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(54) **Method and system for generating characterizing information descriptive of printed material such as address blocks and generating postal indicia or the like incorporating such characterizing information**

Verfahren und System zur Erzeugung von Daten zur Charakterisierung eines Bedruckten Materials wie Adressblöcke und zur Erzeugung diese Daten enthaltendende Postwertzeichen oder dergleichen

Méthode et système pour générer une information caractéristique décrivant des données imprimées telles que des blocs d'adresses et pour générer des indices postaux ou similaires comprenant cette information caractéristique

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Description

[0001] The subject invention relates to methods and systems for generating and printing an indicium and is applicable to the problem of providing a robust, compact characterization of a block of printed text which will distinguish the block of text from other such blocks. More particularly, it relates to the problem of providing an image-based characterization of a printed address block which can be incorporated into a digital postal indicium.

[0002] The present application relates to similar subject matter as, and shares elements of disclosure with, commonly assigned EP Patent Application EP 04 027 300.5 of even date corresponding to U.S. patent application number 10/719,050, entitled "Method and System for Generating Postal Indicia Or The Like" filed on November 21, 2003.

[0003] EP-A2-1 022 692 discloses a system and method for adding addressing information to an indicium printed by a closed system metering device. A scanning device is coupled to a closed system postage meter for scanning addressing information printed on a mailpiece. The addressing information is combined with other information relating to the postage payment for the mailpiece to obtain postal data relating to the mailpiece. The postal data, including the addressing information is used to generate an indicium for the mailpiece. The indicium includes cryptographic evidencing of postage payment. The closed system metering device prints the indicium on the mailpiece.

[0004] Postage metering systems account for postage and other values such as parcel delivery service charges and tax stamps, and print indicia representative of such values as proof of payment. To protect against counterfeiting of indicia modern digital postage metering systems use encryption technology. The postage value and other information relating to an indicium are preferably digitally signed, or otherwise cryptographically authenticated, and the information and signature are incorporated into the digital postal indicium.

[0005] Digital postal indicia using encryption technologies are extremely secure. In general, without knowledge of the proper encryption keys, it is essentially impossible to produce a counterfeit digital indicium. However, digital indicia are subject, as are all postal indicia, to "rubber-stamp" counterfeiting where a valid indicium is scanned and reproduced on multiple mail pieces. To prevent such "rubber-stamp" counterfeiting it is known to incorporate information from the address block of the mail piece into the postal indicium. Because space on an envelope is limited, typically only a small portion of the information in the address block will be incorporated into the indicium.

[0006] In Figure 1, typical prior art mailing system 10 includes address printer controller 12, address printer 14, postage meter 16, and indicia printer 20. Address printer controller 12 receives address information from a data processing system (not envelope E. Meter 16 receives postage information, and other information, from the data processing system. Meter 16 also receives characterizing information descriptive of block A from address printer controller 12. The information received can be either text-based or image-based. Text-based information is descriptive of the words or characters making up to the address, (e.g., ASCII code) while image-based information is descriptive of the actual printed image in the address block. Meter 16 combines the characterizing information with the postage value and other information, typically digitally signs the combination, generates a bitmap representative of an indicium including the digitally signed combination, and controls indicia printer 20 to print indicium I on envelope E. When the mail piece is received by a postal service, the address block can be scanned again, and the information regenerated from the scanned address block compared to information recovered from indicium I; thus tying indicium I to the particular mail piece. (Note that since the indicium is cryptographically linked to the address on the mail piece, printer 20 need not be a secure printer; but can be a general purpose printer which can be controlled by other devices for other uses.) Commonly assigned, U.S. patent application number 10/456,416 published on July 01, 2004 under publication number 2004/0128254 entitled "System And Method For Mail Destination Address Information Encoding Protection And Recovery In Postal Payment", discloses a system similar to that of the Figure 1 using text-based characterizations of the address block.

[0007] While useful for its intended purpose, system of Figure 1 and similarly systems still have problems. It has proven difficult to reliably recover textual information from address blocks during the validation process using available optical character recognition (OCR) techniques. Attempts to increase the robustness of text-based systems by incorporation of additional information and/or the use of error correcting codes has resulted in undesirable increases in indicia size and computational complexity. Thus, it is an object of the present invention to provide a method and system for providing descriptive information which will substantially uniquely identify a block of text in a robust and compact manner. (By "robust and compact" herein is meant information which is small enough in quantity to be incorporated into postal indicia yet will identify a text block, and distinguish among text blocks, with sufficient reliability to deter "rubber stamp" counterfeiting, despite errors introduced by the printing and/or scanning processes.)

[0008] According to a first aspect of the invention, there is provided a method according to claim 1.

According to a second aspect of the invention, there is provided a system according to claim 6.

[0009] In accordance with a particular aspect of the subject invention, the indicium is a postal indicium and the object is a mail piece.

[0010] In accordance with another aspect of the subject invention, the other printed material is an address block and the characterizing information includes measurements of word lengths of words comprised in the address block.

[0011] In accordance with another aspect of the subject invention the other printed material is an address block and

the characterizing information includes a count of outliers in the address block.

[0012] In accordance with another aspect of the subject invention the other printed material is an address block and the characterizing information includes information which is descriptive of the shape of the address block, or of lines, or of words comprised in the address block.

[0013] Other objects and advantages of the present invention will be apparent to those skilled in the art from consideration of the detailed description set forth below and the attached drawings.

[0014] The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

[0015] Figure 1 shows a schematic block diagram of a prior art mailing system;

[0016] Figure 2 shows a schematic block diagram of a mailing system in accordance with the subject invention;

[0017] Figure 3 illustrates a method for abstracting characterizing information descriptive of an address block from an image of the address block in accordance with one embodiment of the subject invention;

[0018] Figure 4 illustrates a method for abstracting characterizing information descriptive of an address block from an image of the address block in accordance with another embodiment of the subject invention;

[0019] Figure 5 illustrates a method for abstracting characterizing information descriptive of an address block from an image of the address block in accordance with another embodiment of the subject invention; and

[0020] Figure 6 shows a flow diagram of the operation of a secure postal indicia printing system, shown in Figure 2. The following describes a method and system for generating and printing an indicium on an object. Other information is printed on the object and the system is controlled in accordance with the method to obtain a digital image of the other printed material and generate characterizing information descriptive of aspects of the image, the aspects being selected from the group consisting of, lengths of elements of the image, numbers of outliers in the image, and shapes of the image or of elements of the image, the characterizing information being selected to fit within the indicium; cryptographically authenticate the characterizing information and other information; generate the indicium to be representative of the cryptographically authenticated information; and print the indicium on the object. Thus, the object's relationship to the indicium can be verified by regenerating the characterizing information from the other printed material and comparing the regenerated characterizing information with characterizing information recovered from the indicium, and copies of said indicium cannot easily be used without detection on other objects which do not include said other printed material. According to a first aspect of the invention, there is provided a method according to claim 1. According to a second aspect of the invention, there is provided a system according to claim 6.

[0021] In Figure 2, mailing system 22 includes address printer controller 12, address printer 14, Postage meter 16, and indicia printer 20, which are substantially similar to the corresponding prior art elements shown in Figure 1. System 22 differs in that scanner 24 scans address block A and scanned data processor 26 generates the characterizing information provided to meter 16 from the scanned image. (In another embodiment of the subject invention, printer controller 12 communicates the bit map used to drive printer 14 to processor 26 (as shown by dotted line connection 13 in Figure 2). Processor 26 then generates the characterizing information from the bit map in the same manner as from the scanned image. In this embodiment, scanner 24 is used for pre-printed addresses, where a bit map is not available; or can be eliminated. Together meter 16, printer 20, scanner 24 (if present), and processor 26 form secure postal indicia printing system 30. Preferably, scanner 24 scans address A to generate a bit map which is processed by processor 26 to generate the characterizing information, as will be described below; however, any convenient combination of scanning and processing techniques which provides a digital image and from which suitable characterizing information can be generated can be used. Use of a separate processor 26 is preferred since it allows the subject invention to be used with an existing postage meter; however, it will be apparent to those skilled in art that postage meter 16, or controller 12, can be programmed to implement the functions of processor 26. Similarly, a single processor can be programmed to manage both control of scanner 24 and processing of the scanned image.) It is believed that more robust results are obtained when the regenerated characterizing information, generated from a scanned image of address block A is compared to characterizing information recovered from indicium I where the recovered information was also generated from a scanned image, rather than from a pristine bit map; and thus includes the inaccuracies and errors introduced into the image by the printing and scanning processes.

[0022] A group of three methods for generation of image-based characterizing information, which are believed to provide improved compactness and robustness in accordance with the above object of the invention, have been found. Each of these methods is believed to provide a sufficiently high likelihood of detection to deter "rubber stamp" counterfeiting, particularly by large scale mailers, while having a sufficiently low rate of false positives that it will not unduly delay mail processing. It is believed that each of these methods, in general, will provide characterizing information which can be specified by a bit stream of approximately 6 to 12 bytes.

[0023] An embodiment of the subject invention where the characterizing information comprises measurements of the lengths of the individual words which make up address A, is shown in Figure 3. Address block A is parsed to identify individual words by first identifying line spaces /s by determining the occurrence of large amounts of horizontal white space between blocks of printed text, and then identifying word spaces ws by determining the occurrence of large

amounts of vertical white space between blocks of printed text (as shown with respect the first line of address A). Word lengths /1 through /9 are then determined for address A. Preferably, word lengths are taken (measured in pixels) from the edges of word spaces ws (or the address edges) as shown, but can be taken in any convenient manner, such as along the midline of the words.

[0024] As noted, the amount of space available in the indicium is limited. Assuming that eight bytes, 64 bits, can be allocated to incorporate the characterizing information, and allowing up to four bits for codes, 60 bits are available to include the characterizing information. (The actual number of bits which can be allocated to express the characterizing information is determined by the size and shape of the postal indicium and the resolution with which the indicium can be printed and scanned.) Table 1 shows the relationship between the number of bits used to encode each word, the number of words which can be encoded, and the granularity (i.e., the number of lengths which can be distinguished) with which the word lengths can be measured.

[0025]

Table 1

Bits/Word	2	3	4	5	6	7	8
Number of Encodable Words	30	20	15	12	10	8	7
Granularity	4	8	16	32	64	128	256

[0026] It is believed that using four or fewer bits per word would not be useful in postal applications. Thus, in a preferred embodiment, the number of bits used can be selected to encode all words in the address and two control bits will be sufficient to indicate selection of five to eight bits per word to encode the length of the word. In other embodiments a fixed number of words in the address, for example the first eight, can be scanned at a fixed number of bits per word; eight in this case, since control bits would not be needed to specify the number of bits per word.

Example

[0027] An address such as shown in Figures 3 - 5 may, depending on the print font selected, etc., produce the following results using six bits per word:

Word#	1	2	3	4	5	6	7	8	9
Length(pixels)	173	45	150	60	154	103	168	68	189

[0028] Preferably the absolute lengths are then normalized to the range 1 - 63, i.e. $2^6 - 1$, so that the smallest value (45) is mapped to 1 and the largest (189) is mapped to 63 by the relationship:

$$\text{Normalized length} = (63 - 1) / (189 - 45) * (\text{length in pixels}) - 18.375 \approx$$

$$0.43 * (\text{length in pixels}) - 18.375, \text{ yielding:}$$

Word#	1	2	3	4	5	6	7	8	9
Length(normalized)	56	1	46	7	48	26	54	11	63

[0029] The normalized lengths are then encoded into a bit stream, where code 01 indicates six bits per word:

01-111001-000001-101110-000111-110000-011010-1101010-001011-111111-000000

Code Word 1 Word2 Word3 Null word

[0030] This bit stream is then incorporated into the indicium to provide a robust and compact characterization of address block A; and, when the indicium is then digitally signed in a conventional manner, will cryptographically link the indicium to the address and associated mail piece. (Note that only bits are included in the actual bit streams of this and other embodiments, and other typographic markings are included only for clarity.)

[0031] Another embodiment of the subject invention, where the characterizing information comprises measurements of the number of "outliers" in each word (or each line) which make up address A, is shown in Figure 4. (By "outliers" herein is meant ascenders or descenders and portions of capitals which project beyond thresholds, which are preferably determined by the upper and lower bounds of lower case letters without ascenders or descenders, such as "a", "c", "e", etc.) Address A is parsed to identify individual words, if necessary, by first identifying line spaces /s by determining the occurrence of large amounts of horizontal white space between blocks of printed text, and then identifying word spaces ws by determining the occurrence of large amounts of vertical white space between blocks of printed text (as shown with respect the first line of address A). Otherwise only the lines need be identified.

[0032] Again assuming six bits are allocated per word, the number of upwards (+) and downwards (-) outliers per word can be encoded as "xxx/yyy" where x and y are binary digits and xxx is the number of (+) outliers and yyy is the number of (-) outliers.

[0033] Whether outliers are recorded per word or per line can be a predetermined design feature, or pre-set for particular applications or can be program controlled. For example, normally an address block would be characterized by the number of outliers per word but long addresses could be characterized per line.

Example

[0034] Again taking eight bytes as the space allocated for the address block characterizing information, as shown in Figure 4 with respect to the first address line, (+) outliers 32, in word 1; 34, in word 2; and 36, in word 3 are identified as exceeding threshold 40, and outlier 42, in word 1, is identified as exceeding threshold 44. Since for address block A all of the outliers can be encoded in less than 60 bits, the resulting bit stream is:

1-001/001-001/000-100/000-010/000-011/000-001/000-010/000-010/000-101/000-111

code	word1	word2	word3	word4	word5	word6	word7	word8	word9	end

where code 1 indicates per word characterization and 111 is an end code. (The 111 end code, of course, implies that no more than six (+) outliers can be recognized in any word, i.e., 110 means 6 or more.) If less space for characterizing information were available in the indicium, the program could recognize that there was insufficient room on a per word basis, and the characterizing information could be encoded as "xxxx/yyyy" on a per line basis. The resulting bit stream would be:

0-1010/0001-1010/0000-1001/0000-1111

code	line1	line2	line3	end

requiring only 29 bits, allowing a seven line address to be characterized in eight bytes. This bit stream is then incorporated into the indicium as described above.

[0035] Another embodiment of the subject invention where the characterizing information comprises a description of the shape of the address block is shown in Figure 5. The shape is determined by using a conventional "best fit" scanning algorithm which encloses address block A with "best fit" closed curve 50. (It should be understood that various algorithms for generating a best fit curve will generate different curves. These differences do not affect the subject invention so long as the same algorithm is used to generate the curve whose description is incorporated into the indicium and to recover the curve from the address block when the indicium is validated.) Preferably, curve 50 is constrained. A curve can be generated with limited information so that the resulting curve is simplified. In Figure 5, curve 50 is formed from linked straight line segments, such as segment 51, which are limited to eight "directions", up (U), down (D), left (L), right (R), up-right (UR), up-left (UL), down-right (DR), and down-left (DL); viewed as being generated starting in the upper left

corner of address block A and traveling clockwise around address block A. Preferably the curve 50 also accounts for spaces between characters, words and lines, treating these spaces as equivalent to printed space, so that curve 50 does not become too convoluted and require extensive descriptive information. It is within the skill of a person skilled in the art to provide an algorithm which will generate robust and compact characterizing information, as described above.

[0036] The characterizing information, i.e., the description of curve 50, can be encoded in a number of ways. For example, each line segment can be described as a direction and length, preferably in pixels. Lengths can be normalized as described above with respect to Figure 3. Alternatively, end points of line segments, such as end points 52 and 54 of segment 51, expressed in Cartesian co-ordinates or any convenient co-ordinate system, which is preferably scaled and referenced to address block A to reduce the amount of descriptive information needed, can be used to describe curve 50. The description of course is ultimately sent to meter 16 as a bit stream.

[0037] These methods of encoding have the advantage that they do not require an end code. Processor 26 needs only to detect closure of curve 50. However, these methods can require relatively large amounts of data if curve 50 is complex. Another method of describing curve 50 is to encode only the directions, without lengths, of each successive line segment.

Example

[0038] Encoding line segment directions as:

R = 000, L = 111, U = 001, D = 110, UR = 010, DL = 101, DR = 011, UL = 100;

and starting at the upper left of address block A, curve 50 is described by the bit stream:

000-011-000-010-011-000-001-000-110-000-001-000-110-111-110-000-110-

R	DR	R	UR	DR	R	U	R	D	R	U	R	D	L	D	R	D

111-110-111-001-111-001-110

L	D	L	U	L	U	D(end)

[0039] Thus, curve 50 can be described in nine bytes, including an end code, which can be indicated by reversal (or repetition) of the immediately preceding segment direction. Again, this bit stream is incorporated into the indicium.

[0040] In other embodiments, the shape of only a portion of address block such as a word or line is described, or only a limited number of line segments are described, which will reduce the amount of data generated. Where only a limited number of segments are described, they can be selected by processor 26 to represent more complex parts of the curve.

[0041] Programming of a data processor to analyze scan data to perform imaging operations such as identifying lines and words, measuring the dimensions of letters and words or fitting a curve to an image in accordance with predetermined constraints are well known. Such operations are substantially routine in the character and general pattern recognition arts, for example. Techniques for carrying out such operations are also taught in Handbook of Pattern Recognition and Image Processing, edited by T Young and K-S Fu, Academic Press, 1986. Thus programming of scanner 24 and processor 26 to carry out the embodiments described above is well within the ability of those skilled in the art and need not be discussed further here for an understanding of the subject invention.

[0042] Figure 6 shows a flow diagram of the operation of indicia printing system 30. At step 60, processor 26 obtains a digital image of address block A, either from scanner 24 or from printer controller 12. At step 62, processor 26 abstracts characterizing information descriptive of address block A from the image.

[0043] At step 66, postage meter 16 inputs postal information such as the postage amount, date, etc., from a data processing system (not shown) or other source, and combines it with the characterizing information and digitally signs the combination. Then, at step 70, meter 16 generates indicium I representative of the combined information and digital signature, preferably as a combination of human-readable text and machine-readable binary code such as 2-dimensional

bar code. At step 72, meter 16 controls printer 20 to print indicium I on mail piece E in a conventional manner.

[0044] The embodiments described above and illustrated in the attached drawings have been given by way of example and illustration only. From the teachings of the present application those skilled in the art will readily recognize numerous other embodiments in accordance with the present invention. Accordingly, limitations on the present invention are to be found only in the claims set forth below.

Claims

1. A method for generating and printing an indicium (I) on an object (E), said object (E) having other material printed thereon, said method comprising the steps of:

- a) obtaining a digital image of said other printed material and generating characterizing information descriptive of aspects of said image, said aspects being selected from the group consisting of, lengths of letters or words of said image, numbers of outliers in said image, and shapes of a text block of said image or of lines or words of said text block, said characterizing information being selected to fit within said indicium (I);
- b) cryptographically authenticating said characterizing information and other information;
- c) generating said indicium to be representative of said cryptographically authenticated information; and
- d) printing said indicium (I) on said object (E); whereby
- e) said object's (E) relationship to said indicium (I) can be verified by regenerating said characterizing information from said other printed material and comparing said regenerated characterizing information with characterizing information recovered from said indicium (I), whereby copies of said indicium (I) cannot easily be used without detection on other objects (E) which do not include said other printed material.

2. A method as described in Claim 1 where said indicium (I) is a postal indicium and said object (E) is a mail piece.

3. A method as described in Claim 1 or 2 where said other printed material is an address block (A) and said characterizing information comprises measurements of word lengths of words comprised in said address block (A).

4. A method as described in Claim 1, 2 or 3 where said other printed material is an address block (A) and said characterizing information comprises a count of outliers in said address block (A).

5. A method as described in any preceding claim, where said other printed material is an address block (A) and said characterizing information comprises information which is descriptive of the shape of said address block (A), or of lines, or of words comprised in said address block (A).

6. A secure indicia printing system for generating and printing an indicium (I) on an object, said object (E) having other material printed thereon, comprising:

- a) a printer (20) for printing said indicium (I);
- b) a processor (26) for receiving a digital image of said other printed material, and for processing said image to abstract characterizing information descriptive of aspects of said image from said image, said aspects being selected from the group consisting of, lengths of letters or words of said image, numbers of outliers in said image, and shapes of a text block of said image or of lines or words of said image, said characterizing information being selected to fit within said indicium (I); and
- c) a meter (16), said meter communicating with said processor (26) to receive said characterizing information, and having a communications link for receiving other information from another information source, and communicating with said printer (20), for:

- c1) cryptographically authenticating said characterizing information and other information;
- c2) generating (70) said indicium (I) to be representative of said cryptographically authenticated information; and
- c3) controlling (72) said printer (20) to print said indicium (I) on said object (E); whereby

d) said object's (E) relationship to said indicium (I) can be verified by regenerating said characterizing information from said other printed material and comparing said regenerated characterizing information with characterizing information recovered from said indicium (I), whereby copies of said indicium (I) cannot easily be used without detection on other objects which do not include said other printed material.

7. A system as described in Claim 6 where said indicium (I) is a postal indicium, and said object (E) is a mail piece, said meter (16) being arranged for accounting for postal value represented by said indicium (I).
8. A system as described in Claim 6 or 7 where said other printed material is an address block and said processor is arranged to abstract measurements of word lengths of words comprised in said address block to generate said characterizing information.
9. A system as described in Claim 6, 7 or 8 where said other printed material is an address block and said processor is arranged to abstract a count of outliers in said address block to generate said characterizing information.
10. A system as described in any one of Claims 6 to 9 where said other printed material is an address block, and said processor is arranged to abstract information which is descriptive of the shape of said address block, or of lines, or of words comprised in said address block to generate said characterizing information.

Patentansprüche

1. Verfahren zum Erzeugen und Drucken eines Freimachungsvermerks (I) auf ein Objekt (E), wobei auf das Objekt (E) weiteres Material gedruckt ist, wobei das Verfahren die Schritte umfasst:
 - a) Erhalten eines Digitalbildes des weiteren gedruckten Materials und Erzeugen von kennzeichnender Information, welche Aspekte des Bildes beschreibt, wobei die Aspekte aus der Gruppe gewählt werden, die aus Längen von Buchstaben oder Wörtern des Bildes, Zahlen von Ausreißern in dem Bild, und Formen eines Textblocks des Bildes oder von Zeilen oder Wörtern des Textblocks besteht, wobei die kennzeichnende Information gewählt wird, dass sie in den Freimachungsvermerk (I) passt;
 - b) kryptographisches Authentifizieren der kennzeichnenden Information und anderer Information;
 - c) Erzeugen des Freimachungsvermerks, so dass er die kryptographisch authentifizierte Information repräsentiert; und
 - d) Drucken des Freimachungsvermerks (I) auf das Objekt (E); wodurch
 - e) die Beziehung des Objekts (E) zu dem Freimachungsvermerk (I) durch Neuerstellen der kennzeichnenden Information aus dem anderen gedruckten Material und durch Vergleichen der neu erstellten kennzeichnenden Information mit kennzeichnender Information, die aus dem Freimachungsvermerk (I) wiederhergestellt wurde, verifiziert werden kann, wodurch Kopien des Freimachungsvermerks (I) nicht einfach ohne Erkennung auf anderen Objekten (E), welche das andere gedruckte Material nicht beinhalten, benutzt werden können.
2. Verfahren wie beschrieben in Anspruch 1, wobei der Freimachungsvermerk (I) ein postalischer Freimachungsvermerk und das Objekt (E) ein Poststück ist.
3. Verfahren wie beschrieben in Anspruch 1 oder 2, wobei das andere gedruckte Material ein Adressblock (A) ist und die kennzeichnende Information Abmessungen von Wortlängen von Wörtern, welche in dem Adressblock (A) enthalten sind, umfasst.
4. Verfahren nach Anspruch 1, 2 oder 3, wobei das andere gedruckte Material ein Adressblock (A) ist und die kennzeichnende Information eine Zahl an Ausreißern in dem Adressblock (A) umfasst.
5. Verfahren wie beschrieben in einem vorangehenden Anspruch, wobei das andere gedruckte Material ein Adressblock (A) ist und die kennzeichnende Information Information umfasst, welche die Form des Adressblocks (A) oder von Zeilen oder von Wörtern, welche in dem Adressblock (A) enthalten sind, beschreibt.
6. Sicheres Freimachungsvermerk-Drucksystem zum Erzeugen und Drucken eines Freimachungsvermerks (I) auf ein Objekt, wobei auf das Objekt (E) anderes Material gedruckt ist, umfassend:
 - a) einen Drucker (20) zum Drucken des Freimachungsvermerks (I);
 - b) einen Prozessor (26) zum Empfangen eines digitalen Bildes des anderen gedruckten Materials, und zum Verarbeiten des Bildes zum Abstrahieren von kennzeichnender Information, welche Aspekte des Bildes aus dem Bild beschreibt, wobei die Aspekte aus der Gruppe gewählt werden, welche aus Längen von Buchstaben oder Wörtern des Bildes, Zahlen von Ausreißern in dem Bild, und Formen eines Textblocks des Bildes oder von Zeilen oder Wörtern des Bildes besteht, wobei die kennzeichnende Information gewählt wird, dass sie in

den Freimachungsvermerk (I) passt; und

c) eine Maschine (16), wobei die Maschine mit dem Prozessor (26) kommuniziert, um die kennzeichnende Information zu empfangen, und eine Kommunikationsverbindung hat, um andere Information von einer weiteren Informationsquelle zu empfangen, und mit dem Drucker (20) zu kommunizieren, zum:

- c1) kryptographischen Authentifizieren der kennzeichnenden Information und anderer Information;
- c2) Erzeugen (70) des Freimachungsvermerks (I), so dass er die kryptographisch authentifizierte Information repräsentiert; und
- c3) Steuern (72) des Druckers (20), um einen Freimachungsvermerk (I) auf das Objekt (E) zu drucken; wobei

d) die Beziehung des Objekts (E) zu dem Freimachungsvermerk (I) durch Neuerstellen der kennzeichnenden Information aus dem anderen bedruckten Material und Vergleichen der neu erstellten kennzeichnenden Information mit kennzeichnender Information, welche aus dem Freimachungsvermerk (I) wiederhergestellt wurde, verifiziert werden kann, wodurch Kopien des Freimachungsvermerks (I) nicht einfach ohne Erkennung auf anderen Objekten, welche nicht das andere gedruckte Material beinhalten, genutzt werden können.

7. System wie beschrieben in Anspruch 6, wobei der Freimachungsvermerk (I) ein postalischer Freimachungsvermerk ist, und das Objekt (E) ein Poststück ist, wobei die Maschine (16) eingerichtet ist, den postalischen Wert, der durch den Freimachungsvermerk (I) repräsentiert wird, abzurechnen.

8. System wie beschrieben in Anspruch 6 oder 7, wobei das andere gedruckte Material ein Adressblock ist und der Prozessor eingerichtet ist, Abmessungen von Wortlängen von Wörtern, welche in dem Adressblock enthalten sind, zu abstrahieren, um die kennzeichnende Information zu erzeugen.

9. System wie beschrieben in Anspruch 6, 7 oder 8, wobei das andere gedruckte Material ein Adressblock ist und der Prozessor eingerichtet ist, eine Zahl von Ausreißern in dem Adressblock zu abstrahieren, um die kennzeichnende Information zu erzeugen.

10. System wie beschrieben in einem der Ansprüche 6 bis 9, wobei das andere gedruckte Material ein Adressblock ist, und der Prozessor eingerichtet ist, Information zu abstrahieren, die die Form des Adressblocks, oder von Zeilen oder von Wörtern, welche in dem Adressblock enthalten sind, beschreibt, um die kennzeichnende Information zu erzeugen.

Revendications

1. Procédé pour créer et imprimer un indice (I) sur un objet (E), ledit objet (E) comportant d'autres données imprimées sur lui, ledit procédé comprenant les étapes consistant à :

- a) obtenir une image numérique desdites autres données imprimées et créer des informations de caractérisation, décrivant des aspects de ladite image, lesdits aspects étant sélectionnés dans le groupe consistant en longueurs de lettres ou de mots de ladite image, nombres de valeurs aberrantes dans ladite image, et formes d'un bloc de texte de ladite image ou de lignes ou mots dudit bloc de texte, lesdites informations de caractérisation étant sélectionnées pour s'ajuster dans ledit indice (I) ;
- b) authentifier par cryptographie lesdites informations de caractérisation ainsi que d'autres informations ;
- c) créer ledit indice pour qu'il soit représentatif desdites informations authentifiées par cryptographie ; et
- d) imprimer ledit indice (I) sur ledit objet (E) ; grâce à quoi
- e) la relation dudit objet (E) audit indice (I) peut être vérifiée en recréant lesdites informations de caractérisation à partir desdites autres données imprimées et en comparant lesdites informations de caractérisation recrées avec des informations de caractérisation récupérées à partir dudit indice (I), grâce à quoi des copies dudit indice (I) ne peuvent être facilement utilisées sans détection sur d'autres objets (E) qui n'incluent pas lesdites autres données imprimées.

2. Procédé selon la revendication 1, dans lequel ledit indice (I) est un indice postal et ledit objet (E) est un objet postal.

3. Procédé selon la revendication 1 ou 2, dans lequel lesdites autres données imprimées sont un bloc d'adresse (A) et lesdites informations de caractérisation comprennent des mesures de longueurs de mots inclus dans ledit bloc d'adresse (A).

4. Procédé selon la revendication 1, 2 ou 3, dans lequel lesdites autres données imprimées sont un bloc d'adresse (A) et lesdites informations de caractérisation comprennent un nombre de valeurs aberrantes dans ledit bloc d'adresse (A).

5. Procédé selon l'une quelconque des revendications précédentes, dans lequel lesdites autres données imprimées sont un bloc d'adresse (A) et lesdites informations de caractérisation comprennent des informations qui décrivent la forme dudit bloc d'adresse (A), ou de lignes, ou de mots inclus dans ledit bloc d'adresse (A).

6. Système d'impression d'indices sécurisé pour créer et imprimer un indice (I) sur un objet (E), ledit objet (E) comportant d'autres données imprimées sur lui, le système comprenant :

a) une imprimante (20) pour imprimer ledit indice (I) ;

b) un processeur (26) destiné à recevoir une image numérique desdites autres données imprimées, et à traiter ladite image afin d'analyser des informations de caractérisation, décrivant des aspects de ladite image à partir de ladite image, lesdits aspects étant sélectionnés dans le groupe consistant en longueurs de lettres ou de mots de ladite image, nombres de valeurs aberrantes dans ladite image, et formes d'un bloc de texte de ladite image ou de lignes ou mots de ladite image, lesdites informations de caractérisation étant sélectionnées pour s'ajuster dans ledit indice (I) ; et

c) un compteur (16), ledit compteur communiquant avec ledit processeur (26) pour recevoir lesdites informations de caractérisation, et comportant une liaison de communications pour recevoir d'autres informations en provenance d'une autre source d'informations, et communiquant avec ladite imprimante (20), pour :

c1) authentifier par cryptographie lesdites informations de caractérisation ainsi que les autres informations ;

c2) créer (70) ledit indice (I) pour qu'il soit représentatif desdites informations authentifiées par cryptographie ; et

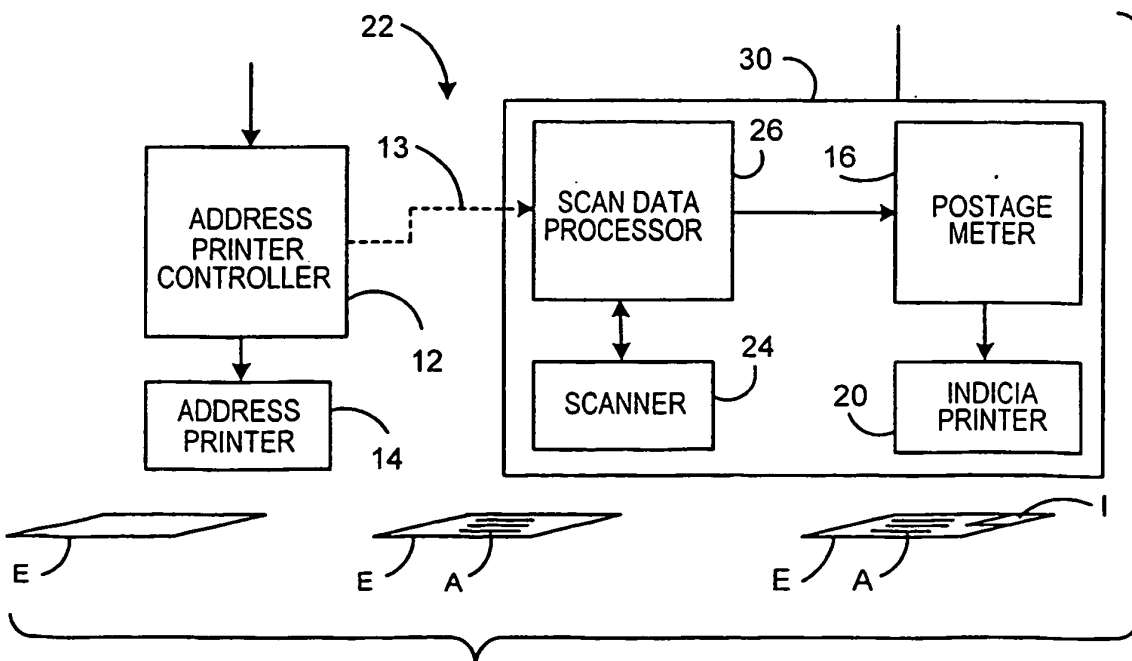
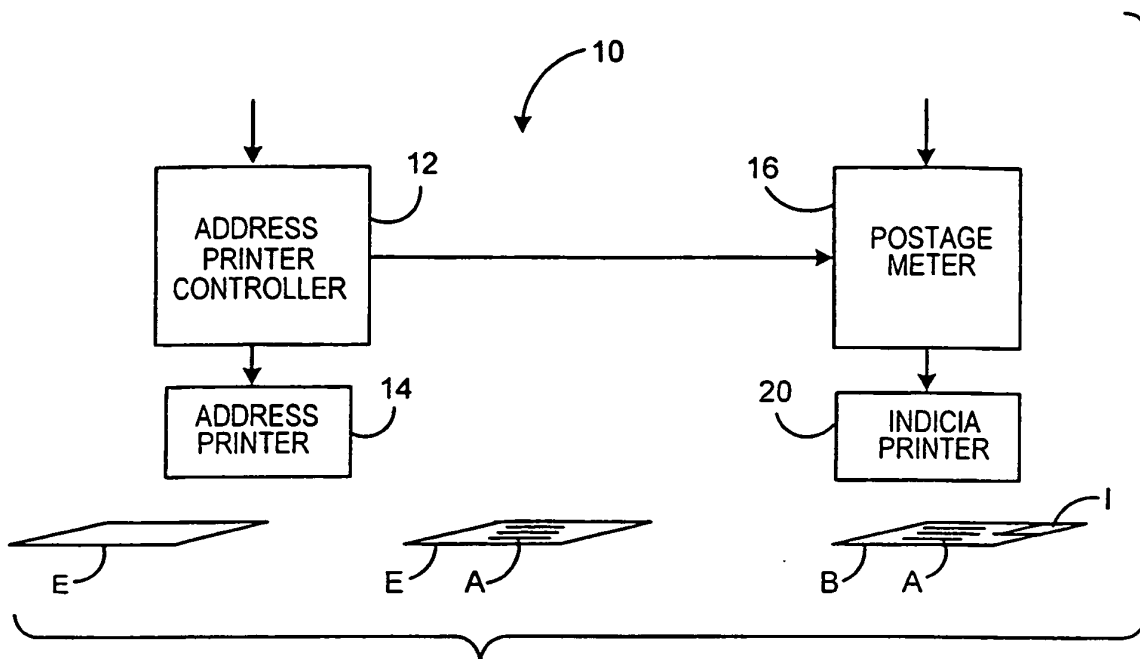
c3) commander (72) ladite imprimante (20) pour imprimer ledit indice (I) sur ledit objet (E) ; grâce à quoi d) la relation dudit objet (E) audit indice (I) peut être vérifiée en recréant lesdites informations de caractérisation à partir desdites autres données imprimées et en comparant lesdites informations de caractérisation recréées avec des informations de caractérisation récupérées à partir dudit indice (I), grâce à quoi des copies dudit indice (I) ne peuvent être facilement utilisées sans détection sur d'autres objets (E) qui n'incluent pas lesdites autres données imprimées.

7. Système selon la revendication 6, dans lequel ledit indice (I) est un indice postal et ledit objet (E) est un objet postal, ledit compteur (16) étant agencé pour relever la valeur postale représentée par ledit indice (I).

8. Système selon la revendication 6 ou 7, dans lequel lesdites autres données imprimées sont un bloc d'adresse et ledit processeur est agencé pour analyser des mesures de longueurs de mots inclus dans ledit bloc d'adresse afin de créer lesdites informations de caractérisation.

9. Système selon la revendication 6, 7 ou 8, dans lequel lesdites autres données imprimées sont un bloc d'adresse et ledit processeur est agencé pour analyser un nombre de valeurs aberrantes dans ledit bloc d'adresse afin de créer lesdites informations de caractérisation.

10. Système selon l'une quelconque des revendications 6 à 9, dans lequel lesdites autres données imprimées sont un bloc d'adresse, et ledit processeur est agencé pour analyser des informations qui décrivent la forme dudit bloc d'adresse, ou de lignes, ou de mots inclus dans ledit bloc d'adresse afin de créer lesdites informations de caractérisation.



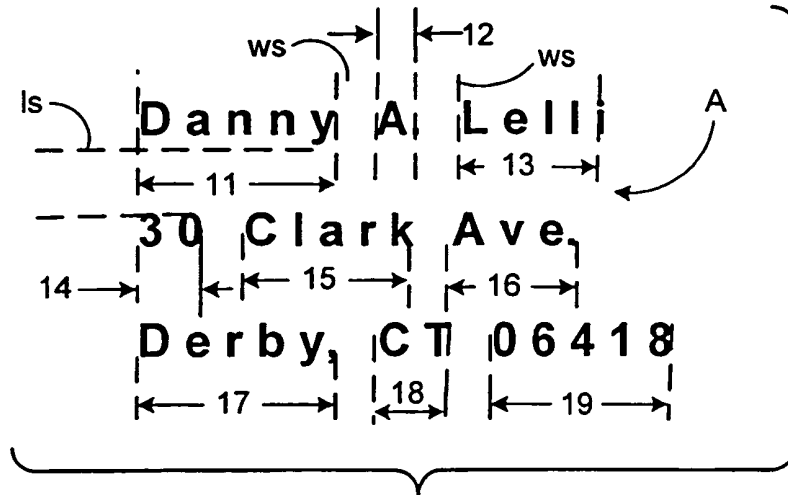


FIG. 3

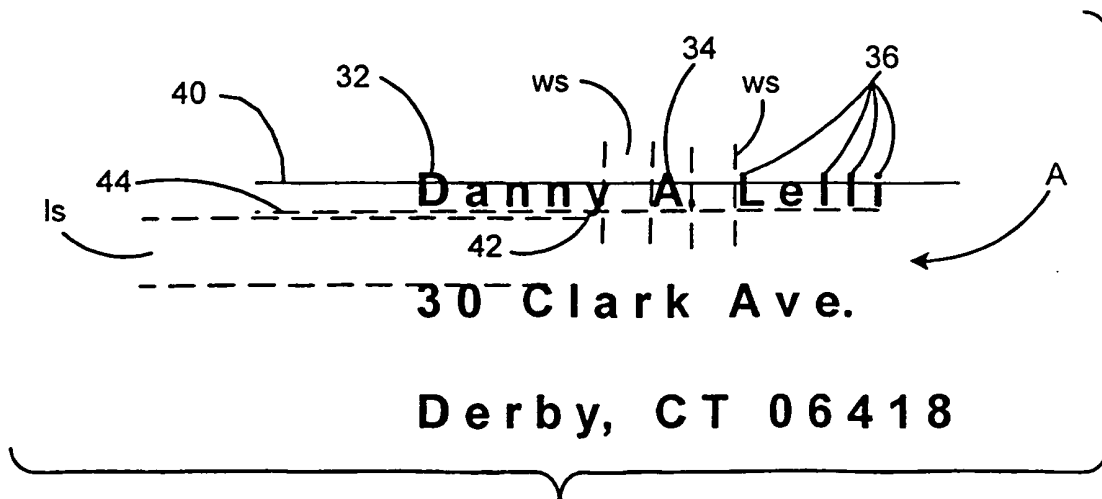


FIG. 4

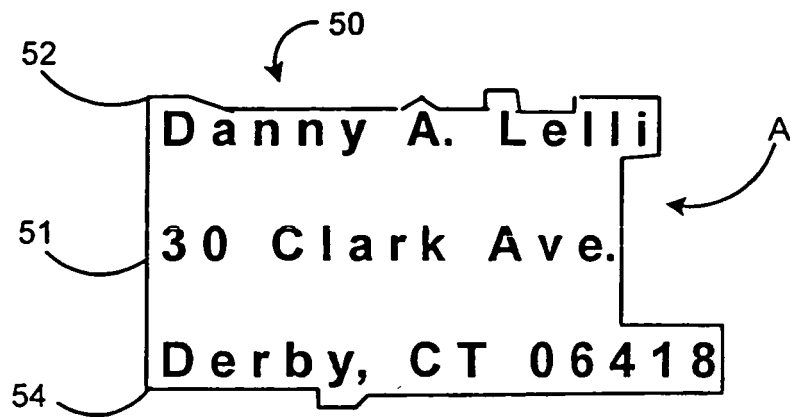


FIG. 5

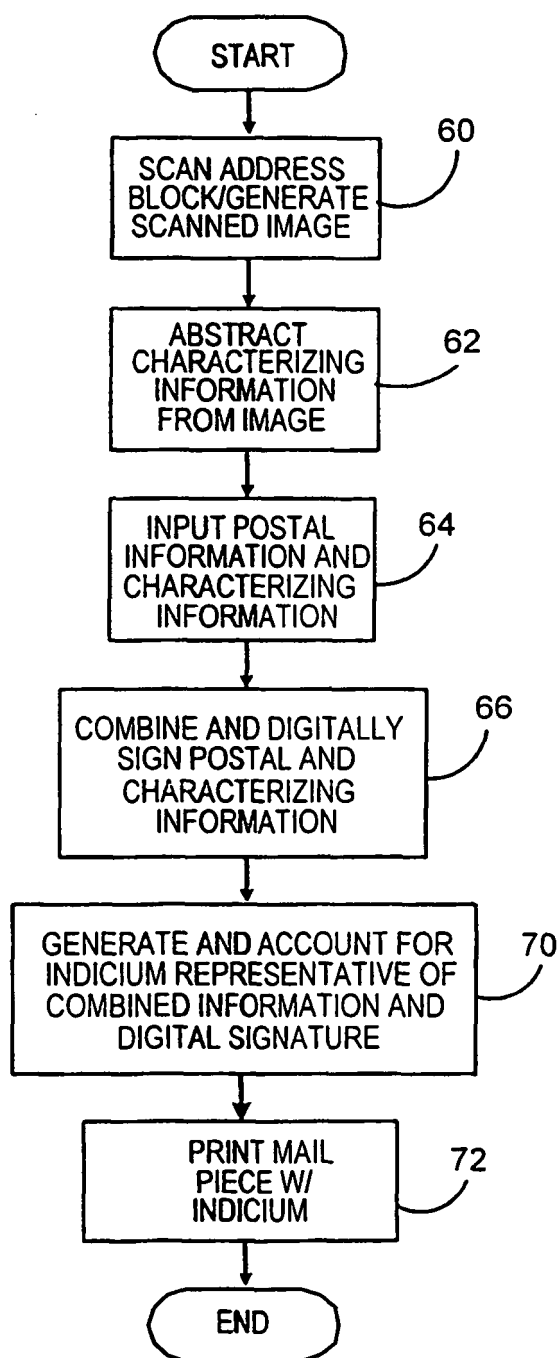


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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