A security bag has tamper indicating features that may be incorporated directly on the bag during manufacture, without requiring conventional tamper-indicating tapes. Release material is selectively applied to the bag in the form of a pattern or void message, prior to treatment of the bag to improve ink-retaining characteristics. After treatment, an ink layer is applied over the release material. An adhesive layer is applied to the bag in an area that will seal an opening of the bag and contact the ink layer at least when the bag is sealed. When the bag is reopened after initial sealing, portions of the ink layer applied over the release material will be retained with the adhesive, while the remainder of the ink layer will be retained on the treated surface of the bag.
TAMPET INDICATING SECURITY BAG

FIELD OF THE INVENTION

[0001] This invention relates generally to plastic bags, and more particularly to plastic security bags.

BACKGROUND OF THE INVENTION

[0002] Plastic security bags are becoming widely used to transport sensitive or valuable items such as paper money, checks, or coins. These bags generally include tamper indicating features that provide visible evidence that a security bag has been opened after it has been initially sealed. For example, many security bags utilize tamper indicating tapes containing a void message or a visible pattern that is activated when the bag is opened. The message or pattern is imbedded into an ink layer that is covered with an adhesive for sealing the bag. When it is desired to seal the bag, a protective backing strip is removed from the adhesive and the tamper indicating tape is placed in contact with the opening of the bag to thereby seal the opening. These tamper indicating bags have several drawbacks. First, the tamper indicating tapes require additional manufacturing steps to create the tamper indicating feature. These additional manufacturing steps, together with the additional cost of the tape, add to the overall cost of producing the bags. In addition, tamper indicating tapes typically require special adhesives which are formulated to release at predetermined tensile values to permit opening the bag while retaining ink in the area of the void message. The need for special adhesives further increases the cost of producing the bags. Many tamper indicating tapes are highly sensitive and often provide a false indication of tampering when no such tampering has occurred. Finally, conventional security bags incorporating tamper indicating tapes are still susceptible to tampering because the ink is generally applied to be exposed on only one side of the adhesive layer of the tape. Thus, entry to the security bag may be gained by delaminating the side of the tape that does not contain ink, for example by heating or freezing the bag.

[0003] There is thus a need for a plastic security bag which overcomes drawbacks of the prior art such as those described above.

SUMMARY OF THE INVENTION

[0004] The present invention provides a security bag which includes tamper-indicating features incorporated directly on the bag during manufacture, without the need for conventional tamper-indicating tapes to be applied to the bag. Because the tamper-indicating features may be incorporated directly on the bag, production line speeds can be increased and overall production costs reduced. In one embodiment, the invention also provides improved security by incorporating tamper-indicating features on both sides of an adhesive that is used to seal the bag. In this embodiment, attempts to delaminate the bag on either side of the adhesive will create a visible indication of the tampering.

[0005] In one aspect of the invention, release material is selectively applied to portions of the bag near its opening, to create a pattern or void message that will be visible when the bag has been tampered with. The bag is then treated, for example by corona discharge, to enhance the ink retaining characteristics of the bag material. After treatment, ink is applied to the bag, generally over the area containing the release material. Adhesive is applied to the bag, either atop the ink layer or in an area of the bag that will engage the opening and ink layer when the bag is sealed.

[0006] When the bag is reopened after initial sealing, portions of the ink layer directly over the selectively applied release material will adhere to the adhesive more strongly than the release material, and will be removed with the adhesive while the other portions of the ink layer will remain in place. The missing portions of the ink layer will provide a visual indication that the bag has been opened, in the form of the pattern or void message created by the release material.

[0007] In an exemplary embodiment, the release material and ink layer are applied to one of first and second wall sections that define a receptacle of the bag. In another exemplary embodiment, release material and ink layers are applied to both wall sections.

[0008] In another exemplary embodiment, the bag further includes a closure configured to engage the opening of the bag. In another exemplary embodiment, the closure comprises one of the opposing wall sections. In yet another exemplary embodiment, the closure comprises a flap engagable with the opening.

[0009] These and other features, objects and advantages of the invention will be more readily apparent to those of ordinary skill in the art upon review of the following detailed description, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with a general description of the invention given above, and the detailed description given below, serve to explain the invention.

[0011] FIG. 1 is a perspective view of an exemplary security bag including tamper indicating features of the present invention;

[0012] FIG. 2 is a partial cross-sectional view of the bag of FIG. 1, taken along line 2-2;

[0013] FIG. 3A is a partial cross-sectional view similar to FIG. 2, illustrating the bag in a closed condition;

[0014] FIG. 3B is a partial cross-sectional view of the bag of FIG. 3A, illustrating an open condition of the bag after initial sealing;

[0015] FIG. 4 is a partial perspective view of the reopened bag of FIG. 1;

[0016] FIG. 5 is a partial cross-sectional view of another exemplary embodiment of the security bag of FIG. 1;

[0017] FIGS. 6A-6C are partial cross-sectional views of yet another security bag of the present invention, illustrating operation of the tamper-indicating features;

[0018] FIG. 7 is a partial cross-sectional view depicting yet another embodiment of a security bag according to the present invention; and
DETAILED DESCRIPTION

[0020] Referring to FIGS. 1 and 2, there is shown an exemplary security bag 10 including tamper-indicating features according to the present invention. In the exemplary embodiment shown, the security bag 10 includes first and second opposing wall sections 12, 14 defining a receptacle 16 for receiving articles to be stored in the bag 10. The bag 10 may be formed, for example, by folding a sheet of plastic material and stamping and heat sealing the folded sheets in appropriate locations to create sealed edges, perforations, and an opening, as will be understood by those skilled in the art. The exemplary bag 10 of FIGS. 1 and 2 has first and second side edges 18, 20 which have been heat sealed and which together with a first transverse heat seal 22 formed between the first and second side edges 18, 20 and proximate a distal end 24 of the bag 10 define the receptacle 16 of the bag 10. An opening 26, in the form of a transverse slit formed in the first wall section 12, provides access to the receptacle 16. A second transverse heat seal 28 formed toward the proximal end 30 of the bag 10 joins the folded layers and defines a closure portion 32 of the bag 10 adjacent the opening 26.

[0021] Transverse perforations 34 formed in the bag 10 at the proximal end 30 define a first receipt portion 38, which may be removed from the bag 10 as known in the art. Bag 10 may further include a second removable receipt portion 40 at the distal end 24, below transverse heat seal 22, and defined by transverse perforations 36. Alternatively, a slit may be formed in the first wall section 12 below the transverse heat seal, instead of perforations 36, to create a pouch which may be used to store routing slips or other non-cash items, as may be desired. Tape or adhesive may be provided on the bag 10, near the slit, to facilitate sealing the pouch in a non-secure manner.

[0022] Tamper-indicating features applied to the bag 10 proximate the opening 26 act in conjunction with the closure 32 to provide a visible indication that the bag 10 has been reopened after initial sealing of the opening 26 with the closure 32. In the exemplary embodiment shown, the tamper-indicating features comprise release material 50 which has been applied to the first wall section 12 adjacent the opening 26 formed in the first wall section 12. The release material 50 may be applied in a specific pattern or in the form of text, and is applied to the first wall section 12 prior to treating the bag 10 to enhance the ink retaining characteristics of the bag material. For example, it is common to corona treat many plastic materials utilized in the formation of plastic security bags prior to applying inks to thereby enhance the ink retaining characteristics of the material. Because the release material 50 is applied to the bag 10 prior to this treatment, the areas of the bag 10 underlying the release material 50 are protected from the treatment and define localized sites where the ink layers applied to the bag 10 will have less ink retention capability. To further create the tamper-indicating features of the bag 10, a visible ink layer 52 is applied to the first wall 12, adjacent the opening 26, and over the release material 50. As noted above, the ink 52 will adhere quite well to the surface of the bag 10 which has been exposed to the surface treatment process, but the ink 52 will not adhere as well to the areas of the bag 10 which have received the release material 50.

[0023] In the exemplary embodiment shown, an adhesive layer 54 is disposed on the closure portion 32 of the bag 10 in an area which will cover the opening 26 and the ink layer 52 which has been applied around the opening 26 on the first wall 12 when the closure 32 is folded to engage the opening 26 as depicted in FIG. 3A. The closure 32 may further include a liner material 56 disposed on the adhesive layer 54 to protect the adhesive 54 from contamination and to prevent premature adhesion of the closure 32 to the bag 10. To seal the bag 10, the protective liner 56 is removed from the adhesive layer 54 and the closure 32 is folded to place the adhesive 54 in contact with the ink layer 52 surrounding the opening 26 of the bag 10. Advantageously, the adhesive 54 readily adheres to the ink layer 52 and securely seals the opening 26.

[0024] When the bag 10 is opened for the first time after initial sealing, the portions of the ink layer 52 disposed on the areas of the bag 10 containing the release material 50 will adhere to the adhesive 54 and will be removed along with the adhesive 54 when the closure 32 is urged away from the opening 26 of the bag 10, as depicted in FIG. 3B. In this manner, the remaining ink layer 52 and exposed release material 50 create a visible pattern or indicia that clearly indicates that the bag 10 has been reopened, as illustrated in FIG. 4. Advantageously, the release material 50 may be selected to be transparent, thereby providing contrast with the visible ink layer 52. Alternatively, the release material 50 may be selected to have a color which is distinct from the ink layer 52. Accordingly, the release material may comprise colored or non-pigmented ink, varnish, or other material suitable for protecting the surface of the bag material from the treatment process.

[0025] Referring now to FIG. 5, there is shown another exemplary embodiment of the security bag 10a according to the present invention wherein release material 50 and ink layers 52 have been applied to the closure portion 32a of the bag 10a in the manner described above. Similar features have been similarly numbered. An adhesive layer 54 and liner 56 are disposed on the closure portion 32a to protect the adhesive 54 prior to sealing the bag 10a. Advantageously, this embodiment provides tamper indicating features on both sides of the adhesive layer 54 when the bag 10a is sealed, thereby providing additional security against unauthorized access to the contents of the bag 10a. For example, the double-applied release material 50 and ink layers 52 provide indication of when delamination of either side of the adhesive layer 54 has been attempted. The exemplary bag 10a of FIG. 5 operates in a manner similar to that described above whereby the liner material 56 is removed from the adhesive layer 54 and the closure 32a is folded to engage the adhesive layer 54 and the ink layer 52 applied to the first wall 12 of the bag 10a adjacent the opening 26. When the bag 10a of FIG. 5 is reopened after initial sealing, one or both ink layers 52 are separated and adhere to the adhesive layers 54 in the areas where the release material 50 has been applied to the bag 10a.

[0026] Referring now to FIG. 6A-6C, there is shown yet another exemplary security bag 10b, according to the present invention, in which features similar to those
described above have been similarly numbered. In this embodiment, an opening 60 to the receptacle 16 is defined by the first and second opposing wall sections 12, 14 of the bag 10b. The release material 50 and ink layers 52 of the tamper-indicating features are applied to the inner surfaces 62, 64 of both the first and second opposing wall sections 12, 14 and an adhesive layer 54 is applied to one of the opposing wall sections, whereby the opening 60 of the bag 10b may be sealed as described above and illustrated in FIG. 6B. When the bag 10b has been reopened after initial sealing, the portions of the ink layer 52 corresponding to areas of the bag 10b containing the release material 50 are separated from adjacent portions of the ink layer 52 and adhere to the adhesive layer 54 as depicted in FIG. 6C and in a manner similar to that described above.

[0027] While the exemplary embodiment of FIGS. 6A-6C has been shown and described as having ink layers 52 and release material 50 disposed on both the first and second opposing wall sections 12, 14 of the bag 10b, it will be recognized that the release material 50 and/or ink layer 52 may alternatively be applied to only one of the opposing wall sections 12, 14.

[0028] Referring now to FIGS. 7 and 8, there are shown additional exemplary embodiments of security bags 10c, 10d including tamper-indicating features of the present invention. In FIG. 7, the security bag 10c comprises first and second opposing wall sections 12, 14 defining a receptacle 16 and having a closure 32c defined by a portion of the second wall section 14 which has been folded over to engage the inner side 62 of the first wall section 12. In FIG. 8, the exemplary bag 10d is configured such that the second wall section 14 is folded over to engage the outer side 66 of the first wall section 12. In both bags 10c, 10d, release material 50 and ink layers 52 have been applied to both the first and second wall sections 12, 14 to create tamper-indicating features, as described above. While these exemplary embodiments have been depicted and described as having release material 50 and ink layers 52 disposed on both the first and second opposing wall sections 12, 14, it will be recognized that the tamper-indicating features may alternatively comprise release material 50 and ink layer 52 applied to only one of the first and second wall sections 12, 14.

[0029] Advantageously, the tamper indicating features of the present invention may be applied directly to the various surfaces of the plastic sheet material forming the plastic bag without the need to incorporate a separate tamper indicating tape into the bag. Accordingly, a security bag of the present invention may be readily formed, incorporating the tamper-indicating features directly into the manufacturing stream. This permits the line speed of machinery which is utilized to manufacture the plastic bags to move at a higher rate to thereby produce a greater quantity of security bags in a given time period. Because the machines can be run at a higher rate, economies of scale provide further cost benefits in producing security bags according to the present invention. Furthermore, the tamper-indicating features of the present invention do not require the use of special adhesives, thereby providing further cost benefits. The tamper-indicating features are also more robust than conventional tamper-indicating tapes in that they are less susceptible to providing a false indication that a security bag has been tampered with.

[0030] Accordingly, an exemplary method of making a tamper indicating security bag includes selectively applying release material 50 to at least one portion of the bag, treating the bag to enhance ink retention characteristics of the bag, and applying an ink layer 52 to the bag atop the release material 50. The release material 50 and ink layer 52 may be applied to the bag in an area that surrounds an opening of the bag, or in an area that will engage the opening when the bag is sealed. The method may further include applying an adhesive layer 54 to the bag, in an area that will engage the ink layer when the bag is closed to seal the opening. Alternatively, the adhesive layer 54 may be applied atop the ink layer.

[0031] While the present invention has been illustrated by the description of various embodiments thereof, and while the embodiments have been described in considerable detail, it is not intended to restrict or in any way limit the scope of the appended claims to such detail. Additional advantages and modifications will readily appear to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus and method and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the scope or spirit of the general inventive concept.

What is claimed is:

1. A security bag, comprising:
   - first and second opposing wall sections defining a receptacle;
   - an opening to said receptacle;
   - release material selectively disposed on at least one of said first and second opposing wall sections, adjacent said opening;
   - an ink layer disposed on at least one of said first and second opposing wall sections, atop said release material;
   - an adhesive layer disposed on at least one of said first and second opposing wall sections, proximate said opening, for sealing said opening.

2. The security bag of claim 1, wherein said release material and said ink layer are disposed on only one of said first and second wall sections.

3. The security bag of claim 1, wherein said release material and said ink layer are disposed on both said wall sections.

4. The security bag of claim 1, wherein said release material, said ink layer, and said adhesive layer are all disposed on only one of said wall sections.

5. A security bag, comprising:
   - first and second opposing wall sections defining a receptacle;
   - an opening to said receptacle;
   - a closure configured to engage said opening;
   - release material selectively disposed on at least one of said first wall section, said second wall section, and said closure;
   - an ink layer disposed atop said release material on at least one of said first wall section, said second wall section, and said closure;
an adhesive layer disposed on at least one of said first wall section, said second wall section, and said closure, such that said opening may be sealed by said adhesive when said closure is engaged with said opening and said adhesive is in contact with said ink layer at least when said closure is engaged with said opening.

6. The security bag of claim 5, wherein said closure comprises at least one of said first and second wall sections.

7. The security bag of claim 5, wherein said closure comprises a flap member configured to engage said opening.

8. The security bag of claim 6, wherein said opening is defined by an aperture formed said first wall section.

9. The security bag of claim 8, wherein said release material and said ink layer are disposed on said first wall section, adjacent said aperture.

10. The security bag of claim 8, wherein said release material and said ink layer are disposed on said closure engagable with said aperture.

11. The security bag of claim 8, wherein said release material and said ink layer are disposed on said first wall section, adjacent said aperture, and on said closure engagable with said aperture.

12. The security bag of claim 6, wherein said adhesive is positioned to contact said ink layer when said opening is sealed.

13. The security bag of claim 6, wherein said adhesive layer is disposed atop said ink layer on at least one of said first wall section, said second wall section and said closure.

14. A method of making a tamper indicating bag, comprising:

- selectively applying release material to at least one portion of the bag;
- treating the bag to enhance ink retention characteristics of the bag; and
- applying an ink layer to the at least one portion of the bag, atop the release material.

15. The method of claim 14, further comprising:

- applying an adhesive layer to the bag, atop the ink layer.

16. The method of claim 14, further comprising:

- applying an adhesive layer to the bag in an area that will engage the ink layer when the bag is sealed.

17. The method of claim 14, wherein treating the bag comprises corona treating at least a portion of the bag.

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Jan. 29, 2003

Feb. 17, 2005