CARD HAVING METALLIC CORE LAYER AND SYSTEMS AND METHODS FOR CARD MANUFACTURING

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application Serial No. 62/541,909, filed on August 7, 2017, entitled "SYSTEMS AND METHODS FOR CARD MANUFACTURING," U.S. Provisional Application Serial No. 62/568,517, filed October 5, 2017, entitled "SYSTEMS AND METHODS FOR CARD MANUFACTURING," and U.S. Provisional Application Serial No. 62/617,863, filed on January 16, 2018, entitled "CARD HAVING METALLIC CORE LAYER AND SYSTEMS AND METHODS FOR CARD MANUFACTURING," each of which is incorporated herein in its respective entirety.

BACKGROUND

[0002] Information carrying cards provide identification, authentication, data storage and application processing. Such cards or parts include key cards, identification cards, telephone cards, credit cards, bankcards, tags, bar code strips, other smart cards and the like.

[0003] Current information carrying cards use plastic or other polymer material cores. Current materials fail to provide a desired tactile response and strength. For example, information carrying cards need to withstand flexing to protect identifying components from damage as well as offer good durability during use. In addition, information carrying cards should be appealing, in terms of appearance and feel, to the end user, in order to facilitate use and adoption of the information carrying card.

SUMMARY

[0003a] In a first aspect, the present disclosure provides a locating device, comprising: an imaging modality configured to identify a position of one or more information carrying cards within a laminate sheet; and a marking instrument configured to generate at least one mark on the laminate sheet, wherein a position of the at least one mark identifies the position of the one or more information carrying cards within the laminate sheet, wherein the imaging modality comprises a non-visible spectrum imaging selected from the group consisting of: an x-ray imager, an ultrasonic imager, a nuclear imager, an ultraviolet imager, and a sonogram imager.

[0003b] In a second aspect, the present disclosure provides a method of manufacturing, comprising: receiving a laminate sheet comprising a plurality of information carrying cards formed integrally therein; inspecting the laminate sheet to identify a location of each of the plurality of information carrying cards within the laminate sheet; generating information corresponding to the location of each of the plurality of information carrying cards; and separating the plurality of information carrying cards from the laminate sheet using the information corresponding to the location of each of the plurality of information carrying cards, wherein generating the information corresponding to the position of each of the plurality of information carrying cards comprises generating a mapping file comprising position data corresponding to the position of at least one of the plurality of information carrying cards.

[0003c] In a third aspect, the present disclosure provides a non-transient computer-readable medium having a plurality of instructions stored thereon, wherein the operate a transfer arm to receive a laminate sheet having a plurality of information carrying cards formed integrally therewith; operate a location device to locate a position of at least one of the plurality of information carrying cards within the laminate sheet, wherein the location device is configured to generate a mapping file corresponding to the position of the at least one of the plurality of information carrying cards; and operate a separation device to separate the plurality of information carrying cards from the laminate sheet, wherein the separation device is operated according to the mapping file.

[0003d] In a fourth aspect, the present disclosure provides a method of forming a plurality of information carrying cards using a card manufacturing system comprising a transfer arm, a locating device, and a separation device, the method comprising: transferring, by the transfer arm, a laminate sheet from a loading station to the locating device; determining, by the locating device, a position of at least one of a plurality of information carrying cards within the laminate sheet; generating, by the locating device, a mapping file corresponding to the position of the at least one of the plurality of information carrying cards; and separating the plurality of information carrying cards from the laminate sheet, wherein the separation device is operated according to the mapping file.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Aspects of the present disclosure are best understood from the following detailed description when read with the accompanying figures. It is noted that, in accordance with the standard practice in the industry, various features are not drawn to scale. In fact, the dimensions of the various features may be arbitrarily increased or reduced for clarity of discussion.

[0005] FIG. 1 illustrates a cross-sectional view of a layer structure of an information carrying card, in accordance with some embodiments.

CLAIMS

What is claimed is:

1. A locating device, comprising:

an imaging modality configured to identify a position of one or more information carrying cards within a laminate sheet; and

a marking instrument configured to generate at least one mark on the laminate sheet, wherein a position of the at least one mark identifies the position of the one or more information carrying cards within the laminate sheet,

wherein the imaging modality comprises a non-visible spectrum imaging selected from the group consisting of: an x-ray imager, an ultrasonic imager, a nuclear imager, an ultraviolet imager, and a sonogram imager.

2. The locating device of claim 1, wherein at least one mark is selected from the group consisting of a visible mark, a non-visible mark, and a reactive mark.

3. A method of manufacturing, comprising:

receiving a laminate sheet comprising a plurality of information carrying cards formed integrally therein;

inspecting the laminate sheet to identify a location of each of the plurality of information carrying cards within the laminate sheet;

generating information corresponding to the location of each of the plurality of information carrying cards; and

separating the plurality of information carrying cards from the laminate sheet using the information corresponding to the location of each of the plurality of information carrying cards,

wherein generating the information corresponding to the position of each of the plurality of information carrying cards comprises generating a mapping file comprising position data corresponding to the position of at least one of the plurality of information carrying cards.

4. The method of claim 3, comprising forming the laminate sheet prior to receiving the laminate sheet.

5. The method of claim 4, wherein forming the laminate sheet comprises:

receiving a frame defining a plurality of cavities, wherein the frame comprises a first material;

positioning at least one core layer within at least one of the plurality of cavities, wherein the at least one core layer comprises a second material, and wherein the second material includes a metal;

forming a printed layer above the at least one core layer; and

laminating the frame, the at least one core layer, and the printed layer to generate at least one information carrying card.

6. The method of claim 3, wherein inspecting the laminate sheet comprises imaging the laminate sheet with an imaging modality, wherein the imaging modality is configured to identify the location of each of the plurality of information carrying cards.

7. The method of claim 6, wherein the imaging modality comprises a non-visible spectrum imaging modality.

8. The method of claim 3, wherein generating the information corresponding to the position of each of the plurality of information carrying cards comprises forming at least one marking on the laminate sheet, wherein the at least one marking corresponds to the position of at least one of the plurality of information carrying cards.

9. The method of claim 3, wherein separating the plurality of information carrying cards comprises guiding a singulation mechanism to remove material from a periphery of each of the information carrying cards in the laminate sheet, wherein the singulation mechanism is guided by the information corresponding to the position of each of the plurality of information carrying cards.

10. The method of claim 9, wherein a predetermined portion of each of the information carrying cards is removed from the periphery of the information carrying card by the singulation mechanism.

11. The method of claim 10, wherein the predetermined portion is selected such that an edge of a core layer of the information carrying card is exposed after the information carrying card is removed from the laminate sheet.

12. The method of claim 3, comprising finishing an edge of the information carrying card to have a predetermined geometry.

13. The method of claim 3, wherein a location device is configured to inspect the laminate sheet, a separation device is configured to separate the plurality of information carrying cards from the laminate sheet, and wherein the method comprises transferring the laminate sheet from the locating device to the separation device.

14. A non-transient computer-readable medium having a plurality of instructions stored thereon, wherein the

operate a transfer arm to receive a laminate sheet having a plurality of information carrying cards formed integrally therewith;

operate a location device to locate a position of at least one of the plurality of information carrying cards within the laminate sheet, wherein the location device is configured to generate a mapping file corresponding to the position of the at least one of the plurality of information carrying cards; and

operate a separation device to separate the plurality of information carrying cards from the laminate sheet, wherein the separation device is operated according to the mapping file.

15. The non-transient computer-readable medium of claim 14, wherein operating the location device comprises operating an imaging modality to image the laminate sheet, wherein the imaging modality is configured to identify the location of each of the plurality of information carrying cards, and wherein the imaging modality comprises a non-visible spectrum imaging modality.

16. The non-transient computer-readable medium of claim 14, wherein operating the location device comprises forming at least one marking on the laminate sheet, wherein the at least one marking corresponds to the position of at least one of the plurality of information carrying cards.

17. The non-transient computer-readable medium of claim 14, wherein operating the separation device comprises guiding a singulation mechanism to remove material from a periphery of each of the information carrying cards in the laminate sheet, wherein the singulation mechanism is guided by the mapping file.

18. The non-transient computer-readable medium of claim 17, wherein a predetermined portion of each of the information carrying cards is removed from the periphery of the information carrying card by the singulation mechanism.

19. The non-transient computer-readable medium of claim 18, wherein the predetermined portion is selected such that an edge of a core layer of the information carrying card is exposed after the information carrying card is removed from the laminate sheet.

20. The non-transient computer-readable medium of claim 14, wherein operating the separation device comprises finishing an edge of the information carrying card to have a predetermined geometry.

21. The non-transient computer-readable medium of claim 14, wherein operating the transfer arm comprises operating a vacuum system formed integrally with the transfer arm to transfer the laminate sheet from the locating device to the separation device.

22. A method of forming a plurality of information carrying cards using a card manufacturing system comprising a transfer arm, a locating device, and a separation device, the method comprising:

transferring, by the transfer arm, a laminate sheet from a loading station to the locating device;

determining, by the locating device, a position of at least one of a plurality of information carrying cards within the laminate sheet;

generating, by the locating device, a mapping file corresponding to the position of the at least one of the plurality of information carrying cards; and

separating the plurality of information carrying cards from the laminate sheet, wherein the separation device is operated according to the mapping file.