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removal by a purchaser also causes problems. The covering to which the security tag attaches may become torn or ripped. The package with the security tag, or without such by removal, is unattractive. The security tag may also overlie or cover over ornamental graphics or text on the packaging.

- 5 Also, importantly, the attachment of an electronic security tag to an interim assembly of an article during manufacture lead to production and handling problems. 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
- 10 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
- 15 a hopper for processing and applying the inner liner.

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

SUMMARY OF THE INVENTION

According to a first aspect of the present invention, there is provided a hard cover product, comprising: an outer liner; a pair of cover boards pre-cut to a selected size and each attached on a first respective major surface to a major surface of the outer liner in spaced-apart relation to define a spine for a hard cover product while defining opposing front cover and back cover therefor; at least one of the cover boards comprising a sheet having opposing planar surfaces with a length and width exceeding a thickness, a laydown area defined selectively in a selected portion on the spine or on one of the opposing planar surfaces of the one of the cover boards; a thin-film ink-circuit security device printed *in situ* on the laydown area with electrically conductive ink that defines a radio frequency circuit and antenna configured for responding to radio frequency signals, the printed thin-film ink-circuit security device having a thickness no greater than about a minority of the thickness of the one of the cover boards; an inner liner attached in overlying relation to at least a respective second major surface of the one of the cover boards; an interior body cooperatively supported within the hard cover product, so that with the laydown area (i) in the spine the printed thin-film ink-circuit security device is concealingly disposed between the outer liner and a back side of the interior body, or (ii) on the one of the cover boards, the outer liner, the security device, the one of the cover boards, and the inner liner laminated together concealingly disposing the security device therein, whereby the printed thin-film ink-circuit security device enclosed therein is concealed from casual indication of its presence and is held after lamination safely and securely therein during normal use thereof for hard cover product purposes; and 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 supporting and enclosing the interior body within the hard cover product.

According to a second aspect of the present invention, there is provided a method of making a hard cover product with a concealed security device, comprising the steps of: (a) attaching to an outer liner a pair of cover boards, each of the cover boards pre-cut to a selected size and having opposing planar surfaces with a length and width exceeding a thickness, the cover boards attached on a respective first major surface to a major surface of the outer liner and disposed in spaced-apart relation to define a spine for a hard cover product while defining opposing front cover and back cover therefor; (b) printing a thin-film ink-circuit security device *in situ* on the laydown area with electrically conductive ink that defines a radio frequency circuit and antenna configured for responding to radio frequency signals on a laydown area selectively (i) in the spine or (ii) on one of the opposing surfaces of one of the cover boards, the printed thin-film ink-circuit security device having a thickness no greater than about a minority of the thickness of the one of the cover boards; (c) attaching an inner liner in overlying relation to a second major surface of at least the one of the cover boards; (d) cooperatively supporting an interior body within the hard cover product, the interior body having a back aligned with the spine, whereby with the laydown area (i) in the spine, concealing

the printed thin-film ink-circuit security device between the outer liner and the back, or (ii) on the one of the cover boards, the outer liner, the security device, the one of the cover boards, and the inner liner concealing the security device therein from casual indication of its presence, the security device held after lamination thereof safely and securely therein during normal use thereof for hard cover product purposes, 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 supporting and enclosing the interior body within the hard cover product.

There is also disclosed~~The present invention meets the need in the art by providing a hard cover product, comprising an outer liner and a pair of rigid cover boards pre-cut to a selected size and disposed in spaced-apart relation to define a spine gap for a hard cover product while~~

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defining opposing front cover and back cover therefor and each attached on a respective major surface to a major surface of the outer liner. At least one of the rigid cover boards comprises a pair of opposing sheets having opposing planar surfaces with a length and width exceeding a thickness, a first one of the pair of opposing sheets defining in a selected portion a laydown area on the planar surface thereof without a debossment or recess thereat and a thin-film ink-circuit security device printed *in situ* on the laydown area with electrically conductive ink that defines a radio frequency circuit and antenna configured for responding to radio frequency signals, the printed thin-film ink-circuit security device having a thickness no greater than about a minority of the thickness of the sheet. The pair of opposing sheets laminated together to sandwich the printed thin-film ink-circuit security device concealingly there between, with the opposing sides of the one of the rigid cover boards substantially parallel without a surface indication of the presence of the printed thin-film security device therein, whereby the printed thin-film ink-circuit security device enclosed and laminated in said one of the rigid cover boards is concealed from casual indication of its presence and is held after lamination safely and securely therein during manufacture of the hard cover product and during normal use thereof for hard cover product purposes. An inner liner attached in overlying relation to the opposing planar surfaces of the rigid cover boards and an interior body cooperatively supported within the hard cover product. The opposing rigid cover boards define a front cover and back cover that move together foldably along lines defined by opposing sides of the spine for containing the interior body within the hard cover product.

There is also disclosed~~In another aspect, the present invention provides~~ a hard cover product, comprising an outer liner and a pair of cover boards pre-cut to a selected size and disposed in spaced-

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apart relation to define a spine gap for a hard cover product while defining opposing front cover and back cover therefor and each attached on a first respective major surface to a major surface of the outer liner. At least one of the cover boards comprising a sheet having opposing planar surfaces with a length and width exceeding a thickness, a first one of the opposing planar surfaces defining in a selected portion a laydown area thereof without debossment or recess thereat; and a thin-film ink-circuit security device printed *in situ* on the laydown area with electrically conductive ink that defines a radio frequency circuit and antenna configured for responding to radio frequency signals, the printed thin-film ink-circuit security device having a thickness no greater than about a minority of the thickness of the sheet. An inner liner attached in overlying relation to the respective second major surfaces of the cover boards, the inner liner and the one of the cover boards laminated together to sandwich the printed thin-film ink-circuit security device concealingly there between, whereby the printed thin-film ink-circuit security device enclosed therein is concealed from casual indication of its presence and is held after lamination safely and securely therein during manufacture of the hard cover product and during normal use thereof for hard cover product purposes. An interior body cooperatively supported within the hard cover product, with the opposing cover boards defining a front cover and back cover that move together foldably along lines defined by opposing sides of the spine for supporting and enclosing the interior body within the hard cover product.

There is also disclosed~~In another aspect, the present invention provides~~ a hard cover product, comprising an outer liner and a pair of cover boards pre-cut to a selected size and disposed in spaced-apart relation to define a gap that receives a spine for a hard cover product while defining

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opposing front cover and back cover therefor and each attached on a respective first major surface to a major surface of the outer liner. The cover boards each comprising a sheet having opposing planar surfaces with a length and width exceeding a thickness. The spine defining in a selected portion a laydown area without debossment or recess

5 thereat with a thin-film ink-circuit security device printed *in situ* on the laydown area with electrically conductive ink that defines a radio frequency circuit and antenna configured for responding to radio frequency signals, the printed thin-film ink-circuit security device having a thickness no greater than about a minority of the thickness of the chipboard cover boards. An inner liner attached in overlying relation to the respective

10 second major surfaces of the cover boards, the inner liner and the cover boards laminate together. An interior body cooperatively supported within the hard cover product with opposing sides attached to the inner liner and a back attached to the spine for concealing the printed thin-film ink-circuit security device from casual indication of its presence and held after attachment safely and securely therein during manufacture of the hard cover

15 product and during normal use thereof for hard cover product purposes. 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 supporting and enclosing the interior body within the hard cover product.

There is also disclosed~~In another aspect, the present invention provides~~ a hard cover product, comprising an outer liner and a pair of cover boards pre-cut to a selected size and disposed in spaced-apart relation to define a gap that receives a spine for a hard cover product while defining opposing front cover and back cover therefor and each attached on a respective first major surface to a major surface of the outer liner. The cover boards each comprising a