A method of protecting an article (2) from alteration and duplication by the use of a hologram (30, 32) and a write resist top surface includes providing an article (2) having a zone to be protected. Providing a hologram (30, 32) as a transparent overlay using heat activatable thermoplastic adhesive and securing the hologram (30, 32) to the article (2) over the zone by applying heat and pressure to the hologram (30, 32) to activate the adhesive layer as in a normal laminating process. The application of heat and pressure to the zone will simultaneously cure the write resist layer. The article (2) may be a document with a signature (28) underlying the transparent hologram (30, 32). An alteration resistant article (2) has a zone having information to be protected, an overlying transparent hologram (30, 32) secured to the zone by a heat activatable thermoplastic adhesive, a write resist layer secured in an overlying relationship with respect to the hologram (30, 32) with the write resisting layer including a thermally cured silicone. In one embodiment, the thermally cured silicone will contain about 2.5 to 10 weight percent wax.
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*FOR THE PURPOSES OF INFORMATION ONLY*

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.
METHOD OF PROTECTING AN ARTICLE FROM ALTERATION
AND A RELATED ALTERATION RESISTANT ARTICLE

BACKGROUND OF THE INVENTION

1. **Field of the Invention**

The present invention relates to a method of employing a hologram and write resistant surface to protect information on an article from undesired alteration. It also relates to an article so protected.

2. **Description of the Prior Art**

The problem of unauthorized alteration of articles with intent to deceive a third party has been prevalent for decades. Among such articles are bank checks and other bank documents, identification cards of various types, charge cards, and a wide variety of legal documents. It has been known to provide credit cards with magnetic tapes with the card being provided with a transparent film which may take the form of an ultraviolet curable varnish. See, U.S. Patent 4,897,533.

U.S. Patent 4,627,642 discloses a method for resisting fraudulent alteration of documents having a monetary value. A polyvinyl chloride layer has an overlying ink layer which is covered by a transparent porous varnish layer which includes a florescent powder. A filigree pattern is provided to certain portions of the ink layer and varnish layer as by silk screening and employing a second pigmented vinyl ink.

It has been known to protectively laminate identification cards within transparent protective vinyl materials. See, U.S. Patent 3,582,439. U.S. Patent 4,378,392 discloses a laminate which is said to extend the life of a photograph. A plurality of films are adhesively bonded in protective relationship with respect to a photograph.

The use of holograms to preserve authenticity of various articles has been known. U.S. Patent 5,248,544 discloses the use of holograms on paper articles. U.S. Patent 4,684,795 discloses a security tape which contains an embossed holographic image on a clear polyester carrier which is then coated with ferrous oxide to form a magnetic strip with an optically viewable holographic image thereon.
It has also been known to provide a transparent hologram which may be provided with an overlying removable support layer and underlying adhesive for securement of the hologram to an article. See U.S. Patent 4,856,857.

U.S. Patent 4,631,222 discloses a hot embossing foil which includes a magnetic layer and a layer which has a structure producing a diffraction effect such as a hologram. Adhesive means may be employed to secure the element to a substrate. The backing foil is adapted to be released from the transfer layer.

U.S. Patent 4,971,646 discloses a holographic film product wherein a thermoplastic adhesive is employed to secure a hologram film and metallized coating which underlies a printed layer and a protective layer of clear film.

U.S. Patent 4,429,015 discloses a laminated identification card wherein efforts to delaminate the card result in fibers of uniaxially oriented polyethylene or polypropylene layers being torn to thereby provide a visual indication of tampering.

U.S. Patent 5,137,208 discloses a tamper evident package wherein a covering layer of material becomes brittle once cured and efforts to tamper with the package result in fragmentation of the brittle material.

PCT Publication WO89/03760 discloses embossing plastic film to create a holographic or diffraction pattern. A metallized film may be provided. The product is said to be employed for decoration of paper or plastic sheeting.

U.S. Patent 5,265,753 discloses a holographic bank draft wherein the hologram is applied to paper with a signature being placed thereover and a clear plastic mylar film secured thereover so as to resist alteration.

My co-pending United States Application Serial No. 07/915,975, filed March 16, 1994 discloses protecting articles having information added after creation of a form, from undesired alteration. This is accomplished by providing a zone of distinct appearance such as a hologram, placing the added information thereover, and covering the added information and at least a portion of the distinctive zone with a write resistant material. In this manner, accurate photocopying of the document, so as to permit alteration, is resisted, as is writing over the inserted information.
It has been known for various types of end uses to employ a wide variety of release materials which resist undesired bonding to other portions of the same material or to other materials. See, generally, U.S. Patents 4,134,842; 4,241,198; 5,120,383; 5,128,391 and 5,154,962. U.S. Patent 4,978,415 discloses the use of liquid silicone to resist undesired adhesion of a portion of a label in contact with the adhesive side of label material.

U.S. Patent 4,241,198 discloses the use of silicone on an exposed surface as a releasing layer.

U.S. Patent 5,128,391 discloses a pasturizable radiation curable coating for metal which coating includes an bulky acrylate or methacrylate monomer, a combination of oligomers, and an organofunctional silane adhesion promoter.

U.S. Patent 5,120,383 discloses a thermal transfer ink sheet.

U.S. Patent 4,134,842 relates to a bearing assembly and discloses the use of a thin film of a parting agent which is said to be polytetrafluoroethylene, silicone, wax emulsion and the like. The parting agent is said to protect against adhesion between the inner bearing member and outer bearing member.

It has also been known to provide an embossed grating hologram having a metallized area thereunder with a heat activated adhesive underlying the metallized area so as to facilitate securement of the hologram to an article. Overlying and adjacent to the embossed gratings is a heat activated release coating over which is a carrier web which may be polyester. In securing this prior art construction to an article, heat and pressure are applied such that the adhesive layer is activated to bond the hologram to the article and the release coat and carrier are withdrawn. This approach permits direct access to the hologram and anything that may be written or otherwise provided thereon so as to permit undesired alteration thereof.

In spite of the foregoing teachings, there is lacking an effective means of protecting an article or a zone of an article which contains areas which are to be alteration free, by means of thermally created construction.
SUMMARY OF THE INVENTION

The present invention has met the foregoing need by providing a method of protecting an article from alteration which includes providing a hologram overlying a heat activatable adhesive with the hologram preferably consisting of an embossed grating and underlying metallized layer. Secured in overlying position to the hologram are a write resistant layer and a carrier. By applying heat and pressure to the hologram assembly with the adhesive material overlying the article in the zone to be protected, the heat activates the thermally activated adhesive and also cures the curable write resistant layer, after which, the carrier may be removed.

The product of the present invention includes an article having a zone to be protected, an overlying hologram which may be transparent or have transparent portions secured to the zone by heat activated adhesive, a write resistant layer secured to the exposed surface of the hologram with the write resisting layer preferably being a heat cured silicone which may have a preferred amount of wax added thereto.

The invention may be used on a wide variety of articles including documents bearing signatures which are to be protected with the signature being applied to the document before application of the protective assembly of the present invention.

It is an object of the present invention to provide an effective system for protecting an article against undesired alteration by means of a combination of a hologram and a write resistant surface.

It is an object of the present invention to provide such a system wherein duplication by photocopying is resisted.

It is a further object of this invention to provide a method of establishing such protection by employing a hologram and the use of heat and pressure to both activate the adhesive and to cure a write resistant coating.

It is a further object of the present invention to provide such a system which may be used effectively with paper and paperboard documents which have signatures or other zones requiring protection.
It is another object of the present invention to provide such a system which facilitates efficient and economical means to resist undesired alteration.

It is a further object of the present invention to provide such a system wherein the write resistant surface also serves as a release surface for facilitating removal of the carrier.

These and other objects of the present invention will be more fully understood from the following description of the invention with reference to the illustrations appended hereto.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a front elevational view of a form of document protected by the system of the present invention.

Figure 2 shows a partial exploded cross-sectional view of the materials and apparatus employed to establish the protection of the present invention.

Figure 3 is a cross-sectional view taken through 3-3 of Figure 1 showing a protected zone of the article of Figure 1.

Figure 4 shows a protected zone with a hologram of the present invention.

**DESCRIPTION OF THE PREFERRED EMBODIMENTS**

As used herein, the term "article" means an article or portion thereof which is intended to communicate information and shall include, but not be limited to, bank checks, bank drafts, money orders, stock certificates and other negotiable instruments.

As used herein, "information" shall expressly include, but not be limited to signatures, words, graphics, other indicia of authenticity and combinations thereof.

As used herein, "transparent hologram" means a hologram which is transparent or has one or more portions which are transparent. The transparent portion of the hologram can be clear or, in the alternative, may not be clear, but be sufficiently clear to permit viewing of all or a desired portion of the underlying information.

Referring to Figure 1, there is shown a bank check 2 which contains a check number 4, a date 6, an account holder's name and address 8, the account...
identification numbers 10, the identification of the bank 12, and a line for inserting the payee 16, and lines 18, 20 for inserting the amount of the check, respectively, in numbers and words. Within the check is a line 26 on which an authorized signature 28, such as that of John Jones, is provided.

As used herein, a reference to "zone" to be protected will generally refer to a region of the article 2 within which a certain portion is to be protected against alteration, such as the rectangular region in Figure 2 which includes the signature 28. While the zone may not have specific physical boundaries, it will generally be preferable to have it include, at minimum, the entire signature 28 or other information sought to be protected. In some instances, an article may have a number of individual zones to be protected or the zone may be coextensive with the article or one surface of the article. Overlying and covering the signature 28 in Figure 1 is the protective assembly of the present invention which consists of a transparent hologram indicated generally by the plurality of X's as exemplified by 30 and 32, which may take any desired form in respect of patterns of words, colors or graphics, or combinations thereof, and will generally be in relative nonobstructing position in respect of viewing the signature 28. In many instances, it will be desired to have the hologram transparent in the region overlying the information so that the information will be readily visible.

Figure 2 shows, in cross-sectional, partial exploded form the assembly of materials which will be employed in a preferred practice of the present invention to create the alteration resistant article of the present invention. The article 40, which has the information which is to be protected, is positioned in underlying relationship with respect to a thermally activatable, preferably continuous layer of adhesive 42. The adhesive may be thermoplastic or thermosetting. The adhesive is preferably a clear thermoplastic laminating adhesive. Suitable adhesives for this purpose are Macromelt #6211 which is available from Henkel Polymers of LaGrange, Illinois and an adhesive sold under the trade designation "Adcoat #333" by Norton International. If desired, in the alternative, a thermosetting adhesive could be employed. Overlying the adhesive layer is a hologram 44 which may consist of a grating formed within a continuous clear plastic material.
Such a hologram may be formed by (a) demetallizing as by use of a suitable acid or (b) by an embossed image with or without a high refractive image clear coat. The hologram may have an underlying metallized or partially metallized layer. If it is desired to have a transparent hologram which has only portions which are transparent and portions which are metallized, the area that is to be clear can be demetallized. The degree of demetallizing will determine the transparency level of the demetallized area. This provides a transparent hologram. Overlying the hologram is a continuous layer of material 46 which will provide the write resistant layer. A carrier 48 is presecured to the assembly by joinder to the layer 46.

In effecting protection of the article 40, in general, the assembly of components 42-48 (even numbers only) will be positioned over the zone of the article 40 to be protected and conventional equipment known to those in the art will be employed to provide heat and pressure so as to effect securement of the assembly of components 42-46 to the article by means of thermally activated adhesive 42. The heating to activate the adhesive layer 40 will also serve to cure the curable write resistant layer 46 and effect bonding between that and the hologram assembly 44 with the carrier 48 being separated therefrom and removable. The invention, therefore, provides for simultaneous securement of the hologram and creation of the write resistant layer under the influence of pressure and temperature. In instances where high pressure cannot be tolerated, lower pressure may be employed.

The equipment as will be well known to those skilled in the art may consist of a support member 60 which supports the assembly during application of pressure and heat by establishing relative closing movement between support element 60 and press platen 62 with heat being generated within one or both of press platen 60 and 62 and the pressure and temperature being applied for a sufficient period of time to effect melting of treat activated adhesive 40 and curing the write resistant material 46. In general, a heated platen 60 will be employed. The support member 60 and press platen 62 are then subject to relative separating movement at which time the carrier 48 may be separated from the other components and the write protected article 46 may be withdrawn after
suitable cooling. The temperature generated within the article is preferably about 260°F to 450°F and the pressure applied thereto is preferably about 50 to 150 psi.

In a preferred embodiment of the invention, the write resisting material will consist of a silicone which is heat curable and preferably has about 2.5 to 10 percent by weight of a wax blended into the silicone resin in order to enhance write resistant characteristics so as to resist undesired alteration by pen, pencil, marker pens, crayons, or other means. A preferred wax is polytetrafluoroethylene. The heat and pressure will not only activate the adhesive, but will also cure the silicone resin and melt the wax.

Figure 3 shows the assembled protected article wherein the article 40 has only a zone thereof protected. It will be appreciated that a signature or other information sought to be protected on the face of the article 40 in surface-to-surface adjacency with the adhesive layer 42 will be readily visible through the transparent write resistant layer 46 and transparent hologram assembly 44. Any efforts to write on upper surface 66 of write resistant surface 46 will be ineffective.

It will be appreciated that the present invention provides the benefit of the dual use of a transparent hologram which overlies the signature or other information sought to be protected and a write resistant surface. The adhesive layer 42 is preferably of such strength that the bond between it and the hologram 44 and it and the article 40 are such that these layers cannot be separated from either without at least partial destruction providing a visual irreversible indication that tampering has occurred. Obviously, any effort to overwrite on the surface 66 of the write resisting layer would be ineffective.

In a preferred embodiment of the invention, the article as supplied prior to application of heat and pressure (Figure 2) will have the hologram 44 having a thickness of about 0.25 to 10 microns and the write resistant layer having a thickness of about 5 to 25 microns with the thermally activated thermoplastic adhesive thickness being about 5 to 50 microns. The article may be of any desired thickness so long as it has adequate strength and thermal resistance to avoid undesired change due to application of pressure and temperature during the affixation of the protective assembly.
In a preferred practice of the invention, the curable silicone write resistant layer 46 will be provided as a coating on the hologram 44.

Referring to Figure 4, there is shown an article 68 having a transparent hologram 70 overlying the zone to be protected. The hologram has a portion 72 which is not transparent, as by being metallized, and a portion 74 which is transparent and permits reading the underlying words 76 "CLEAR SEE THROUGH."

Another advantage of the present system is that duplication by photocopying is resisted. As to clear portions of the hologram 70, the hologram is lost or appears as a colorless gray obstruction to viewing the underlying information. As to metallized portions of the hologram 70, uneven dark areas would be produced and the color change characteristics would be lost.

It will be appreciated that the present invention has provided an effective means of simply and economically providing information on an article with resistance to undesired alteration or reproduction as by photocopying through a combination of the use of a transparent hologram secured to an article under the influence of pressure and temperature to activate the thermally activatable adhesive and to cure the transparent write resistant layer.

The protective laminate consisting of the adhesive, the hologram, and the cured write resisting surface would be flexible.

While for convenience of disclosure specific reference has been herein to a bank check and a signature, it will be appreciated that other forms of articles and information may be employed advantageously. For example, placing this protective material over a trademark on a product preserves the proper identification of source and not only resists alteration, but indirectly advises the consumer that if this write protection material is not present over the mark, that the goods may be counterfeit. The hologram itself serves as an authenticating mechanism. Also, the zone could cover an entire surface of an article, if desired.
As used herein, words such as "overlying," "underlying," and similar words of direction are employed for convenience of reference regarding relative positions and are not to be deemed limitations on the invention.

Whereas particular embodiments of the present invention have been described above for purposes of illustration, it will be appreciated by those skilled in the art that numerous variations of the details may be made without departing from the invention as described in the appended claims.
What is Claimed:

1. A method of protecting an article from alteration comprising
   providing an article having a zone to be protected,
   providing a hologram having a transparent hologram overlying a
   heat activatable adhesive and underlying a write resistant layer,
   securing said hologram to said article over said zone by applying
   heat and pressure thereto to activate said adhesive layer and secure the same to said zone, and
   simultaneously with said securing step curing said write resistant
   layer.

2. The method of claim 1 including
   employing a hologram which consists of an embossed grating.

3. The method of claim 1 including
   employing as said write resistant layer a transparent material.

4. The method of claim 3 including
   employing as said write resistant layer a coating of a heat curable
   resin and a wax.

5. The method of claim 4 including
   employing about 2.5 to 10 percent by weight of said wax in said
   heat curable resin.

6. The method of claim 5 including
   employing polytetrafluoroethylene as said wax.

7. The method of claim 5 including
   effecting curing of said silicone by said heating.

8. The method of claim 7 including
   effecting at least partial melting of said wax by said heating.
9. The method of claim 1 including providing a carrier web secured to said write resistant layer in overlying relationship with respect thereto, and effecting separation of said carrier by said application of heat.

10. The method of claim 5 including employing as said transparent hologram a material having a thickness of about 0.25 to 10 microns prior to application of heat and pressure, employing as said write resistant layer a coating which has a thickness of about 5 to 25 microns prior to application of said heat and pressure.

11. The method of claim 1 including providing information to be protected within said zone, and securing said hologram over said information, whereby the information will be protected from alteration by writing while being readily visible.

12. The method of claim 11 including employing said method on a portion of an article which is a document.

13. The method of claim 11 including securing said hologram over at least one signature.

14. The method of claim 1 including providing a carrier in overlying surface engagement with said write resistant layer, and separating said carrier from the remainder of said hologram assembly under the influence of said heat.

15. The method of claim 1 including employing a hologram which is partially metallized.

16. The method of claim 1 including employing a hologram which is partially demetalized.

17. The method of claim 2 including employing a high refractive index clear coating on said hologram.
18. An alteration resistant article comprising
an article having a zone having information to be protected,
an overlying transparent hologram secured to said zone by heat
activated adhesive,
a write resistant layer secured to said hologram in overlying
relationship with respect thereto, and
said write resisting layer including a thermally cured silicone.

19. The article of claim 18 including
said article being a paper document.

20. The article of claim 18 including
said write resisting layer containing about 2.5 to 10 weight percent
wax.

21. The article of claim 20 including
said wax being polytetrafluoroethylene.

22. The article of claim 19 including
said information zone containing a signature and said hologram
being secured thereover.

23. The article of claim 18 including
said adhesive being secured to said article so that said hologram
cannot be removed from said article without at least partial destruction of at least one of
said article and said hologram to provide a visual indication of tampering.

24. The article of claim 22 including
said hologram covering only a portion of said article.

25. The article of claim 18 including
said hologram being an embossed grating.

26. The article of claim 25 including said hologram having a high
refractive index clear coating thereon.

27. The article of claim 18 including
said hologram being partially metallized.
28. The article of claim 28 including said hologram being partially demetallized.
A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :B32B 3/00, 31/00
US CL :428/195; 156/277
According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S. : 428/195, 201, 203, 204, 205, 209, 211, 915; 156/247, 249, 277, 289; 283/85, 86, 109, 904

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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

Date of the actual completion of the international search
26 MARCH 1996

Date of mailing of the international search report
22 APR 1996

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