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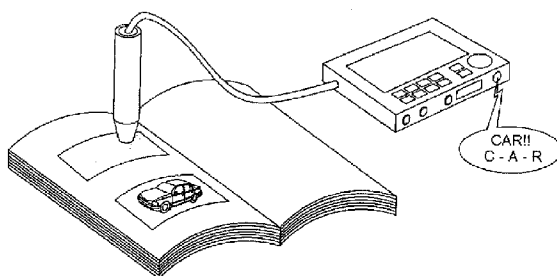
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(54) Title: MULTIMEDIA DIGITAL COOD PRINTING APPARATUS AND PRINTING METHOD



(57) Abstract: A two-dimensional text or picture is converted into a three-dimensional sound or moving image, thereby easily setting a coordinate on a book or a product whenever and wherever, printing in-visualized coordinate without deforming a color or a text of another product, and recognizing the coordinate by using a portable small device having a camera of which focal distance can be automatically converted. The recognized coordinate is outputted as desired information thus to have a high utilization degree. The apparatus can be used to appreciate facilities or books for a blind person, and worldwide text or sound. The apparatus can be also utilized as a supplementary means for studying, and to listen to music or natural sound as a vivid original sound with a book.



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Description

MULTIMEDIA DIGITAL CODE PRINTING APPARATUS AND PRINTING METHOD

Technical Field

- [1] The present invention relates to a multimedia digital code printing apparatus which prints dot coordinates having digital code that is invisible by an user's eye on a printing surface of a two dimensional plane without leaving traces on an original form of the printed surface, and enables a user to see or read the printed material by a user's eye.
- [2] Also, the present invention relates to a printed product inputted with digital code of character location data and recognition apparatus for recognizing the digital code wherein the digital code printed on the printed product includes multimedia function (sound and image), the coordinates for the digital code are recognized by a portable device having camera, transforming the data corresponding to the recognized coordinates to 3-dimensional sound, and enable a user to hear the sound by a user's ear, thereby implementing a user's seeing and hearing effect.

Background Art

- [3] As technique relating computer develops, means for reproducing information appreciated by a user's seeing, hearing, and speaking function are being spotlighted. Especially, an electronic book using a computer is replacing a paper book for transmitting information by using a printed medium.
- [4] Many methods for converting information such as a text or a picture printed on a plane into speech or sound without using a computer have been proposed, which were ineffective due to a high fabrication cost and an impractical aspect.
- [5] For an instance, a book for the blind (detected by a touch feeling) and a scanning method (detected by a predetermined tool such as a bar code) are being much utilized, which are not widely used due to a high fabrication cost and a difficult usage process.
- [6] According to the scanning method, a specific mark or a character has to be printed with a limitation in size (not to exceed a scanning range of a scanner) and in a written shape (a cursive character). Also, it is inconvenient in that specific marks and dots should be printed and more precise scanning is necessary.
- [7] According to an electronic book for coding an image disclosed in a Korean Utility Model registered with No. 036146, a mark should be printed by using a specific printing ink, and the printed mark may overlap another color, accordingly the mark may not be easily recognized. Furthermore, since an additional supplementary device for keeping a printed product is required, a user has a difficulty in universally using and easily carrying the electronic book. Besides, there is limitations in size and

material of a printed product.

Disclosure of Invention

Technical Problem

- [8] Therefore, an object of the present invention is to provide a multimedia digital code printing apparatus capable of allowing a user visually and auditorily to detect a multimedia such as a text or a picture printed on a two-dimensional plane by sound or word, that is, capable of allowing a user to see, hear, and read multimedia.
- [9] A first object of the present invention is to provide a multimedia digital code printing apparatus capable of freely representing a coordinate without overlapping other printed colors by using a general printing ink, and capable of reducing a fabrication cost.
- [10] A second object of the present invention is to provide a multimedia digital code printing apparatus capable of making maximum coordinate range without being influenced by a thickness and a material of a printed media by invisualizing the coordinate so as not to be influenced by other printed color or shape.
- [11] A third object of the present invention is to provide a multimedia digital code printing apparatus capable of not being influenced by a color or a printing method by matching coordinate information to a Unicode (arrangement information of worldwide common alphabet) used in digitalizing texts.
- [12] A fourth object of the present invention is to provide a multimedia digital code printing apparatus capable of simplifying a recognizing device for recognizing coordinate thereby reproducing sound, in which a recognizing camera is implemented so that a focal distance thereof and a distance with a product to be recognized can be freely varied, and a moving image rather than sound is reproduced on a display such as a PC monitor or a wireless television (Bluetooth).

Technical Solution

- [13] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is also provided character location information digital code printing method including printing dot coordinate composed of 64 dots within a range of 0.1mm in horizontal and vertical directions so as to generate location information of a product on a two-dimensional plane, in which the dot coordinate is printed by using black ink formed of a carbon with a printing concentration of 5~3% not to be visualized so as not to influence on a color or a text of the product.
- [14] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is also provided a printed product printed by character location information digital code printing method

including converting a product of data-related file information of a page on which character location information digital code is printed into a PDF image file generated by the above method; converting the PDF image file into a BMP image file in correspondence to a resolution (75dpi) that can be implemented on a computer screen; setting regions according to each location of the BMP image file, sequentially allotting numbers to the regions, and thereby generating coordinate code files matched with each product on a corresponding page; generating a data file for outputting coordinate matched with a corresponding product by sequentially obtaining the coordinate code files; converting the data file for outputting a coordinate and a sound file into a digital sound data file by using a specific program; and compressing the digital sound data file in correspondence to a memory unit to be used, and storing the digital sound data file.

[15] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is also provided

[16] an apparatus for recognizing a printed product inputted with digital code of character location data which includes an inputting unit including a camera having a precise CMOS optical lens connected with an IC circuit and automatically controlling a focal distance when recognizing coordinate, and three LEDs arranged in a triangular shape on the basis of the camera, for receiving character or text data by recognizing only a carbon component printed on the location coordinate, which is reflected onto the camera by the LEDs;

[17] a controlling unit including a memory unit previously storing information which voice or moving image corresponding to a data file of the coordinate is compressed and digitalized into, a central processing unit for transmitting matched information to the apparatus by comparing information obtained from the inputting unit with information of the memory unit, an external inputting unit having a plurality of control buttons for controlling the central processing unit, a power connection terminal connected to a built-in battery or an external power, and a power switch for supplying power to each unit; and

[18] an outputting unit including a speaker or an ear-phone jack for reproducing digital information into sound according to a signal generated from the central processing unit, and a wireless moving image transmitter for transmitting moving image information to a display of an additional computer or TV by using a wireless frequency,

[19] wherein file information relating to data such as a word, a sentence or a picture printed onto a corresponding page of a product on which a character location information digital code is printed is recognized by the camera of the inputting unit, and sound or moving image of the recognized coordinate is outwardly outputted by the outputting unit.

Advantageous Effects

- [20] The present invention has the following advantages. First, a user can detect information of a printed product such as a text or a picture printed on a two-dimensional plane by hearing word or sound as well as by seeing, thereby implementing his seeing, hearing, and reading function with respect to contents inside a book.
- [21] Second, a two-dimensional text or picture is converted into a three-dimensional sound or moving image, thereby easily setting a coordinate on a book or a product whenever and wherever, printing in-visualized coordinate without damaging a color or text of another product, and recognizing the coordinate by using a portable small device having a camera of which focal distance can be automatically converted. The recognized coordinate is outputted as desired information thus to have a high utilization degree.
- [22] Third, the apparatus of the present invention can be used to freely appreciate facilities or books for a blind person, and worldwide text or sound. The apparatus can be also utilized as a supplementary means for studying, and to listen to music or natural sound as a vivid original sound with a book.
- [23] In summary, the apparatus of the present invention can be applied to various fields such as an education field, a publishing field, a newspaper/magazine field, a company/public office advertising field, a tour sites informing/guiding field, and a pamphlet for a blind person or the old having a bad eyesight.

Brief Description of the Drawings

- [24] FIG. 1 is an exemplary view showing an electronic book for coding an image and a recognizing apparatus in accordance with the conventional art;
- [25] FIG. 2 is a reference view showing a printing density of a product;
- [26] FIG. 3 is an enlarged view showing coordinate generated in a visualized maximum printing density according to the present invention;
- [27] FIG. 4 is a flowchart showing a method for fabricating coordinate according to the present invention;
- [28] FIG. 5 is a reference view showing a method for generating coordinate on a product according to the present invention;
- [29] FIG. 6 is a block diagram showing a method for generating coordinate on a product according to the present invention;
- [30] FIG. 7 is an exemplary view showing a substantial product and a recognizing apparatus according to the present invention;
- [31] FIG. 8 is another exemplary view showing a substantial product and a recognizing apparatus according to the present invention;
- [32] FIG. 9 is an exemplary view showing a recognizing apparatus according to the

present invention;

[33] FIG. 10 is a block diagram showing a configuration of the recognizing apparatus according to the present invention;

[34] FIG. 11 is a reference view showing an inputting unit of the recognizing apparatus according to the present invention; and

[35] FIGS. 12 and 13 are reference views for comparing focal ranges of a camera of the recognizing apparatus according to the present invention.

[36] <Reference Numbers in the Drawings>

[37] 10 : recognizing apparatus 20 : inputting unit

[38] 22 : camera 24 : LED

[39] 30 : controlling unit 31 : central processing unit

[40] 32 : memory unit 33 : power switch

[41] 34 : power connection terminal 35 : external inputting unit

[42] 40 : outputting unit

Mode for the Invention

[43] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[44] FIG. 2 is a reference view showing a printing density of a product, FIG. 3 is an enlarged view showing a coordinate generated in a visualized maximum printing density according to the present invention, FIG. 4 is a flowchart showing a method for fabricating coordinate according to the present invention, FIG. 5 is a reference view showing a method for generating coordinate on a product according to the present invention, FIG. 6 is a block diagram showing a method for generating coordinate on a product according to the present invention, FIG. 7 is an exemplary view showing a substantial product and a recognizing apparatus according to the present invention, FIG. 8 is another exemplary view showing a substantial product and a recognizing apparatus according to the present invention, FIG. 9 is an exemplary view showing a recognizing apparatus according to the present invention, FIG. 10 is a block diagram showing a configuration of the recognizing apparatus according to the present invention, FIG. 11 is a reference view showing an inputting unit of the recognizing apparatus according to the present invention, and FIGS. 12 and 13 are reference views for comparing each focal distance of a camera of the recognizing apparatus according to the present invention.

[45] The present invention provides a character location information digital code printing method, a method for generating a digital code for converting character location information into sound information, a printed product produced by using the method, and an apparatus for recognizing a printed product having a digital code

therein for converting a character location information into sound information.

- [46] A method for generating coordinate according to the present invention will be explained.
- [47] In order to reproducing sound or moving image from a picture or a text to be implemented, a picture, a text or a moving image of a printed poster or booklet, or information of any medium inputted of which printable plane of any material rather than paper, it is necessary to make location information corresponding to the information.
- [48] The location information is obtained by presetting specific coordinate, which requires a dot coordinate for generating location information of a printed product, page information and other required information.
- [49] The coordinate is generated with consideration of its size, its shape, and a method for arranging information. The coordinate is preset so as not to generate errors when recognized, and has to be distinguished from general printed information.
- [50] Also, a size of the coordinate is determined with a highest density having the most utilization degree in a general printing method so as to maintain the highest recognition condition by considering a size, a focal distance, and a recognizable range of a camera of an inputting unit of the recognizing apparatus.
- [51] As shown in FIG. 2, a size of a coordinate that can be printed according to a currently used printing method is $8\sim 24\mu(1\mu: 1/1000\text{mm})$. However, since a size of the coordinate that can be recognizable by human's eyes is approximately 0.1mm, specific coordinate information has to be inserted within the range of 0.1mm.
- [52] A widely used printing density is within a range of 1,200 DPI~3,000 DPI which represents that 1,200~3,000 dots can be printed per each one inch in horizontal and vertical directions, and within a range of 120 LPI~180 LPI which represents that 120~180 lines can be printed per each one inch in horizontal and vertical directions. Preferably, the most widely used printing density is 1,200 DPI and 150 LPI.
- [53] Under an assumption that a printing density is 1,200 DPI, 4 dots can be printed within a range of 0.1mm, and 16 dots can be printed in two lines within a range of 0.4mm^2 .
- [54] In the present invention, since information of 32 BITS is enough with consideration of the maximum number of coordinate to be printed, a minimum size of a recognizable coordinate is set to be 0.4mm^2 and data is processed with information of 32 BITS.
- [55] Preferably, information has to be formed in a circular shape or a diamond shape so as to be correctly detected according to a gradient or a recognizing direction of the camera of the apparatus. If specific information for distinguishing a starting point and an ending point of information from each other is required, an amount of entire information is influenced. Accordingly, a method for making a triangular information group and arranging substantial information at right and lower edges of the group is

disclosed, thereby correctly recognizing information in all directions. An example of coordinate information is shown in FIG. 3.

[56] By the above method, nine(9) identical information can be arranged within a range of 1.2mm . Also, one information can be correctly detected at any position or any direction by forming a focus of the recognizing apparatus in a circular shape of 1.2mm .

[57] A method for generating coordinate on a printed product will be explained with reference to FIGS. 4 and 5. First, data of a printed product to be printed on a book (two-dimensional plane) is converted into an image file (PDF). Then, the PDF image file is converted into a BMP image file by lowering a resolution into 75dpi that can be implemented on a computer screen. Herein, each data region of the printed product is set in the BMP image file, and then is sequentially allotted with numbers.

[58] Coordinate of the printed product is set by sequentially setting page information, horizontal information, and vertical information. For instance, the characters of CAR in FIG. 4 is numbered as a first 1 of a first page, and the image of the car is then numbered as a second of the first page, which is coded as a coordinate (e.g., 001001, 001002, ...).

[59] Herein, the data edited in the book is not directly converted into an image but is converted into an image after being converted into a PDF image file. The reason is that character shape or images may be changed according to a program when the data is directly converted into an image. By an additional converting process, more precise image files may be obtained.

[60] The generated BMP image file is stored in a word, a sentence, or a picture on a corresponding page by sequentially inputting each code (e.g., 001001) with using a code program. Herein, a file for outputting coordinate is generated by sequentially obtaining the codes when the sentence or the picture is printed (refer to FIG. 6).

[61] Another method for replacing coordinate information by unicode information by matching the unicode information of character with the coordinate information. According to the method, the object of the present invention may be obtained by recognizing character information of a general printed product without additional coordinate information.

[62] A method for printing coordinate according to the present invention will be explained.

[63] General ink printed on a two-dimensional plane contains a carbon according to each color. Coordinate information is printed by combining each color and a printing order.

[64] For instance, when coordinate information is to be printed by using a white color having a carbon, the white color has to be firstly printed so as not to influence on another color. Herein, another ink may overlap the white color thus to degrade a

recognizing degree.

- [65] When coordinate information is to be printed by using a black color having a carbon, the black color has to be used by being distinguished from a general black ink. As the general black ink, black ink having no carbon is used.
- [66] The general black ink is obtained by combining three primary colors of the general ink by using a principle that black is obtained by combining three primary colors.
- [67] It is preferable to print a coordinate with a concentration less than 5% so as not to influence on another color. However, when a printing concentration is less than 3%, printing is not entirely performed on paper. Accordingly, it is preferable to maintain a printing concentration as 5%~3% and to print a coordinate last thereby to implement a printing having the best recognition quality.
- [68] A method for generating voice and moving image data according to the present invention will be explained.
- [69] As shown in FIG. 6, voice and moving image data are respectively cut so as to be matched with each allocated code to generate location coordinates. Then, each data is allocated with a file name (e.g., 0001.wav), and is added to each other thus to generate one file. The file is made into digital data by using a specific program (sound forge/2003 of SONY), and is compressed in correspondence to a memory unit. Then, the file is stored in the memory unit. If the compression is too much performed, an amount of data is decreased but a characteristic of the original sound is lost thus to become a mechanical sound. On the contrary, if the compression is too less performed, the characteristic of the original sound is maintained but the amount of data is increased. Accordingly, the compression has to be performed with the best ratio.
- [70] In the present invention, sound is compressed by applying the best ratio, in which an amount of sound information and a capacitance of a memory unit are used without using a specific ratio.
- [71] The printed product having the digital code therein is outputted by being converted into sound information through an additional recognizing apparatus for recognizing the digital code.
- [72] As shown in FIGS. 8 and 9, the apparatus 10 for recognizing character location data digital code of a printed product includes: an inputting unit 20 including a camera 22 having a precise CMOS optical lens connected to an IC circuit and automatically controlling a focal distance when recognizing a coordinate, and three LEDs 24 arranged in a triangular shape on the basis of the camera 22, for receiving text or data by recognizing only a carbon component printed on the location coordinate, which is reflected onto the camera by the LEDs;
- [73] a controlling unit 30 including a memory unit 32 previously storing information which voice or moving image corresponding to a data file of the coordinate is

- compressed and digitalized into, a central processing unit 31 for transmitting matched information to the apparatus 10 by comparing information obtained from the inputting unit 20 with information of the memory unit 32, an external inputting unit 35 having a plurality of control buttons for controlling the central processing unit 31, a power connection terminal 34 connected to a built-in battery or an external power, and a power switch 33 for supplying power to each unit; and
- [74] an outputting unit 40 including a speaker or an ear-phone jack for reproducing digital information into sound according to a signal generated from the central processing unit 31, and a wireless moving image transmitter for transmitting moving image information to a display of an additional computer or TV by using a wireless frequency.
- [75] File information relating to data such as a word, a sentence or a picture printed onto a corresponding page of a product on which character location information digital code is printed is recognized by the camera 22 of the inputting unit 20, and sound or moving image of the recognized coordinate is outwardly outputted by the outputting unit 40.
- [76] The inputting unit 20 of the recognizing apparatus 10 has to be controlled so that a size of the LED, an intensity of light, and a focal distance of the camera may be consistent to each other. Light generated from the LED has to be safely protected so as not to influence on peripheral light. When a printed portion of the coordinate is selected thus to receive light from the LED, only a carbon component is reflected thus to read only the coordinate information by the camera lens.
- [77] It should be noted that the three LEDs have to be attached to one another in a triangular shape so as to correctly detect central information by the inputting unit even if light is intensively incident to any direction. Herein, three lights have to be concentrated onto the center.
- [78] If only two LEDs are implemented at right and left sides, data of the center where light is concentrated is detected only when the camera is perpendicular to the printed product or inclined in right and left directions. If the camera is inclined in upper and lower directions, a focus is not aimed at the center thus not to detect information correctly.
- [79] As shown in FIG. 12, right and left inclinations of the camera is not influenced on a recognizable range of the camera, whereas the upper and lower inclinations of the camera make a recognizable range of the camera to be blurred thus to cause information to be incorrectly detected.
- [80] As shown in FIG. 13, even if the camera of the inputting unit is inclined in upper, lower, right and left directions, a recognizable degree of the camera for the center is not influenced thus to detect a coordinate correctly.
- [81] In the recognizing apparatus 10, the inputting unit for reading a coordinate, the

memory unit in which voice or moving image is pre-stored after being compressed, the speaker or an earphone-jack for reproducing digital information into sound, the wireless moving image transmitter for transmitting moving image information to a display of an additional computer or TV by using a wireless frequency are integrally formed. Accordingly, the recognizing apparatus 10 can be conveniently carried by a user.

[82] The external inputting unit 35 connected to the controlling unit 30 of the recognizing apparatus 10 may further implement several functions by using a plurality of on/off switches that can be controlled from outside.

[83] The switches of the external inputting unit 35 may consist of a repeating button for transmitting outputting outputted information, a translating button for transmitting a memory corresponding to an address when a function switch is operated by further storing symmetrical voice information into the memory unit (English-> Korean, or Korean-> English) when storing voice information into the memory unit, and an entire hearing button for transmitting all voice information stored in the memory unit completely.

[84] In the present invention, a digital code can be read by a user's eyes whenever and wherever by invisibly printing dot coordinates on the two-dimensional plane without deforming the original form of the printed product.

[85] Furthermore, code coordinates implemented as sound or moving image data on a two-dimensional plane such as paper that can be printed is printed. Then, the code coordinate is detected by the recognizing apparatus, and information corresponding to the recognized coordinate is converted into a three-dimensional sound by the recognizing apparatus. Accordingly, the user can be simultaneously provided with three functions, i.e., seeing, hearing, and reading functions. The recognizing apparatus can reproduce sound and moving image real time by being connected to an additional speaker and an additional display.

[86] In the present invention, not only the conventional paper but also all kinds of printed products can be made to be digitalized by containing a multimedia function (sound and image) without deforming the original form of the printed product.

[87] The recognizing apparatus of the present invention can be applied to various fields such as an education field, a publishing field, a newspaper/magazine field, company/public office advertising field, tour informing/guiding field, and a pamphlet for a blind person or the old having a bad eyesight. The recognizing apparatus is conveniently used and is easily carried due to its small size and simple structure, thereby being widely used as a studying supplementary device.

[88] In the conventional art, a bar code is scanned to be recognized, and audio service is implemented by a multimedia device for outwardly outputting digital information.

However, in the present invention, a digital code is invisibly dot-printed onto all kinds of printed products, thereby implementing the same printed product without deforming the original form of the conventional printed product. Accordingly, the conventional printed product can be edited within a short time with using the conventional edition data and master sound. Furthermore, a recognizing film has only to be added to a printing film, and an additional printing cost for one degree and sound processing cost are required when a printing process is performed, thus to reduce a fabrication cost.

[89] Furthermore, the recognizing apparatus for recognizing digital code by performing dot-printing on a two-dimensional plane by one degree, and by converting into a digital code, provides text information auditorily through a speaker or a head-phone mounted therein. Also, the recognizing apparatus has a scanning function, a multimedia (sound) service function, a translating function, and a repeating function therein, thereby providing visual and auditory service on a printed product real time. Accordingly, the recognizing apparatus enhances a studying effect, enables blind persons, illiterate persons, or old persons having a bad-eyesight to read the printed product by using their auditory senses, and enables a communication between persons using different languages.

[90] Furthermore, adolescents and adults can have a recognizing apparatus designed to be conveniently carried and to perform various functions, and can be provided with additional functions such as a scanning function, a voice service function, a translation function, an MP3, and a Bluetooth according to a user's demand.

Industrial Applicability

[91] 1) Education/ Studying field

[92] - Orally narrated fairy tale multimedia books and language books (Korean, English, etc.) for infants and children

[93] - Foreign language books for elementary, middle school, and high school students, foreign language books for adults, and studying books for English town

[94] 2) Blind persons, Illiterate persons, and Old persons having bad eyesight

[95] - Instruction for blind persons or illiterate persons, and voice service by a guiding pamphlet

[96] - Reading a printed product by an auditory sense by using the recognizing apparatus

[97] - Reading the Braille, the Bible, etc. by an auditory sense

[98] 3) Guide book for utilizing foreign languages

[99] - Guide books (English, Chinese, Japanese, Germany, etc.) for conversations when visiting foreign countries

[100] - Guide books for salesmen for foreigners

[101] - Domestic and foreign tour guide books

- [102] - Guide books for international exhibition, seminar, etc.
- [103] 4) Advertising government offices and companies
- [104] - Catalogue for advertising multimedia
- [105] - Pamphlet for a specific product (pamphlet for new apartment, pamphlet for new product exhibition, etc.)
- [106] 5) Published material such as monthly magazine
- [107] - Korean entertainment monthly magazine (Korean published material-> translation into Chinese, and voice service, entertainer's voice interview service, etc)

Claims

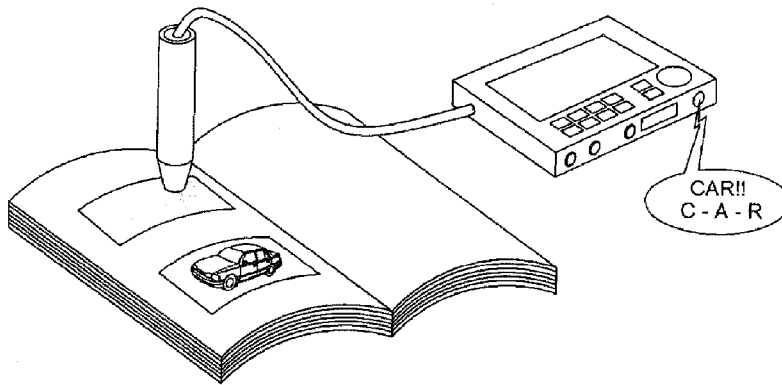
- [1] A character location information digital code printing method, characterized in that dot coordinate composed of 64 dots within a range of 0.1mm in horizontal and vertical directions are printed so as to generate location information of a product on a two-dimensional plane, and the dot coordinate is printed by using black ink formed of carbon with a printing concentration of 5~3% not to be visualized so as not to influence to a color or a text of the product.
- [2] A method for fabricating a digital code for converting character location information into sound information, comprising:
converting a product of data-related file information of a page on which a character location information digital code is printed into a PDF image file generated by the method of claim 1 thereon into a PDF image file;
converting the PDF image file into a BMP image file in correspondence to a resolution (75dpi) that can be implemented on a computer screen;
setting regions according to each location of the BMP image file, sequentially allotting numbers to the regions, and thereby generating coordinate code files matched with each product on the corresponding page;
generating a data file for outputting a coordinate matched with a corresponding product by sequentially obtaining the coordinate code files;
converting the data file for outputting a coordinate and a sound file into a digital sound data file by using a specific program; and
compressing the digital sound data file in correspondence to a memory to be used, and storing the digital sound data file.
- [3] A printed product having a digital code generated by the method of claim 2 therein.
- [4] An apparatus for recognizing a digital code having character location information therein, comprising:
an inputting unit 20 including a camera 22 having a precise CMOS optical lens connected with an IC circuit and automatically controlling a focal distance when recognizing coordinate, and three LEDs 24 arranged in a triangular shape on the basis of the camera 22, for receiving character or text data by recognizing only a carbon component printed on the location coordinate, which is reflected onto the camera 22 by the LEDs 24;
a controlling unit 40 including a memory unit 32 previously storing information which voice or moving image corresponding to a data file of the coordinate is compressed and digitalized into, a central processing unit 31 for transmitting matched information to the apparatus 10 by comparing information obtained

from the inputting unit 20 with information of the memory unit 32, an external inputting unit 35 having a plurality of control buttons for controlling the central processing unit 31, and a power connection terminal 34 connected to a built-in battery or an external power, and a power switch 33 for supplying power to each unit; and

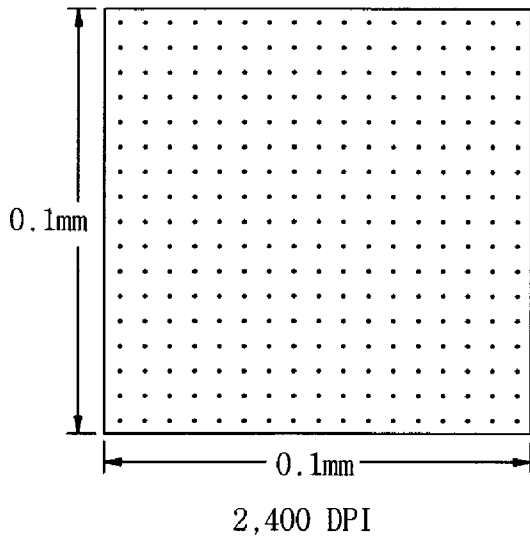
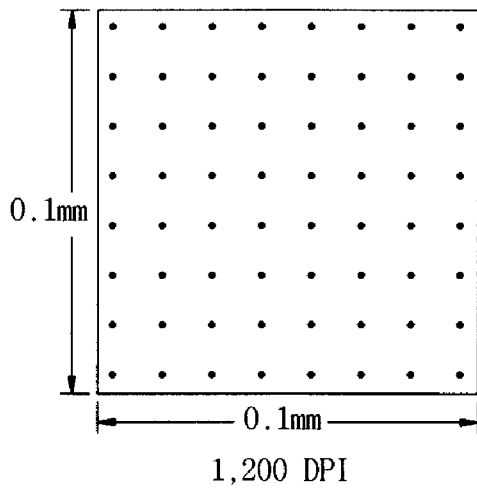
an outputting unit 40 for reproducing digital information into sound and moving images according to a signal generated from the central processing unit 31, wherein file information relating to data such as a word, a sentence or a picture printed onto a corresponding page of a product on which character location information digital code is printed is recognized by the camera 22 of the inputting unit 20, and the recognized coordinate is compared with a value stored in the memory unit thus to output corresponding sound or moving image outwardly through the outputting unit 40.

- [5] The method of claim 1, wherein a digital code having character location information therein is printed by unicode used in a computer.

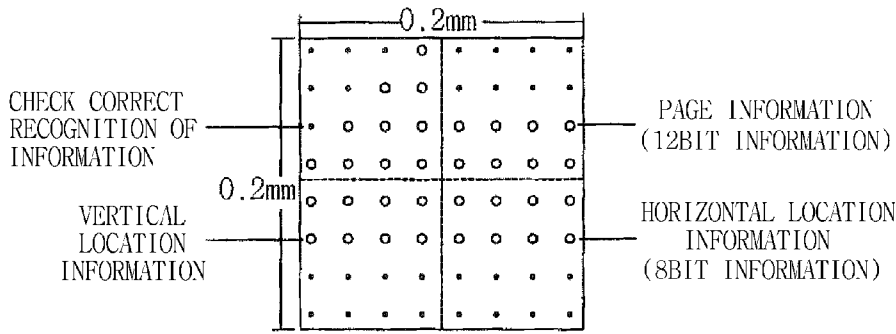
[Fig. 1]



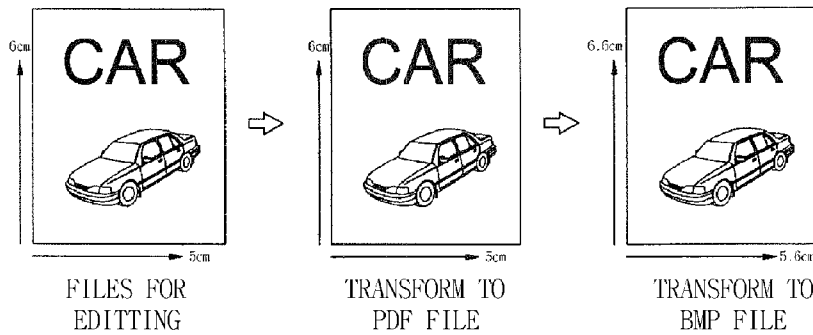
[Fig. 2]



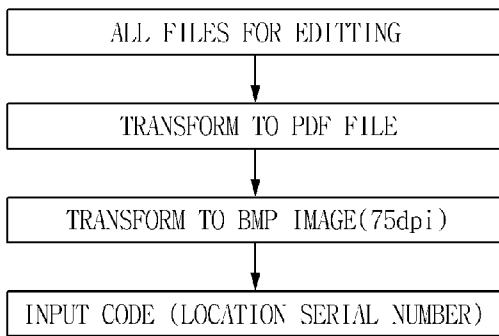
[Fig. 3]



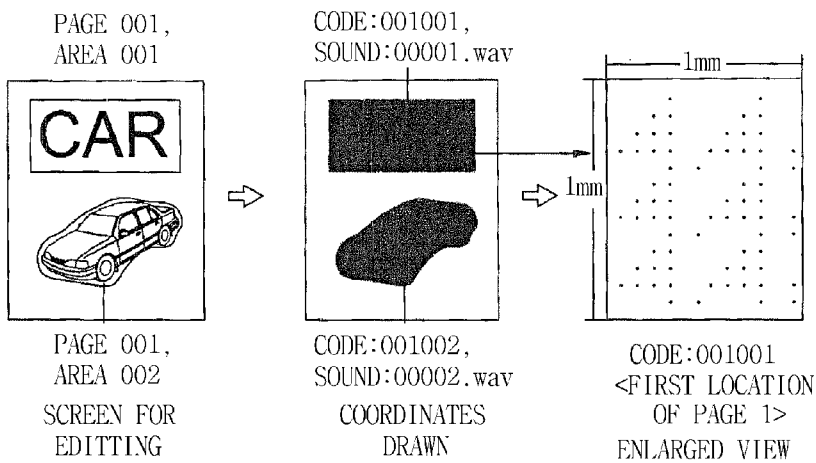
[Fig. 4]



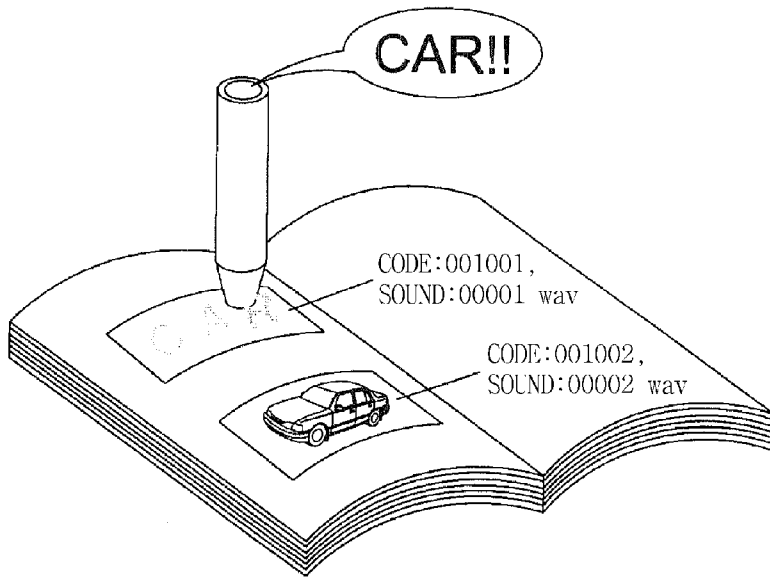
[Fig. 5]



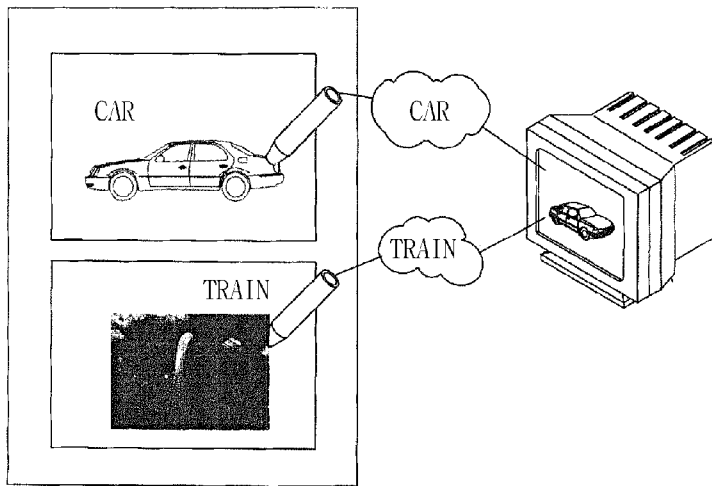
[Fig. 6]



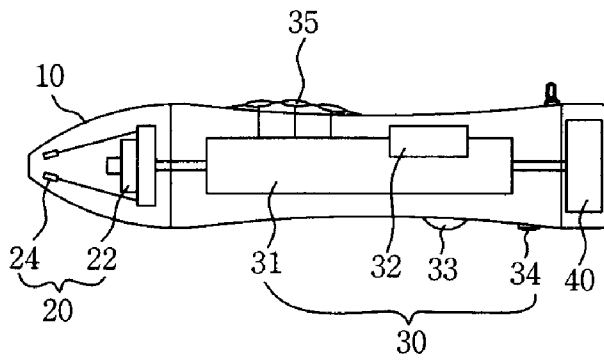
[Fig. 7]

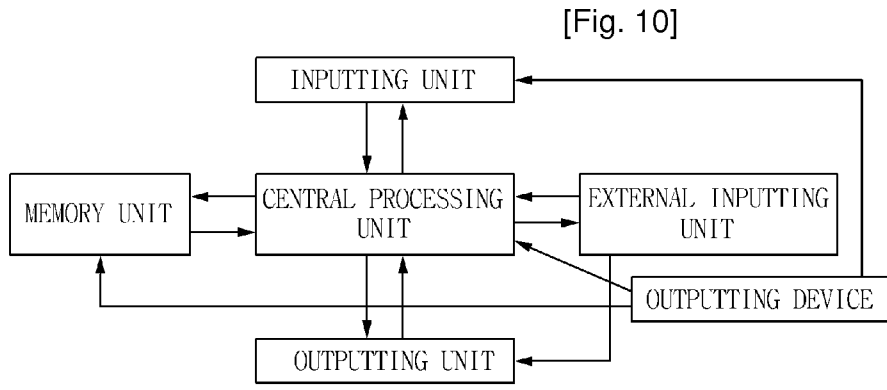


[Fig. 8]

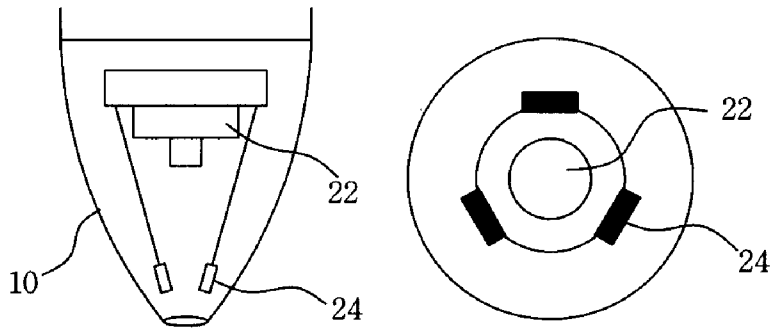


[Fig. 9]

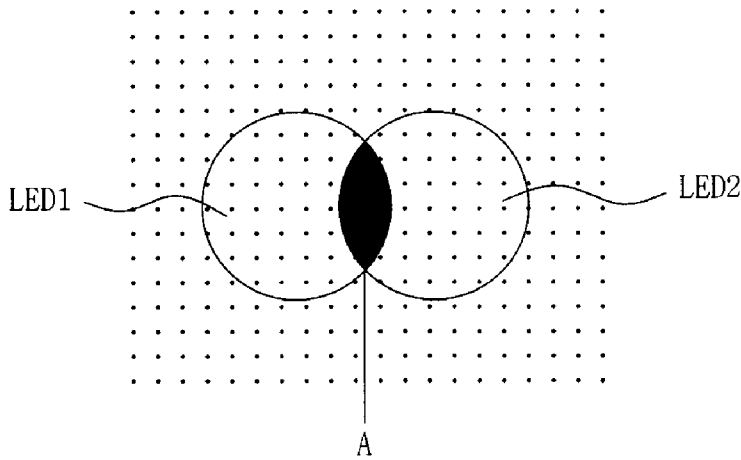




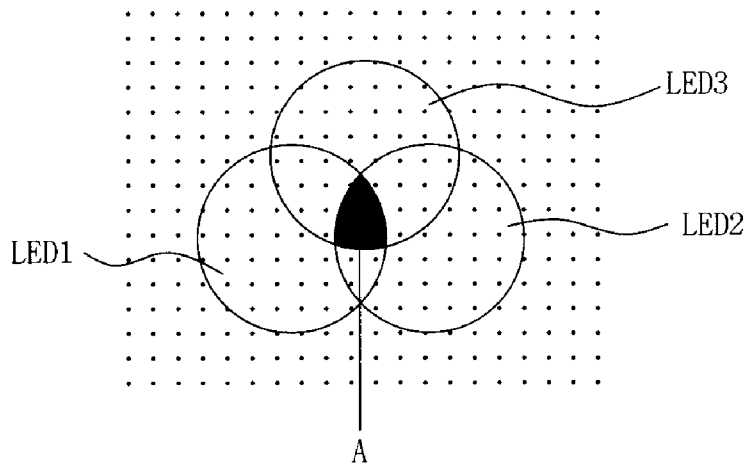
[Fig. 11]



[Fig. 12]



[Fig. 13]



A. CLASSIFICATION OF SUBJECT MATTER**G06K 15/00(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC8 G06K, G06F

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

"Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for utility models since 1975"

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

WPI, PAJ "electronic*", "book", "code", "mesh", "print*", "invisi*", "transpond*"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 20-0368146 Y1 (LEU, H.) 17 November 2004. * See abstract, claims 1-9, figures 1-6.	1-5
A	KR 10-2002-0024484 A (MULTIVIA CO., LTD.) 30 March 2002. * See abstract, figures 1-3.	1-5
A	JP 2003-85476 A (DAINIPPON PRINTING CO. LTD.) 20 March 2003. * See figures 1-4.	1-5

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

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

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"&" document member of the same patent family

Date of the actual completion of the international search

14 FEBRUARY 2007 (14.02.2007)

Date of mailing of the international search report

15 FEBRUARY 2007 (15.02.2007)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2006/004148

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20-0368146 Y1	17. 11. 2004.	None	
KR 10-2002-0024484 A	30. 03. 2002.	None	
JP 2003-85476 A	20. 03. 2003.	None	