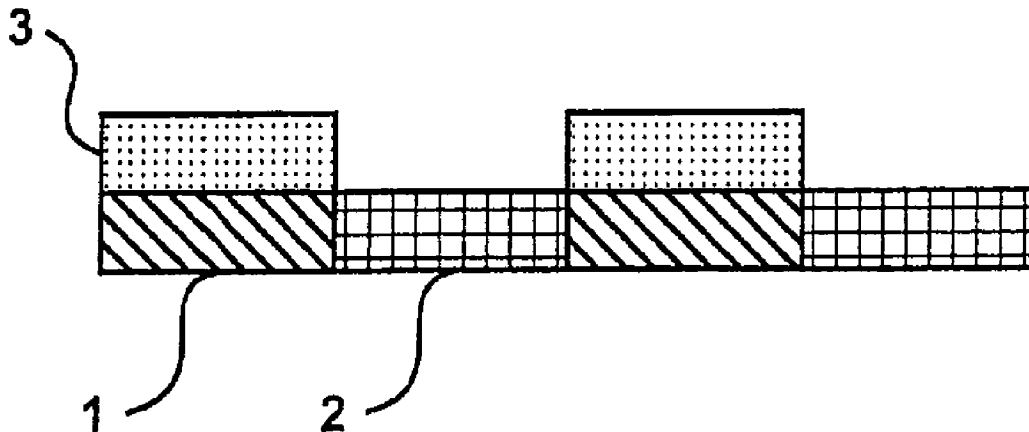




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ELEMENT, AND METHOD FOR CHECKING AUTHENTICITY



(57) **Abrégé/Abstract:**

The invention relates to a security element for a data carrier, in particular a value document, comprising a carrier substrate whose front side has first motif elements and second motif elements, wherein: the first motif elements show a darker color than the second motif elements under first viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast designated a first motif; the first motif elements and the second motif elements show a substantially uniform, visible color and form a second motif under second viewing conditions; the first motif elements show a lighter color than the second motif elements under third viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast that is inverted compared to the light/dark contrast of the first motif and designated a third motif; wherein the first motif and the third motif create for the viewer the impression of a motion image upon an oscillating change between the first and the third viewing conditions, and the first, second and third viewing conditions are defined as follows: first viewing conditions: viewing upon illumination with visible light; second viewing conditions: viewing upon illumination with a combination of visible light and ultraviolet light in substantially equal parts; third viewing conditions: viewing upon illumination with ultraviolet light.

Abstract

The invention relates to a security element for a data carrier, in particular a value document, comprising a carrier substrate whose front side has first motif elements and second motif elements, wherein: the first motif elements show a darker color than the second motif elements under first viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast designated a first motif; the first motif elements and the second motif elements show a substantially uniform, visible color and form a second motif under second viewing conditions; the first motif elements show a lighter color than the second motif elements under third viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast that is inverted compared to the light/dark contrast of the first motif and designated a third motif; wherein the first motif and the third motif create for the viewer the impression of a motion image upon an oscillating change between the first and the third viewing conditions, and the first, second and third viewing conditions are defined as follows: first viewing conditions: viewing upon illumination with visible light; second viewing conditions: viewing upon illumination with a combination of visible light and ultraviolet light in substantially equal parts; third viewing conditions: viewing upon illumination with ultraviolet light.

Security element, manufacturing method, data carrier equipped with said security element, and method for checking authenticity

[0001] This invention relates to a security element for data carriers, in particular for value documents, identity documents and the like. The invention relates furthermore to a data carrier equipped with the security element, a method for checking the authenticity of the data carrier, and a method for manufacturing the security element.

[0002] For protection against imitation, in particular with color copiers or other reproductive methods, data carriers, such as bank notes, papers of value, credit cards, identity documents, passports, deeds and the like, labels, packages or other elements for product authentication are equipped with luminescent security elements. These include fluorescent fibers or planchets (small colored disks) which are mixed into the paper pulp as a security feature during paper manufacture. Furthermore, there are employed fluorescent security threads made of plastic, metal or another material which are embedded wholly or partly into the paper during paper manufacture. It is also known to employ fluorescent imprints which are invisible or colorless in normal light but fluoresce under UV light. Fluorescence is understood in general to be a short-lived light emission ending within 10^{-8} seconds. Instead of fluorescent printing inks there are also employed phosphorescent or photochromic printing inks. With phosphorescent materials, the luminous effect continues from 10^{-8} seconds up to several seconds or hours after the end of irradiation, depending on the material. Photochromic printing ink changes its color upon excitation with UV light. When the UV light source is removed, the color change continues for a time before the color changes back to the original state again. A special case of a photochromic printing ink is iridescent photochromic printing ink. Iridescent or pearl-effect inks contain transparent pigments consisting of tiny mica flakes covered with thin foil. They cause an interference of the irradiating light. This gives rise to lustrous, pearl-like

shimmering effects with a color-tone change at different viewing angles or illumination angles.

[0003] From EP 1 567 358 B1 there is known a luminescent security element for securing bank notes which has two or more regions, each region containing a material or a combination of materials, wherein the two or more regions show substantially the same visible color under first viewing conditions which comprise visible light, and different visible colors under second viewing conditions, wherein the second viewing conditions comprise a combination of visible light and UV light (see claim 1 of EP 1 567 358 B1). Further, there is known from EP 1 567 358 B1 a luminescent security element for securing bank notes which has two or more regions, each region containing a material or a combination of materials, wherein the two or more regions show different visible colors under first viewing conditions which comprise visible light, and substantially the same visible colors under second viewing conditions, wherein the second viewing conditions comprise a combination of visible light and UV light (see claim 2 of EP 1 567 358 B1).

[0004] Starting out from the above prior art, the present invention is based on the object of providing a security element of the type stated at the outset which offers an elevated measure of anti-forgery security and at the same time can be checked for authenticity in a simple manner. Furthermore, there are to be provided a data carrier having such a security element and a method for manufacturing such a security element.

[0005] This object is achieved by the security element disclosed in this application. A method for manufacturing the same, a data carrier having such a security element and a method for checking the authenticity of the data carrier are disclosed in this application. Developments of the invention are also disclosed in this application.

Summary of the invention

[0006] 1. (First aspect) A security element for a data carrier, in particular a value document, comprising a carrier substrate whose front side has first motif elements and second motif elements, wherein:

the first motif elements show a darker color than the second motif elements under first viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast designated a first motif;

the first motif elements and the second motif elements show a substantially uniform, visible color and form a second motif under second viewing conditions;

the first motif elements show a lighter color than the second motif elements under third viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast that is inverted compared to the light/dark contrast of the first motif and designated a third motif; wherein

the first motif and the third motif create for the viewer the impression of a motion image upon an oscillating change between the first and the third viewing conditions, and the first, second and third viewing conditions are defined as follows:

first viewing conditions: viewing upon illumination with visible light;

second viewing conditions: viewing upon illumination with a combination of visible light and ultraviolet light in substantially equal parts;

third viewing conditions: viewing upon illumination with ultraviolet light.

[0007] In particular, in addition to the first motif elements and second motif elements there can also be present white regions, i.e. unprinted or substantially unprinted regions.

[0008] 2. (preferred) The security element according to paragraph 6, wherein the first and second motif elements are disposed offset.

[0009] The first motif elements and the second motif elements can furthermore be mutually separated by white regions, i.e. unprinted or substantially unprinted

regions. For example, a recurrent arrangement of "first motif element – second motif element – white region – first motif element – second motif element – white region" can be present.

[0010] 3. (preferred) The security element according to paragraph 6 or 8, wherein:

the first motif elements respectively have a first color layer in a first visible color and a second color layer formed above the first color layer, and the second color layer contains a material luminescing under UV irradiation which is invisible upon illumination with visible light and shows a second visible color upon illumination with ultraviolet light;

the second motif elements respectively have a color layer in a third visible color; and

the two color layers of the first motif elements are so coordinated that the first and second visible colors yield under the second viewing conditions a mixed color which is substantially identical with the third visible color of the second motif elements.

[0011] 4. (preferred) The security element according to paragraph 6 or 8, wherein:

the first motif elements respectively have a color layer and the color layer contains a material in a first visible color and a further material luminescing under UV irradiation which is invisible upon illumination with visible light and shows a second visible color upon illumination with ultraviolet light;

the second motif elements respectively have a color layer in a third visible color; and

the two materials in the color layer of the first motif elements are so coordinated that the first and second visible colors yield under the second viewing

conditions a mixed color which is substantially identical with the third visible color of the second motif elements.

[0012] The visible colors mentioned in the preceding paragraph (i.e. the first, second and third visible colors) differ in particular in their color tone or in their lightness.

[0013] 5. (preferred) The security element according to any one of paragraphs 6 to 11, wherein the first and second motif elements are configured in the form of two segment groups disposed offset, in particular in the form of two grids disposed offset.

[0014] 6. (preferred) The security element according to paragraph 13, wherein the first and second motif elements are configured in the form of two grids disposed offset and at least one of the two grids has recurrent grid regions, wherein the line thickness of the individual grid elements varies, in particular increases or decreases continuously in one direction, within the recurrent grid region.

[0015] 7. (preferred) The security element according to any one of paragraphs 6 to 14, wherein the first and second motif elements are configured independently of each other in the form of plane figures, in particular polygons, circles, cycloid figures or parts of a circle, and the first and second motif elements are disposed alternately.

[0016] 8. (preferred) The security element according to paragraph 15, wherein at least one of the two types of alternately disposed, plane figures has recurrent regions in which the dimensions of the individual plane figures vary, in particular increase or decrease continuously in one direction.

[0017] 9. (preferred) The security element according to any one of paragraphs 6 to 11, wherein the first or the second motif elements are configured in the form of plane figures disposed in spaced relationship, in particular polygons, circles,

cycloid figures or parts of a circle, and the further motif elements produce a background.

[0018] 10. (preferred) The security element according to paragraph 17, wherein the plane figures disposed in spaced relationship have recurrent regions in which the dimensions of the individual plane figures vary, in particular increase or decrease continuously in one direction.

[0019] 11. (preferred) The security element according to any one of paragraphs 10 to 18, wherein the luminescent material is a fluorescent material, in particular a fluorescent ink or a fluorescent pigment.

[0020] 12. (Second aspect) A data carrier, comprising a security element according to any one of paragraphs 6 to 19.

[0021] 13. (preferred) The data carrier according to paragraph 20, wherein the data carrier is a value document, in particular a bank note, an identity document or a label.

[0022] 14. (Third aspect) A method for manufacturing a security element for a data carrier, in particular a value document, comprising the step of supplying a carrier substrate and the step of producing first and second motif elements on the front side of the carrier substrate by printing technology, in particular by means of offset printing, flexographic printing, screen printing, gravure printing, intaglio printing or ink-jet printing, wherein the first and second motif elements are constituted as follows:

the first motif elements show a darker color than the second motif elements under first viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast designated a first motif;

the first motif elements and the second motif elements show a substantially uniform, visible color and form a second motif under second viewing conditions;

the first motif elements show a lighter color than the second motif elements under third viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast that is inverted compared to the light/dark contrast of the first motif and designated a third motif; wherein

the first motif and the third motif create for the viewer the impression of a motion image upon an oscillating change between the first and the third viewing conditions, and the first, second and third viewing conditions are defined as follows:

first viewing conditions: viewing upon illumination with visible light;

second viewing conditions: viewing upon illumination with a combination of visible light and ultraviolet light in substantially equal parts;

third viewing conditions: viewing upon illumination with ultraviolet light.

[0023] 15. (Fourth aspect) A method for checking the authenticity of a data carrier, in particular a value document, according to paragraph 20 or 21, comprising the step of visually detecting the motion image defined in paragraph 6 by viewing the data carrier in daylight with the aid of a UV light source, in particular a UV hand lamp, with the distance between data carrier and UV light source being shortened and lengthened again in recurrent succession.

Detailed description of the invention

[0024] The term "ultraviolet light" employed herein designates in particular light with a wavelength in a region of 235 to 380 nm.

[0025] Instead of the term "visible light" the term "daylight" will also be employed hereinafter.

[0026] The term "daylight color" is understood to be a color based on light in a wavelength region of 380 nm to 750 nm. Hereinafter the synonyms body color and chromatic color will also be employed.

[0027] The term "motif" is understood to be in particular a pattern or an image. The motif can furthermore convey information to the viewer by having e.g. a character, a character string or a picture information. In a variant, the information is perceptible to the viewer in ultraviolet light and imperceptible in pure visible light, or vice versa.

[0028] The three hereinabove mentioned motifs (i.e. the "first", "second" and "third" motif) are visually distinguishable to the viewer.

[0029] A segment can be understood to be e.g. a plane figure. The term "plane figure" is known in the prior art (see "Mathematische Formelsammlung", Verlag Konrad Wittwer KG, Stuttgart, 1984, pages 12-15). Plane figures include in particular the following elements: triangle, in particular right-angled triangle, isosceles triangle and equilateral triangle; quadrangle, in particular square, rectangle, rhombus, parallelogram, kite, trapezoid, cyclic quadrilateral and tangential quadrilateral; circle; cycloid figures, such as e.g. an ellipse; parts of a circle, in particular circular sector (a circular sector can be defined by the parameters r = radius, b = arc and α = central angle), annulus (an annulus can be defined by the parameters r = radius of the inner circle and R = radius of the outer circle) and annulus sector (an annulus sector can be defined by the parameters r = radius of the inner circle, R = radius of the outer circle, B = outer arc, b = inner arc and α = central angle).

[0030] The term "polygon" employed herein designates in particular an n -gon with $n \geq 3$.

[0031] The invention is based on the idea of achieving a dynamic effect through the interaction of luminous colors or luminescent colors, in particular fluorescent colors, and body colors or chromatic colors by means of a suitable design. The dynamic effect is based on a light/dark interaction of a motif-element structure contained in the motif, and can be observed in particular upon an

oscillating traversing (i.e. through a periodic "back-and-forth") of the transition from (1) the illumination of the security element with visible light, through (2) a UV light/daylight illumination situation in an approximate ratio of 1:1, to (3) a substantially pure UV illumination situation. What is decisive for the dynamic effect is the periodic change of the distance between the UV light source and the security element. The percentage ratio of daylight to UV light changes here in particular in a region of 70/30 to 30/70. Since the human eye regards the lighter image components of a motif as being in the foreground or dominant, the dynamic motion effect is especially impressive upon the change of lightness of closely adjacent motif elements, e.g. lines, dots or circles. The change of lightness is produced by the change of the distance between the UV light source and the security element, with the illuminance e.g. of a fluorescent color increasing quadratically as the distance is shortened. Thus, at a greater distance the lighter daylight color becomes dominant, and at a smaller distance the fluorescent color, which otherwise appears darker in daylight.

[0032] The dynamic motion effect comes about, depending on the choice and arrangement of the motif elements, in the form of a turning or rotation effect (i.e. the motion of a turning wheel) created by an optical illusion, or in the form of a "pumping effect" (i.e. the periodically changing three-dimensional appearance of a motif) otherwise known in holograms, or the like. A turning or rotation effect can be brought about e.g. by joining the first and second motif elements together in an alternating manner such that they together yield a pattern with rotational symmetry, in particular a pattern with rotational symmetry and mirror symmetry (see e.g. the pattern in Fig. 17). The first and second motif elements can be joined together in gapless relationship or in spaced relationship.

[0033] Suitable for carrying out the invention are in particular fluorescent pigments and fluorescent dyes (in particular organic color matters) whose optical effect is based on their ability to absorb UV radiation and emit it in the form of visible light without a time delay, i.e. with a short-lived light emission ending

within 10^{-8} seconds. Phosphorescent materials are less preferred, but can be used on condition that the duration of the afterglow process does not impair the recognizability of the dynamic motion effect.

[0034] The security element according to the invention can be excitable in particular at two or more wavelengths and then show different fluorescent color tones in dependence on the wavelength.

[0035] The invention will be explained more closely with reference to the following embodiment variants or examples in connection with the accompanying figures. The examples represent preferred embodiments, but the invention should in no way be limited thereto. Furthermore, the representations in the figures are strongly schematic for the sake of better comprehension and do not reflect the actual conditions. In particular, the proportions shown in the figures do not correspond to the relations existing in reality and serve exclusively to improve the clearness.

[0036] Specifically, the figures show:

Figures 1 to 15: a first embodiment variant of the invention;

Figures 16 to 22: further embodiment variants of the invention.

[0037] Fig. 10 illustrates the construction of a security element according to the invention according to a first embodiment variant in a cross-sectional view. A carrier substrate, for example the paper substrate of a bank note (not shown in the figure), has on its front side first motif elements (regions with the reference numbers 1 and 3) and second motif elements (regions with the reference number 2). The first and second motif elements are respectively formed by color layers produced by printing technology, with the first motif elements respectively containing a lower color layer 1 and an upper color layer 3 and the second motif

elements respectively comprising only one color layer 2. The color layers possess the following properties:

Color layer 1: dark blue daylight color

Color layer 2: light green daylight color

Color layer 3: yellow fluorescent color

[0038] The yellow fluorescent color of the color layer 3 is invisible upon viewing solely in daylight and appears yellow upon viewing in UV light.

[0039] Figures 1 to 3 show in plan view the structure of the printing forms for manufacturing the security elements shown in Fig. 10. The printing form shown in Fig. 1 is provided for producing the color layer 1 in dark blue daylight color. Fig. 2 shows the printing form for producing the color layer 2 in light green daylight color. Fig. 3 shows the printing form for producing the color layer 3 in yellow fluorescent color.

[0040] Fig. 4 illustrates the construction of the combination print that is obtainable through the printing forms shown in Figures 1 to 3. The combination print has an outer, rectangular border 4 and an inner region 5. The printing ink of the rectangular border 4 is due solely to the printing form shown in Fig. 1. The inner region 5 contains a background print produced by the printing forms of Fig. 1 and Fig. 2 and a plurality of regions overprinted by means of the printing form of Fig. 3.

[0041] Fig. 5 shows the security element of Fig. 10 in plan view upon viewing in pure daylight. The viewer perceives a first information item formed by vertical, light green stripes 7 and a dark blue background 6.

[0042] Fig. 6 shows the security element of Fig. 10 in plan view upon viewing substantially in pure UV light. The viewer perceives a second information item formed by vertical, yellow stripes 10 and a very dark background 9.

[0043] Fig. 7 shows the security element of Fig. 10 in plan view upon viewing in daylight and UV light in a ratio of about 1:1. In the regions 11 the yellow fluorescent color mixes with the dark blue daylight color located therebelow through additive color mixture to form a green corresponding to the daylight green of the regions 12. There thus arises, as a third information item, an area that is single-colored to the eye.

[0044] How the motifs shown in Figures 5, 6 and 7 come about is illustrated by the cross-sectional views shown in Figures 11, 12 and 13.

[0045] Fig. 11 shows the security element of Fig. 5 in pure daylight. The reference number 8 designates the color layers formed with fluorescent color which are invisible under the present viewing conditions. The reference numbers 6 and 7 indicate the visible color layers formed with dark blue and light green daylight color, respectively.

[0046] Fig. 12 shows the security element of Fig. 6 in pure UV light. The reference number 10 designates the color layers formed with yellow fluorescent color which are visible under the present viewing conditions. The reference number 9 indicates the color layers formed with daylight color which are invisible under the present viewing conditions.

[0047] Fig. 13 shows the security element of Fig. 7 upon viewing under daylight/UV light in a ratio of about 1:1. The reference number 11 designates the green recognizable to the viewer through additive color mixture of the yellow fluorescent color and the dark blue daylight color. The reference number 12 indicates the green formed by daylight color which is visible to the viewer.

[0048] The dynamic interplay of light in the course of the periodic motion of the UV light source is illustrated by Figures 8, 9, 14 and 15. As the distance between UV light source and object decreases the lightness of the fluorescent

color increases, while conversely decreasing as said distance increases. Compared to the fluorescent color, the lightness of the daylight colors changes in an opposite manner through decreasing of the daylight portion when the object enters a UV chamber or through shadowing by means of a UV hand lamp sliding above the object. In other words, as the distance from the UV lamp decreases the fluorescent color becomes lighter than the daylight color, while as said distance increases the daylight color becomes lighter than the fluorescent color again.

[0049] Figures 8 (plan view) and 14 (cross-sectional views) show the security element of Fig. 10 upon viewing under daylight/UV light in a ratio of about 1:2. The regions with the reference number 13 are perceived by the viewer with light green color, while the regions with the reference number 14 are perceived with dark green color.

[0050] Figures 9 (plan view) and 15 (cross-sectional view) show the security element of Fig. 10 upon viewing under daylight/UV light in a ratio of about 2:1. The regions with the reference number 13 are perceived by the viewer with dark green color, while the regions with the reference number 14 are perceived with light green color.

[0051] Figures 16 to 22 show further design implementations of the security element shown in Fig. 10.

[0052] Fig. 16 shows an arrangement of the first and second motif elements in the form of two offset grids (which are represented by black and white lines in the figure), with the grid elements having the form of concentric, star-shaped formations.

[0053] Fig. 17 shows an alternating, circular arrangement of first and second motif elements which respectively have the approximate form of an isosceles triangle.

[0054] In a variant for the embodiment shown in Fig. 17, the intermediate lines or sides of the isosceles triangles are formed by alternating first and second motif elements. A variation of the line thickness can additionally intensify the dynamic motion effect.

[0055] Fig. 18 shows the formation of a snail shell in which the circularly disposed white areal elements represent the second motif elements, and the black intermediate lines between the circularly disposed white areal elements represent the first, fluorescent motif elements.

[0056] The examples according to Figures 17 and 18 show an impressive rotation effect as the UV light source moves.

[0057] In the examples according to Figures 19 and 20, the first and second motif elements are configured in the form of two grids disposed offset, with one of the two grids having periodically recurring grid regions. Within the recurrent grid region the line thickness of the individual grid elements varies, i.e. it increases or decreases continuously in one direction. Figures 19 and 20 show only one recurring unit of the periodically recurring grid region (black lines with high line width).

[0058] In the example shown in Fig. 19, the line thickness increases in one direction within the periodically recurring grid region; the distance between the lines decreases in the same direction.

[0059] In the example shown in Fig. 20, both the line thickness and the distance between the lines decrease in the same direction within the periodically recurring grid region.

[0060] Fig. 21 and Fig. 22 respectively show an alternating, circular arrangement of first motif elements 15 and second motif elements 16, with the

arrangement additionally having white regions 17, in the present case unprinted regions.

[0061] In the embodiment variant shown in Fig. 10, the first motif elements are respectively formed by a lower color layer containing a daylight color, and an upper color layer containing a fluorescent color. The construction in the form of a double layer is not necessary, however. According to a further variant, the daylight color and the fluorescent color can also be contained in a single color layer.

[0062] Furthermore, the security element according to the invention can also contain further types of motif elements apart from the first and second motif elements. A conceivable design implementation is for example a security element having additional third motif elements similar to the first motif elements shown in Fig. 10 but with a different fluorescent or phosphorescent color.

Claims

1. A security element for a data carrier, comprising a carrier substrate whose front side has first motif elements and second motif elements, wherein:

the first motif elements show a darker color than the second motif elements under first viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast designated a first motif;

the first motif elements and the second motif elements show a substantially uniform, visible color and form a second motif under second viewing conditions;

the first motif elements show a lighter color than the second motif elements under third viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast that is inverted compared to the light/dark contrast of the first motif and designated a third motif; wherein

the first motif and the third motif create for the viewer the impression of a motion image upon an oscillating change between the first and the third viewing conditions, and the first, second and third viewing conditions are defined as follows:

first viewing conditions: viewing upon illumination with visible light;

second viewing conditions: viewing upon illumination with a combination of visible light and ultraviolet light in substantially equal parts;

third viewing conditions: viewing upon illumination with ultraviolet light.

2. The security element according to claim 1, wherein the first and second motif elements are disposed offset.

3. The security element according to claim 1 or 2, wherein:

the first motif elements respectively have a first color layer in a first visible color and a second color layer formed above the first color layer, and the second color layer contains a material luminescing under UV irradiation which is invisible

upon illumination with visible light and shows a second visible color upon illumination with ultraviolet light;

the second motif elements respectively have a color layer in a third visible color; and

the two color layers of the first motif elements are so coordinated that the first and the second visible color yield under the second viewing conditions a mixed color which is substantially identical with the third visible color of the second motif elements.

4. The security element according to claim 1 or 2, wherein:

the first motif elements respectively have a color layer and the color layer contains a material in a first visible color and a further material luminescing under UV irradiation which is invisible upon illumination with visible light and shows a second visible color upon illumination with ultraviolet light;

the second motif elements respectively have a color layer in a third visible color; and

the two materials in the color layer of the first motif elements are so coordinated that the first and the second visible color yield under the second viewing conditions a mixed color which is substantially identical with the third visible color of the second motif elements.

5. The security element according to any one of claims 1 to 4, wherein the first and second motif elements are configured in the form of two segment groups disposed offset.

6. The security element according to claim 5, wherein the first and second motif elements are configured in the form of two grids disposed offset and at least one of the two grids has recurrent grid regions, wherein the line thickness of the individual grid elements varies within the recurrent grid region.

7. The security element according to any one of claims 1 to 6, wherein the first and second motif elements are configured independently of each other in the form

of plane figures, and the first and second motif elements are disposed alternately.

8. The security element according to claim 7, wherein at least one of the two types of alternately disposed, plane figures has recurrent regions in which the dimensions of the individual plane figures vary.

9. The security element according to any one of claims 1 to 4, wherein the first or the second motif elements are configured in the form of plane figures disposed in spaced relationship, and the further motif elements produce a background.

10. The security element according to claim 9, wherein the plane figures disposed in spaced relationship have recurrent regions in which the dimensions of the individual plane figures vary.

11. The security element according to any one of claims 3 to 10, wherein the luminescent material is a fluorescent material.

12. A data carrier, comprising a security element according to any one of claims 1 to 11.

13. The data carrier according to claim 12, wherein the data carrier is a value document, an identity document or a label.

14. A method for manufacturing a security element for a data carrier, comprising the step of supplying a carrier substrate and the step of producing first and second motif elements on the front side of the carrier substrate by printing technology, wherein the first and second motif elements are constituted as follows:

the first motif elements show a darker color than the second motif elements under first viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast designated a first motif;

the first motif elements and the second motif elements show a substantially uniform, visible color and form a second motif under second viewing conditions;

the first motif elements show a lighter color than the second motif elements under third viewing conditions, so that the viewer perceives the first and second motif elements in the form of a light/dark contrast that is inverted compared to the light/dark contrast of the first motif and designated a third motif; wherein

the first motif and the third motif create for the viewer the impression of a motion image upon an oscillating change between the first and the third viewing conditions, and the first, second and third viewing conditions are defined as follows:

first viewing conditions: viewing upon illumination with visible light;

second viewing conditions: viewing upon illumination with a combination of visible light and ultraviolet light in substantially equal parts;

third viewing conditions: viewing upon illumination with ultraviolet light.

15. A method for checking the authenticity of a data carrier according to claim 12 or 13, comprising the step of visually detecting the motion image defined in claim 1, by viewing the data carrier in daylight with the aid of a UV light source, with the distance between data carrier and UV light source being shortened and lengthened again in recurrent succession.

FIG 1

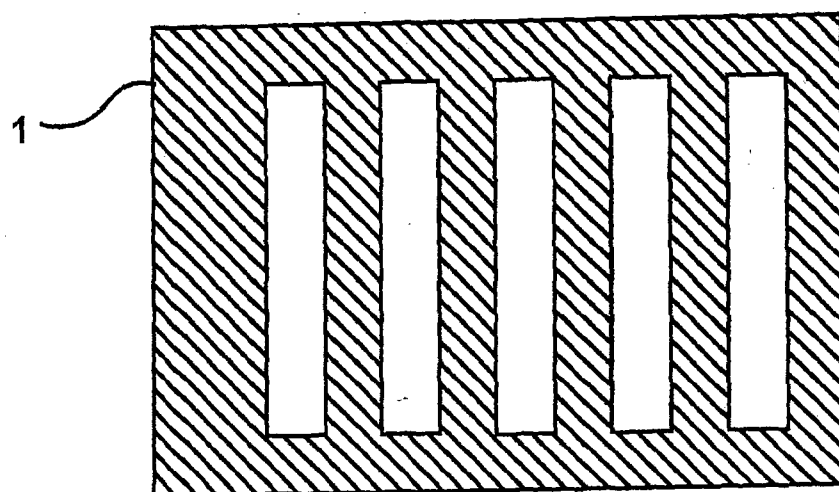


FIG 2

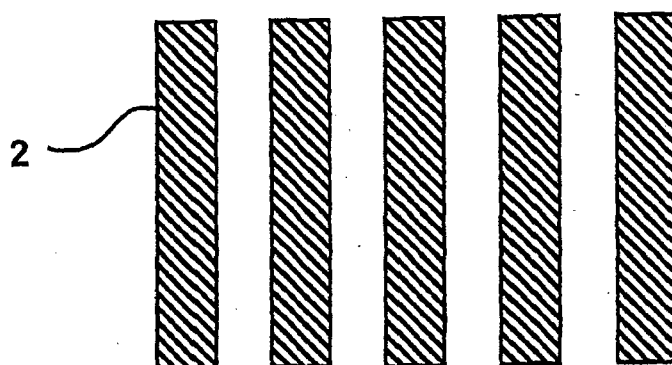


FIG 3

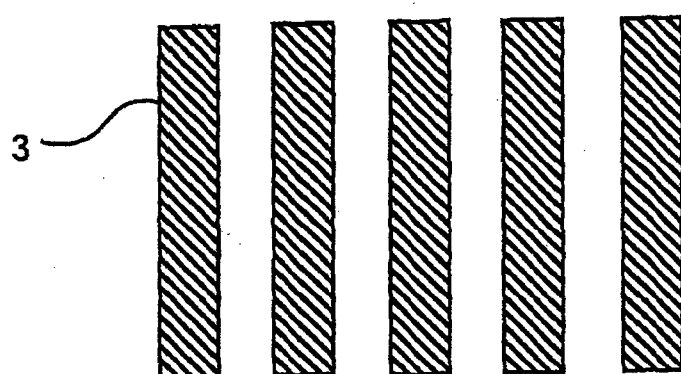


FIG 4

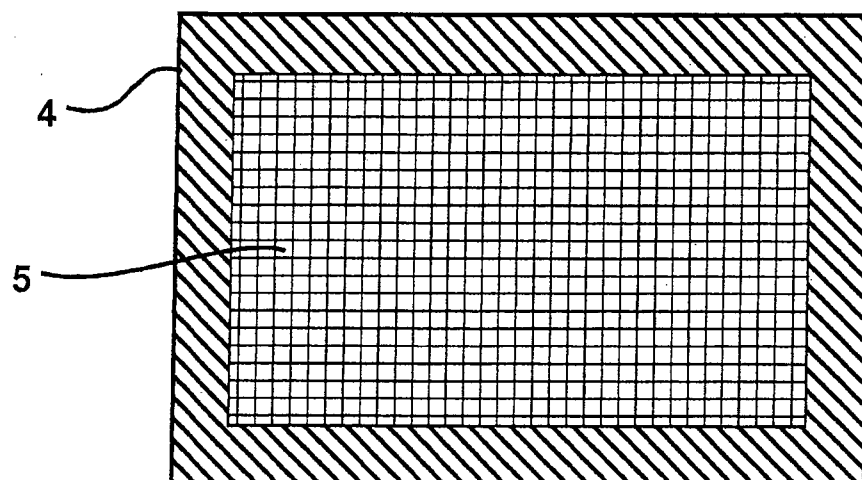


FIG 5

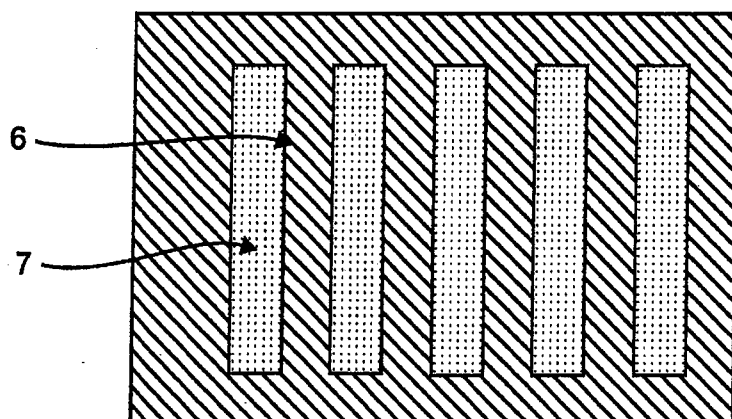


FIG 6

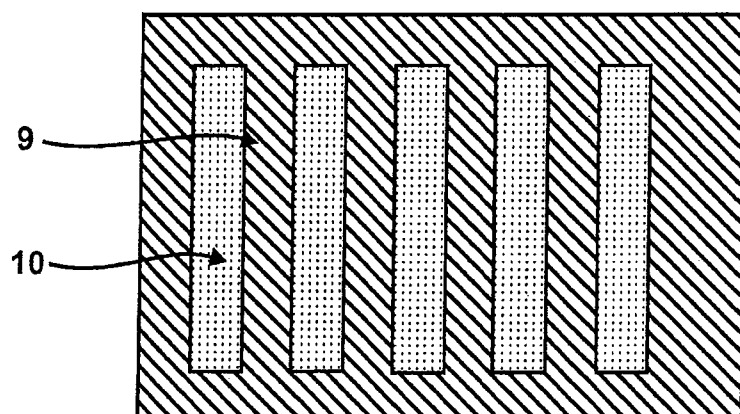


FIG 7

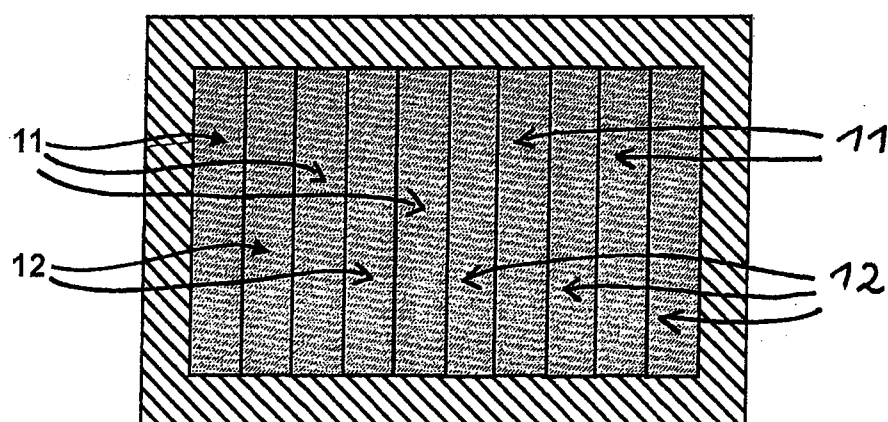


FIG 8

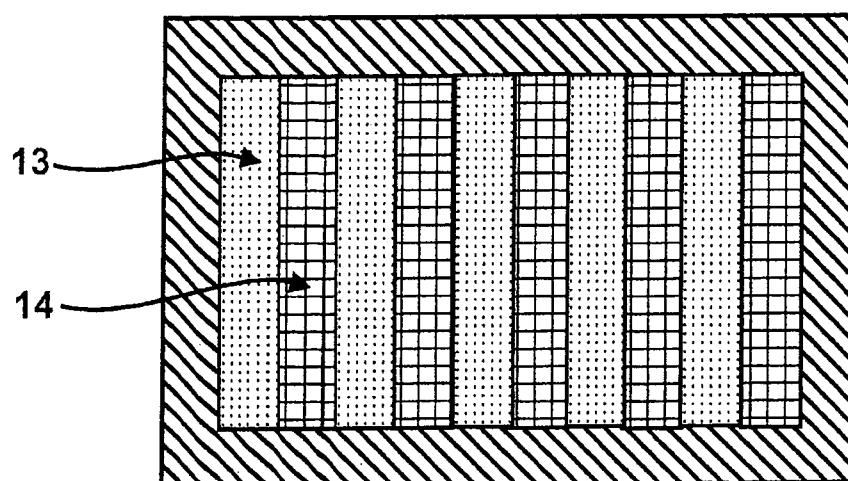


FIG 9

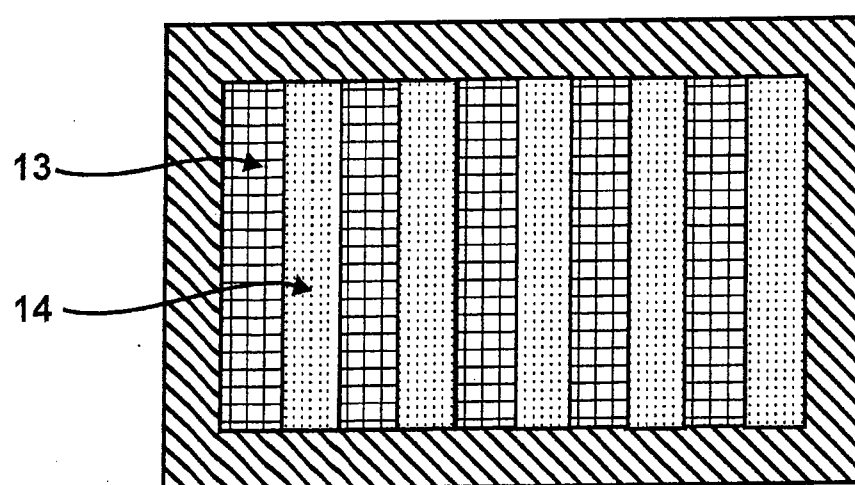


FIG 10

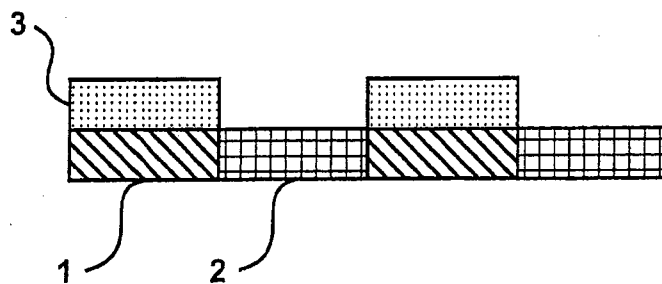


FIG 11

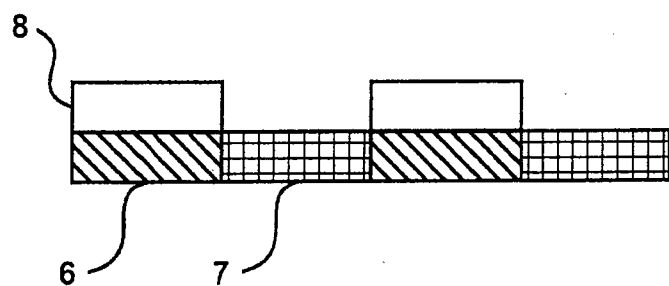


FIG 12

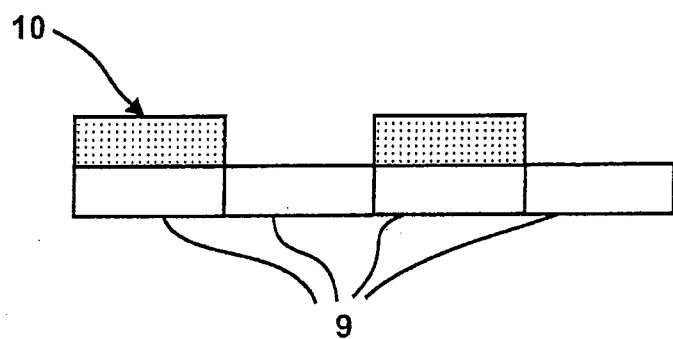


FIG 13

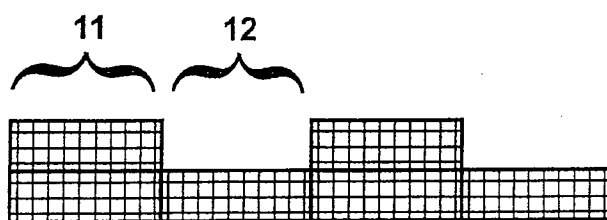


FIG 14

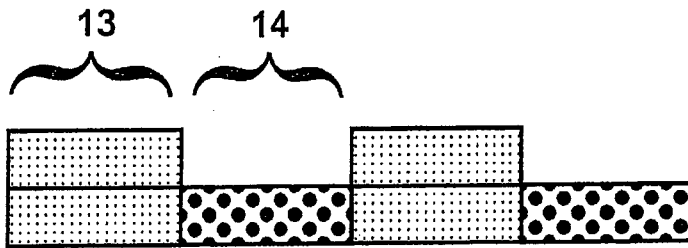


FIG 15

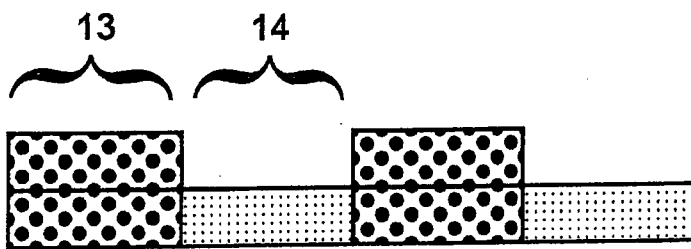


FIG 16

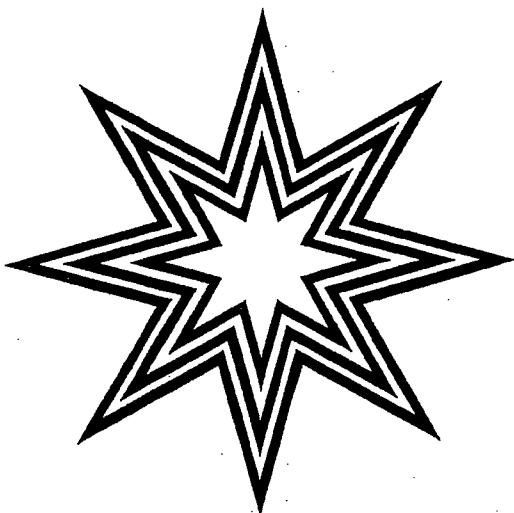


FIG 17

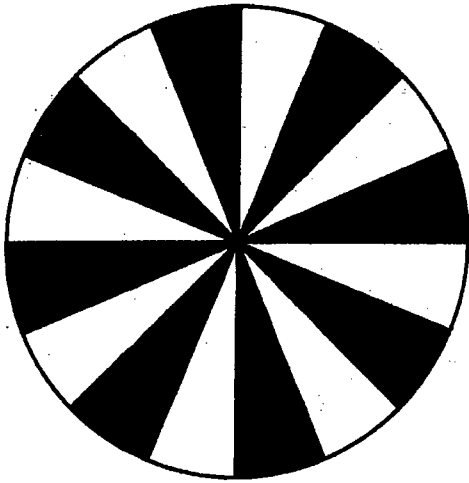


FIG 18

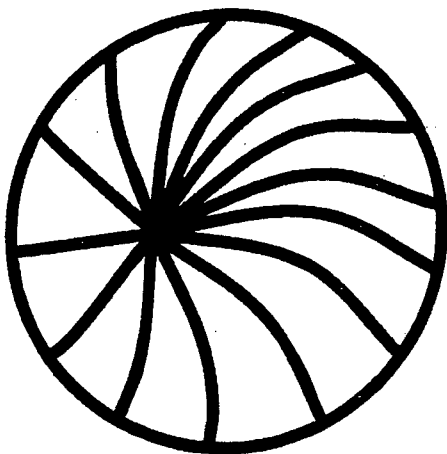


FIG 19

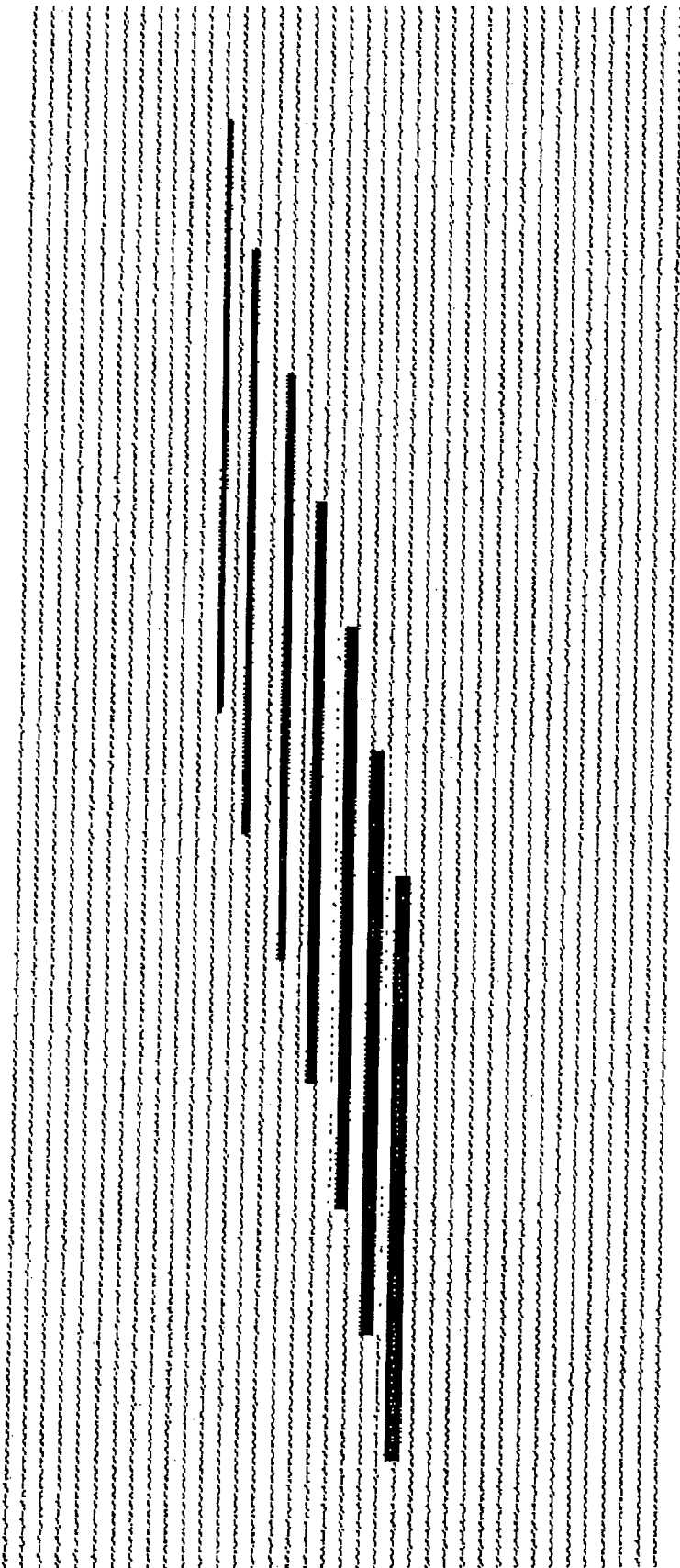


FIG 20

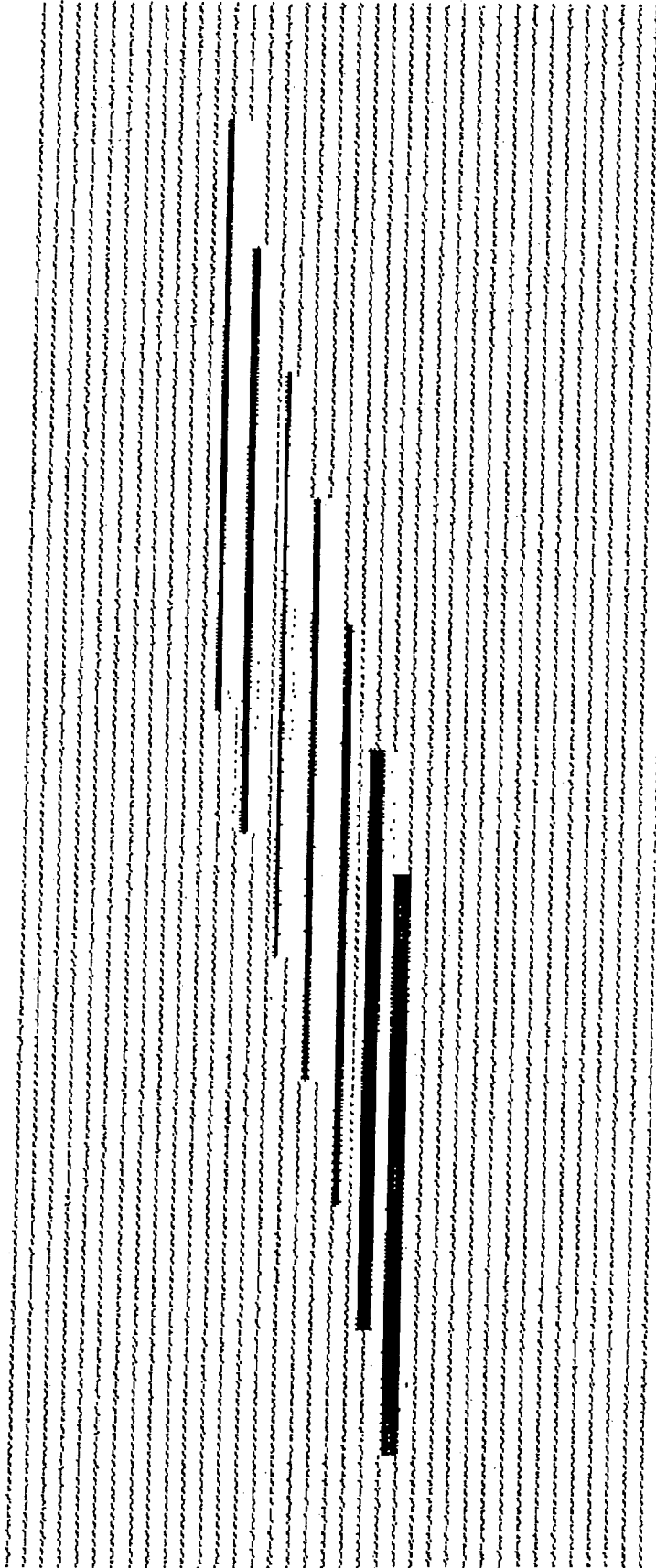


FIG 21

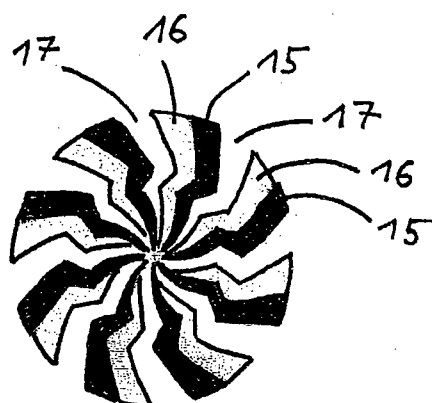


FIG 22

