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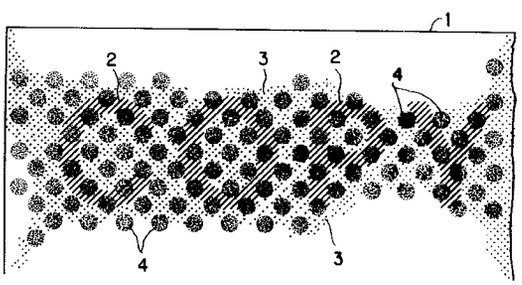
(54) Positive film sheet for use as copying and forgery countermeasure.

(57) A film positive sheet is adapted for a copying--forgery countermeasure and includes latent images (2) formed of multi-lines of about 50-line 10% of meshes of about 150-line 10%, and a background (3) formed of meshes of about 150-line 10% or multi-lines of about 50-line 10%. The film positive sheet further includes ground patterns (4) formed of meshes of about 175-line 10%. The ground patterns (4) are disposed throughout the latent images (2) and the background (3). Accordingly, a print can be produced in a single printing operation from the film positive sheet.

FIG. 2



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BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a film positive sheet adapted for a copying-forgery countermeasure, and more specifically, to a film positive sheet having ground patterns for concealing a latent image or latent images so as to produce a print which is proof against forgery caused by copying.

Description of the Prior Art

Technique has been known in which, for preventing forgery by copying, latent images in the form of characters, such as, "VOID" or "COPY", which are provided on a print or an original document in a manner invisible to the naked eye, are caused to appear on a copy obtained from the original document. In the technique of this type, the latent images should not be visually recognized in advance on the original document, while should be visually recognized distinctly from a background on the obtained copy.

For satisfying such a requirement, roughly two types of printing techniques have been available, that is, a single printing technique and a double printing technique. As disclosed, such as, in Japanese Second (examined) Patent Publication No. 58-47708, in the single printing technique, a fine camouflage pattern in a blank format is incorporated simultaneously when printing the latent images and the background. On the other hand, as disclosed, such as, in Japanese Second (examined) Patent Publication No. 1-5835, in the double printing technique, an overprint pattern of a light color tone is printed on the printed latent images.

In the former single printing technique, the printing can be achieved with only one film positive sheet and thus the printing process is simple so that a product is obtained with reduced cost. However, the latent images and the background are divided into sections by the fine blank pattern so that the fine blank pattern interferes with the latent images and the background on the obtained copy. This causes contrast between the latent images and the background to be unclear or poor so that the latent images are not clearly distinguishable from the background. By adjusting color tone of a copying machine, the latent images may be caused to disappear fully on the obtained copy.

On the other hand, in the latter double printing technique, since the overprint pattern of a light color tone is not reproduced on the obtained copy, the latent images can be visually distinguished with clear contrast between the latent images and the background. However, the printing requires two film positive sheets due to the double printing and thus the printing process requires additional operations so that a product becomes correspondingly costly.

SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide an improved film positive sheet adapted for a copying-forgery countermeasure in view of the foregoing conventional techniques.

According to one aspect of the present invention, a film positive sheet adapted for a copying-forgery countermeasure comprises a substrate; and a latent image and a background formed on the substrate, one of the latent image and the background being formed of multi-lines of about 50-line 10%, the other of the latent image and the background being formed of meshes of about 150-line 10%; wherein the film positive sheet further includes ground patterns formed of meshes of about 175-line 10%, the ground patterns being incorporated all over the latent image and the background on the substrate so that a print is produced through a single printing operation.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood more fully from the detailed description given hereinbelow and from the accompanying drawings of the preferred embodiments of the invention, which are given by way of example only, and are not intended to limit the present invention.

In the drawings:

Fig. 1 is a top plan view schematically showing a film positive sheet adapted for a copying-forgery countermeasure according to a preferred embodiment of the present invention;

Fig. 2 is a partial enlarged view showing the film positive sheet of Fig. 1 on an enlarged scale;

Fig. 3 is a partial enlarged sectional view showing a print or a sheet of paper on which a single printing is performed employing the film positive sheet shown in Fig. 1; and

Fig. 4 is a top plan view showing a copy obtained from the print shown in Fig. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Now, a film positive sheet adapted for a copying-forgery countermeasure according to a preferred embodiment of the present invention will be described hereinbelow with reference to the accompanying drawings.

Fig. 1 is a top plan view schematically showing the film positive sheet according to the preferred embodiment. In Fig. 1, numeral 1 represents a printing film substrate. On the substrate 1, a plurality of latent images 2 representing "COPY" which are difficult to distinguish with the naked eye are formed. The remaining portions on the substrate 1 are identified by numeral 3 representing a background. Further, an en-

ormous number of ground patterns 4 are incorporated in the latent images 2 and the background 3 such that only the ground patterns 4 appear to be present on the substrate 1.

Fig. 2 is a partial enlarged view of Fig. 1 and shows the surface of the substrate 1 on an enlarged scale. As shown in Fig. 2, the latent images 2 are formed of oblique multi-lines, the background 3 is formed of non-pattern meshes, and the ground patterns 4 are also formed of meshes.

In this preferred embodiment, the multi-lines of the latent images 2 are 50-line 10%, the meshes of the background 3 are 150-line 10%, and the meshes of the ground patterns 4 are 175-line 10%. The ground patterns 4 are formed all over the latent images 2 and the background 3 in a superimposed manner. Since the ground patterns 4 are superimposed on the latent images 2 and the background 3, the ground patterns 4 are recognized in a deep color tone.

Fig. 3 is a partial enlarged sectional view showing a print or a sheet of paper 10 on which a single printing is performed employing the foregoing film positive sheet shown in Figs. 1 and 2. On the paper 10, a print layer 11 including the latent images 2, the background 3 and the ground patterns 4 is formed.

A surface of the print looks in the same manner as that of the film positive sheet. Accordingly, the ground patterns 4 of the film positive sheet are visually recognized on the surface of the print in a light color tone and in coloring depending on an ink color so that the latent images 2 are not visually distinguishable from the background 3.

Fig. 4 is a top plan view showing a copy 20 obtained from the print shown in Fig. 3. On the copy 20, the latent images 2 appear distinctly, while the background 3 appears faintly and the ground patterns 4 do not appear. This is because the multi-lines of 50-line 10% are reproducible by the copying machine, the meshes of 150-line 10% are not reproducible in an ordinary color tone by the copying machine, and the meshes of 175-line 10% are not reproducible by the copying machine. Accordingly, the ground patterns 4 do not interfere with the latent images 2 and the background 3 on the obtained copy so that the latent images 2 are visually distinguishable with clear contrast between the latent images 2 and the background 3. As appreciated, when the ground patterns 4 are too deep in color, the ground patterns 4 are reproduced on the obtained copy 20 so as to interfere with the latent images 2 and the background 3 so that the latent images 2 are not visually distinguishable on the obtained copy 20. On the other hand, when the ground patterns 4 are too light in color, the latent images 2 can be recognized with the naked eye on the print, that is, before copying. The meshes of 175-line 10% have been confirmed through experiments to be excellent in view of the required role of the ground patterns 4.

In the foregoing preferred embodiment, the latent images 2 are formed of the multi-lines, and the background 3 of the meshes. On the other hand, the latent images 2 may be formed of the meshes of 150-line 10%, and the background 3 of the multi-lines of 50-line 10%. In this case, when the print is copied via the copying machine, the latent images 2 are not reproduced in an ordinary color tone, while the background 3 is reproduced in a deep color tone. Accordingly, the latent images 2 are visually recognized with clear contrast therebetween.

Further, in the foregoing preferred embodiment, the particular numerical values are indicated for the numbers and percentages of lines of the multi-lines and the meshes. However, numerical values around or near the indicated numerical values are also included within a scope of the present invention as long as they can provide similar effects.

The present invention provides the following particular advantages:

(1) The ground patterns are incorporated in the latent images and the background. Accordingly, the latent images on the surface of the print are concealed by the ground patterns and thus are not distinguishable from the background with the naked eye. This provides a good appearance on the surface of the print.

(2) The ground patterns are not reproduced on the obtained copy, and the latent images are distinctly recognized on the obtained copy as being distinguished from the background. Accordingly, it is made clear that the copy is actually a copy and not an original, which is every effective in view of the copying-forgery countermeasure.

(3) Since the ground patterns are incorporated on the surface of the substrate along with the latent images and the background, the printing is completed with the single printing operation to simplify the printing process so that the product can be provided with reduced cost.

Claims

1. A film positive sheet including a copying-forgery countermeasure, comprising:

   a substrate (1); and

   a latent image (2) and a background (3) formed on said substrate (1), one of said latent image and said background being formed of multi-lines of about 50-line 10%, the other of said latent image and said background being formed of meshes of about 150-line 10%;

   wherein said film positive sheet further includes ground patterns (4) formed of meshes of about 175-line 10%, said ground patterns (4) being disposed throughout said latent image (2) and

said background (3) on said substrate so that a print may be produced from the film positive sheet through a single printing operation.

2. A film positive sheet as set forth in claim 1, wherein said latent image (2) is formed of said multi-lines and said background (3) is formed of said meshes.

3. A film positive sheet as set forth in claim 1, wherein said latent image (2) is formed of said meshes and said background (3) is formed of said multi-lines.

FIG. 1

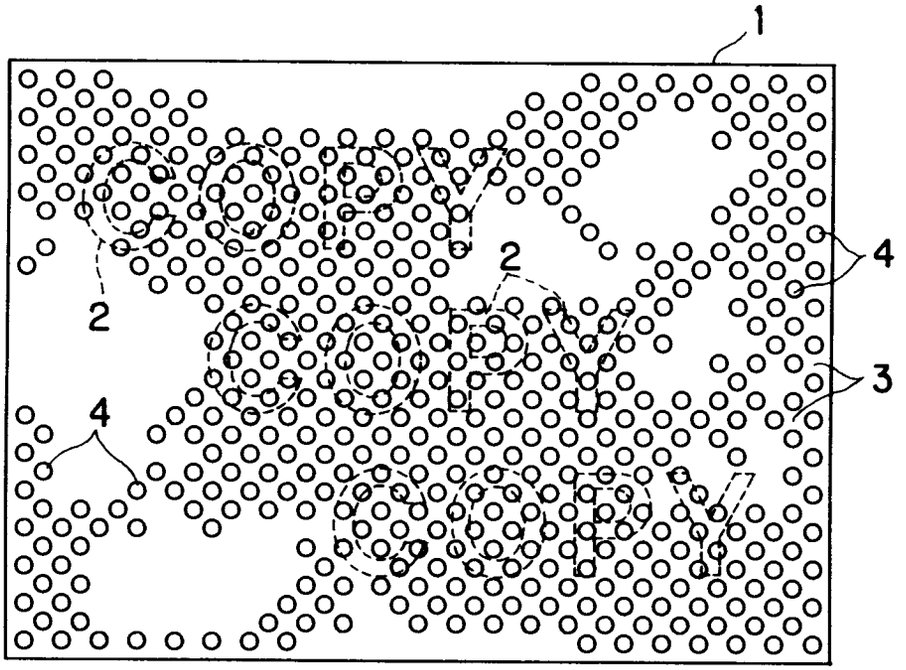


FIG. 2

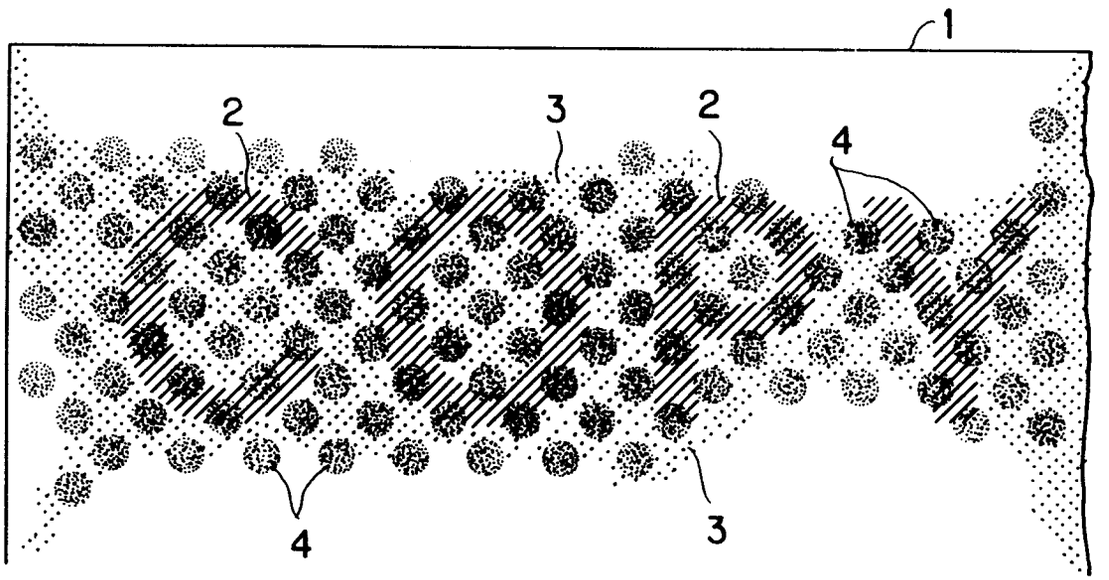


FIG. 3

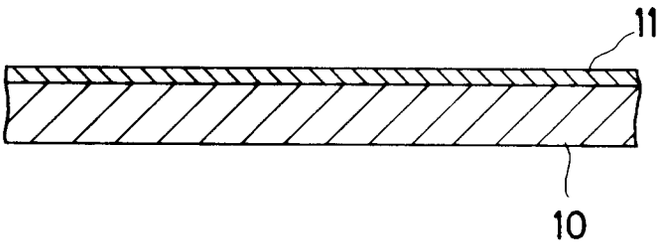
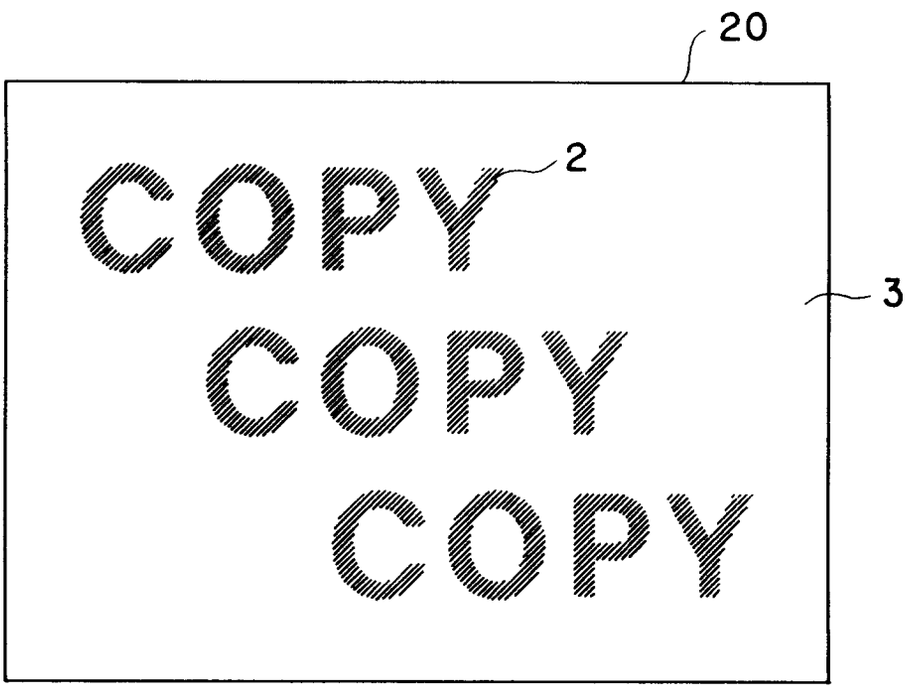


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 2774

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US,A,5 078 428 (TATSUO MAENO) * the whole document *	1-3	B41M3/14 B42D15/00 G03C5/08
X	EP,A,0 522 827 (THE STANDARD REGISTER COMPANY) * column 1, line 22 - column 9, line 19 *	1-3	
X	US,A,5 149 140 (W. H. MOWRY) * column 1, line 30 - column 4, line 52 *	1-3	
X	US,A,4 780 397 (SHOHEI TSUCHIYA) * the whole document *	1-3	
X	GB,A,2 217 258 (SUOMEN PANKIN SETELIPAINO) * page 5, paragraph 4 - page 12, paragraph 3 *	1-3	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B41M
B42D
G03C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 August 1995	Doolan, G

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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