

[54] DOCUMENTS VERIFIABLE AS TO THEIR AUTHENTICITY

2,969,531 1/1961 Stewart 35/2 X
3,279,095 10/1966 Carlson 35/2

[76] Inventors: Anton Wilhelm Jemseby,
Allfarvagen 29, 183 42 Taby; Erik
Gustav Elinder, Djurgardsvagen
136, 115 21 Stockholm, both of
Sweden

FOREIGN PATENTS OR APPLICATIONS

227,601 8/1909 Germany 35/2

[22] Filed: June 11, 1973

Primary Examiner—J. H. Wolfe
Attorney, Agent, or Firm—Karl W. Flocks

[21] Appl. No.: 368,528

[30] Foreign Application Priority Data

June 16, 1972 Sweden 7948/72
Aug. 17, 1972 Sweden 10674/72

[52] U.S. Cl. 35/2, 283/11

[51] Int. Cl. G09c 5/00

[58] Field of Search 35/2; 283/11, 17

[57] ABSTRACT

A document which can be verified as to its authenticity has within at least two adjoining surface areas two similar patterns of surface elements at least some of which are elongated, the pattern of one surface area being displaced in relation to that of the other surface area.

3 Claims, 7 Drawing Figures

[56] References Cited
UNITED STATES PATENTS

2,952,080 9/1960 Avakian et al. 35/2

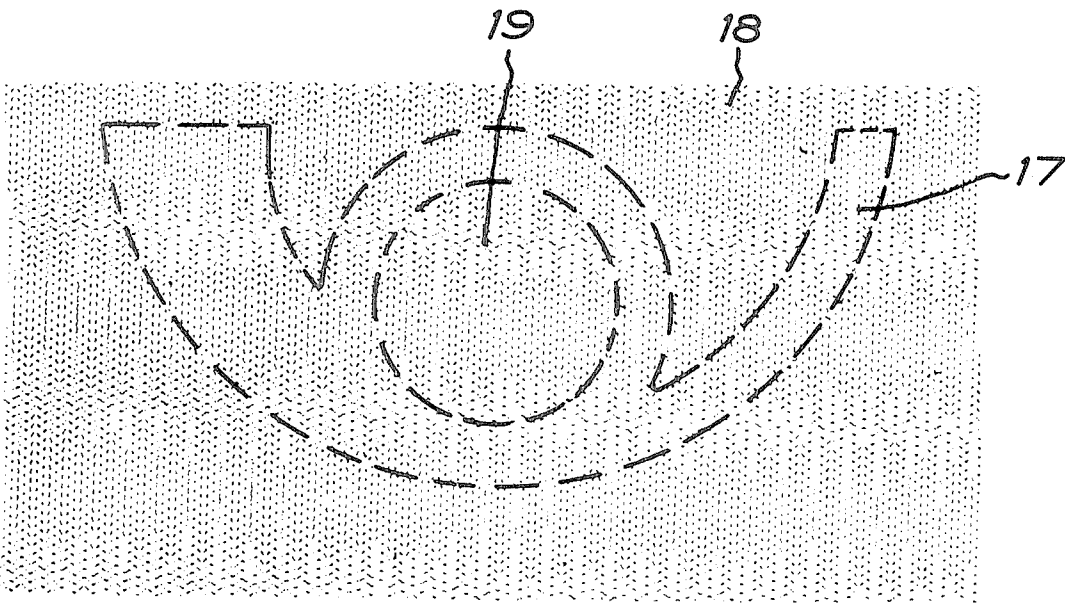


FIG. 1

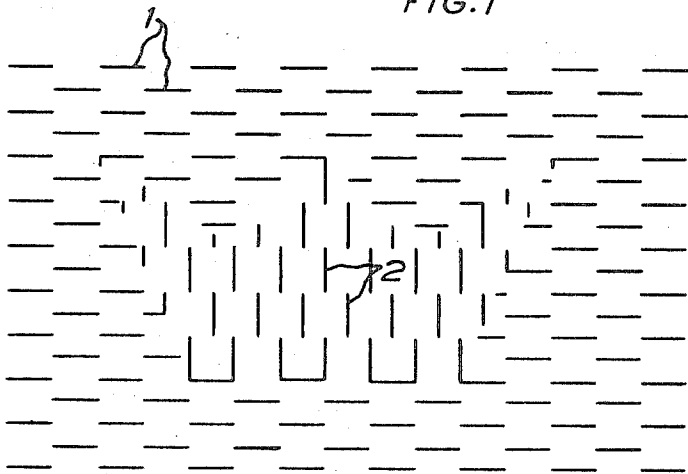
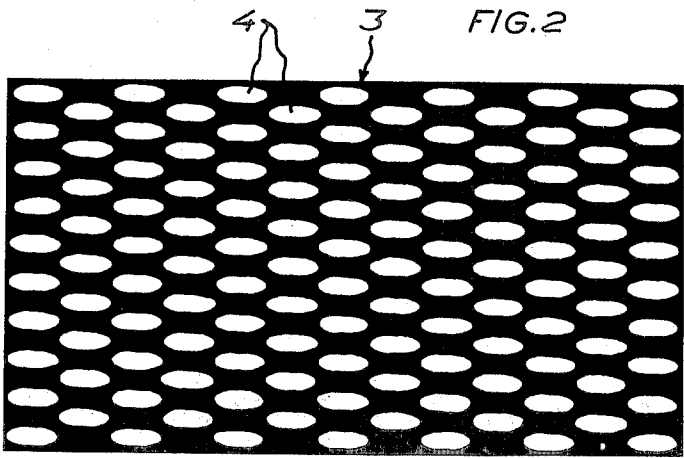


FIG. 2



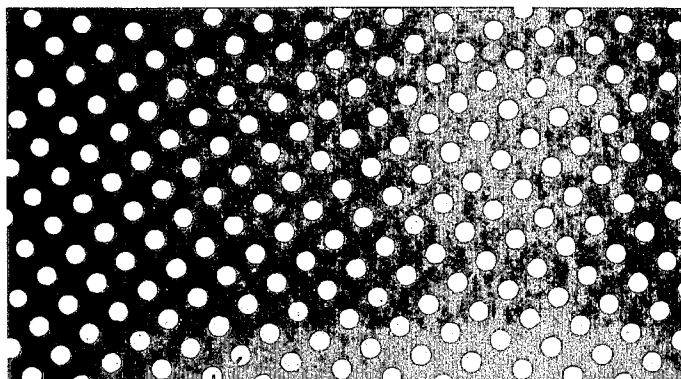


FIG. 3

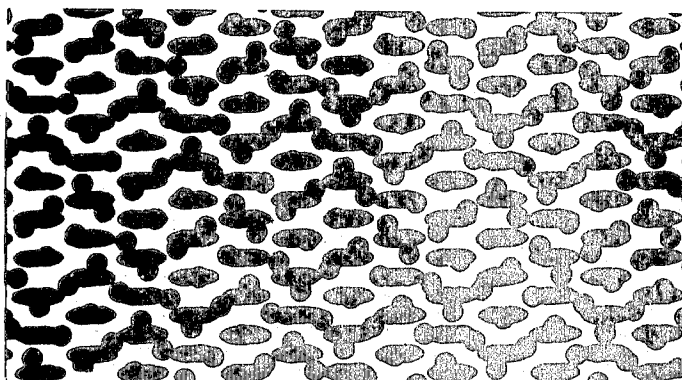


FIG. 4

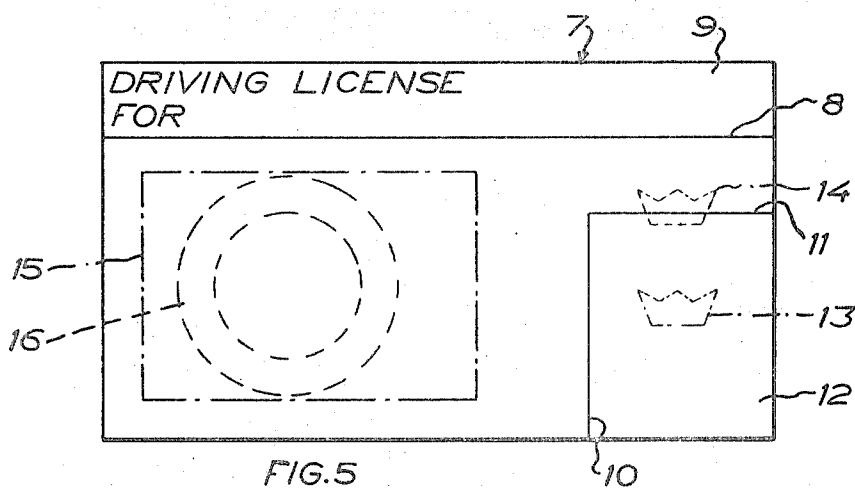


FIG. 5

FIG. 6

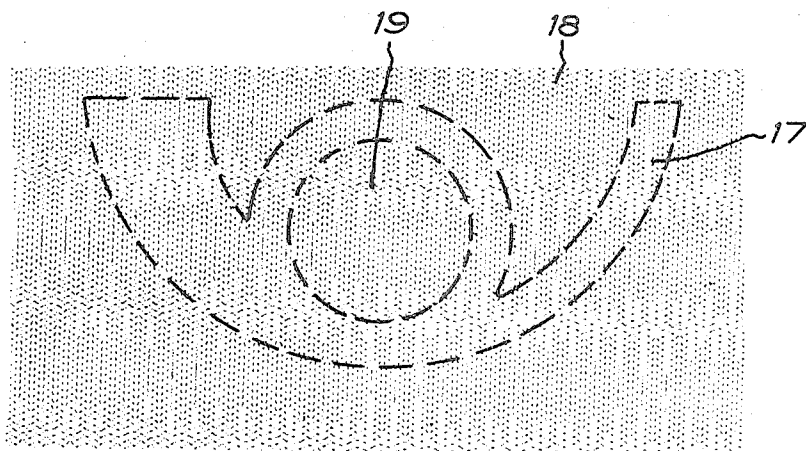
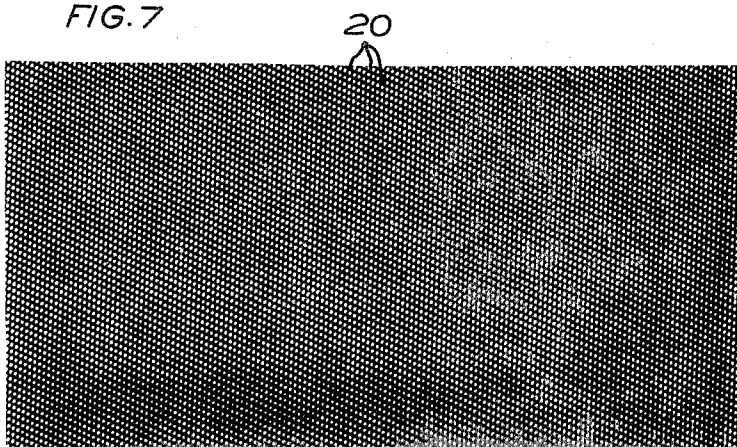


FIG. 7



DOCUMENTS VERIFIABLE AS TO THEIR AUTHENTICITY

Great efforts have been spent in making documents such as banknotes, identity cards, passports etc., difficult to forge. All of the solutions hitherto suggested for the verification of the authenticity of documents are difficult to carry out and time-consuming. The examination of adroit forgeries in the majority of cases must be left to the experts.

One object of the present invention is to attain great safety in making forgeries impossible and simultaneously to permit verification of the authenticity of documents in a simple and rapid manner for personnel transacting business over the counter, e.g., in banks, public offices etc. where the aforementioned types of documents are handled and the authenticity thereof must be ascertained.

Further objects of and the advantages gained by the invention will appear from the following.

According to the basic inventive idea, a document according to the invention within at least two adjoining surface areas has two similar patterns of surface elements at least some of which are elongated, and the pattern of one surface area is displaced in relation to that of the other surface area. The authenticity of the document is verified in a manner to be described hereinbelow with the aid of a verification screen which corresponds to or is the opposite of a screen film which has been used in the production of the surface elements of at least one pattern on said document.

The invention will be more fully described hereinbelow with reference to the accompanying drawings in which:

FIG. 1 diagrammatically and on a highly enlarged scale shows a portion of a document having two different surface areas;

FIG. 2 on a highly enlarged scale shows a portion of a screen for producing the surface areas in FIG. 1;

FIG. 3 on a highly enlarged scale shows a portion of a camouflage screen for use with the screen in FIG. 2;

FIG. 4 on a highly enlarged scale shows a portion of a document produced by means of the screens in FIGS. 2 and 3 in superposition;

FIG. 5 by way of example shows a driving licence having surface areas with various arrangements of surface elements;

FIG. 6 on a very highly enlarged scale shows a small portion of a document in another embodiment of the invention;

FIG. 7 shows a screen used in producing the surface element patterns illustrated in FIG. 6.

The portion on the document shown in FIG. 1 serves to illustrate the basic inventive principle. Although the surface elements in FIG. 1 have been shown for the sake of simplicity in the form of lines, use is preferably made in practice of elongated elliptical surface elements. The portion of the document shown in FIG. 1 has a surface area with a regular checkered pattern of horizontally elongated surface elements 1 which stand out in contrast to the background and which in the embodiment chosen are equally large. The surface area having the surface elements 1 surrounds a surface area which is provided with a regular checkered pattern of vertically elongated surface elements 2 which stand out in contrast to the background and which in the embodiment chosen all are equally large as the surface ele-

ments 1. The surface area having the surface elements 2 in the embodiment chosen is in the form of a crown.

The portion of the document shown in FIG. 1 has been produced in the manner described hereinbelow by means of the screen 3 shown in FIG. 2 and consisting of a film having elliptical transparent surface elements 4 on a non-transparent background. The screen film 3 is placed in contact with the light-sensitive coat of a photographic film and atop the screen film there is placed a masking film which on a transparent background has a non-transparent area in the form of a crown. The light-sensitive film is exposed through the screen film and the masking film. Then the masking film is removed, the screen film 3 is displaced by turning it through 90°, another masking film which on a non-transparent background has a transparent area in the form of a crown is placed on the screen film, and a new exposure of the light-sensitive film is made. The light-sensitive film is developed and has the appearance shown in FIG. 1. It can then be fastened to a suitable substrate in order itself to constitute the document, or it can be used for making a printing plate by which the document is printed on paper or other suitable document material.

The surface elements 4 on the screen film 3 should have a division within the range customary in letterpress printing; on studying the document portion shown in FIG. 1 with the naked eye the observer cannot discern that there is a surface area having the form of a crown in which the elongated surface elements 2 have a direction different from that of the elongated surface elements 1 in the surrounding surface area. If, on the other hand, a verification screen corresponding to the screen film 3 according to FIG. 2 or being the opposite thereof, that is, has non-transparent surface elements on a transparent background is placed on the portion according to FIG. 1, the crown is seen in strong contrast to the surrounding surface area. If the verification screen is placed on the portion according to FIG. 1 with the longitudinal direction of the surface elements of the verification screen parallel with the longitudinal direction of either the surface elements 1 or the surface elements 2 in FIG. 1, the crown is seen in heavy contrast to the environment as a surface area having a uniform degree of brightness that considerably deviates from the uniform degree of brightness of the environment. If the verification screen is placed on the portion according to FIG. 1 with the longitudinal direction of the surface elements of the verification screen at a certain oblique angle to the longitudinal directions of the surface elements 1 and 2 in FIG. 1, the crown and the environment display moire effects heavily contrasting with one other and having different patterns of moire bands. The effects obtained by means of the verification screen are very sensitive to an exact agreement of the verification screen with the screen film 3 which has been used for producing the screen patterns on the document so that already so small faults in the pattern positions of the surface elements as will arise in a forgery made by photographing the screened surfaces of a genuine document by means of a photographic camera are easily discerned upon verification of the forgery with the aid of a verification screen.

To obtain large and marked effects upon verification with the use of verification screens, the surface elements 1 and 2 in FIG. 1 should suitably be at least twice as long as they are wide.

To make a forgery that cannot be discovered by means of the verification screen the forger must have access to a screen film that exactly corresponds to the film 3 in FIG. 2, and he must know in which angular positions and in which positions of register the screen film is to be used in producing the document. To render the access to such screen films 3 difficult only the manufacturer of the documents should possess such films, and the division of the surface elements of the screen film and the shape of said surface elements should deviate from the commercially available screen divisions and surface element configurations. Moreover, the verification screens, which are distributed for verification purposes in great numbers to personnel transacting business over the counter, should have a surface considerably smaller than the entire surface of the documents that is provided with surface element patterns. It is impossible to produce a satisfactory screen film 3 by means of so small verification screen pieces.

To make it still more difficult to make forgeries the pattern of the surface elements 1 and/or 2 in FIG. 1 should preferably have superimposed upon it the pattern of camouflaging surface elements. This can be realized by means of a screen film 5 as shown in FIG. 3. This screen film on a non-transparent background has transparent surface elements 6 which in the embodiment chosen are circular and arranged in a regular checkered pattern and each of which preferably has a considerably smaller surface than one of the surface elements 4 in FIG. 3. On printing, as described above, for producing the portion according to FIG. 1, not only the masking film but also the screen film 5 is placed atop the screen film 3. On printing the screen films 3 and 5 on the light-sensitive film, surface elements of the appearance shown in FIG. 4 are obtained. In this FIG. 4 the film 3 has been printed only in one position and no masking film has been used for obtaining an area in the form of a crown. The superimposed pattern of camouflaging surface elements does not disturb the appearance of the document obtained with the use of the verification screen. The camouflaging surface elements 6 of the screen film 5 can have a configuration other than the circular configuration shown, and it is preferable to arrange the surface elements 6 in an irregular or random pattern.

FIG. 5 shows a driving licence 7 which is embodied in accordance with the invention. Provided above a line 8 is an oblong surface area 9 which contains a pattern (not shown) of for instance vertically elongated surface elements of type 2 in FIG. 1. A surface area 12 which is defined by boundary lines 10 and 11 and shows a picture (not indicated) of the owner of the licence, is provided in the right-hand lower corner of the licence 7. The picture is composed of surface elements 1 and 2 according to FIG. 1. The vertically elongated surface elements 1 are contained within two surface areas indicated by dash lines 13 and 14 and being in the form of crowns, while the horizontally elongated surface elements 2 are contained within the remaining surface area of the picture area 12. The surface elements 1 and 2 have, within the picture area 12, been caused to give the visual impression of a portrait in that the surface elements have been given varying sizes in the manner customary in letterpress printing, that is, at the exposure, described in connection with FIGS. 1 and 2 of a light-sensitive film, light of exposure has been directed not only through the screen film 3 and the masking film

but also through a transparent continuous-tone portrait picture in which case the surface elements 4 of the screen 3 should be lenticular, for instance according to Swedish Pat. No. 215,904. To render forgeries difficult the surface area 14 lies partly inside and partly outside the picture area 12. The driving licence 7 has an area lying within dash-and-dot lines 15 which is reserved for text and signature, and this area includes an annular surface area 16 the boundaries of which are indicated by dash line circles and which is provided with a pattern of vertically elongated surface elements of type 2 in FIG. 1. Arranged within all surface areas of the driving licence 7, except areas 9, 13, 14 and 16, is a pattern of horizontally elongated surface elements of type 1 in FIG. 1. Within all surface areas of the driving licence 7, the surface element patterns may have superimposed on them camouflaging surface elements in the manner described with reference to FIGS. 3 and 4, but no camouflaged surface elements need be arranged within the picture area 12.

On verification of the authenticity of the driving licence 7 a verification screen film piece is placed over the right-hand portion of the driving licence so as to cover the picture area 12 and the overlying part of the driving licence, and another verification screen piece is placed over the surface area 16 and the overlying part of the surface area 9. It is then possible rapidly to establish that these parts of the driving licence that have been selected for verification actually give the prescribed visual impression when verification is made.

In an embodiment of the invention that is simple and advantageous from the viewpoint of manufacture, one pattern of the document is displaced in parallel with respect to the other pattern a distance smaller than the distance measured in the direction of displacement between the centers of two successive surface elements of the pattern.

When a document according to this embodiment has a section that is unique and identifying to the document and contains both patterns, for instance a picture of the owner of the document, such as is the case with driving licences, identity cards and passports, at least one pattern can be composed of regularly arranged and substantially identically conformed surface elements of the same or different sizes. In the absence of such a unique and identifying section — banknotes, the types of checks as at present customary, etc., have no such section — considerably greater possibilities are gained towards preventing forgeries, without any complication of the process of verifying the documents as to their authenticity by means of a verification screen, by having at least one pattern arranged as a moire pattern the surface elements of which correspond to moire elements realized by photographic printing of two or more superimposed and collectively printed screens which have transparent screen apertures on a non-transparent background and at least one of which has regularly arranged elongated screen apertures.

The latter design is of particularly great interest and an embodiment thereof is shown in FIGS. 6 and 7.

The portion illustrated in FIG. 6 of a document according to the invention has a surface area 17 in the form of a posthorn, an outer surface area 18 surrounding said posthorn, and an inner surface area 19 within the posthorn loop. The mutual boundaries of these surface areas are indicated in FIG. 6 by dash lines which do not exist in the actual document but have been in-

serted in FIG. 6 in order clearly to define the boundaries which would otherwise be difficult to perceive in spite of the high enlargement in which the portion of the document has been reproduced in FIG. 6. The free surface areas in FIG. 6 are provided with similar patterns of surface elements which in the embodiment chosen by way of example are in the form of small black dots. These surface elements in a regular way present different shapes and sizes within different parts of FIG. 6. The majority of the surface elements in FIG. 6 are elongated. They actually are moire elements which have been formed in the manner more fully described hereinbelow. The surface elements in the surface areas 18 and 19 belong to one and the same pattern. The surface elements in the surface area 17 constitute a pattern which corresponds to that in the surface areas 18 and 19 but which is displaced in parallel horizontally with respect to the pattern in the surface areas 18 and 19 a distance which is approximately half of the horizontal distance between the centers of two successive surface elements of the pattern.

The surface elements in the surface areas 17-19 in FIG. 6 have been produced in the following way by means of screens according to FIG. 7. The screen illustrated in FIG. 7 has transparent oval (or rhombic) screen apertures 20 on a non-transparent background. The screen is regular inasmuch as the centers of the screen apertures lie at the crossings of two coordinate line systems the lines of which are at the same mutual distances, the lines of one system making oblique angles with those of the other system. When two screens according to FIG. 7 are superimposed and rearviewed different kinds of moire effects are perceived when one screen is turned with respect to the other screen. In the embodiment shown in FIG. 6 a moire effect has been chosen which has alternately brighter and darker horizontal bands which are not, however, particularly pronounced in FIG. 6 because of the high enlargement.

A mask in the form of a transparent film having a non-transparent portion in the form of a posthorn is placed on a light-sensitive coat which is to be used for producing a printing plate for printing a document according to FIG. 6, and two screens according to FIG. 7 are placed upon said mask, one screen being turned with respect to the other screen through such an angle that the desired moire effect is obtained. The light-sensitive coat is then exposed with light that is caused to fall heavily obliquely from one side through the two screens and the mask. This will expose the surface elements in the surface areas 18 and 19 according to FIG. 6. After that, the described mask is removed and replaced with a mask which is the opposite of the earlier used mask, that is, it has a transparent posthorn portion but is otherwise opaque. A new exposure of the light-sensitive coat is made with the screens in unaltered positions, but the new exposure is made with light which is caused to fall heavily obliquely from the direction opposite to the earlier one through the two screens and the new mask. This will expose the surface elements in the surface area 17 in FIG. 6. By the fact that the exposure light in one exposure is incident for example obliquely from the left as viewed in FIG. 6, and in the other exposure obliquely from the right the surface elements in the surface area 17 in FIG. 6 will be displaced

horizontally with respect to the surface elements in the surface areas 18 and 19. After the two exposures the light-sensitive coat can be developed and used in a known manner for producing a printing plate for printing documents according to the invention.

These documents can be verified as to their authenticity, in the same way as has been described above, with the use of a piece of screen film of the kind illustrated in FIG. 7. When the screen film piece is placed over the portion of the document illustrated in FIG. 6 the posthorn earlier invisible to the naked eye will stand out in clear contrast to the remainder of the document, and forged documents are easily revealed by faulty moire effects and density degrees on such verification with the aid of a screen according to FIG. 7.

The difficulty of making forgeries increases if on producing the moire surface elements in a document use is made of two screen films of different embodiments so that one screen film does not conform with the screen film pieces handed out for verification of the documents to personnel transacting business over the counter. It is practically impossible, on the basis of the moire patterns of the documents, to try and establish the parameters of the screens that have been used for the production of the patterns. A still greater safety in this respect is gained if the patterns in FIG. 6 are produced by color printing and at least one pattern is produced by iridescent printing preferably in such a way that different parts of the pattern have complementary colors, for instance purple and bluish-green. A particularly good safety towards forgeries being made is obtained when also at least one pattern in the manner earlier described has superimposed on it the pattern of camouflaging surface elements which have been produced by iridescent printing and have in at least some part of the document a color other than that of the pattern, preferably a complementary color. It is advantageous to print the camouflaging surface elements with gloss ink and the pattern or patterns with a matte ink or vice versa.

What we claim and desire to secure by Letters Patent is:

1. A document verifiable as to its authenticity, comprising a first surface area and a second surface area, adjoining said first surface area, a first pattern of separate spaced apart image elements within said first surface area, and a second pattern of separate spaced apart image elements within said second surface area, said first and second patterns being similar and having the form of a moire pattern, the image elements of which correspond to moire elements formed by photographic printing of a plurality of superimposed and collectively printed screens which have transparent screen apertures on a non-transparent background and at least one of which has regularly arranged elongated screen apertures, and said first pattern being displaced in relation to said second pattern.

2. A document according to claim 1, wherein said first pattern is displaced in parallel with respect to said second pattern.

3. A document according to claim 1, wherein said first pattern is rotated in relation to said second pattern.

* * * * *