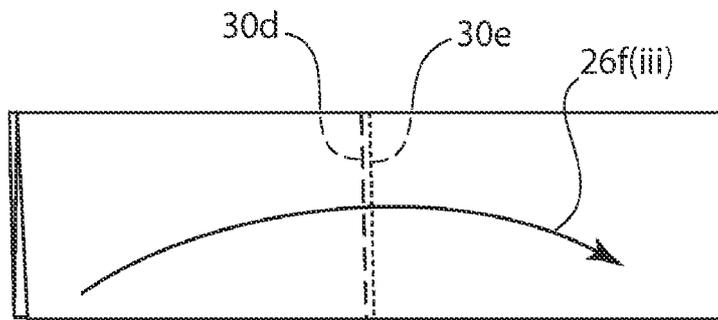


FIG. 3B

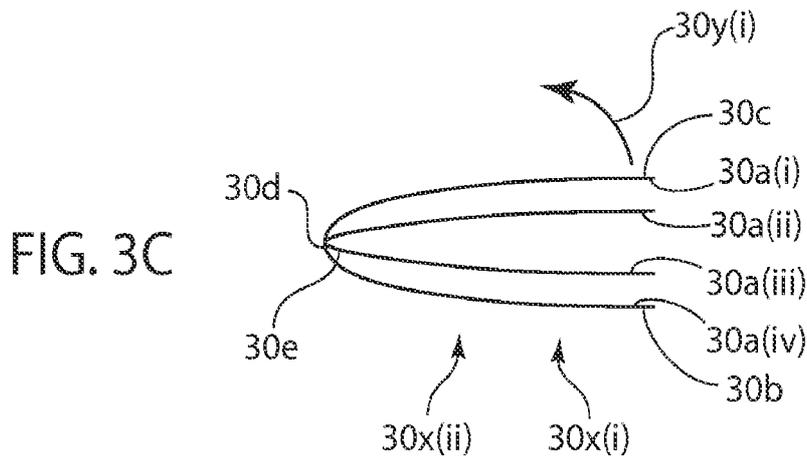


FIG. 3C

SUBSTITUTE SHEET (RULE 26)

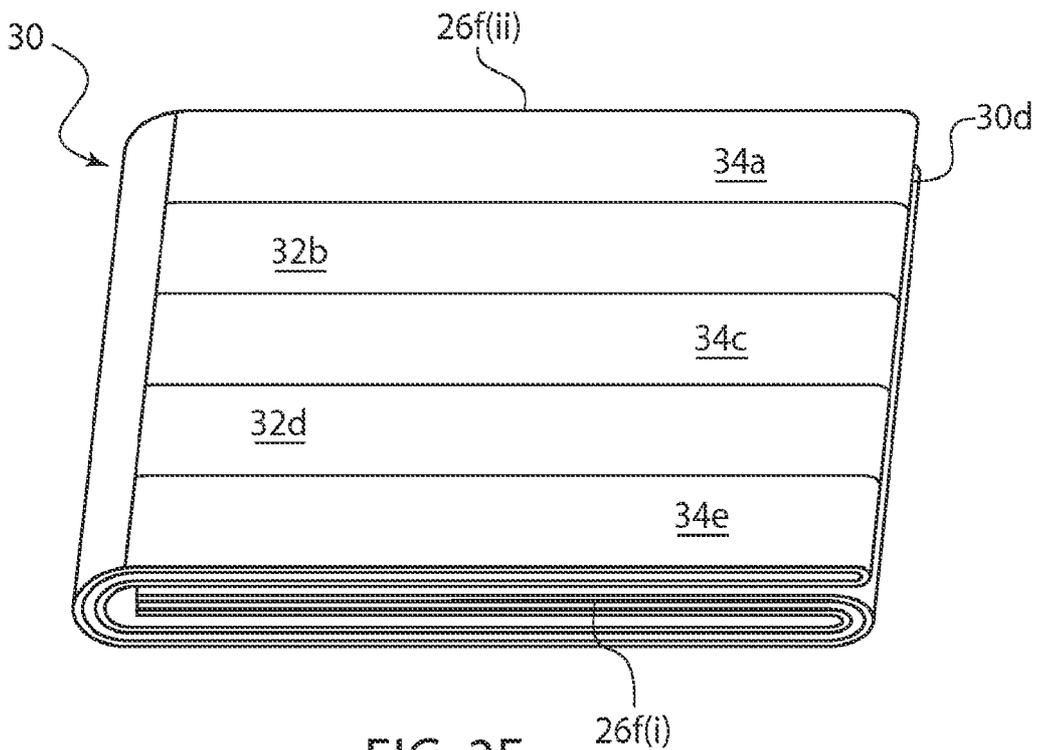
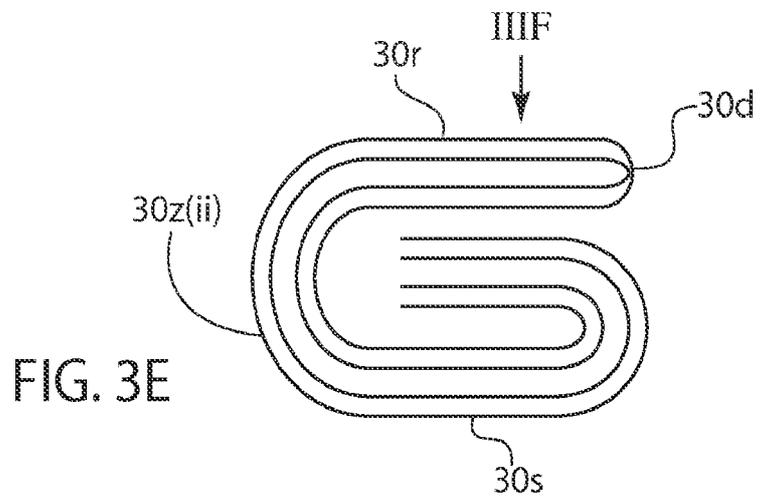
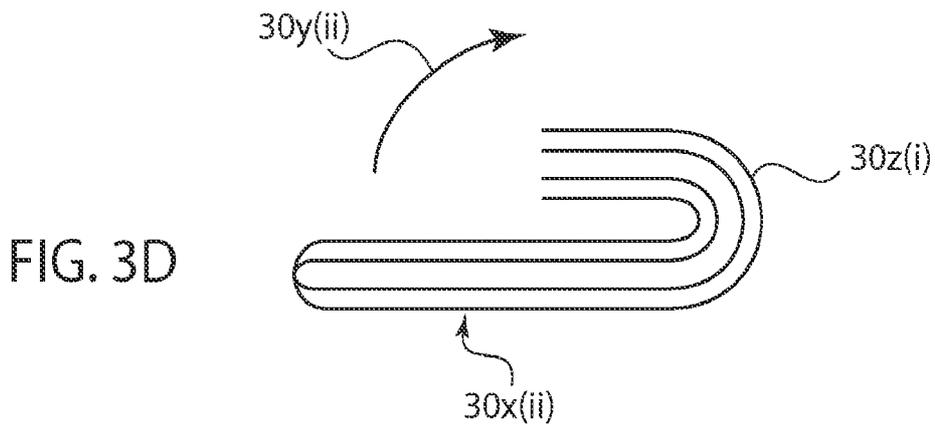
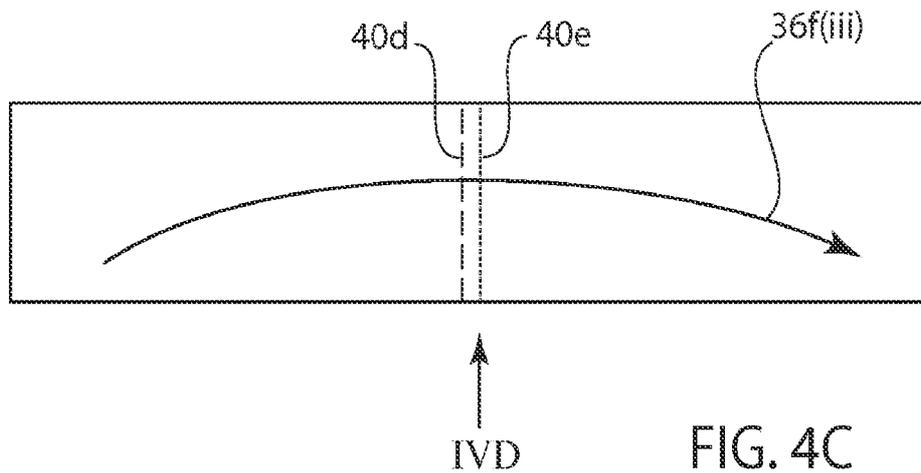
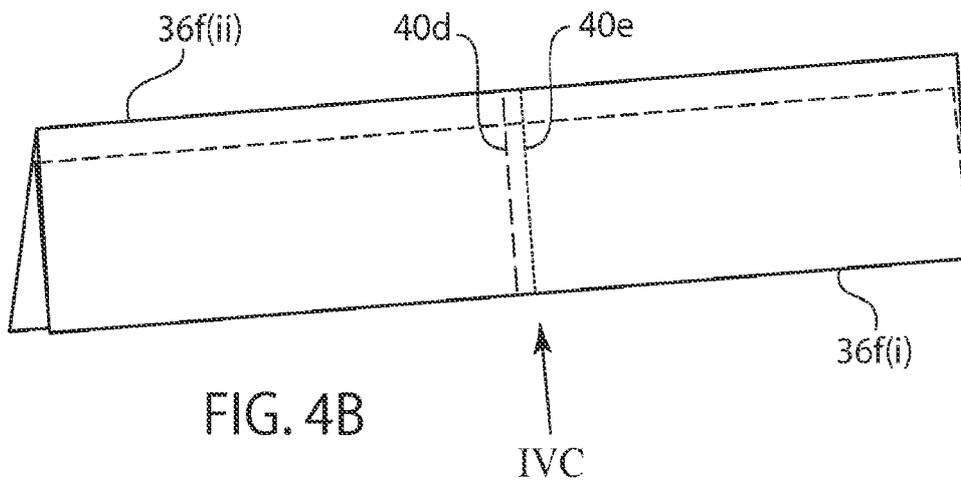
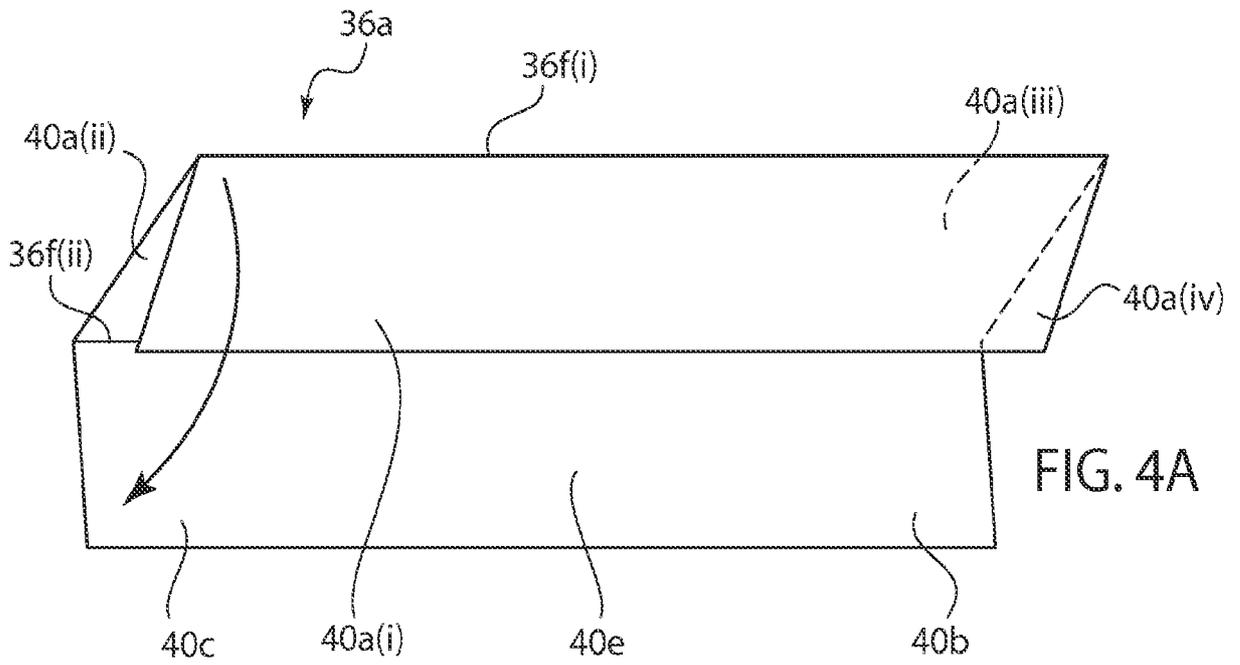
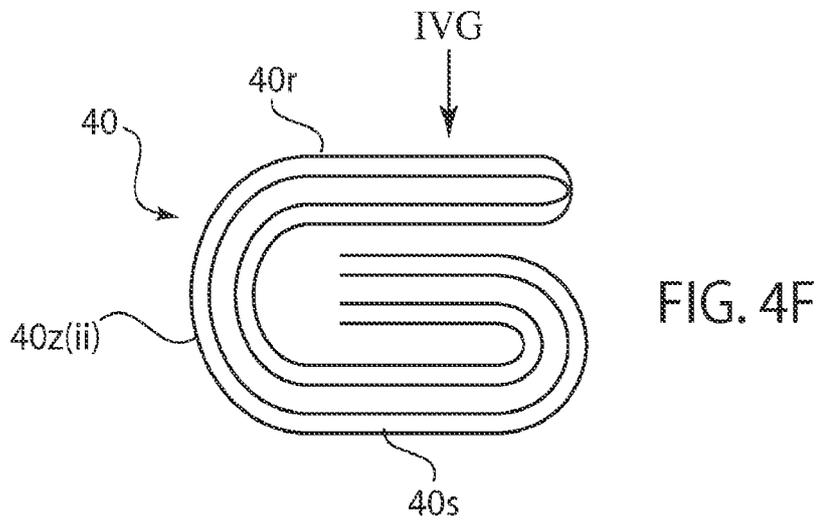
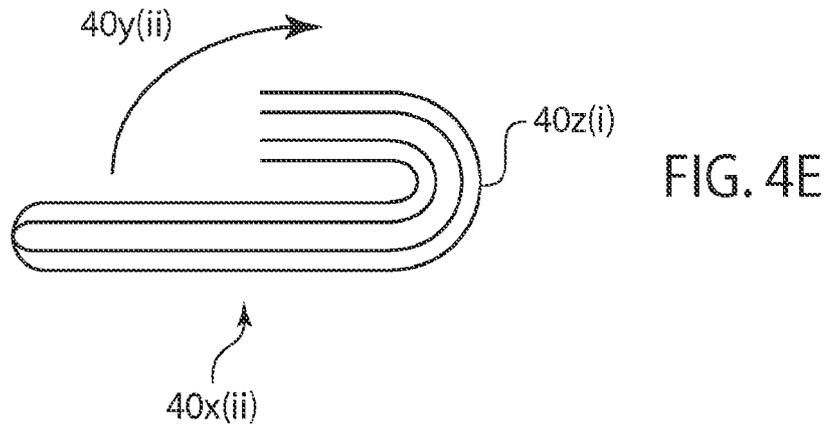
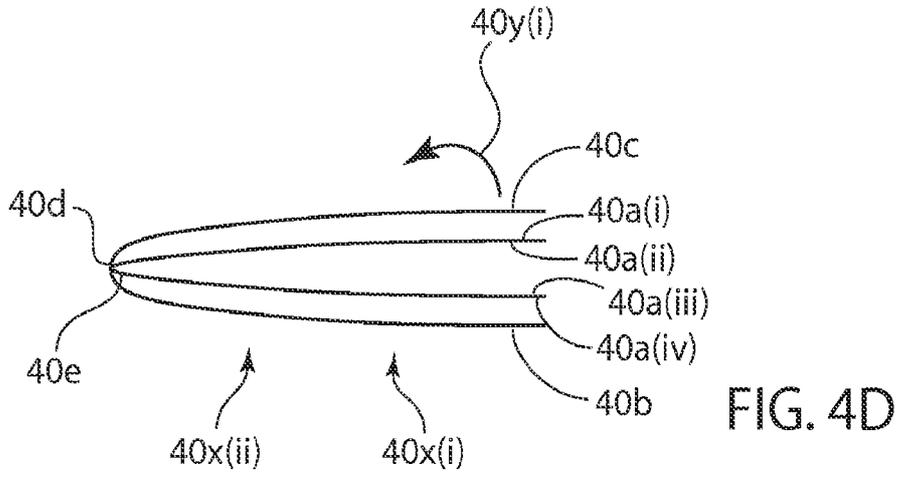


FIG. 3F
SUBSTITUTE SHEET (RULE 26)





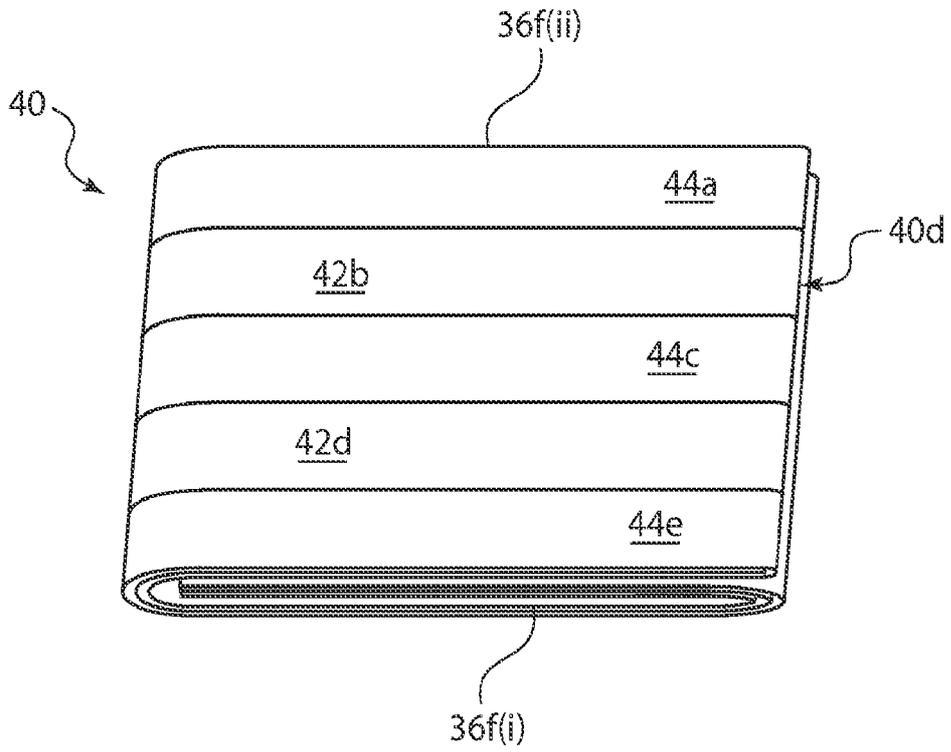


FIG. 4G

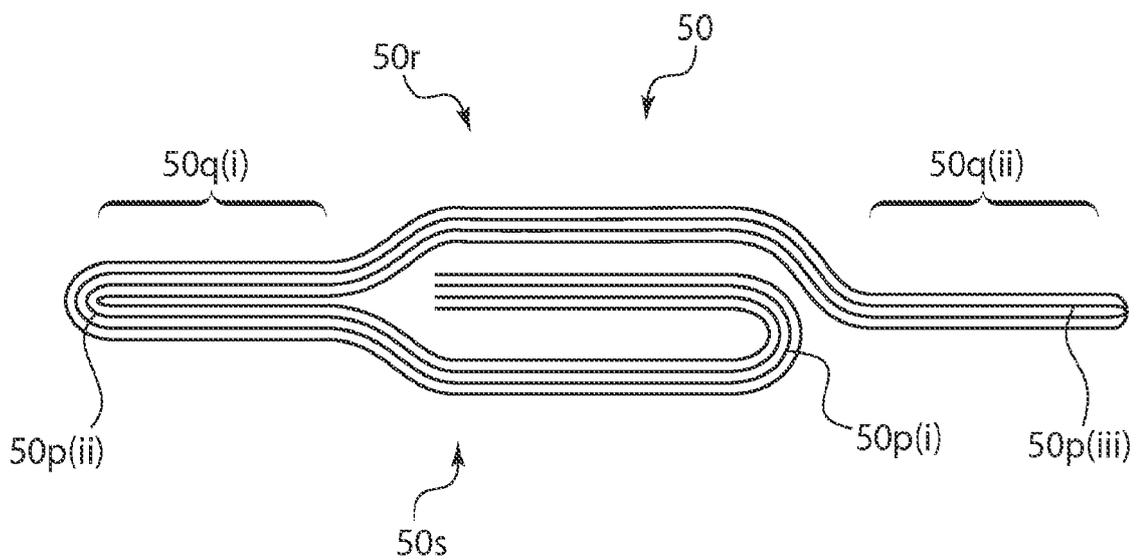
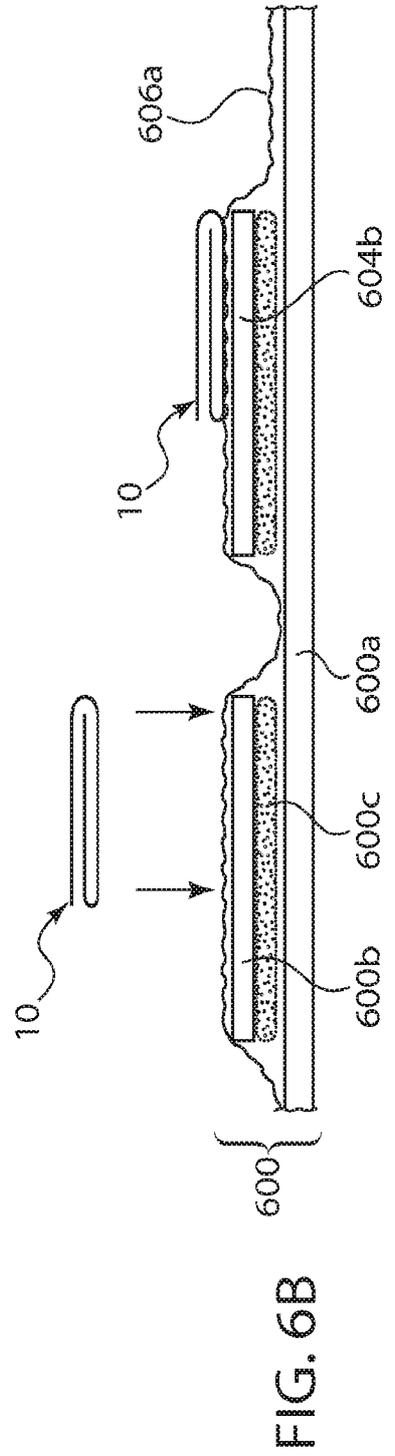
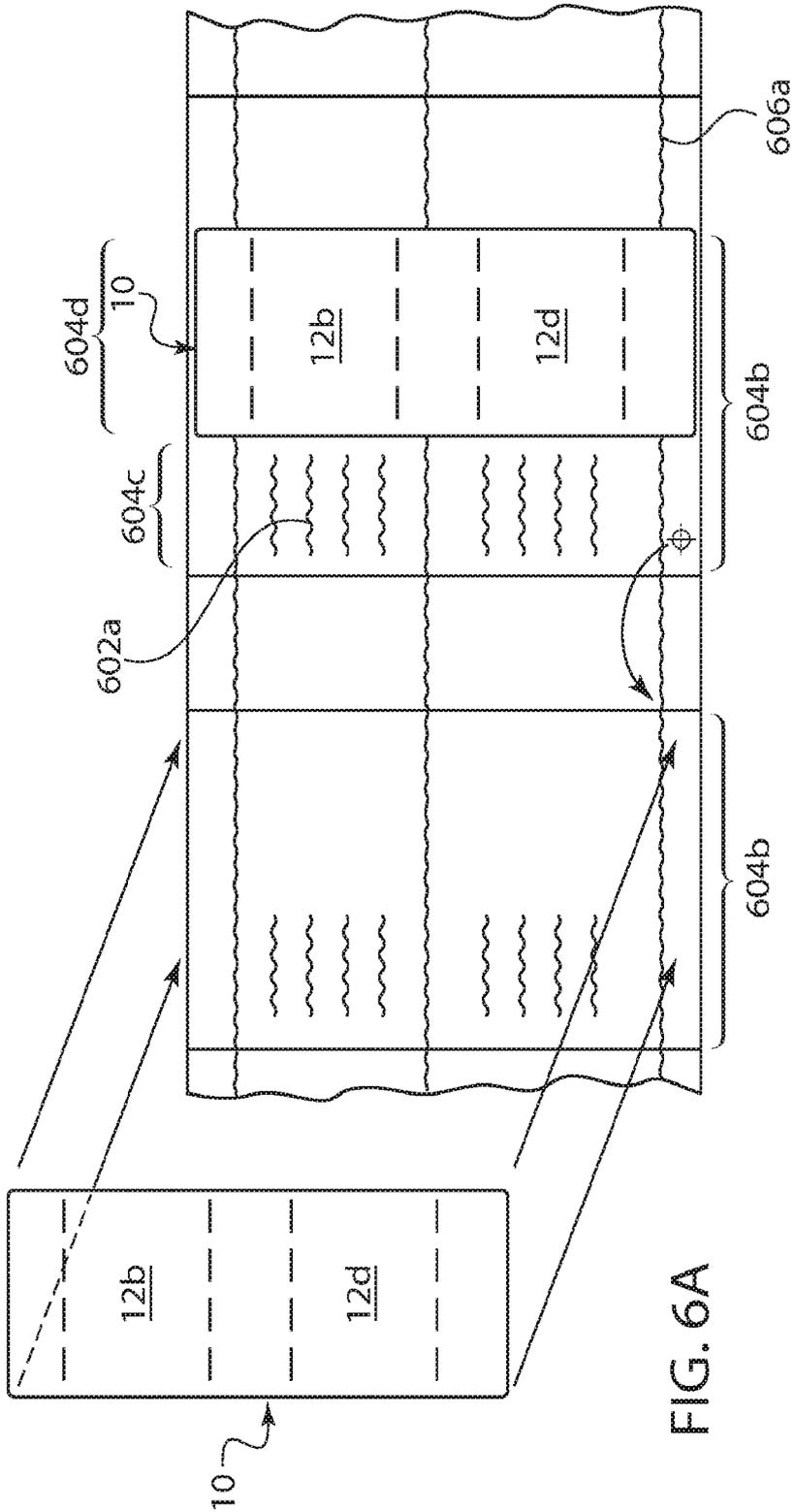


FIG. 5



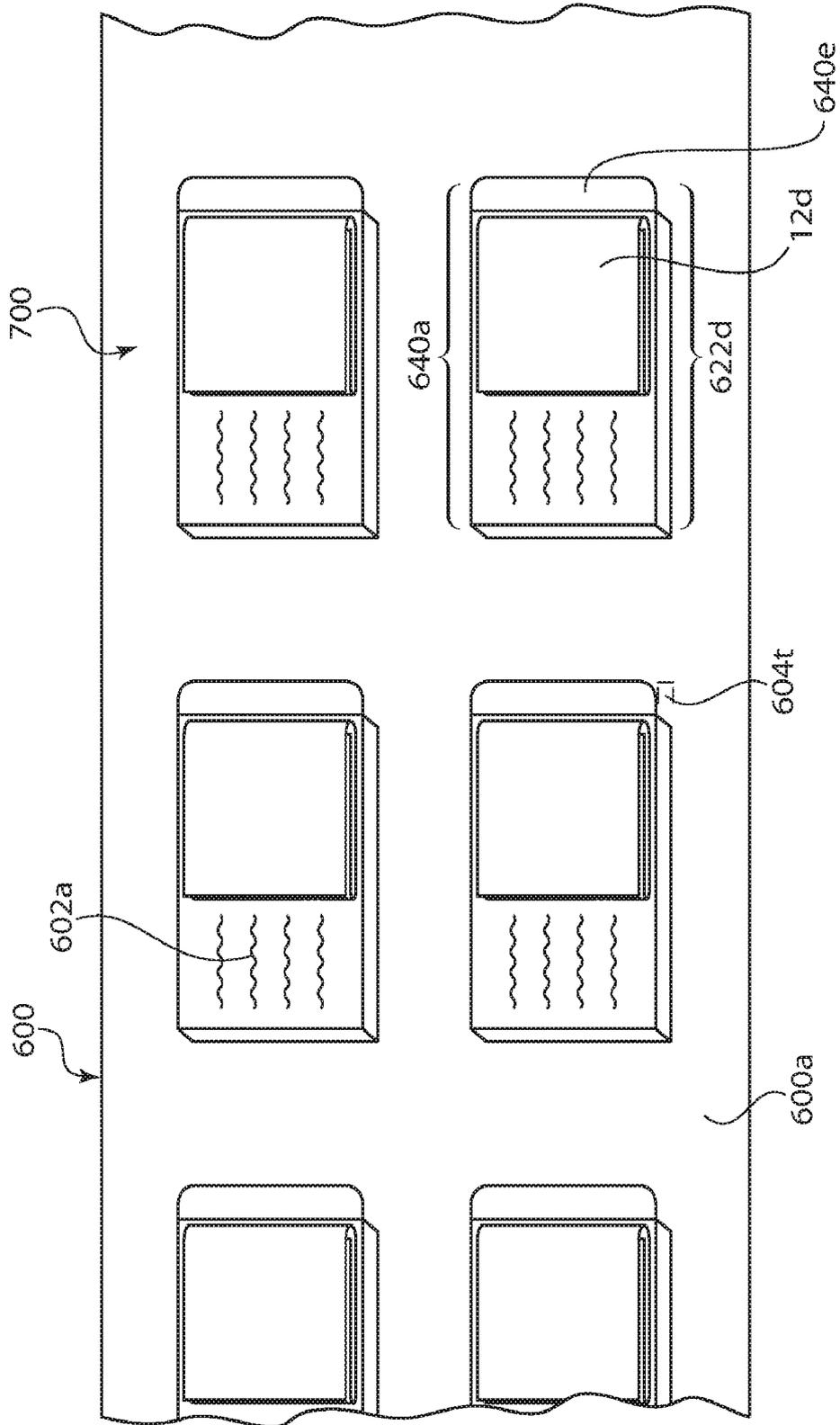
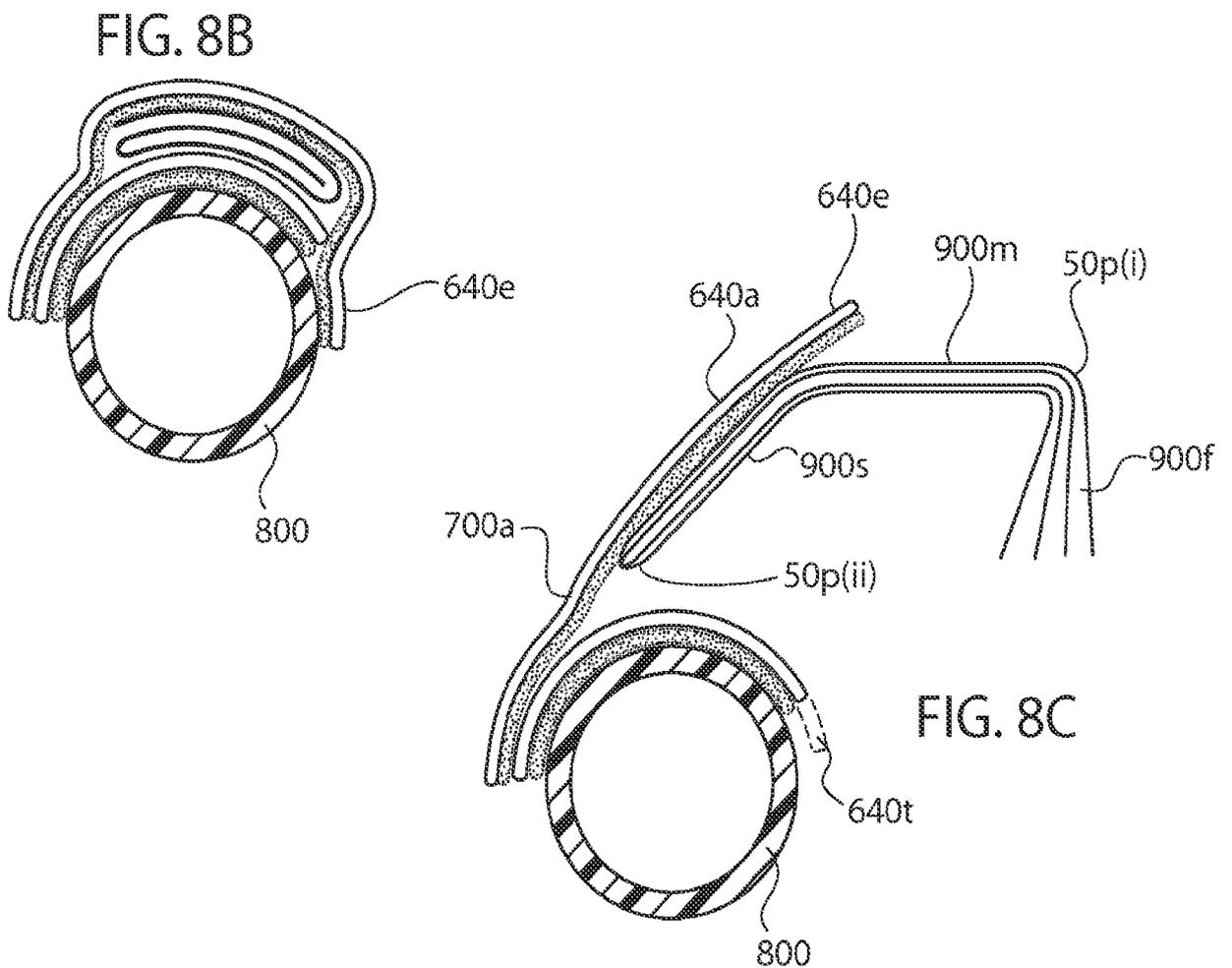
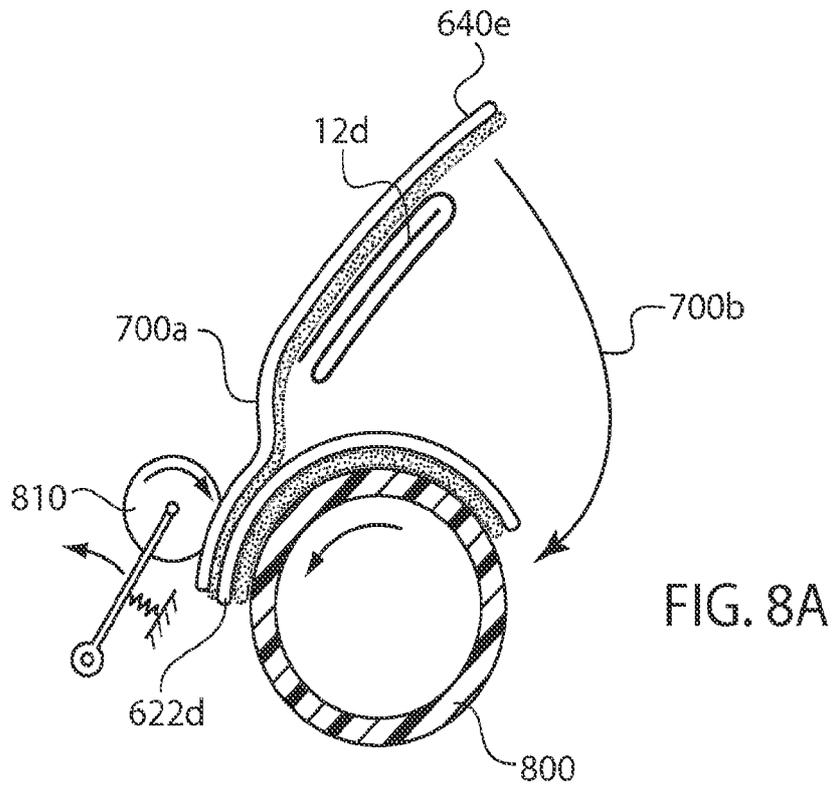


FIG. 7



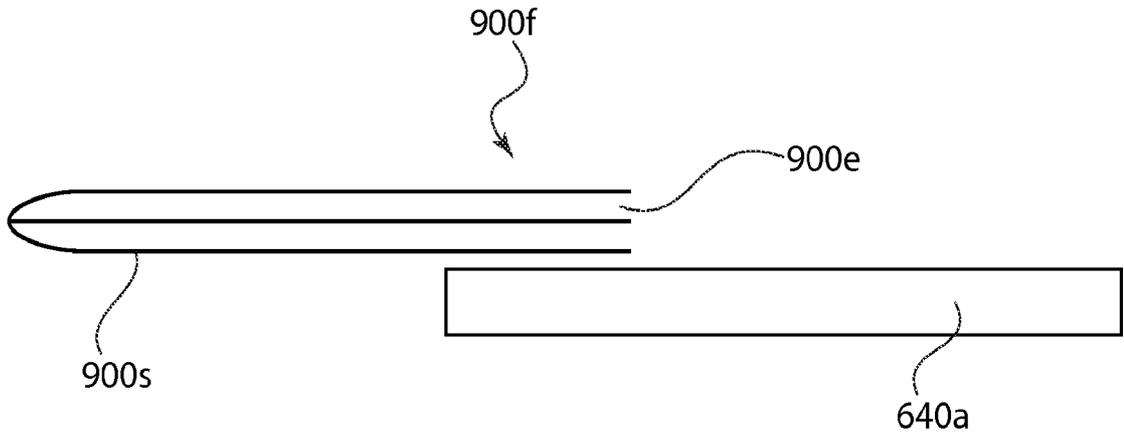


FIG. 8D

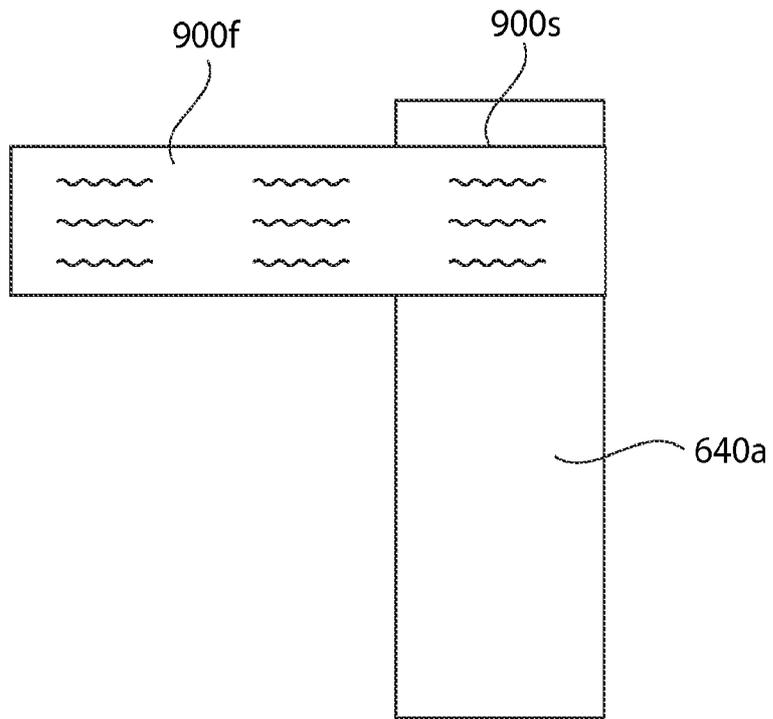


FIG. 8E

INTERNATIONAL SEARCH REPORT

International application No PCT/US2013/070939
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A. CLASSIFICATION OF SUBJECT MATTER
INV. G09F3/02 B42C3/00 B42D15/00
 ADD.

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)
G09F

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)
EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	<p>US 7 947 351 B1 (COWAN RANDY G [US]) 24 May 2011 (2011--05-24)</p> <p>col umn 1, line 35 - line 47 col umn 2, line 36 - line 41 col umn 3, line 33 - line 37 col umn 4, line 27 - line 35 col umn 4, line 41 - col umn 5, line 18 col umn 5, line 30 - line 50 col umn 6, line 2 - line 18 col umn 6, line 29 - line 33 col umn 6, line 66 - col umn 7, line 7 col umn 7, line 50 - line 53 figures 1,2,7</p> <p style="text-align: center;">----- -/- .</p>	<p>1-10, 12-15 11, 16-18</p>

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

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 28 March 2014	Date of mailing of the international search report 04/04/2014
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer <p style="text-align: center;">Lechanteux, Alice</p>
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/070939

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/223368 A1 (ZIETLOW ROBERT C [US] ET AL) 15 September 2011 (2011-09-15)	1-6,8, 11,12, 14,16-18
A	paragraphs [0006] - [0010], [0018] - [0025], [0032] figures 1,2 -----	7,9,10, 13,15
A	US 5 813 700 A (VIJUK JOSEPH M [US] ET AL) 29 September 1998 (1998-09-29) the whole document figures -----	1-18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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