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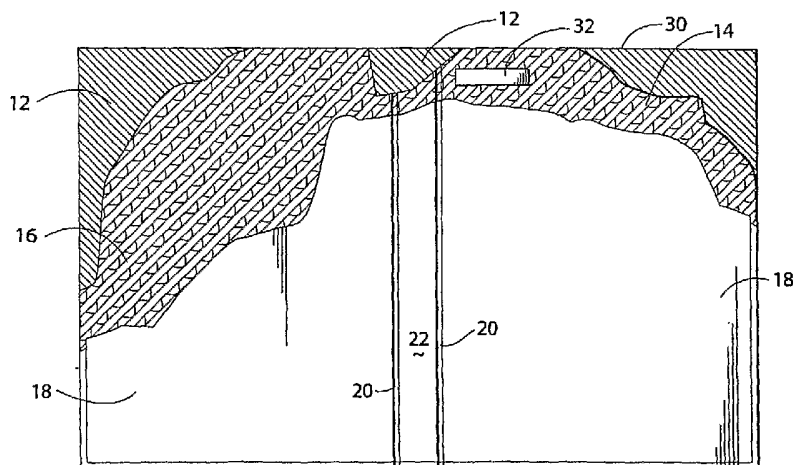
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(54) Title: **HARD COVER PRODUCT WITH CONCEALED SECURITY DEVICE AND METHOD OF MANUFACTURE**



(57) Abstract: A hard cover product having an outer liner attached to a pair of sheet members disposed in spaced-apart relation to define a gap. One of the hard sheet members defines a receiving zone that receives a security tag. An inner liner attaches overlying the pair of hard sheet members and concealing the security tag within the receiving zone. The gap between the pair of sheet members defines a spine for the hard cover product, whereby the opposing hard sheets defining a front cover and back cover that move together foldably. The hard cover product can be made from an intermediate cover board in which a primary sheet has a first thickness and opposing planar surfaces define an opening in a selected portion of the sheet to receive a security device. A pair of opposing secondary sheets laminate to the opposing planar surfaces of the primary sheet to enclose the security device. A method of making the intermediate laminated cover board is disclosed. The hard cover product defines a gap in spine portion which receives a security device.

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HARD COVER PRODUCT WITH CONCEALED SECURITY DEVICE AND METHOD OF MANUFACTURE

TECHNICAL FIELD

The present invention relates to hard cover products. More particularly, the present invention relates to hard cover products with concealed security devices for facilitating manufacture and use of hard cover products, to intermediate liners with concealed security devices therefore, and book products having a spine that concealingly holds a security device and manufacture of such hard cover book products.

BACKGROUND OF THE INVENTION

In recent years, tracking of inventory of goods has become of increased importance. Inventory of goods represents a significant investment in capital. In addition to cost factors, other aspects prompting increased interest in tracking inventory include the increase in just-in-time manufacturing in which materials are provided by suppliers shortly prior to the time of use by the manufacturer of goods, as well as theft deterrence and inventory verification and auditing.

Various electronic and mechanical devices have been provided for tracking and monitoring of goods and containers. These devices include acoustic magnetic security strips and radio frequency security tags. These devices often are embodied in tags, pods, labels, or patches, having adhesive surfaces for attaching the device to the goods or their containers. These devices facilitate tracking and monitoring of goods and containers. The security devices are typically attached to the articles particularly susceptible to pilferage and improper removal from a warehouse or retail store. The security devices include a detectable sensor. One known type of security tag has a circuit that resonates at a predetermined detection frequency range. A transmitter provides electromagnetic energy that excites the circuit. A receiver detects the output signal from the resonating circuit. The transmitter and the receiver are located at detection points, often exits from retail facilities. As the article is carried through the detection point, the receiver signals an alert when an activated sensor device is detected. For articles that are permitted to pass (such as purchased articles), a separate device is used to deactivate the detectable sensor prior to passage. Other devices include RFID devices that communicate digital signals. In some known RFID devices, the signal is indicative of unique identifiers for tracking particular containers.

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Often large retailers require manufacturers of articles to include tracking and monitoring devices within the containers for the articles. For smaller retailers and smaller inventories of articles, the tracking and monitoring devices may not be included with or attached to containers. In such circumstances, the articles may be provided with after-market tracking and monitoring devices. For example, electronic article surveillance tags are available with adhesive backing to secure the tags to the containers. While the containers are thereby subject to electronic article surveillance, the adhesively attached tags experience problems during use. One significant problem is that the tags, being on the exterior of the container, are susceptible to removal. Removing the security tag facilitates circumventing security and the unauthorized removal of the article from the secured area. However, removal by a purchaser also causes problems. The covering to which the security tag attaches may become torn or ripped, thus damaging the package.

Further, the package with the security tag, or without such by removal, creates an eyesore visible to the consumer. The security tag may also overlie or cover over ornamental graphics or text on the packaging. The security device thereby interferes with the printed graphics and/or with other types of covering material and distracts or covers up the printing/stamping designed to enhance the marketability of a product.

Also, importantly, the attachment of an electronic security tag to an interim assembly of an article during manufacture lead to production and handling problems. These manufacturing problems include mechanical problems when producing a product, and also having to operate manufacturing equipment at reduced production speeds. The security tag projects from the surface to which it attaches. This causes stacked ones of the interim assemblies to gradually angle or tip as the stack height increases with placement of additional interim assemblies. For example, hard cover books assembled using casing machines receive an outer liner that attaches to front cover stock and back cover stock. Such interim assemblies are stacked for a second pass through the casing machine to apply an inner liner. Angled stacks make production and handling more difficult during manufacturing. Further, the protruding security tag may scratch the adjacent assembly, for example, when a feeder device pushes one of the assemblies from a hopper for processing and applying the inner liner.

Libraries present an especially interesting application area for concealed security devices. Libraries typically have a large inventory of books that are readily portable products. Some specialty books, rare books, and the like are susceptible to unauthorized removal. To prevent these inventory loss problems, sensor-interrogating devices are positioned near exit

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doors. The interrogator communicates with sensors positioned in the books. A properly checked out book will have the sensor deactivated. If the sensor signals the interrogator, an alarm is sounded. These sensor and interrogator systems for libraries however are retrofit devices, in which the sensor is manually installed at the library. The book is held with the covers splayed apart to open a gap in the spine portion of the book. The gap typically forms between the cover and the spine edge of the bound pages forming the book. A special tool is used to insert the sensor device along the open pathway defined by the gap. Once the sensor device is positioned, typically in a central portion of the spine, the book covers are closed together and the tool is withdrawn thereby depositing the security device in the spine. Often the security device has an adhesive surface in order to attach the security device to the spine of the book. For books that do not develop such a gap upon opening the covers, the security device must be positioned on one of the pages, typically in a central portion of the book. This leaves the sensor susceptible to removal. Installing the sensor devices is time consuming and the books must be periodically checked to determine whether the sensor device remains in place. It is also difficult to assure proper placement and securing of the sensor device within the spine.

Accordingly there is a need in the art for providing hard cover products with concealed security tracking and monitoring devices, intermediate cover boards with concealed security devices for such hard cover products, and hard cover books with in-spine concealed security tracking and monitoring devices. It is to such that the present invention is directed.

SUMMARY OF THE INVENTION

A. Hard cover product and method of manufacturing same.

The present invention meets the need in the art by providing a hard cover product having an outer liner attached on a major surface to a pair of sheet members. The sheet members are disposed in spaced-apart relation and define a front cover and a back cover for the hard cover product. One of the hard sheet members defines a receiving zone that receives a security tag. An inner liner overlies the pair of sheet members and conceals the security tag within the receiving zone. A gap between the pair of sheet members defines a spine for the hard cover product, with the opposing front cover and back covers moving together foldably.

In another aspect, the present invention provides a method of making a hard cover product, comprising the steps of:

- (a) forming a recess in a first sheet;

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(b) attaching an outer liner to a major surface of the first sheet and to a second sheet spaced apart therefrom to define a gap therebetween, the first sheet and the second sheet defining a front and back cover;

(c) depositing a security tag within the recess;

(d) attaching an inner liner in overlying relation to the first and second sheets, the gap defining a spine on which the opposing front and back covers pivot towards each other.

B. Intermediate laminated cover board for hard cover product and manufacturing of same.

In another aspect, the present invention meets the need in the art by providing an intermediate cover board for hard cover products, in which a primary sheet having a first thickness and opposing planar surfaces defines a receiving cavity in a selected portion of the sheet. The receiving cavity receives a security device. The cover board thereafter is suitable for overlay by a cover liner during manufacture of a hard cover product.

The present invention provides a laminated cover board for hard cover products in which a primary sheet having a first thickness and opposing planar surfaces defines a receiving cavity in a selected portion of the sheet, which cavity receives a security device. A pair of opposing secondary sheets each with a second thickness less than the first thickness are laminated to the opposing planar surfaces of the primary sheet. The security device is thereby enclosed between the laminated secondary sheets of the second thickness sufficient that the assembled intermediate laminated cover board does not display surface indications of the presence of the security device.

The present invention provides a method of assembling an intermediate laminated board for subsequent use as a component of hard cover products, comprising the steps of:

(a) providing a primary sheet having opposing planar surfaces with a length and width exceeding a first thickness, the primary sheet defining an opening therethrough in a selected portion thereof;

(b) laminating a first exterior sheet to a first of the opposing planar surfaces and closing the opening in the primary sheet;

(c) positioning a security device in the opening, the security device having a thickness no greater than about a substantial majority of the thickness of the central sheet so that opposing sides thereof are no more than substantially co-planar with respective ones of the opposing planar surfaces of the central sheet; and

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(d) laminating a second exterior sheet to the second of the opposing planar surfaces to form an intermediate laminated board that does not display on the opposing surfaces defined by the exterior sheets indications of the presence of the security device therein. The resulting laminated cover board is gainfully used as a cover board in a hard cover product having an outer cover and an inner liner while not displaying indications of the enclosed security device.

C. Hard cover product with spine-disposed concealed security device.

In another aspect, the present invention meets the need in the art by providing a hard cover book product comprised of an outer liner that includes a pair of hard sheet members attached to a major surface of the outer liner and disposed in spaced-apart relation to define a spine portion therebetween, with the hard sheet members folding movably toward each other along the edges with the outer liner. A security tag attaches within the spine portion and a body portion attaches to the hard sheet members. The sensor provides for tracking of the hard cover book product by responding to a remote interrogator.

Objects, advantages and features of the present invention will become apparent from reading of the following detailed description of the invention and claims in view of the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

A. Hard cover product and method.

Fig. 1 is a plan view of a hard cover product in which a security device is attached to an exterior surface.

Fig. 2 is an end view of a stack of assemblies used to make a hard cover product illustrated in Fig. 1.

Fig. 3 is a plan view of an embodiment of the present invention providing a hard cover product with a concealed security device.

Fig. 4 is an exploded edge view of the hard cover product assembly illustrated in Fig. 3.

Fig. 5 is a plan view of an alternate embodiment of the hard cover product according to the present invention.

Fig. 6 is a perspective view of a hard cover product illustrating features of the present invention.

Fig. 7 is a perspective view of an alternate embodiment of the hard cover product according to the present invention.

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Fig. 8A is a perspective exploded view of a hard cover product with a bound assembly of papers for a book.

Fig. 8B is a perspective exploded view of a hard cover product with a bound assembly of papers for a book.

Fig. 9 is a schematic illustration of an assembly line for manufacturing hard cover products of the present invention.

B. Intermediate laminated cover board for hard cover product and manufacturing of same.

Fig. 10 is a plan view of a hard cover product in which a security device is enclosed in an intermediate laminated cover board according to the present invention.

Fig. 11 is a perspective cut-away view of the intermediate laminated cover board illustrated in Fig. 10.

Fig. 12 is a perspective exploded view of the intermediate laminated cover board illustrated in FIG. 10.

Fig. 13 is a partial cross-sectional view of the intermediate laminated cover board illustrated in Fig. 10, taken along the line 13 – 13.

Fig. 14 illustrates in perspective view an alternate embodiment of the intermediate laminated cover board using a sheet type security device in accordance with the present invention.

Fig. 15 illustrates in cross-sectional side view the alternate embodiment of the intermediate laminated cover board shown in Fig. 14.

Fig. 16 illustrates in perspective exploded view an alternate embodiment of an intermediate cover board that features a combination dual security device in accordance with the present invention.

Fig. 17 is a perspective cut-away view of a laminated multi-ply board having a security device sandwiched within the board and an index as to the location of the security device in accordance with the present invention.

Fig. 18 is a schematic illustration of a manufacturing process to make the laminated multi-ply board illustrated in Fig. 17.

C. Hard cover product with spine-disposed concealed security device.

Fig. 19 is an exploded perspective illustration of a hard cover book having a security device in a spine portion according to the present invention.

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Fig. 19A is a back perspective partially cut-away illustration of the hard cover book illustrated in Fig. 19.

Fig. 20 is an exploded perspective view of a second embodiment of a hard cover book having an in-spine security device according to the present invention.

Fig. 21 is a perspective cut-away back view of a third embodiment of hard cover book having an in-spine security device according to the present invention.

DETAILED DESCRIPTION

A. Hard cover product and method.

Referring now in more detail to the drawings in which like numerals refer to like parts throughout the several views, Fig. 1 illustrates a hard cover product 10 having an outer liner 12, a pair of spaced-apart sheets 14, 16, and covered by an inner liner 18. The outer liner 12 and the inner line 18 may include graphics, text, and other visual ornamentation, such as the graphics 17. The sheets 14, 16 (enclosed by the outer liner 12 and the inner liner 18) define front and back covers for the product. A pair of spaced-apart grooves or scores 20 enable the sheets 14, 16 to fold together to close the hard cover product 10. A gap 22 between the scores 20 defines a spine or back of the closeable hard cover product 10. A security sensor 24 attaches with adhesive to the face of the inner liner 18 in a selected position. The sensor extends above the surface defined by the inner liner 18. As illustrated in Fig. 2, this can lead to handling and production problems during manufacture of the hard cover product 10. The upwardly extending security sensor causes a portion of the stack to be disposed an oblique angle 26, rather than lying flat. This uneven stack makes handling of work in progress more difficult.

Fig. 3 illustrates a hard cover product 30 according to the present invention in which the security sensor 24 is concealed within an assembly of the outer liner 12, the sheets 14, 16, and the inner liner 18. Fig. 4 is an exploded edge view of the hard cover product assembly illustrated in Fig. 3. A recess 32 is formed in the sheet 14 such as by die cutting the sheet in a casing operation typical for binding of books using a casing machine. An applicator apparatus places the security sensor 24 within the recess 32. The outer liner 12 closes the recess 32 from an exterior side of the assembly for the hard cover product 30, and the inner liner 18 closes the recess 32 from the opposing interior side. The inner liner 18 thereby conceals the security device 24 within the hard cover product 30.

The thickness of the sheet 14 (on a line 34 shown in Fig. 4 transverse through the opposing major surfaces) is preferably sufficient that the security device 24 is recessed in the

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recess 32 relative to the major surfaces. The sheets 14, 16 are cardboard sheet, fiberboard sheets, or other stiff or hard sheet material suitable for forming a cover to a book, casing, or other article-container.

In the illustrated embodiment, the gap 22 defines scores or grooves in the overlapped inner and outer lines 12, 18. These define pivots or lines on which the front and back covers fold together.

Fig. 5 illustrates an alternate embodiment of a hard cover product 50 according to the present invention. In this embodiment, a substantially planar radio frequency tag 52 attaches to the surface of the sheet 14a. The inner liner 18 attaches in overlaying relation to the sheets 14, 16. In the illustrated embodiment, which does not include the recess 32, the inner liner 18 extends over the area of the spine. The inner liner 18 thereby overlies and concealingly encloses the sheet-like security tag 52. The security tag 52 is perceptible as a slight bulge, but generally does not detract from the graphics or text on the inner liner.

In the illustrated embodiment, the hard cover product 50 attaches to an interior body, such as plastic matingly engagable plastic diskholders, configured for receiving compact discs or DVD discs. However, the interior body may be a bound assembly of papers for a book. Other shell devices that define an interior body for the hard cover product may be gainfully attached to the interior front and back covers, such as for packaging small articles, video tapes, books, ring binders, or other articles. For example, Figs. 8A and 8B illustrate a bound assembly 61 of paper sheets containing printed material to be bound in the hard cover product as a book. The bound assembly 61 attaches to the spine 22. In embodiment illustrated in Fig. 8A uses the sheet-like security tag 52, while the embodiment illustrated in Fig. 8B uses the security tag 24.

Fig. 6 illustrates the hard cover product 50 in which the outer liner 12 includes an indicia 62 such as a bar code or other product inventory number. In this embodiment, the recess 32 for the security tag 24 (or security tag 52 attached to the sheet 14) is disposed substantially in alignment with the indicia 62. In this way, a security tag detector deactivates the security tag when the hard cover product 30 is scanned for pricing, so that the product can be taken from a store without triggering alarms.

Fig. 7 illustrates an alternate embodiment of a hard cover product 70 that includes a three-ring binder assembly 72. In this embodiment, the sheet 14 receives one of the sheet-like security devices 52, although in an alternate embodiment, the sheet defining front (or back) cover includes the recess 32.

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Fig. 9 is a schematic illustration of an assembly line 90 for manufacturing hard cover products of the present invention discussed above. The assembly line 90 includes a supply hopper 92 that receives a stack 93 of interim assemblies of the hard cover product. A casing machine 94 operates to cut blanks of cardboard sheets to define the front and back cover bodies enclosed in the outer and inner liners. The casing machine 94 (such as a KOLBUS 232 case machine or similar equipment) also includes a rotatable cylinder 91 with a die cutter 95 for slitting open the recess 32. An interim assembly of the hard cover product includes the outer liner 12 attached to the sheets 14, 16. A label applicator 96 (such as a LABELAIRE or similar device) receives a supply of security tags 24 and positions one in the recess 32 or on the sheet 14 (for a sheet type security tag). Operation of the assembly line in a first stage of manufacture results in interim assemblies that are subsequently returned to the hopper for attaching the inner liner 18.

The assembly line 90 further includes an inner liner application station 97 in which the inner liner 18 is attached in overlying relation to the major surfaces of the sheets 14, 16 opposing the outer liner 12. A glue station 98 includes an adhesive applicator 100 for depositing a selected adhesive 101 to the inner liner 18. A casing applicator 102 includes a supply hopper 104 that holds a plurality of interior bodies or casings 103, such as the engageable shells 54, 56. A metering device 106 causes one of the casings 103 to be positioned on the spine 22. Opposing ploughs 108 guide the opposing front and back covers to pivot together to foldingly close the hard cover product. Rollers 110 bear against the opposing covers to close the hard cover product and to force the casing 103 into engaging contact with the adhesive. The completed, closed hard cover product then is received in a stacker 112 for packaging.

Accordingly, the manufacturing process in one embodiment comprises the steps of: (a) die cutting an aperture in a board of the turned edge or paper-lined product prior to wrapping the product or mounting a paper product to it; (b) mounting or attaching the printed cover material to a surface of the board; (c) placing a security sensor bar in the die cut aperture; (d) lining the exposed side of the board with an inner liner of a sheet material that may or may not be printed. This process places the security bar or device within the die cut aperture or cavity to eliminates covering up of the printing or printed matter on the cover or inner liner, reduces mechanical problems related to manufacturing with resultant cost savings, increases the difficulty for a person to remove the security tag without damaging the package or product itself, and allows placing the security bar at any position within the board of the hard cover product.

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As to RFID security stickers, the present invention provides a method and apparatus to fully conceal an RFID security sticker by applying the sheet-like RFID sticker to a selected position on a board used for a hard cover product either prior to case making the cover or after case making and prior to lining the cover product with a printed cover stock, and thereby concealing the RFID sticker so it has reduced visibility in the completed product. The RFID security device is placed in the product to have reduced visibility to a casual eye while eliminating the covering up of the printed or decorated product. Manufacturing problems are reduced with resultant cost savings. The concealed security device is difficult to remove without severely damaging the product or package itself.

B. Intermediate laminated cover board for hard cover product and manufacturing of same.

While the hard cover product 10 described above provides the enclosed and concealed security sensor 24, the exterior surfaces of the outer liner 12 and the inner liner 18 tend to include indications of the presence of the security sensor contained therein. These indications include a subtle but noticeable border defined by the edge of the recess 32, a shallow depression in the outer liner 12 or the inner liner 18 in the proximity of the recess, or a shallowly bulging portion proximate to the recess. The present invention provides in another aspect as illustrated in Fig. 10, an intermediate laminated cover board 120 that does not display surface indications of the presence of the security sensor or device 32 enclosed within a hard cover product 122 assembled using the intermediate laminated cover board. The hard cover product 122 includes the outer liner 12, a cover board 124, the intermediate laminated cover board 120 disposed spaced apart therefrom, and an inner liner 18. The cover board 124 and the intermediate laminated cover board 120 overlaid with the outer liner 12 and the inner liner 18 define front and back covers for the hard cover product, such as a book, a binder, a disc enclosure, or the like product having an interior body. A gap between the spaced apart cover board 124 and intermediate laminated cover board 120 define a spine for the hard cover product 122 that closes by folding the opposing cover boards along line defined by the spine.

With reference to Figs. 11 and 12, the intermediate laminated cover board 120 (illustrated in perspective cut-away view and perspective exploded view, respectively), is gainfully used for assembling hard cover products 122. The intermediate laminated cover board 120 includes a primary or central sheet 130 having opposing planar surfaces 132, 134 with a length and width exceeding a first thickness 136. The central sheet 130 further defines an opening 138 through the central sheet. The opening 138 is formed by a die cutter such as a

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roller with an extending die that bears upon the cover board as it moves past the roller on a conveyor. The opening 138 is formed in a selected portion of the cover board, and particularly so that the outer cover 12 can be printed with an indicia such as a bar code that also directs the positioning of a security canceling device such as the scanners used at store checkout registers.

The security device 32 is received in the opening 138. In the illustrated embodiment, the security device 32 has a thickness generally no greater than about a substantial majority of the thickness of the central sheet 130, so that opposing sides of the security device 32 are substantially co-planar with respective ones of the opposing planar surfaces 132, 134 of the central sheet, as best illustrated in cross-sectional view in Fig. 13, taken along line 13 – 13 of Fig. 10.

A pair of opposing exterior sheets 142, 144 attach with an adhesive as a lamination to respective opposing planar surfaces 132, 134 of the central sheet 130. The exterior sheets 142, 144 each have a respective second thickness that less than the first thickness 136. The laminated exterior sheets 142, 144 thereby enclose the security device 32 in the opening 138 and between the exterior sheets. The thickness of the exterior sheets 142, 144 is sufficiently sized so that the laminated intermediate cover board 120 does not display surface indications of the presence of the security device 32. The security device 32 thereby enclosed in the central sheet 130 is concealed from casual indication of its presence.

The central board 130, as well as the exterior boards 142, 144 are made of a semi-rigid sheet material, such as chip board, pasted chip board, card board, grey fibreboard, or the like material used for cover boards for books, backings for note pads, and the like products.

With reference to Figs. 11 – 13, the center board 130 and the exterior boards 142, 144 intermediate together to produce the laminated board 120 for subsequent use as a component of hard cover products. The central sheet 130 is provided with the opening 138 such as by a die cutter extending through the opposing surfaces in the selected portion. The exterior sheet 144 then laminates with an adhesive to the planar surface 134. This closes the opening 138 on one side. The security device 32 is positioned in the opening 138. As illustrated in Fig. 13, the security device 32 preferably has a thickness no greater than about a substantial majority of the thickness of the central sheet 130 so that opposing sides are no more than substantially co-planar with the opposing planar surfaces 132, 134 of the central sheet. The second exterior sheet 142 laminates to the planar surface 132 to enclose the security device 32 and to form an intermediate laminated board 130 that does not display on the opposing surfaces defined by the exterior sheets indications of the presence of the security device in the intermediate laminated board 130.

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In an example, the central board 130 has a length of 7 ½ inches, a width of 5 ¾ inches, and a thickness of 0.060 inches. The opening 138 is cut 1 inch from the head of the central board 130 and is centered laterally. A commercially available type of security device has a thickness of about 0.056 inches. The exterior boards 142, 144 conform in length and width to the central board, and have a thickness of about 0.010 inches. In an alternate embodiment, the central board 130 can be left open on one side, by using one exterior board having a thickness of about 0.020 inches, which may be a less expensive embodiment of the invention. Other embodiments are readily apparent to those of ordinary skill in the art of forming hard cover products.

With reference to Fig. 10, the intermediate laminated cover board 130 readily assembles with the cover board 124, the outer cover 12, and the inner cover 18, as discussed above to form the foldable hard cover product 122 to enclose the security device 32 while not having casually observable surface indications as to the security device.

Fig. 14 illustrates in perspective cut-away view an alternate embodiment of a intermediate laminated cover board 150 using a sheet-type security device such as the planar radio frequency tag 52 while not displaying surface indications of the presence the security device. Fig. 15 illustrates in cross-sectional exploded side view the intermediate laminated cover board 150 which defines a shallow recess 154. The recess 154 has a bottom surface and is formed in the cover board by a deboss process. The recess 154 results from passing the cover board 152 between a roller having a projection and a pressure plate, which projection compresses the selected portion of the cover board in order to define the shallow recess 154 therein. The recess 154 thereafter receives one of the planar radio frequency tags 52. The depth of the deboss recess 154 is about the thickness of the radio frequency tag 52, but generally is sufficiently compressed so that an exterior surface of the radio frequency tag 52 is coplanar or recessed relative to a surface of the cover board 152 around the recess. A liner board 156 attaches with adhesive in overlaying relation and enclosing the radio frequency tag 52 in the recess with little if any exterior surface indication of the presence of the security device enclosed within the laminated structure. It is to be appreciated that with respect to Fig. 15, the security sensor (radio frequency tag 52) is totally concealed before a cover 12 and inner liner 18 are applied. The intermediate cover board 150 may also be supplied to a manufacturer of hard cover products (such as a book binder) without the laminated cover liner 156 for application by the binder of the cover 12 and liner 18. This alternate embodiment with the recess 154 may have slight surface indications of the security tag after application of the cover 12.

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Fig. 16 illustrates in perspective exploded view an alternate embodiment of an intermediate cover board 160 that accommodates a combination security device 166. The cover board 160 defines a slot 162 and an adjacent recess 164. The slot 162 is die cut through the cover board 160 while the recess 164 is debossed therein as discussed above. The combination security device 166 includes a backing sheet 168 with an acoustic magnetic security bar 170 and a planar radio frequency tag 172. A perimeter portion of the combination security tag 166 includes an adhesive coating 173.

For purposes of illustration, Fig. 16 illustrates the combination security tag 166 with the security bar 170 and the planar radio frequency tag 172 disposed in a direction away from the cover board 160. When installed, the combination security device 166 is disposed towards the cover board 160 with the security bar 170 received in the slot 162 and planar sheet radio frequency tag 172 disposed in the recess 164, respectively. The adhesive coating 173 on the perimeter secures the combination security tag 166 in place. While not illustrated, it is to be appreciated with reference to Fig. 11 and 12 that the combination security tag 166 can be enclosed by laminating a cover liner 142 to the cover board 160, and further in an alternate embodiment, a pair of opposing cover boards 142, 144 can be laminated to opposing sides of the cover board 160. The embodiment illustrated in Fig. 16 is gainfully used in facilities (such as stores or libraries, as examples) having one or both of such security detection devices. The intermediate cover board 160 including the security device 166 is provided to manufacturers of hard cover products for applying cover liners 12 and inner liners 18. The resulting hard cover product has reduced surface indications of the presence of the hidden enclosed security device or with the cover liner 142, 144, the product lacks observable indications of the enclosed security device. The manufacturer of hard cover products can select an embodiment having the cover liners 142, 144, or the single layer intermediate cover board.

Fig. 17 illustrates in perspective cut-away view a laminated multi-ply board 320 having at least two layers 322, 324 of a board stock material and sandwiching within the laminated board a security device 52 and including an aligned index mark 326 as to the location of the security device 52 in accordance with the present invention. While the board 320 may include the security device 24, the laminated multi-ply board preferably uses the sheet-like security device 52. The board 320 provides an intermediate product useful in assembly of hard cover products such as those discussed above. The board 320 includes the index mark 326 on the exterior surface of the layer 322 for alignment of the intermediate product in casing machines and other equipment during the subsequent book casing manufacture process, such as for proper

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orientation of the board 320 to align with the indicia 62 of the outer cover sheet 12. In one embodiment, the board layers 322, 324 are 40 point chip boards that are pasted together with an adhesive to form a substantially 80 point board commonly used in book casing operations.

Fig. 18 is a schematic illustration of a manufacturing process to make the laminated multi-ply board 320 illustrated in Fig. 17. A supply roll 330 provides a continuous feed of the first layer 322. An applicator 332 applies the security device 52 from a supply 333 to a surface of the layer 322 while a marker 334 applies the index mark 326 simultaneously to an opposing side of the layer 322. The security device is illustrated in exaggerated size for illustration purposes. The marker 334 moves from a retracted position to a marking position in sequence with the applicator 332 placing the security device. A adhesive sprayer 336 communicates with a supply 338 and applies a spray of an adhesive to the surface of the layer 322. A second supply roll 340 provides a continuous feed of the second layer 324 past appropriate guide rolls 342. Crimp rollers 344, 346 compress the first and second layers 322, 324 together sandwiching the security device. A knife 348 periodically moves against an anvil 350 to separate discrete laminated boards 320 from the continuous feed. A stacker 352 collects the separated boards 320 for packaging or transfer to a casing line.

C. Hard cover product with spine-disposed concealed security device.

Fig. 19 is a perspective exploded view of a hard cover book 230 having an outer liner 12 with the spaced-apart hard cover sheets 14, 16. Perimeter edge portions of the outer liner 12 overlap the outer edges of the sheets 14, 16. The sheets 14, 16 are spaced apart and attached to an inner surface of the outer liner 12. This defines the gap 22 for a spine 232 or back of the hard cover book 230. The security sensor 24 attaches with adhesive to the face of the inner liner in a selected position in the spine portion 232. A book block 234 made of a bound assembly of printed pages 236 for the book attaches conventionally to the spine 22 and the covers 14, 16 of the book 230. The book block or body 234 includes a plurality of pages 236 bound conventionally together at a back portion 238 that defines the spine or back of the book block 234.

With reference to Fig. 19A showing a back perspective partially cut-away view of the book 230, the front cover 12 includes a preprinted bar code 240. The sensor device 24 attaches to the spine 132 in opposed alignment with the bar code 240. This facilitates use of pricing scanners/sensor deactivators that read the bar code for inventory control and pricing while deactivating the security device, for example, by a cashier at a payment or checkout station, as well as for use by a library for tracking its book inventory.

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In the embodiment illustrated in Fig. 19, the sensor device 24 attaches to the inner surface of the outer cover 12. Fig. 20 is a perspective view of a second embodiment of a hard cover book 246. In this embodiment, the spine 22 is defined by the spaced apart hard cover sheets 14, 16, as well as a spine member 248. The spine member 248 defines gaps 250, 252 relative to the adjacent edges of the hard cover sheets 14, 16 for folding the hard covers towards each other to close the book 146. The security device 24 attaches to the spine member 248. It is to be appreciated that the spine member 248 in an alternate embodiment includes a recess such as the recess 32 formed in the sheet 14, for receiving the security device 24.

Fig. 21 is a back perspective partially cut-away view of a third embodiment of a hard cover book 260 in which a substantially planar radio frequency tag 52 attaches to the spine 238 of the book block 234 prior to attachment of the book body to the spine 232.

With reference to Figs. 19 – 21, the hard cover book products 230, 246 and 260 each have a spine portion that concealingly holds a security device such as the security sensor 24, the radio frequency tag 52, or the like remotely interrogated sensor within the spine portion. As illustrated in these embodiments, the security device is readily disposed on an inner surface of the spine 232 opposing the back 238 of the book block 234, on (or in a recess in) the spine member 248, or on the back 238 of the book block 234. The hard cover book products are readily manufactured in accordance with conventional book binding processes with the addition of a label depositing apparatus in an appropriate portion of the manufacturing line. The embodiments illustrated in Figs. 19 and 20 provide the label depositing apparatus in the manufacturing line for assembly of the cover for the hard cover book product. The embodiment illustrated in Fig. 19 provides for attaching the security device to the back 238 of the book body during assembly of the book body to the cover during conventional casing in line.

Casing in line involves securing the book body to the cover typically with adhesive. A belt conveyor for casing in line carries the book block with the spine upwardly disposed. Rollers apply glue to the front and back end sheets of the book block and the back for attaching a fiberboard or Kraft paper liner on the spine. In the embodiment illustrated in Fig. 21, the label-attaching device deposits a security device to the back selectively before or after attaching the fiberboard liner on the spine. The cover is then overlaid on the book block 234, and the spine 22 keeps the cover in place relative to the book block. The front and back covers are moved into contact with the adhesive on the interior surfaces of the sheets 14, 16. A building-in device having heated pressure plates closes against the front and back of the book sandwiching

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the assembly of the cover and the book block to cure the adhesive. The assembled book products are stacked and packaged for shipment and storage.

This specification has described the present invention that provides a hard cover product with a concealed security device, the intermediate laminated cover board and method useful in making such hard cover products with concealed security devices, and a hard cover product with a security device concealed within the spine, including the steps necessary for making and using various embodiments thereof. It is to be understood, however, that numerous changes and variations may be made in the construction of the present hard cover product within the spirit and scope of the present invention, and that modifications and changes may be made therein without departing from the scope thereof as set forth in the appended claims.

CLAIMS

What is claimed is:

1. A hard cover product, comprising:
an outer liner;
a pair of hard sheet members disposed in spaced-apart relation to define a gap and attached to a major surface of the outer liner,
one of the hard sheet members defining a receiving zone;
a security tag received within the receiving zone;
an inner liner attached overlying the pair of hard sheet members and concealing the security tag within the security tag receiving zone; and
the gap between the pair of hard sheet members defining a spine for the hard cover product, whereby the opposing hard sheet members defining a front cover and back cover that move together foldably.
2. The hard cover product as recited in claim 1, wherein the outer line further defines a coded indicia displayed on a portion of the exterior surface.
3. The hard cover product as recited in claim 2, wherein the receiving zone is in substantial alignment with the coded indicia on the exterior surface of the outer liner.
4. The hard cover product as recited in claim 1, wherein the receiving zone is a slot defined in one of the hard sheet members.
5. The hard cover product as recited in claim 4, wherein the slot is of a depth such that the security tag is recessed relative to a major surface that attaches to the inner liner.
6. The hard cover product as recited in claim 1, wherein the security tag is a sheet-like electronic response device.
7. The hard cover product as recited in claim 1, wherein the outer liner has an exterior surface that includes graphics images.

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8. The hard cover product as recited in claim 1, wherein a perimeter portion of the outer liner overlaps and attaches to laterally outward edge portions the pair of sheet members.

9. The hard cover product as recited in claim 1, further comprising an interior body attached to the spine.

10. The hard cover product as recited in claim 1, wherein the interior body comprises a shell configured for receiving a disc.

11. The hard cover product as recited in claim 1, wherein the interior body comprises a plurality of pages that define a loose-leaf book.

12. The hard cover product as recited in claim 1, wherein the interior body comprises a ring member for receiving sheets.

13. A hard cover product, comprising:
an outer liner having an exterior surface that includes graphics images and a coded indicia;
a pair of opposing hard sheet members disposed in spaced-apart relation to define a gap and attached to an inner surface of the outer liner, a perimeter portion of the outer liner overlapping laterally outward edge portions of the pair of hard sheet members;
one of the hard sheet members defining a open slot in substantial alignment with the coded indicia on the exterior surface of the outer liner;
a security tag received within the slot, the slot of a depth such that the security tag is recessed relative to a major surface of the one of the hard sheet members;
an inner liner overlying the pair of hard sheet members and concealing the security tag within the slot; and
the gap between the pair of hard sheet members defining a spine for the hard cover product.

14. The hard cover product as recited in claim 13, further comprising an interior body attached to the spine.

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15. The hard cover product as recited in claim 14, wherein the interior body comprises opposing matingly engageable shells for receiving a disc, each one of the shells attached to a respective interior surface of the front and back covers.

16. The hard cover product as recited in claim 14, wherein the interior body comprises a plurality of pages that define a loose-leaf book.

17. The hard cover product as recited in claim 14, wherein the interior body comprises a ring member for receiving sheets.

18. A method of making a hard cover product, comprising the steps of:

(a) forming a recess in a first sheet;

(b) attaching an outer liner to a major surface of the first sheet and to a second sheet spaced apart therefrom to define a gap therebetween, the first sheet and the second sheet defining a front and back cover;

(c) depositing a security tag within the recess;

(d) attaching an inner liner in overlying relation to the first and second sheets, the gap defining a spine on which the opposing front and back covers pivot towards each other.

19. The method as recited in claim 18, further comprising the step of (e) attaching an interior body to the spine.

20. An intermediate laminated cover board for hard cover products, comprising:

a primary sheet having a first thickness and opposing planar surfaces and defining a receiving cavity in a selected portion of the sheet;

a security device received in the receiving cavity;

a pair of opposing secondary sheets each having a second thickness less than the first thickness laminated to the opposing planar surfaces of the primary sheet,

whereby the security device is enclosed between the laminated secondary sheets of the second thickness sufficient that the assembled intermediate laminated cover board does not display surface indications of the presence of the security device therein.

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21. The intermediate laminated cover board as recited in claim 20, wherein the security device has a thickness no greater than about a substantial majority of the thickness of the primary sheet.

22. The intermediate laminated cover board as recited in claim 20, wherein the security device is aligned in the receiving cavity such that opposing surfaces thereof are substantially co-planar with the planar surfaces of the primary sheet.

23. The intermediate laminated cover board as recited in claim 20, wherein the primary sheet and the secondary sheets are of a flexible material.

24. The intermediate laminated cover board as recited in claim 23, wherein flexible material is chip board.

25. The intermediate laminated cover board as recited in claim 23, wherein the flexible material is cardboard.

26. The intermediate laminated cover board as recited in claim 20, wherein the receiving cavity comprises a die-cut opening and the security device has a thickness no greater than about a substantial majority of the thickness of the primary sheet.

27. The intermediate cover board as recited in claim 26, wherein the security device is aligned in the opening such that opposing outward surfaces thereof are substantially co-planar with the planar surfaces of the primary sheet.

28. The intermediate cover board as recited in claim 20, wherein the receiving cavity comprises a debossed recess and the security device comprises a sheet member having a thickness no greater than about a substantial majority of the depth of the debossed recess relative to a majority planar portion of the primary sheet.

29. The intermediate cover board as recited in claim 28, wherein the security device is aligned in the debossed recess such that an outward surface thereof is substantially co-planar with a planar surface of the primary sheet.

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30. An intermediate laminated board for assembling hard cover products, comprising:
a central sheet having opposing planar surfaces with a length and width exceeding a first thickness, the central sheet defining an opening therethrough in a selected portion thereof;
a security device received in the opening, the security device having a thickness no greater than about a substantial majority of the thickness of the central sheet so that opposing sides thereof are substantially co-planar with respective ones of the opposing planar surfaces of the central sheet;
a pair of opposing exterior sheets, each having a respective second thickness less than the first thickness laminated to the opposing planar surfaces of the central sheet and thereby enclosing the security device therebetween, the second thickness sufficiently sized so that the laminated board does not display surface indications of the presence of the security device therein,
whereby the security device enclosed in the central sheet is concealed from casual indication of its presence.

31. The intermediate laminated cover board as recited in claim 30, wherein the central sheet and the exterior sheets are of a semi-rigid material.

32. The intermediate laminated cover board as recited in claim 21, wherein semi-rigid material is chip board.

33. The intermediate laminated cover board as recited in claim 31, wherein the semi-rigid material is cardboard.

34. A method of assembling an intermediate laminated board for subsequent use as a component of hard cover products, comprising the steps of:

(a) providing a primary sheet having opposing planar surfaces with a length and width exceeding a first thickness, the primary sheet defining an opening therethrough in a selected portion thereof;

(b) laminating a first exterior sheet to a first of the opposing planar surfaces and closing the opening in the primary sheet;

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(c) positioning a security device in the opening, the security device having a thickness no greater than about a substantial majority of the thickness of the central sheet so that opposing sides thereof are no more than substantially co-planar with respective ones of the opposing planar surfaces of the central sheet; and

(d) laminating a second exterior sheet to the second of the opposing planar surfaces to form an intermediate laminated board that does not display on the opposing surfaces defined by the exterior sheets indications of the presence of the security device therein.

35. A hard cover product having an outer cover sheet adhesively attached to a first planar surface of a pair of cover boards disposed in spaced-apart relation, a first one of the pair of cover boards comprising an intermediate laminated board made in accordance with the method of claim 34, and an inner liner sheet adhesively attached to respective opposing second planar surfaces of the cover boards to form a covered product.

36. The hard cover product as recited in claim 35, wherein the outer cover sheet carries an indicia disposed in alignment with the selected portion of the primary sheet, whereby a security canceling device is readily positioned in alignment with the concealed security device.

37. An intermediate board made in accordance with the method as recited in claim 34 for use as one of a pair of cover boards disposed in spaced-apart relation to form a hard cover product.

38. A hard cover product, comprising:

an outer liner;

a pair of cover boards disposed in spaced-apart relation to define a spine for a hard cover product while defining opposing cover boards therefor and attached on opposing major surfaces to a major surface of the outer liner;

at least one of the cover boards comprising:

a central sheet having opposing planar surfaces with a length and width exceeding a first thickness, the central sheet defining an opening therethrough in a selected portion thereof;

a security device received in the opening, the security device having a thickness no greater than about a substantial majority of the thickness of the central sheet so that opposing

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sides thereof are substantially co-planar with respective ones of the opposing planar surfaces of the central sheet; and

a pair of opposing exterior sheets, each having a respective second thickness less than the first thickness laminated to the opposing planar surfaces of the primary sheet and thereby enclosing the security device therebetween, the second thickness sufficiently sized so that the laminated board does not display surface indications of the presence of the security device therein,

whereby the security device enclosed in the central sheet is concealed from casual indication of its presence; and

an inner liner attached in overlying relation to the opposing planar surfaces of the cover boards,

whereby the opposing cover boards define a front cover and back cover that move together foldably along lines defined by opposing sides of the spine for the hard cover product.

39. The hard cover product as recited in claim 38, wherein the outer liner defines a coded indicia that is displayed on a portion thereof in alignment with the selected portion of the central sheet.

40. The hard cover product as recited in claim 38, wherein the security tag is a sheet-like electronic response device.

41. The hard cover product as recited in claim 38, further comprising an interior body attached to the spine.

42. The hard cover product as recited in claim 41, wherein the interior body comprises a shell configured for receiving a disc.

43. The hard cover product as recited in claim 41, wherein the interior body comprises a plurality of pages bonded together along a side edge to define a book.

44. The hard cover product as recited in claim 41, wherein the interior body comprises a ring member for receiving sheets.

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45. An intermediate cover board for hard cover products, comprising:
a primary sheet having a first thickness and opposing planar surfaces and defining a receiving cavity in a selected portion of the sheet; and
a security device received in the receiving cavity,
whereby the security device is disposed within the cavity of the primary sheet for overlay by a cover liner during manufacture of a hard cover product.

46. The intermediate cover board as recited in claim 45, further comprising at least one secondary sheet having a second thickness less than the first thickness laminated to one of the opposing planar surfaces of the primary sheet,
whereby the cover board, overlaid on one side by the laminated secondary sheet, does not display surface indications of the presence of the security device therein.

47. The intermediate cover board as recited in claim 45, wherein the primary sheet and secondary sheet are made of a semi-rigid material.

48. The intermediate cover board as recited in claim 47, wherein semi-rigid material is chip board.

49. The intermediate cover board as recited in claim 47, wherein the semi-rigid material is cardboard.

50. The intermediate cover board as recited in claim 45, wherein the receiving cavity comprises a die-cut opening and the security device has a thickness no greater than about a substantial majority of the thickness of the primary sheet.

51. The intermediate cover board as recited in claim 50, wherein the security device is aligned in the opening such that opposing outward surfaces thereof are substantially co-planar with the planar surfaces of the primary sheet.

52. The intermediate cover board as recited in claim 45, wherein the receiving cavity comprises a debossed recess and the security device comprises a sheet member having a thickness no greater than about a substantial majority of the depth of the debossed recess relative to a majority planar portion of the primary sheet.

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53. The intermediate cover board as recited in claim 52, wherein the security device is aligned in the debossed recess such that an outward surface thereof is substantially co-planar with a planar surface of the primary sheet.

54. The intermediate cover board as recited in claim 52, further comprising at least one secondary sheet having a second thickness less than the first thickness laminated to one of the opposing planar surfaces of the primary sheet,

whereby the cover board, overlaid on one side by the laminated secondary sheet, does not display surface indications of the presence of the security device therein.

55. The intermediate cover board as recited in claim 54, wherein the primary sheet and secondary sheet are made of a semi-rigid material.

56. The intermediate cover board as recited in claim 55, wherein semi-rigid material is chip board.

57. The intermediate cover board as recited in claim 55, wherein the semi-rigid material is cardboard.

58. The intermediate cover board as recited in claim 45, wherein the primary sheet is made of a semi-rigid material.

59. The intermediate cover board as recited in claim 58, wherein semi-rigid material is chip board.

60. The intermediate cover board as recited in claim 58, wherein the semi-rigid material is cardboard.

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61. A hard cover book product, comprising:
an outer liner;
a pair of hard sheet members attached to a major surface of the outer liner and disposed in spaced-apart relation to define a spine portion therebetween, the hard sheet members foldingly movable towards each other along edges with the outer liner;
a security tag attached within the spine portion; and
a body portion attached to the hard sheet members,
for tracking the hard cover product by the security tag responsive to a remote interrogator.

62. The hard cover product as recited in claim 61, further comprising a spine member attached to the outer liner in the spine portion between the spaced-apart members and defining lateral gaps between the respective hard sheet member and a side edge of the spine member.

63. The hard cover product as recited in claim 62, wherein the security tag attaches in the spine portion between the outer liner and the spine member.

64. The hard cover product as recited in claim 62, wherein the security tag attaches in the spine portion between the spine member and the body.

65. The hard cover product as recited in claim 62, further comprising an inner liner attached overlying the pair of hard sheet members and the spine member concealing the security tag within the spine portion.

66. The hard cover product as recited in claim 61, wherein the outer line further defines a coded indicia displayed on a portion of the exterior surface.

67. The hard cover product as recited in claim 66, wherein the security tag is disposed in substantial alignment with the coded indicia.

68. The hard cover product as recited in claim 61, wherein the security tag is a sheet-like electronic response device.

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69. The hard cover product as recited in claim 61, wherein the body comprises a shell configured for receiving a disc.

70. The hard cover product as recited in claim 61, wherein the body comprises a plurality of pages that define a loose-leaf book.

71. The hard cover product as recited in claim 61, wherein the body comprises a ring member for receiving sheets.

72. A hard cover book product, comprising:
an outer liner having an exterior surface that includes graphics images and a coded indicia;
a pair of opposing hard sheet members disposed in spaced-apart relation to define a spine portion in a gap therebetween and the hard sheet members attached to an inner surface of the outer liner, a perimeter portion of the outer liner overlapping laterally outward edge portions of the pair of hard sheet members;
a security tag attached within the spine portion;
an inner liner overlying the pair of hard sheet members and concealing the security tag within the spine portion; and
a body received within a space defined by the main sheet members folding together to define a front and back cover,
whereby the hard cover book product is trackable by a remote interrogator that senses a response by the security tag to a signal.

73. The hard cover product as recited in claim 72, wherein the body comprises opposing matingly engageable shells for receiving a disc, each one of the shells attached to a respective interior surface of the front and back covers.

74. The hard cover product as recited in claim 72, wherein the body comprises a plurality of pages that define a loose-leaf book.

75. The hard cover product as recited in claim 72, wherein the body comprises a ring member for receiving sheets.

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76. A method of making a hard cover product, comprising the steps of:

- (a) attaching an outer liner to a major surface of a first cover sheet and to a second cover sheet disposed in spaced apart relation to define a spine portion in a gap therebetween, the first cover sheet and the second cover sheet foldable on the inner liner towards each other along lines defined by a respective inner edge of the first and second cover sheet;
- (b) attaching a security tag within the spine portion; and
- (c) attaching an inner body in overlying relation to the first and second cover sheets.

77. A method of making an intermediate board for a hard cover product, comprising the steps of:

- (a) providing a continuous feed of a first layer of a sheet material;
- (b) attaching a security device to a selected position on a first surface of the sheet material;
- (c) applying an index mark to an opposing second surface of the sheet material in alignment with the security device;
- (d) applying an adhesive to the first surface;
- (e) providing a continuous feed of a second layer of sheet material in overlying relation to the first surface of the first layer;
- (f) laminating the first and the second layers to sandwich the security device therebetween; and
- (g) cutting discrete boards each containing at least one security device from the continuous feed of the first and the second layers of sheet material.

Fig. 1
Prior Art

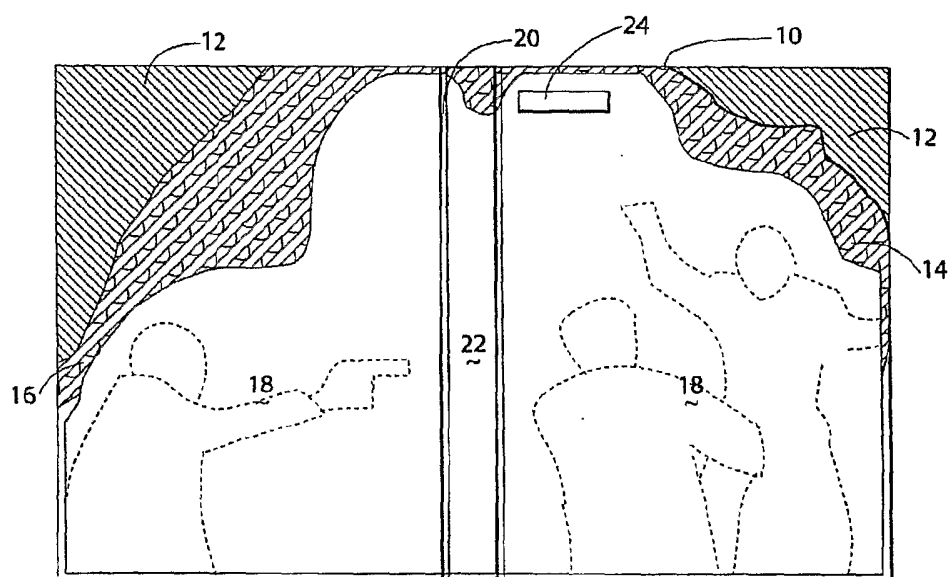


Fig. 2
Prior Art

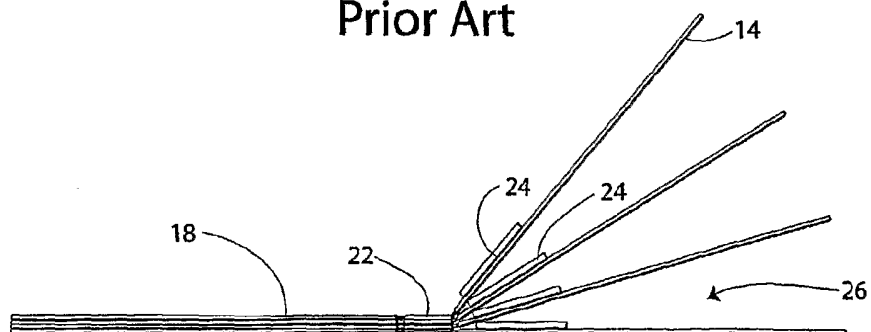


Fig. 3

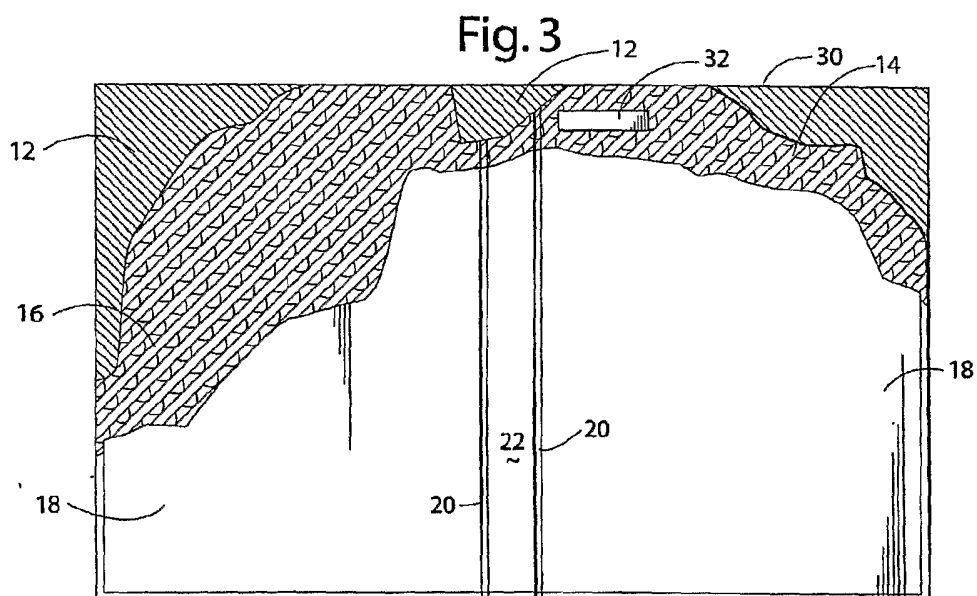


Fig.4

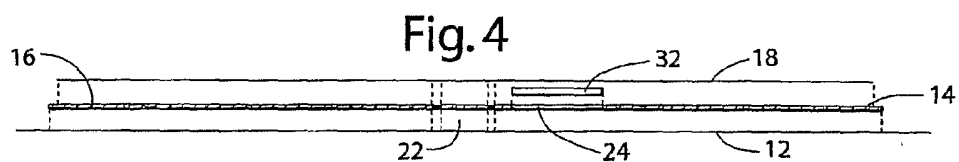


Fig. 5

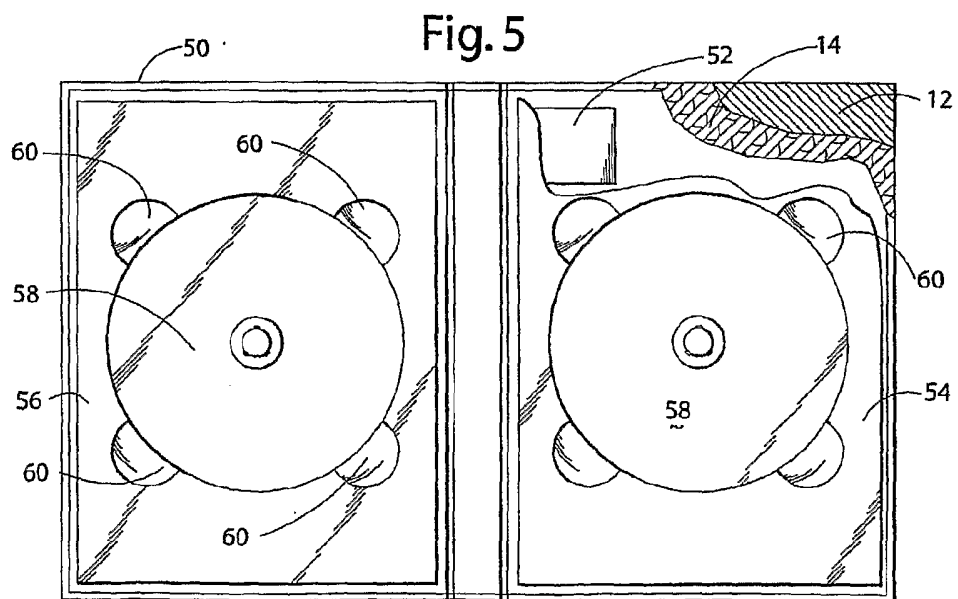


Fig. 6

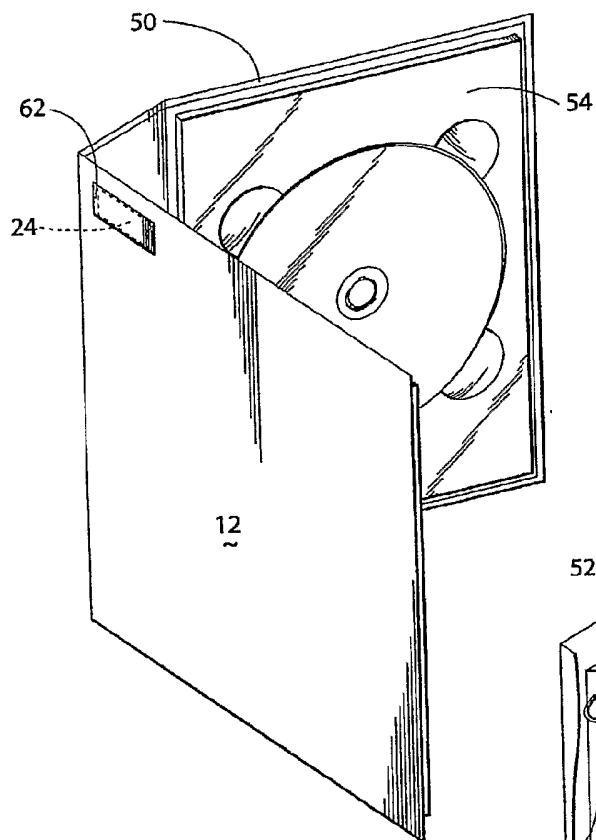


Fig. 7

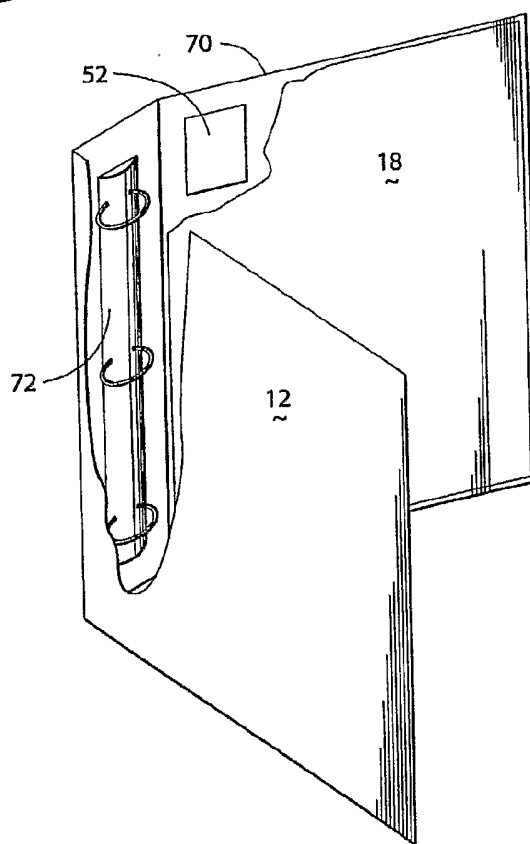


Fig. 8A

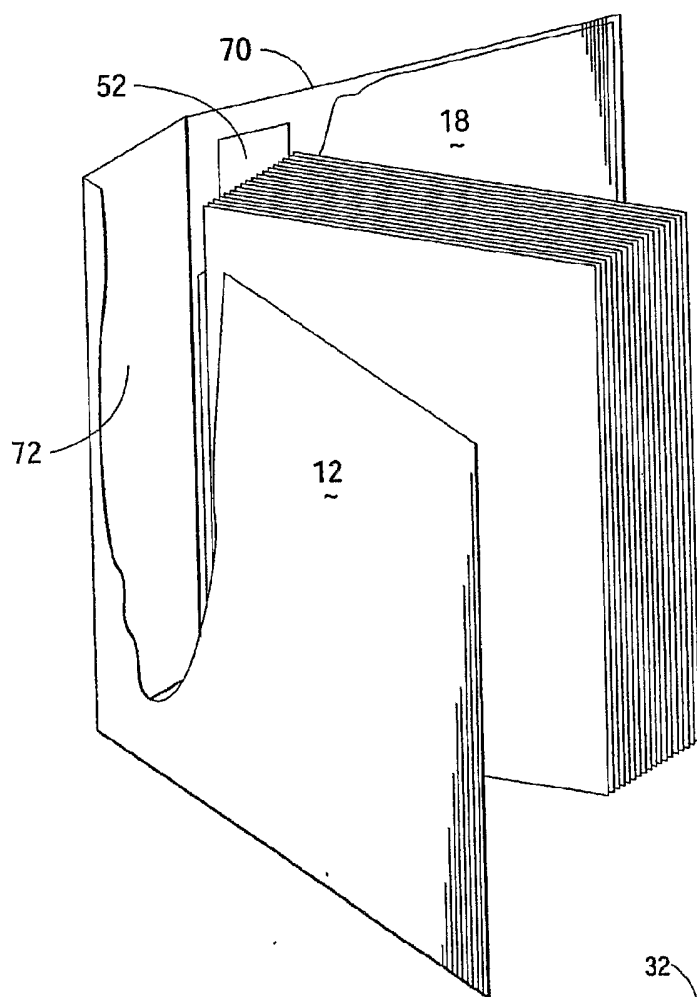


Fig. 8B

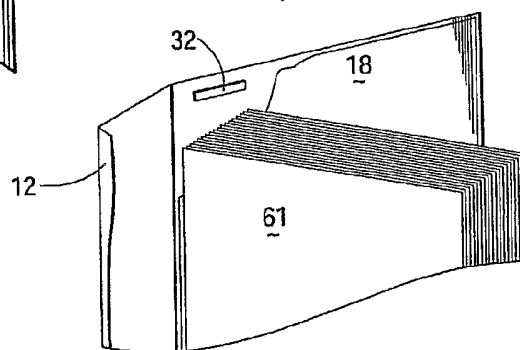


Fig.9

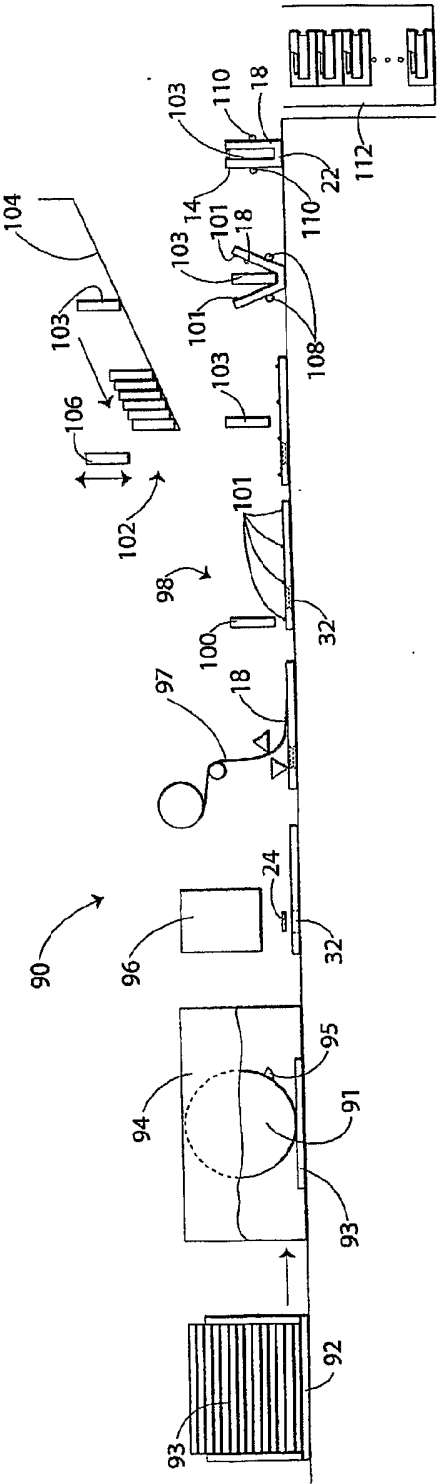


Fig. 10

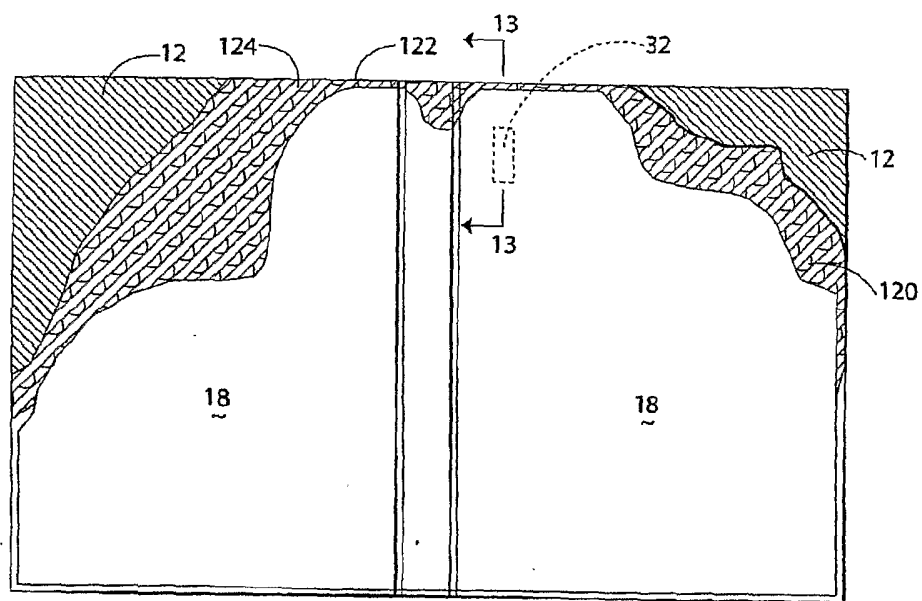


Fig. 11

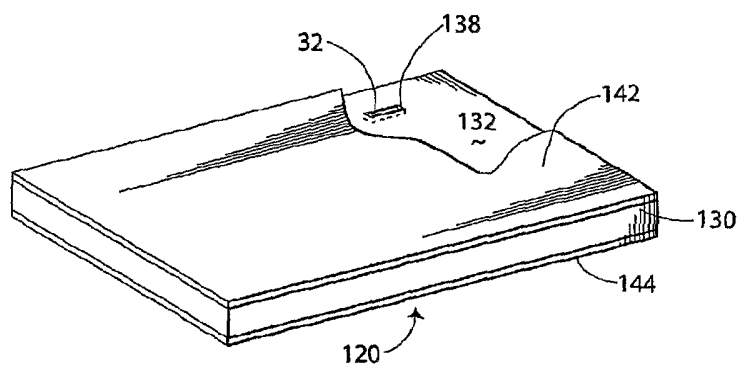


Fig. 12

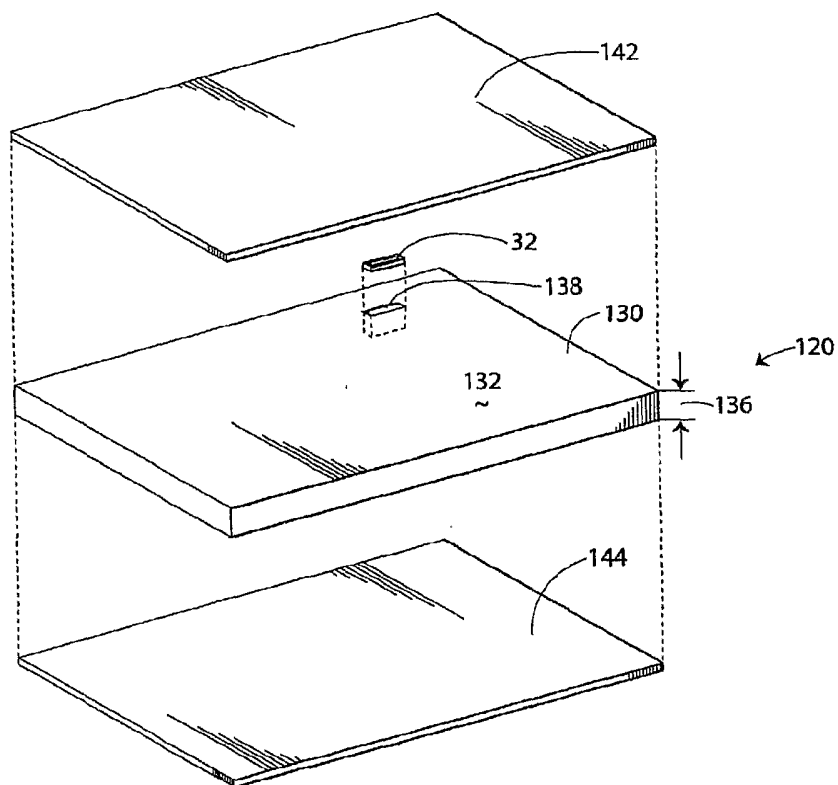


Fig. 13

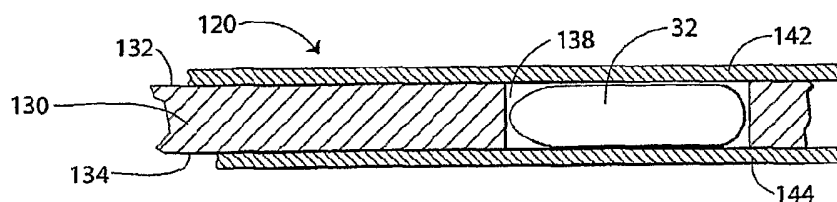


Fig. 14

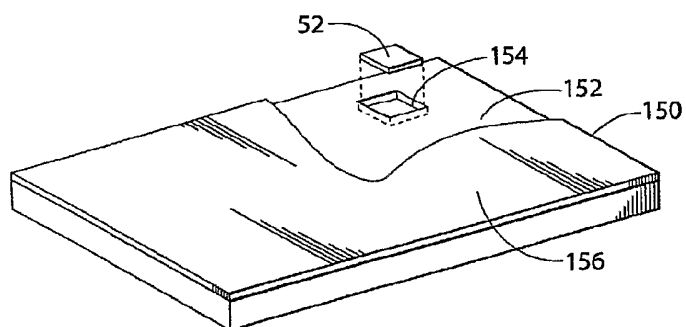


Fig. 15

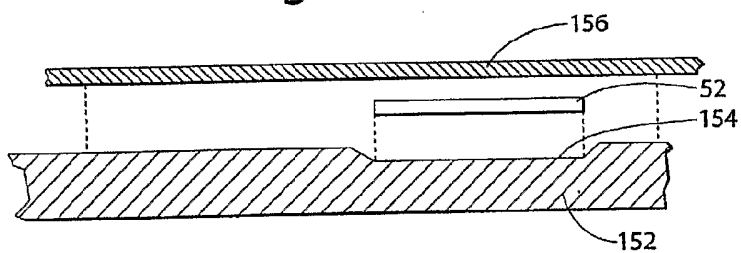


Fig. 16

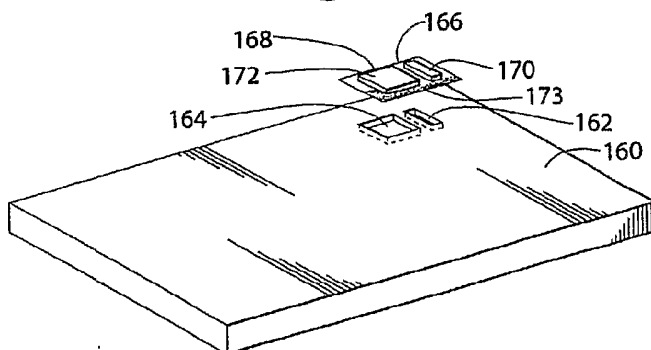


Fig. 17

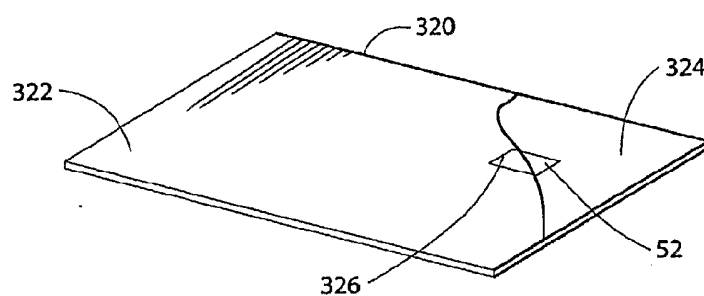


Fig. 18

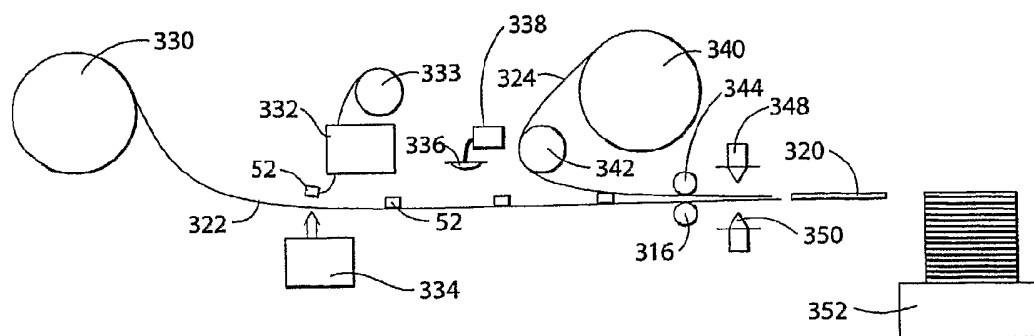


Fig. 19

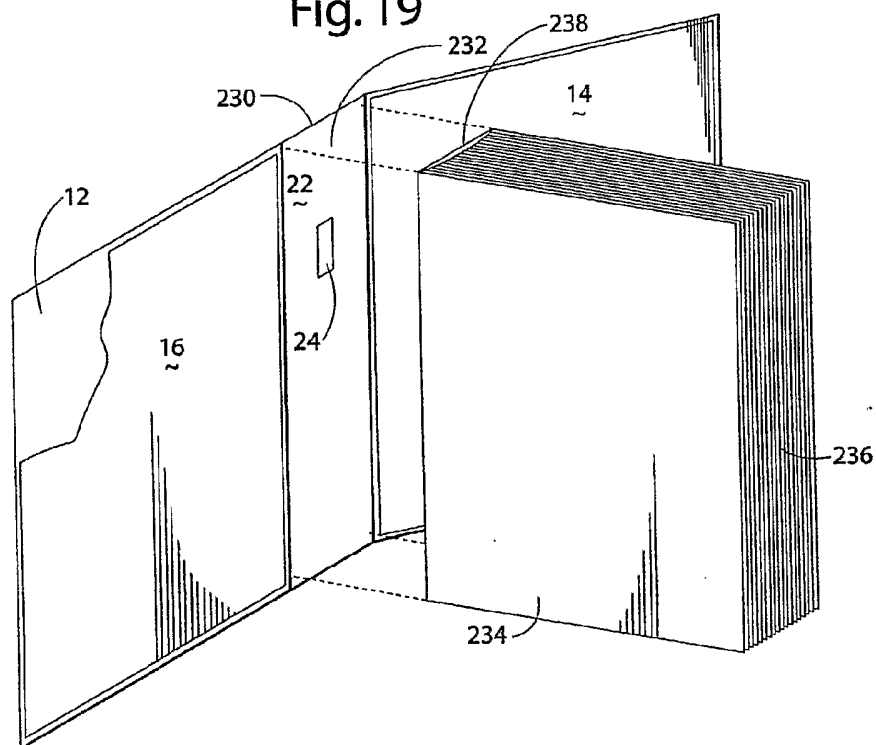


Fig. 19A

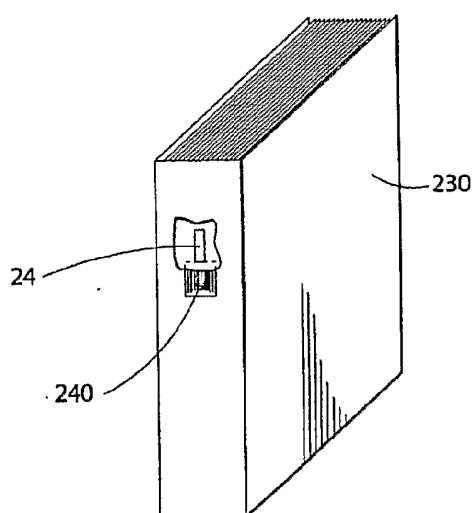


Fig. 20

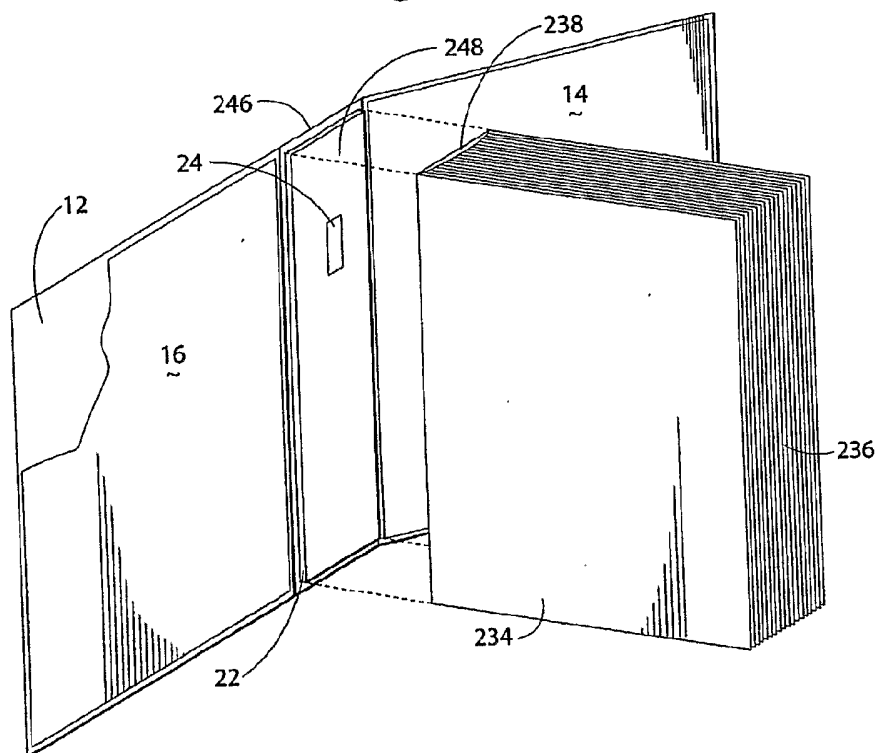


Fig. 21

